ATTACHMENT L1

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INTEGRATED CPT-BASED LIQUEFACTION EVALUATION METHOD EXCEL SPREADSHEET PRINTOUTS AND BACKUP DATA

An Excel Spreadsheet was developed to numerically model the integrated cone penetration test (CPT)-based empirical method used to evaluate the site liquefaction potential and estimate liquefaction-induced settlements (Robertson and Wride, 1997; Ishihara and Yoshimine, 1992). Following the example spreadsheet printout, backup information from several publications (Robertson, 1989; Youd and Idriss, 1997; Robertson and Wride, 1997; Robertson, 2000; and Ishihara and Yoshimine, 1992), including a flowchart illustrating the steps involved in the empirical evaluation of the liquefaction potential are presented to illustrate the process of the development of the attached spreadsheet. The support information is presented as Plates L1 through L21.

The spreadsheet consists of five separate sheets. Sheet 1 summarizes the input CPT data and applies a correction to the CPT tip resistance to account for the effects of cone tip geometry (unequal end area effects) for cones that record pore pressures (Plates L1 and L2). Sheet 5 computes total and effective vertical stresses versus depth, which are used as input in Sheet 2. Sheet 2 provides corrections to CPT tip resistance data for the effects of the vertical stress, thin layers, pre-surcharge loads (soil surcharge loads for accelerating consolidation, weight of a structure or earth fill, and so forth), and fines content (Plates L3 through L18). Sheets 2 and 3 also provide calculations for evaluating CRR and CSR values based on the attached flowchart (Plates L19 and L20). CRR and CSR values are plotted versus depth to illustrate factor of safety against liquefaction potential (Figures L4 through L24). Sheet 4 computes the liquefaction-induced settlements based on the Ishihara and Yoshimine (1992) chart presented on Plate L21. The spreadsheet on Sheet 4 computes settlements for 2-inch-thick layers (CPT readings at 2-inch intervals). The spreadsheet multiplies volumetric strain for each soil layer obtained from plots on Plate 21 by the layer's thickness to compute settlement of the layer. Settlements for all layers are then added to estimate the total settlement.

INPUT CPT DATA

Sheet 1

DIRECT CPT MEASUREMENTS INPUT (e.g. GREGG's Data)
(Input additional data in CPT Analysis Sheet)

Project Name:	Alameda Navy Landfill
CPT Name:	CPT-05
CPT Firm:	Hushmand Associates
Personnel Name:	
Date of operation:	January 23, 2002

Ground Surface Elevation:	8.8	ft	
Est. Groundwater Depth :	4.1	ft	
CPT Data:			
CPT Type:	CPTU		(CPTU)
Diameter:	35.7	mm	(35.7)
Area:	10	cm^2	(10)
Area Ratio:	0.85		Gregg (0.85), HFA (0.80)
Pen. Rate:	2	cm/sec	(2)
Position Piezoelem.:	behind tip		(behind tip)

Corrected Tip Resistance Per Equation 2 of Robertson (1989) (See Plate)

A	B	C	D	E	F	G
Basic Data ("Copy Values" from Gregg In Situ files)				**Standard Plot Data**		
Depth (m)	Meas. Tip Resist., q_c (tsf)	Sleeve Friction (tsf)	Dyn. Pore Pressure (psi)	Depth (ft)	Elevation (ft)	Corr. Tip Resist., q_t (tsf)
Reference: Robertson, P.K., 1989. "Soil Classification Using the Cone Penetration Test."						
0.05	10.73	0.36	0.56	0.16	8.64	10.74
0.10	30.83	0.52	0.06	0.33	8.47	30.83
0.15	36.74	0.62	2.49	0.49	8.31	36.17
0.20	38.28	1.05	0.62	0.66	8.14	38.29
0.25	54.13	0.25	3.82	0.82	7.98	54.18
0.30	99.11	3.00	16.96	0.98	7.82	99.29
0.35	140.87	5.9	0.31	1.15	7.65	140.87
0.40	125.92	2.95	0.36	1.31	7.49	125.92
0.45	135.33	2.26	0.72	1.48	7.32	135.34
0.50	131.87	0.97	0.96	1.64	7.16	131.88
0.55	116.23	1.31	0.80	1.80	7.00	116.24
0.60	38.75	1.58	0.24	1.97	6.83	38.75
0.65	85.98	1.65	1.83	2.13	6.67	85.99
0.70	82.49	1.61	1.00	2.30	6.50	82.50
0.75	78.65	1.58	0.83	2.46	6.34	78.66
0.80	84.83	1.67	1.10	2.62	6.18	84.84
0.85	85.43	1.67	1.01	2.79	6.01	85.44
0.90	81.24	1.41	2.40	2.95	5.85	81.44
0.95	65.33	1.30	2.30	3.12	5.68	65.35
1.00	12.39	0.36	0.32	3.28	5.52	12.39
1.05	11.45	0.40	0.13	3.44	5.36	11.45
1.10	15.38	0.39	-0.09	3.61	5.19	15.38
1.15	12.90	0.82	0.10	3.77	5.03	12.90
1.20	15.08	0.86	1.10	3.94	4.86	15.09

Raw Data Obtained From CPT Field Measurements

CPT ANALYSIS and PLOT

CPT CALCULATIONS & PLOT

Project Name: Alameda Navy Landfill
CPT Name: CPT-05

Surcharge Pressure (kPa):	0.00	Surcharge Depth after CPT (m):	0
Depth of GWT @ CPT Time(m):	1.25	Unit Weight (kN/m³):	0
GWT Depth for Liquefaction (m):	1.25		
Earthquake Magnitude:	7.90		
PGA (g):	0.45		
Kmag:	1.14		

Eqn. 1, P. 49

Profile of Unit Weights:

Depth (m) Top	Depth (m) Bottom	Total Unit Weight (kN/m³)
0.00	999.00	[illegible]
999.00	999.00	[illegible]
999.00	999.00	[illegible]
999.00	999.00	[illegible]
999.00	999.00	[illegible]
999.00	999.00	[illegible]
999.00	999.00	[illegible]
999.00	999.00	[illegible]
999.00	999.00	[illegible]

Reference: P.K. Robertson & C.E. Wride, 1997,
Youd & Idriss, 1997, Proceeding of the NCEER Workshop on Evaluation of Liquefaction Resistance Soils
P.K. Robertson & C.E. Wride, 2000, ASCE LA Section Presentation
Ishihara & Yoshimine, 1992, Soils and Foundation

Last Modified: May 5, 2001 (AB)

* Becomes asymtotic to 0.587 after 10 tsf.

Convert to kPa; $\frac{G}{F} \times 100$; Eqn. 13, P. 76 Thin Layer Indicator; Manual Correction for thin layers Figure 22, P. 75; Total & Effective Stress; $\left(\frac{fs}{q_c - 6}\right) \times 100$; Eqn. 10, P. 70; Normalized CPT Penetration Resistance, Dimensionless Eqn. 10, P. 70; Table 4, P. 71 & P. 69; Fig. 18; [=(Q)final If Q≥300 then = 300]; Eqn. 12, CPT Grain Fig. 20 PP. 72-73 Charact. Corr. Factor; Kc q_{c1N}; PP. 74 & 76 Eqn. 14 Fig. 21; Eff. Stress; Eqn. 4 P. 55; Eqn. 3 P. 55; Fig. 14, P. 30; Column E, Sheet 4; Column H, Sheet 4

Row	Depth (ft)	Elev. (ft)	q_t (tsf)	Sleeve (tsf)	Depth (m)	q_t (kPa)	Sleeve (kPa)	FR (%)	* means apply K_H	$(q_c)_{CR}$ (kPa)	Pre-Surcharge σ (kPa)	Pre-Surcharge σ' (kPa)	F (%)	Final Q	I_c	Soil Type
20	0.16	8.64	10.74	0.36	0.05	1028	34	3.35		1028	0.94	0.94	3.36	201.22	2.10	Sand Mixtures: silty sand to sandy silt
21	0.33	8.47	30.83	0.52	0.10	2952	50	1.69		2952	1.89	1.89	1.69	257.84	1.79	Sands: clean sand to silty sand
22	0.49	8.31	36.17	0.62	0.15	3463	59	1.71		3463	2.83	2.83	1.72	248.81	1.81	Sands: clean sand to silty sand
23	0.66	8.14	38.29	1.05	0.20	3666	101	2.74		3666	3.77	3.77	2.75	259.81	1.97	Sands: clean sand to silty sand
24	0.82	7.98	54.18	1.25	0.25	5189	120	2.31		5189	4.72	4.72	2.31	295.43	1.87	Sands: clean sand to silty sand
25	0.98	7.82	99.29	3.00	0.30	9508	287	3.02		9508	5.66	5.66	3.02	487.72	1.87	Sands: clean sand to silty sand
26	1.15	7.65	140.87	2.59	0.35	13489	248	1.84		13489	6.60	6.60	1.84	533.49	1.66	Sands: clean sand to silty sand
27	1.31	7.49	125.92	2.95	0.40	12059	282	2.34		12059	7.54	7.54	2.34	486.19	1.77	Sands: clean sand to silty sand
28	1.48	7.32	135.34	2.23	0.45	12960	214	1.65		12960	8.49	8.49	1.65	449.04	1.65	Sands: clean sand to silty sand
29	1.64	7.16	131.88	0.97	0.50	12629	93	0.74		12629	9.43	9.43	0.74	410.95	1.38	Sands: clean sand to silty sand
30	1.80	7.00	116.24	1.31	0.55	11131	125	1.13		11131	10.37	10.37	1.13	345.29	1.58	Sands: clean sand to silty sand
31	1.97	6.83	38.75	1.58	0.60	3711	151	4.08		3711	11.32	11.32	4.09	161.18	2.22	Sand Mixtures: silty sand to sandy silt
32	2.13	6.67	85.99	1.63	0.65	8235	156	1.90		8235	12.26	12.26	1.90	264.41	1.83	Sands: clean sand to silty sand
33	2.30	6.50	82.50	1.61	0.70	7900	154	1.95		7900	13.20	13.20	1.95	247.41	1.86	Sands: clean sand to silty sand
34	2.46	6.34	78.66	1.58	0.75	7532	151	2.01		7532	14.15	14.15	2.01	230.60	1.88	Sands: clean sand to silty sand
35	2.62	6.18	84.84	1.67	0.80	8125	160	1.97		8125	15.09	15.09	1.97	237.69	1.87	Sands: clean sand to silty sand
36	2.79	6.01	85.44	1.47	0.85	8182	141	1.72		8182	16.03	16.03	1.72	226.86	1.83	Sands: clean sand to silty sand
37	2.95	5.85	81.44	1.41	0.90	7798	135	1.73		7798	16.97	16.97	1.74	211.70	1.85	Sands: clean sand to silty sand
38	3.12	5.68	65.35	1.30	0.95	6258	124	1.99		6258	17.92	17.92	1.99	173.50	1.96	Sands: clean sand to silty sand
39	3.28	5.52	12.39	0.96	1.00	1187	92	7.75		1187	18.86	18.86	7.87	47.44	2.77	Silt mixtures: clayey silt to silty clay
40	3.44	5.36	11.45	0.40	1.05	1096	38	3.49		1096	19.80	19.80	3.56	38.33	2.59	Sand Mixtures: silty sand to sandy silt
41	3.61	5.19	15.38	0.39	1.10	1473	37	2.54		1473	20.75	20.75	2.57	46.32	2.43	Sand Mixtures: silty sand to sandy silt
42	3.77	5.03	12.90	0.82	1.15	1235	79	6.36		1235	21.69	21.69	6.47	43.10	2.74	Silt mixtures: clayey silt to silty clay
43	3.94	4.86	15.09	0.86	1.20	1445	82	5.70		1445	22.63	22.63	5.79	47.41	2.67	Silt mixtures: clayey silt to silty clay
44	4.10	4.70	25.29	0.25	1.25	2422	24	0.99	*	4314	23.58	23.57	0.56	93.98	1.78	Sands: clean sand to silty sand
45	4.27	4.53	30.01	0.12	1.30	2874	11	0.40	*	5119	24.52	24.02	0.23	103.94	1.56	Sands: clean sand to silty sand
46	4.43	4.37	10.91	0.01	1.35	1045	1	0.09	*	1861	25.46	24.48	0.05	40.74	1.86	Sands: clean sand to silty sand
47	4.59	4.21	4.27	0.02	1.40	409	2	0.47	*	729	26.40	24.93	0.27	18.51	2.30	Sand Mixtures: silty sand to sandy silt
48	4.76	4.04	3.53	0.03	1.45	338	3	0.85		338	27.35	25.38	0.92	9.74	2.75	Silt mixtures: clayey silt to silty clay
49	4.92	3.88	3.31	0.27	1.50	317	25	8.00		317	28.29	25.84	8.78	10.95	3.25	Clays: silty clay to clay
50	5.09	3.71	5.25	0.40	1.55	503	38	7.61		503	29.23	26.29	8.08	16.58	3.10	Clays: silty clay to clay
51	5.25	3.55	5.33	0.50	1.60	510	48	9.39		510	30.18	26.74	9.98	16.90	3.15	Clays: silty clay to clay
52	5.41	3.39	29.34	0.72	1.65	2810	69	2.45		2810	31.12	27.19	2.48	68.85	2.30	Sand Mixtures: silty sand to sandy silt
53	5.58	3.22	30.27	0.53	1.70	2899	51	1.75		2899	32.06	27.65	1.77	67.68	2.20	Sand Mixtures: silty sand to sandy silt
54	5.74	3.06	13.51	0.30	1.75	1293	29	2.22		1293	33.01	28.10	2.28	33.10	2.51	Sand Mixtures: silty sand to sandy silt
55	5.91	2.89	9.92	0.16	1.80	950	15	1.61		950	33.95	28.55	1.67	24.04	2.54	Sand Mixtures: silty sand to sandy silt
56	6.07	2.73	9.77	0.15	1.85	935	14	1.54		935	34.89	29.00	1.60	23.34	2.54	Sand Mixtures: silty sand to sandy silt
57	6.23	2.57	10.03	0.17	1.90	960	16	1.70		960	35.83	29.46	1.76	23.82	2.56	Sand Mixtures: silty sand to sandy silt
58	6.40	2.40	11.09	0.17	1.95	1062	16	1.53		1062	36.78	29.91	1.59	25.62	2.50	Sand Mixtures: silty sand to sandy silt
59	6.56	2.24	11.90	0.17	2.00	1139	16	1.43		1139	37.72	30.36	1.48	26.89	2.47	Sand Mixtures: silty sand to sandy silt
60	6.73	2.07	12.85	0.19	2.05	1230	18	1.48		1230	38.66	30.81	1.53	28.62	2.45	Sand Mixtures: silty sand to sandy silt
61	6.89	1.91	13.21	0.19	2.10	1265	18	1.44		1265	39.61	31.27	1.48	29.00	2.44	Sand Mixtures: silty sand to sandy silt
62	7.05	1.75	14.55	0.19	2.15	1393	18	1.31		1393	40.55	31.72	1.35	31.13	2.39	Sand Mixtures: silty sand to sandy silt
63	7.22	1.58	15.27	0.14	2.20	1462	13	0.92		1462	41.49	32.17	0.94	31.42	2.31	Sand Mixtures: silty sand to sandy silt
64	7.38	1.42	15.02	0.20	2.25	1438	19	1.33		1438	42.44	32.63	1.37	31.49	2.39	Sand Mixtures: silty sand to sandy silt
65	7.55	1.25	15.49	0.18	2.30	1484	17	1.16		1484	43.38	33.08	1.20	31.77	2.36	Sand Mixtures: silty sand to sandy silt
66	7.71	1.09	16.04	0.19	2.35	1536	18	1.18		1536	44.32	33.53	1.22	32.55	2.35	Sand Mixtures: silty sand to sandy silt
67	7.87	0.93	17.99	0.21	2.40	1723	20	1.17		1723	45.26	33.98	1.20	35.81	2.31	Sand Mixtures: silty sand to sandy silt
68	8.04	0.76	18.78	0.34	2.45	1799	33	1.81		1799	46.21	34.44	1.86	38.14	2.40	Sand Mixtures: silty sand to sandy silt
69	8.20	0.60	21.64	0.44	2.50	2072	42	2.03		2072	47.15	34.89	2.08	43.47	2.39	Sand Mixtures: silty sand to sandy silt
70	8.37	0.43	20.13	0.55	2.55	1928	53	2.73		1928	48.09	35.34	2.80	41.28	2.49	Sand Mixtures: silty sand to sandy silt
71	8.53	0.27	27.53	0.37	2.60	2636	35	1.34		2636	49.04	35.79	1.37	51.69	2.22	Sand Mixtures: silty sand to sandy silt
72	8.69	0.11	31.97	0.48	2.65	3061	46	1.50		3061	49.98	36.25	1.53	59.35	2.20	Sand Mixtures: silty sand to sandy silt
73	8.86	-0.06	24.16	0.43	2.70	2314	41	1.78		2314	50.92	36.70	1.82	46.05	2.34	Sand Mixtures: silty sand to sandy silt
74	9.02	-0.22	34.31	0.47	2.75	3285	45	1.37		3285	51.87	37.15	1.39	61.95	2.16	Sand Mixtures: silty sand to sandy silt
75	9.19	-0.39	36.96	0.27	2.80	3539	26	0.73		3539	52.81	37.60	0.74	63.08	1.99	Sands: clean sand to silty sand
76	9.35	-0.55	37.32	0.33	2.85	3573	32	0.88		3573	53.75	38.06	0.90	63.99	2.04	Sands: clean sand to silty sand
77	9.51	-0.71	33.27	0.29	2.90	3186	28	0.87		3186	54.69	38.51	0.89	57.13	2.07	Sand Mixtures: silty sand to sandy silt
78	9.68	-0.88	34.22	0.33	2.95	3277	32	0.96		3277	55.64	38.96	0.98	58.60	2.09	Sand Mixtures: silty sand to sandy silt
79	9.84	-1.04	33.88	0.34	3.00	3244	33	1.00		3244	56.58	39.42	1.02	57.81	2.10	Sand Mixtures: silty sand to sandy silt
80	10.01	-1.21	33.08	0.34	3.05	3168	33	1.03		3168	57.52	39.87	1.05	56.24	2.12	Sand Mixtures: silty sand to sandy silt
81	10.17	-1.37	32.59	0.32	3.10	3121	31	0.98		3121	58.47	40.32	1.00	54.93	2.12	Sand Mixtures: silty sand to sandy silt
82	10.33	-1.53	32.18	0.28	3.15	3082	27	0.87		3082	59.41	40.77	0.89	53.52	2.10	Sand Mixtures: silty sand to sandy silt
83	10.50	-1.70	28.42	0.24	3.20	2722	23	0.84		2722	60.35	41.23	0.86	47.28	2.14	Sand Mixtures: silty sand to sandy silt
84	10.66	-1.86	26.09	0.23	3.25	2498	22	0.88		2498	61.30	41.68	0.90	43.47	2.18	Sand Mixtures: silty sand to sandy silt
85	10.83	-2.03	25.96	0.23	3.30	2486	22	0.89		2486	62.24	42.13	0.91	42.98	2.18	Sand Mixtures: silty sand to sandy silt
86	10.99	-2.19	24.51	0.22	3.35	2347	21	0.90		2347	63.18	42.58	0.92	40.48	2.21	Sand Mixtures: silty sand to sandy silt
87	11.15	-2.35	24.92	0.21	3.40	2386	20	0.84		2386	64.12	43.04	0.87	40.70	2.19	Sand Mixtures: silty sand to sandy silt
88	11.32	-2.52	24.41	0.22	3.45	2338	21	0.90		2338	65.07	43.49	0.93	39.78	2.22	Sand Mixtures: silty sand to sandy silt
89	11.48	-2.68	23.69	0.12	3.50	2269	11	0.49		2269	66.01	43.94	0.50	37.30	2.11	Sand Mixtures: silty sand to sandy silt
90	11.65	-2.85	22.64	0.01	3.55	2168	1	0.04		2168	66.95	44.39	0.05	33.95	1.94	Sands: clean sand to silty sand

Row	q_{c1N}	R	Kc	$(q_{c1N})_{cs}$	CRR	Liquefaction Analysis σ' (kPa)	Under Initial Condition r_d	Under Initial Condition K_σ*	Under Initial Condition CSR	After Surcharging r_d	After Surcharging K_σ*	After Surcharging CSR	Lower Cumulative Δh (cm)	Upper Cumulative Δh (cm)
20	201		1.45	293	0.60	0.94	1.00	1.00		1.00	1.00			
21	258		1.10	284	0.60	1.89	1.00	1.00		1.00	1.00			
22	247		1.11	275	0.60	2.83	1.00	1.00		1.00	1.00			
23	260		1.26	300	0.60	3.77	1.00	1.00		1.00	1.00			
24	295		1.16	300	0.60	4.72	1.00	1.00		1.00	1.00			
25	300		1.16	300	0.60	5.66	1.00	1.00		1.00	1.00			
26	300		1.01	300	0.60	6.60	1.00	1.00		1.00	1.00			
27	300		1.09	300	0.60	7.54	1.00	1.00		1.00	1.00			
28	300		1.01	300	0.60	8.49	1.00	1.00		1.00	1.00			
29	300		1.00	300	0.60	9.43	1.00	1.00		1.00	1.00			
30	300		1.00	300	0.60	10.37	1.00	1.00		1.00	1.00			
31	161		1.73	279	0.60	11.32	1.00	1.00		1.00	1.00			
32	264		1.13	298	0.60	12.26	1.00	1.00		1.00	1.00			
33	247		1.15	284	0.60	13.20	0.99	1.00		0.99	1.00			
34	231		1.17	271	0.60	14.15	0.99	1.00		0.99	1.00			
35	238		1.16	276	0.60	15.09	0.99	1.00		0.99	1.00			
36	227		1.13	257	0.60	16.03	0.99	1.00		0.99	1.00			
37	212		1.15	243	0.60	16.97	0.99	1.00		0.99	1.00			
38	174		1.25	216	0.60	17.92	0.99	1.00		0.99	1.00			
39	47		Likely non-Liquefiable	#VALUE!	Likely non-Liquefiable	18.86	0.99	1.00		0.99	1.00			
40	38		3.25	125	0.26	19.80	0.99	1.00		0.99	1.00			
41	46		2.45	113	0.22	20.75	0.99	1.00		0.99	1.00			
42	43		Likely non-Liquefiable	#VALUE!	Likely non-Liquefiable	21.69	0.99	1.00		0.99	1.00			
43	47		Likely non-Liquefiable	#VALUE!	Likely non-Liquefiable	22.63	0.99	1.00		0.99	1.00			
44	94		1.09	103	0.18	23.57	0.99	1.00	0.33	0.99	1.00	0.33	19.20	19.27
45	104		1.00	104	0.18	24.02	0.99	1.00	0.34	0.99	1.00	0.34	19.09	19.15
46	41		1.00	41	0.08	24.48	0.99	1.00	0.34	0.99	1.00	0.34	18.96	19.04
47	19		1.00	19	0.07	24.93	0.99	1.00	0.35	0.99	1.00	0.35	18.74	18.80
48	10		Evaluate Using Other Crit	#VALUE!	aluate Using Other Crit	25.38	0.99	1.00	0.36	0.99	1.00	0.36	18.38	18.44
49	11		Likely non-Liquefiable	#VALUE!	Likely non-Liquefiable	25.84	0.99	1.00	0.36	0.99	1.00	0.36	18.38	18.44
50	17		Likely non-Liquefiable	#VALUE!	Likely non-Liquefiable	26.29	0.99	1.00	0.37	0.99	1.00	0.37	18.38	18.44
51	17		Likely non-Liquefiable	#VALUE!	Likely non-Liquefiable	26.74	0.99	1.00	0.37	0.99	1.00	0.37	18.38	18.44
52	69		1.94	133	0.30	27.19	0.99	1.00	0.38	0.99	1.00	0.38	18.38	18.44
53	68		1.67	113	0.21	27.65	0.99	1.00	0.38	0.99	1.00	0.38	18.31	18.36
54	33		2.81	93	0.15	28.10	0.99	1.00	0.39	0.99	1.00	0.39	18.20	18.25
55	24		2.98	72	0.11	28.55	0.99	1.00	0.39	0.99	1.00	0.39	18.08	18.13
56	23		2.97	69	0.11	29.00	0.99	1.00	0.40	0.99	1.00	0.40	17.93	17.98
57	24		3.06	73	0.12	29.46	0.99	1.00	0.40	0.99	1.00	0.40	17.77	17.82
58	26		2.79	71	0.11	29.91	0.99	1.00	0.40	0.99	1.00	0.40	17.62	17.67
59	27		2.61	70	0.11	30.36	0.98	1.00	0.41	0.98	1.00	0.41	17.47	17.52
60	29		2.55	73	0.12	30.81	0.98	1.00	0.41	0.98	1.00	0.41	17.32	17.37
61	29		2.50	72	0.12	31.27	0.98	1.00	0.42	0.98	1.00	0.42	17.17	17.22
62	31		2.28	71	0.11	31.72	0.98	1.00	0.42	0.98	1.00	0.42	17.02	17.07
63	31		1.97	62	0.10	32.17	0.98	1.00	0.42	0.98	1.00	0.42	16.87	16.92
64	31		2.29	72	0.11	32.63	0.98	1.00	0.43	0.98	1.00	0.43	16.69	16.75
65	32		2.15	68	0.11	33.08	0.98	1.00	0.43	0.98	1.00	0.43	16.54	16.60
66	33		2.13	69	0.11	33.53	0.98	1.00	0.43	0.98	1.00	0.43	16.39	16.44
67	36		2.00	71	0.11	33.98	0.98	1.00	0.44	0.98	1.00	0.44	16.23	16.28
68	38		2.33	89	0.15	34.44	0.98	1.00	0.44	0.98	1.00	0.44	16.08	16.13
69	43		2.28	99	0.17	34.89	0.98	1.00	0.44	0.98	1.00	0.44	15.95	16.00
70	41		2.74	113	0.21	35.34	0.98	1.00	0.45	0.98	1.00	0.45	15.84	15.89
71	52		1.72	89	0.14	35.79	0.98	1.00	0.45	0.98	1.00	0.45	15.73	15.78
72	59		1.67	99	0.17	36.25	0.98	1.00	0.45	0.98	1.00	0.45	15.60	15.66
73	46		2.07	95	0.16	36.70	0.98	1.00	0.45	0.98	1.00	0.45	15.49	15.54
74	62		1.58	98	0.17	37.15	0.98	1.00	0.46	0.98	1.00	0.46	15.37	15.42
75	63		1.29	82	0.13	37.60	0.98	1.00	0.46	0.98	1.00	0.46	15.25	15.30
76	64		1.35	86	0.14	38.06	0.98	1.00	0.46	0.98	1.00	0.46	15.11	15.17
77	57		1.41	80	0.13	38.51	0.98	1.00	0.46	0.98	1.00	0.46	14.98	15.04
78	59		1.44	84	0.14	38.96	0.98	1.00	0.47	0.98	1.00	0.47	14.85	14.90
79	58		1.46	85	0.14	39.42	0.98	1.00	0.47	0.98	1.00	0.47	14.72	14.77
80	56		1.49	84	0.14	39.87	0.98	1.00	0.47	0.98	1.00	0.47	14.58	14.64
81	55		1.49	82	0.13	40.32	0.98	1.00	0.47	0.98	1.00	0.47	14.45	14.50
82	54		1.45	78	0.12	40.77	0.98	1.00	0.48	0.98	1.00	0.48	14.32	14.37
83	47		1.52	72	0.11	41.23	0.98	1.00	0.48	0.98	1.00	0.48	14.17	14.23
84	43		1.61	70	0.11	41.68	0.98	1.00	0.48	0.98	1.00	0.48	14.02	14.08
85	43		1.62	70	0.11	42.13	0.97	1.00	0.48	0.97	1.00	0.48	13.87	13.92
86	40		1.69	68	0.11	42.58	0.97	1.00	0.48	0.97	1.00	0.48	13.71	13.77
87	41		1.65	67	0.11	43.04	0.97	1.00	0.49	0.97	1.00	0.49	13.56	13.61
88	40		1.70	68	0.11	43.49	0.97	1.00	0.49	0.97	1.00	0.49	13.40	13.45
89	37		1.00	37	0.08	43.94	0.97	1.00	0.49	0.97	1.00	0.49	13.24	13.29
90	34		1.00	34	0.08	44.39	0.97	1.00	0.49	0.97	1.00	0.49	12.98	13.04

Eqn. 9, P. 68 — Equiv. Clean Sand Normalized CPT Penetration Resistance

Q, n, Ic Iterations to Calculate n

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS
1																																													
2																																													
3																																													
4																																													
5	Initial																																												
6	F (%)	Cn	Q	I_c	n	Cn	Q	I_c	n	Cn	Q	I_c	n	Cn	Q	I_c	n	Cn	Q	I_c	n	Cn	Q	I_c	n	Cn	Q	I_c	n	Cn	Q	I_c	n	Cn	Q	I_c	n	Cn	Q	I_c	n	Cn	Q	I_c	Δn
7	3.36	106.04	1069.23	1.80	0.55	12.86	132.08	2.21	0.67	22.75	233.65	2.06	0.63	16.64	191.50	2.11	0.64	19.92	204.52	2.10	0.64	19.48	200.08	2.10	0.64	19.63	201.60	2.10	0.64	19.58	201.08	2.10	0.64	19.59	201.26	2.10	0.64	19.59	201.20	2.10	0.64	19.59	201.22	2.10	OK
8	1.69	53.02	1564.41	1.47	0.50	7.26	214.84	1.84	0.56	9.25	272.98	1.78	0.54	8.59	253.42	1.80	0.55	8.79	259.21	1.79	0.55	8.72	257.43	1.79	0.55	8.74	257.97	1.79	0.55	8.74	257.90	1.79	0.55	8.74	257.85	1.79	0.55	8.74	257.84	1.79	0.55	8.74	257.84	1.79	OK
9	1.72	35.35	1223.23	1.50	0.50	6.95	205.74	1.86	0.57	7.51	259.85	1.80	0.55	7.03	243.45	1.81	0.55	7.16	247.78	1.81	0.55	7.12	246.55	1.81	0.55	7.13	246.89	1.81	0.55	7.13	246.79	1.81	0.55	7.13	246.82	1.81	0.55	7.13	246.81	1.81	0.55	7.13	246.81	1.81	OK
10	2.75	26.51	970.99	1.73	0.53	5.81	205.51	2.02	0.61	7.50	274.65	1.95	0.59	7.00	256.55	1.97	0.60	7.11	260.57	1.97	0.60	7.09	259.64	1.97	0.60	7.09	259.85	1.97	0.60	7.09	259.80	1.97	0.60	7.09	259.81	1.97	0.60	7.09	259.81	1.97	0.60	7.09	259.81	1.97	OK
11	2.31	21.21	1099.42	1.64	0.50	4.61	238.84	1.92	0.59	5.97	309.53	1.86	0.57	5.64	292.54	1.87	0.57	5.71	296.04	1.87	0.57	5.70	295.29	1.87	0.57	5.70	295.45	1.87	0.57	5.70	295.42	1.87	0.57	5.70	295.43	1.87	0.57	5.70	295.43	1.87	0.57	5.70	295.43	1.87	OK
12	3.02	17.67	1679.52	1.72	0.52	4.50	427.27	1.90	0.58	5.24	498.23	1.87	0.57	5.12	486.11	1.87	0.57	5.14	487.98	1.87	0.57	5.13	487.68	1.87	0.57	5.13	487.73	1.87	0.57	5.13	487.72	1.87	0.57	5.13	487.72	1.87	0.57	5.13	487.72	1.87	0.57	5.13	487.72	1.87	OK
13	1.84	15.15	2042.55	1.49	0.50	3.89	524.78	1.66	0.51	3.97	534.89	1.66	0.51	3.96	533.27	1.66	0.51	3.96	533.52	1.66	0.51	3.96	533.48	1.66	0.51	3.96	533.49	1.66	0.51	3.96	533.49	1.66	0.51	3.96	533.49	1.66	0.51	3.96	533.49	1.66	0.51	3.96	533.49	1.66	OK
14	2.34	13.26	1597.43	1.61	0.50	3.64	438.75	1.79	0.55	4.10	493.85	1.77	0.54	4.03	485.07	1.77	0.54	4.04	486.36	1.77	0.54	4.03	486.17	1.77	0.54	4.03	486.20	1.77	0.54	4.03	486.19	1.77	0.54	4.03	486.19	1.77	0.54	4.03	486.19	1.77	0.54	4.03	486.19	1.77	OK
15	1.65	11.78	1526.04	1.47	0.50	3.43	444.57	1.66	0.50	3.47	449.76	1.65	0.50	3.47	448.93	1.65	0.50	3.47	449.06	1.65	0.50	3.47	449.04	1.65	0.50	3.47	449.04	1.65	0.50	3.47	449.04	1.65	0.50	3.47	449.04	1.65	0.50	3.47	449.04	1.65	0.50	3.47	449.04	1.65	OK
16	0.74	10.60	1338.23	1.14	0.50	3.26	410.95	1.38	0.50	3.26	410.95	1.38	0.50	3.26	410.95	1.38	0.50	3.26	410.95	1.38	0.50	3.26	410.95	1.38	0.50	3.26	410.95	1.38	0.50	3.26	410.95	1.38	0.50	3.26	410.95	1.38	0.50	3.26	410.95	1.38	0.50	3.26	410.95	1.38	OK
17	1.13	9.64	1072.08	1.35	0.50	3.10	345.29	1.58	0.50	3.10	345.29	1.58	0.50	3.10	345.29	1.58	0.50	3.10	345.29	1.58	0.50	3.10	345.29	1.58	0.50	3.10	345.29	1.58	0.50	3.10	345.29	1.58	0.50	3.10	345.29	1.58	0.50	3.10	345.29	1.58	0.50	3.10	345.29	1.58	OK
18	4.09	8.84	326.94	2.07	0.63	3.93	145.29	2.25	0.68	4.43	163.93	2.22	0.67	4.34	160.74	2.23	0.68	4.36	161.25	2.22	0.68	4.36	161.17	2.22	0.68	4.36	161.18	2.22	0.68	4.36	161.18	2.22	0.68	4.36	161.18	2.22	0.68	4.36	161.18	2.22	0.68	4.36	161.18	2.22	OK
19	1.90	8.15	670.73	1.63	0.50	2.88	234.84	1.88	0.57	3.28	269.45	1.82	0.56	3.21	263.63	1.83	0.56	3.22	264.53	1.83	0.56	3.22	264.39	1.83	0.56	3.22	264.41	1.83	0.56	3.22	264.41	1.83	0.56	3.22	264.41	1.83	0.56	3.22	264.41	1.83	0.56	3.22	264.41	1.83	OK
20	1.95	7.57	597.42	1.66	0.51	2.79	220.09	1.89	0.57	3.19	251.95	1.85	0.56	3.13	246.72	1.86	0.56	3.14	247.52	1.86	0.56	3.14	247.39	1.86	0.56	3.14	247.41	1.86	0.56	3.14	247.41	1.86	0.56	3.14	247.41	1.86	0.56	3.14	247.41	1.86	0.56	3.14	247.41	1.86	OK
21	2.01	7.07	531.51	1.70	0.52	2.75	206.56	1.91	0.58	3.12	234.49	1.88	0.57	3.06	230.03	1.88	0.57	3.07	230.69	1.88	0.57	3.07	230.59	1.88	0.57	3.07	230.60	1.88	0.57	3.07	230.60	1.88	0.57	3.07	230.60	1.88	0.57	3.07	230.60	1.88	0.57	3.07	230.60	1.88	OK
22	1.97	6.63	537.47	1.69	0.51	2.64	214.27	1.90	0.58	2.98	241.32	1.86	0.57	2.92	237.17	1.87	0.57	2.93	237.76	1.87	0.57	2.93	237.68	1.87	0.57	2.93	237.69	1.87	0.57	2.93	237.69	1.87	0.57	2.93	237.69	1.87	0.57	2.93	237.69	1.87	0.57	2.93	237.69	1.87	OK
23	1.72	6.24	509.38	1.64	0.50	2.50	204.42	1.86	0.57	2.82	230.35	1.83	0.56	2.77	226.36	1.83	0.56	2.78	226.93	1.83	0.56	2.78	226.85	1.83	0.56	2.78	226.86	1.83	0.56	2.78	226.86	1.83	0.56	2.78	226.86	1.83	0.56	2.78	226.86	1.83	0.56	2.78	226.86	1.83	OK
24	1.74	5.89	458.43	1.67	0.51	2.46	191.75	1.88	0.57	2.76	214.74	1.85	0.56	2.72	211.27	1.86	0.56	2.72	211.76	1.85	0.56	2.72	211.69	1.85	0.56	2.72	211.70	1.85	0.56	2.72	211.70	1.85	0.56	2.72	211.70	1.85	0.56	2.72	211.70	1.85	0.56	2.72	211.70	1.85	OK
25	1.99	5.58	348.30	1.78	0.54	2.54	158.54	1.98	0.60	2.82	175.74	1.95	0.59	2.78	173.19	1.96	0.59	2.78	173.55	1.96	0.59	2.78	173.50	1.96	0.59	2.78	173.50	1.96	0.59	2.78	173.50	1.96	0.59	2.78	173.50	1.96	0.59	2.78	173.50	1.96	0.59	2.78	173.50	1.96	OK
26	7.87	5.30	61.93	2.70	0.82	3.92	45.73	2.78	0.84	4.08	47.88	2.77	0.84	4.06	47.40	2.77	0.84	4.08	47.44	2.77	0.84	4.08	47.44	2.77	0.84	4.08	47.44	2.77	0.84	4.08	47.44	2.77	0.84	4.08	47.44	2.77	0.84	4.08	47.44	2.77	0.84	4.08	47.44	2.77	OK
27	3.56	5.05	54.36	2.49	0.75	3.38	36.37	2.60	0.78	3.59	38.65	2.59	0.78	3.56	38.29	2.59	0.78	3.56	38.34	2.59	0.78	3.56	38.33	2.59	0.78	3.56	38.33	2.59	0.78	3.56	38.33	2.59	0.78	3.56	38.33	2.59	0.78	3.56	38.33	2.59	0.78	3.56	38.33	2.59	OK
28	2.57	4.82	69.99	2.30	0.70	3.00	43.56	2.45	0.74	3.22	46.75	2.43	0.74	3.19	46.25	2.43	0.74	3.19	46.33	2.43	0.74	3.19	46.31	2.43	0.74	3.19	46.32	2.43	0.74	3.19	46.32	2.43	0.74	3.19	46.32	2.43	0.74	3.19	46.32	2.43	0.74	3.19	46.32	2.43	OK
29	6.47	4.61	55.98	2.86	0.81	3.43	41.85	2.75	0.83	3.57	43.30	2.74	0.83	3.55	43.08	2.74	0.83	3.55	43.11	2.74	0.83	3.55	43.10	2.74	0.83	3.55	43.10	2.74	0.83	3.55	43.10	2.74	0.83	3.55	43.10	2.74	0.83	3.55	43.10	2.74	0.83	3.55	43.10	2.74	OK
30	5.79	4.42	62.86	2.59	0.79	3.21	45.74	2.68	0.81	3.35	47.63	2.67	0.81	3.33	47.38	2.67	0.81	3.33	47.41	2.67	0.81	3.33	47.41	2.67	0.81	3.33	47.41	2.67	0.81	3.33	47.41	2.67	0.81	3.33	47.41	2.67	0.81	3.33	47.41	2.67	0.81	3.33	47.41	2.67	OK
31	0.56	4.24	162.01	1.55	0.50	2.06	88.37	1.80	0.55	2.21	94.90	1.78	0.54	2.19	93.83	1.78	0.54	2.19	94.00	1.78	0.54	2.19	93.97	1.78	0.54	2.19	93.98	1.78	0.54	2.19	93.98	1.78	0.54	2.19	93.98	1.78	0.54	2.19	93.98	1.78	0.54	2.19	93.98	1.78	OK
32	0.23	4.16	212.06	1.28	0.50	2.04	103.94	1.56	0.50	2.04	103.94	1.56	0.50	2.04	103.94	1.56	0.50	2.04	103.94	1.56	0.50	2.04	103.94	1.56	0.50	2.04	103.94	1.56	0.50	2.04	103.94	1.56	0.50	2.04	103.94	1.56	0.50	2.04	103.94	1.56	0.50	2.04	103.94	1.56	OK
33	0.05	4.09	75.00	1.60	0.50	2.02	37.10	1.90	0.58	2.26	41.44	1.85	0.56	2.21	40.61	1.86	0.57	2.22	40.76	1.86	0.57	2.22	40.73	1.86	0.57	2.22	40.74	1.86	0.57	2.22	40.74	1.86	0.57	2.22	40.74	1.86	0.57	2.22	40.74	1.86	0.57	2.22	40.74	1.86	OK
34	0.27	4.01	28.19	2.12	0.65	2.45	17.22	2.33	0.71	2.67	18.75	2.29	0.70	2.63	18.47	2.30	0.70	2.64	18.52	2.30	0.70	2.63	18.51	2.30	0.70	2.63	18.51	2.30	0.70	2.63	18.51	2.30	0.70	2.63	18.51	2.30	0.70	2.63	18.51	2.30	0.70	2.63	18.51	2.30	OK
35	0.92	3.94	12.25	2.86	0.81	3.02	9.39	2.76	0.84	3.15	9.80	2.75	0.83	3.13	9.73	2.75	0.83	3.13	9.74	2.75	0.83	3.13	9.74	2.75	0.83	3.13	9.74	2.75	0.83	3.13	9.74	2.75	0.83	3.13	9.74	2.75	0.83	3.13	9.74	2.75	0.83	3.13	9.74	2.75	OK
36	8.78	3.87	11.19	3.25	0.98	3.78	10.92	3.25	0.98	3.79	10.96	3.25	0.98	3.79	10.95	3.25	0.98	3.79	10.95	3.25	0.98	3.79	10.95	3.25	0.98	3.79	10.95	3.25	0.98	3.79	10.95	3.25	0.98	3.79	10.95	3.25	0.98	3.79	10.95	3.25	0.98	3.79	10.95	3.25	OK
37	8.08	3.80	18.03	3.07	0.93	3.46	16.40	3.10	0.94	3.50	16.60	3.10	0.94	3.50	16.57	3.10	0.94	3.50	16.58	3.10	0.94	3.50	16.58	3.10	0.94	3.50	16.58	3.10	0.94	3.50	16.58	3.10	0.94	3.50	16.58	3.10	0.94	3.50	16.58	3.10	0.94	3.50	16.58	3.10	OK
38	9.98	3.74	17.95	3.14	0.95	3.50	16.77	3.16	0.96	3.52	16.91	3.15	0.95	3.52	16.90	3.15	0.95	3.52	16.90	3.15	0.95	3.52	16.90	3.15	0.95	3.52	16.90	3.15	0.95	3.52	16.90	3.15	0.95	3.52	16.90	3.15	0.95	3.52	16.90	3.15	0.95	3.52	16.90	3.15	OK
39	2.48	3.66	102.19	2.18	0.66	2.37	65.73	2.31	0.70	2.49	69.24	2.29	0.70	2.48	68.80	2.30	0.70	2.48	68.85	2.30	0.70	2.48	68.85	2.30	0.70	2.48	68.85	2.30	0.70	2.48	68.85	2.30	0.70	2.48	68.85	2.30	0.70	2.48	68.85	2.30	0.70	2.48	68.85	2.30	OK
40	1.77	3.62	103.69	2.07	0.63	2.24	64.27	2.22	0.67	2.38	68.12	2.20	0.67	2.36	67.63	2.20	0.67	2.36	67.69	2.20	0.67	2.36	67.68	2.20	0.67	2.36	67.68	2.20	0.67	2.36	67.68	2.20	0.67	2.36	67.68	2.20	0.67	2.36	67.68	2.20	0.67	2.36	67.68	2.20	OK
41	2.28	3.56	44.85	2.41	0.73	2.53	31.85	2.52	0.76	2.64	33.26	2.51	0.76	2.62	33.08	2.51	0.76	2.63	33.10	2.51	0.76	2.63	33.10	2.51	0.76	2.63	33.10	2.51	0.76	2.63	33.10	2.51	0.76	2.63	33.10	2.51	0.76	2.63	33.10	2.51	0.76	2.63	33.10	2.51	OK
42	1.67	3.50	32.06	2.44	0.74	2.53	23.13	2.55	0.77	2.64	24.16	2.54	0.77	2.62	24.02	2.54	0.77	2.62	24.04	2.54	0.77	2.62	24.04	2.54	0.77	2.62	24.04	2.54	0.77	2.62	24.04	2.54	0.77	2.62	24.04	2.54	0.77	2.62	24.04	2.54	0.77	2.62	24.04	2.54	OK
43	1.60	3.45	31.05	2.44	0.74	2.50	22.48	2.55	0.77	2.60	23.46	2.54	0.77	2.59	23.33	2.54	0.77	2.59	23.34	2.54	0.77	2.59	23.34	2.54	0.77	2.59	23.34	2.54	0.77	2.59	23.34	2.54	0.77	2.59	23.34	2.54	0.77	2.59	23.34	2.54	0.77	2.59	23.34	2.54	OK
44	1.76	3.39	31.38	2.46	0.75	2.49	22.99	2.57	0.78	2.59	23.94	2.55	0.77	2.58	23.81	2.56	0.77	2.58	23.83	2.56	0.77	2.58	23.82	2.56	0.77	2.58	23.82	2.56	0.77	2.58	23.82	2.56	0.77	2.58	23.82	2.56	0.77	2.58	23.82	2.56	0.77	2.58	23.82	2.56	OK
45	1.59	3.34	34.27	2.40	0.73	2.41	24.89	2.52	0.76	2.51	25.75	2.50	0.76	2.50	25.61	2.50	0.76	2.50	25.62	2.50	0.76	2.50	25.62	2.50	0.76	2.50	25.62	2.50	0.76	2.50	25.62	2.50	0.76	2.50	25.62	2.50	0.76	2.50	25.62	2.50	0.76	2.50	25.62	2.50	OK
46	1.48	3.29	36.29	2.36	0.72	2.35	25.89	2.48	0.75	2.45	27.02	2.47	0.75	2.44	26.87	2.47	0.75	2.44	26.89	2.47	0.75	2.44	26.89	2.47	0.75	2.44	26.89	2.47	0.75	2.44	26.89	2.47	0.75	2.44	26.89	2.47	0.75	2.44	26.89	2.47	0.75	2.44	26.89	2.47	OK
47	1.53	3.25	38.68	2.35	0.71	2.31	27.57	2.47	0.75	2.41	28.76	2.45	0.74	2.40	28.61	2.45	0.74	2.40	28.63	2.45	0.74	2.40	28.62	2.45	0.74	2.40	28.62	2.45	0.74	2.40	28.62	2.45	0.74	2.40	28.62	2.45	0.74	2.40	28.62	2.45	0.74	2.40	28.62	2.45	OK
48	1.48	3.20	39.19	2.34	0.71	2.28	27.94	2.46	0.74	2.38	29.13	2.44	0.74	2.36	28.98	2.44	0.74	2.37	29.00	2.44	0.74	2.37	29.00	2.44	0.74	2.37	29.00	2.44	0.74	2.37	29.00	2.44	0.74	2.37	29.00	2.44	0.74	2.37	29.00	2.44	0.74	2.37	29.00	2.44	OK
49	1.35	3.15	42.65	2.28	0.69	2.21	29.96	2.41	0.73	2.31	31.28	2.39	0.73	2.30	31.11	2.39	0.73	2.30	31.13	2.39	0.73	2.30	31.13	2.39	0.73	2.30	31.13	2.39	0.73	2.30	31.13	2.39	0.73	2.30	31.13	2.39	0.73	2.30	31.13	2.39	0.73	2.30	31.13	2.39	OK
50	0.94	3.11	44.16	2.18	0.66	2.12	30.11	2.32	0.70	2.22	31.59	2.30	0.70	2.21	31.40	2.31	0.70	2.21	31.43	2.31	0.70	2.21	31.42	2.31	0.70	2.21	31.42	2.31	0.70	2.21	31.42	2.31	0.70	2.21	31.42	2.31	0.70	2.21	31.42	2.31	0.70	2.21	31.42	2.31	OK

See attached Flowchart for evaluation of $CRR_{7.5}$ by CPT based Robertson and Wride's (1997) method (Plate L20).

$$C_n = \left(\frac{100}{\sigma'_{v_0}}\right)^n \qquad I_c = \left[(3.47 - \log Q)^2 + (1.22 + \log F)^2\right]^{1/2}$$

$$Q = \frac{(q_c - \sigma_{v_0})}{100} \times C_n \qquad F = \frac{f_s}{(q_c - \sigma_{v_0})} \cdot 100$$

10 Iterations was performed to arrive at final value of $n = 0.64$ for Row 6, or $n = 0.70$ for Row 50.

Liquefaction-Induced Settlement:

SOIL PROPERTIES & SETTLEMENT

A = $(q_{c1N})_{cs}$ ↓

B = $\frac{CRR}{CSR}$ (Factor of Safety) ↓

C (See Fig. A-1, Plate L21) ↓

D = $(\varepsilon_v)_{lb} \times t$ ↓

E ↓

F (See Fig. A-1, Plate L21) ↓

G = $(\varepsilon_v)_{ub} \times t$ ↓

H ↓

* Based on Ishihara & Yoshimine 1992

t = Reading Thickness (m): 0.05

Liqeufaction Settlement							
$(Q_{C1})_{CS}$	FS	Lower Bound ε_v*	Lower Bound Δh (cm)	Lower Cumulative Δh (cm)	Upper Bound ε_v*	Upper Bound Δh (cm)	Upper Cumulative Δh (cm)
102.7845842	0.546653	2.28	0.11	19.20	2.26	0.11	19.27
103.9423364	0.546148	2.26	0.11	19.09	2.24	0.11	19.15
40.73508869	0.243934	4.80	0.24	18.98	4.80	0.24	19.04
18.51275719	0.186807	7.23	0.36	18.74	7.23	0.36	18.80
		0.00	0.00	18.38	0.00	0.00	18.44
		0.00	0.00	18.38	0.00	0.00	18.44
		0.00	0.00	18.38	0.00	0.00	18.44
		0.00	0.00	18.38	0.00	0.00	18.44
133.2548195	0.794513	1.34	0.07	18.38	1.64	0.08	18.44
112.938381	0.559276	2.13	0.11	18.31	2.12	0.11	18.36
93.07216633	0.40011	2.46	0.12	18.20	2.44	0.12	18.25
71.514354	0.290898	3.03	0.15	18.08	3.03	0.15	18.13
69.29552046	0.279892	3.12	0.16	17.93	3.12	0.16	17.98
72.98260798	0.289883	2.98	0.15	17.77	2.98	0.15	17.82
71.41034767	0.281254	3.04	0.15	17.62	3.04	0.15	17.67
70.31332403	0.274722	3.08	0.15	17.47	3.08	0.15	17.52
72.93463196	0.281213	2.98	0.15	17.32	2.98	0.15	17.37

$(\varepsilon_v)_{lb}$ = Lower Bound Vertical Strain

$(\varepsilon_v)_{ub}$ = Upper Bound Vertical Strain

STRESS CALCULATION

Stress Calculations for Layers:

Layer No.	Depth (m)		γ_t (kN/m^3)	At Bottom of Layer	
	Top	Bottom		σ (kPa)	σ' (kPa)
1	0.00	999	18.86	18841.14	9056.50
2	999	999		#VALUE!	#VALUE!
3	999	999		#VALUE!	#VALUE!
4	999	999		#VALUE!	#VALUE!
5	999	999		#VALUE!	#VALUE!
6	999	999		#VALUE!	#VALUE!
7	999	999	0.00	0.00	-9784.64
8	999	999	0.00	0.00	-9784.64
9	999	999	0.00	0.00	-9784.64

Stress Calcs. for CPT w/ Original GWT

CPT Depth (m)	σ (kPa)	σ' (kPa)
0.05	0.94	0.94
0.10	1.89	1.89
0.15	2.83	2.83
0.20	3.77	3.77
0.25	4.72	4.72
0.30	5.66	5.66
0.35	6.60	6.60
0.40	7.54	7.54
0.45	8.49	8.49
0.50	9.43	9.43
0.55	10.37	10.37
0.60	11.32	11.32
0.65	12.26	12.26
0.70	13.20	13.20
0.75	14.15	14.15
0.80	15.09	15.09
0.85	16.03	16.03
0.90	16.97	16.97
0.95	17.92	17.92
1.00	18.86	18.86
1.05	19.80	19.80
1.10	20.75	20.75
1.15	21.69	21.69
1.20	22.63	22.63
1.25	23.58	23.57
1.30	24.52	24.02
1.35	25.46	24.48
1.40	26.40	24.93
1.45	27.35	25.38
1.50	28.29	25.84

Stress Calcs. for Liquefaction

σ' (kPa)
0.94
1.89
2.83
3.77
4.72
5.66
6.60
7.54
8.49
9.43
10.37
11.32
12.26
13.20
14.15
15.09
16.03
16.97
17.92
18.86
19.80
20.75
21.69
22.63
23.57
24.02
24.48
24.93
25.38
25.84

Plate L1

Soil classification using the cone penetration test

P. K. ROBERTSON

Department of Civil Engineering, The University of Alberta, Edmonton, Alta., Canada T6G 2G7

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Several charts exist for evaluating soil type from electric cone penetration test (CPT) data. A new system is proposed based on normalized CPT data. The new charts are based on extensive data available from published and unpublished experience worldwide. The new charts are evaluated using data from a 300 m deep borehole with wire-line CPT. Good agreement was obtained between samples and the CPT data using the new normalized charts. Recommendations are provided concerning the location at which to measure pore pressures during cone penetration.

Key words: soil classification, cone penetration test, *in situ*, case history.

Il existe plusieurs abaques pour identifier le type de sol en partant des données d'essais de pénétration au cône (« CPT »). L'on propose un nouveau système basé sur des données CPT normalisées. Les nouveaux abaques sont établis en partant d'une quantité importante de données provenant de l'expérience publiée et non publiée à travers le monde. Les nouveaux abaques ont été vérifiés en utilisant les données obtenues dans un forage de 300 m de profondeur avec un CPT à câble. Une bonne concordance a été obtenue entre les échantillons et les données de CPT utilisant les nouveaux abaques. L'on présente des recommandations quant à la position du point de mesure de la pression interstitielle durant la pénétration au cône.

Mots clés : classification du sol, essai de pénétration au cône, *in situ*, histoire de cas.

[Traduit par la revue]

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Introduction

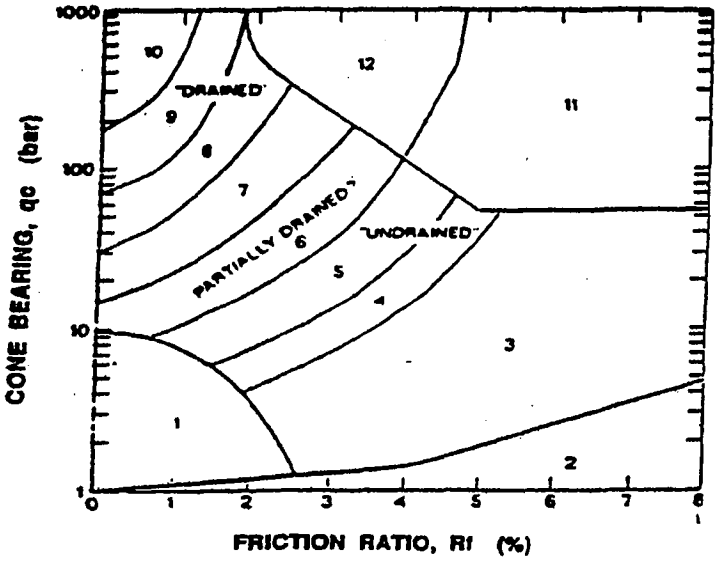
One of the primary applications of the cone penetration test (CPT) is for stratigraphic profiling. Considerable experience exists concerning the identification and classification [illegible] types from CPT data. Several soil classification charts [illegible] CPT and for cone penetration testing with pore press[illegible] measurements (CPTU).

In this paper the limitations of existing CPT and CPTU classification charts are discussed and a new system is proposed based on normalized measurements. A discussion is also presented regarding the recommended position of measurement of pore pressure during cone penetration.

Soil classification

Some of the most comprehensive recent work on soil classification using electric cone penetrometer data was presented by Douglas and Olsen (1981). One important distinc-

Plate L2



ZONE	SOIL BEHAVIOUR TYPE
1	sensitive fine grained
2	organic material
3	clay
4	silty clay to clay
5	clayey silt to silty clay
6	sandy silt to clayey silt
7	silty sand to sandy silt
8	sand to silty sand
9	sand
10	gravelly sand to sand
11	very stiff fine grained (*)
12	sand to clayey sand (*)

(*) overconsolidated or cemented

FIG. 1. Simplified soil behaviour type classification for standard electric friction cone (Robertson *et al.* 1986). 1 bar = 100 kPa.

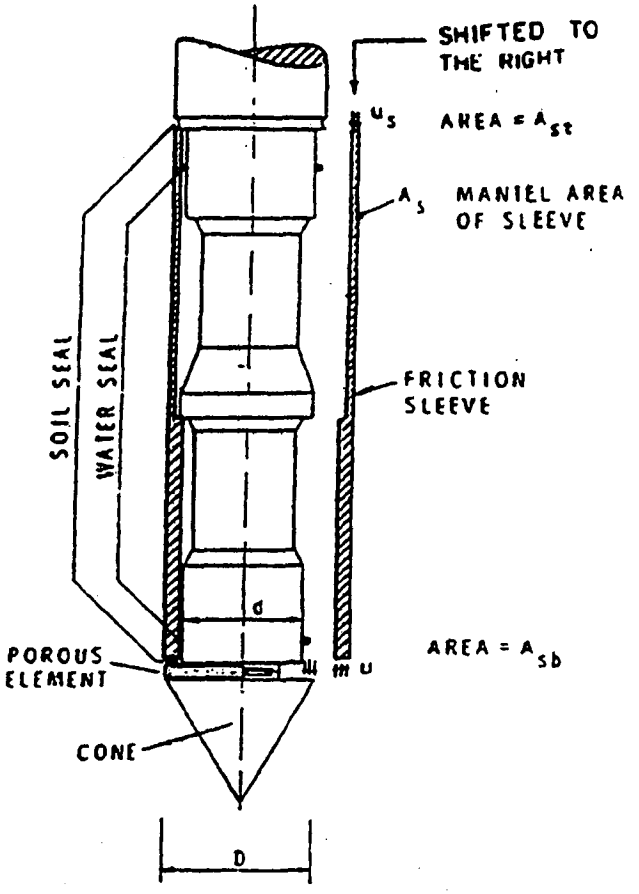


FIG. 2. Schematic representation of piezo-friction-con penetrometer (adapted from Konrad 1987).

tion made by them was that CPT classification charts cannot be expected to provide accurate predictions of soil type based on grain size distribution but can provide a guide to soil behaviour type. The CPT data provide a repeatable index of the aggregate behaviour of the *in situ* soil in the immediate area of the probe.

In recent years soil classification charts have been adapted and improved from an expanded data base (Robertson 1986; Olsen and Farr 1986). An example of such a soil classification chart for electric CPT data is shown in Fig. 1. The chart in Fig. 1 is based on data obtained predominantly at depths less than 30 m and is global in nature. Therefore, some overlap in zones should be expected.

Most classification charts, such as the one shown in Fig. 1, use the cone penetration ressitance, q_c, and friction ratio, R_f, where

$$[1] \quad R_f = \frac{f_s}{q_c} \times 100\%$$

f_s is sleeve friction.

Recent research has illustrated the importance of cone design and the effect that water pressures have on the measured penetration resistance and sleeve friction because of unequal end areas (Campanella *et al.* 1982; Baligh *et al.* 1981). Thus, cones of slightly different designs, but conforming to the international standard (ISSMFE 1977) and reference test procedure (ISOPT 1988), will give slightly different values of q_c and f_s, especially in soft clays and silts.

For electric cones that record pore pressures (Fig. 2), corrections can be made to account for unequal end area effects. Baligh *et al.* (1981) and Campanella *et al.* (1982) proposed that the cone resistance, q_c, could be corrected to a total cone resistance, q_t, using the following expression:

$$[2] \quad q_t = q_c + (1 - a)u$$ ← Sheet "1" Col. "G"

where u is pore pressure measured between the cone tip and the friction sleeve and a is net area ratio.

It is often assumed that the net area ratio is given by

$$[3] \quad a = \frac{d^2}{D^2}$$

where d is diameter of load cell support and D is diameter of cone. However, this provides only an approximation of the net area ratio, since additional friction forces are developed due to distortion of the water seal O-ring. Therefore, it is recommended that the net area ratio should always be determined in a small calibration vessel (Battaglio and Maniscalco 1983; Campanella and Robertson 1988).

A similar correction can also be applied to the sleeve fr tion (Lunne *et al.* 1986; Konrad 1987). Konrad (1987) s gested the following expression for the total stress sleeve friction, f_t:

$$[4] \quad f_t = f_s - (1 - \beta b)cu$$

Plate L3

NATIONAL CENTER FOR EARTHQUAKE ENGINEERING RESEARCH

Headquartered at the State University of New York at Buffalo

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held at
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1 Professor and Chair, Department of Civil and Environmental Engineering, Brigham Young University
2 Professor, Department of Civil Engineering, University of California at Davis

NATIONAL CENTER FOR EARTHQUAKE ENGINEERING RESEARCH
State University of New York at Buffalo
Red Jacket Quadrangle, Buffalo, NY 14261

Plate L4

Summary Report

Workshop Participants

Chair: T. Leslie Youd, Brigham Young University, Provo, UT; **Co-chair: Izzat M. Idriss**, University of California at Davis, Davis, CA; **Ronald D. Andrus**, National Institute for Standards and Technology, Gaithersburg, MD; **Ignacio Arango**, Bechtel Corp., Oakland, CA; **Gonzalo Castro**, GEI Consultants, Inc., Winchester, MA; **John T. Christian**, Engineering Consultant, Boston, MA; **Ricardo Dobry**, Rensselaer Polytechnic Institute, Troy, NY; **W.D. Liam Finn**, University of British Columbia, Vancouver, BC; **Leslie F. Harder, Jr.**, California Department of Water Resources, Sacramento, CA; **Mary Ellen Hynes**,US Army Engineers Waterways Experiment Station, Vicksburg, MS; **Kenji Ishihara**, Science University of Tokyo, Tokyo, Japan; **Joseph P. Koester**, US Army Engineers Waterways Experiment Station, Vicksburg, MS; **Sam S.C. Liao**, Parsons Brinckerhoff, Boston, MA; **William F. Marcuson, III**, US Army Engineers Waterways Experiment Station, Vicksburg, MS; **Geoffrey R. Martin**, University of Southern California, Los Angeles, CA; **James K. Mitchell**, Virginia Tech, Blacksburg, VA; **Yoshiharu Moriwaki**, Woodward-Clyde Consultants, Santa Ana, CA; **Maurice S. Power**, Geomatrix Consultants, San Francisco, CA; **Peter K. Robertson**, University of Alberta, Edmonton, Alberta; **Raymond B. Seed**, University of California, Berkeley, CA; **Kenneth H. Stokoe, II**, University of Texas, Austin, TX

Abstract

Over the past twenty-five years, a procedure, termed the "simplified procedure," has evolved for evaluating liquefaction resistance of soils. This procedure has become the standard of practice in North America and throughout much of the world. Following disastrous earthquakes in Alaska and in Niigata, Japan in 1964, Professors H.B. Seed and I.M. Idriss developed and published the basic "simplified procedure." The procedure, which is largely empirical, evolved over the decades primarily through summary papers by H.B. Seed and his colleagues. In 1985, Professor Robert V. Whitman convened a workshop on behalf of the National Research Council (NRC) in which thirty-six experts reviewed the state-of-knowledge and the state-of-the-art for assessing liquefaction hazard. No general review or update of the simplified procedures has occurred since that time. The purpose of the 1996 workshop, sponsored by the National Center for Earthquake Engineering Research (NCEER), was to convene a group of experts to review developments and gain consensus for further augmentations to the procedure. To keep the workshop focused and the content tractable, the scope was limited to evaluation of liquefaction resistance. Post-liquefaction phenomena, such as soil deformation and ground failure, although equally or more important, were beyond the scope of this workshop. The participants developed consensus recommendations on the following topics: (1) use of the standard and cone penetration tests for evaluation of liquefaction resistance, (2) use of shear wave velocity measurements for evaluation of liquefaction resistance, (3) use of the Becker penetration test for gravelly soils, (4) magnitude scaling factors, (5) correction factors K_α and K_σ, and (6) evaluation of seismic factors required for the evaluation procedure. Probabilistic analysis and seismic energy considerations were also reviewed. Seismic energy concepts were judged to be insufficiently developed to make recommendations for engineering practice. Probabilistic methods have been used in some risk analyses, but are still outside the mainstream of standard practice.

Recommendations for Engineering Practice

The workshop participants reviewed the MSF listed in Table 3 and all but one (S.S.C. Liao) agree that the original factors were too conservative and that an increase is warranted for engineering practice for magnitudes less than 7.5. Rather than recommending a single set of factors, the workshop participants suggest a range of MSF with the engineer allowed to choose factors from within that range requisite with the conservatism required for the given application. For magnitudes less than 7.5, the lower bound for the recommended range is the revised set of magnitude scaling factors proposed by Idriss (Column 3, Table 3, or Equation 23). The upper bound for the suggested range is the MSF proposed by Andrus and Stokoe (Column 7, Table 3, or Equation 26). The upper bound values are consistent with MSF suggested by Ambraseys, Arango, and Youd and Noble for P_L<20% (generally within about 10 percent).

For magnitudes greater than 7.5, the factors recommended by Idriss (Column 3, Table 3; Equation 25) should be used for engineering practice. Above magnitude 7.5, these factors are smaller than the original Seed and Idriss (1982) factors, and hence application of the new factors leads to increased calculated liquefaction hazard compared to the original factors. The reasoning for this recommendation is that the original factors by Seed and Idriss (1982) may not have been sufficiently conservative for magnitudes greater than 7.5. There are insufficient case history data for earthquakes with magnitudes greater than 8 to support use of the lower MSF values listed in Table 3. These lower values were generally extrapolated from smaller magnitude earthquakes. Thus, these more conservative MSF are not recommended for engineering practice.

Corrections for High Overburden Pressures, Static Shear Stresses, and Age of Deposit

The correction factors K_σ and K_α were developed by Seed (1983) to adjust cyclic resistance ratios (CRR) to static overburden and shear stresses larger than those embodied in the development of the simplified procedure. As noted, the simplified procedure is only valid for level to gently sloping sites (low static shear stress) and depths less than about 15 m (low overburden pressures). The K_σ correction factor extends cyclic ratios to high overburden pressures, while the K_α correction factor allows extension of the simplified procedure to more steeply sloping ground conditions. Because there are virtually no case histories available to help define these correction factors, the results from laboratory test programs have been used to develop corrections for engineering practice.

K_σ Correction Factor

Cyclically loaded, isotropically consolidated triaxial compression tests show that while liquefaction resistance of a soil increases with increasing confining pressure, the resistance, as measured by the cyclic stress ratio, is a nonlinear function that decreases with increased normal stress. To incorporate the nonlinear effect of decreasing cyclic stress ratio with increasing confining pressure, Seed (1983) recommended incorporation of a correction factor, K_σ, for overburden pressures greater than 100 kPa. This factor allows correction of results obtained from the simplified procedure to overburden pressures that are greater than those generally extant in the observational data base from which the procedure was derived. Because of the lack of case history data, extrapolation of the simplified

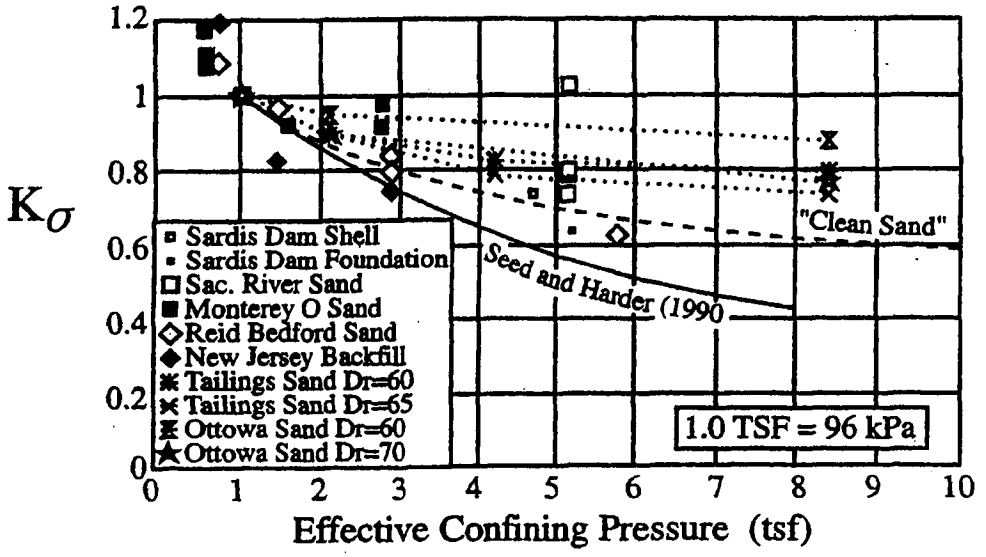


Figure 13 K_σ values determined by various investigators (After Seed and Harder, 1990)

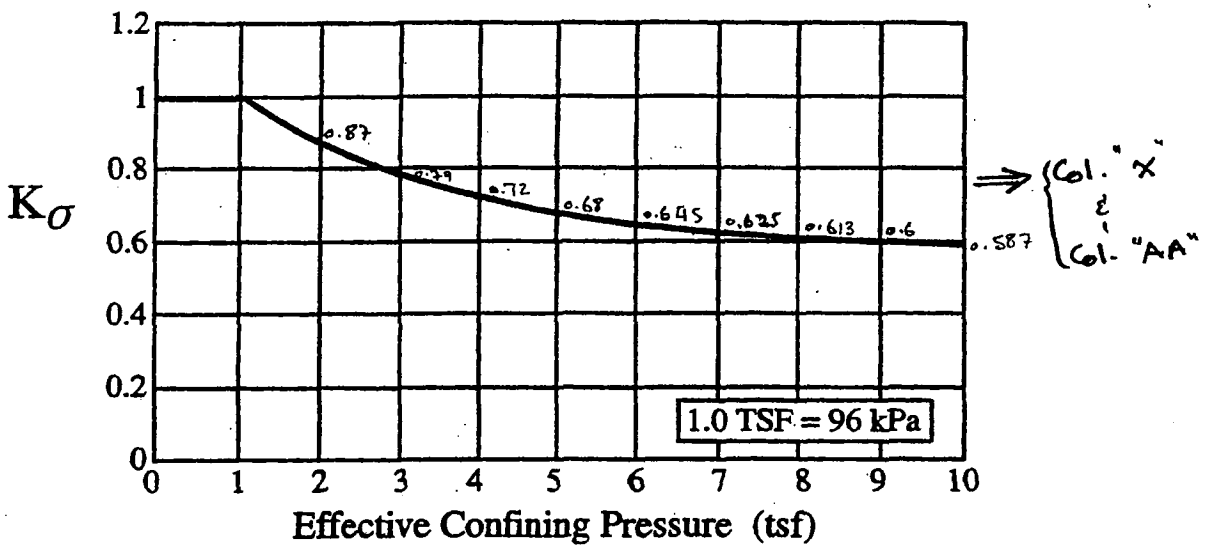


Figure 14. Minimum Values for K_σ Recommended for Clean and Silty Sands and Gravels (After Harder and Boulanger, this report)

procedure to depths greater than 15 m using K_σ factors yields results, such as factors of safety, that are less certain than at shallower depths.

The K_σ values developed by Seed (1983) were obtained by normalizing cyclic resistance ratios of isotropically consolidated cyclic triaxial compression tests to CRR values associated with an effective confining pressure of 100 kPa. For confining pressures greater than 100 kPa, the K_σ correction factor is less than one and decreases with increasing pressure. The original analyses by Seed (1983) yielded a band of suggested K_σ factors that decreased approximately linearly with effective overburden pressure from a value of 1.0 at 100 kPa to values ranging from about 0.40 to 0.65 at 800 kPa (Figure 13). Seed and Harder (1990) analyzed additional data and suggested

Plate L7

Cyclic Liquefaction and its Evaluation based on the SPT and CPT

P.K. Robertson and C.E. (Fear) Wride

Geotechnical Group, University of Alberta
Edmonton, Alberta, Canada

Abstract

Soil liquefaction is a major concern for structures constructed with or on sandy soils. This paper describes the phenomena of soil liquefaction, provides suitable definitions, and provides an update on methods to evaluate cyclic liquefaction using primarily the Standard Penetration Test and the Cone Penetration Test (CPT). A new method is described to estimate grain characteristics directly from the CPT and to incorporate this into one of the methods for evaluating resistance to cyclic loading. A method is also described for correcting the results of the CPT in thin layers. A worked example is also provided. This paper is the final submission from the authors to the proceedings of the 1996 NCEER workshop on soil liquefaction; a similar version has been submitted for review to the Canadian Geotechnical Journal.

The most common form of soil liquefaction observed in the field has been cyclic softening due to earthquake loading. Much of the existing research work on soil liquefaction has been related to cyclic softening, primarily cyclic liquefaction. Cyclic liquefaction applies to level or gently sloping ground where shear stress reversal occurs during earthquake loading. This paper is concerned primarily with cyclic liquefaction due to earthquake loading.

Cyclic resistance based on laboratory testing

Much of the early work related to earthquake-induced soil liquefaction resulted from laboratory testing of reconstituted samples subjected to cyclic loading by means of cyclic triaxial, cyclic simple shear, or cyclic torsional tests. The outcome of these studies generally confirmed that the resistance to cyclic loading is influenced primarily by the state of the soil (i.e. void ratio, effective confining stresses, and soil structure) and the intensity and duration of the cyclic loading (i.e. cyclic shear stress and number of cycles), as well as the grain characteristics of the soil. Soil structure incorporates features such as fabric, age and cementation. Grain characteristics incorporate features such as grain size distribution, grain shape, and mineralogy.

Resistance to cyclic loading is usually represented in terms of a cyclic stress ratio or cyclic resistance ratio (CRR). For cyclic simple shear tests, CRR is taken as the ratio of the cyclic shear stress to cause cyclic liquefaction to the initial vertical effective stress; i.e. $(CRR)_{ss} = \tau_{cyc}/\sigma'_{vo}$. For cyclic triaxial tests, CRR is taken as the ratio of the maximum cyclic shear stress to cause cyclic liquefaction to the initial effective confining stress; i.e. $(CRR)_{tx} = \sigma_{dc}/2\sigma'_{3c}$. The two tests impose different loading conditions and the CRR values are not equivalent. Cyclic simple shear tests are generally considered to be better than cyclic triaxial tests at closely representing earthquake loading for level ground conditions. However, experience has shown that the $(CRR)_{ss}$ can be estimated quite well from $(CRR)_{tx}$, and correction factors have been developed (Ishihara, 1993). The CRR is typically taken at about 15 cycles of uniform loading to represent an equivalent earthquake loading of Magnitude (M) 7.5; i.e. $CRR_{7.5}$.

The CRR for any other size earthquake can be estimated using the following equation:

$$CRR = (CRR_{7.5})(MSF) \quad (1)$$

where:
MSF = magnitude scaling factor (recommended values are provided in the report by Youd et al. (1997), which summarizes the results of the 1996 NCEER Workshop).

It is common practice to define the point of 'liquefaction' in a cyclic laboratory test as the time at which the sample achieves a strain level of either 5% double-amplitude axial strain in a cyclic triaxial test or 3 to 4% double-amplitude shear strain in a cyclic simple shear test. For loose sand

projects for which the consequences of liquefaction may result in large costs. Therefore, there will always be a need for simple, economic procedures for estimating the CRR of sandy soils. Currently, the most popular simple method for estimating CRR makes use of the penetration resistance from the Standard Penetration Test (SPT) although, more recently, the Cone Penetration Test (CPT) has become very popular due to its greater repeatability and the continuous nature of its profile.

The late Professor H.B. Seed and his co-workers developed a comprehensive approach to estimate the potential for cyclic softening due to earthquake loading. The approach requires an estimate of the cyclic stress ratio (CSR) profile caused by a design earthquake. This is usually done based on a probability of occurrence for a given earthquake. A site specific seismicity analysis can be carried out to determine the design CSR profile with depth. A simplified method to estimate CSR was also developed by Seed and Idriss (1971) based on the maximum ground surface acceleration (a_{max}) at the site. This simplified approach can be summarized as follows:

$$CSR = \frac{\tau_{av}}{\sigma'_{vo}} = 0.65\left(\frac{a_{max}}{g}\right)\left(\frac{\sigma_{vo}}{\sigma'_{vo}}\right)r_d \qquad (3)$$

where τ_{av} is the average cyclic shear stress; a_{max} is the maximum horizontal acceleration at the ground surface; $g = 9.81 m/s^2$ is the acceleration due to gravity; σ_{vo} and σ'_{vo} are the total and effective vertical overburden stresses, respectively; and r_d is a stress reduction factor which is dependent on depth. The factor r_d can be estimating using the following tri-linear function, which provides a good fit to the average of the suggested range in r_d originally proposed by Seed and Idriss (1971):

$$\begin{aligned} r_d &= 1.0 - 0.00765\,z && \text{if } z < 9.15 \text{ m} \\ &= 1.174 - 0.0267\,z && \text{if } z = 9.15 \text{ to } 23 \text{ m} \\ &= 0.744 - 0.008\,z && \text{if } z = 23 \text{ to } 30 \text{ m} \\ &= 0.5 && \text{if } z > 30 \text{ m} \end{aligned} \qquad (4)$$

where z is the depth in metres. The first two formulae in Equation 4 (i.e. for depths less than 23 m) were recommended by Liao and Whitman (1986b). The third formula has been added here to provide a better match with the average of the range in r_d suggested by Seed and Idriss (1971) at depths between 23 m and 30 m. The fourth formula has been added as a conservative cutoff at large depths. These formulae are approximate, at best, and represent only average values since r_d shows considerable variation with increasing depth (Seed and Idriss, 1971). The CSR profile from the earthquake can be compared to the estimated CRR profile for the soil deposit, adjusted to the same magnitude using Equation 1. At any depth, if CSR is greater than CRR, cyclic softening (liquefaction) is possible. This approach is the most commonly used technique in most parts of the world for estimating soil liquefaction due to earthquake loading.

The CPT combined database is now larger than the original SPT-based database proposed by Seed et al. (1985). It is important to note that the simplified approach based on either the SPT or the CPT has many uncertainties. The correlations are empirical and there is some uncertainty over the degree of conservatism in the correlations as a result of the methods used to select representative values of penetration resistance within the layers assumed to have liquefied (Fear and McRoberts, 1995). A detailed review of the CPT data, similar to those carried out by Liao and Whitman (1986b) and Fear and McRoberts (1995) on SPT data, would be required to investigate the degree of conservatism contained in Figure 16 and Figure 17. The correlations are also sensitive to the amount and plasticity of the fines within the sand.

One reason for the continued use of the SPT has been the need to obtain a soil sample to determine the fines content of the soil. However, this has been offset by the poor repeatability of SPT data. With the increasing interest in the CPT due to its greater repeatability, several researchers (e.g. Robertson and Campanella, 1985; Olsen, 1988; Olsen and Malone, 1988; Olsen and Koester, 1995; Suzuki et al., 1995a & 1995b; Stark and Olson, 1995; Robertson and Fear, 1995) have developed a variety of approaches for evaluating cyclic liquefaction potential using CPT results. It is now possible to estimate grain characteristics such as apparent fines content and grain size from CPT data and incorporate this directly into the evaluation of liquefaction potential. The following is a modification and update of the CPT approach suggested by Robertson and Fear (1995).

As for the SPT, for the same CRR, the CPT penetration resistance in silty sands is smaller due to the greater compressibility and decreased permeability of silty sands. Robertson and Fear (1995) recommended an average correction, which was dependent on apparent fines content, but not on penetration resistance. Similar to the SPT, it is possible to correct the CPT penetration resistance based on grain characteristics, such as fines content, plasticity, etc. The proposed equation to obtain the equivalent clean sand normalized CPT penetration resistance, $(q_{c1N})_{cs}$, is a function of both the measured penetration resistance, q_{c1N}, and the grain characteristics of the soil, as follows:

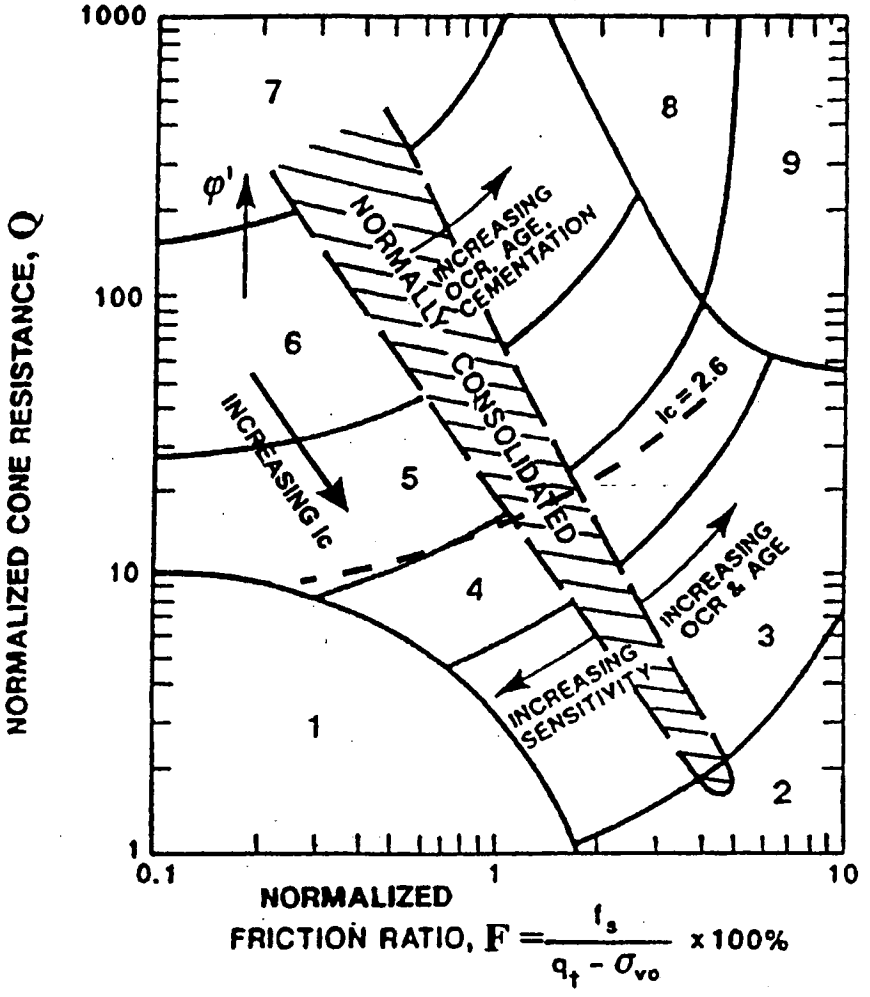
$$(q_{c1N})_{cs} = K_c \; q_{c1N} \tag{9}$$

where K_c is a correction factor that is a function of the grain characteristics of the soil, as described later in this paper.

Grain characteristics from the CPT

In recent years, charts have been developed to estimate soil type from CPT data (Olsen and Malone, 1988; Olsen and Koester, 1995; Robertson and Campanella, 1988; Robertson, 1990). Experience has shown that the CPT friction ratio (ratio of the CPT sleeve friction to the cone tip resistance) increases with increasing fines content and soil plasticity. Hence, grain characteristics

such as apparent fines content of sandy soils can be estimated directly from CPT data using any of these soil behaviour charts, such as that by Robertson (1990) shown in Figure 18. As a result, the measured penetration resistance can be corrected to an equivalent clean sand value. The addition of pore pressure data can also provide valuable additional guidance in estimating fines content. Robertson et al. (1992) suggested a method for estimating fines content based on the rate of pore pressure dissipation (t_{50}) during a pause in the CPT.



1. Sensitive, fine grained
2. Organic soils - peats
3. Clays - silty clay to clay
4. Silt Mixtures - clayey silt to silty clay
5. Sand Mixtures - silty sand to sandy silt
6. Sands - clean sand to silty sand
7. Gravelly sand to dense sand
8. Very stiff sand to clayey sand*
9. Very stiff, fine grained*

* *Heavily overconsolidated or cemented*

Figure 18 Normalized CPT soil behaviour type chart, as proposed by Robertson (1990).

Based on extensive field data and experience, it is possible to estimate grain characteristics directly from CPT results using the soil behaviour type chart shown in Figure 18. The boundaries between soil behaviour type Zones 2 to 7 can be approximated as concentric circles (Jefferies and Davies, 1993). The radius of each circle can then be used as a soil behaviour type index. Based on the CPT chart developed by Robertson (1990), the soil behaviour type index, I_c, can be defined as follows:

$$I_c = [\,(3.47 - \log Q)^2 + (\log F + 1.22)^2]^{0.5} \tag{10}$$

where $Q = \left(\frac{q_c - \sigma_{vo}}{P_{a2}}\right)\left(\frac{P_a}{\sigma'_{vo}}\right)^n$ is the normalized CPT penetration resistance, dimensionless; n = exponent, typically equal to 1.0; $F = [f_s/(q_c - \sigma_{vo})] \times 100\%$ is the normalized friction ratio, in percent; f_s is the CPT sleeve friction stress; σ_{vo} and σ'_{vo} are the total and effective overburden stresses, respectively; P_a is a reference pressure in the same units as σ'_{vo} (i.e. P_a=100 kPa if σ'_{vo} is in kPa); and P_{a2} is a reference pressure in the same units as q_c and σ_{vo} (i.e. P_{a2}=0.1 MPa if q_c and σ_{vo} are in MPa).

The soil behaviour type chart by Robertson (1990) uses a normalized cone penetration resistance (Q) based on a simple linear stress exponent of n = 1.0 (see above), whereas the chart recommended here for estimating CRR (see Figure 16) is essentially based on a normalized cone penetration resistance (q_{c1N}) based on a stress exponent n = 0.5 (see Equation 8). Olsen and Malone (1988) correctly suggested a normalization where the stress exponent (n) varies from around 0.5 in sands to 1.0 in clays. However, this normalization for soil type is somewhat complex and iterative.

The Robertson (1990) procedure using n=1.0 is recommended for soil classification in clay type soils when $I_c > 2.6$. However, in sandy soils when $I_c \leq 2.6$, it is recommended that data being plotted on the Robertson (1990) chart be modified by using n=0.5. Hence, the recommended procedure is to first use n = 1.0 to calculate Q and, therefore, an initial value of I_c for CPT data. If $I_c > 2.6$, the data should be plotted directly on the Robertson (1990) chart (and assume $q_{c1N} = Q$). However, if $I_c \leq 2.6$, the exponent to calculate Q should be changed to n = 0.5 (i.e. essentially calculate q_{c1N} using Equation 8 since $\sigma_{vo} << q_c$) and I_c should be recalculated based on q_{c1N} and F. If the recalculated I_c remains less than 2.6, the data should be plotted on the Robertson (1990) chart using q_{c1N} based on n = 0.5. If, however, I_c iterates above and below a value of 2.6, depending which value of n is used, a value of n = 0.75 should be selected to calculate q_{c1N} (using Equation 8) and plot data on the Robertson (1990) chart. Note that if the in-situ effective overburden stresses are in the order of 50 kPa to 150 kPa, the choice of normalization has little effect on the calculated normalized penetration resistance.

The boundaries of soil behaviour type are given in terms of the index, I_c, as shown in Table 4.

Plate L13

Table 4. Boundaries of soil behaviour type (after Robertson, 1990).

Soil Behaviour Type Index, I_c	Zone	Soil Behaviour Type (see Figure 18)
$I_c < 1.31$	7	Gravelly sand to dense sand
$1.31 < I_c < 2.05$	6	Sands: clean sand to silty sand
$2.05 < I_c < 2.60$	5	Sand Mixtures: silty sand to sandy silt
$2.60 < I_c < 2.95$	4	Silt Mixtures: clayey silt to silty clay
$2.95 < I_c < 3.60$	3	Clays: silty clay to clay
$I_c > 3.60$	2	Organic soils: peats

The soil behaviour type index does not apply to Zones 1, 8 or 9. Along the normally consolidated region in Figure 18, soil behaviour type index increases with increasing apparent fines content and soil plasticity, and the following simplified relationship is suggested:

if $I_c < 1.26$	Apparent fines content, FC (%) = 0	(11a)
if $1.26 \leq I_c \leq 3.5$	Apparent fines content, FC (%) = $1.75\ I_c^{3.25} - 3.7$	(11b)
if $I_c > 3.5$	Apparent fines content, FC (%) = 100	(11c)

The range of potential correlations is illustrated in Figure 19, which shows the variation of soil behaviour type index (I_c) with apparent fines content and the effect of the degree of plasticity of the fines. The recommended relationship given in Equation 11 is also shown in Figure 19. Note that this equation is slightly modified from the original work by Robertson and Fear (1995) in order to increase the prediction of apparent FC for a given value of I_c.

The proposed correlation between CPT soil behaviour index (I_c) and apparent fines content is approximate, since the CPT responds to many other factors affecting soil behaviour, such as soil plasticity, mineralogy, sensitivity and stress history. However, for small projects, the above correlation provides a useful guide. Caution must be taken in applying Equation 11 to sands that plot in the region defined by $1.64 < I_c < 2.36$ and $F < 0.5\%$ in Figure 18, so as not to confuse very loose clean sands with denser sands containing fines. In this zone, it is suggested that the apparent fines content is set equal to 5%, such that no correction will be applied to the measured CPT tip resistance when the CPT data plot in this zone. To evaluate the correlation shown in Figure 19 it is important to show the complete soil profile (CPT and samples; e.g. see Figure 24), since comparing soil samples with an adjacent CPT at the same elevation can be misleading due to soil stratigraphic changes and soil heterogeneity.

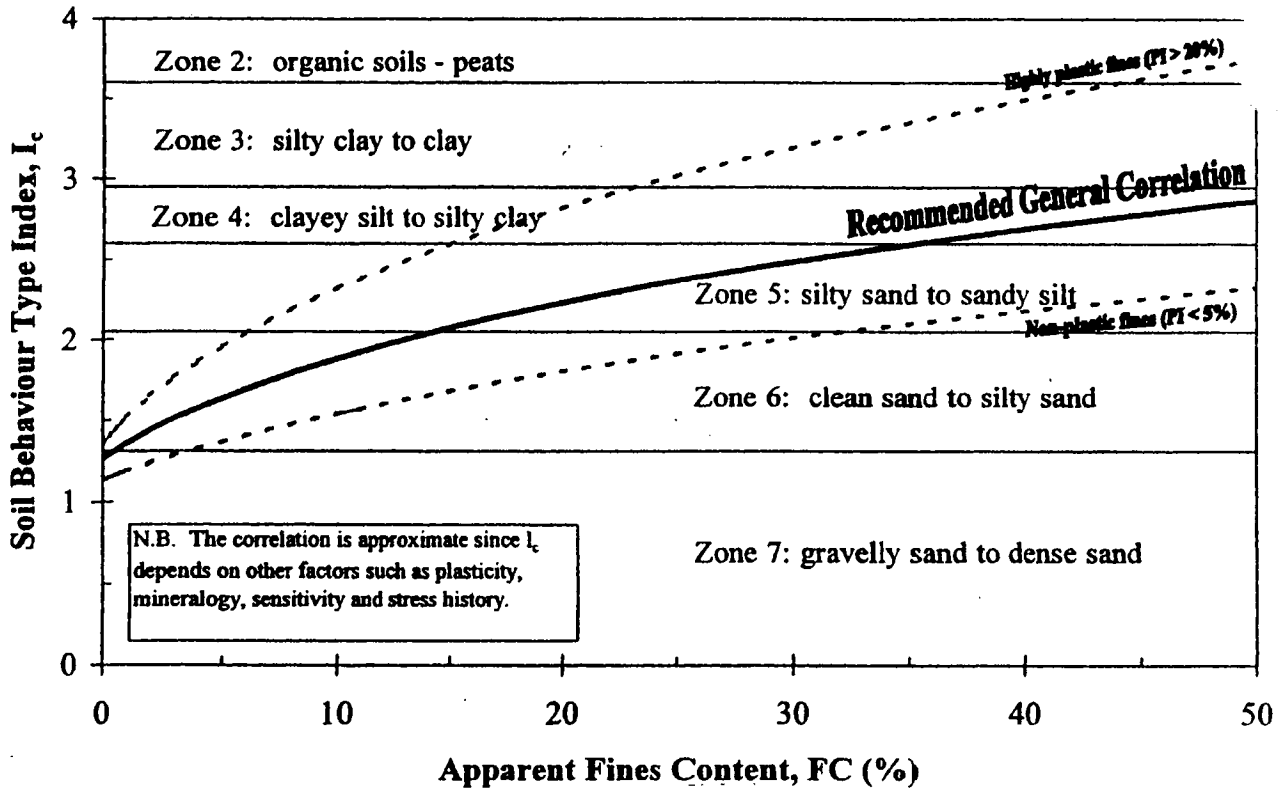


Figure 19 Variation of CPT soil behaviour type index (I_c) with apparent fines content or close to the normally consolidated zone of the soil behaviour chart Robertson (1990).

Based on the above method for estimating grain characteristics directly from the CPT using the soil behaviour index (I_c), the recommended relationship between I_c and the correction factor K_c is shown in Figure 20 and given by the following equations:

if $I_c \leq 1.64$ $\quad K_c = 1.0$ (12a)

if $I_c > 1.64$ $\quad K_c = -0.403\, I_c^4 + 5.581\, I_c^3 - 21.63\, I_c^2 + 33.75\, I_c - 17.88$ (12b)

The proposed correction factor, K_c, is approximate since the CPT responds to many factors, such as soil plasticity, fines content, mineralogy, soil sensitivity and stress history. However, for small projects or for initial screening on larger projects, the above correlation provides a useful guide. Caution must be taken in applying the relationship to sands that plot in the region defined by $1.64 < I_c < 2.36$ and $F \leq 0.5\%$ so as not to confuse very loose clean sands with sands containing fines. In this zone, it is suggested that the correction factor K_c be set to a value of 1.0 (i.e. assume that the sand is a clean sand).

Plate L15

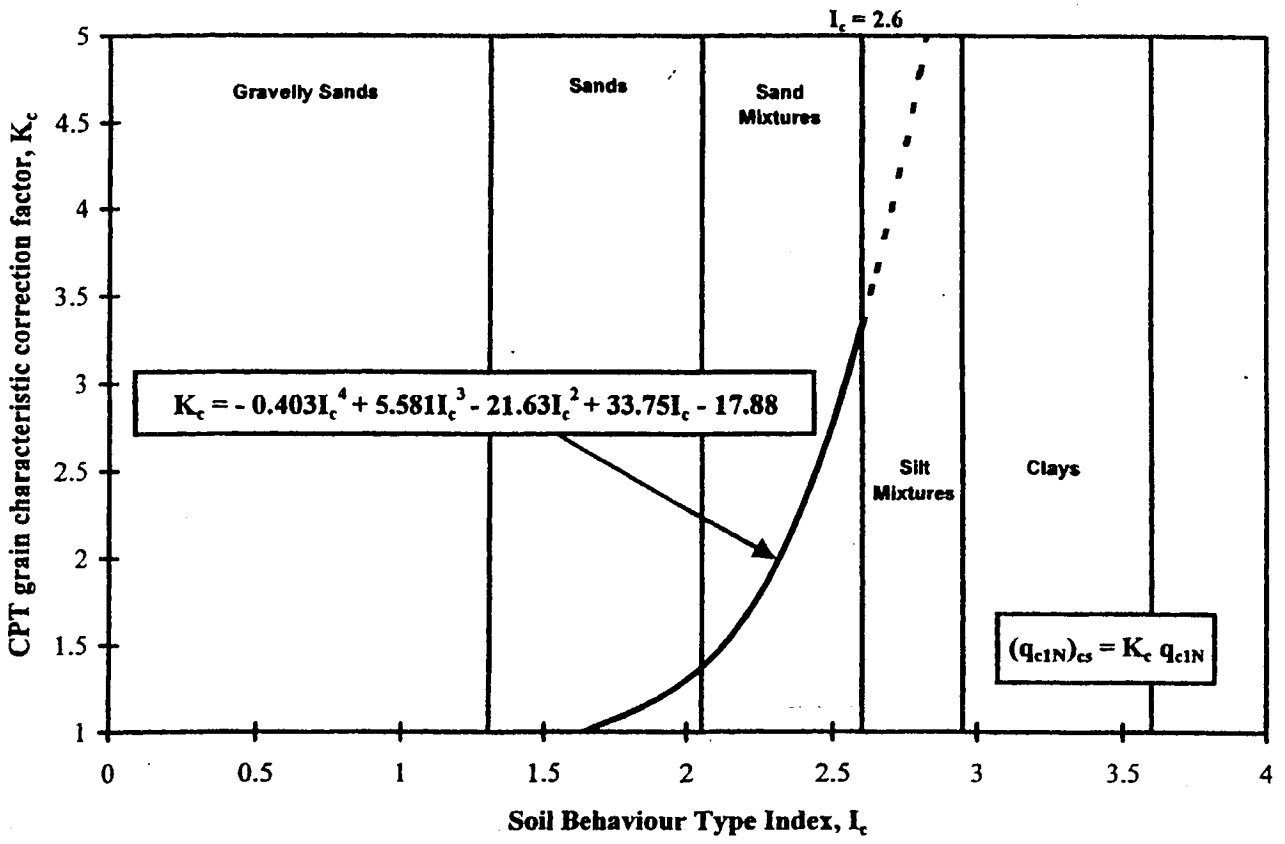


Figure 20 Recommended grain characteristic correction to obtain clean sand equivalent CPT penetration resistance in sandy soils.

Note that the relationship between the recommended correction factor, K_c, and soil behaviour type index, I_c, is shown dashed beyond an I_c of 2.6, which corresponds to an approximate apparent fines content of 35%. Soils with $I_c > 2.6$ fall into the clayey silt, silty clay and clay regions of the CPT soil behaviour chart (i.e. Zones 3 and 4). When the CPT indicates soils in these regions ($I_c > 2.6$), samples should be obtained and evaluated using the criteria shown in Figure 9. It is reasonable to assume, in general, that soils with $I_c > 2.6$ are non-liquefiable and that the correction K_c could be large. Soils that fall in the lower left region of the CPT soil behaviour chart (Figure 18), defined by $I_c > 2.6$ and $F \leq 1.0\%$, can be very sensitive and, hence, possibly susceptible to both cyclic and/or flow liquefaction. Soils in this region should be evaluated using criteria such as that shown in Figure 9 combined with additional testing.

Figure 21 shows the resulting equivalent CRR curves for I_c values of 1.64, 2.07 and 2.59 which represent approximate apparent fines contents of 5%, 15% and 35%, respectively.

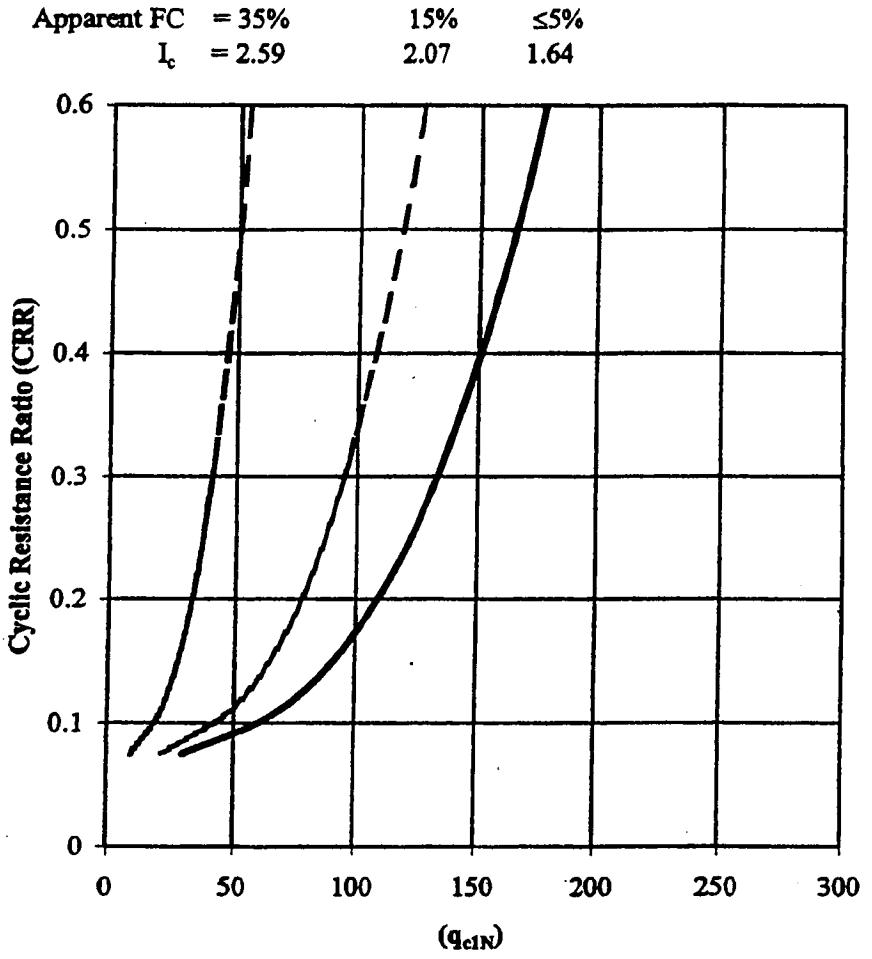


Figure 21 **CPT base curves for various values of soil behaviour index, I_c (corresponding to various apparent fines contents, as indicated).**

Influence of thin layers

A problem associated with the interpretation of penetration tests in interbedded soils occurs when thin sand layers are embedded in softer deposits. Theoretical as well as laboratory studies show that the cone resistance is influenced by the soil ahead of and behind the penetrating cone. The cone will start to sense a change in soil type before it reaches the new soil and will continue to sense the original soil even when it has entered a new soil. As a result, the CPT will not always measure the correct mechanical properties in thinly interbedded soils. The distance over which the cone tip senses an interface increases with increasing soil stiffness. In soft soils, the diameter of the sphere of influence can be as small as 2 to 3 cone diameters, whereas, in stiff soils, the sphere of influence can be up to 20 cone diameters. Hence, the cone resistance can fully respond (i.e. reach full value within the layer) in thin soft layers better than in thin stiff layers. Care should, therefore, be taken when interpreting cone resistance in thin sand layers located within soft clay or silt deposits. Based on a simplified elastic solution, Vreugdenhil et al. (1994) have

provided some insight as to how to correct cone data in thin layers. Vreugdenhil et al. (1994) have shown that the error in the measured cone resistance within thin stiff layers is a function of the thickness of the layer as well as the stiffness of the layer relative to that of the surrounding softer soil. The relative stiffness of the layers is reflected by the change in cone resistance from the soft surrounding soil to the stiff soil in the layer (q_{cA}/q_{cB}). Vreugdenhil et al. (1994) validated the model with laboratory and field data.

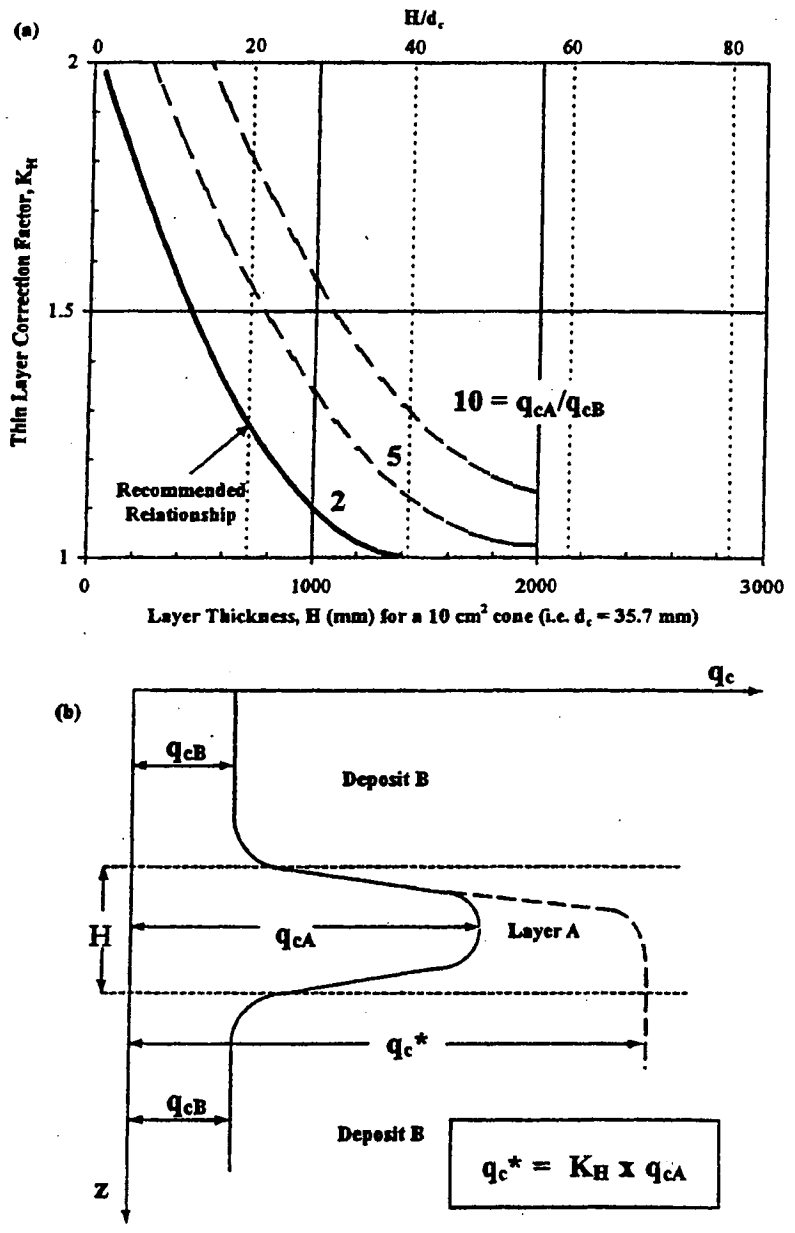


Figure 22 **Suggested correction (K_H) to CPT penetration resistance in thin sand layers (based on results by Vreugdenhil et al., 1994) (after Robertson and Fear, 1995).**

Based on this work, Robertson and Fear (1995) suggested a correction factor for cone resistance (originally termed K_c by Robertson and Fear (1995), but now termed K_H in order to prevent confusion with the correction outlined above for obtaining clean sand equivalent penetration resistance) as a function of layer thickness (H), as shown in Figure 22. The corrections apply only to thin sand layers embedded in thick fine-grained layers. The corrections appear to have a reasonable trend, but are rather large. Therefore, Robertson and Fear (1995) recommended a conservative correction (corresponding to $(q_{cA}/q_{cB}) = 2$) as is shown in Figure 22 and given by the following expression:

$$K_H = 0.5\left(\frac{H/d_c}{28} - 1.45\right)^2 + 1.0 \qquad (13)$$

where H is the layer thickness, in mm, for $H < 40.6\ d_c$; q_{cA} and q_{cB} are the tip resistances in the layer and in the soil surrounding the layer, respectively; and d_c is the cone diameter, in mm (e.g. for a 10 cm^2 cone, d_c=35.7 mm).

Thin sand layers embedded in soft clay deposits are often incorrectly classified as silty sands based on the CPT soil behaviour type charts. Hence, a slightly improved classification can be achieved if the cone resistance is first corrected for layer thickness before applying the classification charts.

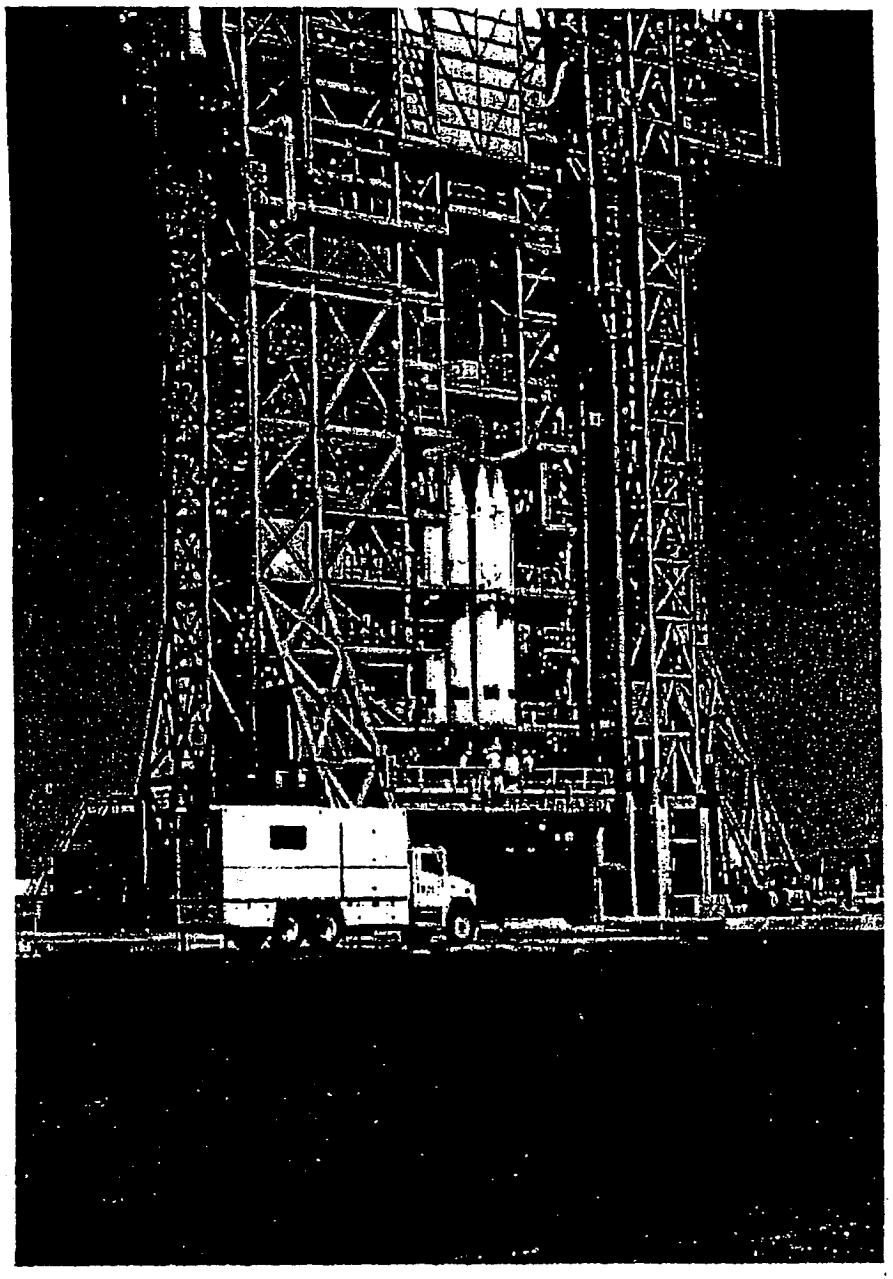
Cyclic resistance from the CPT

In an earlier section, a method was suggested for estimating apparent fines content directly from CPT results, using Equation 11. Following the traditional SPT approach, the estimated apparent fines content could be used to estimate the correction necessary to obtain the clean sand equivalent penetration resistance. However, since other grain characteristics also influence the measured CPT penetration resistance, it is recommended that the necessary correction be estimated from the soil behaviour type index, as described above. Hence, Equations 9, 10 and 12 can be combined to estimate the equivalent clean sand normalized penetration resistance, $(q_{c1N})_{cs}$, directly from the measured CPT data. Then, using the equivalent clean sand normalized penetration resistance $(q_{c1N})_{cs}$, the CRR (for M = 7.5) can be estimated using the following simplified equation (which approximates the clean sand curve recommended in Figure 16):

$$\text{if } 50 \le (q_{c1N})_{cs} < 160 \qquad CRR = 93\left(\frac{(q_{c1N})_{cs}}{1000}\right)^3 + 0.08 \qquad (14a)$$

$$\text{if } (q_{c1N})_{cs} < 50 \qquad CRR = 0.833\left(\frac{(q_{c1N})_{cs}}{1000}\right) + 0.05 \qquad (14b)$$

In summary, Equations 9 to 12 and 14 (and Equation 13 if thin layers are present) can be combined to provide an integrated method for evaluating the cyclic resistance (M=7.5) of



LIQUEFACTION EVALUATION USING THE CPT

Peter Robertson

ASCE, LA section meeting 2000

ASCE Local Geotechnical Section Meeting, 2000

Complements of:
Gregg In Situ, Inc.
Gregg Drilling & Testing, Inc.
2726 Walnut Avenue
Signal Hill, California 90806
Phone: 562-427-6899

Plate L15

All Colonum are in Sheet 2, except wherever mentioned.

Col. "F" Col. "G"

q_c : tip resistance, f_s : sleeve friction

σ_{vo} , σ_{vo}' : in-situ vertical total and effective stress → Calculated in sheet "5" and copied to Col.s "K" and "L"

units: all in kPa

initial stress exponent : $n = 1.0$ and calcualte Q, F, and I_c

if $I_c <= 1.64$, $n = 0.5$

if $1.64 < I_c < 3.30$, $n = (I_c - 1.64)*0.3 + 0.5$

if $I_c >= 3.30$, $n = 1.0$

iterate until the change in n, $\Delta n < 0.01$

if $\sigma_{vo}' > 300$ kPa, let $n = 1.0$ for all soils

Ten iterations are performed in sheet "3" and $\Delta n < 0.01$ is chec at the last column. Final Q & Ic are duplicated in Col. "N" and Col. "O"

$$C_n = \left(\frac{100}{\sigma_{vo}'}\right)^n$$ → Iterated in sheet "3"

Col. "N"

$$Q = \frac{(q_c - \sigma_{vo})}{100} \cdot C_n \quad , \quad F = \frac{f_s}{(q_c - \sigma_{vo})} \cdot 100$$ Col "M"

$$I_c = \sqrt{\left[(3.47 - \log Q)^2 + (1.22 + \log F)^2\right]}$$ Col. "O" → Soil Type Col. "P"

if $I_c <= 1.64$, $K_c = 1.0$

if $1.64 < I_c < 2.60$, $K_c = -0.403 I_c^4 + 5.581 I_c^3 - 21.63 I_c^2 + 33.75 I_c - 17.88$

if $I_c >= 2.60$, evaluate using other criteria; likely non-liquefiable if $F > 1\%$

<u>BUT</u>, if $1.64 < I_c < 2.36$ <u>and</u> $F < 0.5\%$, set $K_c = 1.0$

Col. "S"

$$(q_{c1N})_{cs} = K_c \cdot Q$$ Col. "T"

$$CRR_{7.5} = 93 \cdot \left(\frac{(q_{c1N})_{cs}}{1000}\right)^3 + 0.08, \quad \text{if } 50 <= (q_{c1N})_{cs} < 160$$

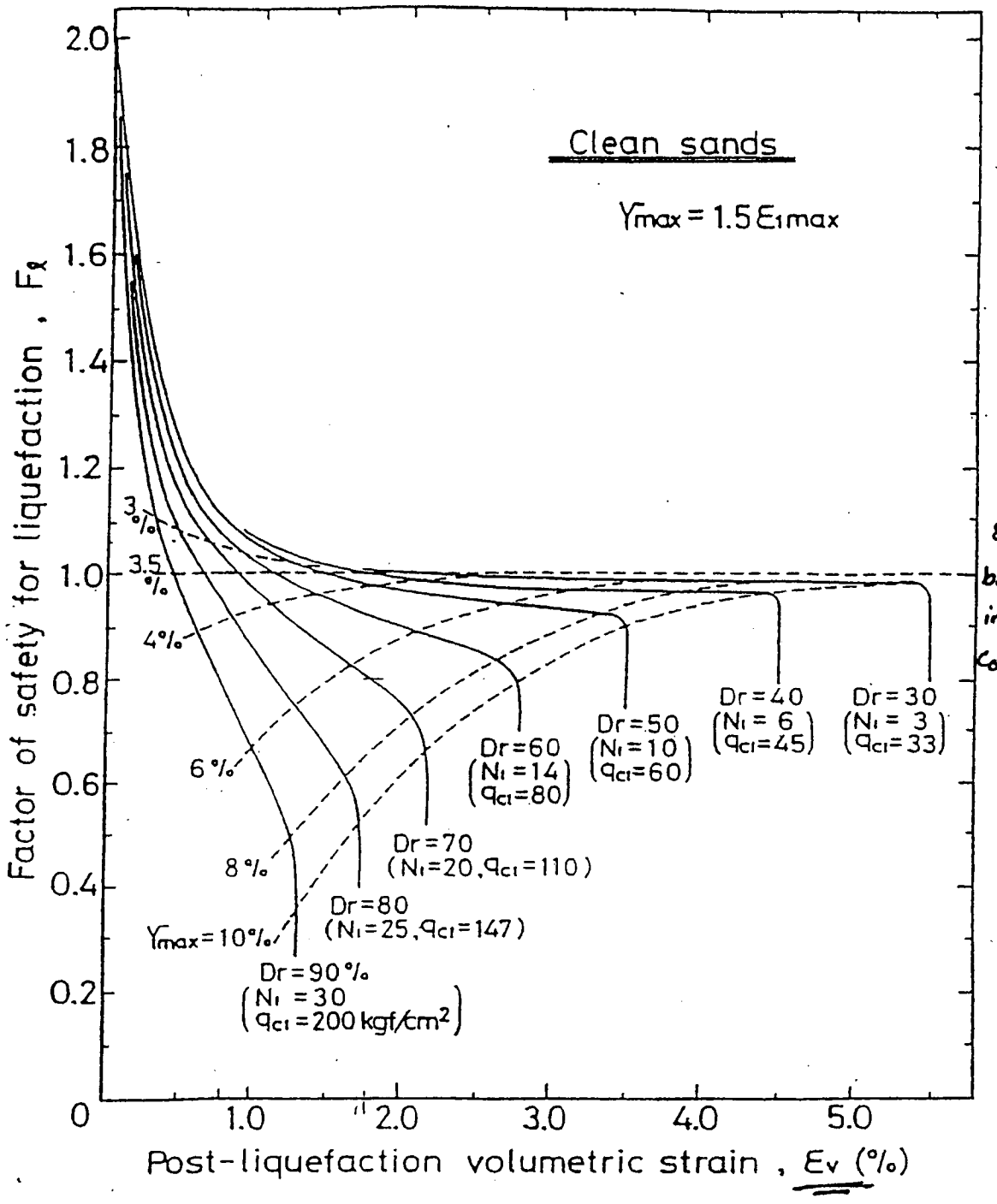
$$CRR_{7.5} = 0.833 \cdot \left(\frac{(q_{c1N})_{cs}}{1000}\right) + 0.05, \quad \text{if } (q_{c1N})_{cs} < 50$$

Col. "U"

if $I_c >= 2.60$, evaluate using other criteria; likely non-liquefiable if $F > 1\%$

Flowchart for evaluation of $CRR_{7.5}$ by CPT based Robertson and Wride's (1997) method

Plate 1



ε_v is calculated based on this chart in sheet "4", Col.s "C" and "F".

Figure A-1: Post-Liquefaction Volumetric Strain as a Function of Factor of Safety With Respect to Liquefaction (Ishihara & Yoshimi 1990)

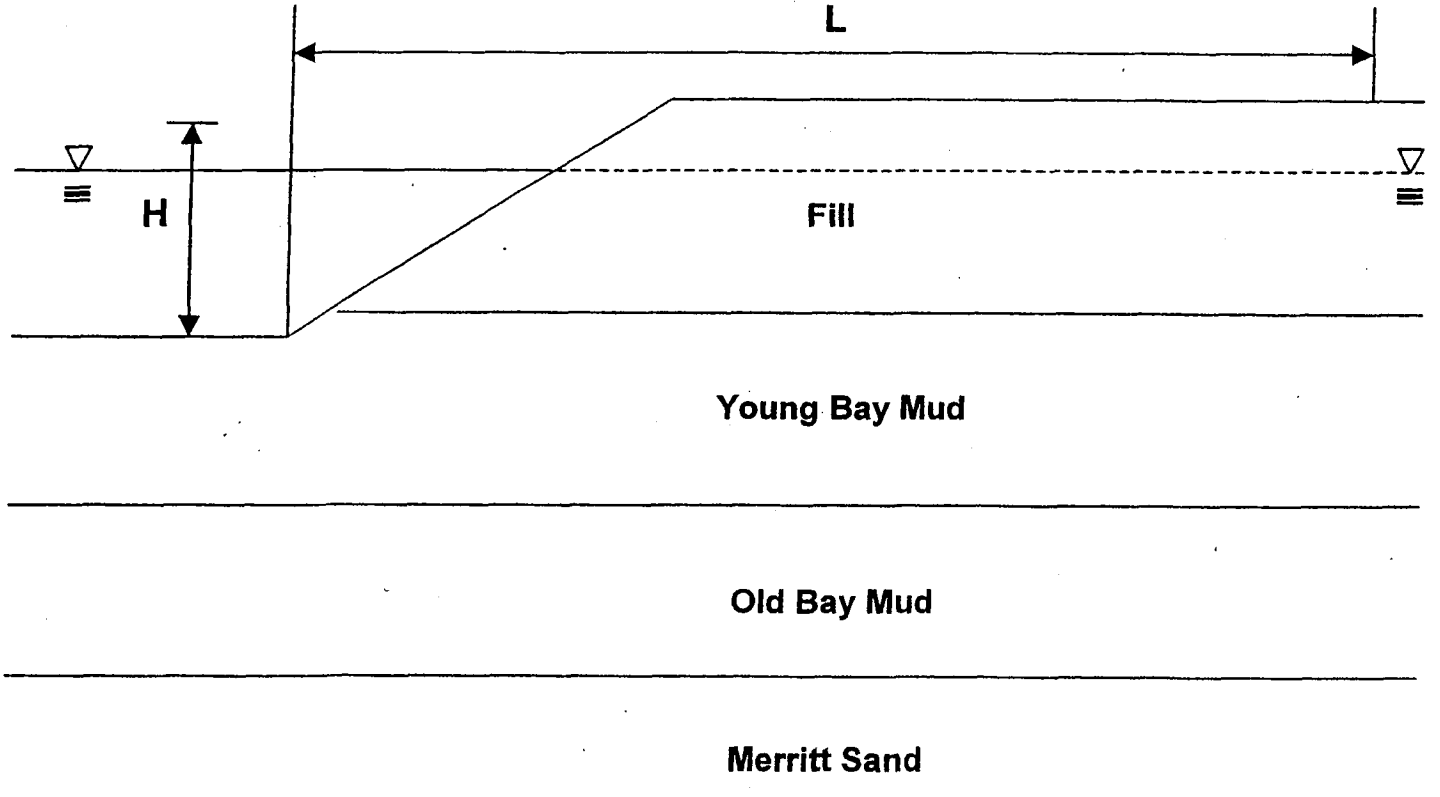
Cumulative liquefaction induced settlements are calculated in Col.s "E" and "H" of sheet "4" and are duplicated in Cols. "AC" and "AD" of sheet "2".

ATTACHMENT L2

ATTACHMENT L2

EXCEL SPREADSHEET FOR EMPIRICAL EVALUATION OF LATERAL SPREAD DISPLACEMENTS

An EXCEL Spreadsheet was developed to numerically model the empirical method used to estimate the order of magnitude of lateral spread displacements (Bartlett and Youd, 1995; Youd et al., 2002). Equation 6a of Youd et al. (2002) for "free face" conditions (steep slope condition) was numerically modeled in the spreadsheet. The variables of the equation are defined on the attached spreadsheet and are also described in detail in Youd et al. (2002). The properties of the site granular, potentially liquefiable soils, which are used in the equation (grain size distribution characteristics) were obtained from the results of laboratory tests performed on the site soils (Appendix H). Lateral spread displacements were estimated for five critical cross sections along the site perimeter slopes. These were Cross Sections D-D', E-E' and F-F' along the site western perimeter slope and Cross Sections G-G' and H-H' along the southern site perimeter slope. Lateral displacements were estimated to largely exceed the limiting displacement of about 20 feet [the upper limit of lateral displacements that can be reliably predicted using Youd et al. (2002) equation].



REVISED Mulilinear Regresion (MLR) EQUATIONS FOR PREDICTING LATERAL SPREAD DISPLACEMENT
by T. Leslie Youd, Corbett M. Hansen, and Steven F. Bartlett
Paper Accepted for Publication in the Journal of Geotechnical and Geoenviromental Engineering, 2002

REVISED MLR EQUATIONS FOR PREDICTING LATERAL SPREAD DISPLACEMENT
by T. Leslie Youd, Corbett M. Hansen, and Steven F. Bartlett
Proceedings of the 7th U.S.-Japan Workshop on Earthquake Resistant Design of Lifeline Facilities and Countermeasures Against Soil Liquefaction, MCEER, August 15-17 1999, Seattle, Washington.

EMPIRICAL PREDICTION OF LIQUEFACTION-INDUCED LATERAL SPREAD
by Steven F. Barlett and T. Leslie Youd
Journal of Geotechnical Engineering, Volume 121, No. 4, April, 1995

Parameters for Analyses

D = Dh = Estimated lateral ground displacement in meters (multiply by 3.28 to convert to feet)
$D50_{15}$ = Average mean grain size in granular layers included in T_{15}, in millimeters (D50 < 1 mm)
F_{15} = Average fines content (percent passing No. 200 Sieve) for granular layers included in T_{15}, in percent ($0<F_{15}<50\%$)
M = Earthquake moment magnitude (6 < M < 8)
R = Horizontal distance from the seismic energy source, in kilometers (miles multiplied by 1.6093)
R_o = Minimum Horizontal distance based on M from the following table, in kilometers (miles multiplied by 1.6093)
S = Groundslope, in percent (0.1 < S < 6%)
T_{15} = Cumulative thickness of saturated granular layers with corrected blow counts, (N1)60, less than 15, in meters {feet multiplied by 0.3048} (1 < T15 < 15 m)
W = 100 H/L = Ratio of the Height (H) of the free face to the distance (L) from the base of the free face to the point in question, in percent [Figure 2] (1 < W < 20%)

Required Inputs

Free-Face Conditions (Youd et al., 2002, Equation 6a, p.10)

$$\mathrm{Log}(D) = -16.713+1.532(M)-1.406\mathrm{Log}(R^*)-0.012(R)+0.592\mathrm{Log}(W)+0.540\mathrm{Log}(T_{15})+3.413\mathrm{Log}(100-F_{15})-0.795\mathrm{Log}(D50_{15}+0.1\mathrm{mm})$$

Note: Equation does not take direct slope dimensions into account. Deformations more than 6 meters associate with uncertainties.

SITE 2

Case No.	D-D'	E-E'	F-F'	G-G'	H-H'	D-D'	E-E'	F-F'	G-G'	H-H'	D-D'	E-E'	F-F'	G-G'	H-H'	D-D'	E-E'	F-F'	G-G'	H-H'	D-D'	E-E'	F-F'	G-G'	H-H'	D-D'	E-E'	F-F'	G-G'	H-H'
H (m)	6.1	12.8	13.7	8.23	7.62	6.1	12.8	13.7	8.23	7.62	6.1	12.8	13.7	8.23	7.62	6.1	12.8	13.7	8.23	7.62	6.1	12.8	13.7	8.23	7.62	6.1	12.8	13.7	8.23	7.62
L (m)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
$D50_{15}$ (mm)	0.05	0.05	0.05	0.05	0.05	0.15	0.15	0.15	0.15	0.15	0.25	0.25	0.25	0.25	0.25	0.05	0.05	0.05	0.05	0.05	0.15	0.15	0.15	0.15	0.15	0.25	0.25	0.25	0.25	0.25
F_{15} (%)	10	16.65	17.5	6.77	11.35	10	16.65	17.5	6.77	11.35	10	16.65	17.5	6.77	11.35	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
M (mag.)	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
R (km)	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Ro (km)	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60	24.60
T_{15} (m)	5.5	4	10.97	9.45	7.31	5.5	4	10.97	9.45	7.31	5.5	4	10.97	9.45	7.31	5.5	4	10.97	9.45	7.31	5.5	4	10.97	9.45	7.31	5.5	4	10.97	9.45	7.31
W (%)	61.00	128.00	137.00	82.30	76.20	61.00	128.00	137.00	82.30	76.20	61.00	128.00	137.00	82.30	76.20	30.50	64.00	68.50	41.15	38.10	30.50	64.00	68.50	41.15	38.10	30.50	64.00	68.50	41.15	38.10
D (meters)	42.4	39.5	68.3	77.4	52.7	26.5	24.6	42.7	48.3	32.9	19.4	18.1	31.3	35.4	24.1	28.9	36.6	65.9	45.9	38.2	18.1	22.8	41.1	28.6	23.9	13.2	16.7	30.2	21.0	17.5
D (feet)	139.1	129.5	224.2	253.7	173.0	86.8	80.8	139.9	158.3	107.9	63.6	59.3	102.6	116.1	79.1	94.9	120.0	216.3	150.5	125.4	59.2	74.9	135.0	93.9	78.2	43.4	54.9	98.9	68.9	57.3

Note:
Estimated lateral spread displacements are all greater than 6 m (approximately 19 ft).
Predicted displacements greater than 6 m are poorly constrained and uncertain. In general, engineering practices do not use predicted displacements greater than 6 m. However, such large predicted displacements do indicate that displacements are likely to be large.

APPENDIX M

SLOPE STABILITY ANALYSIS RESULTS

1.0 CALCULATION COVER SHEET

PROJECT: NAS Alameda IR Site 2 (Former Naval Air Station, Alameda, California)

SUBJECT: Static and Pseudo-Static Slope Stability Analysis Results

IMPORTANT TO SAFETY ☒ **ASME** ☐ **NOT IMPORTANT TO SAFETY** ☐

CLIENT: Foster Wheeler / USNAVY **PROJECT NO:** 01-0810

CALCULATION NO: 02 **NUMBER OF PAGES:** _____

CALCULATION BY OTHERS: **YES** ☐ **NO** ☒

PREPARER: Julio E. Badel Julio E. Badel

CHECKER: Ben Hushmand Ben Hushmand

VERIFIER: Dr. Bill Lu Julio E. Badel For.

APPROVED BY: Ben Hushmand Ben Hushmand **DATE:** 9-5-2002

ASSUMPTIONS THAT REQUIRE CONFIRMATION: **YES** ☐ **NO** ☒

CONFIRMED BY: _____ **DATE:** _____ **INITIAL:** _____

PRINT NAME, DATE AND INITIAL

Rev No	Affected Pages	Prepared by Date	Checked by Date	Verified by Date
1	ALL	Julio E. Badel Badel 9/5/02	Ben Hushmand Ben Hushmand 9/5/02	Bill Lu BL 9/5/02.

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1.0 CALCULATION COVER SHEET

2.0 SLOPE STABILITY ANALYSIS RESULTS

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FIGURE M-2 Seismically-Induced Displacements
FIGURE M-3 Seismically-Induced Slope Displacements versus Yield Accelerations

3.0 PC-STABL-5M INPUT FILES AND OUTPUT PLOTS

APPENDIX M

SLOPE STABILITY ANALYSIS RESULTS

This appendix contains Slope Stability Analysis Results for Cross Sections C-C' through I-I' shown in plan view in Figure M-1.

The computer program PC-STABL-5M (Achilleos, 1988) was used to calculate the factors of safety against potential failure. Specifically, this appendix includes input files followed by plots illustrating geometries of the Installation Restoration Site 1 perimeter slope cross sections and the ten most critical potential failure planes searched by the program, as well as computed factors of safety. The failure plane with the lowest factor of safety is identified with two arrows at its initiation and termination points.

Most critical surfaces identified during an initial extensive search based on the simplified Janbu/Bishop methods of analysis were subsequently analyzed using the more rigorous Spencer's method of analysis.

Potential Sliding Mass and Yield Accelerations

Yield accelerations were computed from a series of pseudo-static analyses. As for the static cases, the pseudo-static slope stability analyses showed that the most critical potential failure mechanism considered is a circular failure or a wedge (block) failure plane sliding mostly through the Young Bay Mud and then through the existing overlying fill and the proposed landfill cover.

The computed yield acceleration coefficient (K_y) represents a limiting value of the horizontal seismic coefficient beyond which movement of a slide mass would likely occur (namely, seismic coefficient resulting in a factor of safety equal to 1.0).

Dynamic Site Response

As discussed in Section 4.6.3, dynamic response of the landfill and average acceleration time history of the potential sliding mass were evaluated for three representative input ground motions. Although the site has a two-dimensional geometry along the shoreline, the state-of-practice in most cases is, to compute one-dimensional dynamic response of a representative soil/landfill waste column, which generally provides a conservative estimate of the site seismic response.

Using the computed time histories of shear stresses and accelerations for different soil layers within the soil/landfill waste column, average accelerations of the potential slide mass were computed.

Seismically Induced Permanent Displacement Analyses

The effects of earthquake shaking on the landfill slopes were evaluated by estimating seismically induced permanent displacements using Newmark-type pseudo-dynamic double-integration deformation analysis methods (Houston et al., 1987; Newmark, 1965).

During an earthquake, over numerous cycles of loading, a slide mass can move incrementally along a potential failure plane through displacement accumulation. The seismically induced permanent displacement of the potential sliding mass occurs whenever the driving force exceeds the resisting force. Therefore, if the average induced acceleration on a potential sliding mass is larger than its yield acceleration (the acceleration at which the potential mass will just begin to move), the movement will start and stop when the direction of the ground acceleration is reversed and the average acceleration becomes less than the yield acceleration. By double integration of the part of the average acceleration time history that exceeds the yield acceleration, permanent displacements are calculated. This procedure is schematically shown in Figure M-2.

The maximum seismic-induced displacement depends primarily on the characteristics of the site design earthquake ground motion (peak acceleration, frequency content, and duration) and the dynamic response characteristics of the landfill and its foundation soils. Figures M-3a through M-3c summarize the results of the estimated seismically induced permanent displacements (computed using a Newmark-type double-integration method applied to the average acceleration time history of the potential sliding mass) versus the yield seismic coefficient (K_y). These analyses use, as input, the average acceleration time history of the potential sliding mass estimated from the one-dimension dynamic SHAKE91 response analyses.

Table M-1 provides typical properties of compacted soils used to select shear strength properties of the assumed landfill cover. Table M-2 summarizes the estimated K_y values (as a fraction of the gravitational acceleration, g) and potential slide mass displacements in feet. Plots of the potential failure planes and values of computed yield accelerations are also provided here.

References:

Achilleos, E. 1988. *User's Guide for PC-STABL-5M, Informational Report.* Purdue University, Lafayette, Indiana.

Houston, S.L, W.N. Houston, and J.M. Padilla. 1987. *Microcomputer-Aided Evaluation of Earthquake-Induced Permanent Slope Displacements.* Microcomputers in Civil Engineering, pp. 207-222.

Naval Facilities Engineering Command (NAVFAC). 1982. *Design Manual (DM-7.02: Foundations & Earth Structures).*

Newmark, N.M. 1965. *Effects of Earthquakes on Dams and Embankments.* Fifth Rankine Lecture, Geotechnique, Volume 15, No. 2, pp. 139-160.

TABLE M-1
Typical Properties of Compacted Soils (Source: NAVFAC, DM-7.02, 1982)

Group Symbol	Soil Type	Range of Maximum Dry Unit Weight, pcf	Range of Optimum Moisture, Percent	Typical Value of Compression: At 1.4 tsf (20 psi)	Typical Value of Compression: At 3.6 tsf (50 psi)	Typical Strength Characteristics: Cohesion (as compacted) psf	Typical Strength Characteristics: Cohesion (saturated) psf	Typical Strength Characteristics: ϕ (Effective Stress Envelope Degrees)	Typical Strength Characteristics: Tan ϕ	Typical Coefficient of Permeability ft./min.	Range of CBR Values	Range of Subgrade Modulus k lbs/cu in.
				Percent of Original Height								
GW	Well graded clean gravels, gravel-sand mixtures.	125 - 135	11 - 8	0.3	0.6	0	0	>38	>0.79	5×10^{-2}	40 - 80	300 - 500
GP	Poorly graded clean gravels, gravel-sand mix	115 - 125	14 - 11	0.4	0.9	0	0	>37	>0.74	10^{-1}	30 - 60	250 - 400
GM	Silty gravels, poorly graded gravel-sand-silt.	120 - 135	12 - 8	0.5	1.1	.....	.....	>34	>0.67	$>10^{-6}$	20 - 60	100 - 400
GC	Clayey gravels, poorly graded gravel-sand-clay.	115 - 130	14 - 9	0.7	1.6	.....	.....	>31	>0.60	$>10^{-7}$	20 - 40	100 - 300
SW	Well graded clean sands, gravelly sands.	110 - 130	16 - 9	0.6	1.2	0	0	38	0.79	$>10^{-3}$	20 - 40	200 - 300
SP	Poorly graded clean sands, sand-gravel mix.	100 - 120	21 - 12	0.8	1.4	0	0	37	0.74	$>10^{-3}$	10 - 40	200 - 300
SM	Silty sands, poorly graded sand-silt mix.	110 - 125	16 - 11	0.8	1.6	1050	420	34	0.67	$5 \times >10^{-5}$	10 - 40	100 - 300
SM-SC	Sand-silt clay mix with slightly plastic fines.	110 - 130	15 - 11	0.8	1.4	1050	300	33	0.66	$2 \times >10^{-6}$	5 - 30	100 - 300
SC	Clayey sands, poorly graded sand-clay-mix.	105 - 125	19 - 11	1.1	2.2	1550	230	31	0.60	$5 \times >10^{-7}$	5 - 20	100 - 300
ML	Inorganic silts and clayey silts.	95 - 120	24 - 12	0.9	1.7	1400	190	32	0.62	$>10^{-5}$	15 or less	100 - 200
ML-CL	Mixture of inorganic silt and clay.	100 - 120	22 - 12	1.0	2.2	1350	460	32	0.62	$5 \times >10^{-7}$	.....	
CL	Inorganic clays of low to medium plasticity.	95 - 120	24 - 12	1.3	2.5	1800	270	28	0.54	$>10^{-7}$	15 or less	50 - 200
OL	Organic silts and silt-clays, low plasticity.	80 - 100	33 - 21	.....	.....	.....	.....	.....	.....	.....	5 or less	50 - 100
MH	Inorganic clayey silts, elastic silts.	70 - 95	40 - 24	2.0	3.8	1500	420	25	0.47	$5 \times >10^{-7}$	10 or less	50 - 100
CH	Inorganic clays of high plasticity	75 - 105	36 - 19	2.6	3.9	2150	230	19	0.35	$>10^{-7}$	15 or less	50 - 150
OH	Organic clays and silty clays	65 - 100	45 - 21	.....	.....	.....	.....	.....	.....	.....	5 or less	25 - 100

Notes:

1. All properties are for condition of "Standard Proctor" maximum density, except values of k and CBR which are for "modified Proctor" maximum density.
2. Typical stength characteristics are for effective strength envelopes and are obtained from USBR data.
3. Compression values are for vertical loading with complete lateral confinement.
4. (>) indicates that typical property is greater than the value shown.
   (..) indicates insufficient data available for an estimate.

TABLE M-2

SUMMARY OF SLOPE STABILITY ANALYSIS RESULTS

Analysis Cross Section	Static Factor of Safety	Remarks	Yield Acceleration K_y (g), and Seismic Permanent Displacement * (feet)	
			K_y (1)	* (3)
[C-C']	1.46 [S](2)	Static Slope Stability, Circular Failure Surface	--	--
	1.55 [S](2)	Static Slope Stability, Block Failure Surface	--	--
	3.18 [S](2)	Long-term Slope Stability, Circular Failure Surface	--	--
	3.74 [S](2)	Long-term Slope Stability, Block Failure Surface	--	--
	1.00 [S](2)	Pseudo-static, Circular Failure Surface, Averaged Existing and Post-earthquake, Soil Properties	0.03	19
	1.00 [S](2)	Pseudo-static, Block Failure Surface, Averaged Existing and Post-earthquake, Soil Properties	0.03	19
	1.06 [S](2)	Post-earthquake, Static Slope Stability, Circular Failure Surface	--	--
	1.18 [S](2)	Post-earthquake, Static Slope Stability, Block Failure Surface	--	--
[D-D']	1.69 [S](2)	Static Slope Stability, Circular Failure Surface	--	--
	1.79 [S](2)	Static Slope Stability, Block Failure Surface	--	--
	1.00 [S](2)	Pseudo-static, Circular Failure Surface, Averaged Existing and Post-earthquake, Soil Properties	0.03	19
	1.00 [S](2)	Pseudo-static, Block Failure Surface, Averaged Existing and Post-earthquake, Soil Properties	0.04	14
	1.13 [S](2)	Post-earthquake, Static Slope Stability, Circular Failure Surface	--	--
	1.19 [S](2)	Post-earthquake, Static Slope Stability, Block Failure Surface	--	--
[E-E']	1.77 [S](2)	Static Slope Stability, Circular Failure Surface	--	--
	2.07 [S](2)	Static Slope Stability, Block Failure Surface	--	--
	1.00 [S](2)	Pseudo-static, Circular Failure Surface, Averaged Existing and Post-earthquake, Soil Properties	0.04	14
	1.00 [S](2)	Pseudo-static, Block Failure Surface, Averaged Existing and Post-earthquake, Soil Properties	0.04	14
	1.02 [S](2)	Post-earthquake, Static Slope Stability, Circular Failure Surface	--	--
	1.12 [S](2)	Post-earthquake, Static Slope Stability, Block Failure Surface	--	--
[F-F']	2.11 [S](2)	Static Slope Stability, Circular Failure Surface	--	--
	2.58 [S](2)	Static Slope Stability, Block Failure Surface	--	--
	1.93 [S](2)	Long-term Slope Stability, Circular Failure Surface	--	--
	2.71 [S](2)	Long-term Slope Stability, Block Failure Surface	--	--
	1.00 [S](2)	Pseudo-static, Circular Failure Surface, Averaged Existing and Post-earthquake, Soil Properties	0.06	10
	1.00 [S](2)	Pseudo-static, Block Failure Surface, Averaged Existing and Post-earthquake, Soil Properties	0.06	10
	0.86 [S](2)	Post-earthquake, Static Slope Stability, Circular Failure Surface	--	--
	1.30 [S](2)	Post-earthquake, Static Slope Stability, Block Failure Surface	--	--

TABLE M-2

SUMMARY OF SLOPE STABILITY ANALYSIS RESULTS

Analysis Cross Section	Static Factor of Safety	Remarks	Yield Acceleration K_y (g), and Seismic Permanent Displacement * (feet)	
			K_y (1)	* (3)
[G-G']	1.72 [S](2)	Static Slope Stability, Circular Failure Surface	--	--
	2.48 [S](2)	Static Slope Stability, Block Failure Surface	--	--
	1.00 [S](2)	Pseudo-static, Circular Failure Surface, Averaged Existing and Post-earthquake, Soil Properties	0.06	10
	1.00 [S](2)	Pseudo-static, Block Failure Surface, Averaged Existing and Post-earthquake, Soil Properties	0.07	8
	1.08 [S](2)	Post-earthquake, Static Slope Stability, Circular Failure Surface		
	1.38 [S](2)	Post-earthquake, Static Slope Stability, Block Failure Surface	--	--
[H-H']	2.14 [S](2)	Static Slope Stability, Circular Failure Surface	--	--
	2.36 [S](2)	Static Slope Stability, Block Failure Surface	--	--
	1.00 [S](2)	Pseudo-static, Circular Failure Surface, Averaged Existing and Post-earthquake, Soil Properties	0.11	4
	1.00 [S](2)	Pseudo-static, Block Failure Surface, Averaged Existing and Post-earthquake, Soil Properties	0.09	5
	1.43 [S](2)	Post-earthquake, Static Slope Stability, Circular Failure Surface	--	--
	1.93 [S](2)	Post-earthquake, Static Slope Stability, Block Failure Surface	--	--
[I-I']	2.08 [S](2)	Static Slope Stability, Circular Failure Surface	--	--
	2.30 [S](2)	Static Slope Stability, Block Failure Surface	--	--
	1.00 [S](2)	Pseudo-static, Circular Failure Surface, Averaged Existing and Post-earthquake, Soil Properties	0.06	9
	1.00 [S](2)	Pseudo-static, Block Failure Surface, Averaged Existing and Post-earthquake, Soil Properties	0.06	9
	1.63 [S](2)	Post-earthquake, Static Slope Stability, Circular Failure Surface	--	--
	1.94 [S](2)	Post-earthquake, Static Slope Stability, Block Failure Surface	--	--

Notes:

(1) K_y Yield acceleration, defined as the value of the horizontal acceleration resulting in a pseudo-static factor of safety equal to unity.

(2) [S] Spencer's "rigorous" method of analysis, used for most critical cases and loading conditions.

(3) * Seismically induced permanent displacement computed based on the procedure using the Newmark's double-integration method of analysis (Newmark, 1965).

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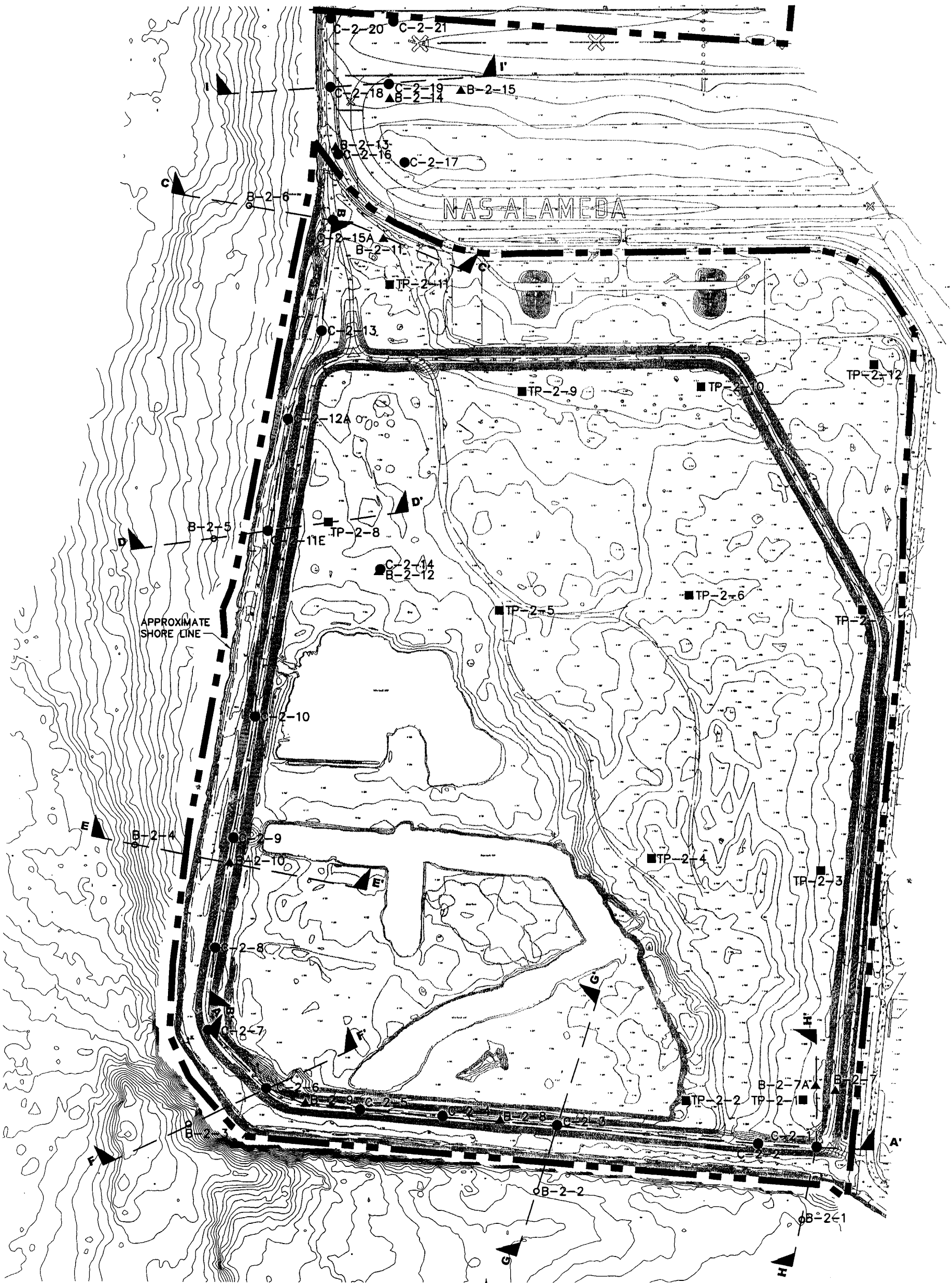


REFRENCE:
HJW-GeoSpatial, Inc., Upland topography
NAD27, NGVD29 - CCS Zone III.

LEGEND

● C	CPT SOUNDINGS
▲ B	UPLAND BORINGS
■ TP	TEST PITS
○ B	OFFSHORE BORINGS
	SITE BOUNDARY
F ◣ — — ◢ F'	CROSS SECTION

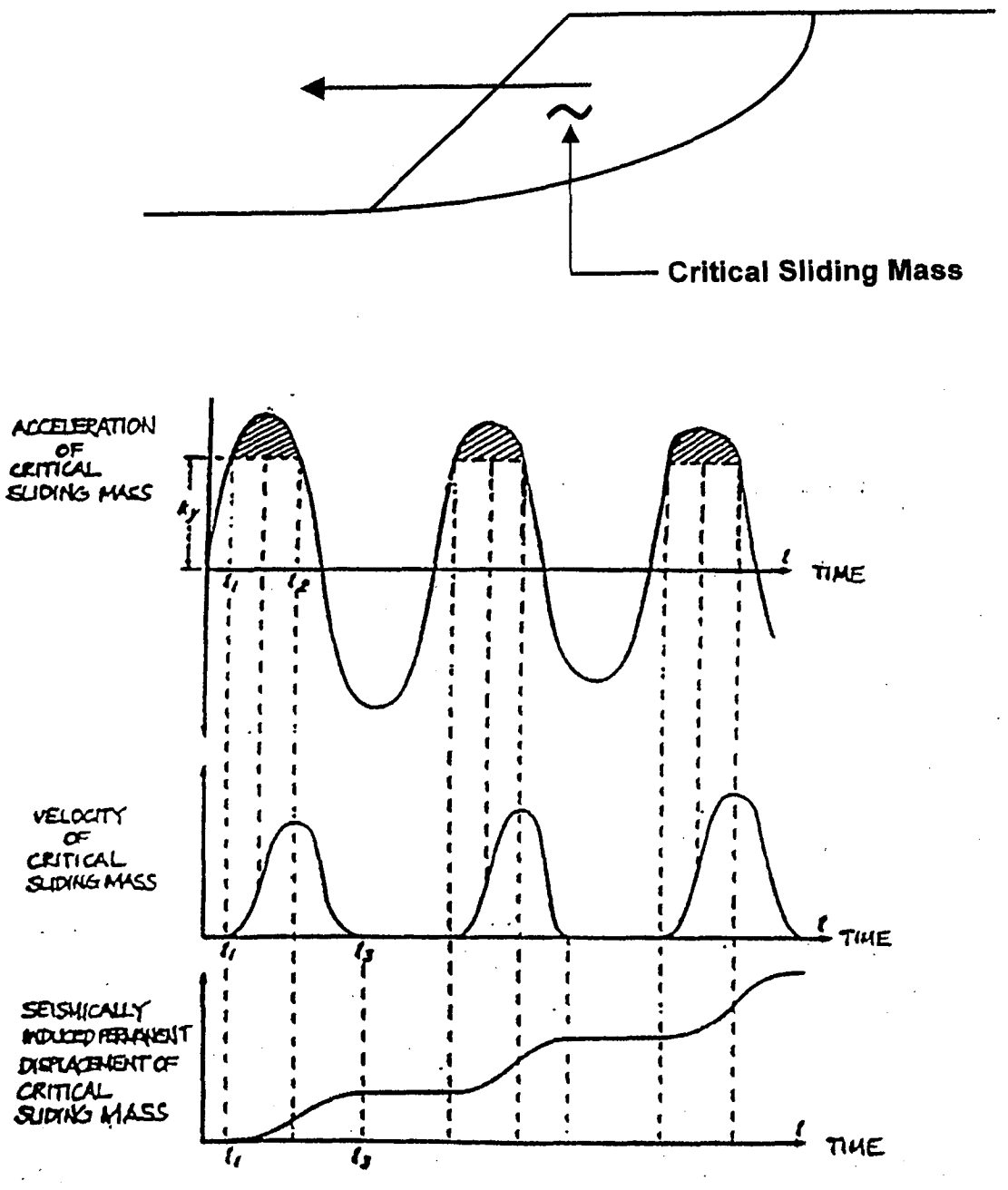
N

300 150 0 300
SCALE IN FEET

Figure M-1
ANALYSIS CROSS SECTION

Southwest Division
Naval Facilities Engineering Command

TETRA TECH FW, INC.



SOURCE: HUSHMAND ASSOCIATES, INC.

Figure M-2
SEISMICALLY INDUCED DISPLACEMENTS

Southwest Division
Naval Facilities Engineering Command

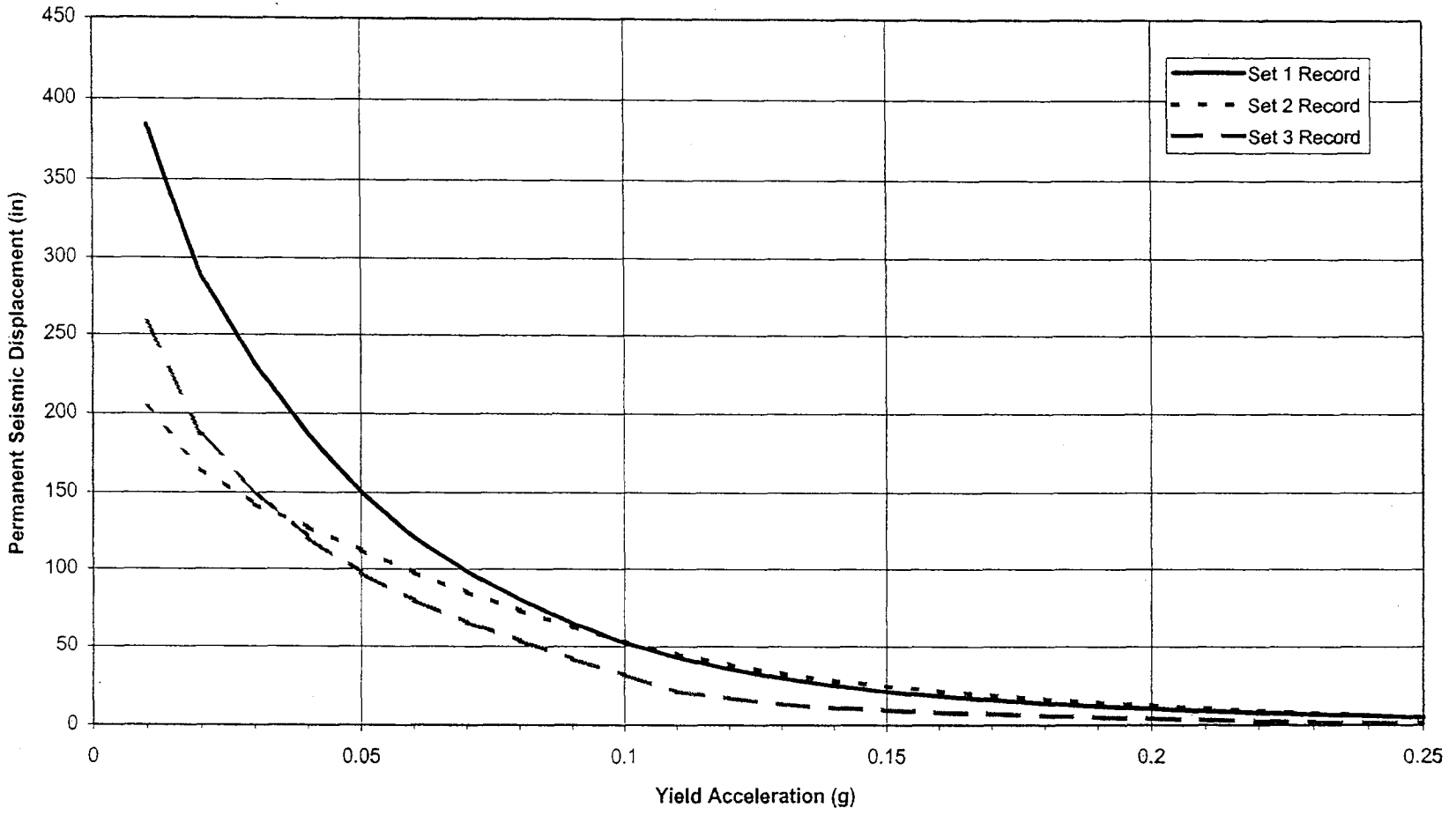
FOSTER WHEELER
ENVIRONMENTAL CORPORATION

DRAWING NO: 032899M2.DWG
DCN: FWSD-RAC-03-2899
CTO: #0054
APPROVED BY: AL
CHECKED BY: TL
REV: REVISION 0
DRAWN BY: MD
DATE: 10/29/03

I:\1990-RAC\CTO-0054\DWG\032899\032899M2.DWG
PLOT/UPDATE: SEP 16 2003 09:03:56

I:\1990-RAC\CTO-0054\DWG\032899\032899M3A.DWG
PLOT/UPDATE: OCT 24 2003 07:56:23

DRAWN BY: MD	CHECKED BY: TL	APPROVED BY: AL	DCN: FWSD-RAC-03-2899	DRAWING NO:
DATE: 10/29/03	REV: REVISION 0		CTO: #0054	032899M3a.DWG



SOURCE: HUSHMAND ASSOCIATES, INC.

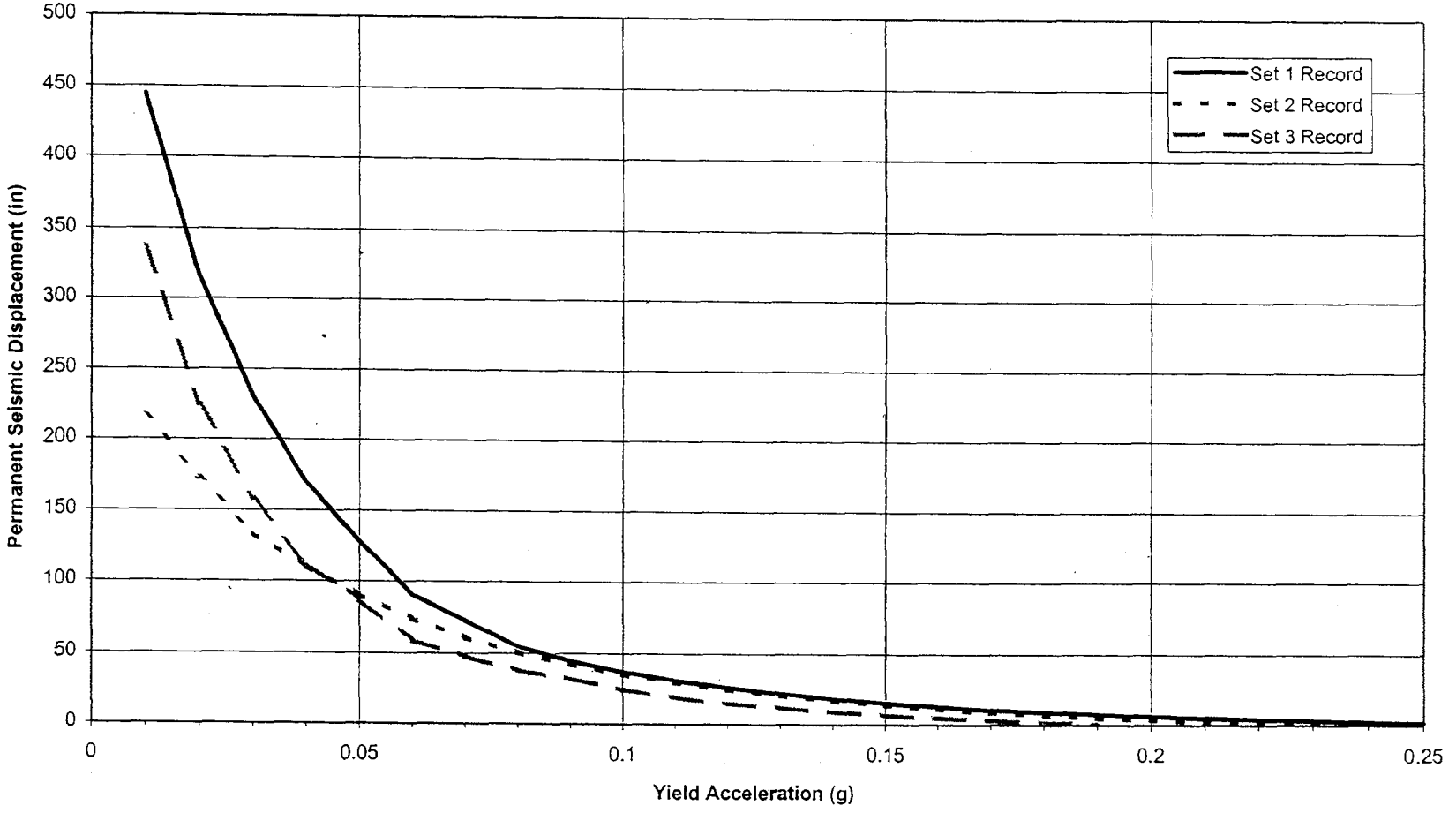
Figure M-3a
SEISMICALLY INDUCED SLOPE DISPLACEMENTS VERSUS YIELD ACCELERATION (SOUTH OF IR SITE 2)

Southwest Division
Naval Facilities Engineering Command

FOSTER WHEELER
ENVIRONMENTAL CORPORATION

I:\1990-RAC\CTO-0054\DWG\032899\032899M3B.DWG
PLOT/UPDATE: SEP 16 2003 09:05:38

DRAWN BY: MD	CHECKED BY: TL	APPROVED BY: AL	DCN: FWSD-RAC-03-2899	DRAWING NO:
DATE: 10/29/03	REV: REVISION 0		CTO: #0054	032899M3b.DWG



SOURCE: HUSHMAND ASSOCIATES, INC.

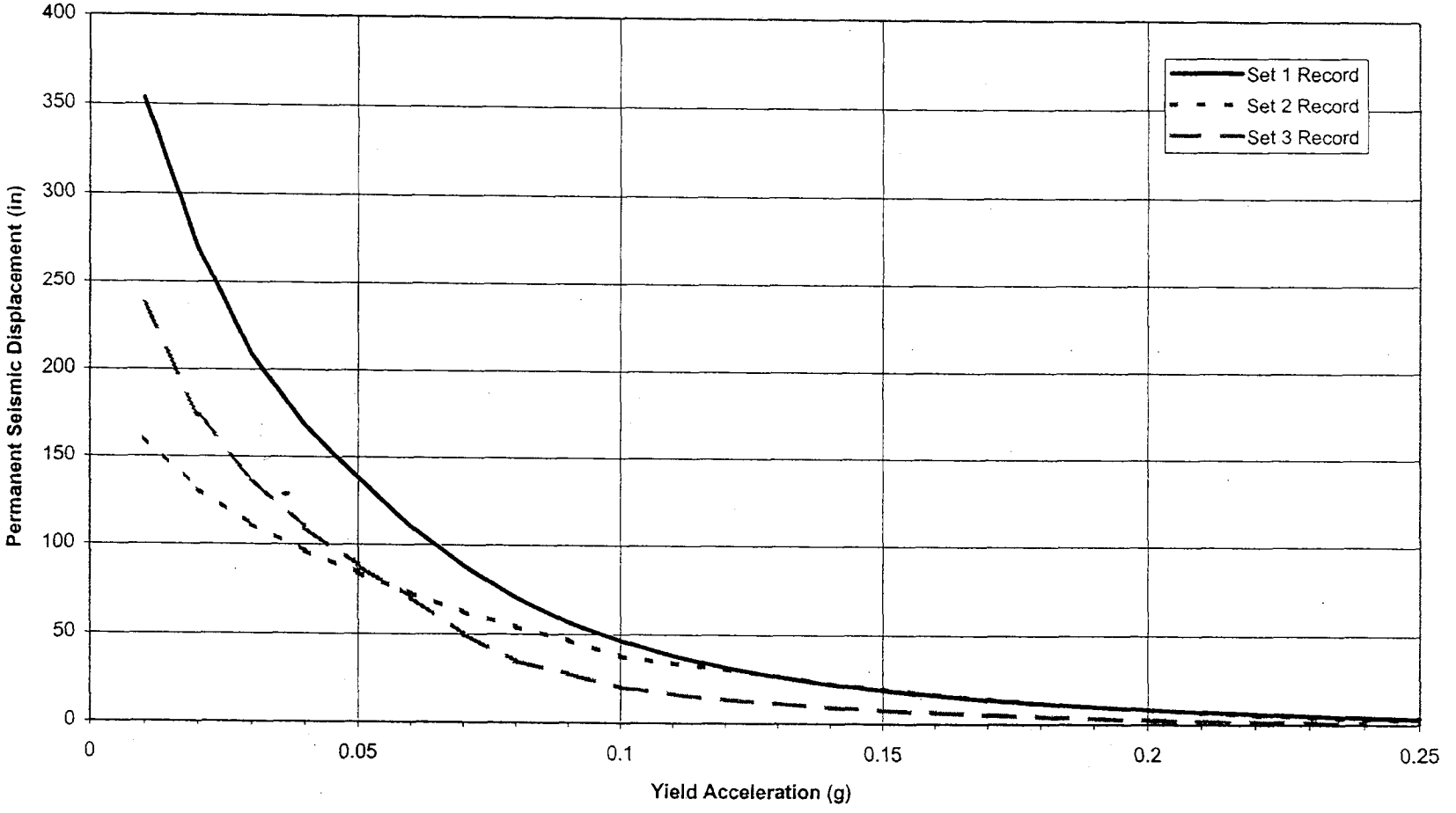
Figure M-3b
SEISMICALLY INDUCED SLOPE DISPLACEMENTS VERSUS YIELD ACCELERATION (WEST SIDE OF IR SITE 2)

Southwest Division
Naval Facilities Engineering Command

FOSTER WHEELER
ENVIRONMENTAL CORPORATION

I:\1990-RAC\CTO-0054\DWG\032899\032899M3C.DWG
PLOT/UPDATE: SEP 16 2003 09:06:56

DRAWN BY: MD	CHECKED BY: TL	APPROVED BY: AL	DCN: FWSD-RAC-03-2899	DRAWING NO:
DATE: 10/29/03	REV: REVISION 0		CTO: #0054	032899M3c.DWG



SOURCE: HUSHMAND ASSOCIATES, INC.

Figure M-3c
SEISMICALLY INDUCED SLOPE DISPLACEMENTS VERSUS YIELD ACCELERATION (AREA BETWEEN IR SITES 1 AND 2)

Southwest Division
Naval Facilities Engineering Command

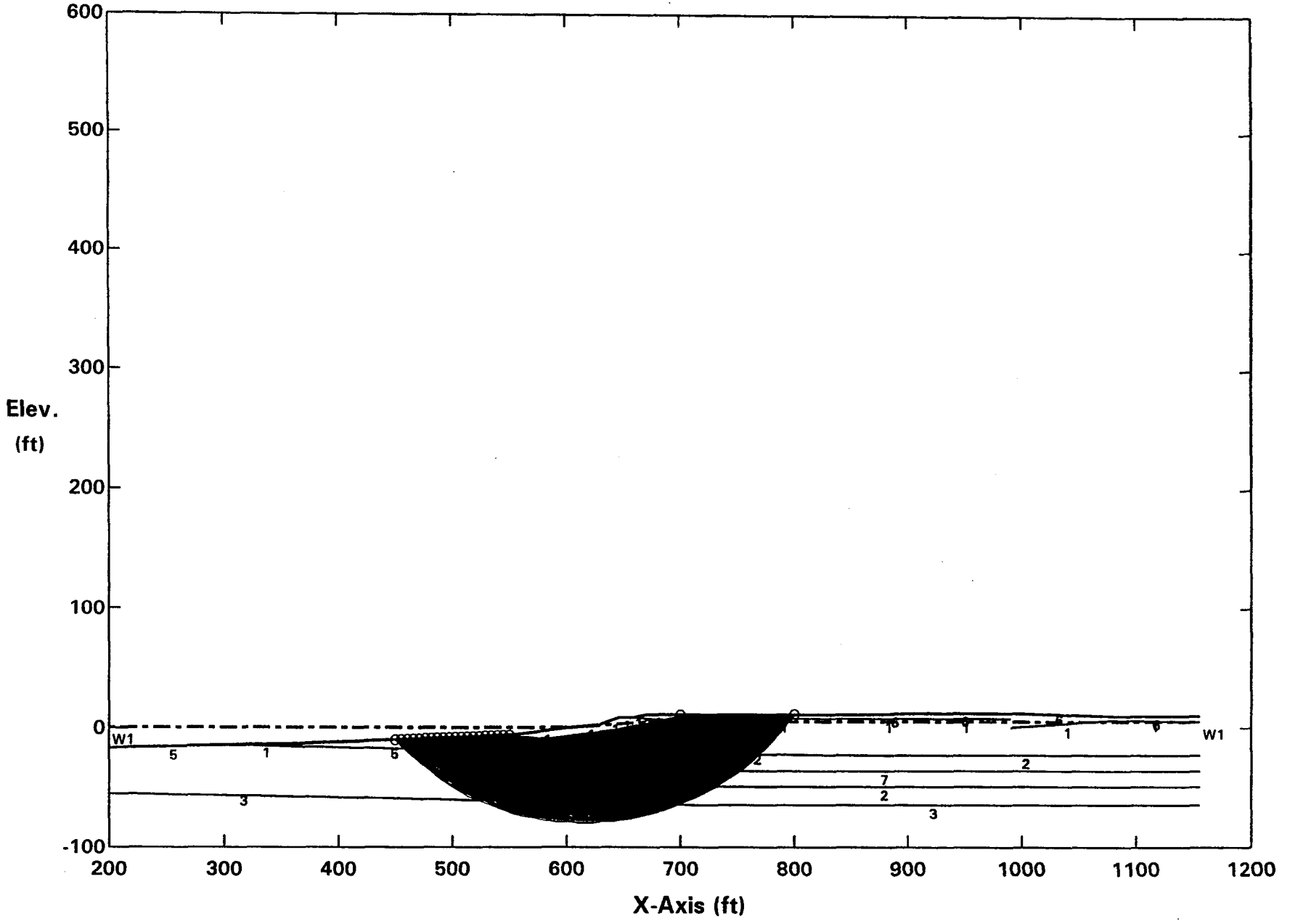
FOSTER WHEELER
ENVIRONMENTAL CORPORATION

SECTION C-C'

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\C-2\IR2CLTBS.IN  PCSTABL Version 5M /O(200.
 ,-100. )
A-NAS IR Site 2, Section C-C', Long-TermStatic Bishop Circular Search
22 15
   83. 100. 86. 5
100. 86. 164. 87. 1
164. 87. 353. 94. 1
353. 94. 404. 100. 1
404. 100. 430. 103. 1
430. 103. 447. 109. 1
447. 109. 458. 109. 1
458. 109. 470. 111. 6
470. 111. 490. 110.6 6
490. 110.6 525. 111. 6
525. 111. 655. 111.3 6
655. 111.3 710. 112. 6
710. 112. 790. 112. 6
790. 112. 880. 110. 6
880. 110. 955. 109.5 6
458. 109. 470. 107. 1
470. 107. 490. 106.6 1
490. 106.6 525. 107. 1
525. 107. 655. 107.3 1
655. 107.3 710. 108. 1
710. 108. 790. 108. 1
790. 100. 880. 106. 1
880. 106. 955. 105.5 1
100. 86. 404. 80.5 5
404. 80.5 490. 79. 2
   ). 79. 650. 77. 2
  ,0. 77. 955. 77. 2
404. 64. 955. 64. 7
404. 51. 955. 51. 2
0. 45. 240. 42. 3
240. 42. 490. 36. 3
490. 36. 955. 36. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 100. 32. 0. 0. 1
115. 115. 620. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 560. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
404. 100.
475. 105.
955. 105.
CIRCL2-Bishop circular, search
20 100
 ). 350. 500. 600. 0. 10. 0. 0.
```

A-NAS IR Site 2, Section C-C', Long-Term Static Bishop Circular Search

All surfaces evaluated. C:IR2CLTBS.PLT By: MMM 08-02-02 5:30pm



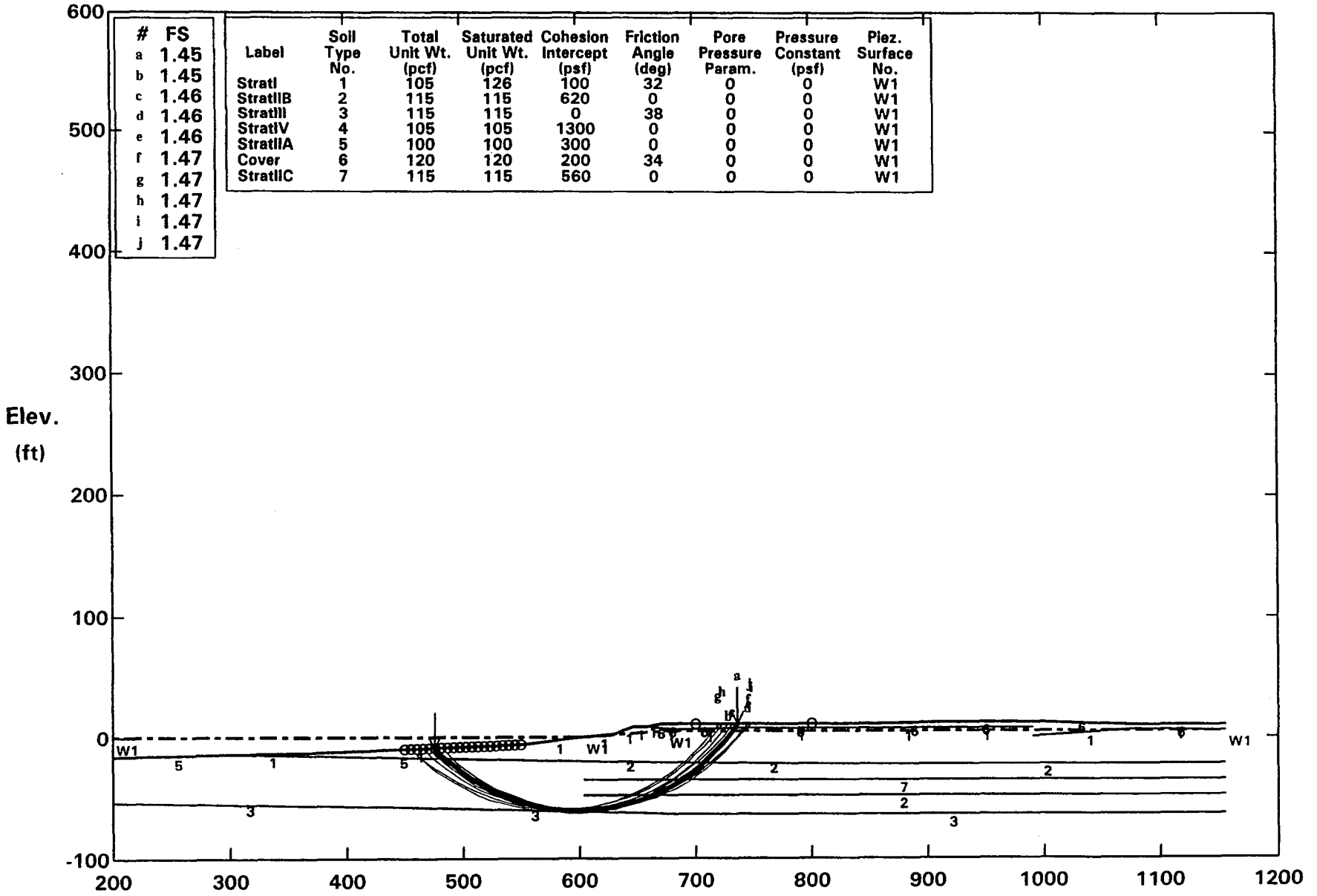
Factors Of Safety Calculated By The Modified Bishop Method

A-NAS IR Site 2, Section C-C', Long-Term Static Bishop Circular Search

Ten Most Critical. C:IR2CLTBS.PLT By: MMM 08-02-02 5:30pm

#	FS
a	1.45
b	1.45
c	1.46
d	1.46
e	1.46
f	1.47
g	1.47
h	1.47
i	1.47
j	1.47

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	620	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	560	0	0	0	W1



PCSTABL5M FSmin = 1.45 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

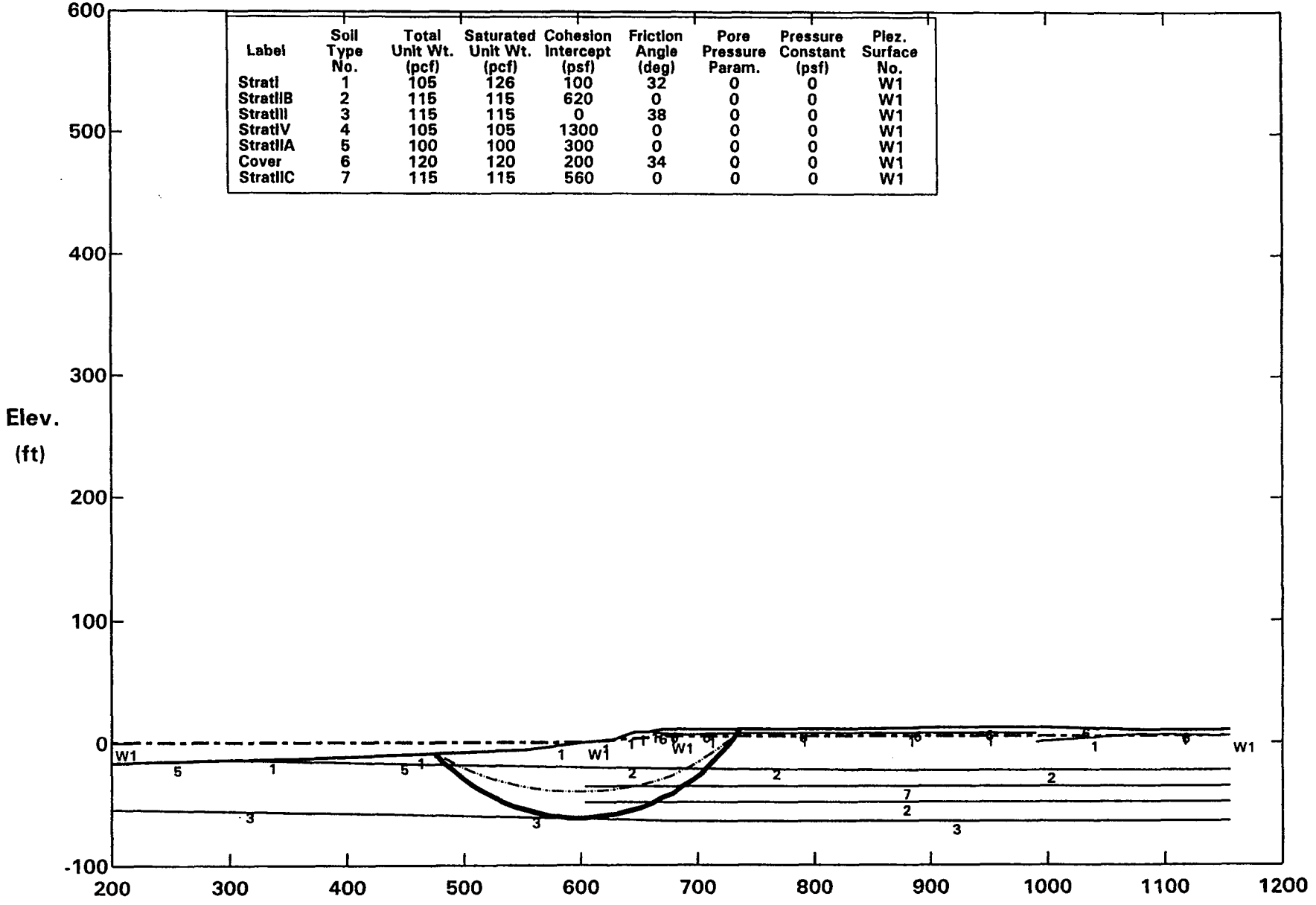
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\C-2\IR2CLTSC.IN  PCSTABL Version 5M /O(200.
 ,-100. )
A-NAS IR Site 2, Section C-C', Long-TermSpencer Static Slope Stability (Circ.`
32 15
0. 83. 100. 86. 5
100. 86. 164. 87. 1
164. 87. 353. 94. 1
353. 94. 404. 100. 1
404. 100. 430. 103. 1
430. 103. 447. 109. 1
447. 109. 458. 109. 1
458. 109. 470. 111. 6
470. 111. 490. 110.6 6
490. 110.6 525. 111. 6
525. 111. 655. 111.3 6
655. 111.3 710. 112. 6
710. 112. 790. 112. 6
790. 112. 880. 110. 6
880. 110. 955. 109.5 6
458. 109. 470. 107. 1
470. 107. 490. 106.6 1
490. 106.6 525. 107. 1
525. 107. 655. 107.3 1
655. 107.3 710. 108. 1
710. 108. 790. 108. 1
790. 100. 880. 106. 1
880. 106. 955. 105.5 1
100. 86. 404. 80.5 5
404. 80.5 490. 79. 2
490. 79. 650. 77. 2
650. 77. 955. 77. 2
404. 64. 955. 64. 7
404. 51. 955. 51. 2
0. 45. 240. 42. 3
240. 42. 490. 36. 3
490. 36. 955. 36. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 100. 32. 0. 0. 1
115. 115. 620. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 560. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
404. 100.
475. 105.
955. 105.
SPENCR
6.
SURBIS #1-IR2CLTBS.OUT
31
276.32 91.16
283.4 84.1
290.89 77.48
```

```
298.77 71.32
306.99 65.63
315.55 60.45
324.39 55.78
  3.5 51.65
 42.83 48.07
352.37 45.05
362.06 42.6
371.89 40.74
381.81 39.46
391.78 38.78
401.78 38.69
411.77 39.2
421.71 40.31
431.56 42.
441.3 44.28
450.89 47.13
460.28 50.55
469.46 54.52
478.38 59.03
487.02 64.07
495.35 69.61
503.33 75.64
510.93 82.13
518.14 89.06
524.92 96.41
531.25 104.15
536.22 111.03
EXECUT
```

A-NAS IR Site 2, Section C-C', Long-Term Spencer Static Slope Stability (Circ.)

Surface #1-IR2CLTBS.OUT. C:IR2CLTSC.PLT By: MMM 08-02-02 5:32pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	620	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	560	0	0	0	W1



PCSTABL5M FS = 1.46 Theta = 1.51 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
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 ,-100. )
A-NAS IR Site 2, Section C-C', Long-TermStatic Janbu Block Search
   15
0. 83. 100. 86. 5
100. 86. 164. 87. 1
164. 87. 353. 94. 1
353. 94. 404. 100. 1
404. 100. 430. 103. 1
430. 103. 447. 109. 1
447. 109. 458. 109. 1
458. 109. 470. 111. 6
470. 111. 490. 110.6 6
490. 110.6 525. 111. 6
525. 111. 655. 111.3 6
655. 111.3 710. 112. 6
710. 112. 790. 112. 6
790. 112. 880. 110. 6
880. 110. 955. 109.5 6
458. 109. 470. 107. 1
470. 107. 490. 106.6 1
490. 106.6 525. 107. 1
525. 107. 655. 107.3 1
655. 107.3 710. 108. 1
710. 108. 790. 108. 1
790. 100. 880. 106. 1
880. 106. 955. 105.5 1
100. 86. 404. 80.5 5
  1. 80.5 490. 79. 2
 0. 79. 650. 77. 2
650. 77. 955. 77. 2
404. 64. 955. 64. 7
404. 51. 955. 51. 2
0. 45. 240. 42. 3
240. 42. 490. 36. 3
490. 36. 955. 36. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 100. 32. 0. 0. 1
115. 115. 620. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 560. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
404. 100.
475. 105.
955. 105.
BLOCK2-Rankine block, search

   0 2 10.
200. 60. 400. 60. 40.
401. 55. 550. 55. 40.
```
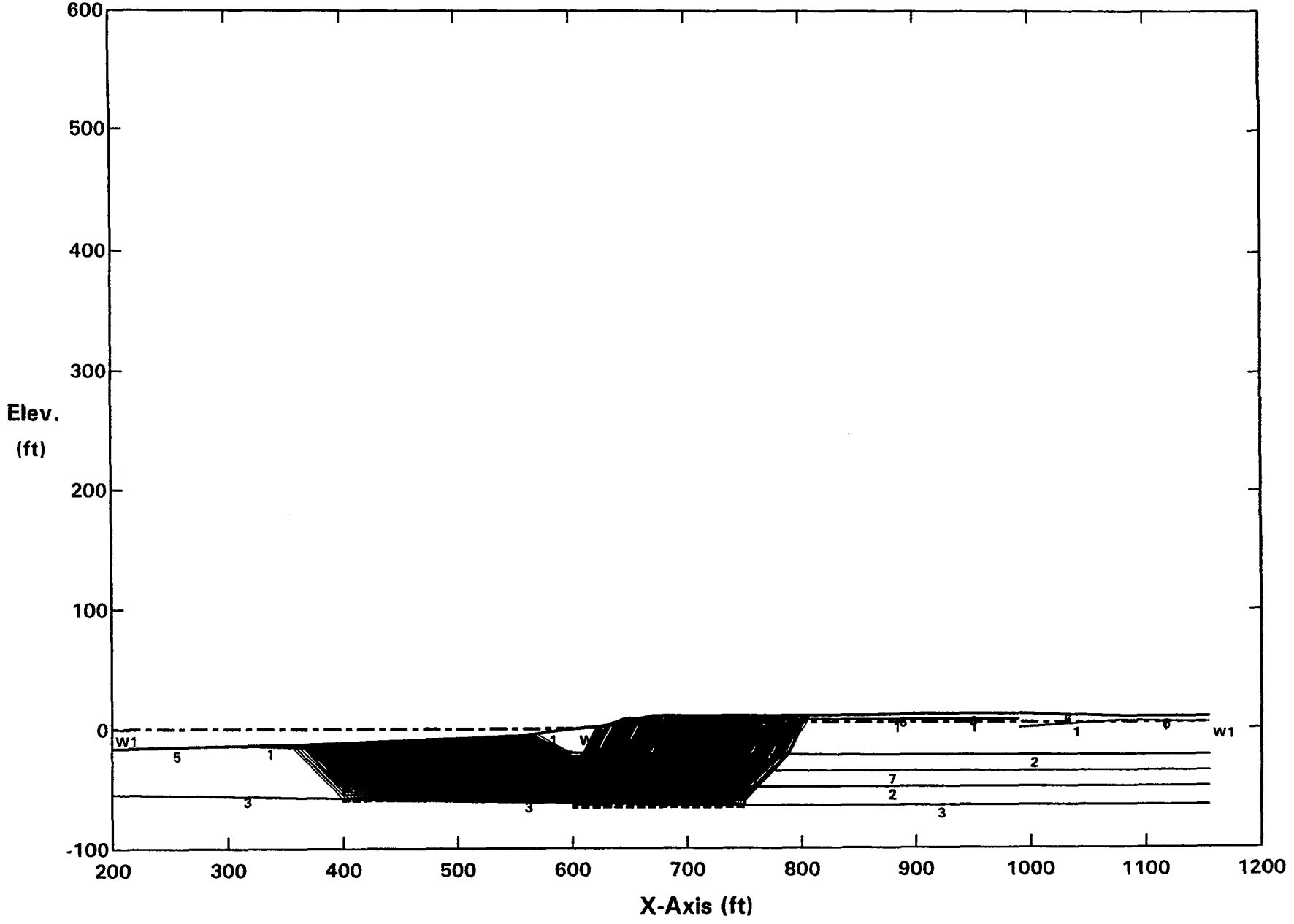

A-NAS IR Site 2, Section C-C', Long-Term Static Janbu Block Search

All surfaces evaluated. C:IR2CLTJS.PLT By: MMM 08-02-02 5:52pm



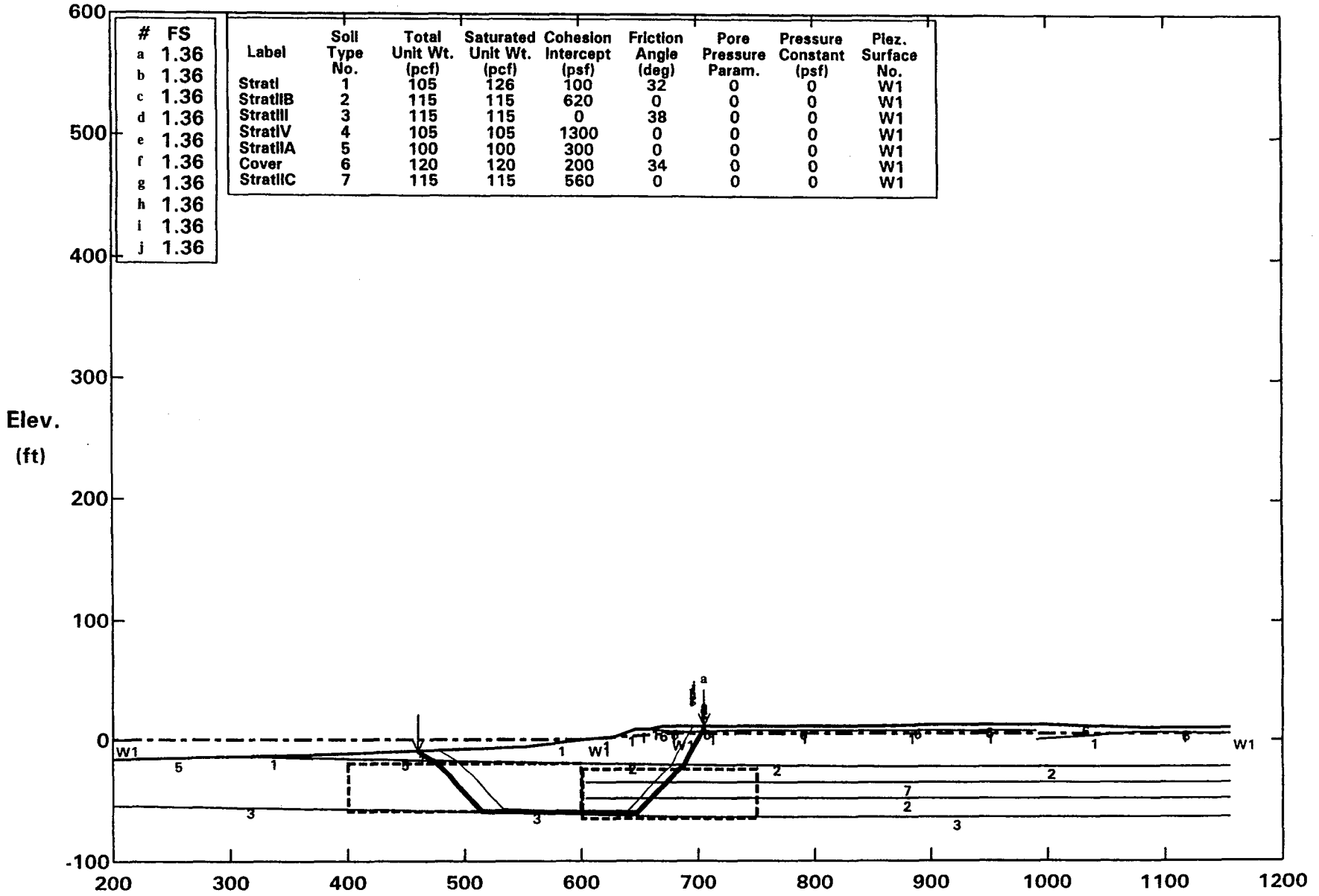
Factors Of Safety Calculated By The Modified Janbu Method

A-NAS IR Site 2, Section C-C', Long-Term Static Janbu Block Search

Ten Most Critical. C:IR2CLTJS.PLT By: MMM 08-02-02 5:52pm

#	FS
a	1.36
b	1.36
c	1.36
d	1.36
e	1.36
f	1.36
g	1.36
h	1.36
i	1.36
j	1.36

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	620	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	560	0	0	0	W1



PCSTABL5M FSmin = 1.36 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

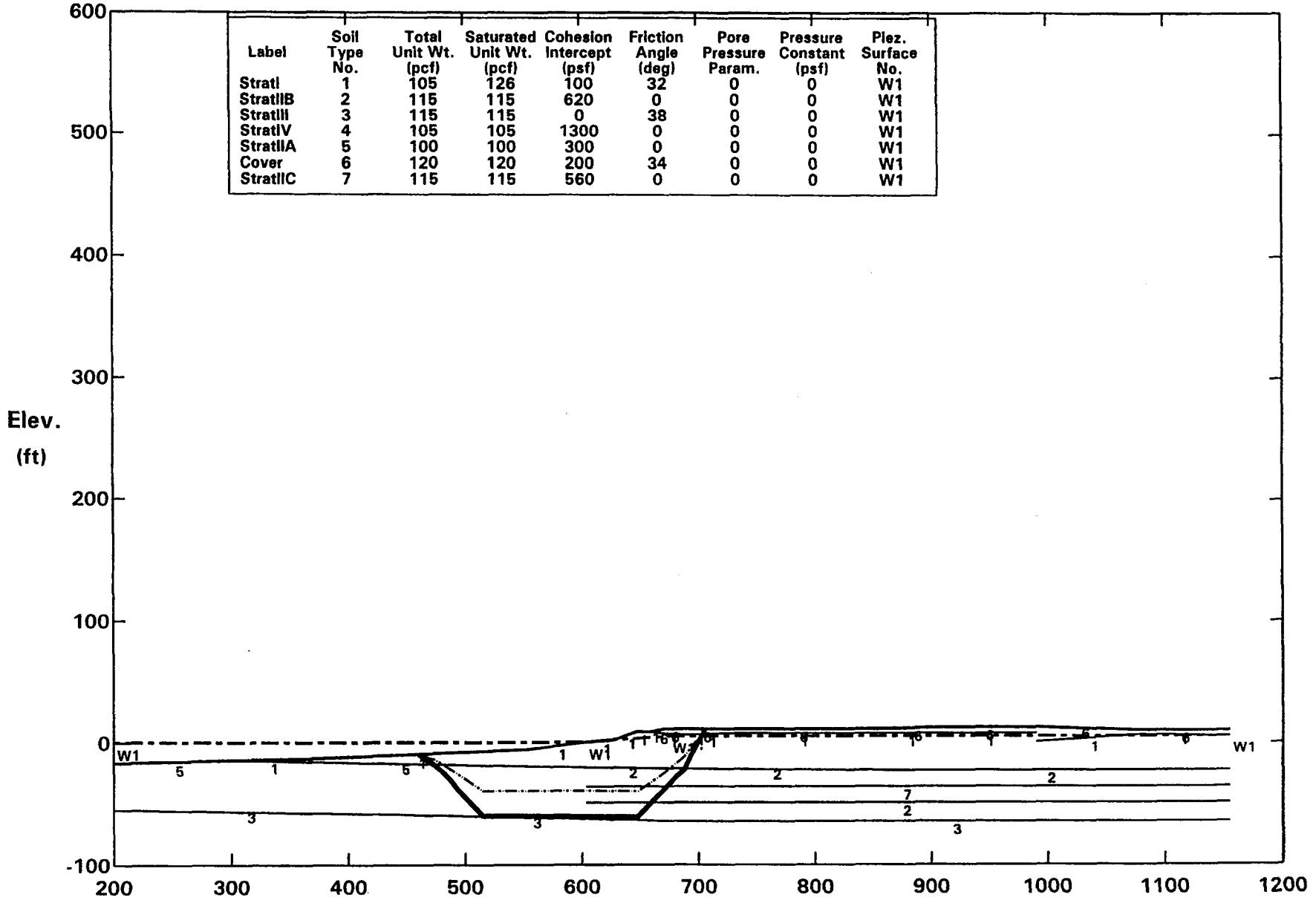
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\C-2\IR2CLTSB.IN  PCSTABL Version 5M /O(200.
 ,-100. )
A-NAS IR Site 2, Section C-C', Long-TermSpencer Static Slope Stability (Block
32 15
0. 83. 100. 86. 5
100. 86. 164. 87. 1
164. 87. 353. 94. 1
353. 94. 404. 100. 1
404. 100. 430. 103. 1
430. 103. 447. 109. 1
447. 109. 458. 109. 1
458. 109. 470. 111. 6
470. 111. 490. 110.6 6
490. 110.6 525. 111. 6
525. 111. 655. 111.3 6
655. 111.3 710. 112. 6
710. 112. 790. 112. 6
790. 112. 880. 110. 6
880. 110. 955. 109.5 6
458. 109. 470. 107. 1
470. 107. 490. 106.6 1
490. 106.6 525. 107. 1
525. 107. 655. 107.3 1
655. 107.3 710. 108. 1
710. 108. 790. 108. 1
790. 100. 880. 106. 1
880. 106. 955. 105.5 1
100. 86. 404. 80.5 5
404. 80.5 490. 79. 2
490. 79. 650. 77. 2
650. 77. 955. 77. 2
404. 64. 955. 64. 7
404. 51. 955. 51. 2
0. 45. 240. 42. 3
240. 42. 490. 36. 3
490. 36. 955. 36. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 100. 32. 0. 0. 1
115. 115. 620. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 560. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
404. 100.
475. 105.
955. 105.
SPENCR
6.
SURFAC #1-IR2CLTJS.OUT
22
259.81 90.55
264.93 87.71
273.68 82.86
```

```
280.11 76.43
287.18 69.36
294.25 62.28
301.32 55.21
  8.4 48.14
315.47 41.07
447.95 39.1
455.02 46.17
459.85 51.
466.93 58.07
472.85 64.
479.93 71.07
487. 78.14
487.89 79.04
492.74 87.78
497.59 96.53
502.44 105.28
503.25 106.75
505.39 110.78
EXECUT
```

A-NAS IR Site 2, Section C-C', Long-Term Spencer Static Slope Stability (Block)

Surface #1-IR2CLTJS.OUT. C:IR2CLTSB.PLT By: MMM 08-02-02 5:53pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	620	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	560	0	0	0	W1



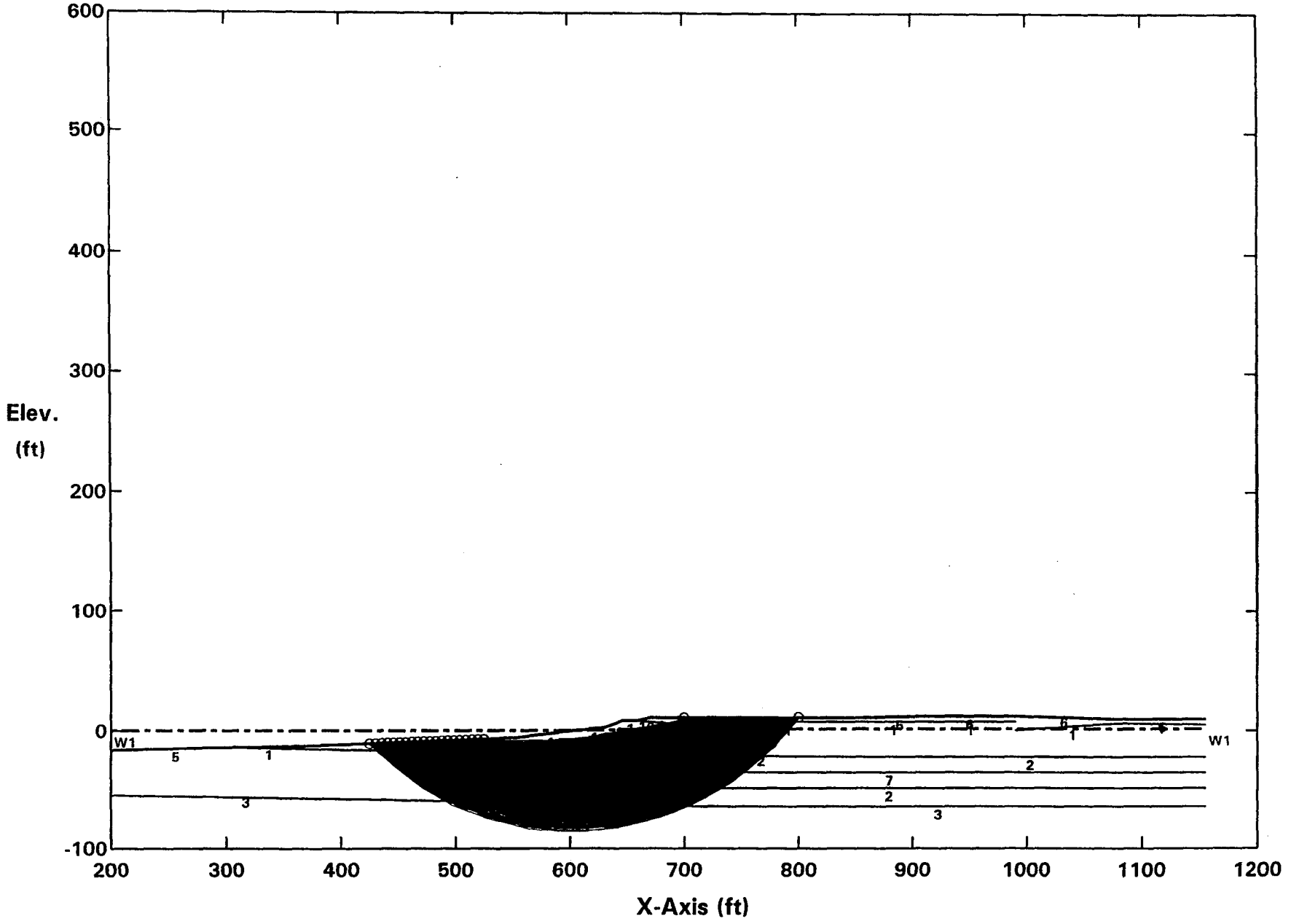
PCSTABL5M FS = 1.55 Theta = 1.86 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL       C:\GEO\STED\A-NAS\SITE2\C-2\IR2CBD.IN  PCSTABL Version 5M /O(200. ,
-100. )
A-NAS IR Site 2, Section C-C',          Dynamic Bishop Circular Search, 0.05g
   15
.. 83. 100. 86. 5
100. 86. 164. 87. 1
164. 87. 353. 94. 1
353. 94. 404. 100. 1
404. 100. 430. 103. 1
430. 103. 447. 109. 1
447. 109. 458. 109. 1
458. 109. 470. 111. 6
470. 111. 490. 110.6 6
490. 110.6 525. 111. 6
525. 111. 655. 111.3 6
655. 111.3 710. 112. 6
710. 112. 790. 112. 6
790. 112. 880. 110. 6
880. 110. 955. 109.5 6
458. 109. 470. 107. 1
470. 107. 490. 106.6 1
490. 106.6 525. 107. 1
525. 107. 655. 107.3 1
655. 107.3 710. 108. 1
710. 108. 790. 108. 1
790. 100. 880. 106. 1
880. 106. 955. 105.5 1
100. 86. 404. 80.5 5
  4. 80.5 490. 79. 2
 0. 79. 650. 77. 2
650. 77. 955. 77. 2
404. 64. 955. 64. 7
404. 51. 955. 51. 2
0. 45. 240. 42. 3
240. 42. 490. 36. 3
490. 36. 955. 36. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 200. 17.6 0. 0. 1
115. 115. 560. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 480. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
404. 100.
475. 102.
955. 102.
EQUAKE
  05 0. 0.
  .CL2-Bishop circular, search
20 100
225. 325. 500. 600. 0. 10. 0. 0.
```

A-NAS IR Site 2, Section C-C', Dynamic Bishop Circular Search, 0.05g

All surfaces evaluated. C:IR2CBD.PLT By: MMM 08-02-02 5:34pm



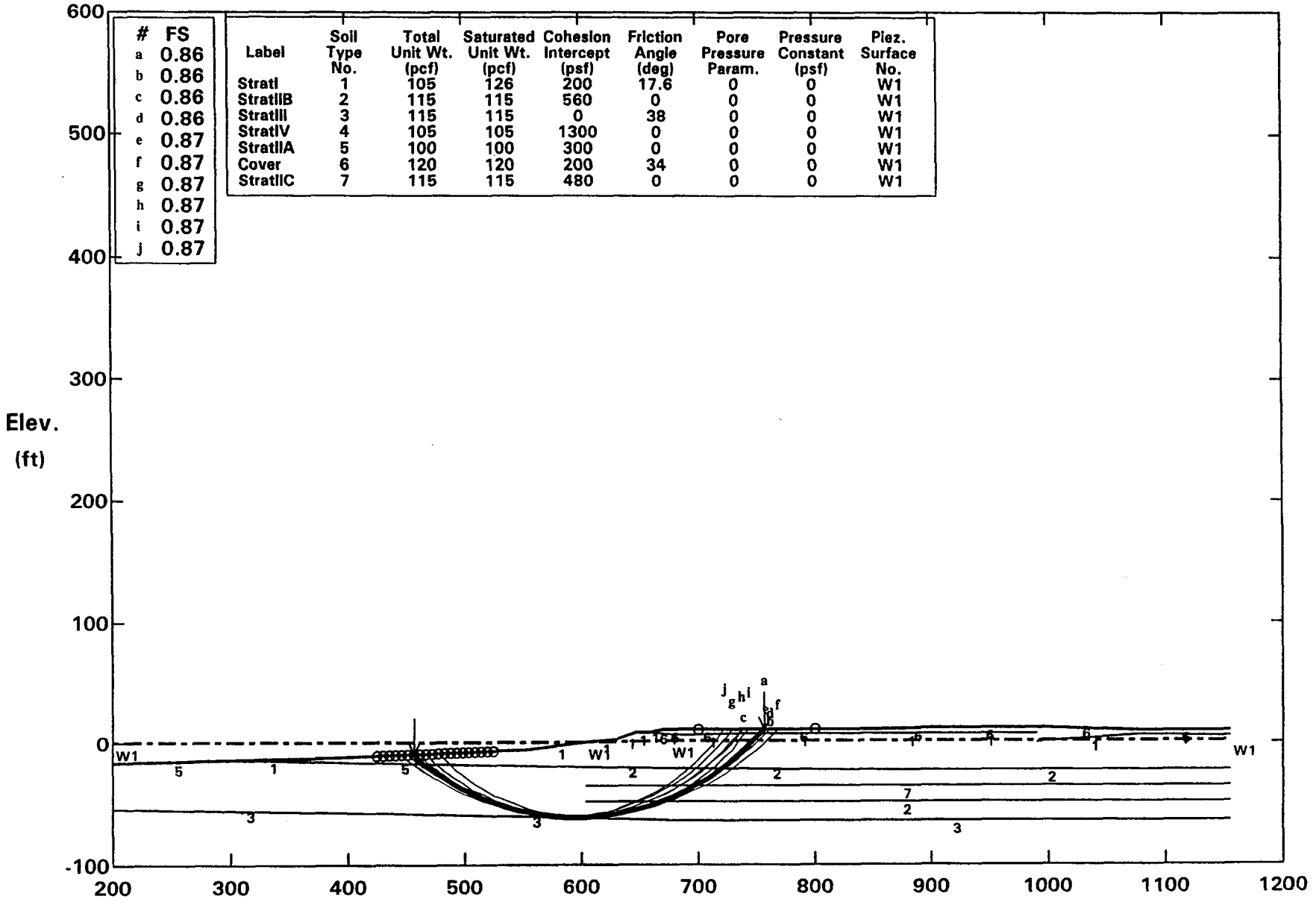
Factors Of Safety Calculated By The Modified Bishop Method

A-NAS IR Site 2, Section C-C', Dynamic Bishop Circular Search, 0.05g

Ten Most Critical. C:IR2CBD.PLT By: MMM 08-02-02 5:34pm

#	FS
a	0.86
b	0.86
c	0.86
d	0.86
e	0.87
f	0.87
g	0.87
h	0.87
i	0.87
j	0.87

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	560	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	480	0	0	0	W1



PCSTABL5M FSmin = 0.86 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

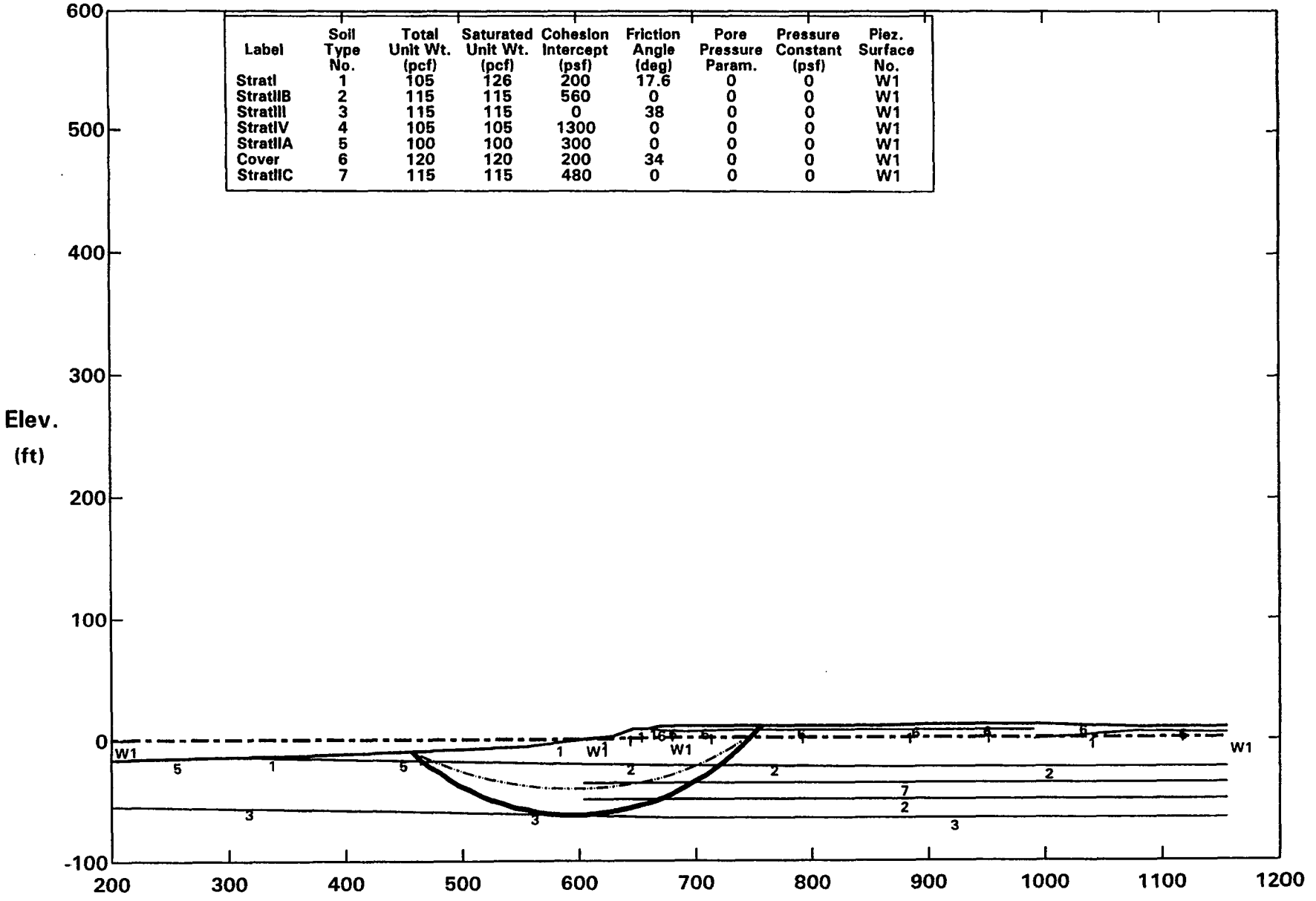
```
PROFIL       C:\GEO\STED\A-NAS\SITE2\C-2\IR2CSSC.IN  PCSTABL Version 5M /O(200.
,-100. )
A-NAS IR Site 2, Section C-C',          Spencer Static Slope Stability (Circ `
32 15
0. 83. 100. 86. 5
100. 86. 164. 87. 1
164. 87. 353. 94. 1
353. 94. 404. 100. 1
404. 100. 430. 103. 1
430. 103. 447. 109. 1
447. 109. 458. 109. 1
458. 109. 470. 111. 6
470. 111. 490. 110.6 6
490. 110.6 525. 111. 6
525. 111. 655. 111.3 6
655. 111.3 710. 112. 6
710. 112. 790. 112. 6
790. 112. 880. 110. 6
880. 110. 955. 109.5 6
458. 109. 470. 107. 1
470. 107. 490. 106.6 1
490. 106.6 525. 107. 1
525. 107. 655. 107.3 1
655. 107.3 710. 108. 1
710. 108. 790. 108. 1
790. 100. 880. 106. 1
880. 106. 955. 105.5 1
100. 86. 404. 80.5 5
404. 80.5 490. 79. 2
490. 79. 650. 77. 2
650. 77. 955. 77. 2
404. 64. 955. 64. 7
404. 51. 955. 51. 2
0. 45. 240. 42. 3
240. 42. 490. 36. 3
490. 36. 955. 36. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 200. 17.6 0. 0. 1
115. 115. 560. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 480. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
404. 100.
475. 102.
955. 102.
SPENCR
1.9
SURBIS #1-IR2CBD.OUT
35
256.58 90.43
264.28 84.05
272.27 78.04
```

280.54 72.41
289.06 67.18
297.82 62.35
306.8 57.95
5.97 53.97
325.32 50.42
334.83 47.33
344.47 44.68
354.23 42.49
364.08 40.76
374. 39.49
383.97 38.7
393.96 38.38
403.96 38.52
413.94 39.14
423.88 40.23
433.76 41.78
443.56 43.79
453.24 46.27
462.81 49.2
472.22 52.58
481.46 56.39
490.52 60.64
499.36 65.31
507.97 70.38
516.34 75.86
524.44 81.73
532.25 87.97
539.76 94.57
5.95 101.52
53.81 108.8
555.75 111.07
EXECUT

A-NAS IR Site 2, Section C-C', Spencer Static Slope Stability (Circ.)

Surface #1-IR2CBD.OUT. C:IR2CSSC.PLT By: MMM 08-02-02 5:38pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	560	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	480	0	0	0	W1



PCSTABL5M FS = 1.38 Theta = 1.58 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

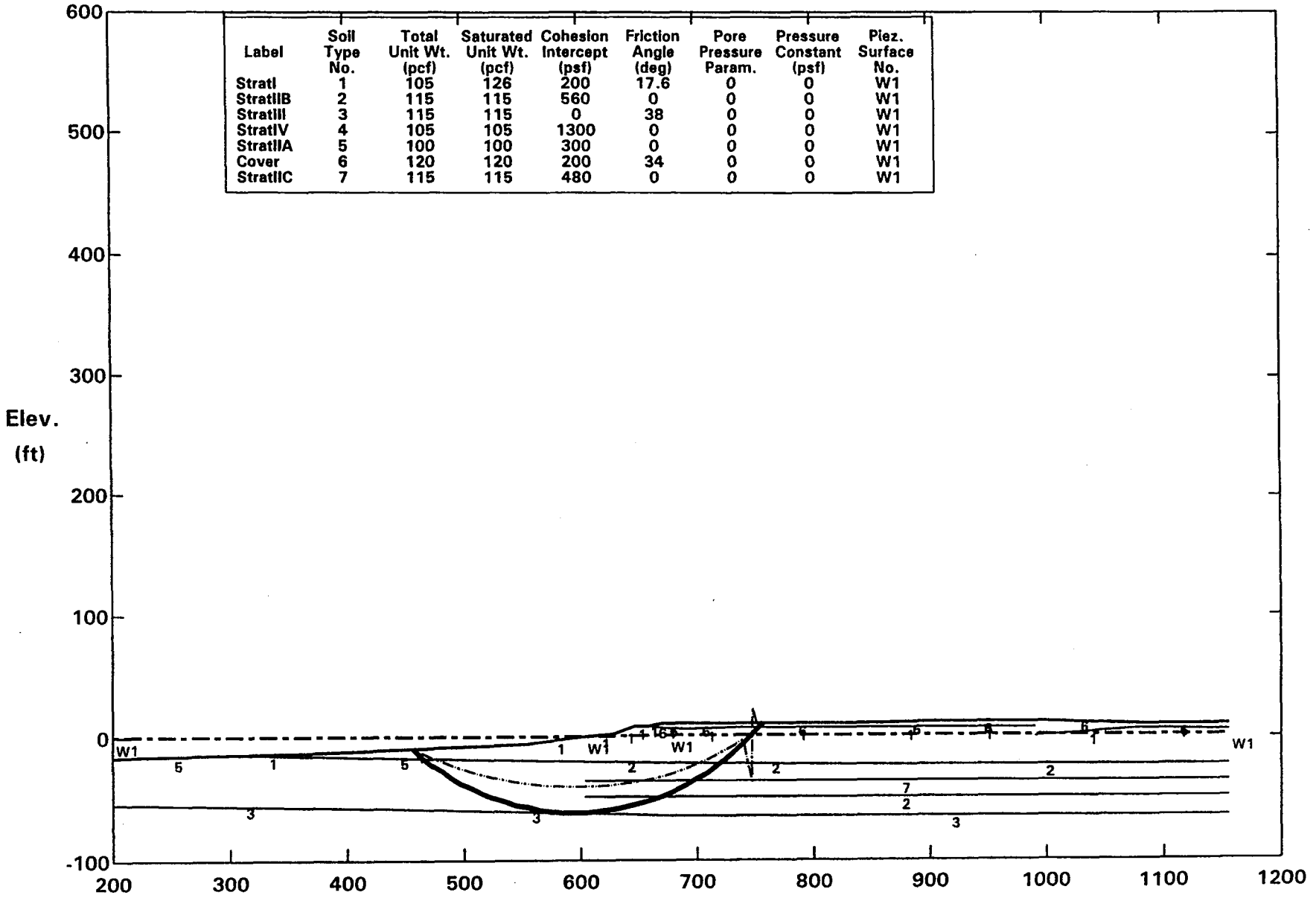
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\C-2\IR2CSDC.IN  PCSTABL Version 5M /O(200.
,-100. )
*-NAS IR Site 2, Section C-C', (Circ.)  Spencer Dynamic Slope Stability Ky=.03g
   15
0. 83. 100. 86. 5
100. 86. 164. 87. 1
164. 87. 353. 94. 1
353. 94. 404. 100. 1
404. 100. 430. 103. 1
430. 103. 447. 109. 1
447. 109. 458. 109. 1
458. 109. 470. 111. 6
470. 111. 490. 110.6 6
490. 110.6 525. 111. 6
525. 111. 655. 111.3 6
655. 111.3 710. 112. 6
710. 112. 790. 112. 6
790. 112. 880. 110. 6
880. 110. 955. 109.5 6
458. 109. 470. 107. 1
470. 107. 490. 106.6 1
490. 106.6 525. 107. 1
525. 107. 655. 107.3 1
655. 107.3 710. 108. 1
710. 108. 790. 108. 1
790. 100. 880. 106. 1
880. 106. 955. 105.5 1
100. 86. 404. 80.5 5
  1. 80.5 490. 79. 2
 0. 79. 650. 77. 2
650. 77. 955. 77. 2
404. 64. 955. 64. 7
404. 51. 955. 51. 2
0. 45. 240. 42. 3
240. 42. 490. 36. 3
490. 36. 955. 36. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 200. 17.6 0. 0. 1
115. 115. 560. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 480. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
404. 100.
475. 102.
955. 102.
EQUAKE
  028 0. 0.
  NCR
1.9
SURBIS #1-IR2CBD.OUT
35
256.58 90.43
```

```
264.28 84.05
272.27 78.04
280.54 72.41
289.06 67.18
297.82 62.35
306.8 57.95
315.97 53.97
325.32 50.42
334.83 47.33
344.47 44.68
354.23 42.49
364.08 40.76
374. 39.49
383.97 38.7
393.96 38.38
403.96 38.52
413.94 39.14
423.88 40.23
433.76 41.78
443.56 43.79
453.24 46.27
462.81 49.2
472.22 52.58
481.46 56.39
490.52 60.64
499.36 65.31
507.97 70.38
516.34 75.86
524.44 81.73
532.25 87.97
539.76 94.57
546.95 101.52
553.81 108.8
555.75 111.07
EXECUT
```

A-NAS IR Site 2, Section C-C', (Circ.) Spencer Dynamic Slope Stability Ky = .03g

Surface #1-IR2CBD.OUT. C:IR2CSDC.PLT By: MMM 08-02-02 5:37pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	560	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	480	0	0	0	W1



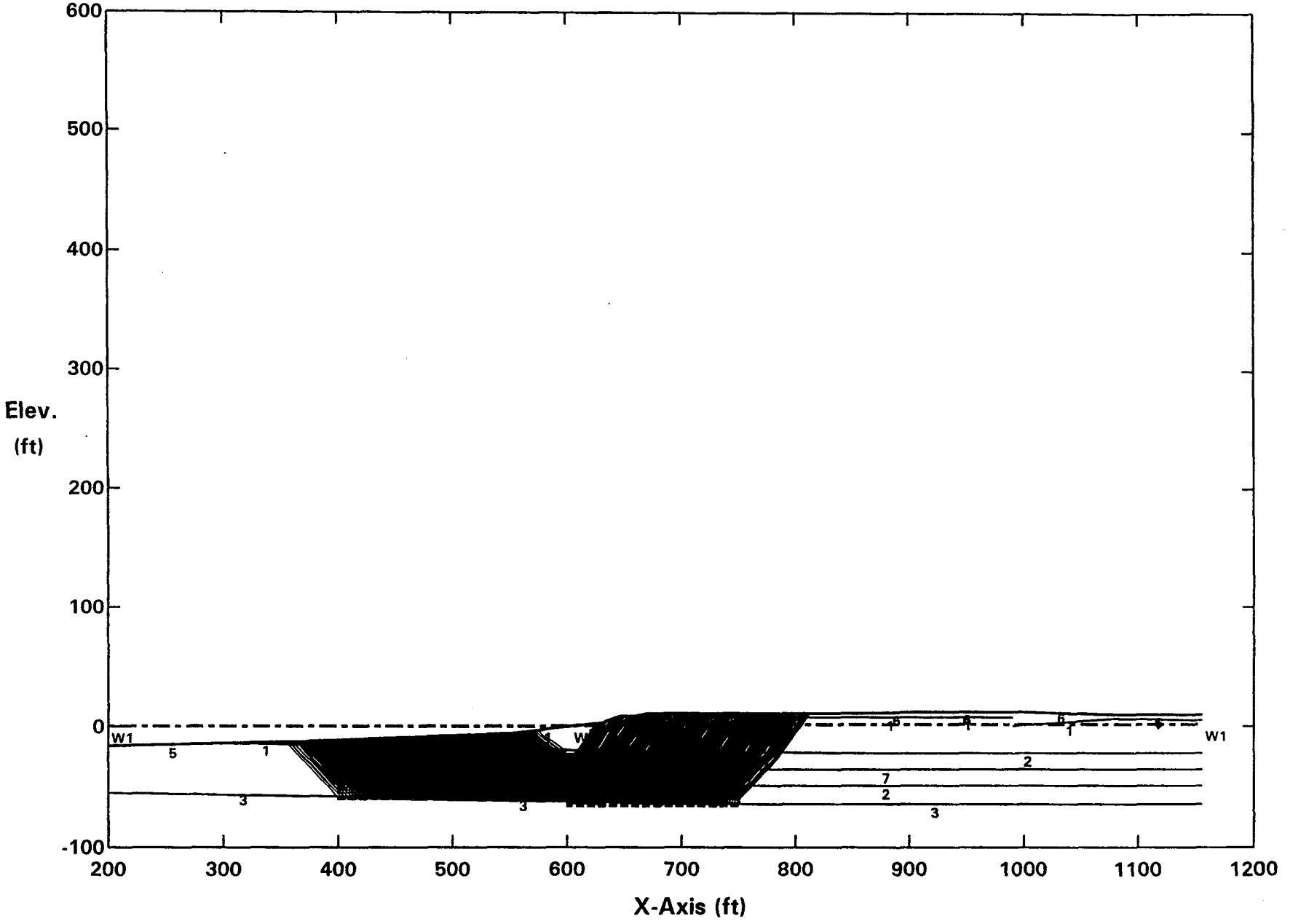
PCSTABL5M FS = 1.00 Theta = .95 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL       C:\GEO\STED\A-NAS\SITE2\C-2\IR2CJD.IN  PCSTABL Version 5M /O(200. ,
-100. )
A-NAS IR Site 2, Section C-C',          Dynamic Janbu Block Search, 0.05g
32 15
0. 83. 100. 86. 5
100. 86. 164. 87. 1
164. 87. 353. 94. 1
353. 94. 404. 100. 1
404. 100. 430. 103. 1
430. 103. 447. 109. 1
447. 109. 458. 109. 1
458. 109. 470. 111. 6
470. 111. 490. 110.6 6
490. 110.6 525. 111. 6
525. 111. 655. 111.3 6
655. 111.3 710. 112. 6
710. 112. 790. 112. 6
790. 112. 880. 110. 6
880. 110. 955. 109.5 6
458. 109. 470. 107. 1
470. 107. 490. 106.6 1
490. 106.6 525. 107. 1
525. 107. 655. 107.3 1
655. 107.3 710. 108. 1
710. 108. 790. 108. 1
790. 100. 880. 106. 1
880. 106. 955. 105.5 1
100. 86. 404. 80.5 5
404. 80.5 490. 79. 2
490. 79. 650. 77. 2
650. 77. 955. 77. 2
404. 64. 955. 64. 7
404. 51. 955. 51. 2
0. 45. 240. 42. 3
240. 42. 490. 36. 3
490. 36. 955. 36. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 200. 17.6 0. 0. 1
115. 115. 560. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 480. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
404. 100.
475. 102.
955. 102.
EQUAKE
0.05 0. 0.
BLOCK2-Rankine block, search
0
5000 2 10.
200. 60. 400. 60. 40.
401. 55. 550. 55. 40.
```

A-NAS IR Site 2, Section C-C', Dynamic Janbu Block Search, 0.05g

All surfaces evaluated. C:IR2CJD.PLT By: MMM 08-02-02 5:42pm



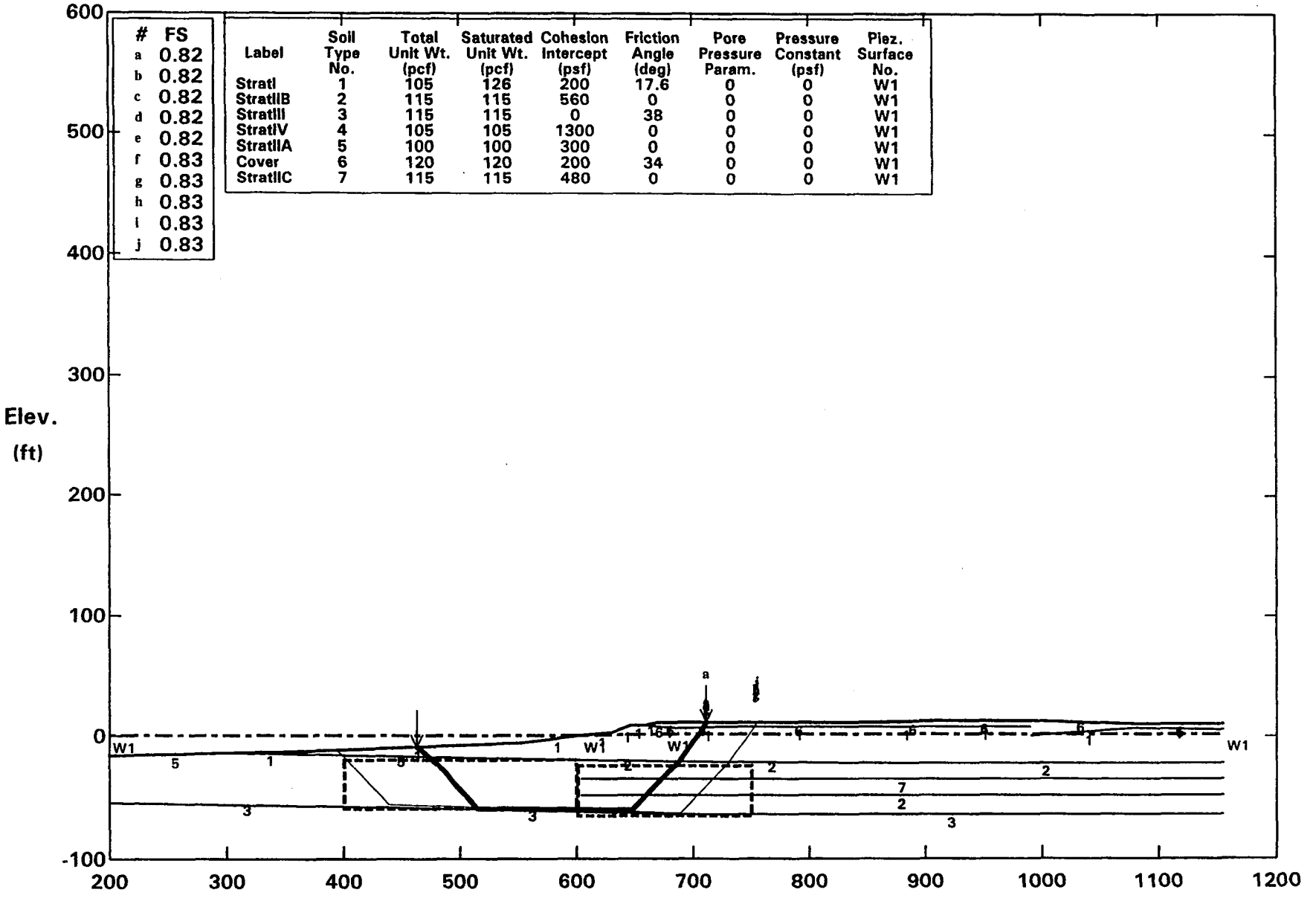
Factors Of Safety Calculated By The Modified Janbu Method

A-NAS IR Site 2, Section C-C', Dynamic Janbu Block Search, 0.05g

Ten Most Critical. C:IR2CJD.PLT By: MMM 08-02-02 5:42pm

#	FS
a	0.82
b	0.82
c	0.82
d	0.82
e	0.82
f	0.83
g	0.83
h	0.83
i	0.83
j	0.83

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	560	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	480	0	0	0	W1



PCSTABL5M FSmin = 0.82 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

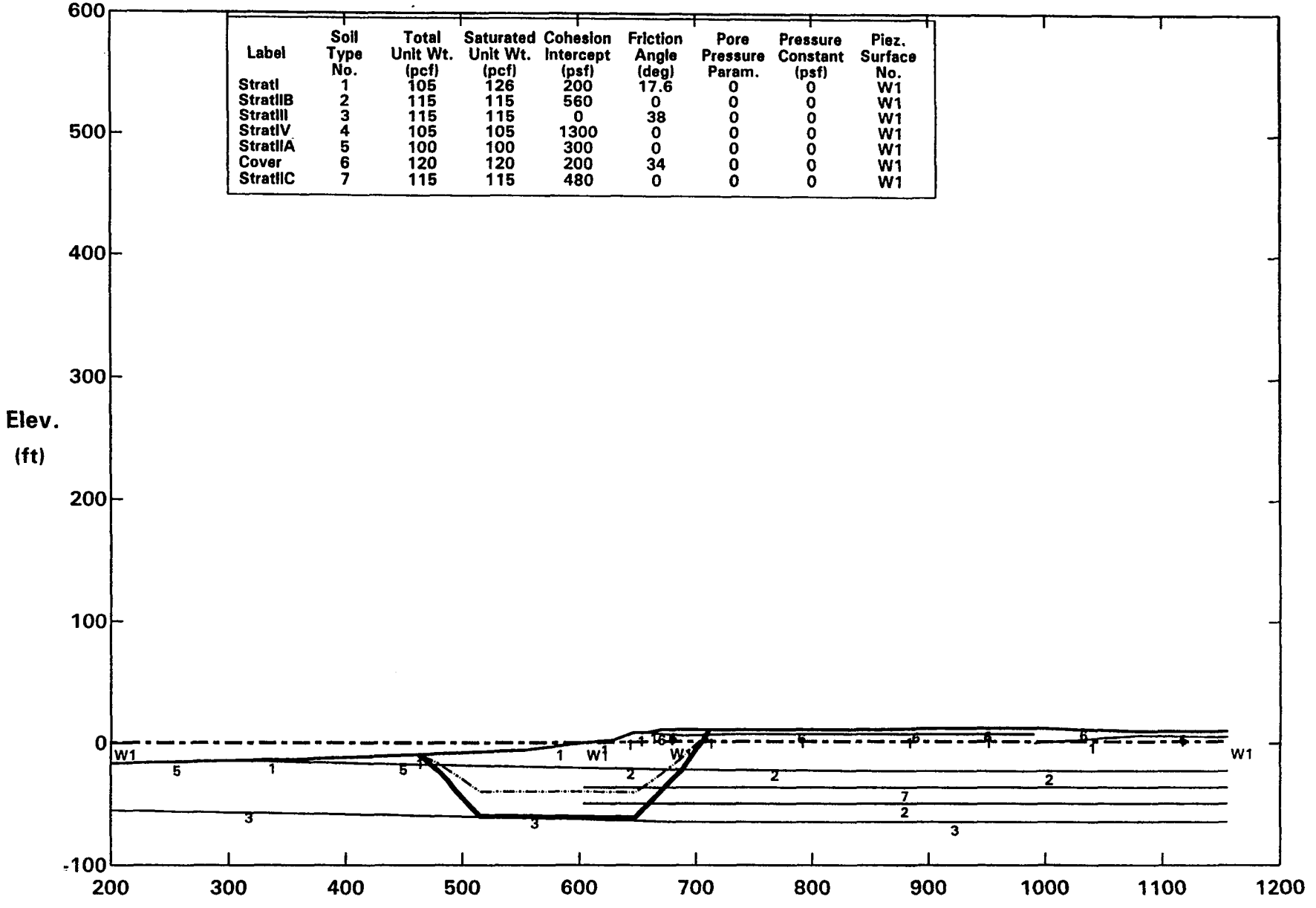
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\C-2\IR2CSSB.IN  PCSTABL Version 5M /O(200.
,-100. )
A-NAS IR Site 2, Section C-C',          Spencer Static Slope Stability (Block'
32 15
0. 83. 100. 86. 5
100. 86. 164. 87. 1
164. 87. 353. 94. 1
353. 94. 404. 100. 1
404. 100. 430. 103. 1
430. 103. 447. 109. 1
447. 109. 458. 109. 1
458. 109. 470. 111. 6
470. 111. 490. 110.6 6
490. 110.6 525. 111. 6
525. 111. 655. 111.3 6
655. 111.3 710. 112. 6
710. 112. 790. 112. 6
790. 112. 880. 110. 6
880. 110. 955. 109.5 6
458. 109. 470. 107. 1
470. 107. 490. 106.6 1
490. 106.6 525. 107. 1
525. 107. 655. 107.3 1
655. 107.3 710. 108. 1
710. 108. 790. 108. 1
790. 100. 880. 106. 1
880. 106. 955. 105.5 1
100. 86. 404. 80.5 5
404. 80.5 490. 79. 2
490. 79. 650. 77. 2
650. 77. 955. 77. 2
404. 64. 955. 64. 7
404. 51. 955. 51. 2
0. 45. 240. 42. 3
240. 42. 490. 36. 3
490. 36. 955. 36. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 200. 17.6 0. 0. 1
115. 115. 560. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 480. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
404. 100.
475. 102.
955. 102.
SPENCR
3.
SURFAC #1-IR2CJD.OUT
22
263.01 90.67
265.61 88.76
273.68 82.86
```

280.11 76.43
287.18 69.36
294.25 62.28
301.32 55.21
8.4 48.14
315.47 41.07
447.95 39.1
455.02 46.17
459.85 51.
466.93 58.07
472.85 64.
479.93 71.07
487. 78.14
487.89 79.04
493.8 87.11
499.7 95.18
505.61 103.25
508.22 106.81
510.36 110.83
EXECUT

A-NAS IR Site 2, Section C-C', Spencer Static Slope Stability (Block)

Surface #1-IR2CJD.OUT. C:IR2CSSB.PLT By: MMM 08-02-02 5:45pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	560	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	480	0	0	0	W1



PCSTABL5M FS = 1.46 Theta = 1.89 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

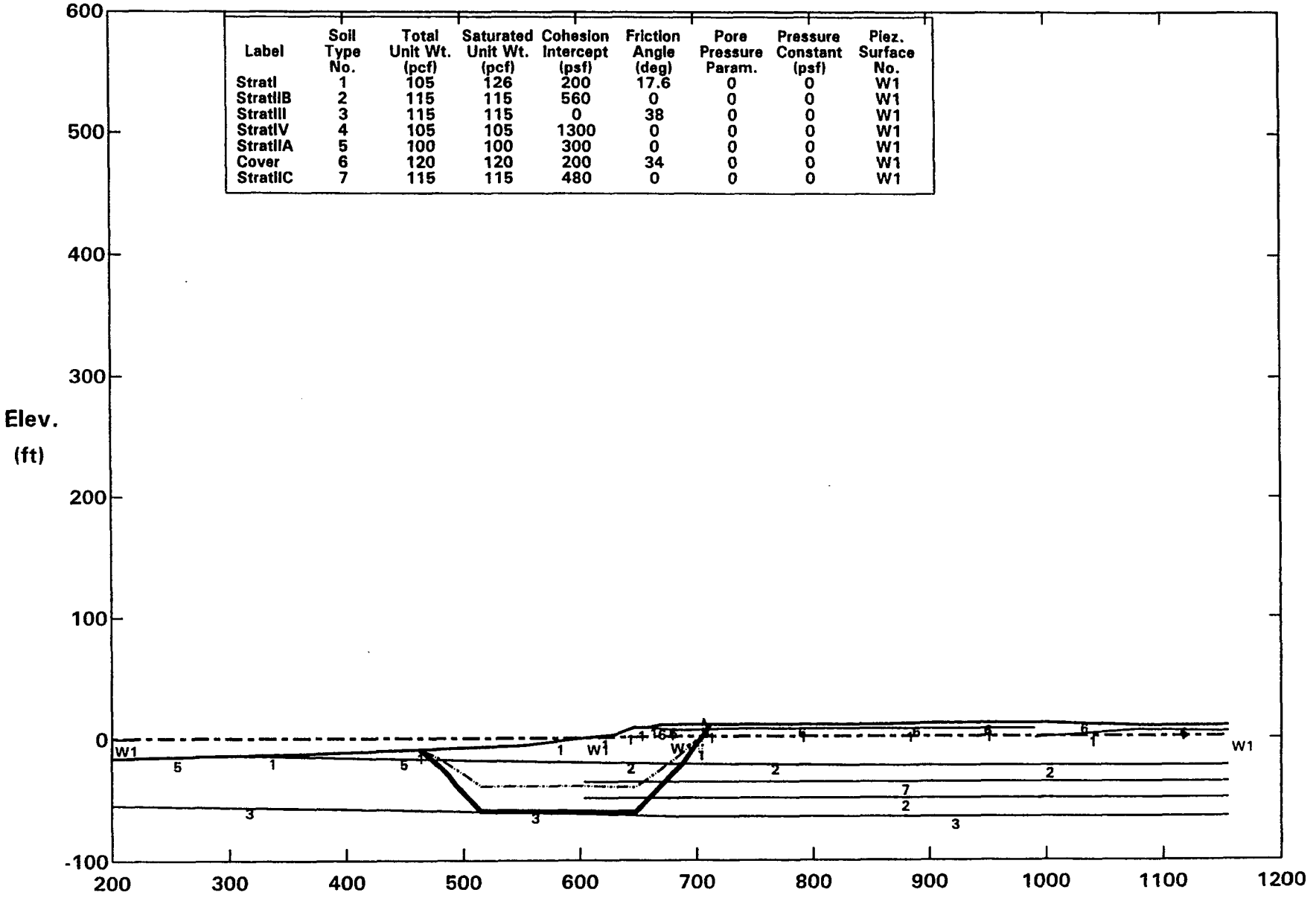
```
PROFIL       C:\GEO\STED\A-NAS\SITE2\C-2\IR2CSDB.IN  PCSTABL Version 5M /O(200.
,-100. )
-NAS IR Site 2, Section C-C', (Block)  Spencer Dynamic Slope Stability Ky=.03g
   15
0. 83. 100. 86. 5
100. 86. 164. 87. 1
164. 87. 353. 94. 1
353. 94. 404. 100. 1
404. 100. 430. 103. 1
430. 103. 447. 109. 1
447. 109. 458. 109. 1
458. 109. 470. 111. 6
470. 111. 490. 110.6 6
490. 110.6 525. 111. 6
525. 111. 655. 111.3 6
655. 111.3 710. 112. 6
710. 112. 790. 112. 6
790. 112. 880. 110. 6
880. 110. 955. 109.5 6
458. 109. 470. 107. 1
470. 107. 490. 106.6 1
490. 106.6 525. 107. 1
525. 107. 655. 107.3 1
655. 107.3 710. 108. 1
710. 108. 790. 108. 1
790. 100. 880. 106. 1
880. 106. 955. 105.5 1
100. 86. 404. 80.5 5
  4. 80.5 490. 79. 2
 0. 79. 650. 77. 2
650. 77. 955. 77. 2
404. 64. 955. 64. 7
404. 51. 955. 51. 2
0. 45. 240. 42. 3
240. 42. 490. 36. 3
490. 36. 955. 36. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 200. 17.6 0. 0. 1
115. 115. 560. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 480. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
404. 100.
475. 102.
955. 102.
EQUAKE
  032 0. 0.
  ENCR
2.5
SURFAC #1-IR2CJD.OUT
22
263.01 90.67
```

```
265.61 88.76
273.68 82.86
280.11 76.43
287.18 69.36
294.25 62.28
301.32 55.21
308.4 48.14
315.47 41.07
447.95 39.1
455.02 46.17
459.85 51.
466.93 58.07
472.85 64.
479.93 71.07
487. 78.14
487.89 79.04
493.8 87.11
499.7 95.18
505.61 103.25
508.22 106.81
510.36 110.83
EXECUT
```

A-NAS IR Site 2, Section C-C', (Block) Spencer Dynamic Slope Stability Ky = .03g

Surface #1-IR2CJD.OUT. C:IR2CSDB.PLT By: MMM 08-02-02 5:45pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	560	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	480	0	0	0	W1



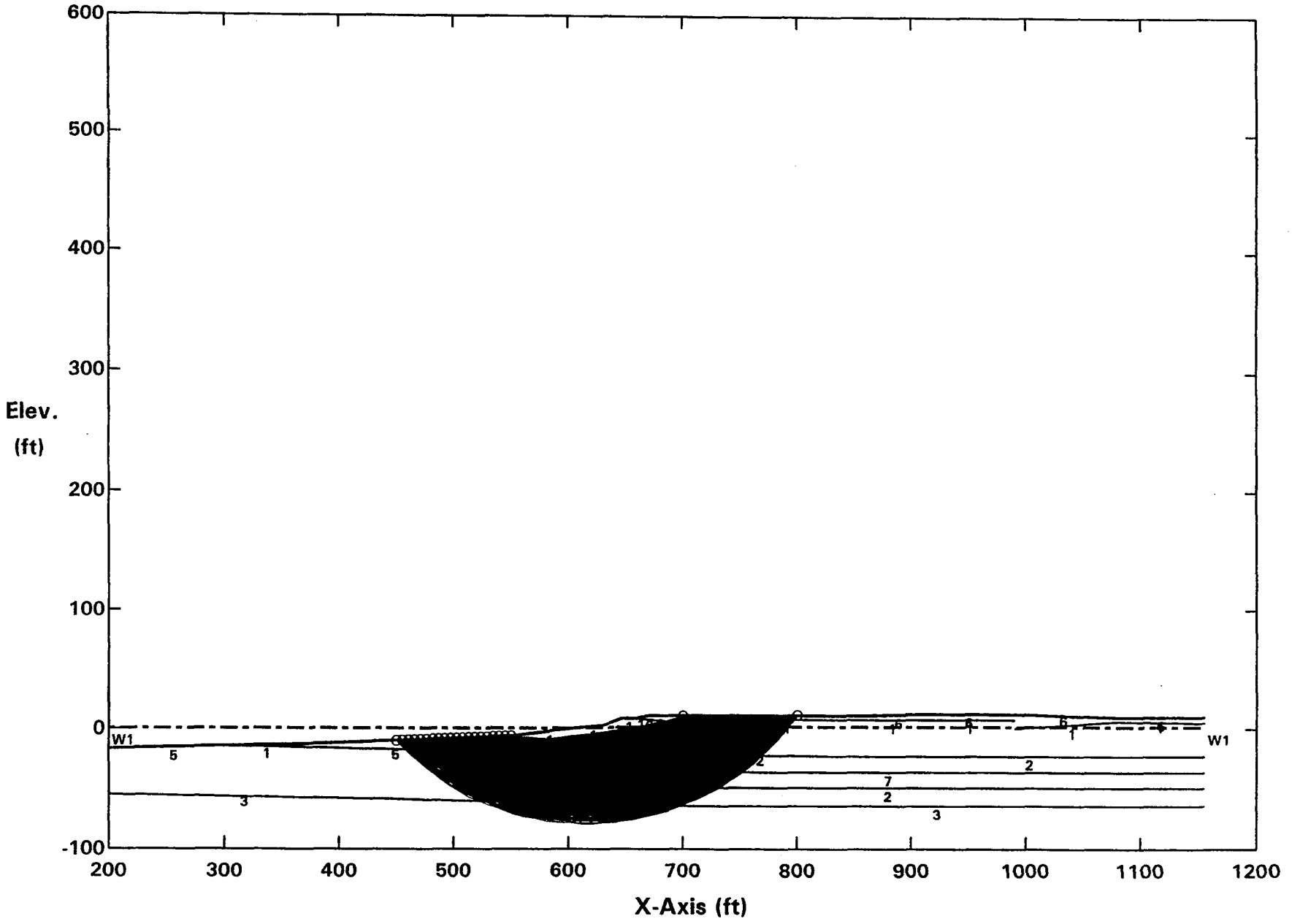
PCSTABL5M FS = 1.00 Theta = 1.16 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL       C:\GEO\STED\A-NAS\SITE2\C-2\IR2CEQBS.IN  PCSTABL Version 5M /O(200
 ,-100. )
A-NAS IR Site 2, Section C-C', Post-EQ  Static Bishop Circular Search
32 15
0. 83. 100. 86. 5
100. 86. 164. 87. 1
164. 87. 353. 94. 1
353. 94. 404. 100. 1
404. 100. 430. 103. 1
430. 103. 447. 109. 1
447. 109. 458. 109. 1
458. 109. 470. 111. 6
470. 111. 490. 110.6 6
490. 110.6 525. 111. 6
525. 111. 655. 111.3 6
655. 111.3 710. 112. 6
710. 112. 790. 112. 6
790. 112. 880. 110. 6
880. 110. 955. 109.5 6
458. 109. 470. 107. 1
470. 107. 490. 106.6 1
490. 106.6 525. 107. 1
525. 107. 655. 107.3 1
655. 107.3 710. 108. 1
710. 108. 790. 108. 1
790. 100. 880. 106. 1
880. 106. 955. 105.5 1
100. 86. 404. 80.5 5
404. 80.5 490. 79. 2
490. 79. 650. 77. 2
650. 77. 955. 77. 2
404. 64. 955. 64. 7
404. 51. 955. 51. 2
0. 45. 240. 42. 3
240. 42. 490. 36. 3
490. 36. 955. 36. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
404. 100.
475. 102.
955. 102.
CIRCL2-Bishop circular, search
20 100
250. 350. 500. 600. 0. 10. 0. 0.
```

A-NAS IR Site 2, Section C-C', Post-EQ Static Bishop Circular Search

All surfaces evaluated. C:IR2CEQBS.PLT By: MMM 08-02-02 5:48pm



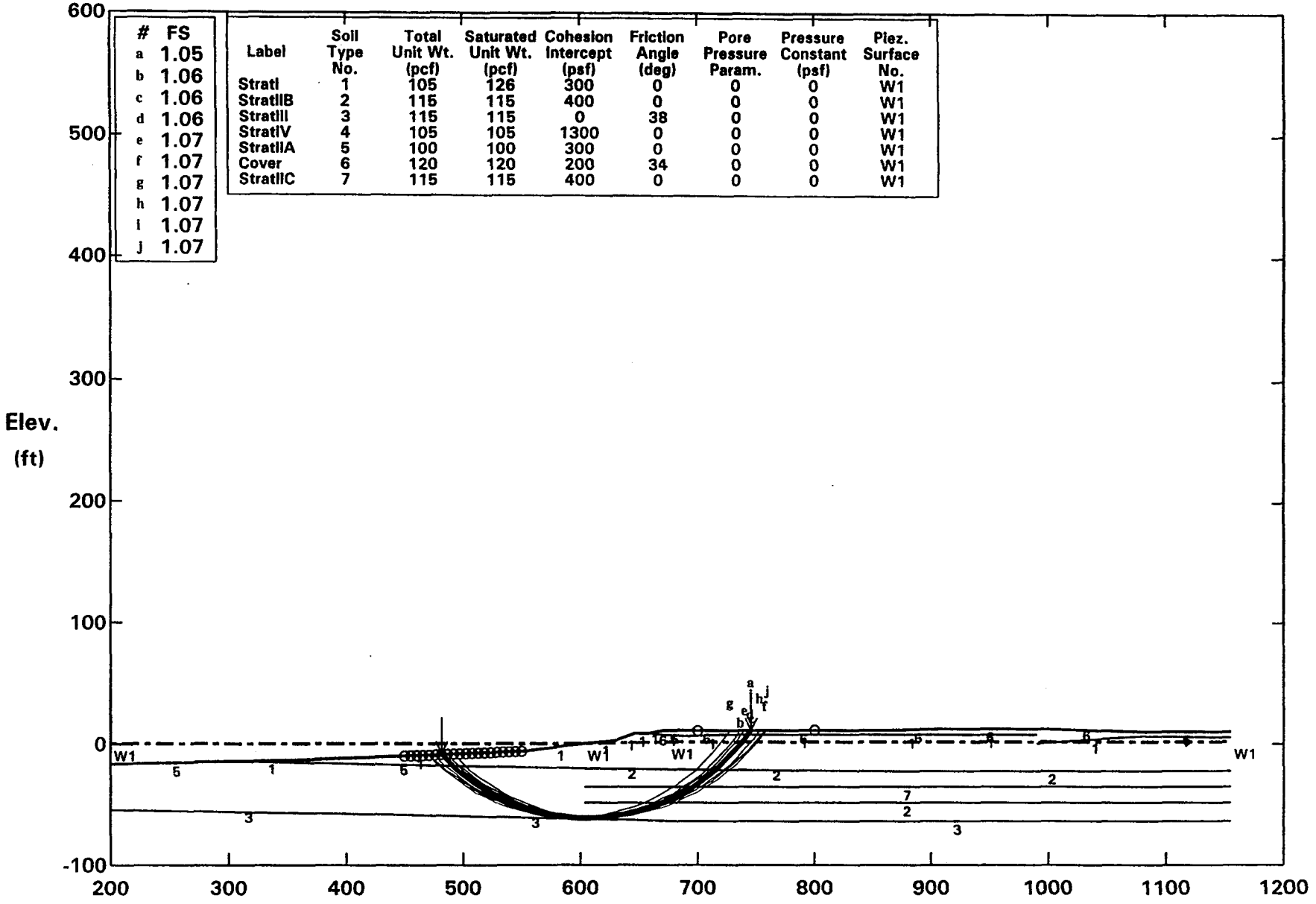
Factors Of Safety Calculated By The Modified Bishop Method

A-NAS IR Site 2, Section C-C', Post-EQ Static Bishop Circular Search

Ten Most Critical. C:IR2CEQBS.PLT By: MMM 08-02-02 5:48pm

#	FS
a	1.05
b	1.06
c	1.06
d	1.06
e	1.07
f	1.07
g	1.07
h	1.07
i	1.07
j	1.07

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	400	0	0	0	W1



PCSTABL5M FSmin = 1.05 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

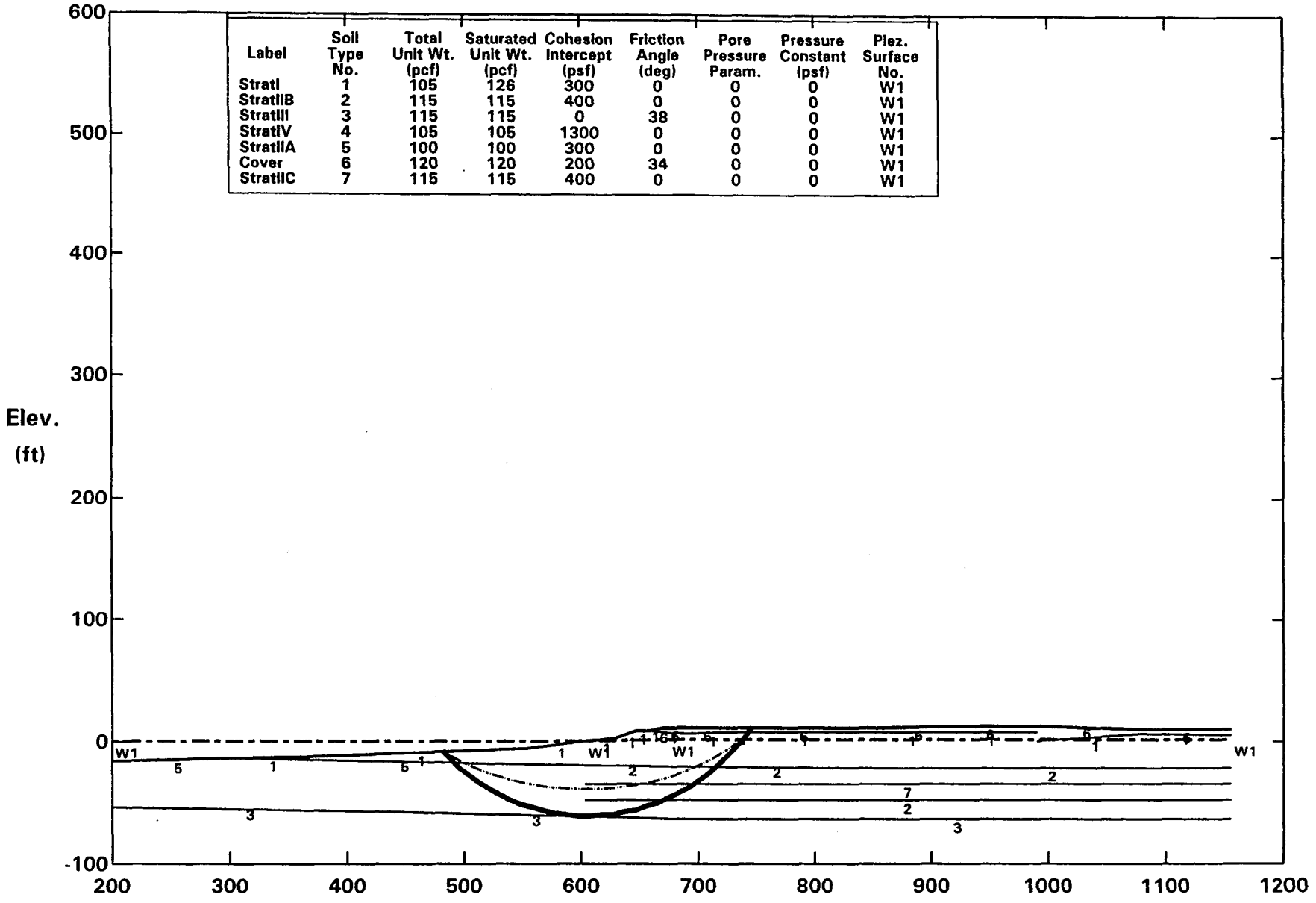
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\C-2\IR2CEQSC.IN  PCSTABL Version 5M /O(200.
 ,-100. )
- NAS IR Site 2, Section C-C', Post-EQ  Spencer Static Slope Stability (Circ.)
   15
  . 83. 100. 86. 5
100. 86. 164. 87. 1
164. 87. 353. 94. 1
353. 94. 404. 100. 1
404. 100. 430. 103. 1
430. 103. 447. 109. 1
447. 109. 458. 109. 1
458. 109. 470. 111. 6
470. 111. 490. 110.6 6
490. 110.6 525. 111. 6
525. 111. 655. 111.3 6
655. 111.3 710. 112. 6
710. 112. 790. 112. 6
790. 112. 880. 110. 6
880. 110. 955. 109.5 6
458. 109. 470. 107. 1
470. 107. 490. 106.6 1
490. 106.6 525. 107. 1
525. 107. 655. 107.3 1
655. 107.3 710. 108. 1
710. 108. 790. 108. 1
790. 100. 880. 106. 1
880. 106. 955. 105.5 1
100. 86. 404. 80.5 5
  1. 80.5 490. 79. 2
  0. 79. 650. 77. 2
650. 77. 955. 77. 2
404. 64. 955. 64. 7
404. 51. 955. 51. 2
0. 45. 240. 42. 3
240. 42. 490. 36. 3
490. 36. 955. 36. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
404. 100.
475. 102.
955. 102.
SPENCR

  RBIS #1-IR2CEQBS.OUT
32
281.58 91.35
288.7 84.33
296.21 77.73
```

```
304.1 71.59
312.33 65.91
320.89 60.73
329.73 56.05
338.82 51.9
348.15 48.29
357.67 45.23
367.35 42.73
377.16 40.8
387.07 39.45
397.04 38.68
407.04 38.5
417.03 38.89
426.99 39.88
436.86 41.44
446.63 43.57
456.26 46.28
465.71 49.54
474.96 53.35
483.97 57.69
492.71 62.55
501.15 67.91
509.26 73.76
517.01 80.07
524.39 86.83
531.35 94.
537.89 101.57
543.97 109.51
545.01 111.05
EXECUT
```

A-NAS IR Site 2, Section C-C', Post-EQ Spencer Static Slope Stability (Circ.)

Surface #1-IR2CEQBS.OUT. C:IR2CEQSC.PLT By: MMM 08-02-02 5:49pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	400	0	0	0	W1



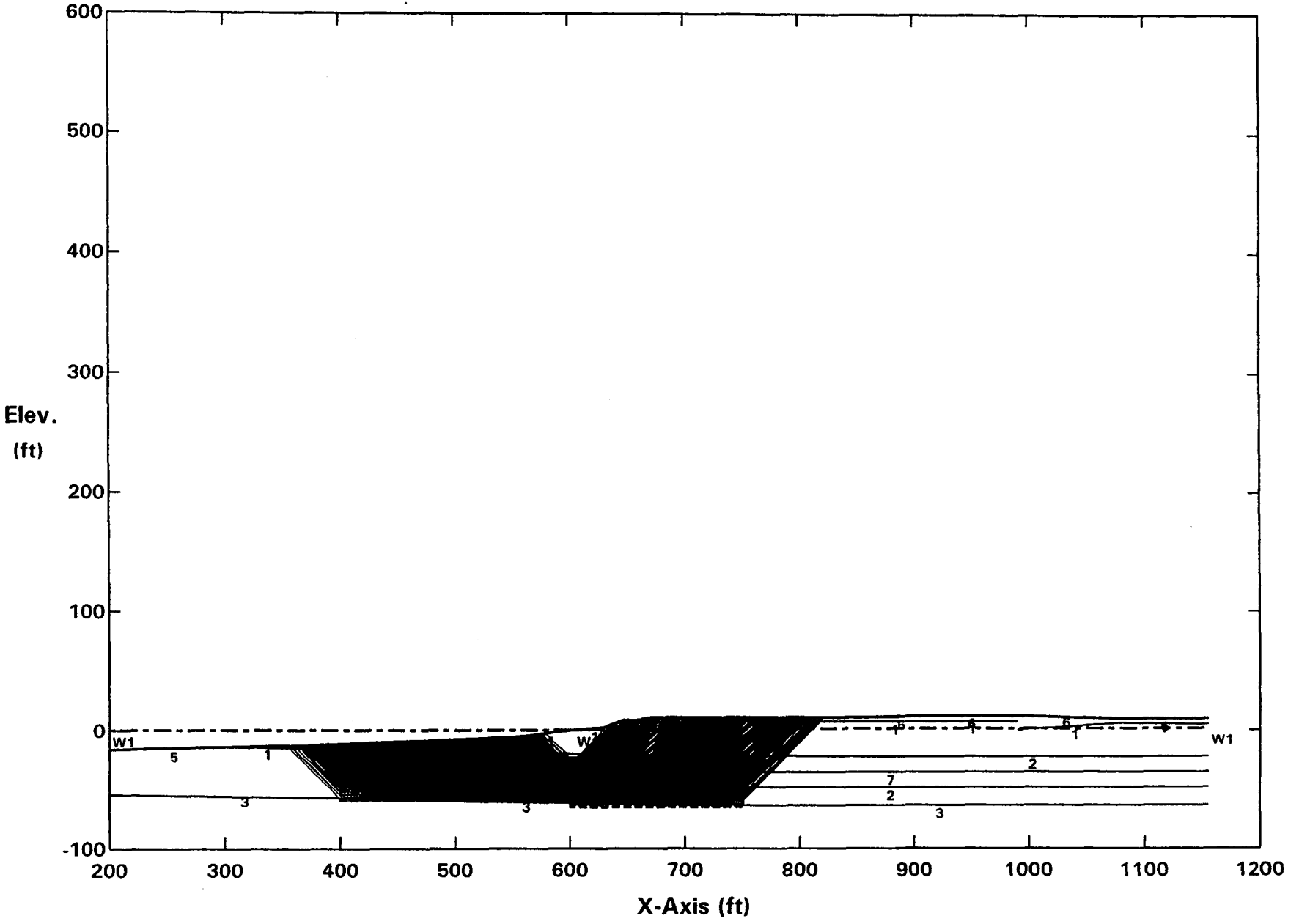
PCSTABL5M FS = 1.06 Theta = 1.81 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL       C:\GEO\STED\A-NAS\SITE2\C-2\IR2CEQJS.IN  PCSTABL Version 5M /O(200.
 ,-100. )
A-NAS IR Site 2, Section C-C', Post-EQ  Static Janbu Block Search
32 15
0. 83. 100. 86. 5
100. 86. 164. 87. 1
164. 87. 353. 94. 1
353. 94. 404. 100. 1
404. 100. 430. 103. 1
430. 103. 447. 109. 1
447. 109. 458. 109. 1
458. 109. 470. 111. 6
470. 111. 490. 110.6 6
490. 110.6 525. 111. 6
525. 111. 655. 111.3 6
655. 111.3 710. 112. 6
710. 112. 790. 112. 6
790. 112. 880. 110. 6
880. 110. 955. 109.5 6
458. 109. 470. 107. 1
470. 107. 490. 106.6 1
490. 106.6 525. 107. 1
525. 107. 655. 107.3 1
655. 107.3 710. 108. 1
710. 108. 790. 108. 1
790. 100. 880. 106. 1
880. 106. 955. 105.5 1
100. 86. 404. 80.5 5
404. 80.5 490. 79. 2
490. 79. 650. 77. 2
650. 77. 955. 77. 2
404. 64. 955. 64. 7
404. 51. 955. 51. 2
0. 45. 240. 42. 3
240. 42. 490. 36. 3
490. 36. 955. 36. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
404. 100.
475. 102.
955. 102.
BLOCK2-Rankine block, search
0
5000 2 10.
200. 60. 400. 60. 40.
401. 55. 550. 55. 40.
```

A-NAS IR Site 2, Section C-C', Post-EQ Static Janbu Block Search

All surfaces evaluated. C:IR2CEQJS.PLT By: MMM 08-02-02 5:50pm



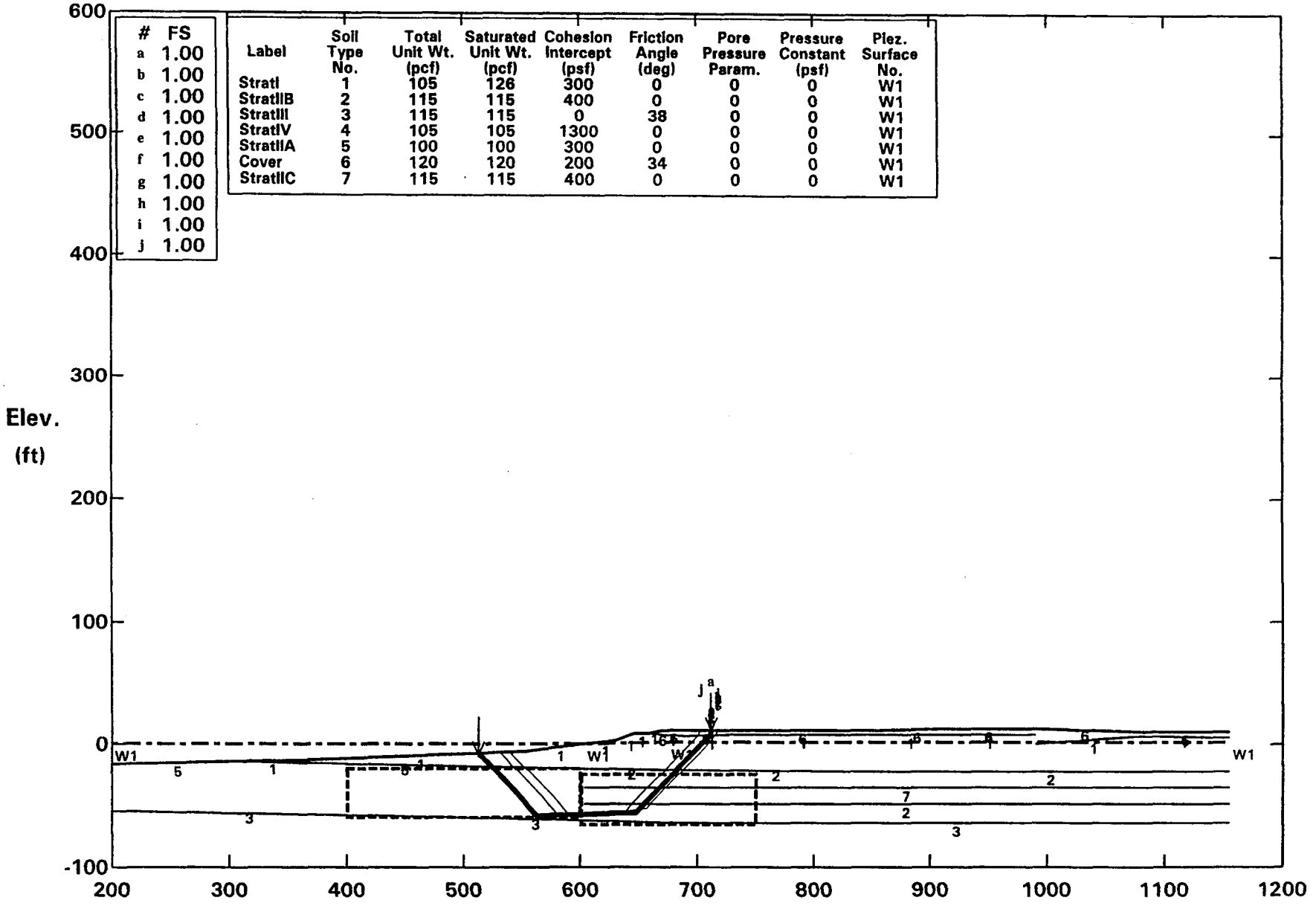
Factors Of Safety Calculated By The Modified Janbu Method

A-NAS IR Site 2, Section C-C', Post-EQ Static Janbu Block Search

Ten Most Critical. C:IR2CEQJS.PLT By: MMM 08-02-02 5:50pm

#	FS
a	1.00
b	1.00
c	1.00
d	1.00
e	1.00
f	1.00
g	1.00
h	1.00
i	1.00
j	1.00

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	400	0	0	0	W1



PCSTABL5M FSmin = 1.00 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

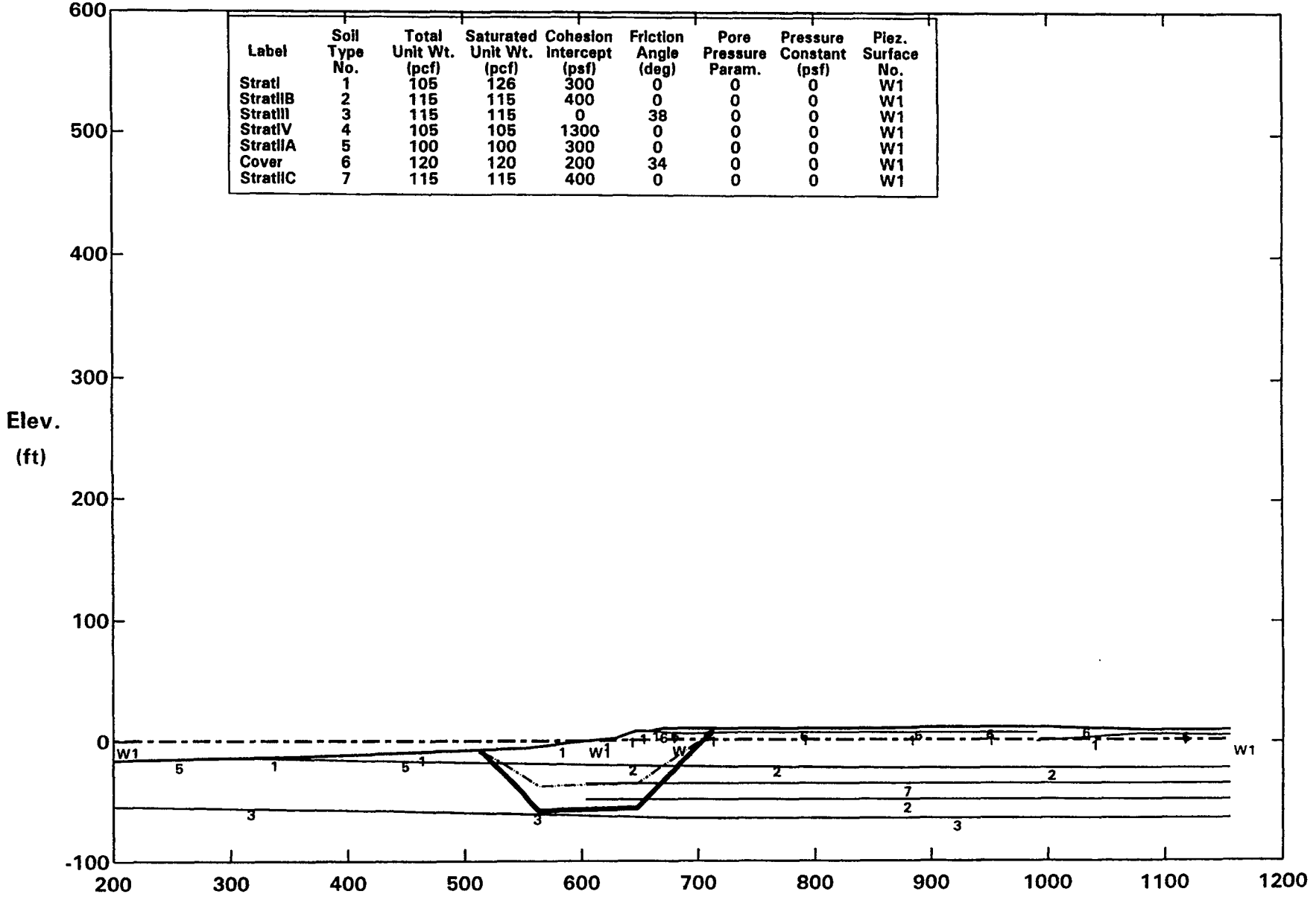
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\C-2\IR2CEQSB.IN  PCSTABL Version 5M /O(200.
 ,-100. )
A-NAS IR Site 2, Section C-C', Post-EQ  Spencer Static Slope Stability (Block)
   15
0. 83. 100. 86. 5
100. 86. 164. 87. 1
164. 87. 353. 94. 1
353. 94. 404. 100. 1
404. 100. 430. 103. 1
430. 103. 447. 109. 1
447. 109. 458. 109. 1
458. 109. 470. 111. 6
470. 111. 490. 110.6 6
490. 110.6 525. 111. 6
525. 111. 655. 111.3 6
655. 111.3 710. 112. 6
710. 112. 790. 112. 6
790. 112. 880. 110. 6
880. 110. 955. 109.5 6
458. 109. 470. 107. 1
470. 107. 490. 106.6 1
490. 106.6 525. 107. 1
525. 107. 655. 107.3 1
655. 107.3 710. 108. 1
710. 108. 790. 108. 1
790. 100. 880. 106. 1
880. 106. 955. 105.5 1
100. 86. 404. 80.5 5
  4. 80.5 490. 79. 2
 0. 79. 650. 77. 2
650. 77. 955. 77. 2
404. 64. 955. 64. 7
404. 51. 955. 51. 2
0. 45. 240. 42. 3
240. 42. 490. 36. 3
490. 36. 955. 36. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
404. 100.
475. 102.
955. 102.
SPENCR

  .FAC #1-IR2CEQJS.OUT
22
312.55 92.5
316.02 89.03
323.09 81.96
```

```
327.96 77.09
335.03 70.02
342.1 62.95
349.18 55.88
356.25 48.81
363.32 41.74
447.52 43.83
454.59 50.9
454.69 51.
461.76 58.07
467.69 64.
474.76 71.07
481.83 78.14
482.82 79.13
489.89 86.2
496.96 93.27
504.03 100.34
510.53 106.83
512.67 110.86
EXECUT
```

A-NAS IR Site 2, Section C-C', Post-EQ Spencer Static Slope Stability (Block)

Surface #1-IR2CEQJS.OUT. C:IR2CEQSB.PLT By: MMM 08-02-02 5:51pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	400	0	0	0	W1



PCSTABL5M FS = 1.18 Theta = 2.29 X-Axis (ft)

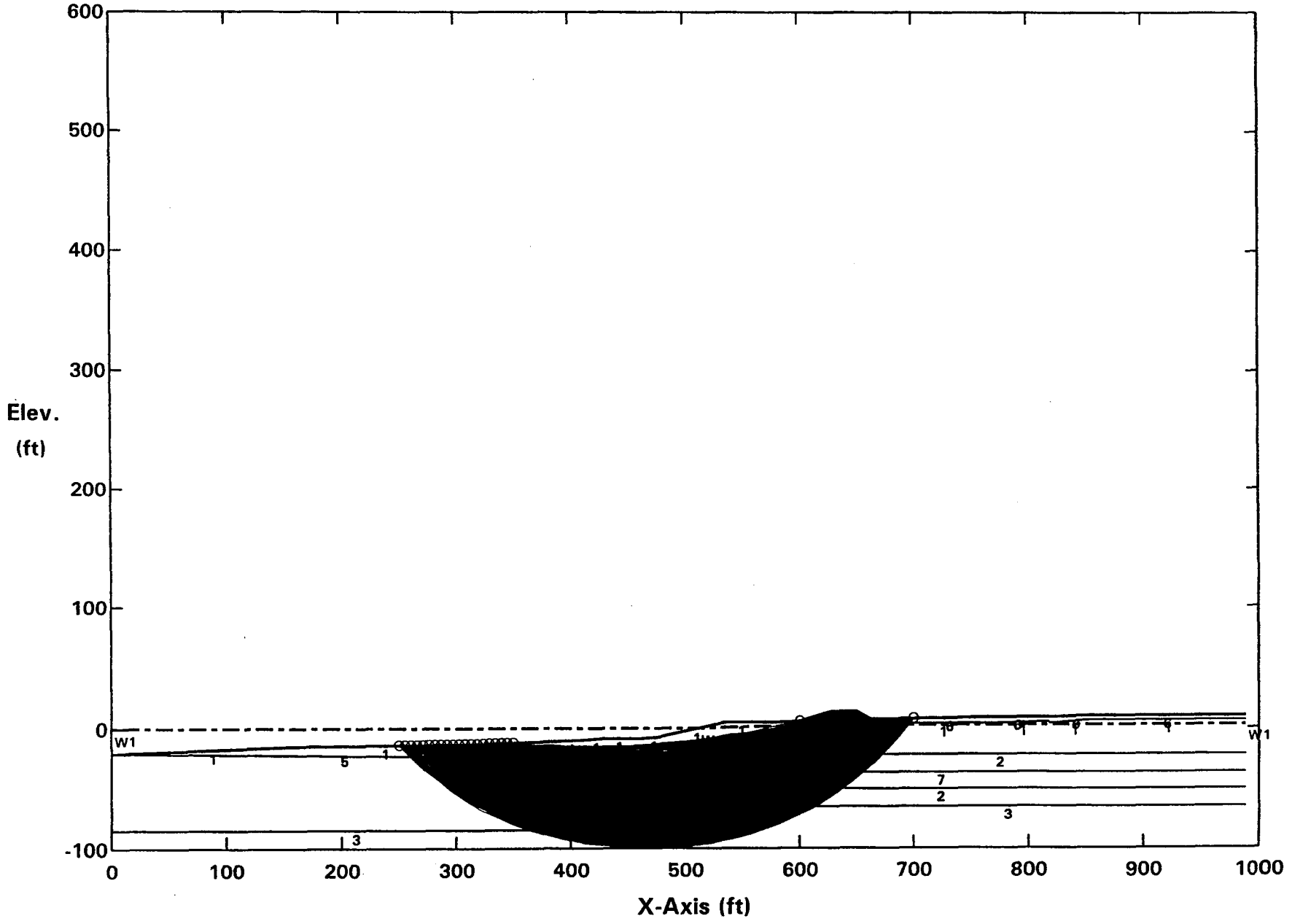
Factors Of Safety Calculated By Spencer`s Method of Slices

SECTION D-D'

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\D-2\IR2DLTBS.IN  PCSTABL Version 5M /O(0. ,
-100. )
A-NAS IR Site 2, Section D-D', Long-TermStatic Bishop Circular Search
21
   79.5 165. 85. 1
 5. 85. 300. 87. 1
300. 87. 381. 89. 1
381. 89. 410. 90. 1
410. 90. 425. 91. 1
425. 91. 460. 92. 1
460. 92. 475. 93. 1
475. 93. 535. 105. 1
535. 105. 562. 105. 1
562. 105. 578. 104.5 1
578. 104.5 590. 105. 1
590. 105. 602. 106. 1
602. 106. 627. 114. 1
627. 114. 649. 114. 1
649. 114. 662.2 108. 1
662.2 108. 671. 108. 6
671. 108. 688. 108. 6
688. 108. 763. 108.2 6
763. 108.2 818. 109. 6
818. 109. 853. 110. 6
853. 110. 988. 110. 6
662.2 108. 671. 104. 1
671. 104. 688. 104. 1
688. 104. 763. 104.2 1
763. 104.2 818. 105. 1
   . 104. 853. 106. 1
  3. 106. 988. 106. 1
0. 79.5 410. 75. 5
410. 75. 460. 76.6 5
460. 76.6 562. 80. 2
562. 78. 988. 78. 2
460. 63. 988. 63. 7
460. 49. 988. 49. 2
0. 15. 425. 15. 3
425. 15. 575. 34. 3
575. 34. 988. 34. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 100. 32. 0. 0. 1
115. 115. 620. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 560. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
511. 100.
   . 102.
  5. 102.
CIRCL2-Bishop circular, search
20 100
250. 350. 600. 700. 0. 15. 0. 0.
```

A-NAS IR Site 2, Section D-D', Long-Term Static Bishop Circular Search

All surfaces evaluated. C:IR2DLTBS.PLT By: MMM 08-02-02 6:05pm



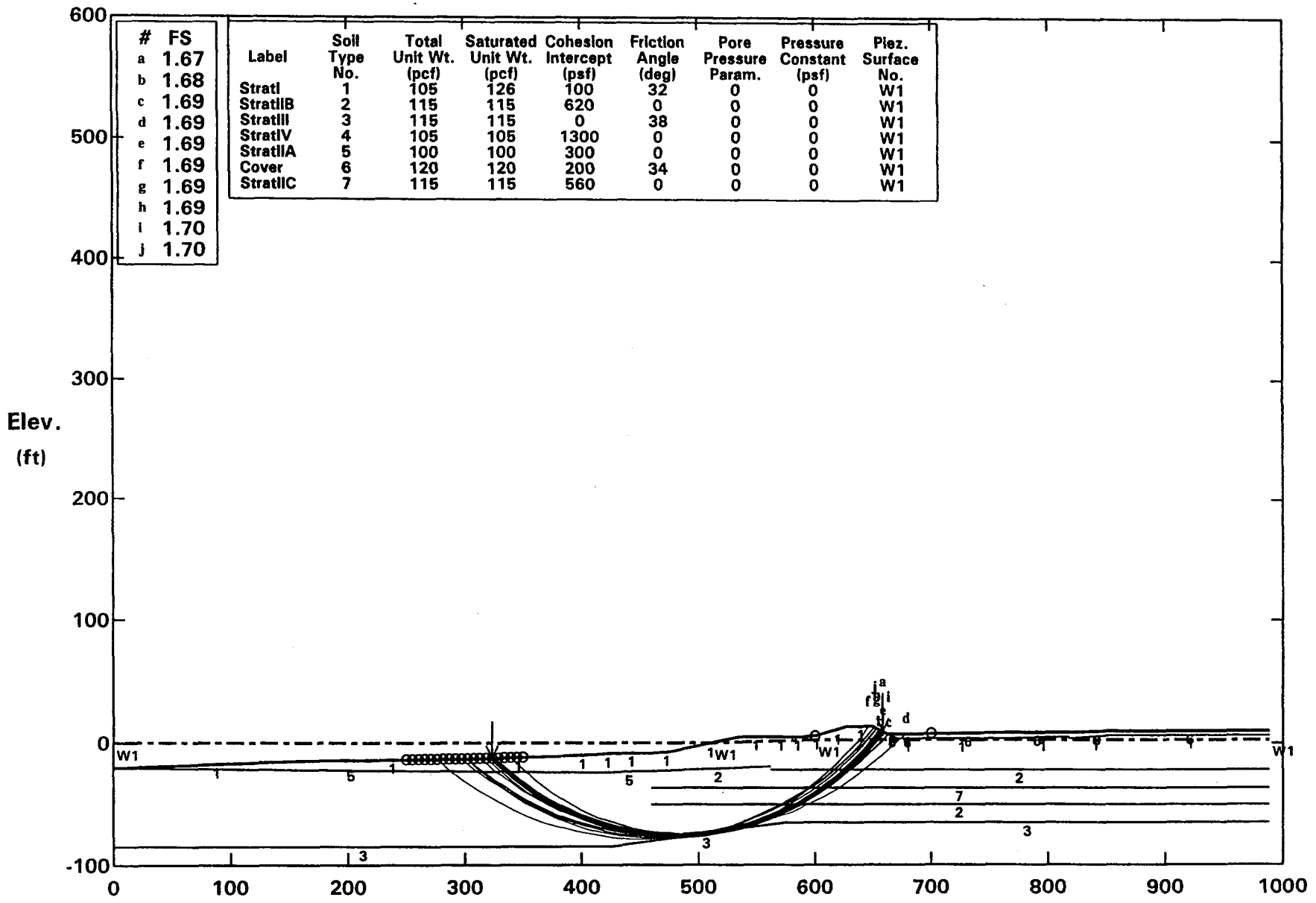
Factors Of Safety Calculated By The Modified Bishop Method

A-NAS IR Site 2, Section D-D', Long-Term Static Bishop Circular Search

Ten Most Critical. C:IR2DLTBS.PLT By: MMM 08-02-02 6:05pm

#	FS
a	1.67
b	1.68
c	1.69
d	1.69
e	1.69
f	1.69
g	1.69
h	1.69
i	1.70
j	1.70

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	620	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	560	0	0	0	W1



PCSTABL5M FSmin = 1.67 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

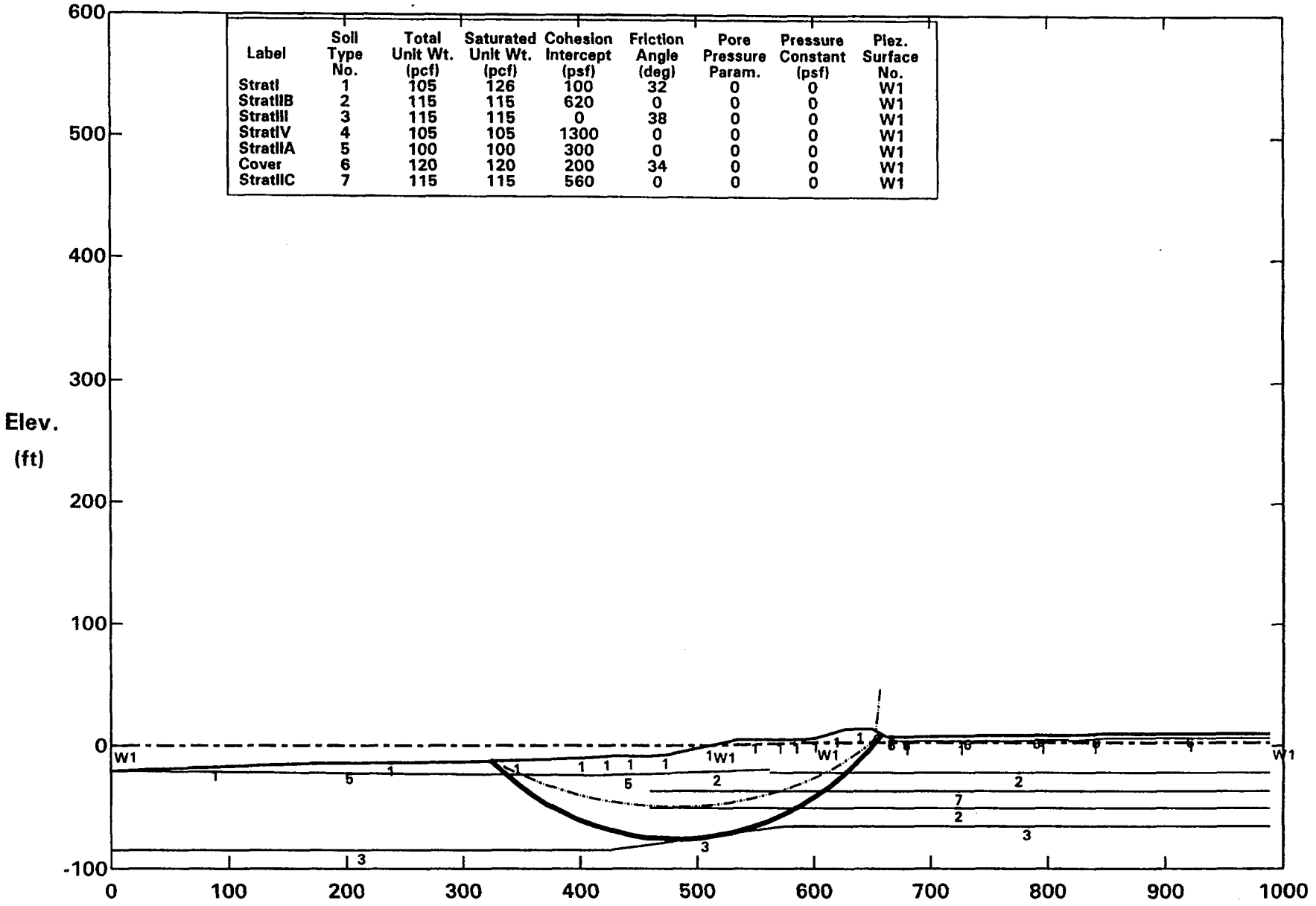
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\D-2\IR2DLTSC.IN  PCSTABL Version 5M /O(0. ,
-100. )
A-NAS IR Site 2, Section D-D', Long-TermSpencer Static Slope Stability (Circ `
36 21
0. 79.5 165. 85. 1
165. 85. 300. 87. 1
300. 87. 381. 89. 1
381. 89. 410. 90. 1
410. 90. 425. 91. 1
425. 91. 460. 92. 1
460. 92. 475. 93. 1
475. 93. 535. 105. 1
535. 105. 562. 105. 1
562. 105. 578. 104.5 1
578. 104.5 590. 105. 1
590. 105. 602. 106. 1
602. 106. 627. 114. 1
627. 114. 649. 114. 1
649. 114. 662.2 108. 1
662.2 108. 671. 108. 6
671. 108. 688. 108. 6
688. 108. 763. 108.2 6
763. 108.2 818. 109. 6
818. 109. 853. 110. 6
853. 110. 988. 110. 6
662.2 108. 671. 104. 1
671. 104. 688. 104. 1
688. 104. 763. 104.2 1
763. 104.2 818. 105. 1
818. 104. 853. 106. 1
853. 106. 988. 106. 1
0. 79.5 410. 75. 5
410. 75. 460. 76.6 5
460. 76.6 562. 80. 2
562. 78. 988. 78. 2
460. 63. 988. 63. 7
460. 49. 988. 49. 2
0. 15. 425. 15. 3
425. 15. 575. 34. 3
575. 34. 988. 34. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 100. 32. 0. 0. 1
115. 115. 620. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 560. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
511. 100.
600. 102.
988. 102.
SPENCR
3.5
SURBIS #1-IR2DLTBS.OUT
```

27
323.68 87.58
334.81 77.52
346.58 68.22
8.93 59.72
371.83 52.05
385.2 45.25
398.99 39.35
413.14 34.38
427.59 30.35
442.27 27.29
457.13 25.21
472.09 24.12
487.09 24.01
502.06 24.9
516.94 26.78
531.67 29.64
546.17 33.46
560.39 38.24
574.26 43.95
587.73 50.56
600.72 58.05
613.2 66.38
625.09 75.52
636.35 85.43
646.94 96.06
656.8 107.36
658.54 109.66
EXECUT

A-NAS IR Site 2, Section D-D', Long-Term Spencer Static Slope Stability (Circ.)

Surface #1-IR2DLTBS.OUT. C:IR2DLTSC.PLT By: MMM 08-02-02 6:06pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	620	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	560	0	0	0	W1



PCSTABL5M FS = 1.69 Theta = 1.64 X-Axis (ft)

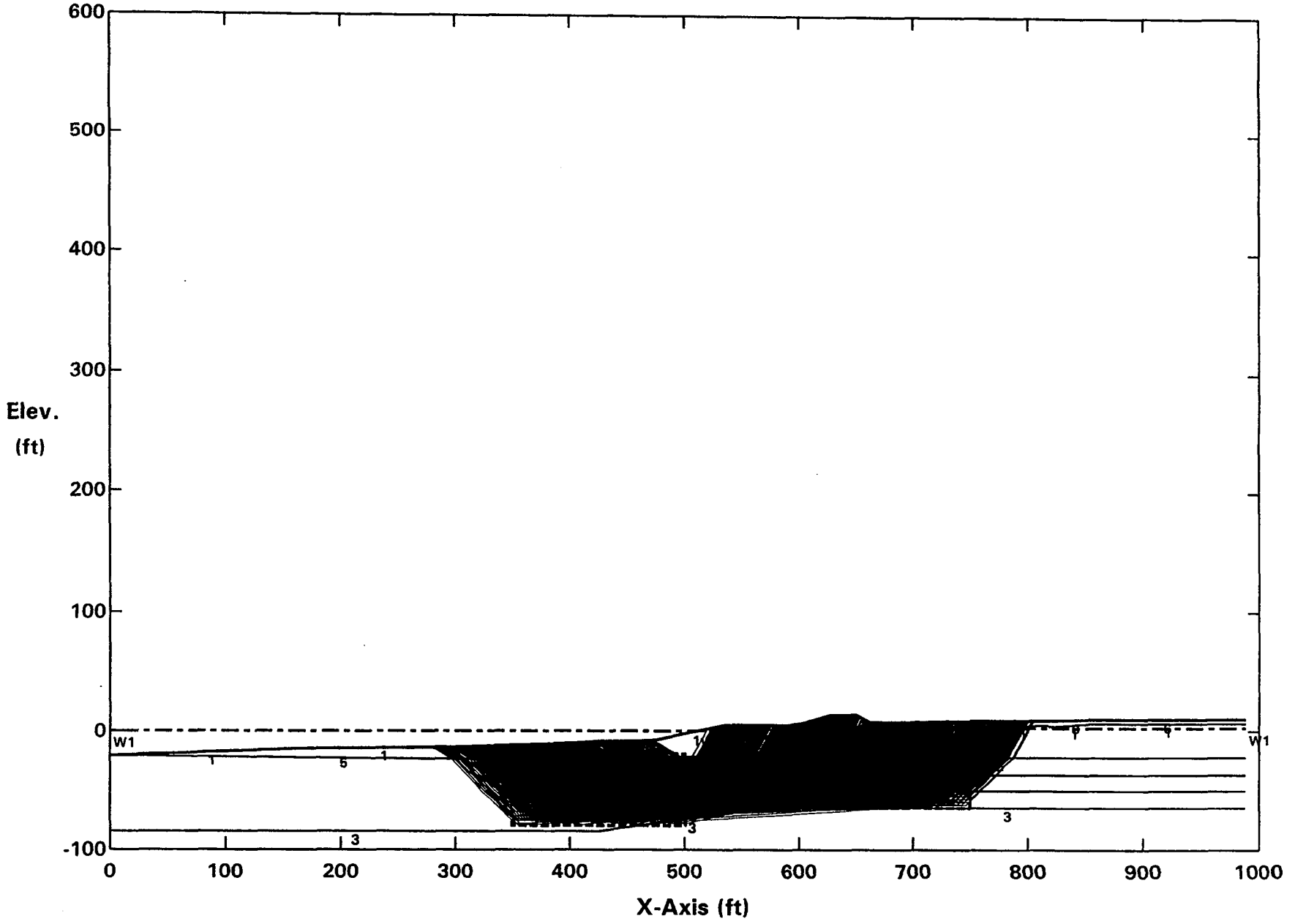
Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\D-2\IR2DLTJS.IN  PCSTABL Version 5M /O(0. ,
-100. )
* NAS IR Site 2, Section D-D', Long-TermStatic Janbu Block Search
   21
0. 79.5 165. 85. 1
165. 85. 300. 87. 1
300. 87. 381. 89. 1
381. 89. 410. 90. 1
410. 90. 425. 91. 1
425. 91. 460. 92. 1
460. 92. 475. 93. 1
475. 93. 535. 105. 1
535. 105. 562. 105. 1
562. 105. 578. 104.5 1
578. 104.5 590. 105. 1
590. 105. 602. 106. 1
602. 106. 627. 114. 1
627. 114. 649. 114. 1
649. 114. 662.2 108. 1
662.2 108. 671. 108. 6
671. 108. 688. 108. 6
688. 108. 763. 108.2 6
763. 108.2 818. 109. 6
818. 109. 853. 110. 6
853. 110. 988. 110. 6
662.2 108. 671. 104. 1
671. 104. 688. 104. 1
688. 104. 763. 104.2 1
   . 104.2 818. 105. 1
  .8. 104. 853. 106. 1
853. 106. 988. 106. 1
0. 79.5 410. 75. 5
410. 75. 460. 76.6 5
460. 76.6 562. 80. 2
562. 78. 988. 78. 2
460. 63. 988. 63. 7
460. 49. 988. 49. 2
0. 15. 425. 15. 3
425. 15. 575. 34. 3
575. 34. 988. 34. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 100. 32. 0. 0. 1
115. 115. 620. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 560. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
   . 100.
  . 102.
988. 102.
BLOCK2-Rankine block, search
0
5000 2 10.
```

350. 50. 500. 50. 60.
501. 56. 750. 56. 42.

A-NAS IR Site 2, Section D-D', Long-Term Static Janbu Block Search

All surfaces evaluated. C:IR2DLTJS.PLT By: MMM 08-02-02 6:21pm



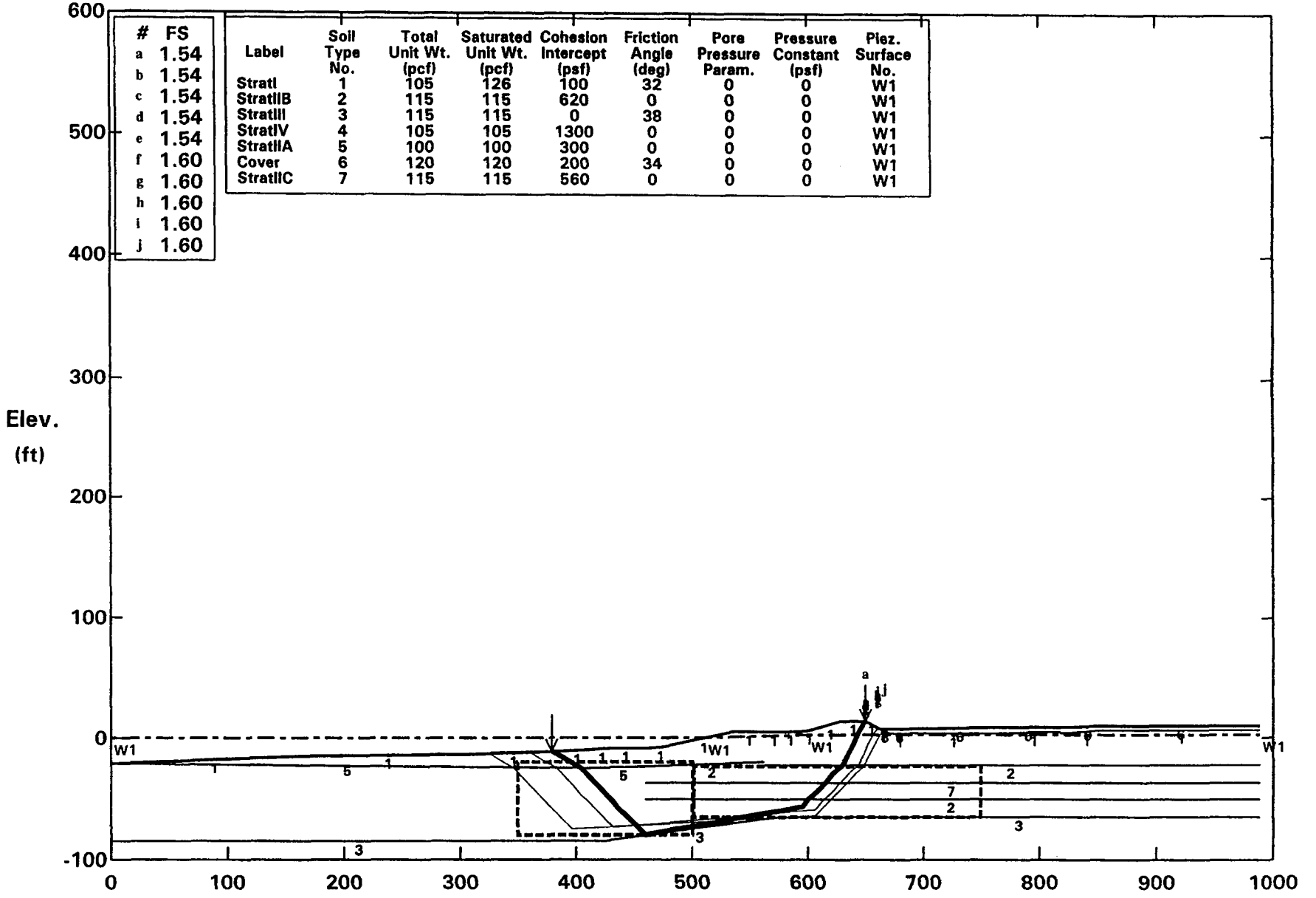
Factors Of Safety Calculated By The Modified Janbu Method

A-NAS IR Site 2, Section D-D', Long-Term Static Janbu Block Search

Ten Most Critical. C:IR2DLTJS.PLT By: MMM 08-02-02 6:21pm

#	FS
a	1.54
b	1.54
c	1.54
d	1.54
e	1.54
f	1.60
g	1.60
h	1.60
i	1.60
j	1.60

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	620	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	560	0	0	0	W1



PCSTABL5M FSmin = 1.54 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

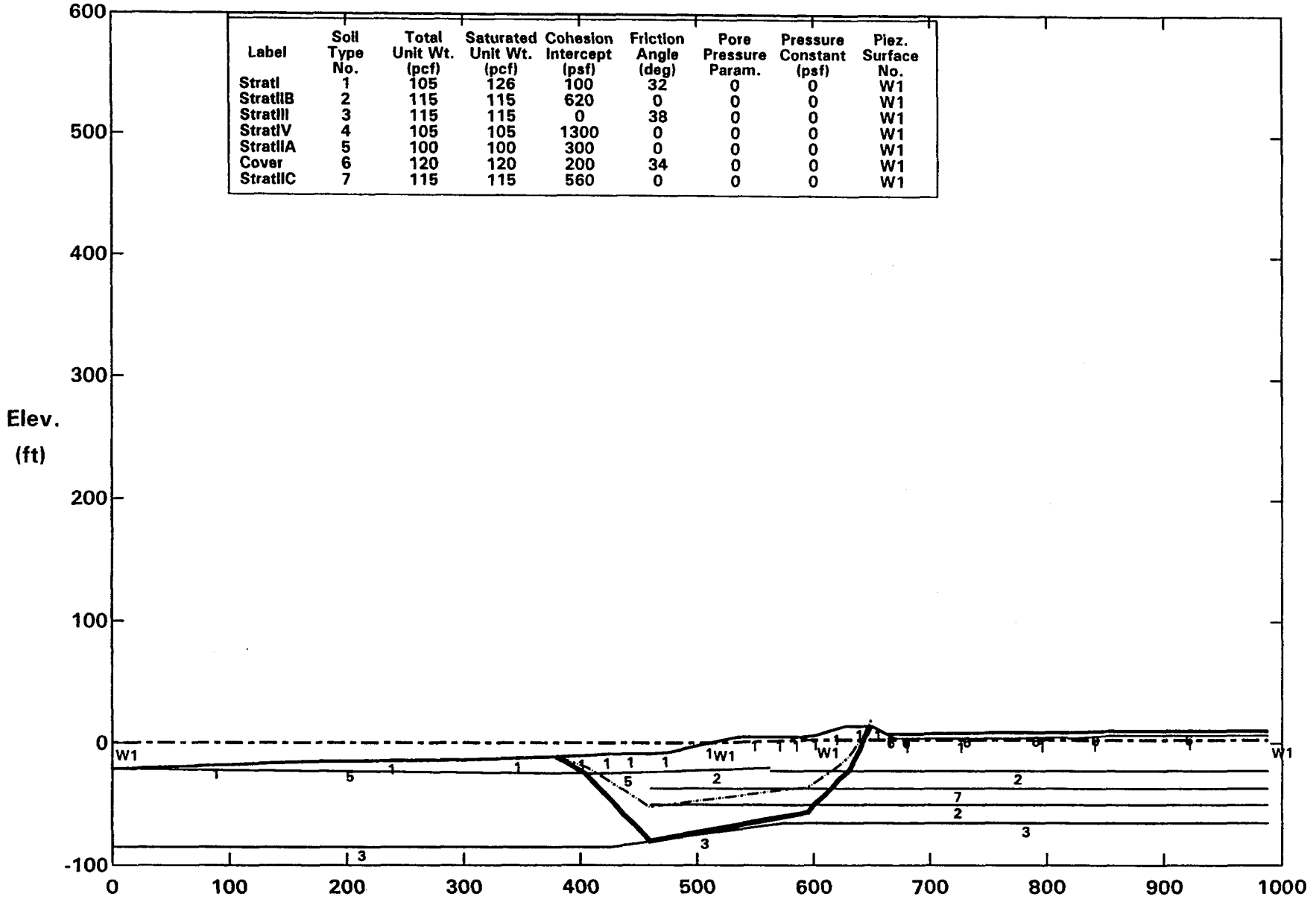
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\D-2\IR2DLTSB.IN  PCSTABL Version 5M /O(0. ,
-100. )
 NAS IR Site 2, Section D-D', Long-TermSpencer Static Slope Stability (Block)
   21
  . 79.5 165. 85. 1
165. 85. 300. 87. 1
300. 87. 381. 89. 1
381. 89. 410. 90. 1
410. 90. 425. 91. 1
425. 91. 460. 92. 1
460. 92. 475. 93. 1
475. 93. 535. 105. 1
535. 105. 562. 105. 1
562. 105. 578. 104.5 1
578. 104.5 590. 105. 1
590. 105. 602. 106. 1
602. 106. 627. 114. 1
627. 114. 649. 114. 1
649. 114. 662.2 108. 1
662.2 108. 671. 108. 6
671. 108. 688. 108. 6
688. 108. 763. 108.2 6
763. 108.2 818. 109. 6
818. 109. 853. 110. 6
853. 110. 988. 110. 6
662.2 108. 671. 104. 1
671. 104. 688. 104. 1
688. 104. 763. 104.2 1
  3. 104.2 818. 105. 1
  8. 104. 853. 106. 1
853. 106. 988. 106. 1
0. 79.5 410. 75. 5
410. 75. 460. 76.6 5
460. 76.6 562. 80. 2
562. 78. 988. 78. 2
460. 63. 988. 63. 7
460. 49. 988. 49. 2
0. 15. 425. 15. 3
425. 15. 575. 34. 3
575. 34. 988. 34. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 100. 32. 0. 0. 1
115. 115. 620. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 560. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
   . 100.
  J. 102.
J88. 102.
SPENCR
4.
SURFAC #1-IR2DLTJS.OUT
```

```
24
378.93 88.95
386.48 84.76
395.23 79.91
403.97 75.07
409.51 69.52
416.59 62.45
423.66 55.38
430.73 48.31
437.8 41.24
444.87 34.17
451.94 27.1
459.01 20.03
595.27 43.77
600.5 49.
607.57 56.07
614.5 63.
621.57 70.07
628.64 77.14
629.5 78.
634.34 86.75
639.19 95.49
644.04 104.24
648.89 112.98
649.36 113.84
EXECUT
```

A-NAS IR Site 2, Section D-D', Long-Term Spencer Static Slope Stability (Block)

Surface #1-IR2DLTJS.OUT. C:IR2DLTSB.PLT By: MMM 08-02-02 6:23pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	620	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	560	0	0	0	W1



PCSTABL5M FS = 1.79 Theta = 1.92 X-Axis (ft)

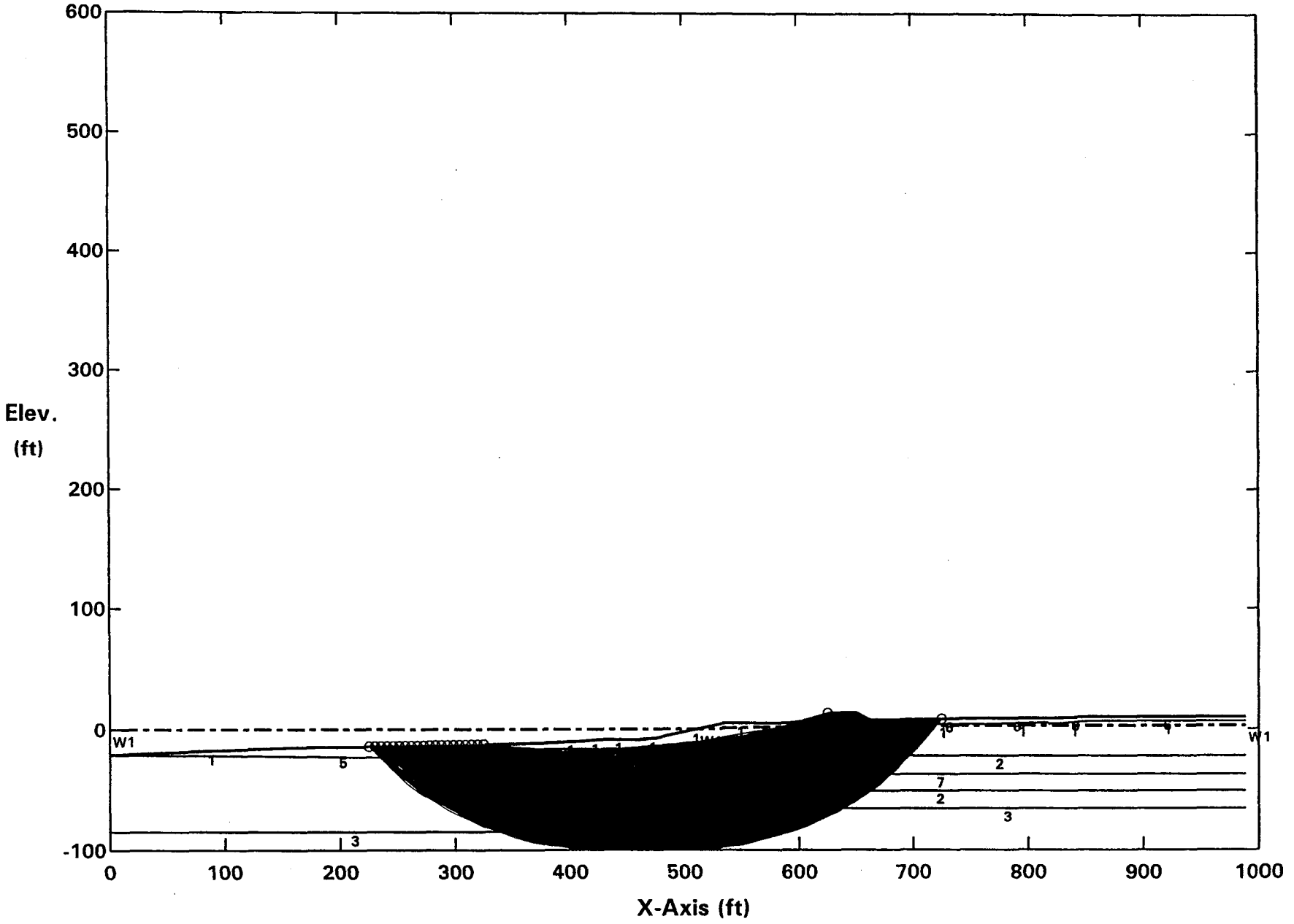
Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\D-2\IR2DBD.IN  PCSTABL Version 5M /O(0. ,-1
00. )
A-NAS IR Site 2, Section D-D',          Dynamic Bishop Circular Search, 0.05c
36 21
0. 79.5 165. 85. 1
165. 85. 300. 87. 1
300. 87. 381. 89. 1
381. 89. 410. 90. 1
410. 90. 425. 91. 1
425. 91. 460. 92. 1
460. 92. 475. 93. 1
475. 93. 535. 105. 1
535. 105. 562. 105. 1
562. 105. 578. 104.5 1
578. 104.5 590. 105. 1
590. 105. 602. 106. 1
602. 106. 627. 114. 1
627. 114. 649. 114. 1
649. 114. 662.2 108. 1
662.2 108. 671. 108. 6
671. 108. 688. 108. 6
688. 108. 763. 108.2 6
763. 108.2 818. 109. 6
818. 109. 853. 110. 6
853. 110. 988. 110. 6
662.2 108. 671. 104. 1
671. 104. 688. 104. 1
688. 104. 763. 104.2 1
763. 104.2 818. 105. 1
818. 104. 853. 106. 1
853. 106. 988. 106. 1
0. 79.5 410. 75. 5
410. 75. 460. 76.6 5
460. 76.6 562. 80. 2
562. 78. 988. 78. 2
460. 63. 988. 63. 7
460. 49. 988. 49. 2
0. 15. 425. 15. 3
425. 15. 575. 34. 3
575. 34. 988. 34. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 200. 17.6 0. 0. 1
115. 115. 560. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 480. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
511. 100.
600. 102.
988. 102.
EQUAKE
0.05 0. 0.
CIRCL2-Bishop circular, search
```

20 100
225. 325. 625. 725. 0. 15. 0. 0.

A-NAS IR Site 2, Section D-D', Dynamic Bishop Circular Search, 0.05g

All surfaces evaluated. C:IR2DBD.PLT By: MMM 08-02-02 6:08pm



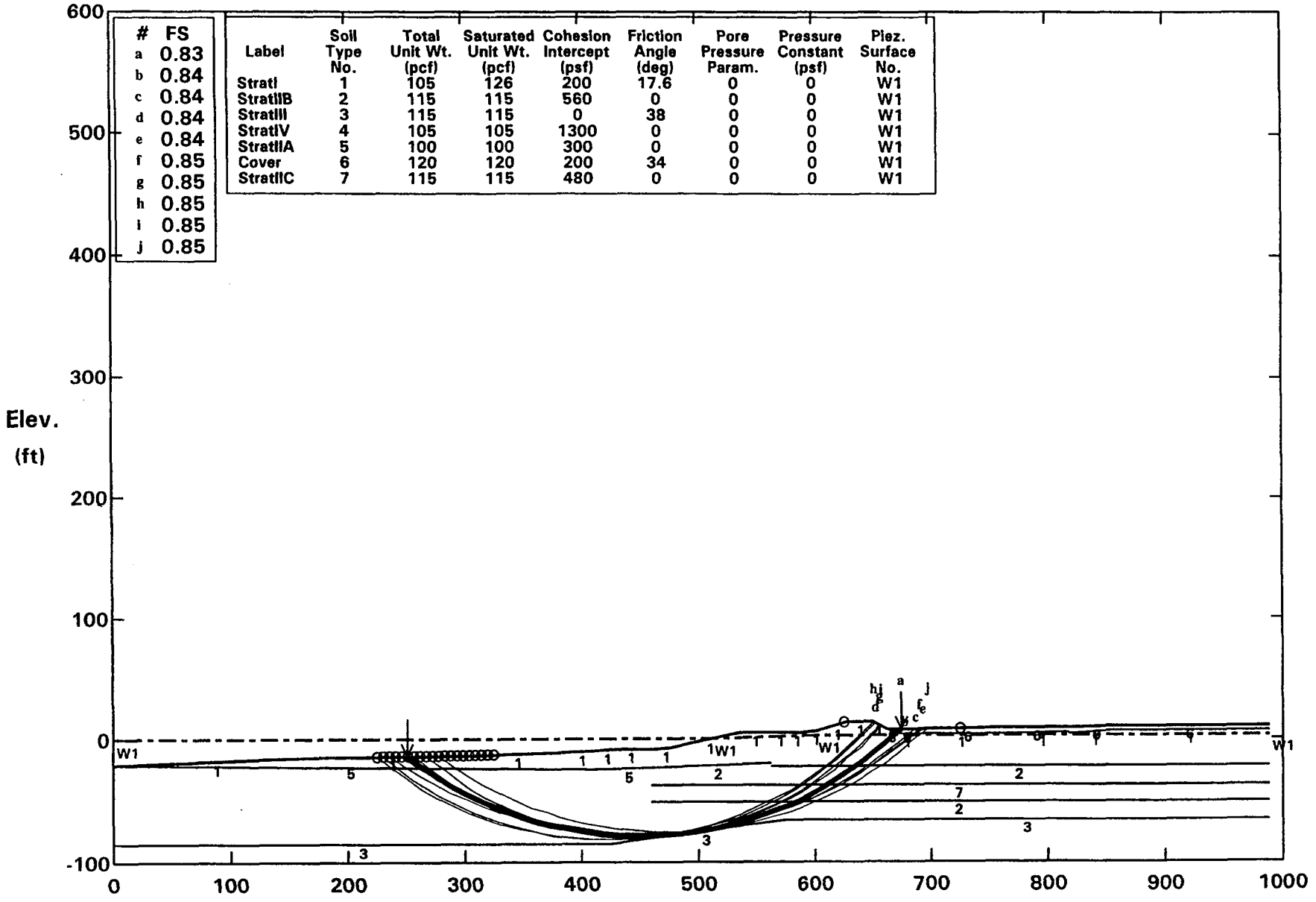
Factors Of Safety Calculated By The Modified Bishop Method

A-NAS IR Site 2, Section D-D', Dynamic Bishop Circular Search, 0.05g

Ten Most Critical. C:IR2DBD.PLT By: MMM 08-02-02 6:08pm

#	FS
a	0.83
b	0.84
c	0.84
d	0.84
e	0.84
f	0.85
g	0.85
h	0.85
i	0.85
j	0.85

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	560	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	480	0	0	0	W1



PCSTABL5M FSmin = 0.83 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

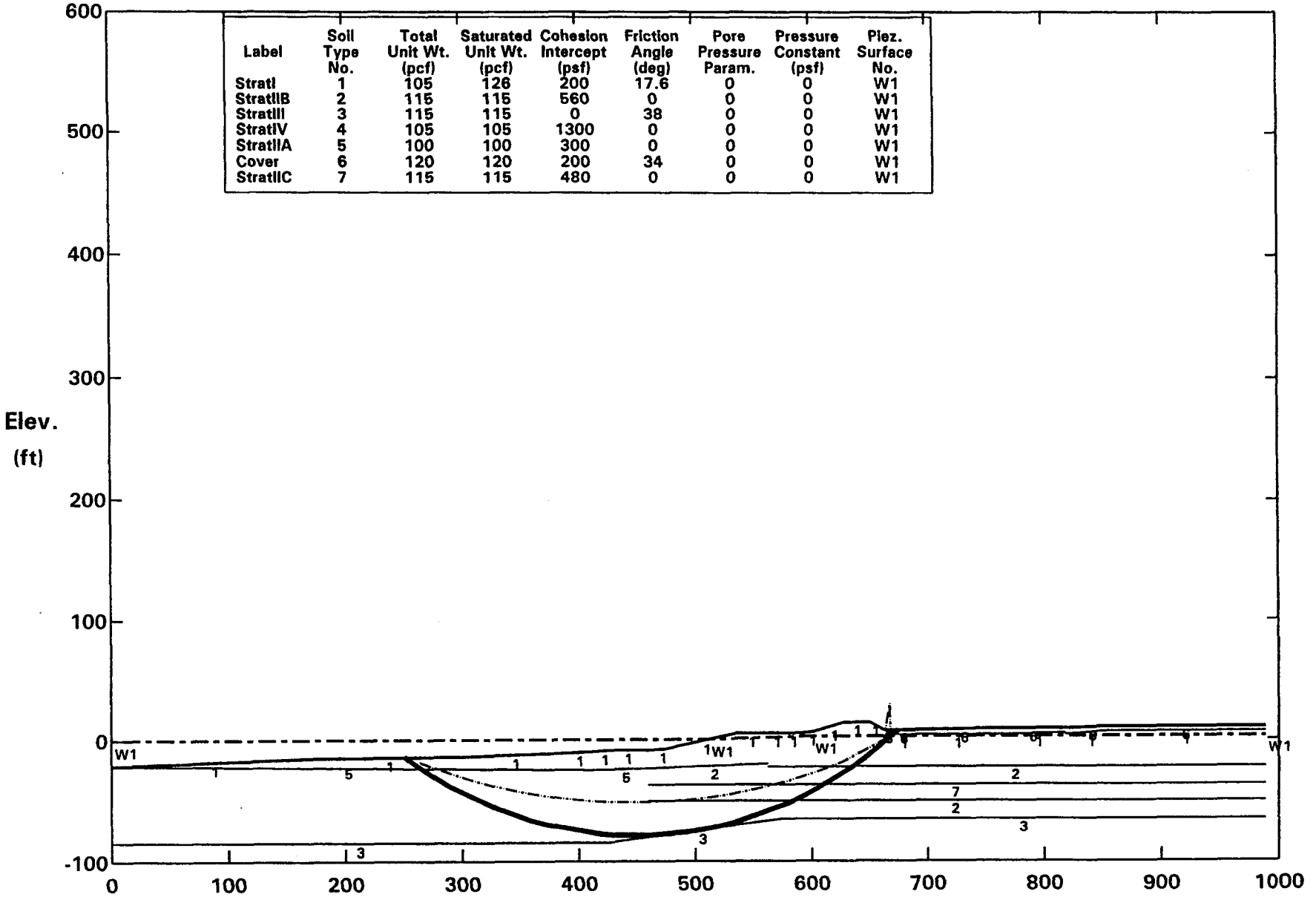
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\D-2\IR2DSSC.IN  PCSTABL Version 5M /O(0. ,-
100. )
A-NAS IR Site 2, Section D-D',          Spencer Static Slope Stability (Circ `
36 21
0. 79.5 165. 85. 1
165. 85. 300. 87. 1
300. 87. 381. 89. 1
381. 89. 410. 90. 1
410. 90. 425. 91. 1
425. 91. 460. 92. 1
460. 92. 475. 93. 1
475. 93. 535. 105. 1
535. 105. 562. 105. 1
562. 105. 578. 104.5 1
578. 104.5 590. 105. 1
590. 105. 602. 106. 1
602. 106. 627. 114. 1
627. 114. 649. 114. 1
649. 114. 662.2 108. 1
662.2 108. 671. 108. 6
671. 108. 688. 108. 6
688. 108. 763. 108.2 6
763. 108.2 818. 109. 6
818. 109. 853. 110. 6
853. 110. 988. 110. 6
662.2 108. 671. 104. 1
671. 104. 688. 104. 1
688. 104. 763. 104.2 1
763. 104.2 818. 105. 1
818. 104. 853. 106. 1
853. 106. 988. 106. 1
0. 79.5 410. 75. 5
410. 75. 460. 76.6 5
460. 76.6 562. 80. 2
562. 78. 988. 78. 2
460. 63. 988. 63. 7
460. 49. 988. 49. 2
0. 15. 425. 15. 3
425. 15. 575. 34. 3
575. 34. 988. 34. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 200. 17.6 0. 0. 1
115. 115. 560. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 480. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
511. 100.
600. 102.
988. 102.
SPENCR
4.
SURBIS #1-IR2DBD.OUT
```

```
32
251.32 86.28
263.57 77.63
276.21 69.54
 9.19 62.03
 02.5 55.12
316.11 48.81
329.99 43.11
344.11 38.05
358.44 33.63
372.96 29.86
387.63 26.75
402.43 24.3
417.32 22.51
432.28 21.41
447.28 20.97
462.27 21.21
477.25 22.13
492.16 23.72
506.99 25.98
521.7 28.9
536.27 32.49
550.66 36.72
564.84 41.6
578.79 47.12
592.48 53.25
605.88 60.
618.96 67.34
631.69 75.27
  4.06 83.76
 6.03 92.79
667.58 102.36
673.8 108.
EXECUT
```

A-NAS IR Site 2, Section D-D', Spencer Static Slope Stability (Circ.)

Surface #1-IR2DBD.OUT. C:IR2DSSC.PLT By: MMM 08-02-02 6:10pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	560	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	480	0	0	0	W1



PCSTABL5M FS = 1.53 Theta = 1.51 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

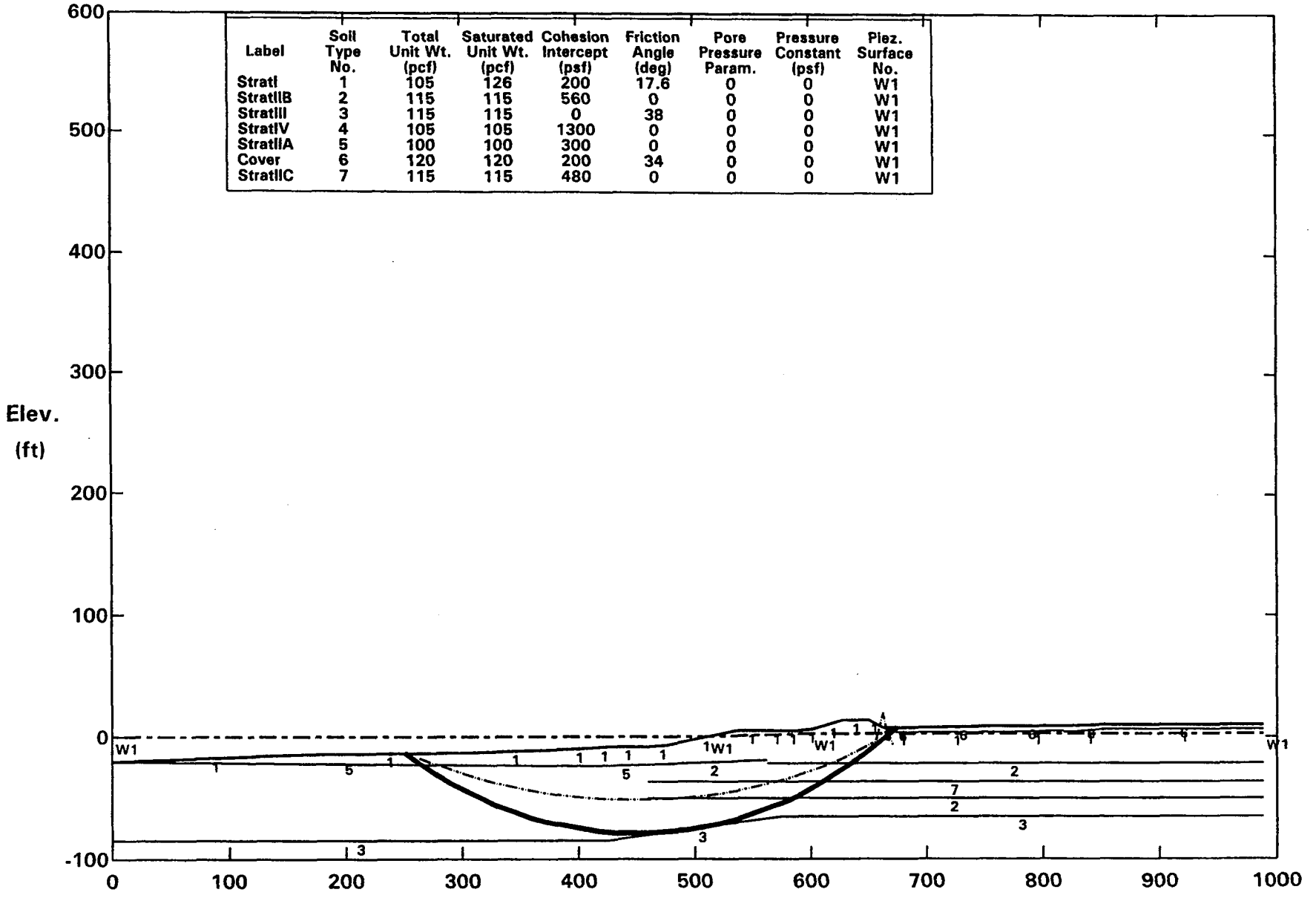
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\D-2\IR2DSDC.IN  PCSTABL Version 5M /O(0. ,-
100. )
 NAS IR Site 2, Section D-D', (Circ.)  Spencer Dynamic Slope Stability Ky=.03g
   21
  . 79.5 165. 85. 1
165. 85. 300. 87. 1
300. 87. 381. 89. 1
381. 89. 410. 90. 1
410. 90. 425. 91. 1
425. 91. 460. 92. 1
460. 92. 475. 93. 1
475. 93. 535. 105. 1
535. 105. 562. 105. 1
562. 105. 578. 104.5 1
578. 104.5 590. 105. 1
590. 105. 602. 106. 1
602. 106. 627. 114. 1
627. 114. 649. 114. 1
649. 114. 662.2 108. 1
662.2 108. 671. 108. 6
671. 108. 688. 108. 6
688. 108. 763. 108.2 6
763. 108.2 818. 109. 6
818. 109. 853. 110. 6
853. 110. 988. 110. 6
662.2 108. 671. 104. 1
671. 104. 688. 104. 1
688. 104. 763. 104.2 1
  3. 104.2 818. 105. 1
  .8. 104. 853. 106. 1
853. 106. 988. 106. 1
0. 79.5 410. 75. 5
410. 75. 460. 76.6 5
460. 76.6 562. 80. 2
562. 78. 988. 78. 2
460. 63. 988. 63. 7
460. 49. 988. 49. 2
0. 15. 425. 15. 3
425. 15. 575. 34. 3
575. 34. 988. 34. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 200. 17.6 0. 0. 1
115. 115. 560. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 480. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
   . 100.
  0. 102.
988. 102.
EQUAKE
0.029 0. 0.
SPENCR
```

```
4.
SURBIS #1-IR2DBD.OUT
32
251.32 86.28
263.57 77.63
276.21 69.54
289.19 62.03
302.5 55.12
316.11 48.81
329.99 43.11
344.11 38.05
358.44 33.63
372.96 29.86
387.63 26.75
402.43 24.3
417.32 22.51
432.28 21.41
447.28 20.97
462.27 21.21
477.25 22.13
492.16 23.72
506.99 25.98
521.7 28.9
536.27 32.49
550.66 36.72
564.84 41.6
578.79 47.12
592.48 53.25
605.88 60.
618.96 67.34
631.69 75.27
644.06 83.76
656.03 92.79
667.58 102.36
673.8 108.
EXECUT
```

A-NAS IR Site 2, Section D-D', (Circ.) Spencer Dynamic Slope Stability Ky = .03g

Surface #1-IR2DBD.OUT. C:IR2DSDC.PLT By: MMM 08-02-02 6:10pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	560	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	480	0	0	0	W1



PCSTABL5M FS = 1.00 Theta = .94 X-Axis (ft)

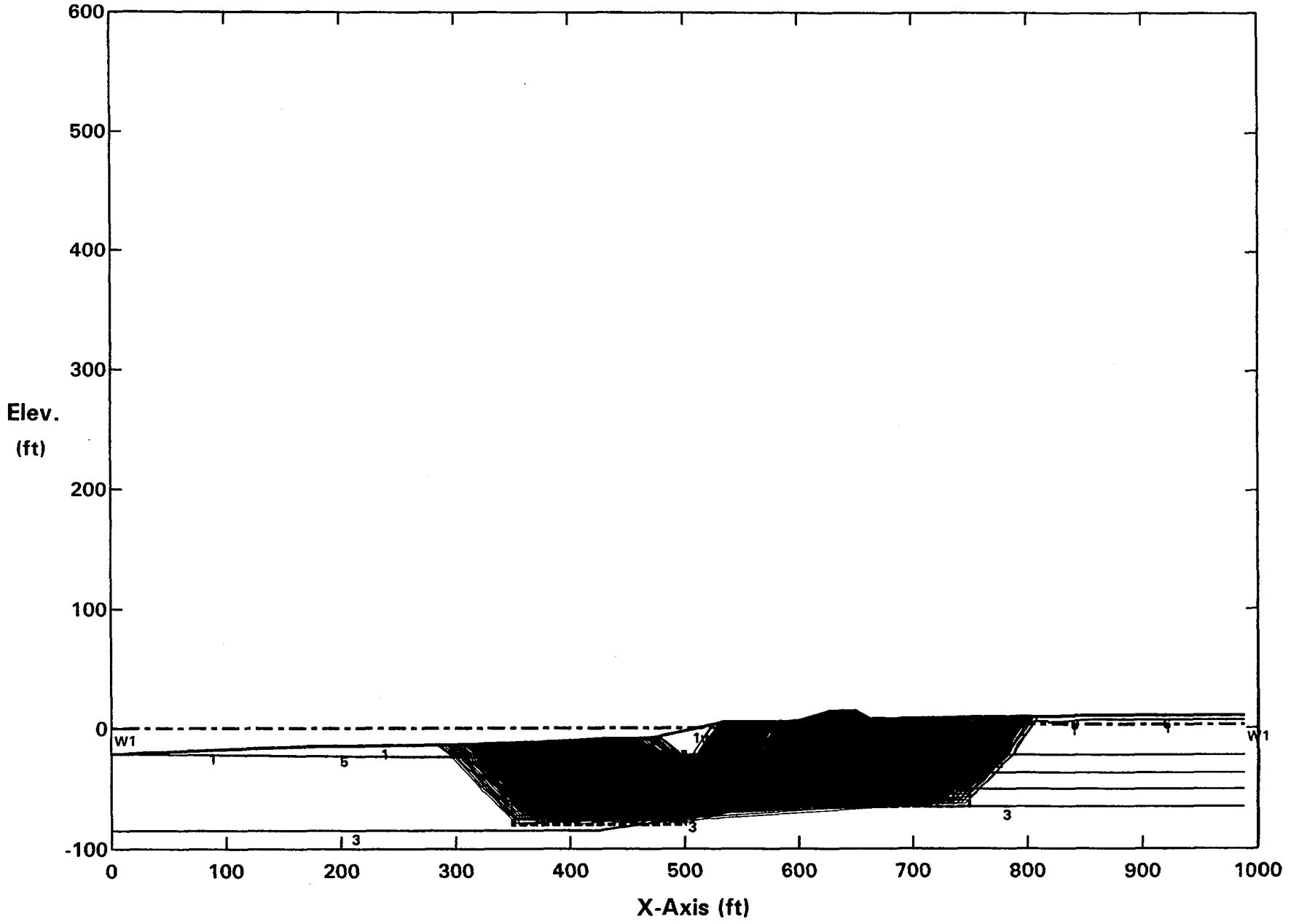
Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\D-2\IR2DJD.IN  PCSTABL Version 5M /O(0. ,-1
00. )
A-NAS IR Site 2, Section D-D',          Dynamic Janbu Block Search, 0.05g
36 21
0. 79.5 165. 85. 1
165. 85. 300. 87. 1
300. 87. 381. 89. 1
381. 89. 410. 90. 1
410. 90. 425. 91. 1
425. 91. 460. 92. 1
460. 92. 475. 93. 1
475. 93. 535. 105. 1
535. 105. 562. 105. 1
562. 105. 578. 104.5 1
578. 104.5 590. 105. 1
590. 105. 602. 106. 1
602. 106. 627. 114. 1
627. 114. 649. 114. 1
649. 114. 662.2 108. 1
662.2 108. 671. 108. 6
671. 108. 688. 108. 6
688. 108. 763. 108.2 6
763. 108.2 818. 109. 6
818. 109. 853. 110. 6
853. 110. 988. 110. 6
662.2 108. 671. 104. 1
671. 104. 688. 104. 1
688. 104. 763. 104.2 1
763. 104.2 818. 105. 1
818. 104. 853. 106. 1
853. 106. 988. 106. 1
0. 79.5 410. 75. 5
410. 75. 460. 76.6 5
460. 76.6 562. 80. 2
562. 78. 988. 78. 2
460. 63. 988. 63. 7
460. 49. 988. 49. 2
0. 15. 425. 15. 3
425. 15. 575. 34. 3
575. 34. 988. 34. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 200. 17.6 0. 0. 1
115. 115. 560. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 480. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
511. 100.
600. 102.
988. 102.
EQUAKE
0.05 0. 0.
BLOCK2-Rankine block, search
```

```
0
5000 2 10.
350. 50. 500. 50. 60.
701. 56. 750. 56. 42.
```

A-NAS IR Site 2, Section D-D', Dynamic Janbu Block Search, 0.05g

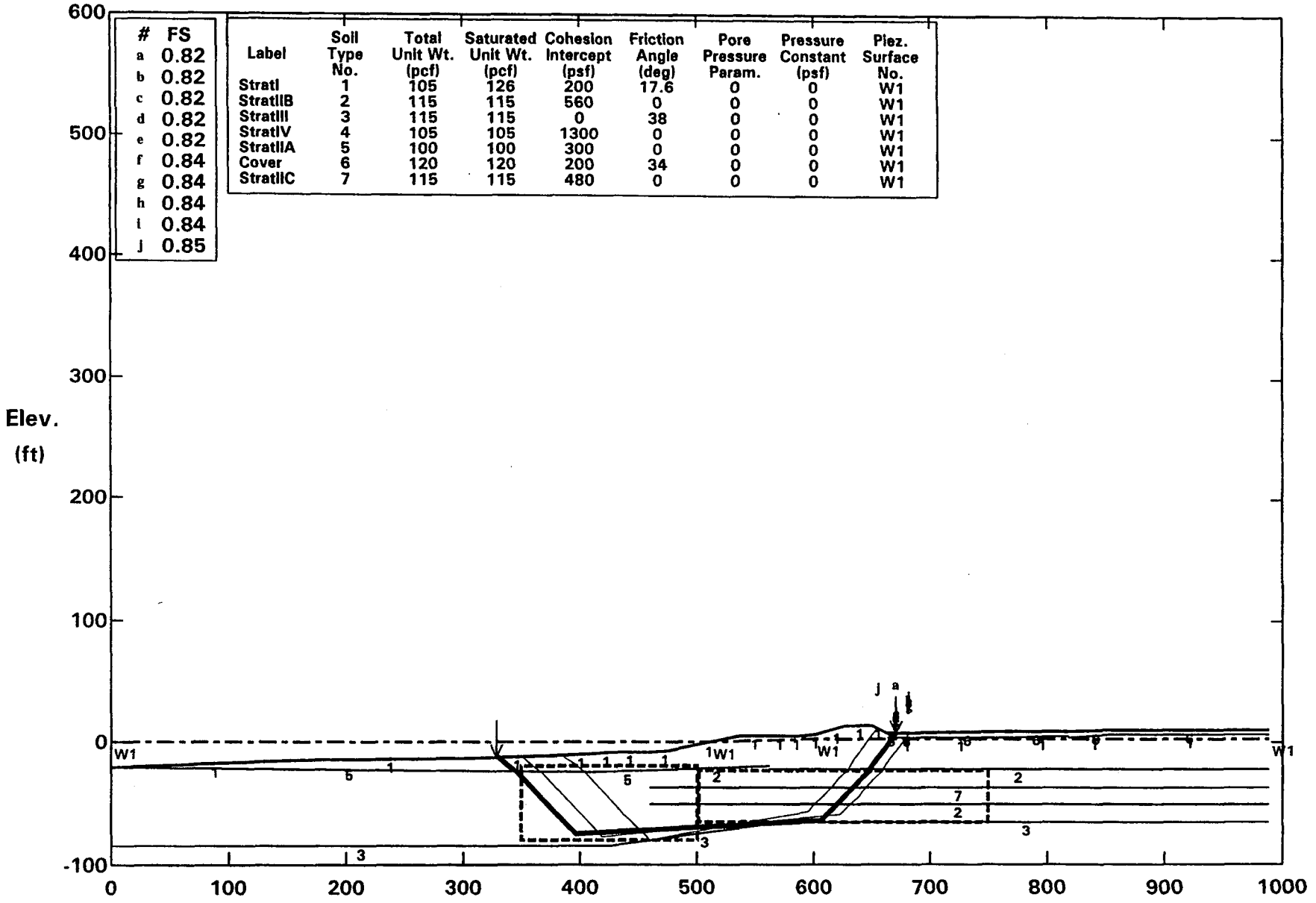
All surfaces evaluated. C:IR2DJD.PLT By: MMM 08-02-02 6:13pm



Factors Of Safety Calculated By The Modified Janbu Method

A-NAS IR Site 2, Section D-D', Dynamic Janbu Block Search, 0.05g

Ten Most Critical. C:IR2DJD.PLT By: MMM 08-02-02 6:13pm



#	FS
a	0.82
b	0.82
c	0.82
d	0.82
e	0.82
f	0.84
g	0.84
h	0.84
i	0.84
j	0.85

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	560	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	480	0	0	0	W1

PCSTABL5M FSmin = 0.82 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

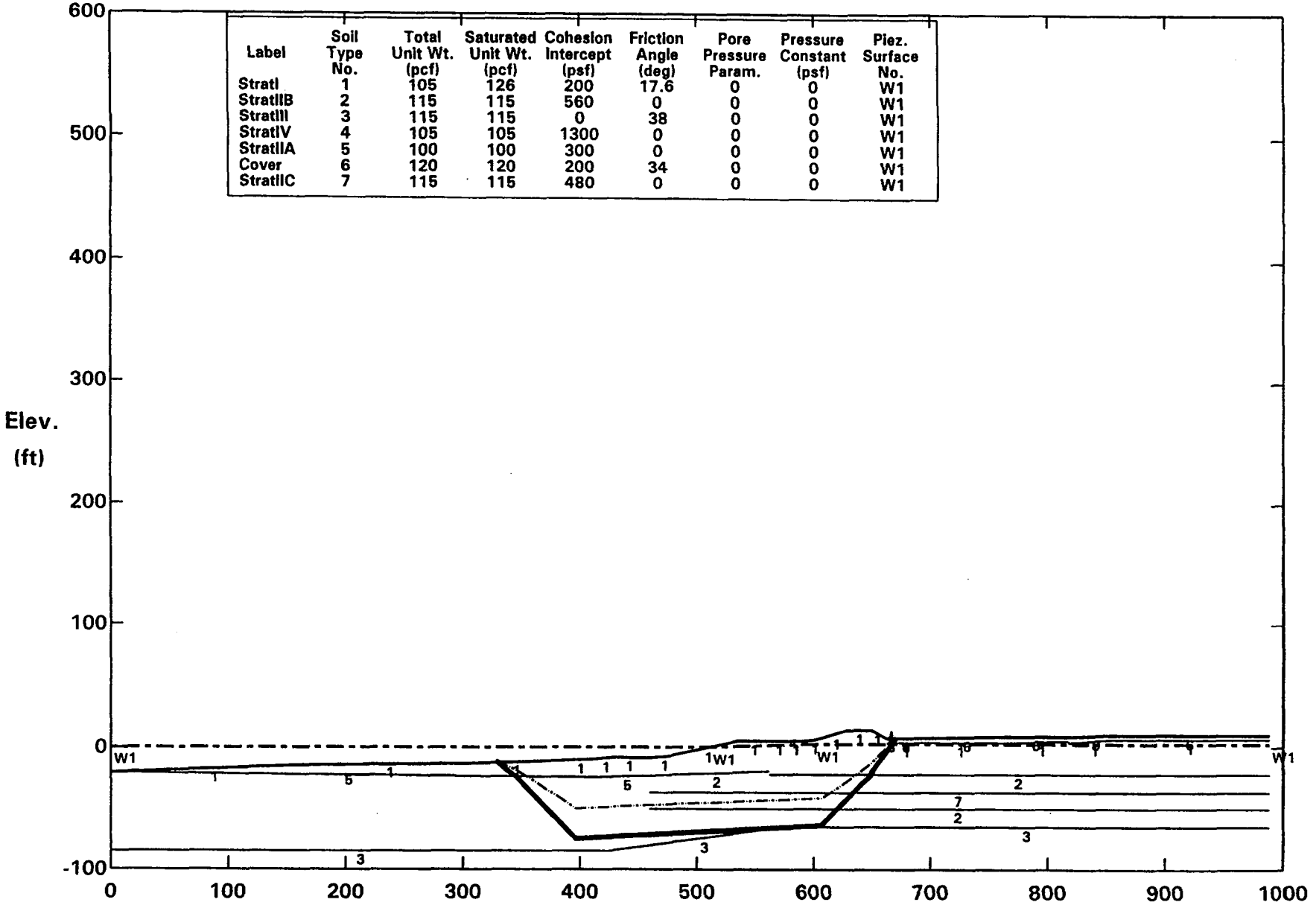
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\D-2\IR2DSSB.IN  PCSTABL Version 5M /O(0. ,-
100. )
A-NAS IR Site 2, Section D-D',          Spencer Static Slope Stability (Block'
36 21
0. 79.5 165. 85. 1
165. 85. 300. 87. 1
300. 87. 381. 89. 1
381. 89. 410. 90. 1
410. 90. 425. 91. 1
425. 91. 460. 92. 1
460. 92. 475. 93. 1
475. 93. 535. 105. 1
535. 105. 562. 105. 1
562. 105. 578. 104.5 1
578. 104.5 590. 105. 1
590. 105. 602. 106. 1
602. 106. 627. 114. 1
627. 114. 649. 114. 1
649. 114. 662.2 108. 1
662.2 108. 671. 108. 6
671. 108. 688. 108. 6
688. 108. 763. 108.2 6
763. 108.2 818. 109. 6
818. 109. 853. 110. 6
853. 110. 988. 110. 6
662.2 108. 671. 104. 1
671. 104. 688. 104. 1
688. 104. 763. 104.2 1
763. 104.2 818. 105. 1
818. 104. 853. 106. 1
853. 106. 988. 106. 1
0. 79.5 410. 75. 5
410. 75. 460. 76.6 5
460. 76.6 562. 80. 2
562. 78. 988. 78. 2
460. 63. 988. 63. 7
460. 49. 988. 49. 2
0. 15. 425. 15. 3
425. 15. 575. 34. 3
575. 34. 988. 34. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 200. 17.6 0. 0. 1
115. 115. 560. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 480. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
511. 100.
600. 102.
988. 102.
SPENCR
4.
SURFAC #1-IR2DJD.OUT
```

```
25
329.06 87.72
329.33 87.52
337.4 81.61
  5.47 75.71
347.26 73.92
354.33 66.85
361.4 59.78
368.47 52.7
375.54 45.63
382.61 38.56
389.68 31.49
396.76 24.42
606.7 36.02
613.77 43.09
619.68 49.
626.75 56.07
633.68 63.
640.75 70.07
647.82 77.14
648.68 78.
654.58 86.07
660.49 94.14
666.4 102.21
668.53 105.12
670.06 108.
EXECUT
```

A-NAS IR Site 2, Section D-D', Spencer Static Slope Stability (Block)

Surface #1-IR2DJD.OUT. C:IR2DSSB.PLT By: MMM 08-02-02 6:15pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	560	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	480	0	0	0	W1



PCSTABL5M FS = 1.64 Theta = 1.78 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

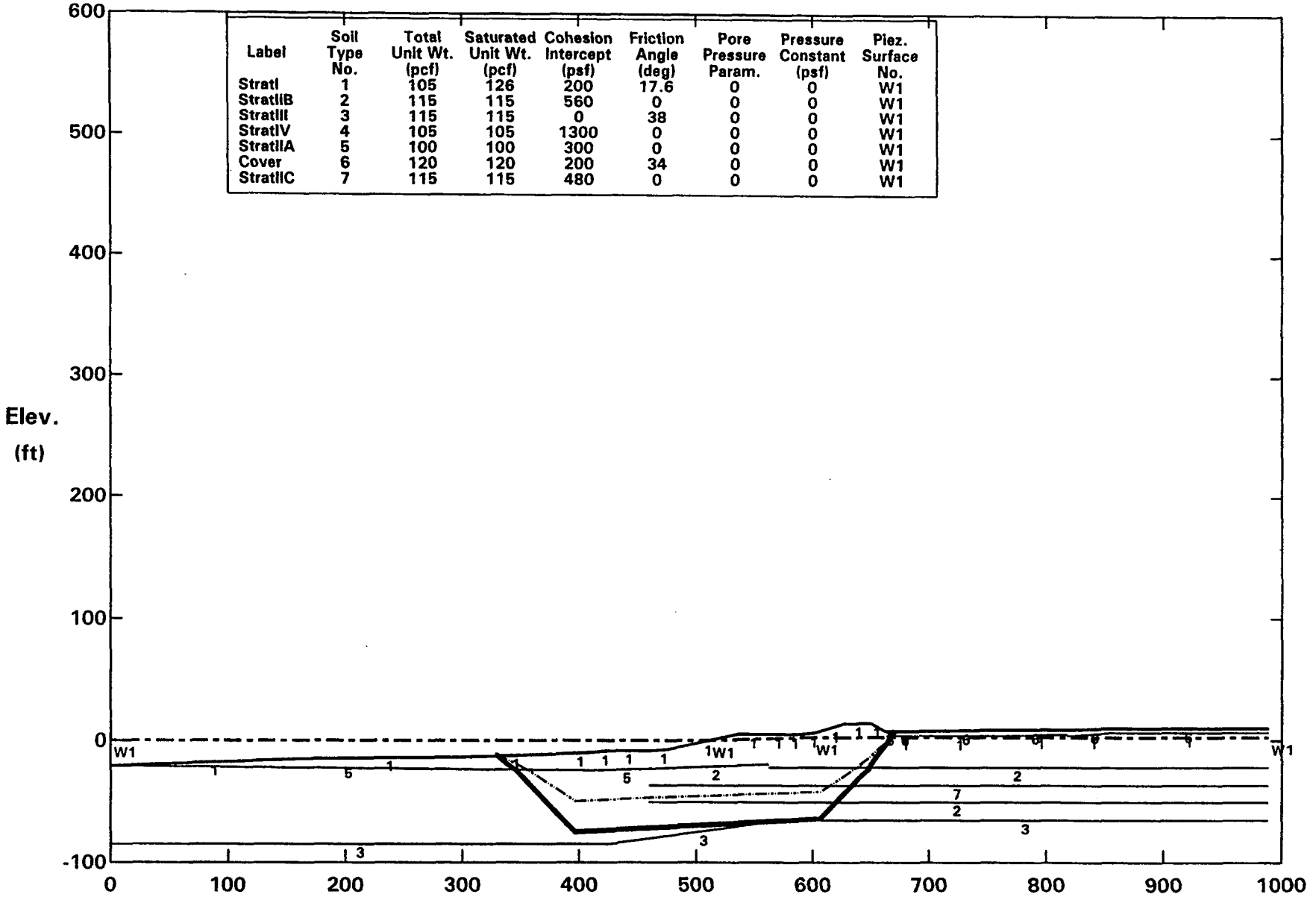
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\D-2\IR2DSDB.IN  PCSTABL Version 5M /O(0. ,-
100. )
^-NAS IR Site 2, Section D-D', (Block)  Spencer Dynamic Slope Stability Ky=.04g
   21
 . 79.5 165. 85. 1
165. 85. 300. 87. 1
300. 87. 381. 89. 1
381. 89. 410. 90. 1
410. 90. 425. 91. 1
425. 91. 460. 92. 1
460. 92. 475. 93. 1
475. 93. 535. 105. 1
535. 105. 562. 105. 1
562. 105. 578. 104.5 1
578. 104.5 590. 105. 1
590. 105. 602. 106. 1
602. 106. 627. 114. 1
627. 114. 649. 114. 1
649. 114. 662.2 108. 1
662.2 108. 671. 108. 6
671. 108. 688. 108. 6
688. 108. 763. 108.2 6
763. 108.2 818. 109. 6
818. 109. 853. 110. 6
853. 110. 988. 110. 6
662.2 108. 671. 104. 1
671. 104. 688. 104. 1
688. 104. 763. 104.2 1
  3. 104.2 818. 105. 1
 .8. 104. 853. 106. 1
853. 106. 988. 106. 1
0. 79.5 410. 75. 5
410. 75. 460. 76.6 5
460. 76.6 562. 80. 2
562. 78. 988. 78. 2
460. 63. 988. 63. 7
460. 49. 988. 49. 2
0. 15. 425. 15. 3
425. 15. 575. 34. 3
575. 34. 988. 34. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 200. 17.6 0. 0. 1
115. 115. 560. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 480. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
  ⁺. 100.
  ⁰. 102.
988. 102.
EQUAKE
0.035 0. 0.
SPENCR
```

```
4.
SURFAC #1-IR2DJD.OUT
25
329.06 87.72
329.33 87.52
337.4 81.61
345.47 75.71
347.26 73.92
354.33 66.85
361.4 59.78
368.47 52.7
375.54 45.63
382.61 38.56
389.68 31.49
396.76 24.42
606.7 36.02
613.77 43.09
619.68 49.
626.75 56.07
633.68 63.
640.75 70.07
647.82 77.14
648.68 78.
654.58 86.07
660.49 94.14
666.4 102.21
668.53 105.12
670.06 108.
EXECUT
```

A-NAS IR Site 2, Section D-D', (Block) Spencer Dynamic Slope Stability Ky = .04g

Surface #1-IR2DJD.OUT. C:IR2DSDB.PLT By: MMM 08-02-02 6:14pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	560	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	480	0	0	0	W1



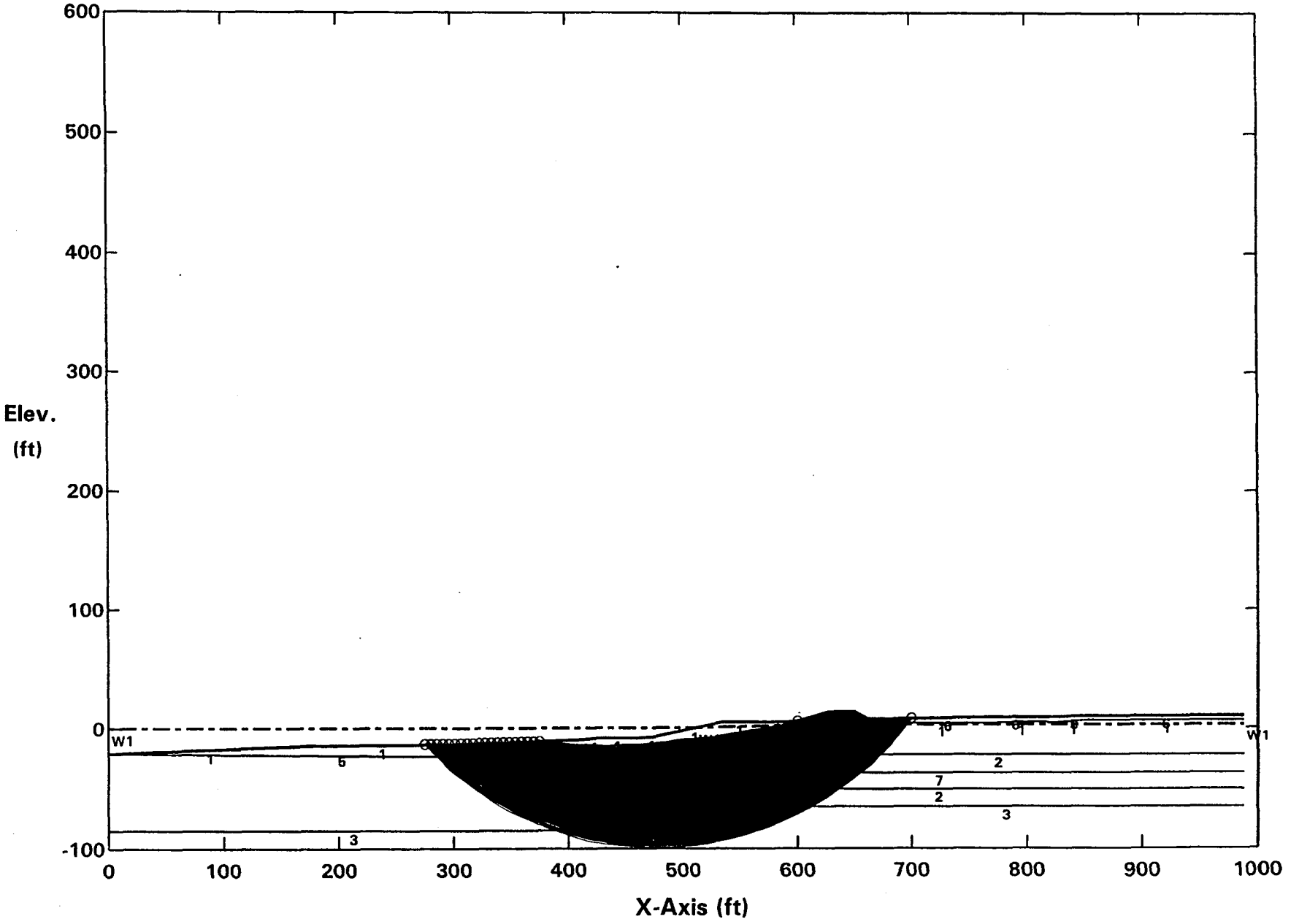
PCSTABL5M FS = 1.00 Theta = 1.13 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL       C:\GEO\STED\A-NAS\SITE2\D-2\IR2DEQBS.IN  PCSTABL Version 5M /O(0. ,
-100. )
A-NAS IR Site 2, Section D-D', Post-EQ  Static Bishop Circular Search
36 21
0. 79.5 165. 85. 1
165. 85. 300. 87. 1
300. 87. 381. 89. 1
381. 89. 410. 90. 1
410. 90. 425. 91. 1
425. 91. 460. 92. 1
460. 92. 475. 93. 1
475. 93. 535. 105. 1
535. 105. 562. 105. 1
562. 105. 578. 104.5 1
578. 104.5 590. 105. 1
590. 105. 602. 106. 1
602. 106. 627. 114. 1
627. 114. 649. 114. 1
649. 114. 662.2 108. 1
662.2 108. 671. 108. 6
671. 108. 688. 108. 6
688. 108. 763. 108.2 6
763. 108.2 818. 109. 6
818. 109. 853. 110. 6
853. 110. 988. 110. 6
662.2 108. 671. 104. 1
671. 104. 688. 104. 1
688. 104. 763. 104.2 1
763. 104.2 818. 105. 1
818. 104. 853. 106. 1
853. 106. 988. 106. 1
0. 79.5 410. 75. 5
410. 75. 460. 76.6 5
460. 76.6 562. 80. 2
562. 78. 988. 78. 2
460. 63. 988. 63. 7
460. 49. 988. 49. 2
0. 15. 425. 15. 3
425. 15. 575. 34. 3
575. 34. 988. 34. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
511. 100.
600. 102.
988. 102.
CIRCL2-Bishop circular, search
20 100
275. 375. 600. 700. 0. 15. 0. 0.
```

A-NAS IR Site 2, Section D-D', Post-EQ Static Bishop Circular Search

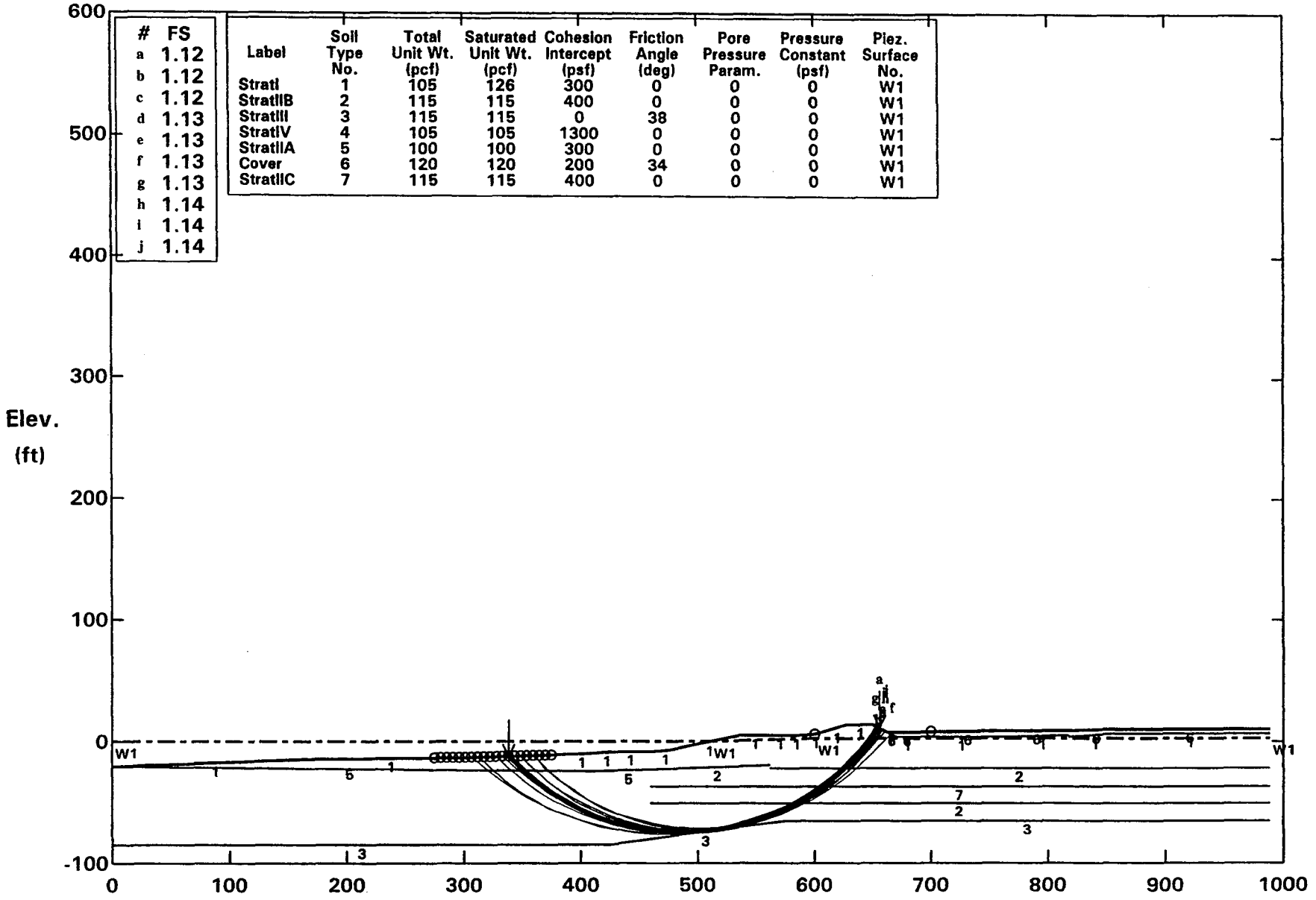
All surfaces evaluated. C:IR2DEQBS.PLT By: MMM 08-02-02 6:19pm



Factors Of Safety Calculated By The Modified Bishop Method

A-NAS IR Site 2, Section D-D', Post-EQ Static Bishop Circular Search

Ten Most Critical. C:IR2DEQBS.PLT By: MMM 08-02-02 6:19pm



#	FS
a	1.12
b	1.12
c	1.12
d	1.13
e	1.13
f	1.13
g	1.13
h	1.14
i	1.14
j	1.14

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	400	0	0	0	W1

PCSTABL5M FSmin = 1.12 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

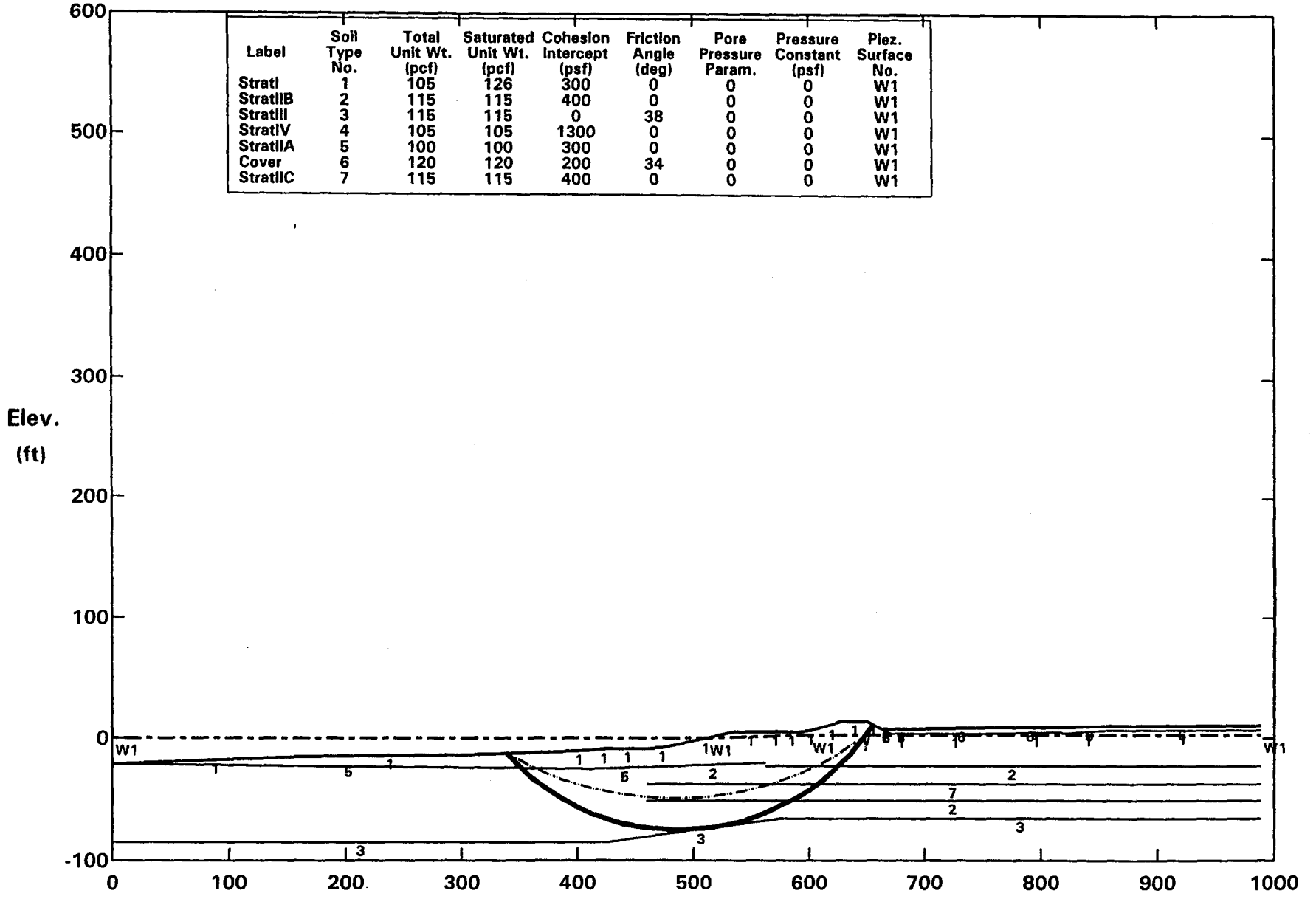
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\D-2\IR2DEQSC.IN  PCSTABL Version 5M /O(0. ,
-100. )
A-NAS IR Site 2, Section D-D', Post-EQ  Spencer Static Slope Stability (Circ `
36 21
0. 79.5 165. 85. 1
165. 85. 300. 87. 1
300. 87. 381. 89. 1
381. 89. 410. 90. 1
410. 90. 425. 91. 1
425. 91. 460. 92. 1
460. 92. 475. 93. 1
475. 93. 535. 105. 1
535. 105. 562. 105. 1
562. 105. 578. 104.5 1
578. 104.5 590. 105. 1
590. 105. 602. 106. 1
602. 106. 627. 114. 1
627. 114. 649. 114. 1
649. 114. 662.2 108. 1
662.2 108. 671. 108. 6
671. 108. 688. 108. 6
688. 108. 763. 108.2 6
763. 108.2 818. 109. 6
818. 109. 853. 110. 6
853. 110. 988. 110. 6
662.2 108. 671. 104. 1
671. 104. 688. 104. 1
688. 104. 763. 104.2 1
763. 104.2 818. 105. 1
818. 104. 853. 106. 1
853. 106. 988. 106. 1
0. 79.5 410. 75. 5
410. 75. 460. 76.6 5
460. 76.6 562. 80. 2
562. 78. 988. 78. 2
460. 63. 988. 63. 7
460. 49. 988. 49. 2
0. 15. 425. 15. 3
425. 15. 575. 34. 3
575. 34. 988. 34. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
511. 100.
600. 102.
988. 102.
SPENCR
4.2
SURBIS #1-IR2DEQBS.OUT
```

26
338.16 87.94
348.99 77.57
360.55 68.01
2.77 59.31
385.58 51.51
398.93 44.66
412.73 38.79
426.92 33.93
441.43 30.11
456.17 27.35
471.07 25.65
486.06 25.04
501.06 25.52
515.97 27.07
530.74 29.7
545.28 33.39
559.52 38.12
573.37 43.87
586.78 50.6
599.66 58.28
611.96 66.87
623.6 76.33
634.53 86.6
644.69 97.64
654.02 109.38
655.24 111.16
EXECUT

A-NAS IR Site 2, Section D-D', Post-EQ Spencer Static Slope Stability (Circ.)

Surface #1-IR2DEQBS.OUT. C:IR2DEQSC.PLT By: MMM 08-02-02 6:20pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	400	0	0	0	W1



PCSTABL5M FS = 1.13 Theta = 2.12 X-Axis (ft)

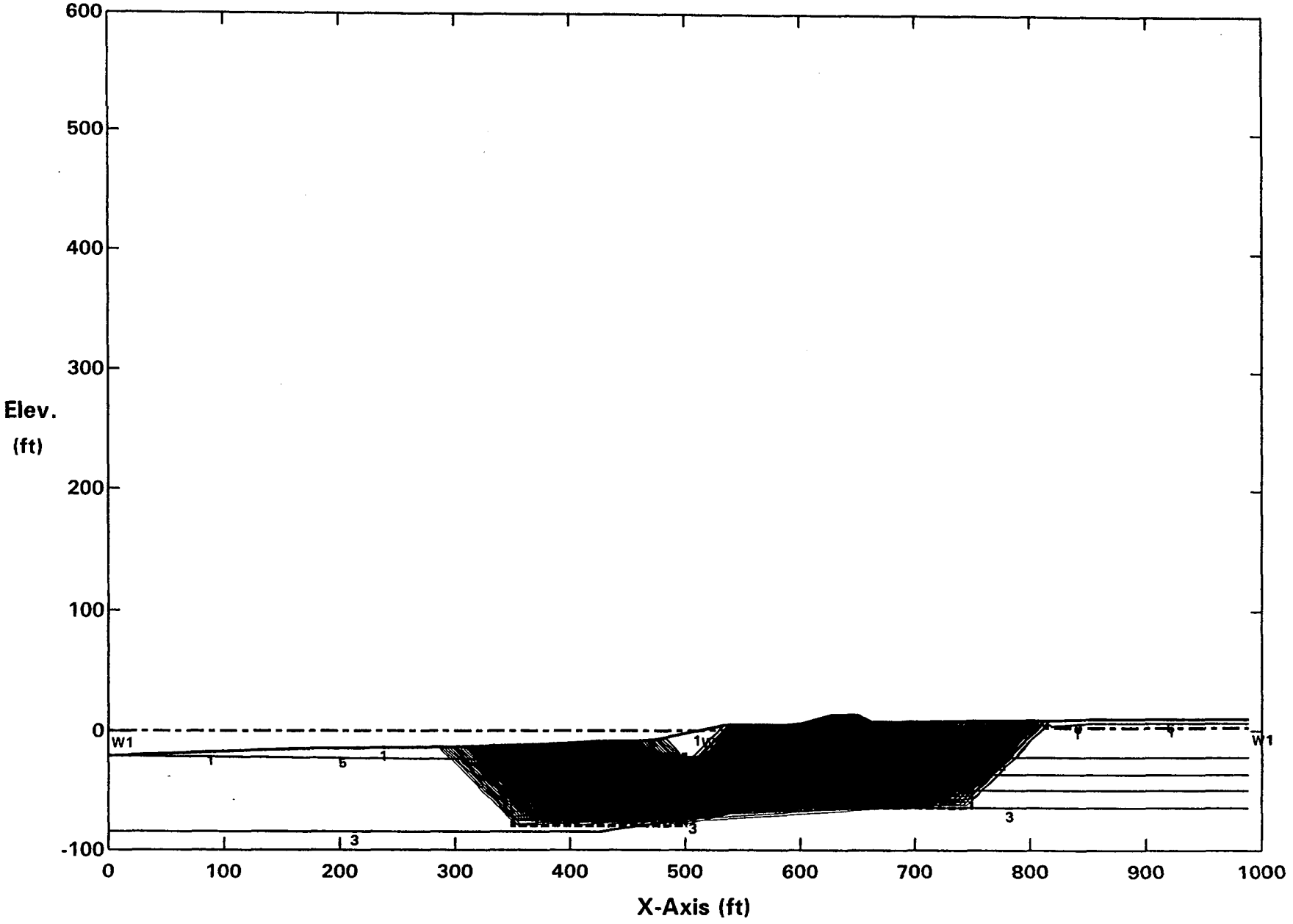
Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\D-2\IR2DEQJS.IN  PCSTABL Version 5M /O(0. ,
-100. )
A-NAS IR Site 2, Section D-D', Post-EQ  Static Janbu Block Search
  21
  . 79.5 165. 85. 1
165. 85. 300. 87. 1
300. 87. 381. 89. 1
381. 89. 410. 90. 1
410. 90. 425. 91. 1
425. 91. 460. 92. 1
460. 92. 475. 93. 1
475. 93. 535. 105. 1
535. 105. 562. 105. 1
562. 105. 578. 104.5 1
578. 104.5 590. 105. 1
590. 105. 602. 106. 1
602. 106. 627. 114. 1
627. 114. 649. 114. 1
649. 114. 662.2 108. 1
662.2 108. 671. 108. 6
671. 108. 688. 108. 6
688. 108. 763. 108.2 6
763. 108.2 818. 109. 6
818. 109. 853. 110. 6
853. 110. 988. 110. 6
662.2 108. 671. 104. 1
671. 104. 688. 104. 1
688. 104. 763. 104.2 1
  3. 104.2 818. 105. 1
  .8. 104. 853. 106. 1
853. 106. 988. 106. 1
0. 79.5 410. 75. 5
410. 75. 460. 76.6 5
460. 76.6 562. 80. 2
562. 78. 988. 78. 2
460. 63. 988. 63. 7
460. 49. 988. 49. 2
0. 15. 425. 15. 3
425. 15. 575. 34. 3
575. 34. 988. 34. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
  1. 100.
  0. 102.
988. 102.
BLOCK2-Rankine block, search
0
5000 2 10.
```

350. 50. 500. 50. 60.
501. 56. 750. 56. 42.

A-NAS IR Site 2, Section D-D', Post-EQ Static Janbu Block Search

All surfaces evaluated. C:IR2DEQJS.PLT By: MMM 08-02-02 6:16pm



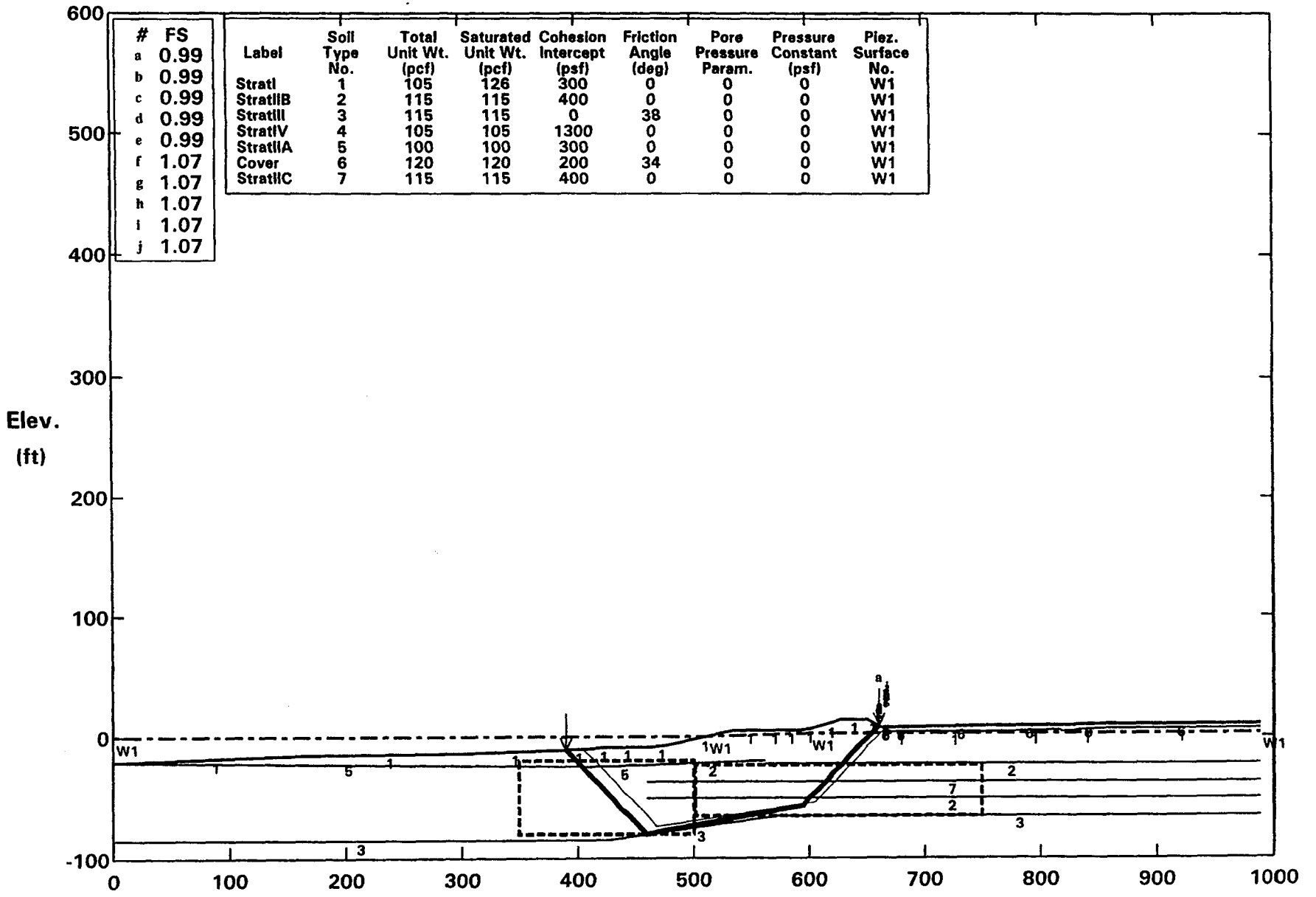
Factors Of Safety Calculated By The Modified Janbu Method

A-NAS IR Site 2, Section D-D', Post-EQ Static Janbu Block Search

Ten Most Critical. C:IR2DEQJS.PLT By: MMM 08-02-02 6:16pm

#	FS
a	0.99
b	0.99
c	0.99
d	0.99
e	0.99
f	1.07
g	1.07
h	1.07
i	1.07
j	1.07

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	400	0	0	0	W1



PCSTABL5M FSmin = 0.99 X-Axis (ft)

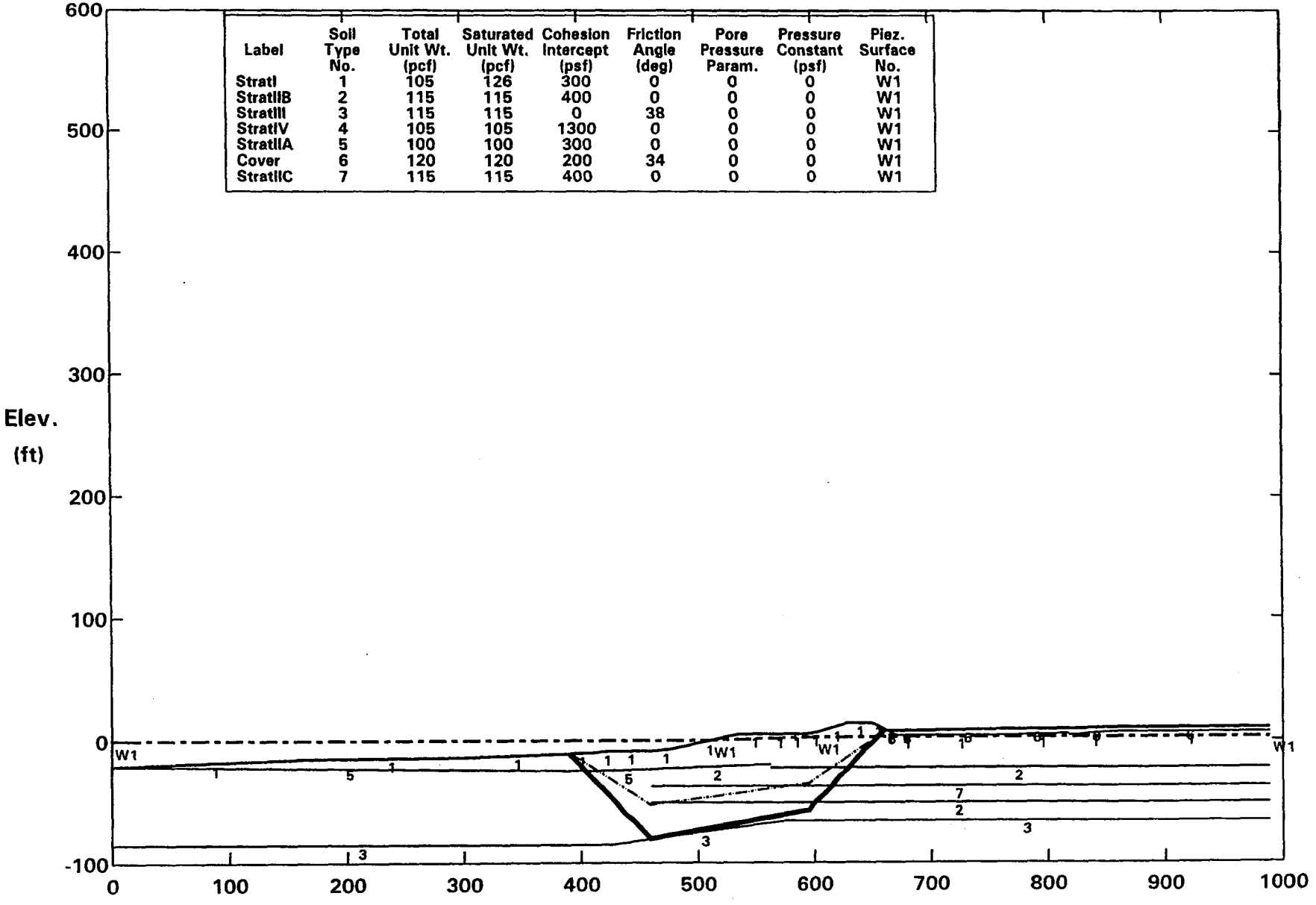
Factors Of Safety Calculated By The Modified Janbu Method

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\D-2\IR2DEQSB.IN  PCSTABL Version 5M /O(0. ,
-100. )
*-NAS IR Site 2, Section D-D', Post-EQ  Spencer Static Slope Stability (Block)
   21
0. 79.5 165. 85. 1
165. 85. 300. 87. 1
300. 87. 381. 89. 1
381. 89. 410. 90. 1
410. 90. 425. 91. 1
425. 91. 460. 92. 1
460. 92. 475. 93. 1
475. 93. 535. 105. 1
535. 105. 562. 105. 1
562. 105. 578. 104.5 1
578. 104.5 590. 105. 1
590. 105. 602. 106. 1
602. 106. 627. 114. 1
627. 114. 649. 114. 1
649. 114. 662.2 108. 1
662.2 108. 671. 108. 6
671. 108. 688. 108. 6
688. 108. 763. 108.2 6
763. 108.2 818. 109. 6
818. 109. 853. 110. 6
853. 110. 988. 110. 6
662.2 108. 671. 104. 1
671. 104. 688. 104. 1
688. 104. 763. 104.2 1
763. 104.2 818. 105. 1
818. 104. 853. 106. 1
853. 106. 988. 106. 1
0. 79.5 410. 75. 5
410. 75. 460. 76.6 5
460. 76.6 562. 80. 2
562. 78. 988. 78. 2
460. 63. 988. 63. 7
460. 49. 988. 49. 2
0. 15. 425. 15. 3
425. 15. 575. 34. 3
575. 34. 988. 34. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover   StratIIC
7
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
WATER
1 62.4
4
0. 100.
[illegible]. 100.
[illegible]. 102.
988. 102.
SPENCR
4.
SURFAC #1-IR2DEQJS.OUT
```

```
24
389.74 89.3
389.83 89.21
396.9 82.14
403.97 75.07
409.51 69.52
416.59 62.45
423.66 55.38
430.73 48.31
437.8 41.24
444.87 34.17
451.94 27.1
459.01 20.03
595.27 43.77
600.5 49.
607.57 56.07
614.5 63.
621.57 70.07
628.64 77.14
629.5 78.
636.57 85.07
643.64 92.14
650.71 99.21
657.78 106.28
660.34 108.84
EXECUT
```

A-NAS IR Site 2, Section D-D', Post-EQ Spencer Static Slope Stability (Block)

Surface #1-IR2DEQJS.OUT. C:IR2DEQSB.PLT By: MMM 08-02-02 6:17pm



Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1
StratIIC	7	115	115	400	0	0	0	W1

PCSTABL5M FS = 1.19 Theta = 2.25 X-Axis (ft)

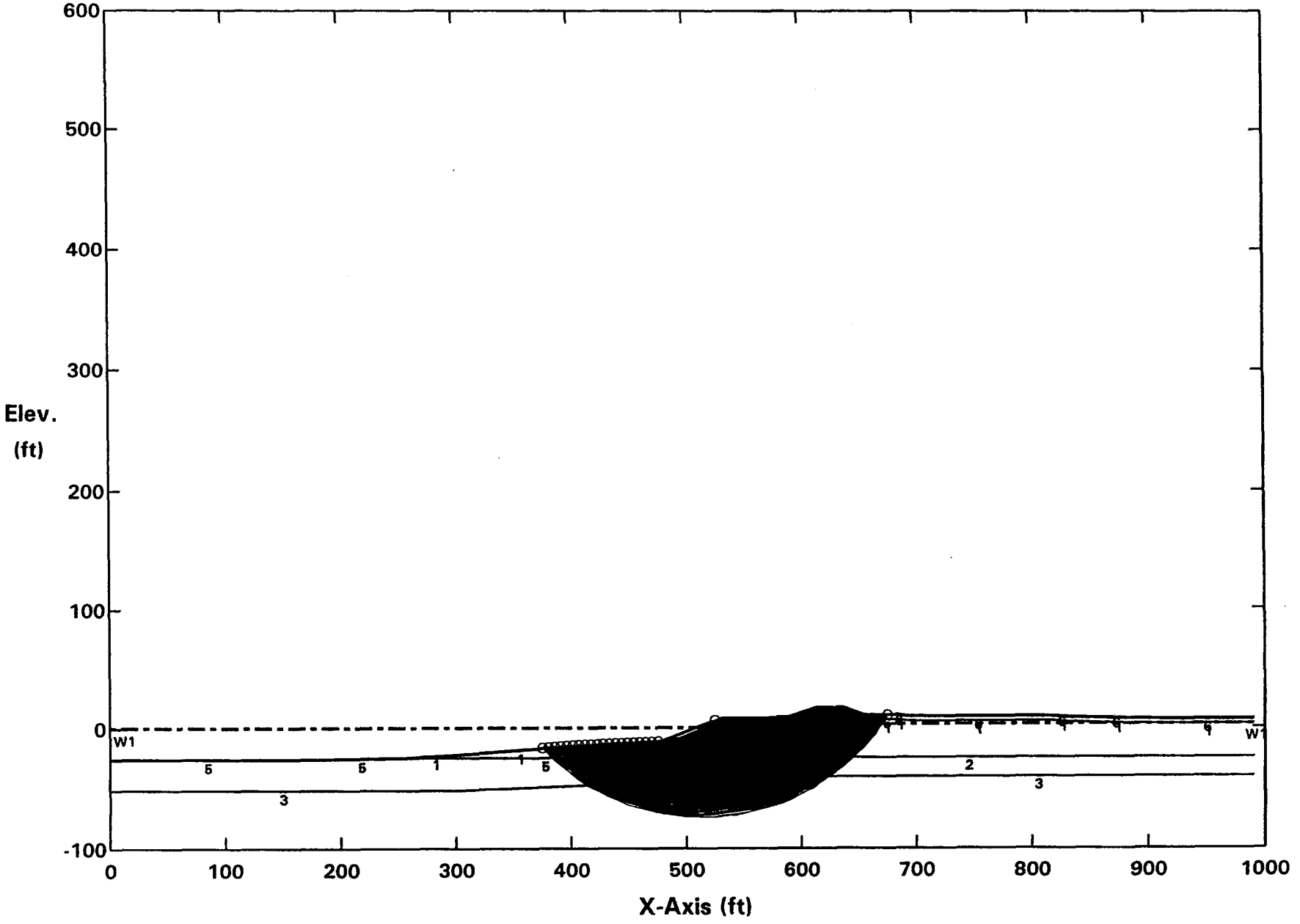
Factors Of Safety Calculated By Spencer`s Method of Slices

SECTION E-E'

```
PROFIL       C:\GEO\STED\A-NAS\SITE2\E-2\IR2ELTBS.IN  PCSTABL Version 5M /O(0. ,
-100. )
^ NAS IR Site 2, Section E-E', Long-TermStatic Bishop Circular Search
   20
   74. 170. 74. 5
170. 74. 255. 75. 5
255. 75. 300. 78. 1
300. 78. 403. 86. 1
403. 86. 478. 89. 1
478. 89. 515. 103. 1
515. 103. 531. 108. 1
531. 108. 570. 108. 1
570. 108. 590. 109. 1
590. 109. 613. 116. 1
613. 116. 621. 116.8 1
621. 116.8 637. 116. 1
637. 116. 653.8 110. 1
653.8 110. 665. 110. 6
665. 110. 684. 110. 6
684. 110. 691. 109. 6
691. 109. 816. 109. 6
816. 109. 841. 108. 6
841. 108. 911. 107. 6
911. 107. 991. 107. 6
651. 111. 665. 106. 1
665. 106. 684. 106. 1
684. 106. 691. 105. 1
691. 105. 816. 105. 1
  5. 105. 841. 104. 1
  1. 104. 911. 103. 1
  1. 103. 991. 103. 1
255. 75. 500. 75. 5
500. 75. 991. 75. 2
0. 48. 300. 48. 3
300. 48. 621. 60. 3
621. 60. 991. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 100. 32. 0. 0. 1
115. 115. 600. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
507. 100.
600. 103.
991. 103.
CIRCL2-Bishop circular, search
20 100
  5. 475. 525. 675. 0. 10. 0. 0.
```

A-NAS IR Site 2, Section E-E', Long-Term Static Bishop Circular Search

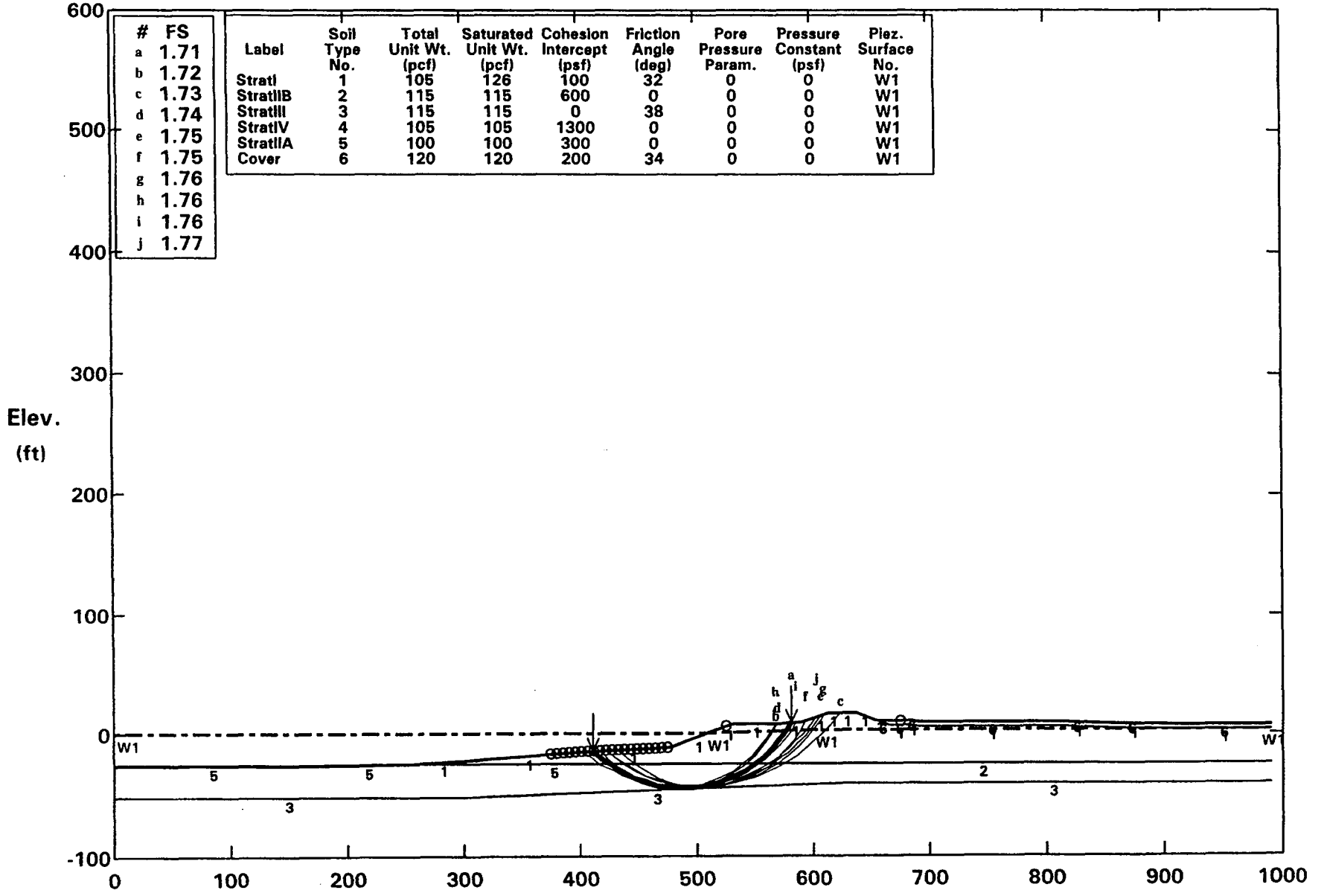
All surfaces evaluated. C:IR2ELTBS.PLT By: MMM 08-02-02 6:31pm



Factors Of Safety Calculated By The Modified Bishop Method

A-NAS IR Site 2, Section E-E', Long-Term Static Bishop Circular Search

Ten Most Critical. C:IR2ELTBS.PLT By: MMM 08-02-02 6:31pm



#	FS
a	1.71
b	1.72
c	1.73
d	1.74
e	1.75
f	1.75
g	1.76
h	1.76
i	1.76
j	1.77

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	600	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1

PCSTABL5M FSmin = 1.71 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

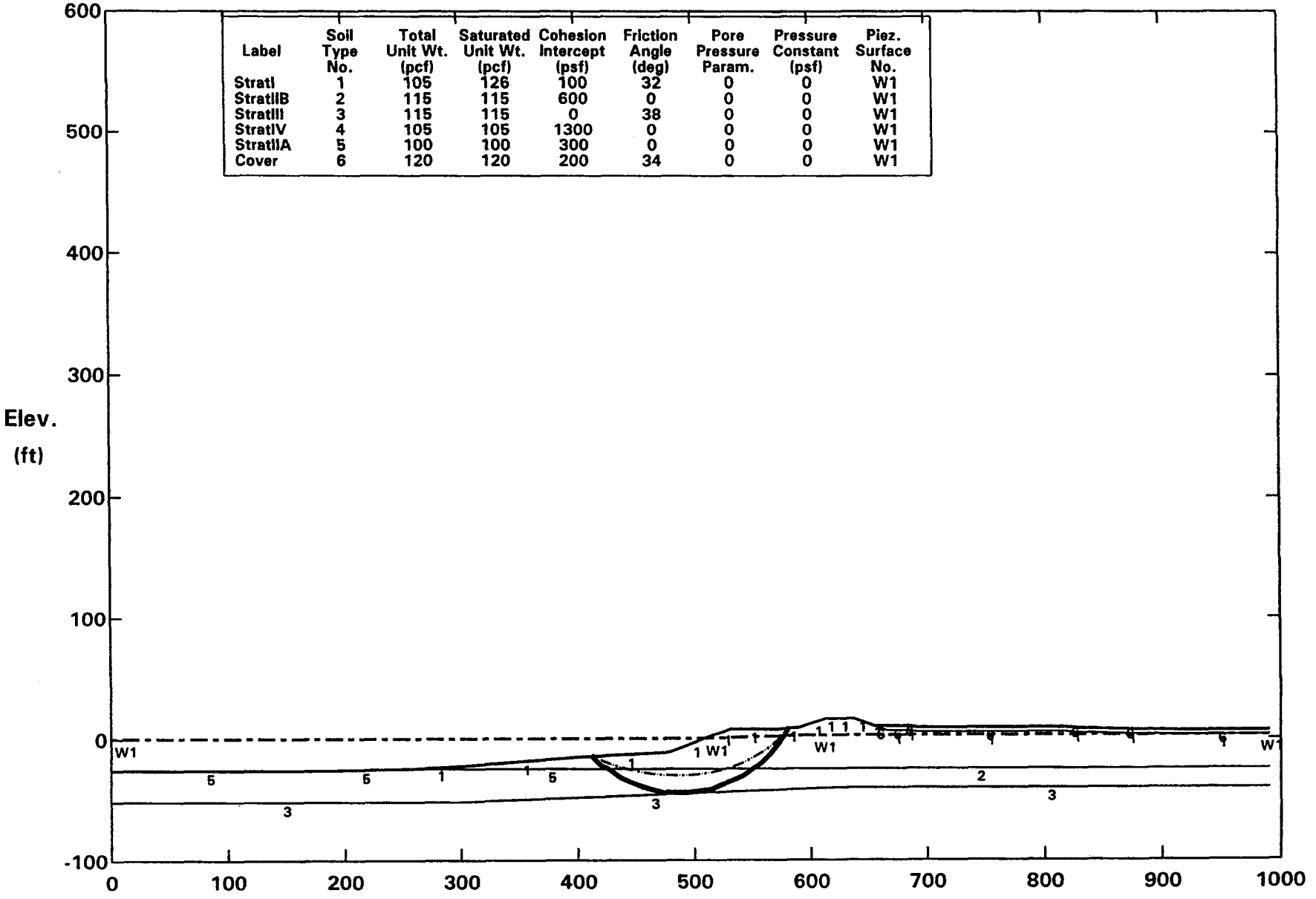
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\E-2\IR2ELTSC.IN  PCSTABL Version 5M /O(0.
-100. )
A-NAS IR Site 2, Section E-E', Long-TermSpencer Static Slope Stability (Circ '
32 20
0. 74. 170. 74. 5
170. 74. 255. 75. 5
255. 75. 300. 78. 1
300. 78. 403. 86. 1
403. 86. 478. 89. 1
478. 89. 515. 103. 1
515. 103. 531. 108. 1
531. 108. 570. 108. 1
570. 108. 590. 109. 1
590. 109. 613. 116. 1
613. 116. 621. 116.8 1
621. 116.8 637. 116. 1
637. 116. 653.8 110. 1
653.8 110. 665. 110. 6
665. 110. 684. 110. 6
684. 110. 691. 109. 6
691. 109. 816. 109. 6
816. 109. 841. 108. 6
841. 108. 911. 107. 6
911. 107. 991. 107. 6
651. 111. 665. 106. 1
665. 106. 684. 106. 1
684. 106. 691. 105. 1
691. 105. 816. 105. 1
816. 105. 841. 104. 1
841. 104. 911. 103. 1
911. 103. 991. 103. 1
255. 75. 500. 75. 5
500. 75. 991. 75. 2
0. 48. 300. 48. 3
300. 48. 621. 60. 3
621. 60. 991. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 100. 32. 0. 0. 1
115. 115. 600. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
507. 100.
600. 103.
991. 103.
SPENCR
4.
SURBIS #1-IR2ELTBS.OUT
21
411.84 86.35
419.3 79.69
427.35 73.75
435.9 68.58
```

```
444.9 64.21
454.26 60.69
463.91 58.06
473.75 56.32
  3.72 55.5
 93.72 55.6
 03.67 56.62
513.48 58.56
523.07 61.39
532.36 65.09
541.26 69.64
549.71 74.99
557.63 81.09
564.96 87.9
571.62 95.36
577.57 103.39
580.69 108.53
EXECUT
```

A-NAS IR Site 2, Section E-E', Long-Term Spencer Static Slope Stability (Circ.)

Surface #1-IR2ELTBS.OUT. C:IR2ELTSC.PLT By: MMM 08-02-02 6:32pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	600	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



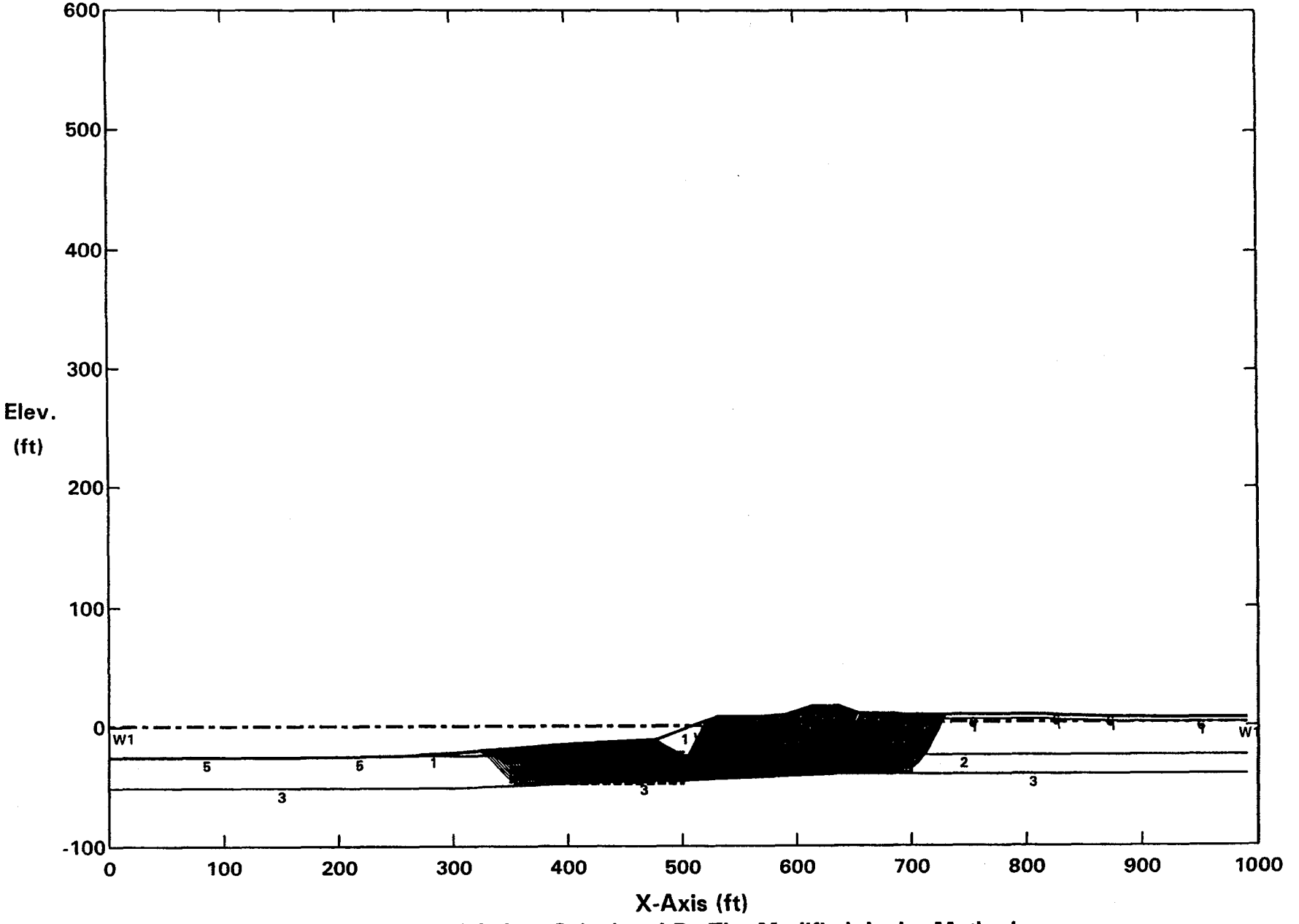
PCSTABL5M FS = 1.77 Theta = 2.8 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\E-2\IR2ELTJS.IN  PCSTABL Version 5M /O(0. ,
-100. )
^-NAS IR Site 2, Section E-E', Long-TermStatic Janbu Block Search
   20
  . 74. 170. 74. 5
 /0. 74. 255. 75. 5
255. 75. 300. 78. 1
300. 78. 403. 86. 1
403. 86. 478. 89. 1
478. 89. 515. 103. 1
515. 103. 531. 108. 1
531. 108. 570. 108. 1
570. 108. 590. 109. 1
590. 109. 613. 116. 1
613. 116. 621. 116.8 1
621. 116.8 637. 116. 1
637. 116. 653.8 110. 1
653.8 110. 665. 110. 6
665. 110. 684. 110. 6
684. 110. 691. 109. 6
691. 109. 816. 109. 6
816. 109. 841. 108. 6
841. 108. 911. 107. 6
911. 107. 991. 107. 6
651. 111. 665. 106. 1
665. 106. 684. 106. 1
684. 106. 691. 105. 1
691. 105. 816. 105. 1
  6. 105. 841. 104. 1
 .1. 104. 911. 103. 1
  1. 103. 991. 103. 1
255. 75. 500. 75. 5
500. 75. 991. 75. 2
0. 48. 300. 48. 3
300. 48. 621. 60. 3
621. 60. 991. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 100. 32. 0. 0. 1
115. 115. 600. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
507. 100.
600. 103.
991. 103.
BLOCK2-Rankine block, search
0
  )0 2 8.
  J. 65. 500. 65. 25.
  l. 67.5 700. 67.5 14.
```

A-NAS IR Site 2, Section E-E', Long-Term Static Janbu Block Search

All surfaces evaluated. C:IR2ELTJS.PLT By: MMM 08-02-02 7:00pm



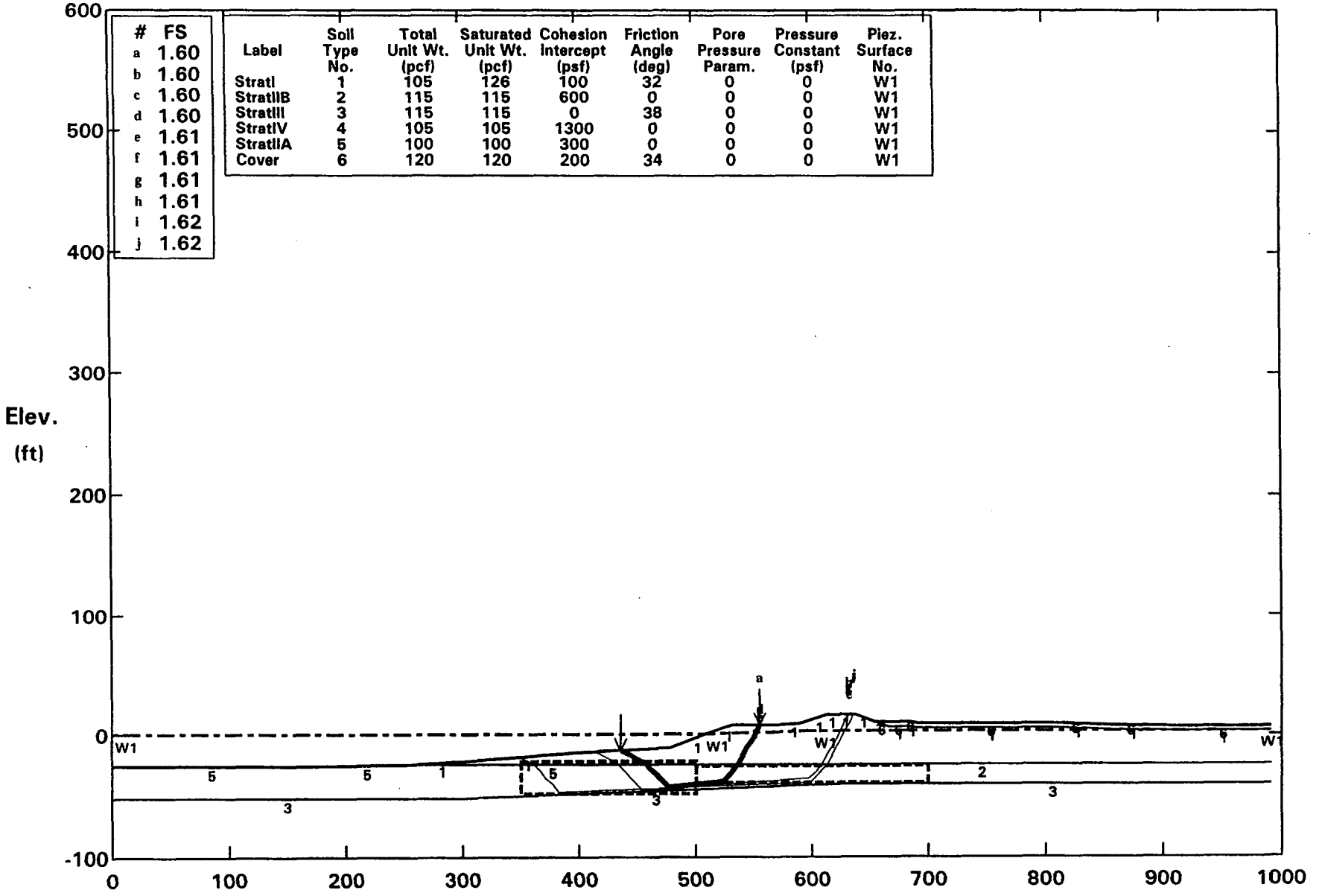
Factors Of Safety Calculated By The Modified Janbu Method

A-NAS IR Site 2, Section E-E', Long-Term Static Janbu Block Search

Ten Most Critical. C:IR2ELTJS.PLT By: MMM 08-02-02 7:00pm

#	FS
a	1.60
b	1.60
c	1.60
d	1.60
e	1.61
f	1.61
g	1.61
h	1.61
i	1.62
j	1.62

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	600	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 1.60 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

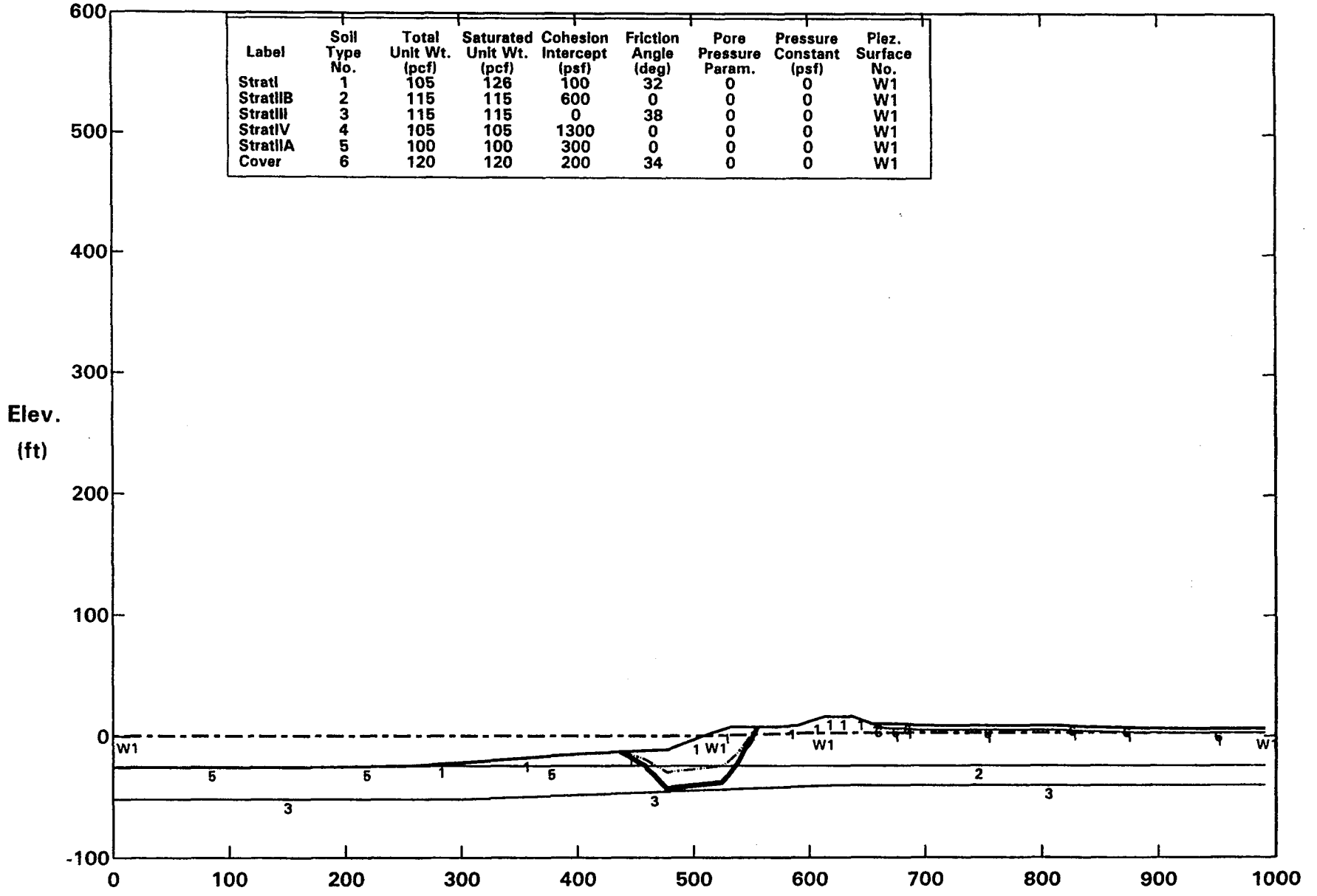
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\E-2\IR2ELTSB.IN  PCSTABL Version 5M /O(0.
-100. )
A-NAS IR Site 2, Section E-E', Long-TermSpencer Static Slope Stability (Block\
32 20
0. 74. 170. 74. 5
170. 74. 255. 75. 5
255. 75. 300. 78. 1
300. 78. 403. 86. 1
403. 86. 478. 89. 1
478. 89. 515. 103. 1
515. 103. 531. 108. 1
531. 108. 570. 108. 1
570. 108. 590. 109. 1
590. 109. 613. 116. 1
613. 116. 621. 116.8 1
621. 116.8 637. 116. 1
637. 116. 653.8 110. 1
653.8 110. 665. 110. 6
665. 110. 684. 110. 6
684. 110. 691. 109. 6
691. 109. 816. 109. 6
816. 109. 841. 108. 6
841. 108. 911. 107. 6
911. 107. 991. 107. 6
651. 111. 665. 106. 1
665. 106. 684. 106. 1
684. 106. 691. 105. 1
691. 105. 816. 105. 1
816. 105. 841. 104. 1
841. 104. 911. 103. 1
911. 103. 991. 103. 1
255. 75. 500. 75. 5
500. 75. 991. 75. 2
0. 48. 300. 48. 3
300. 48. 621. 60. 3
621. 60. 991. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 100. 32. 0. 0. 1
115. 115. 600. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
507. 100.
600. 103.
991. 103.
SPENCR
6.
SURFAC #1-IR2ELTJS.OUT
18
436.18 87.33
437.43 86.64
444.43 82.76
451.42 78.88
```

```
458.42 75.
460.06 73.36
465.72 67.71
471.37 62.05
  7.03 56.39
 14.07 62.43
 29.72 68.08
535.38 73.74
536.64 75.
540.52 82.
544.4 88.99
548.27 95.99
552.15 102.99
554.93 108.
EXECUT
```

A-NAS IR Site 2, Section E-E', Long-Term Spencer Static Slope Stability (Block)

Surface #1-IR2ELTJS.OUT. C:IR2ELTSB.PLT By: MMM 08-02-02 7:01pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	600	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



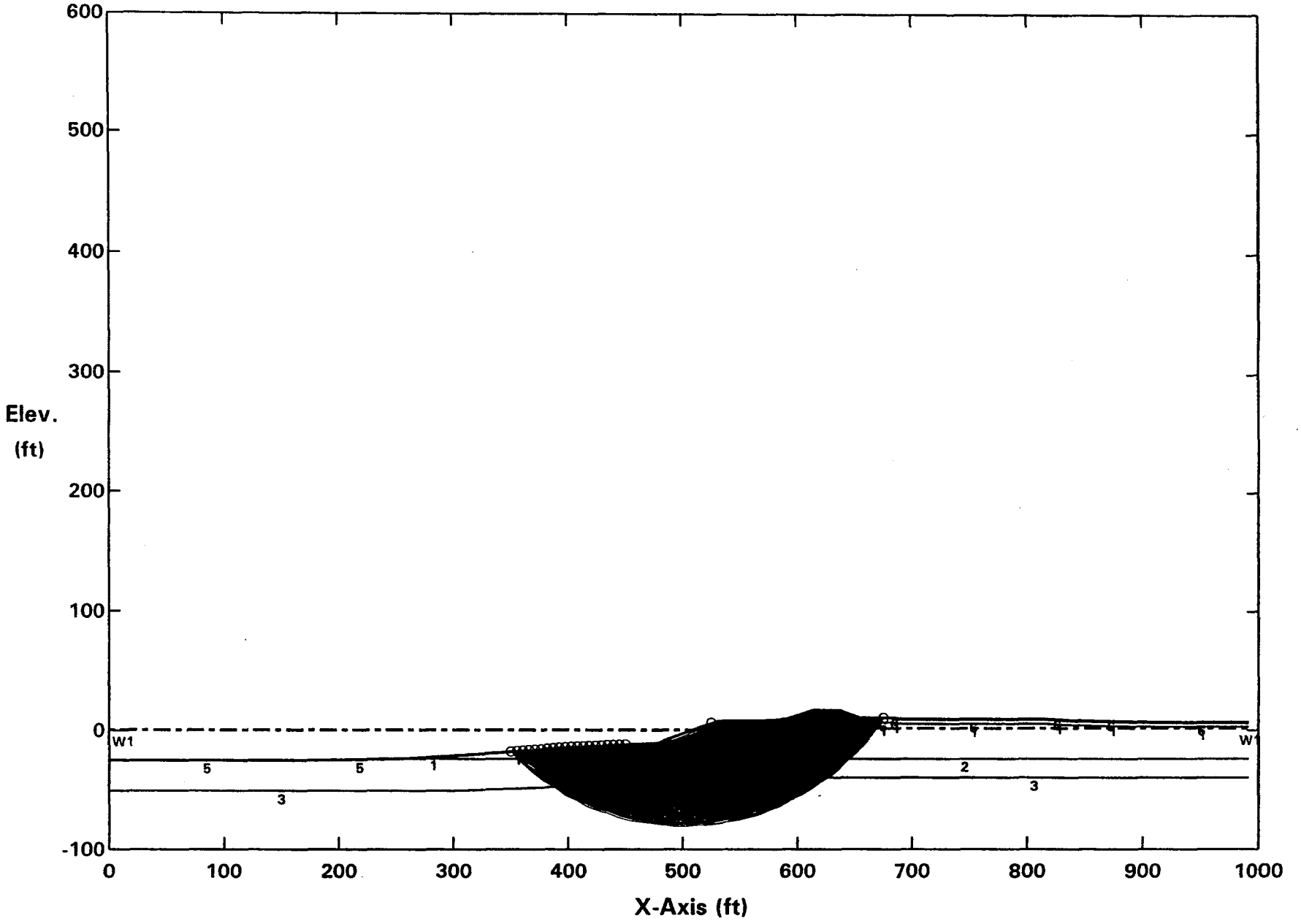
PCSTABL5M FS = 2.07 Theta = 3.84 X-Axis (ft)

Factors Of Safety Calc''ated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\E-2\IR2EBD.IN  PCSTABL Version 5M /O(0. ,-1
00. )
A-NAS IR Site 2, Section E-E',          Dynamic Bishop Circular Search, 0.05g
   20
   74. 170. 74. 5
 170. 74. 255. 75. 5
255. 75. 300. 78. 1
300. 78. 403. 86. 1
403. 86. 478. 89. 1
478. 89. 515. 103. 1
515. 103. 531. 108. 1
531. 108. 570. 108. 1
570. 108. 590. 109. 1
590. 109. 613. 116. 1
613. 116. 621. 116.8 1
621. 116.8 637. 116. 1
637. 116. 653.8 110. 1
653.8 110. 665. 110. 6
665. 110. 684. 110. 6
684. 110. 691. 109. 6
691. 109. 816. 109. 6
816. 109. 841. 108. 6
841. 108. 911. 107. 6
911. 107. 991. 107. 6
651. 111. 665. 106. 1
665. 106. 684. 106. 1
684. 106. 691. 105. 1
691. 105. 816. 105. 1
  6. 105. 841. 104. 1
  1. 104. 911. 103. 1
  1. 103. 991. 103. 1
255. 75. 500. 75. 5
500. 75. 991. 75. 2
0. 48. 300. 48. 3
300. 48. 621. 60. 3
621. 60. 991. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 500. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
507. 100.
600. 102.
991. 102.
EQUAKE
0.05 0. 0.
 PCL2-Bishop circular, search
   100
  ). 450. 525. 675. 0. 10. 0. 0.
```

A-NAS IR Site 2, Section E-E', Dynamic Bishop Circular Search, 0.05g

All surfaces evaluated. C:IR2EBD.PLT By: MMM 08-02-02 6:40pm



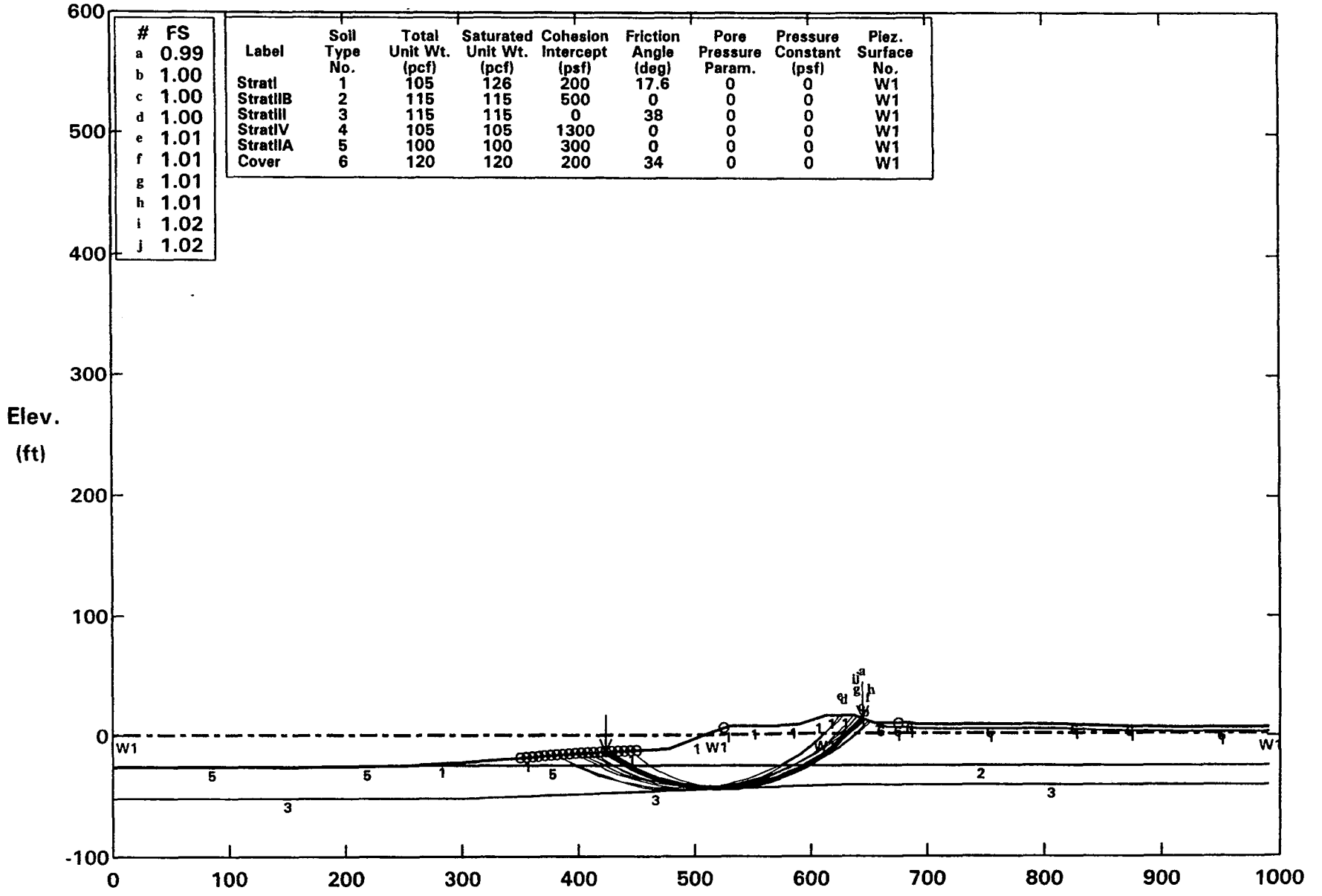
Factors Of Safety Calculated By The Modified Bishop Method

A-NAS IR Site 2, Section E-E', Dynamic Bishop Circular Search, 0.05g

Ten Most Critical. C:IR2EBD.PLT By: MMM 08-02-02 6:40pm

#	FS
a	0.99
b	1.00
c	1.00
d	1.00
e	1.01
f	1.01
g	1.01
h	1.01
i	1.02
j	1.02

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	500	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 0.99 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

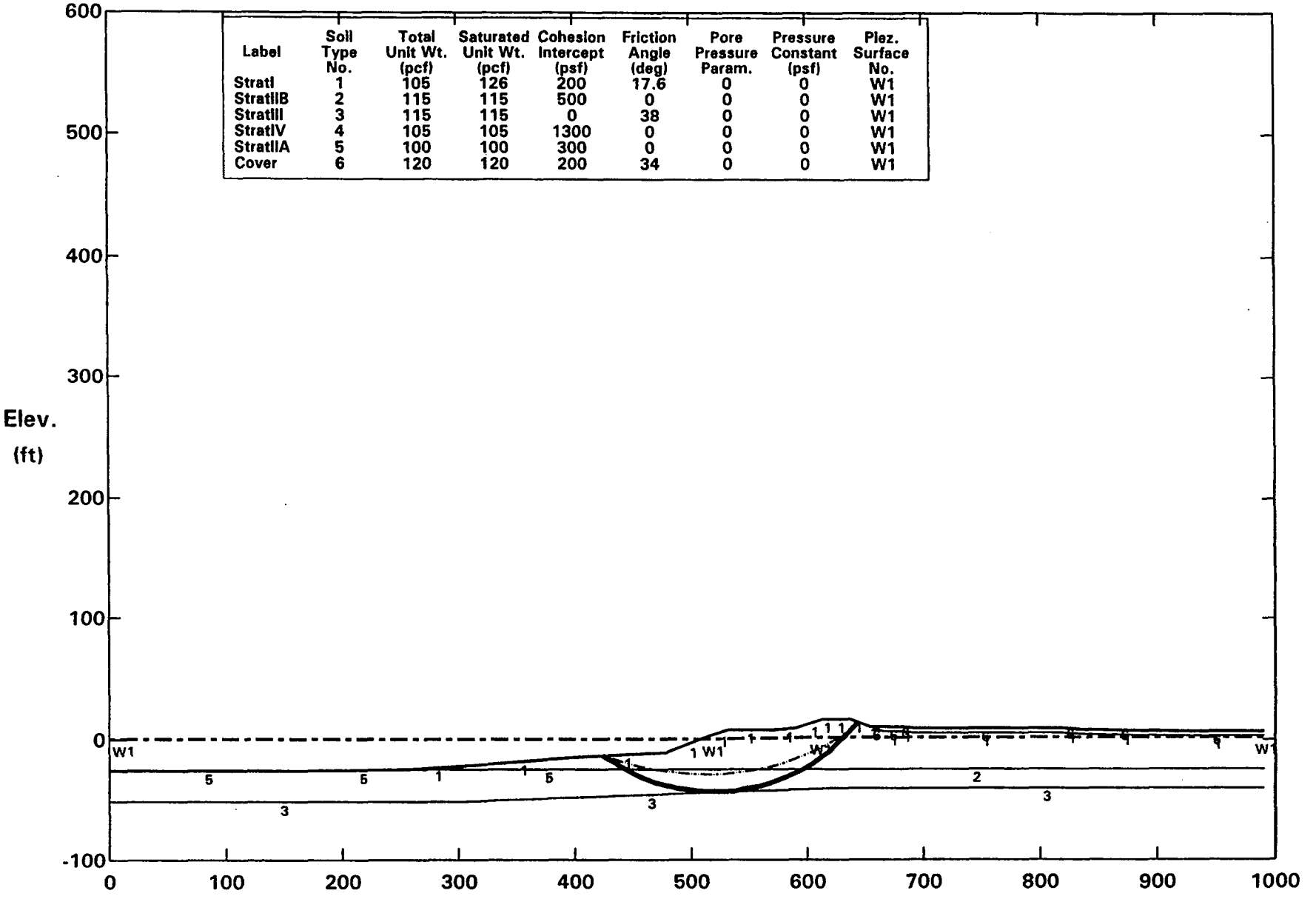
```
PROFIL       C:\GEO\STED\A-NAS\SITE2\E-2\IR2ESSC.IN  PCSTABL Version 5M /O(0. ,
100. )
A-NAS IR Site 2, Section E-E',          Spencer Static Slope Stability (Circ '
32 20
0. 74. 170. 74. 5
170. 74. 255. 75. 5
255. 75. 300. 78. 1
300. 78. 403. 86. 1
403. 86. 478. 89. 1
478. 89. 515. 103. 1
515. 103. 531. 108. 1
531. 108. 570. 108. 1
570. 108. 590. 109. 1
590. 109. 613. 116. 1
613. 116. 621. 116.8 1
621. 116.8 637. 116. 1
637. 116. 653.8 110. 1
653.8 110. 665. 110. 6
665. 110. 684. 110. 6
684. 110. 691. 109. 6
691. 109. 816. 109. 6
816. 109. 841. 108. 6
841. 108. 911. 107. 6
911. 107. 991. 107. 6
651. 111. 665. 106. 1
665. 106. 684. 106. 1
684. 106. 691. 105. 1
691. 105. 816. 105. 1
816. 105. 841. 104. 1
841. 104. 911. 103. 1
911. 103. 991. 103. 1
255. 75. 500. 75. 5
500. 75. 991. 75. 2
0. 48. 300. 48. 3
300. 48. 621. 60. 3
621. 60. 991. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 500. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
507. 100.
600. 102.
991. 102.
SPENCR
5.03
SURBIS #1-IR2EBD.OUT
26
423.68 86.83
432.01 81.29
440.66 76.27
449.59 71.78
```

```
458.79 67.84
468.2 64.47
477.8 61.68
487.56 59.47
  7.43 57.86
 )7.38 56.86
 17.37 56.46
527.37 56.67
537.33 57.48
547.23 58.9
557.03 60.92
566.68 63.53
576.16 66.72
585.42 70.48
594.44 74.79
603.19 79.65
611.62 85.03
619.71 90.91
627.42 97.27
634.74 104.08
641.63 111.33
643.58 113.65
EXECUT
```

A-NAS IR Site 2, Section E-E', Spencer Static Slope Stability (Circ.)

Surface #1-IR2EBD.OUT. C:IR2ESSC.PLT By: MMM 08-02-02 6:42pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	500	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FS = 1.43 Theta = 3.58 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

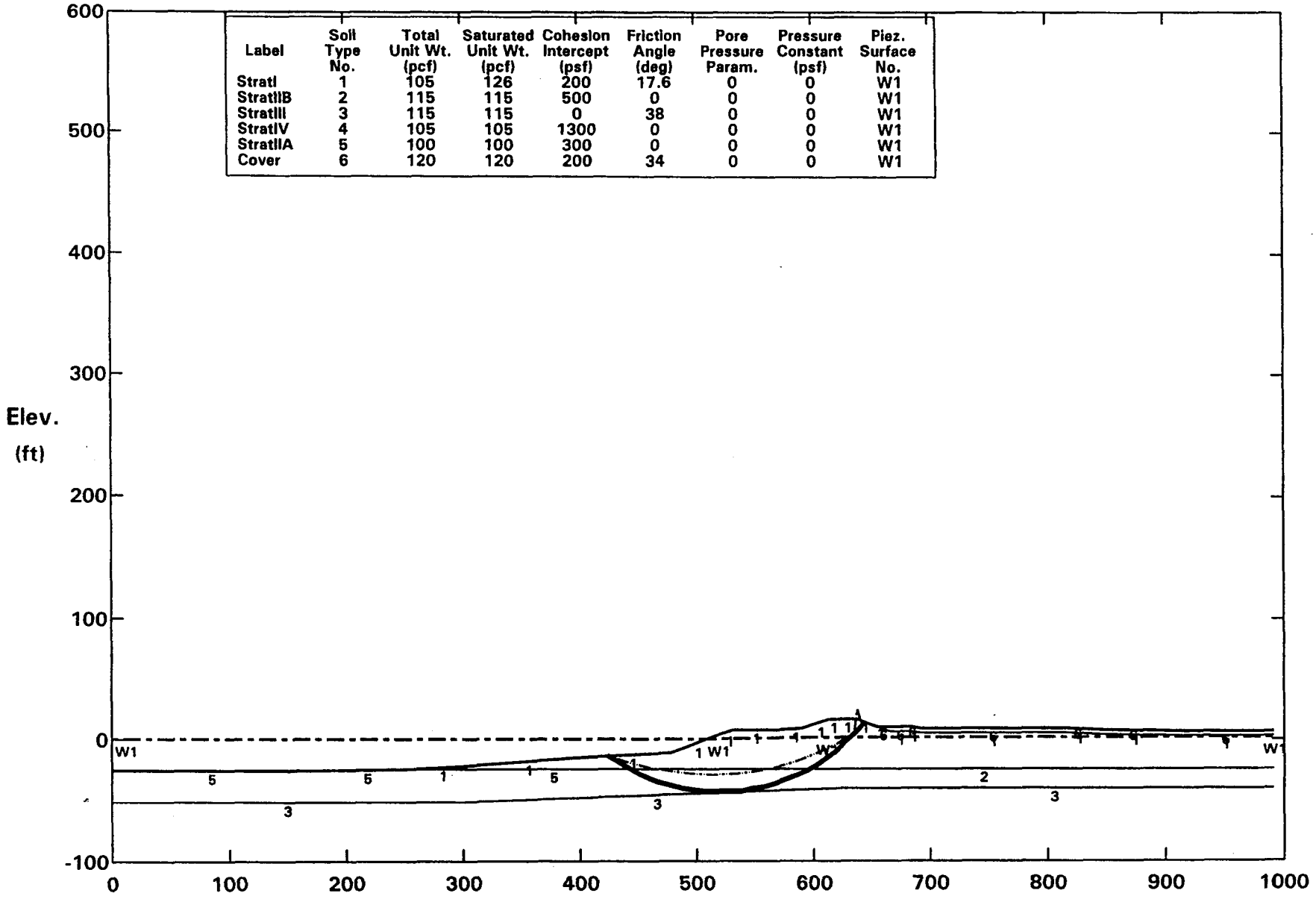
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\E-2\IR2ESDC.IN  PCSTABL Version 5M /O(0. ,-
100. )
A-NAS IR Site 2, Section E-E', (Circ.)  Spencer Dynamic Slope Stability Ky=.04g
32 20
   74. 170. 74. 5
 0. 74. 255. 75. 5
 5. 75. 300. 78. 1
300. 78. 403. 86. 1
403. 86. 478. 89. 1
478. 89. 515. 103. 1
515. 103. 531. 108. 1
531. 108. 570. 108. 1
570. 108. 590. 109. 1
590. 109. 613. 116. 1
613. 116. 621. 116.8 1
621. 116.8 637. 116. 1
637. 116. 653.8 110. 1
653.8 110. 665. 110. 6
665. 110. 684. 110. 6
684. 110. 691. 109. 6
691. 109. 816. 109. 6
816. 109. 841. 108. 6
841. 108. 911. 107. 6
911. 107. 991. 107. 6
651. 111. 665. 106. 1
665. 106. 684. 106. 1
684. 106. 691. 105. 1
691. 105. 816. 105. 1
816. 105. 841. 104. 1
  1. 104. 911. 103. 1
  1. 103. 991. 103. 1
  5. 75. 500. 75. 5
500. 75. 991. 75. 2
0. 48. 300. 48. 3
300. 48. 621. 60. 3
621. 60. 991. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 500. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
507. 100.
600. 102.
991. 102.
EQUAKE
0.044 0. 0.
SPENCR
 03
  BIS #1-IR2EBD.OUT

423.68 86.83
432.01 81.29
440.66 76.27
```

```
449.59 71.78
458.79 67.84
468.2 64.47
477.8 61.68
487.56 59.47
497.43 57.86
507.38 56.86
517.37 56.46
527.37 56.67
537.33 57.48
547.23 58.9
557.03 60.92
566.68 63.53
576.16 66.72
585.42 70.48
594.44 74.79
603.19 79.65
611.62 85.03
619.71 90.91
627.42 97.27
634.74 104.08
641.63 111.33
643.58 113.65
EXECUT
```

A-NAS IR Site 2, Section E-E', (Circ.) Spencer Dynamic Slope Stability Ky = .04g

Surface #1-IR2EBD.OUT. C:IR2ESDC.PLT By: MMM 08-02-02 6:41pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	500	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



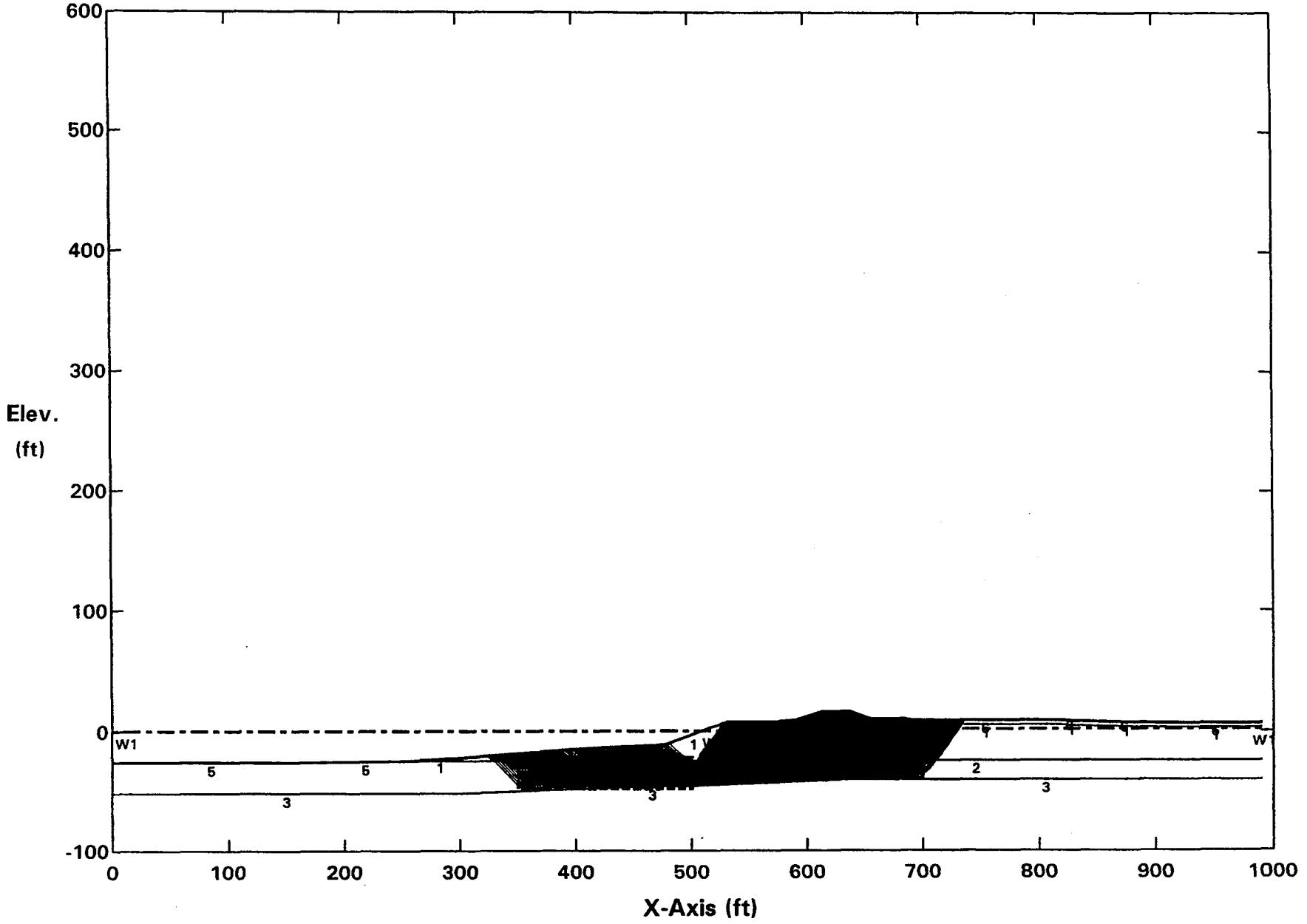
PCSTABL5M FS = 1.00 Theta = 2.54 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\E-2\IR2EJD.IN  PCSTABL Version 5M /O(0. ,-
00. )
A-NAS IR Site 2, Section E-E',          Dynamic Janbu Block Search, 0.05g
32 20
0. 74. 170. 74. 5
170. 74. 255. 75. 5
255. 75. 300. 78. 1
300. 78. 403. 86. 1
403. 86. 478. 89. 1
478. 89. 515. 103. 1
515. 103. 531. 108. 1
531. 108. 570. 108. 1
570. 108. 590. 109. 1
590. 109. 613. 116. 1
613. 116. 621. 116.8 1
621. 116.8 637. 116. 1
637. 116. 653.8 110. 1
653.8 110. 665. 110. 6
665. 110. 684. 110. 6
684. 110. 691. 109. 6
691. 109. 816. 109. 6
816. 109. 841. 108. 6
841. 108. 911. 107. 6
911. 107. 991. 107. 6
651. 111. 665. 106. 1
665. 106. 684. 106. 1
684. 106. 691. 105. 1
691. 105. 816. 105. 1
816. 105. 841. 104. 1
841. 104. 911. 103. 1
911. 103. 991. 103. 1
255. 75. 500. 75. 5
500. 75. 991. 75. 2
0. 48. 300. 48. 3
300. 48. 621. 60. 3
621. 60. 991. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 500. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
507. 100.
600. 102.
991. 102.
EQUAKE
0.05 0. 0.
BLOCK2-Rankine block, search
0
4000 2 8.
350. 65. 500. 65. 25.
501. 67.5 700. 67.5 14.
```

A-NAS IR Site 2, Section E-E', Dynamic Janbu Block Search, 0.05g

All surfaces evaluated. C:IR2EJD.PLT By: MMM 08-02-02 6:46pm



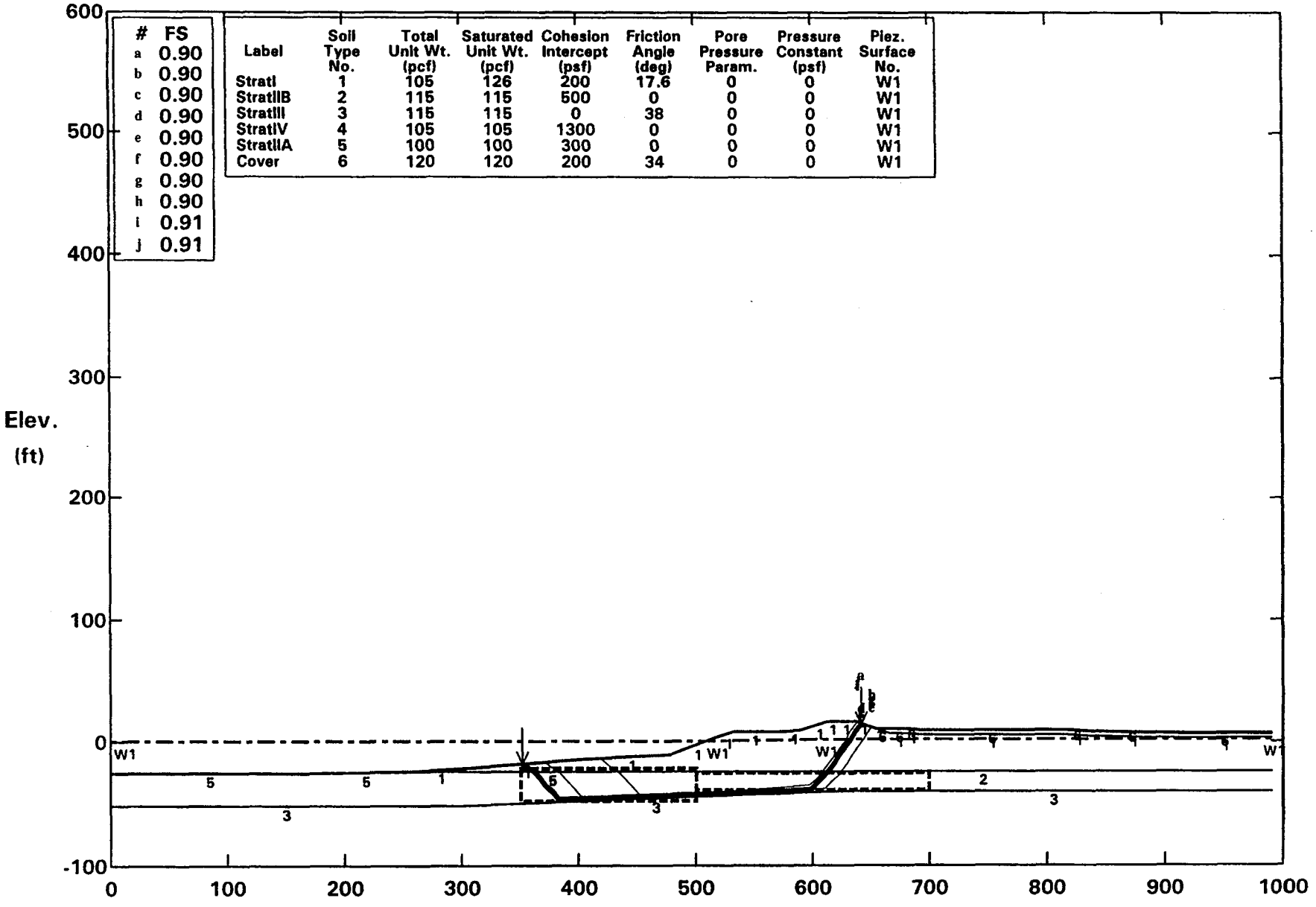
Factors Of Safety Calculated By The Modified Janbu Method

A-NAS IR Site 2, Section E-E', Dynamic Janbu Block Search, 0.05g

Ten Most Critical. C:IR2EJD.PLT By: MMM 08-02-02 6:46pm

#	FS
a	0.90
b	0.90
c	0.90
d	0.90
e	0.90
f	0.90
g	0.90
h	0.90
i	0.91
j	0.91

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	500	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 0.90 X-Axis (ft)

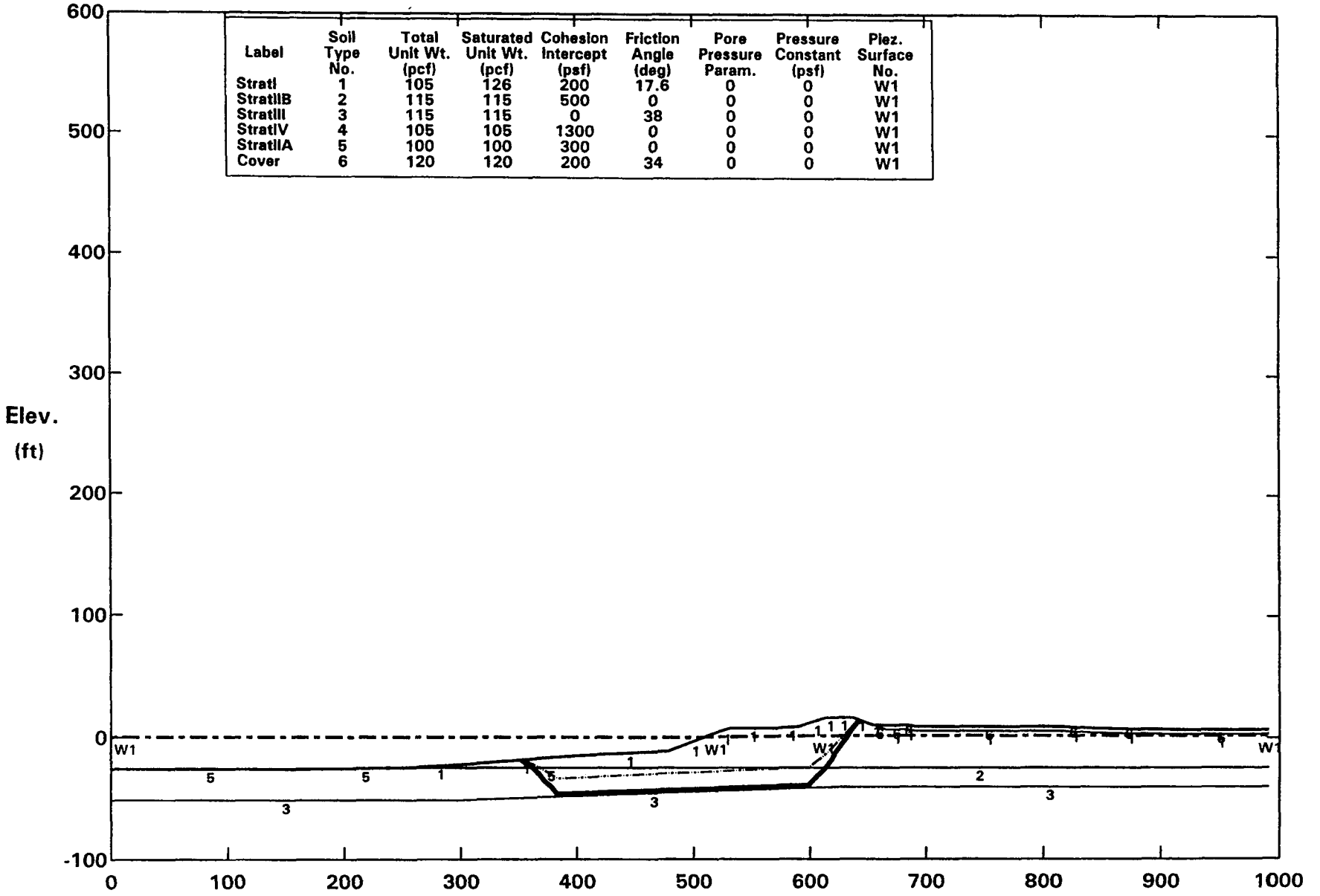
Factors Of Safety Calculated By The Modified Janbu Method

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\E-2\IR2ESSB.IN  PCSTABL Version 5M /O(0. ,-
100. )
^-NAS IR Site 2, Section E-E',          Spencer Static Slope Stability (Block)
   20
 . 74. 170. 74. 5
_70. 74. 255. 75. 5
255. 75. 300. 78. 1
300. 78. 403. 86. 1
403. 86. 478. 89. 1
478. 89. 515. 103. 1
515. 103. 531. 108. 1
531. 108. 570. 108. 1
570. 108. 590. 109. 1
590. 109. 613. 116. 1
613. 116. 621. 116.8 1
621. 116.8 637. 116. 1
637. 116. 653.8 110. 1
653.8 110. 665. 110. 6
665. 110. 684. 110. 6
684. 110. 691. 109. 6
691. 109. 816. 109. 6
816. 109. 841. 108. 6
841. 108. 911. 107. 6
911. 107. 991. 107. 6
651. 111. 665. 106. 1
665. 106. 684. 106. 1
684. 106. 691. 105. 1
691. 105. 816. 105. 1
  6. 105. 841. 104. 1
 .1. 104. 911. 103. 1
 .1. 103. 991. 103. 1
255. 75. 500. 75. 5
500. 75. 991. 75. 2
0. 48. 300. 48. 3
300. 48. 621. 60. 3
621. 60. 991. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 500. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
507. 100.
600. 102.
991. 102.
SPENCR
6.
 RFAC #1-IR2EJD.OUT

  1.94 82.03
55.09 79.72
361.55 75.
366.31 70.24
```

```
371.97 64.58
377.62 58.92
383.28 53.27
598.69 60.68
604.35 66.33
610. 71.99
613.01 75.
617.74 81.46
622.46 87.91
627.19 94.37
631.91 100.82
636.64 107.28
641.36 113.73
641.77 114.3
EXECUT
```

A-NAS IR Site 2, Section E-E', Spencer Static Slope Stability (Block)

Surface #1-IR2EJD.OUT. C:IR2ESSB.PLT By: MMM 08-02-02 6:49pm



Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	500	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1

PCSTABL5M FS = 1.56 Theta = 3.42 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

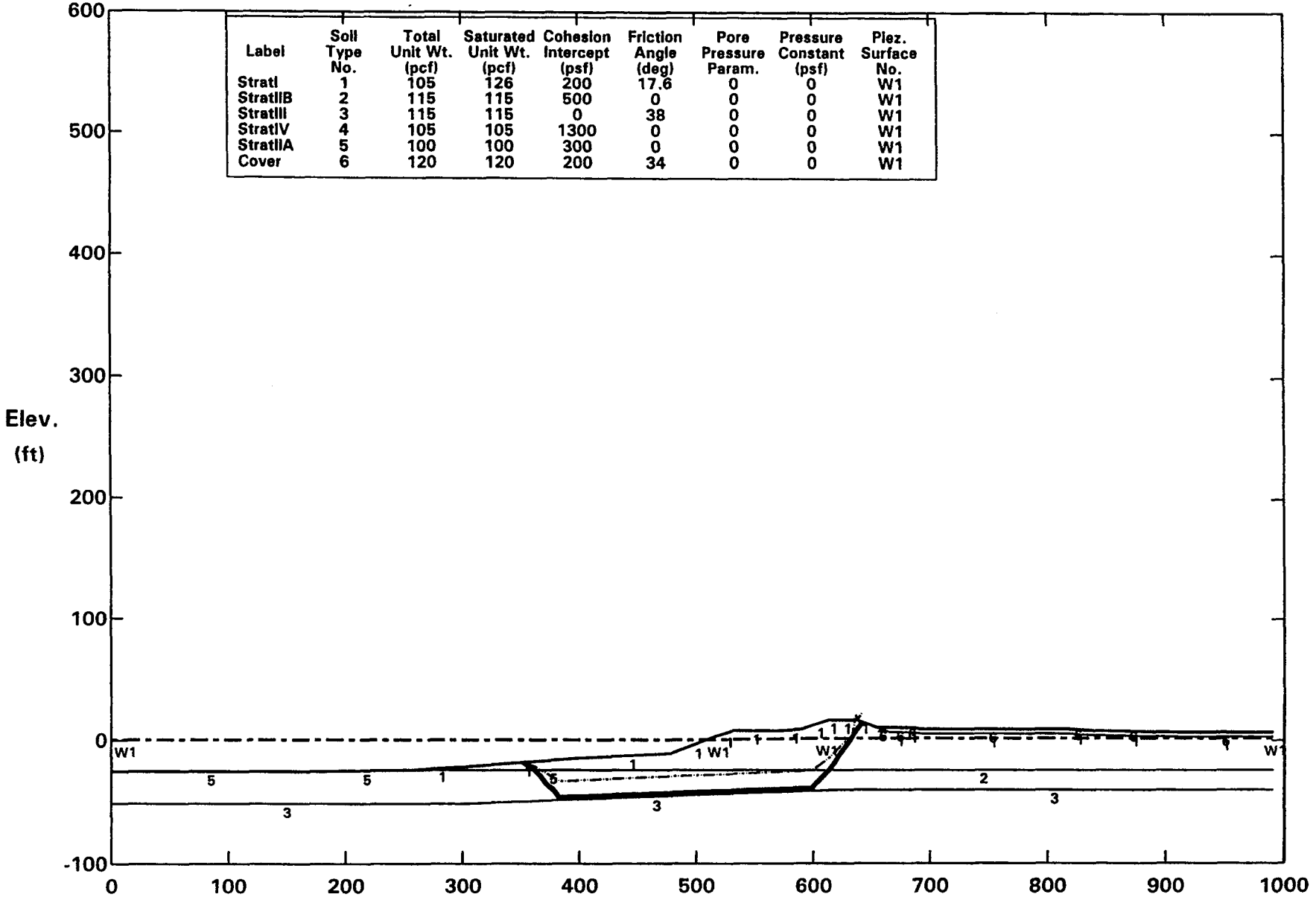
```
PROFIL       C:\GEO\STED\A-NAS\SITE2\E-2\IR2ESDB.IN  PCSTABL Version 5M /O(0. ,
100. )
A-NAS IR Site 2, Section E-E', (Block)  Spencer Dynamic Slope Stability Ky=.0
32 20
0. 74. 170. 74. 5
170. 74. 255. 75. 5
255. 75. 300. 78. 1
300. 78. 403. 86. 1
403. 86. 478. 89. 1
478. 89. 515. 103. 1
515. 103. 531. 108. 1
531. 108. 570. 108. 1
570. 108. 590. 109. 1
590. 109. 613. 116. 1
613. 116. 621. 116.8 1
621. 116.8 637. 116. 1
637. 116. 653.8 110. 1
653.8 110. 665. 110. 6
665. 110. 684. 110. 6
684. 110. 691. 109. 6
691. 109. 816. 109. 6
816. 109. 841. 108. 6
841. 108. 911. 107. 6
911. 107. 991. 107. 6
651. 111. 665. 106. 1
665. 106. 684. 106. 1
684. 106. 691. 105. 1
691. 105. 816. 105. 1
816. 105. 841. 104. 1
841. 104. 911. 103. 1
911. 103. 991. 103. 1
255. 75. 500. 75. 5
500. 75. 991. 75. 2
0. 48. 300. 48. 3
300. 48. 621. 60. 3
621. 60. 991. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 500. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
507. 100.
600. 102.
991. 102.
EQUAKE
0.044 0. 0.
SPENCR
6.
SURFAC #1-IR2EJD.OUT
18
351.94 82.03
355.09 79.72
```

```
361.55 75.
366.31 70.24
371.97 64.58
377.62 58.92
  3.28 53.27
 98.69 60.68
 04.35 66.33
610. 71.99
613.01 75.
617.74 81.46
622.46 87.91
627.19 94.37
631.91 100.82
636.64 107.28
641.36 113.73
641.77 114.3
EXECUT
```

A-NAS IR Site 2, Section E-E', (Block) Spencer Dynamic Slope Stability Ky = .04g

Surface #1-IR2EJD.OUT. C:IR2ESDB.PLT By: MMM 08-02-02 6:48pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	500	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



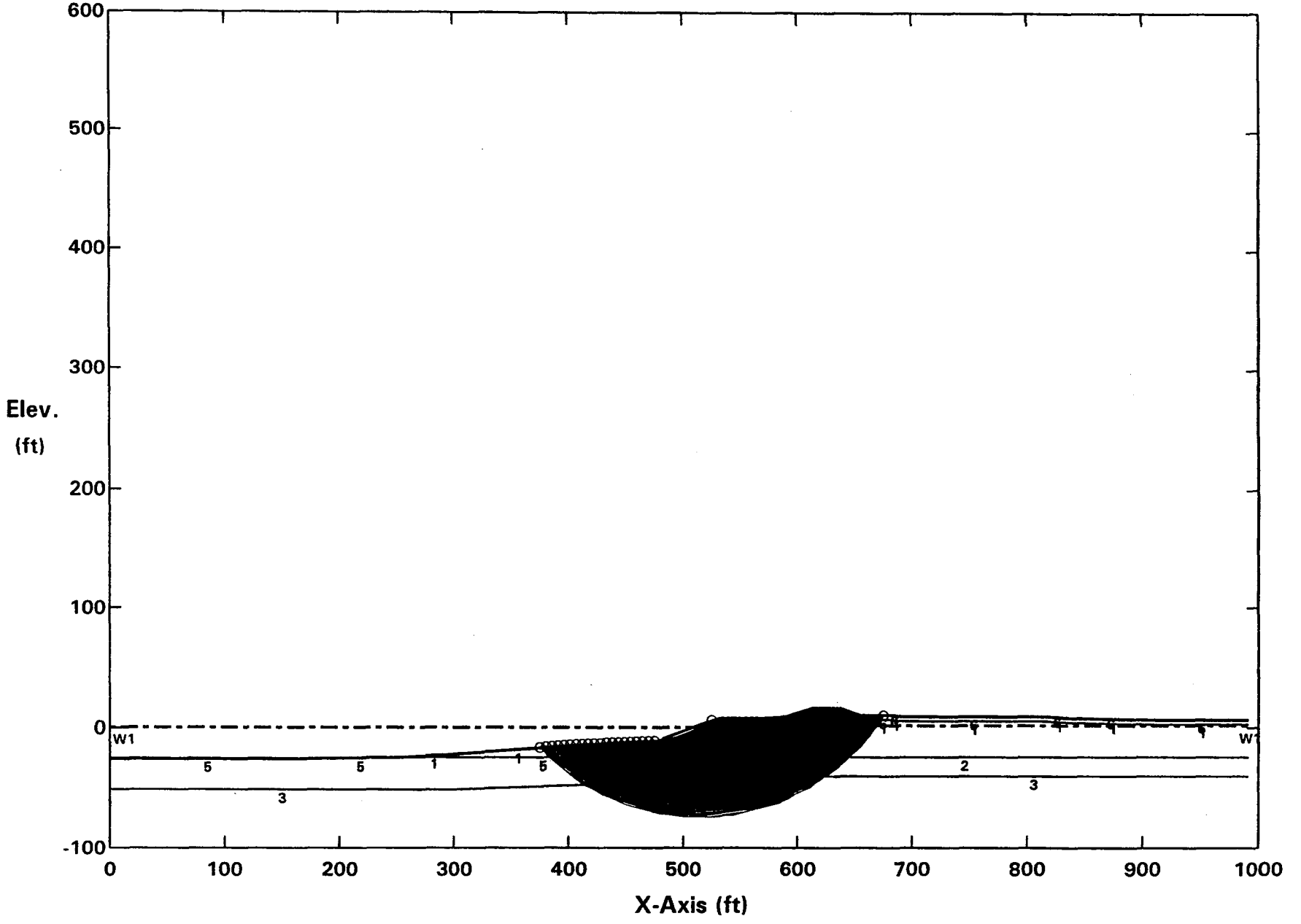
PCSTABL5M FS = 1.00 Theta = 2.72 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\E-2\IR2EEQBS.IN  PCSTABL Version 5M /O(0. ,
-100. )
A-NAS IR Site 2, Section E-E', Post-EQ  Static Bishop Circular Search
   20
 . 74. 170. 74. 5
 70. 74. 255. 75. 5
255. 75. 300. 78. 1
300. 78. 403. 86. 1
403. 86. 478. 89. 1
478. 89. 515. 103. 1
515. 103. 531. 108. 1
531. 108. 570. 108. 1
570. 108. 590. 109. 1
590. 109. 613. 116. 1
613. 116. 621. 116.8 1
621. 116.8 637. 116. 1
637. 116. 653.8 110. 1
653.8 110. 665. 110. 6
665. 110. 684. 110. 6
684. 110. 691. 109. 6
691. 109. 816. 109. 6
816. 109. 841. 108. 6
841. 108. 911. 107. 6
911. 107. 991. 107. 6
651. 111. 665. 106. 1
665. 106. 684. 106. 1
684. 106. 691. 105. 1
691. 105. 816. 105. 1
  5. 105. 841. 104. 1
  1. 104. 911. 103. 1
  1. 103. 991. 103. 1
255. 75. 500. 75. 5
500. 75. 991. 75. 2
0. 48. 300. 48. 3
300. 48. 621. 60. 3
621. 60. 991. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
507. 100.
600. 102.
991. 102.
CIRCL2-Bishop circular, search
20 100
 5. 475. 525. 675. 0. 10. 0. 0.
```

A-NAS IR Site 2, Section E-E', Post-EQ Static Bishop Circular Search

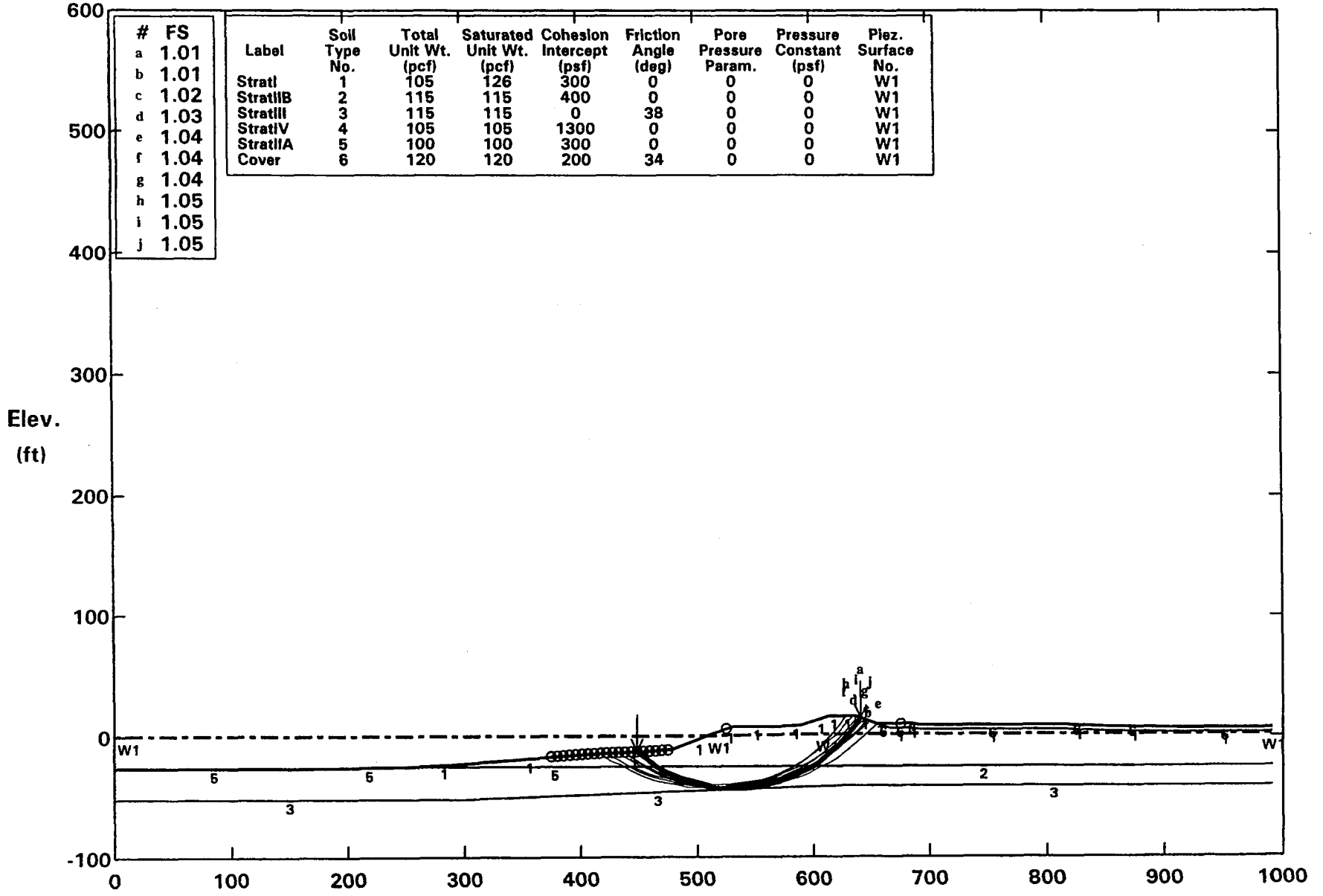
All surfaces evaluated. C:IR2EEQBS.PLT By: MMM 08-02-02 6:38pm



Factors Of Safety Calculated By The Modified Bishop Method

A-NAS IR Site 2, Section E-E', Post-EQ Static Bishop Circular Search

Ten Most Critical. C:IR2EEQBS.PLT By: MMM 08-02-02 6:38pm



#	FS
a	1.01
b	1.01
c	1.02
d	1.03
e	1.04
f	1.04
g	1.04
h	1.05
i	1.05
j	1.05

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1

PCSTABL5M FSmin = 1.01 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

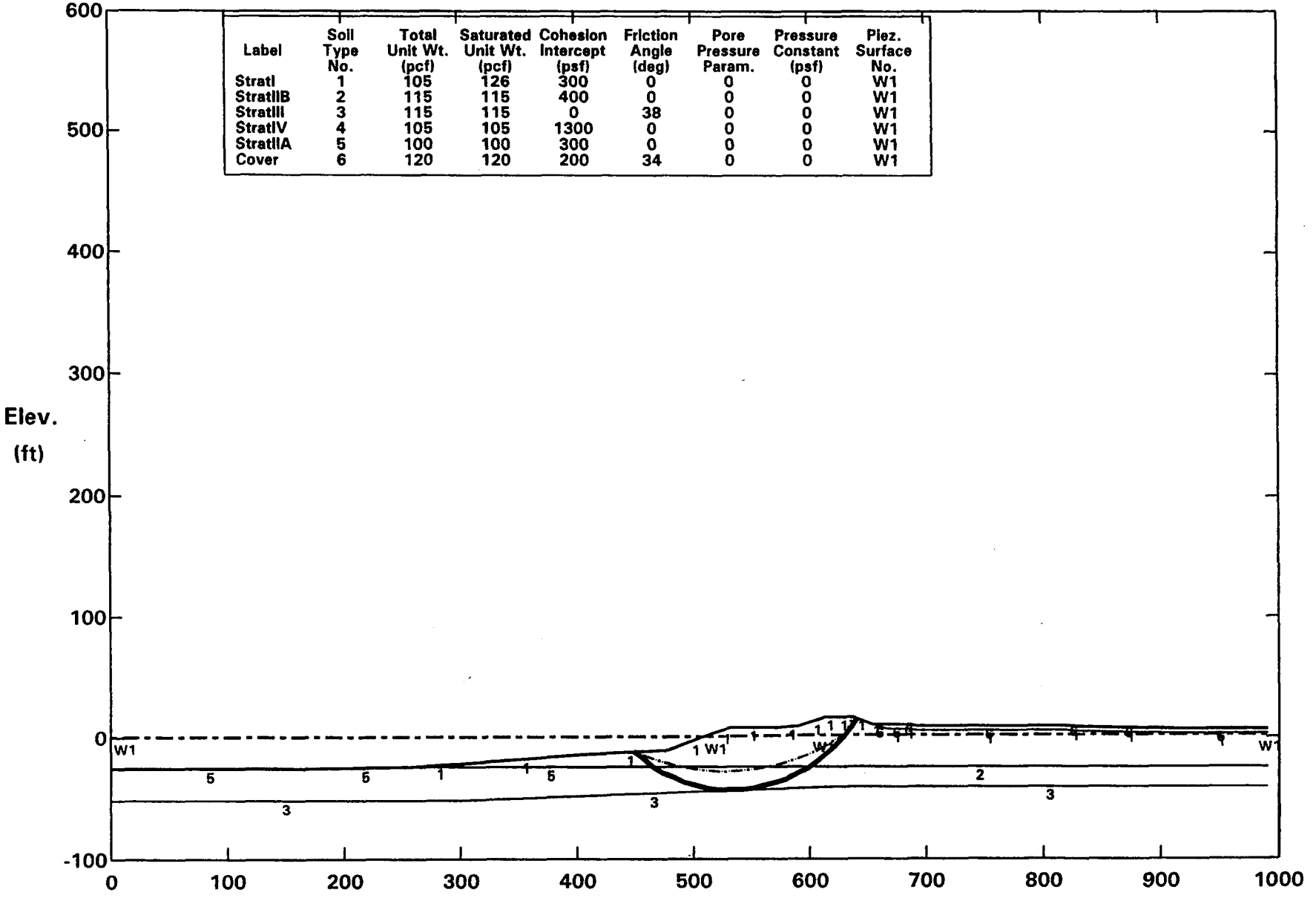
```
PROFIL       C:\GEO\STED\A-NAS\SITE2\E-2\IR2EEQSC.IN  PCSTABL Version 5M /O(0.
-100. )
A-NAS IR Site 2, Section E-E', Post-EQ  Spencer Static Slope Stability (Circ \
32 20
0. 74. 170. 74. 5
170. 74. 255. 75. 5
255. 75. 300. 78. 1
300. 78. 403. 86. 1
403. 86. 478. 89. 1
478. 89. 515. 103. 1
515. 103. 531. 108. 1
531. 108. 570. 108. 1
570. 108. 590. 109. 1
590. 109. 613. 116. 1
613. 116. 621. 116.8 1
621. 116.8 637. 116. 1
637. 116. 653.8 110. 1
653.8 110. 665. 110. 6
665. 110. 684. 110. 6
684. 110. 691. 109. 6
691. 109. 816. 109. 6
816. 109. 841. 108. 6
841. 108. 911. 107. 6
911. 107. 991. 107. 6
651. 111. 665. 106. 1
665. 106. 684. 106. 1
684. 106. 691. 105. 1
691. 105. 816. 105. 1
816. 105. 841. 104. 1
841. 104. 911. 103. 1
911. 103. 991. 103. 1
255. 75. 500. 75. 5
500. 75. 991. 75. 2
0. 48. 300. 48. 3
300. 48. 621. 60. 3
621. 60. 991. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
507. 100.
600. 102.
991. 102.
SPENCR
6.
SURBIS #1-IR2EEQBS.OUT
23
448.68 87.83
456.54 81.63
464.84 76.07
473.56 71.16
```

482.62 66.94
491.99 63.44
501.6 60.67
511.39 58.66
1.31 57.4
31.3 56.93
41.3 57.22
551.24 58.29
561.07 60.13
570.73 62.72
580.16 66.05
589.3 70.11
598.1 74.85
606.51 80.27
614.47 86.32
621.94 92.97
628.87 100.17
635.23 107.9
640.12 114.89
EXECUT

A-NAS IR Site 2, Section E-E', Post-EQ Spencer Static Slope Stability (Circ.)

Surface #1-IR2EEQBS.OUT. C:IR2EEQSC.PLT By: MMM 08-02-02 6:39pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



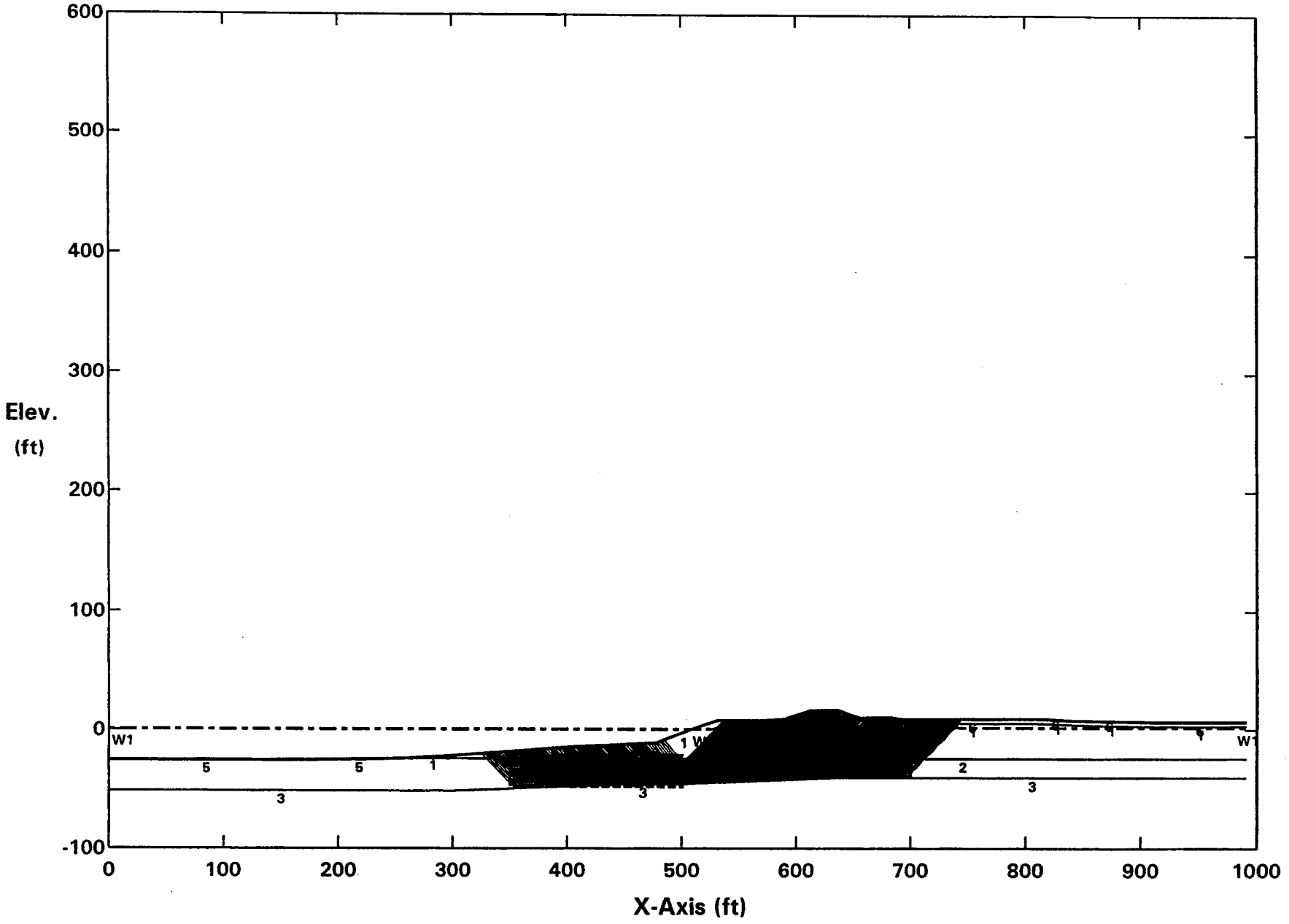
PCSTABL5M FS = 1.02 Theta = 4.4 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\E-2\IR2EEQJS.IN  PCSTABL Version 5M /O(0. ,
-100. )
^-NAS IR Site 2, Section E-E', Post-EQ  Static Janbu Block Search
   20
 . 74. 170. 74. 5
 70. 74. 255. 75. 5
255. 75. 300. 78. 1
300. 78. 403. 86. 1
403. 86. 478. 89. 1
478. 89. 515. 103. 1
515. 103. 531. 108. 1
531. 108. 570. 108. 1
570. 108. 590. 109. 1
590. 109. 613. 116. 1
613. 116. 621. 116.8 1
621. 116.8 637. 116. 1
637. 116. 653.8 110. 1
653.8 110. 665. 110. 6
665. 110. 684. 110. 6
684. 110. 691. 109. 6
691. 109. 816. 109. 6
816. 109. 841. 108. 6
841. 108. 911. 107. 6
911. 107. 991. 107. 6
651. 111. 665. 106. 1
665. 106. 684. 106. 1
684. 106. 691. 105. 1
691. 105. 816. 105. 1
  5. 105. 841. 104. 1
 .1. 104. 911. 103. 1
  1. 103. 991. 103. 1
255. 75. 500. 75. 5
500. 75. 991. 75. 2
0. 48. 300. 48. 3
300. 48. 621. 60. 3
621. 60. 991. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
507. 100.
600. 102.
991. 102.
BLOCK2-Rankine block, search
0
  10 2 8.
  . 65. 500. 65. 25.
  . 67.5 700. 67.5 14.
```

A-NAS IR Site 2, Section E-E', Post-EQ Static Janbu Block Search

All surfaces evaluated. C:IR2EEQJS.PLT By: MMM 08-02-02 6:56pm



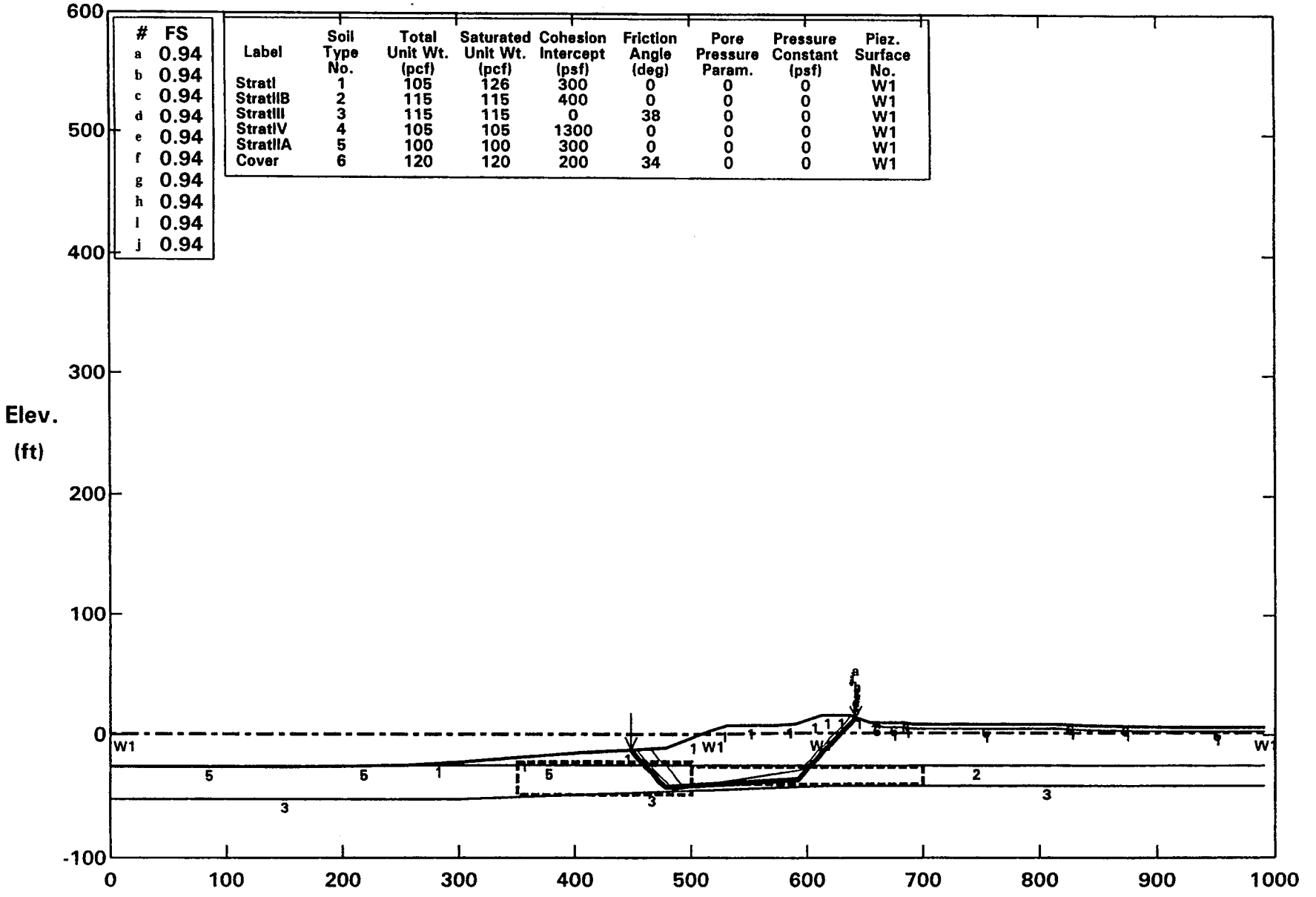
Factors Of Safety Calculated By The Modified Janbu Method

A-NAS IR Site 2, Section E-E', Post-EQ Static Janbu Block Search

Ten Most Critical. C:IR2EEQJS.PLT By: MMM 08-02-02 6:56pm

#	FS
a	0.94
b	0.94
c	0.94
d	0.94
e	0.94
f	0.94
g	0.94
h	0.94
i	0.94
j	0.94

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 0.94 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

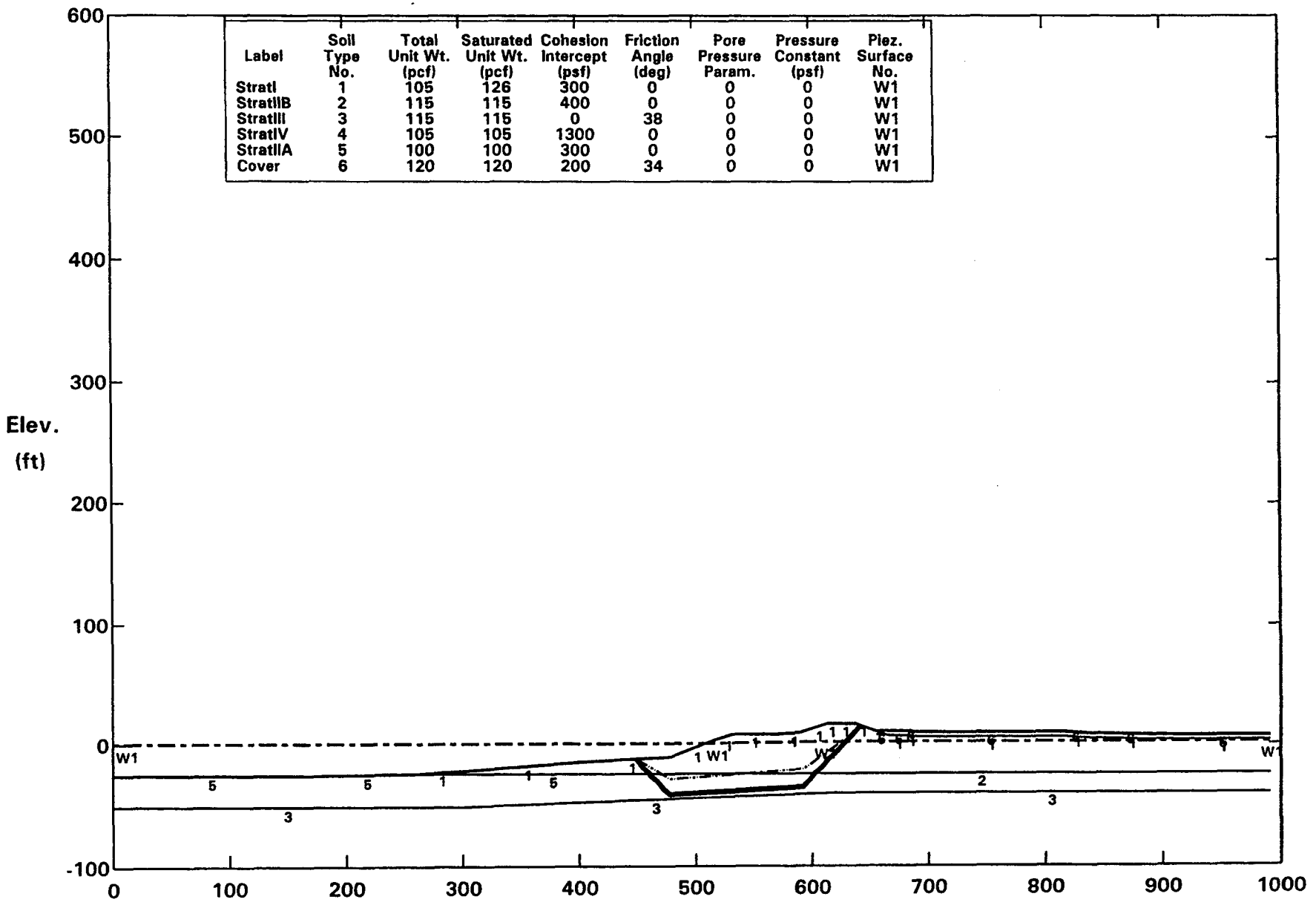
```
PROFIL       C:\GEO\STED\A-NAS\SITE2\E-2\IR2EEQSB.IN  PCSTABL Version 5M /O(0. ,
-100. )
A-NAS IR Site 2, Section E-E', Post-EQ  Spencer Static Slope Stability (Block'
32 20
0. 74. 170. 74. 5
170. 74. 255. 75. 5
255. 75. 300. 78. 1
300. 78. 403. 86. 1
403. 86. 478. 89. 1
478. 89. 515. 103. 1
515. 103. 531. 108. 1
531. 108. 570. 108. 1
570. 108. 590. 109. 1
590. 109. 613. 116. 1
613. 116. 621. 116.8 1
621. 116.8 637. 116. 1
637. 116. 653.8 110. 1
653.8 110. 665. 110. 6
665. 110. 684. 110. 6
684. 110. 691. 109. 6
691. 109. 816. 109. 6
816. 109. 841. 108. 6
841. 108. 911. 107. 6
911. 107. 991. 107. 6
651. 111. 665. 106. 1
665. 106. 684. 106. 1
684. 106. 691. 105. 1
691. 105. 816. 105. 1
816. 105. 841. 104. 1
841. 104. 911. 103. 1
911. 103. 991. 103. 1
255. 75. 500. 75. 5
500. 75. 991. 75. 2
0. 48. 300. 48. 3
300. 48. 621. 60. 3
621. 60. 991. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
507. 100.
600. 102.
991. 102.
SPENCR
6.
SURFAC #1-IR2EEQJS.OUT
18
448.08 87.8
449.57 86.31
455.23 80.66
460.89 75.
```

461.08 74.8
466.74 69.15
472.4 63.49
478.05 57.83
..28 64.87
7.93 70.53
.02.4 75.
608.06 80.66
613.72 86.31
619.37 91.97
625.03 97.63
630.69 103.28
636.34 108.94
641.72 114.31
EXECUT

A-NAS IR Site 2, Section E-E', Post-EQ Spencer Static Slope Stability (Block)

Surface #1-IR2EEQJS.OUT. C:IR2EEQSB.PLT By: MMM 08-02-02 6:57pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FS = 1.12 Theta = 4.51 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

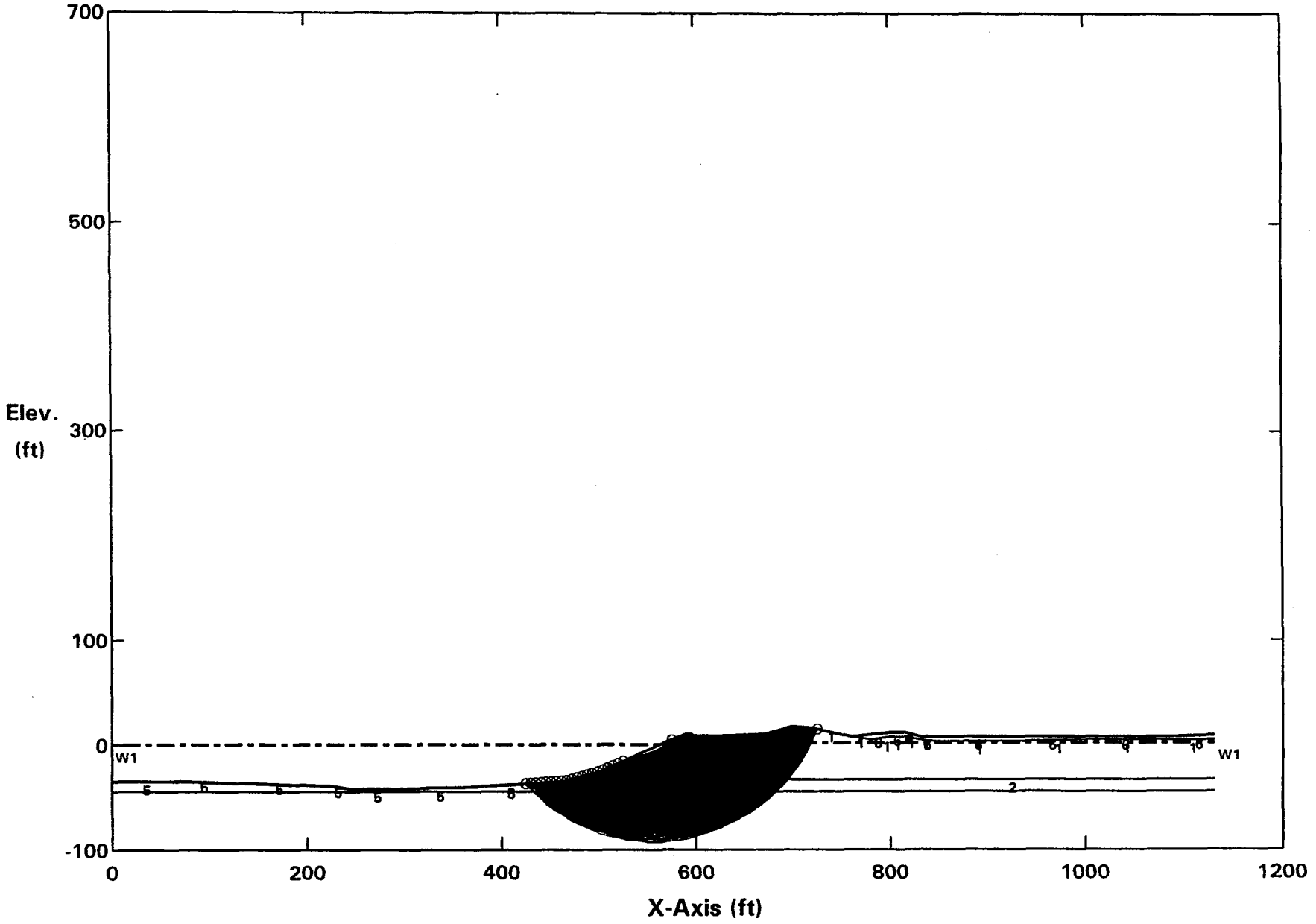
SECTION F-F'

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\F-2\IR2FLTBS.IN  PCSTABL Version 5M /O(0. ,
-100. )
A-NAS IR Site 2, Section F-F', Long-TermStatic Bishop Circular Search
 27
   65.5 70. 65. 5
    65. 125. 64. 5
125. 64. 225. 61. 5
225. 61. 245. 58. 5
245. 58. 300. 58. 5
300. 58. 360. 59. 5
360. 59. 445. 64. 5
445. 64. 465. 65. 5
465. 65. 502. 75. 1
502. 75. 563. 100. 1
563. 100. 590. 110. 1
590. 110. 595. 110. 1
595. 110. 598. 109. 1
598. 109. 638. 109. 1
638. 109. 670. 110. 1
670. 110. 698. 117. 1
698. 117. 700. 117. 1
700. 117. 720. 116. 1
720. 116. 760. 107. 1
760. 107. 800. 111. 6
800. 111. 815. 111. 6
815. 111. 831. 108. 6
831. 108. 846. 107. 6
846. 107. 936. 107. 6
936. 107. 996. 108. 6
   . 108. 1086. 108. 6
  36. 108. 1131. 109. 6
780. 107. 780. 105. 1
780. 105. 800. 107. 1
800. 107. 815. 107. 1
815. 107. 831. 104. 1
831. 104. 846. 103. 1
846. 103. 936. 103. 1
936. 103. 996. 104. 1
996. 104. 1086. 104. 1
1086. 104. 1131. 105. 1
465. 65. 720. 66. 2
720. 66. 1131. 66. 2
0. 55. 1131. 55. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 100. 32. 0. 0. 1
115. 115. 775. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
   100.
  3. 100.
  . 102.
1131. 102.
CIRCL2-Bishop circular, search
20 100
```

425. 525. 575. 725. 0. 10. 0. 0.

A-NAS IR Site 2, Section F-F', Long-Term Static Bishop Circular Search

All surfaces evaluated. C:IR2FLTBS.PLT By: MMM 08-02-02 7:08pm



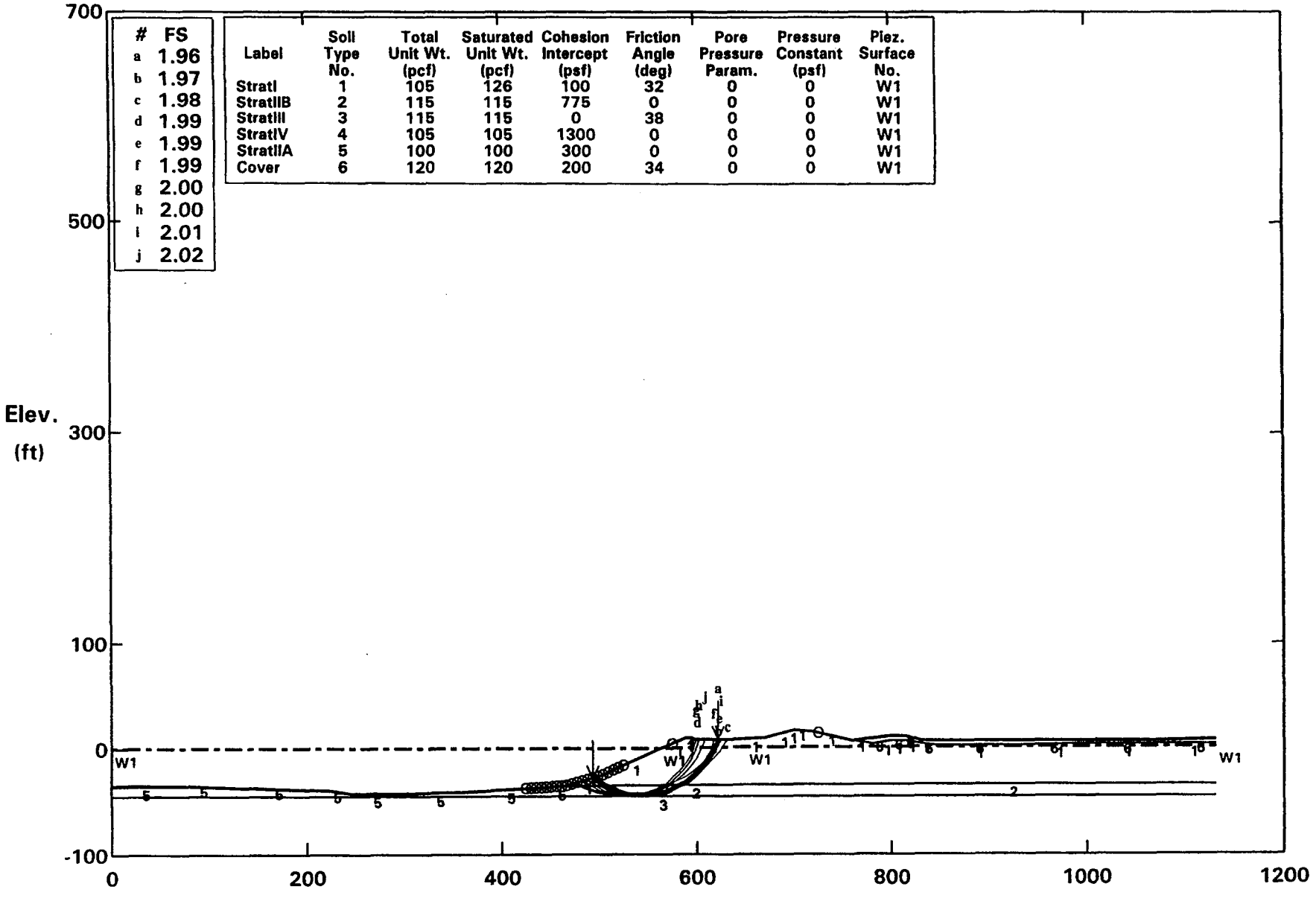
Factors Of Safety Calculated By The Modified Bishop Method

A-NAS IR Site 2, Section F-F', Long-Term Static Bishop Circular Search

Ten Most Critical. C:IR2FLTBS.PLT By: MMM 08-02-02 7:08pm

#	FS
a	1.96
b	1.97
c	1.98
d	1.99
e	1.99
f	1.99
g	2.00
h	2.00
i	2.01
j	2.02

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	775	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 1.96 X-Axis (ft)

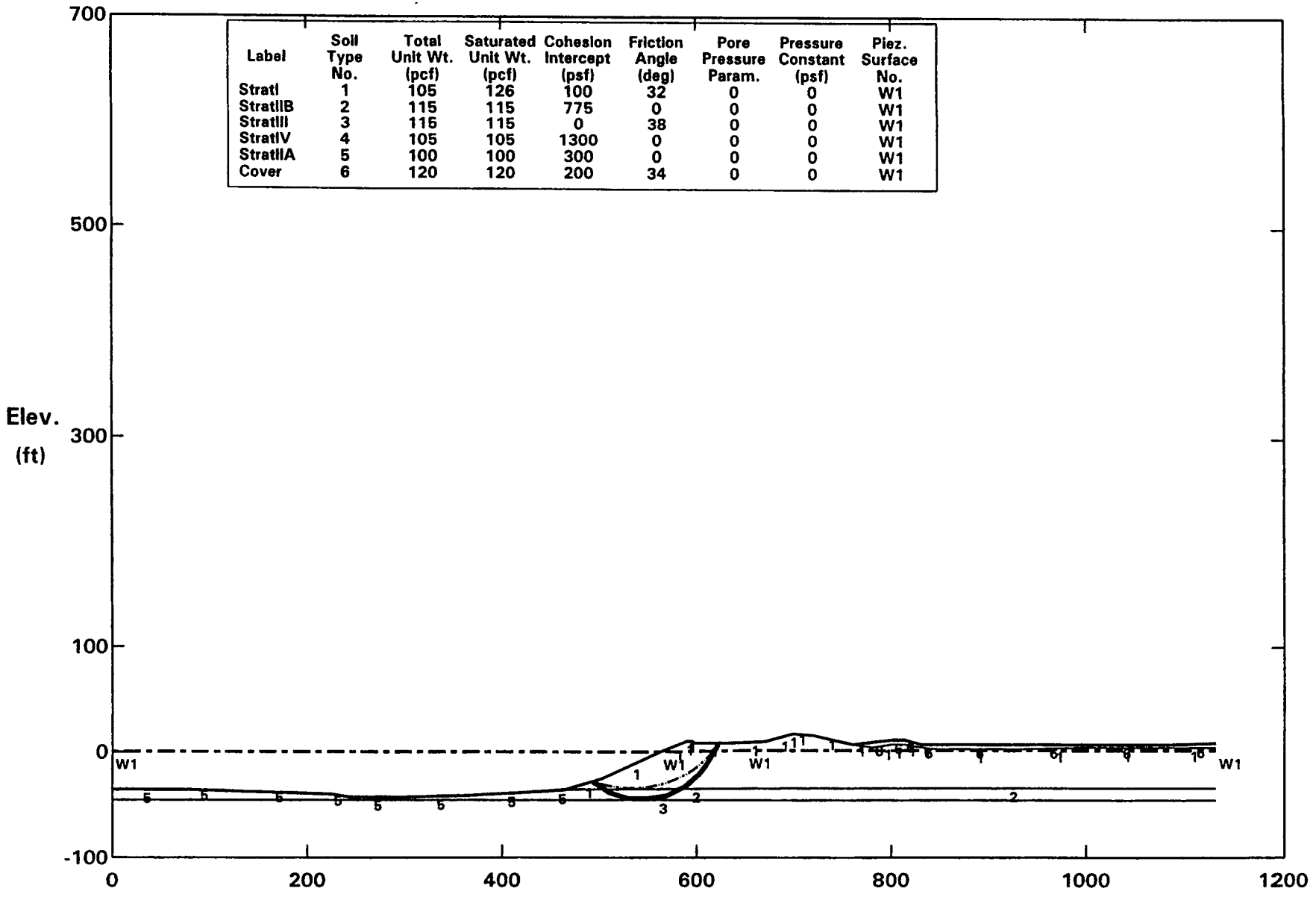
Factors Of Safety Calculated By The Modified Bishop Method

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\F-2\IR2FLTSC.IN  PCSTABL Version 5M /O(0. ,
-100. )
A-NAS IR Site 2, Section F-F', Long-TermSpencer Static Slope Stability (Circ.)
   27
   65.5 70. 65. 5
 0. 65. 125. 64. 5
125. 64. 225. 61. 5
225. 61. 245. 58. 5
245. 58. 300. 58. 5
300. 58. 360. 59. 5
360. 59. 445. 64. 5
445. 64. 465. 65. 5
465. 65. 502. 75. 1
502. 75. 563. 100. 1
563. 100. 590. 110. 1
590. 110. 595. 110. 1
595. 110. 598. 109. 1
598. 109. 638. 109. 1
638. 109. 670. 110. 1
670. 110. 698. 117. 1
698. 117. 700. 117. 1
700. 117. 720. 116. 1
720. 116. 760. 107. 1
760. 107. 800. 111. 6
800. 111. 815. 111. 6
815. 111. 831. 108. 6
831. 108. 846. 107. 6
846. 107. 936. 107. 6
  6. 107. 996. 108. 6
  6. 108. 1086. 108. 6
  86. 108. 1131. 109. 6
760. 107. 780. 105. 1
780. 105. 800. 107. 1
800. 107. 815. 107. 1
815. 107. 831. 104. 1
831. 104. 846. 103. 1
846. 103. 936. 103. 1
936. 103. 996. 104. 1
996. 104. 1086. 104. 1
1086. 104. 1131. 105. 1
465. 65. 720. 66. 2
720. 66. 1131. 66. 2
0. 55. 1131. 55. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 100. 32. 0. 0. 1
115. 115. 775. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4

   100.
  3. 100.
630. 102.
1131. 102.
SPENCR
```

```
4.
SURBIS #1-IR2FLTBS.OUT
17
493.42 72.68
501.76 67.16
510.69 62.67
520.1 59.28
529.85 57.03
539.79 55.96
549.79 56.08
559.7 57.39
569.39 59.87
578.71 63.49
587.54 68.19
595.74 73.91
603.2 80.56
609.82 88.06
615.5 96.29
620.15 105.14
621.63 109.
EXECUT
```

A-NAS IR Site 2, Section F-F', Long-Term Spencer Static Slope Stability (Circ.)
Surface #1-IR2FLTBS.OUT. C:IR2FLTSC.PLT By: MMM 08-02-02 7:10pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	775	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



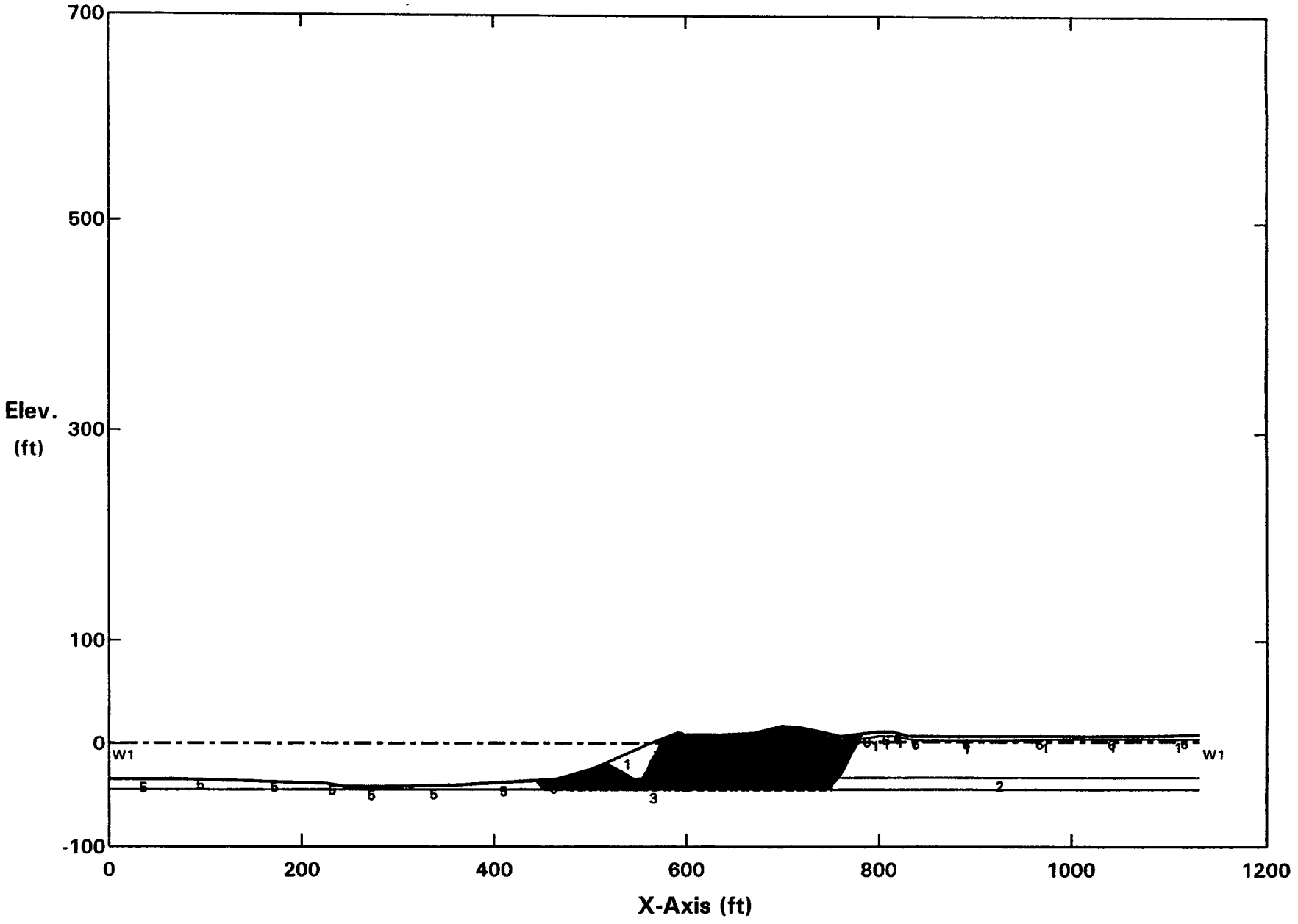
PCSTABL5M FS = 2.11 Theta = 8.15 X-Axis (ft)
Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\F-2\IR2FLTJS.IN  PCSTABL Version 5M /O(0. ,
-100. )
A-NAS IR Site 2, Section F-F', Long-TermStatic Janbu Block Search
39 27
0. 65.5 70. 65. 5
70. 65. 125. 64. 5
125. 64. 225. 61. 5
225. 61. 245. 58. 5
245. 58. 300. 58. 5
300. 58. 360. 59. 5
360. 59. 445. 64. 5
445. 64. 465. 65. 5
465. 65. 502. 75. 1
502. 75. 563. 100. 1
563. 100. 590. 110. 1
590. 110. 595. 110. 1
595. 110. 598. 109. 1
598. 109. 638. 109. 1
638. 109. 670. 110. 1
670. 110. 698. 117. 1
698. 117. 700. 117. 1
700. 117. 720. 116. 1
720. 116. 760. 107. 1
760. 107. 800. 111. 6
800. 111. 815. 111. 6
815. 111. 831. 108. 6
831. 108. 846. 107. 6
846. 107. 936. 107. 6
936. 107. 996. 108. 6
996. 108. 1086. 108. 6
1086. 108. 1131. 109. 6
760. 107. 780. 105. 1
780. 105. 800. 107. 1
800. 107. 815. 107. 1
815. 107. 831. 104. 1
831. 104. 846. 103. 1
846. 103. 936. 103. 1
936. 103. 996. 104. 1
996. 104. 1086. 104. 1
1086. 104. 1131. 105. 1
465. 65. 720. 66. 2
720. 66. 1131. 66. 2
0. 55. 1131. 55. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 100. 32. 0. 0. 1
115. 115. 785. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
563. 100.
650. 102.
1131. 102.
BLOCK2-Rankine block, search
```

```
0
4000 2 10.
450. 59. 550. 59. 8.
551. 60. 750. 60. 10.
```

A-NAS IR Site 2, Section F-F', Long-Term Static Janbu Block Search

All surfaces evaluated. C:IR2FLTJS.PLT By: MMM 08-02-02 7:36pm



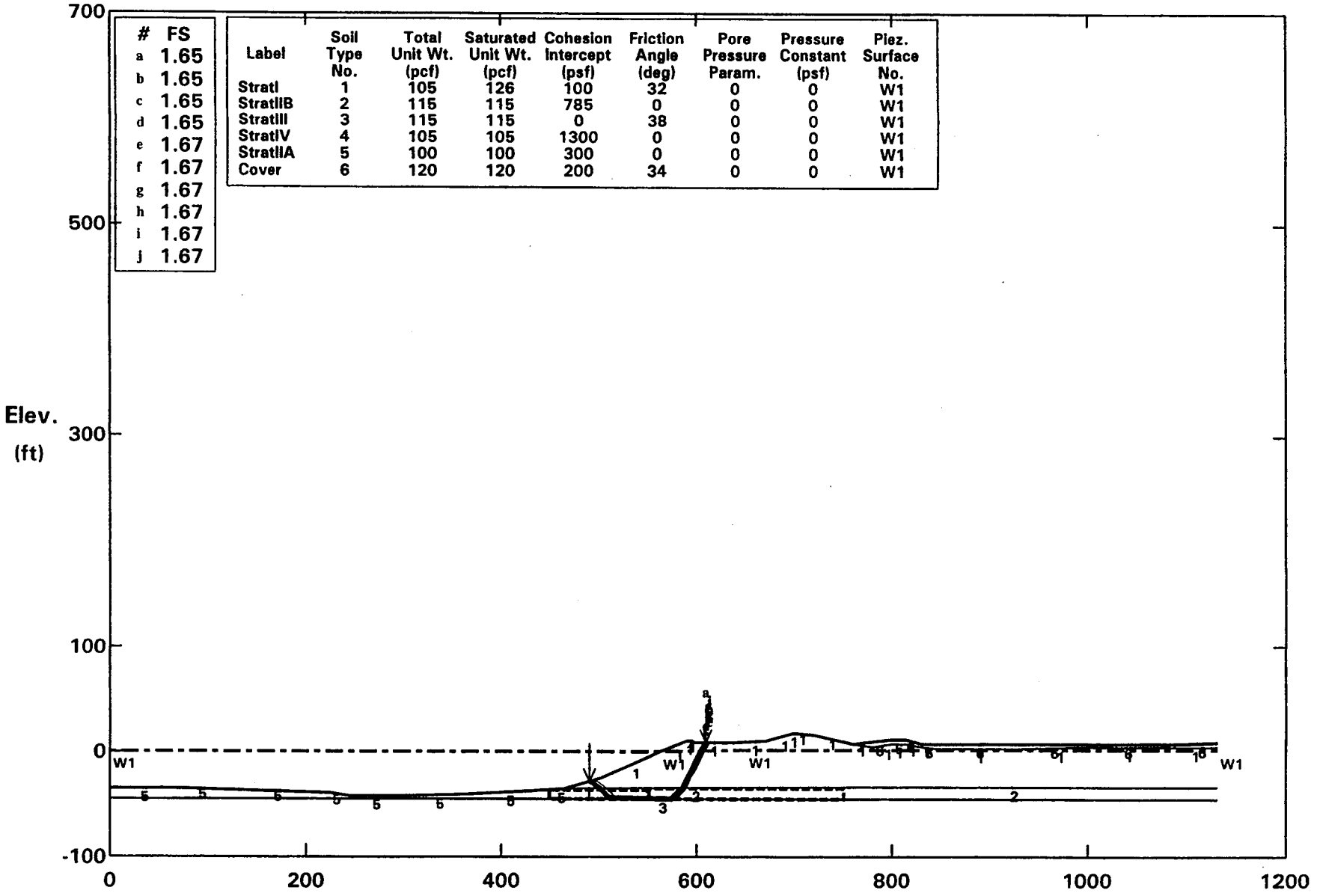
Factors Of Safety Calculated By The Modified Janbu Method

A-NAS IR Site 2, Section F-F', Long-Term Static Janbu Block Search

Ten Most Critical. C:IR2FLTJS.PLT By: MMM 08-02-02 7:36pm

#	FS
a	1.65
b	1.65
c	1.65
d	1.65
e	1.67
f	1.67
g	1.67
h	1.67
i	1.67
j	1.67

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	785	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 1.65 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

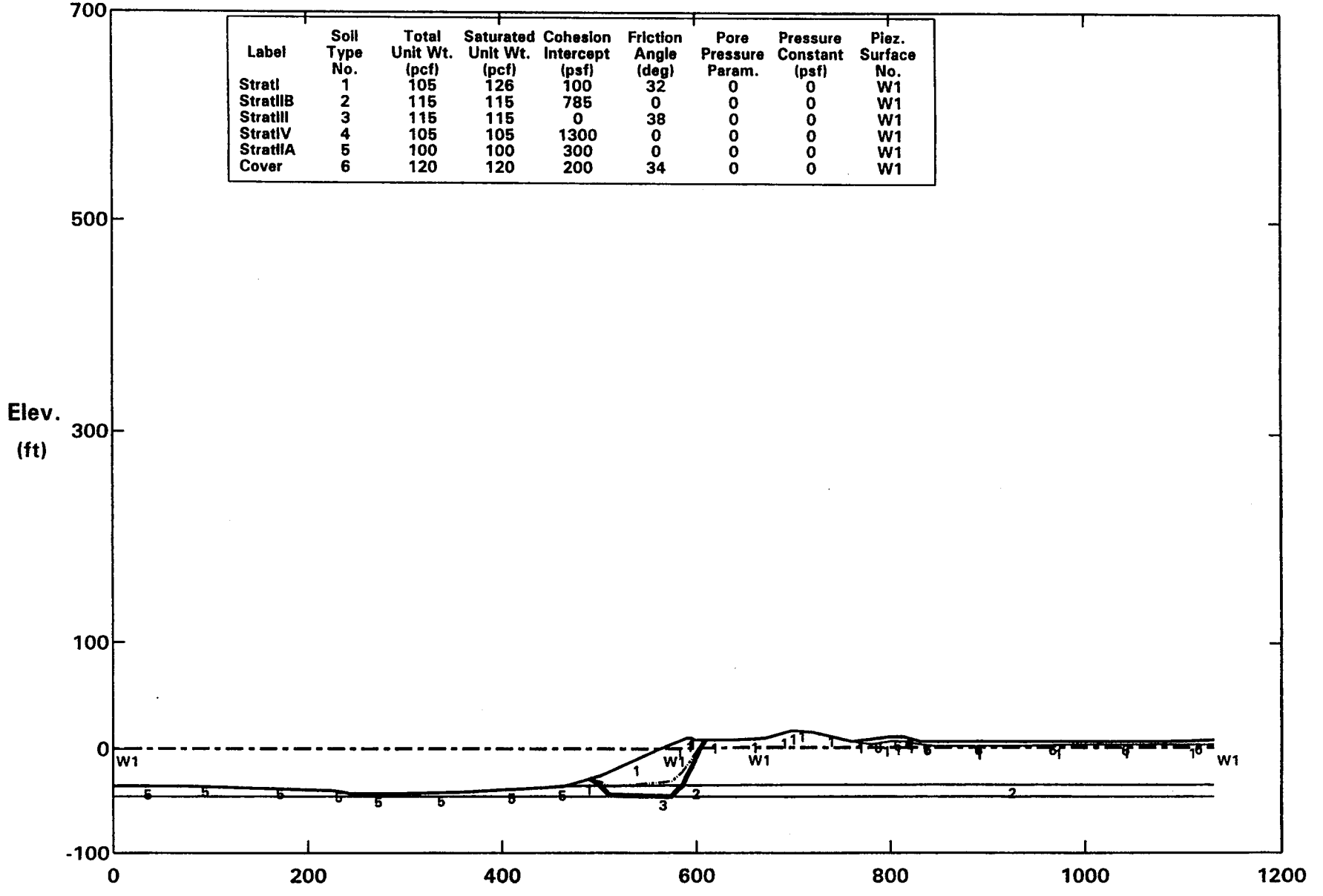
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\F-2\IR2FLTSB.IN  PCSTABL Version 5M /O(0. ,
-100. )
A-NAS IR Site 2, Section F-F', Long-TermSpencer Static Slope Stability (Block)
39 27
0. 65.5 70. 65. 5
70. 65. 125. 64. 5
125. 64. 225. 61. 5
225. 61. 245. 58. 5
245. 58. 300. 58. 5
300. 58. 360. 59. 5
360. 59. 445. 64. 5
445. 64. 465. 65. 5
465. 65. 502. 75. 1
502. 75. 563. 100. 1
563. 100. 590. 110. 1
590. 110. 595. 110. 1
595. 110. 598. 109. 1
598. 109. 638. 109. 1
638. 109. 670. 110. 1
670. 110. 698. 117. 1
698. 117. 700. 117. 1
700. 117. 720. 116. 1
720. 116. 760. 107. 1
760. 107. 800. 111. 6
800. 111. 815. 111. 6
815. 111. 831. 108. 6
831. 108. 846. 107. 6
846. 107. 936. 107. 6
936. 107. 996. 108. 6
996. 108. 1086. 108. 6
1086. 108. 1131. 109. 6
760. 107. 780. 105. 1
780. 105. 800. 107. 1
800. 107. 815. 107. 1
815. 107. 831. 104. 1
831. 104. 846. 103. 1
846. 103. 936. 103. 1
936. 103. 996. 104. 1
996. 104. 1086. 104. 1
1086. 104. 1131. 105. 1
465. 65. 720. 66. 2
720. 66. 1131. 66. 2
0. 55. 1131. 55. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 100. 32. 0. 0. 1
115. 115. 785. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
563. 100.
650. 102.
1131. 102.
SPENCR
```

```
8.
SURFAC #1-IR2FLTJS.OUT
13
489.87 71.72
  2.98 69.99
 01.73 65.14
 03.69 63.18
510.76 56.11
574.65 55.19
581.72 62.27
584.92 65.47
589.77 74.22
594.62 82.96
599.47 91.71
604.32 100.46
609.05 109.
EXECUT
```

A-NAS IR Site 2, Section F-F', Long-Term Spencer Static Slope Stability (Block)

Surface #1-IR2FLTJS.OUT. C:IR2FLTSB.PLT By: MMM 08-02-02 7:37pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	785	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FS = 2.58 Theta = 8.82 X-Axis (ft)

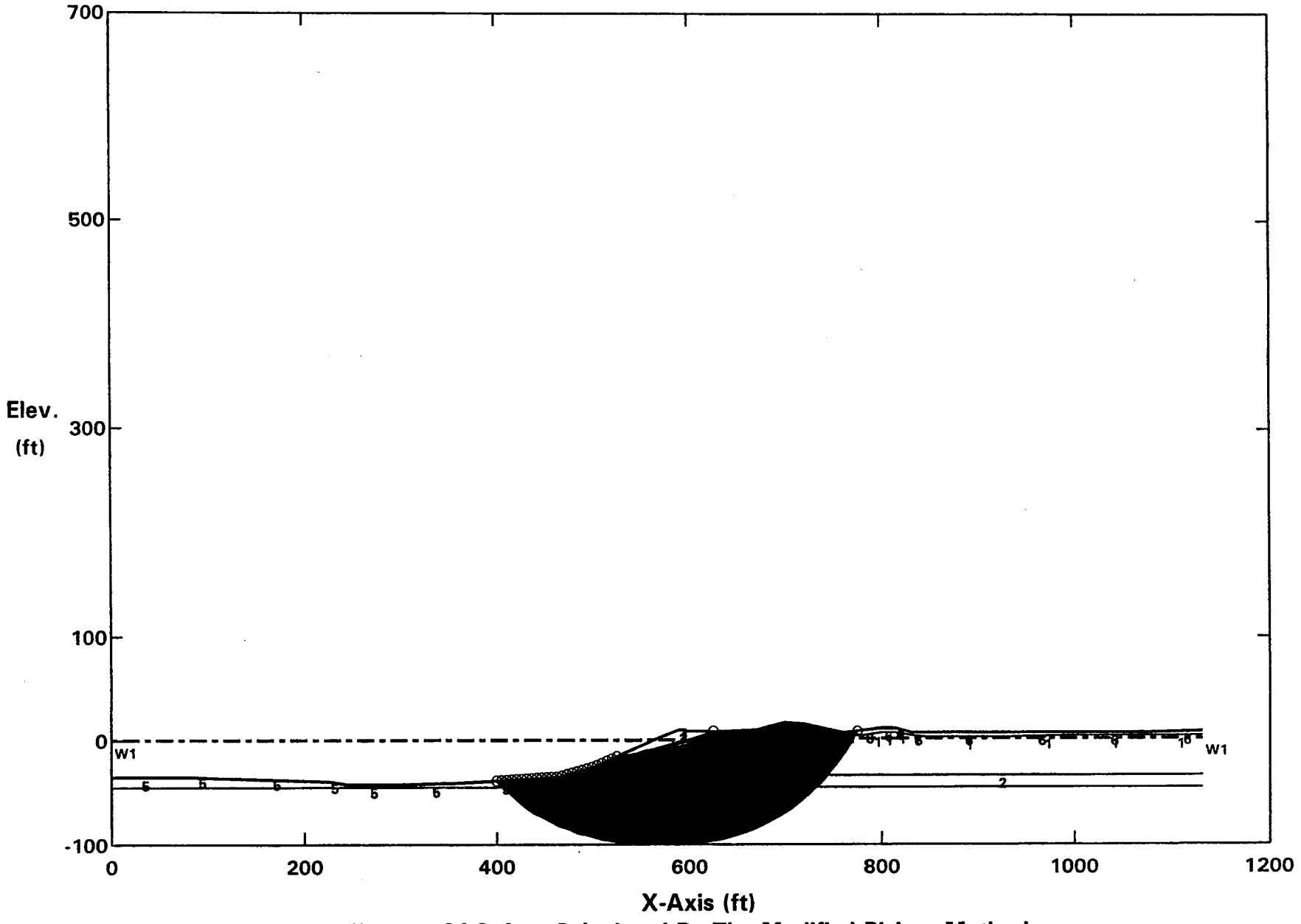
Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\F-2\IR2FBD.IN  PCSTABL Version 5M /O(0. ,-1
00. )
* NAS IR Site 2, Section F-F',          Dynamic Bishop Circular Search, 0.1g
   27
   65.5 70. 65. 5
 0. 65. 125. 64. 5
125. 64. 225. 61. 5
225. 61. 245. 58. 5
245. 58. 300. 58. 5
300. 58. 360. 59. 5
360. 59. 445. 64. 5
445. 64. 465. 65. 5
465. 65. 502. 75. 1
502. 75. 563. 100. 1
563. 100. 590. 110. 1
590. 110. 595. 110. 1
595. 110. 598. 109. 1
598. 109. 638. 109. 1
638. 109. 670. 110. 1
670. 110. 698. 117. 1
698. 117. 700. 117. 1
700. 117. 720. 116. 1
720. 116. 760. 107. 1
760. 107. 800. 111. 6
800. 111. 815. 111. 6
815. 111. 831. 108. 6
831. 108. 846. 107. 6
846. 107. 936. 107. 6
  6. 107. 996. 108. 6
  6. 108. 1086. 108. 6
  36. 108. 1131. 109. 6
760. 107. 780. 105. 1
780. 105. 800. 107. 1
800. 107. 815. 107. 1
815. 107. 831. 104. 1
831. 104. 846. 103. 1
846. 103. 936. 103. 1
936. 103. 996. 104. 1
996. 104. 1086. 104. 1
1086. 104. 1131. 105. 1
465. 65. 720. 66. 2
720. 66. 1131. 66. 2
0. 55. 1131. 55. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 587. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4

   100.
  . 100.
650. 102.
1131. 102.
EQUAKE
```

0.1 0. 0.
CIRCL2-Bishop circular, search
25 100
400. 525. 625. 775. 0. 10. 0. 0.

A-NAS IR Site 2, Section F-F', Dynamic Bishop Circular Search, 0.1g

All surfaces evaluated. C:IR2FBD.PLT By: MMM 08-02-02 7:18pm



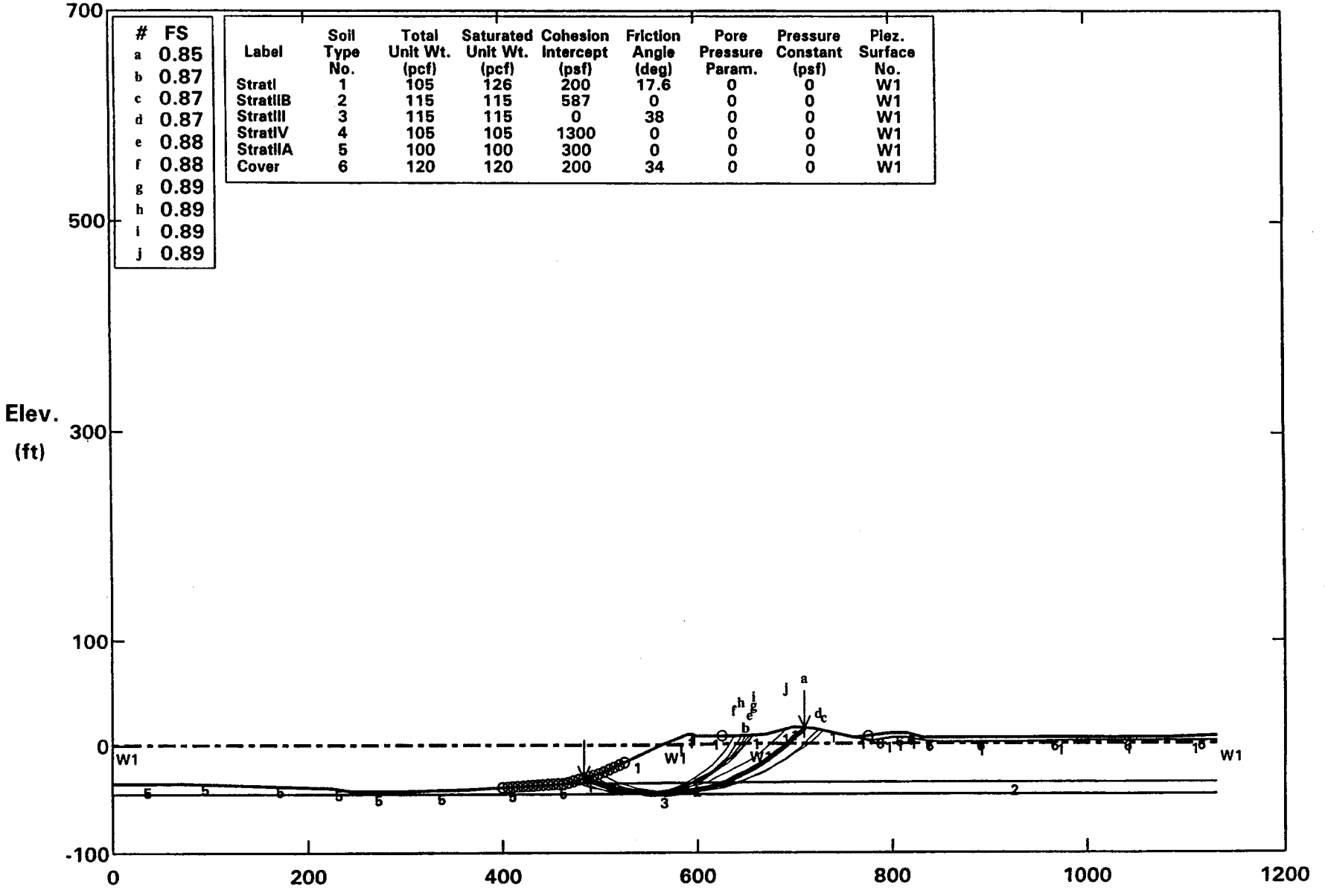
Factors Of Safety Calculated By The Modified Bishop Method

A-NAS IR Site 2, Section F-F', Dynamic Bishop Circular Search, 0.1g

Ten Most Critical. C:IR2FBD.PLT By: MMM 08-02-02 7:18pm

#	FS
a	0.85
b	0.87
c	0.87
d	0.87
e	0.88
f	0.88
g	0.89
h	0.89
i	0.89
j	0.89

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	587	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 0.85 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

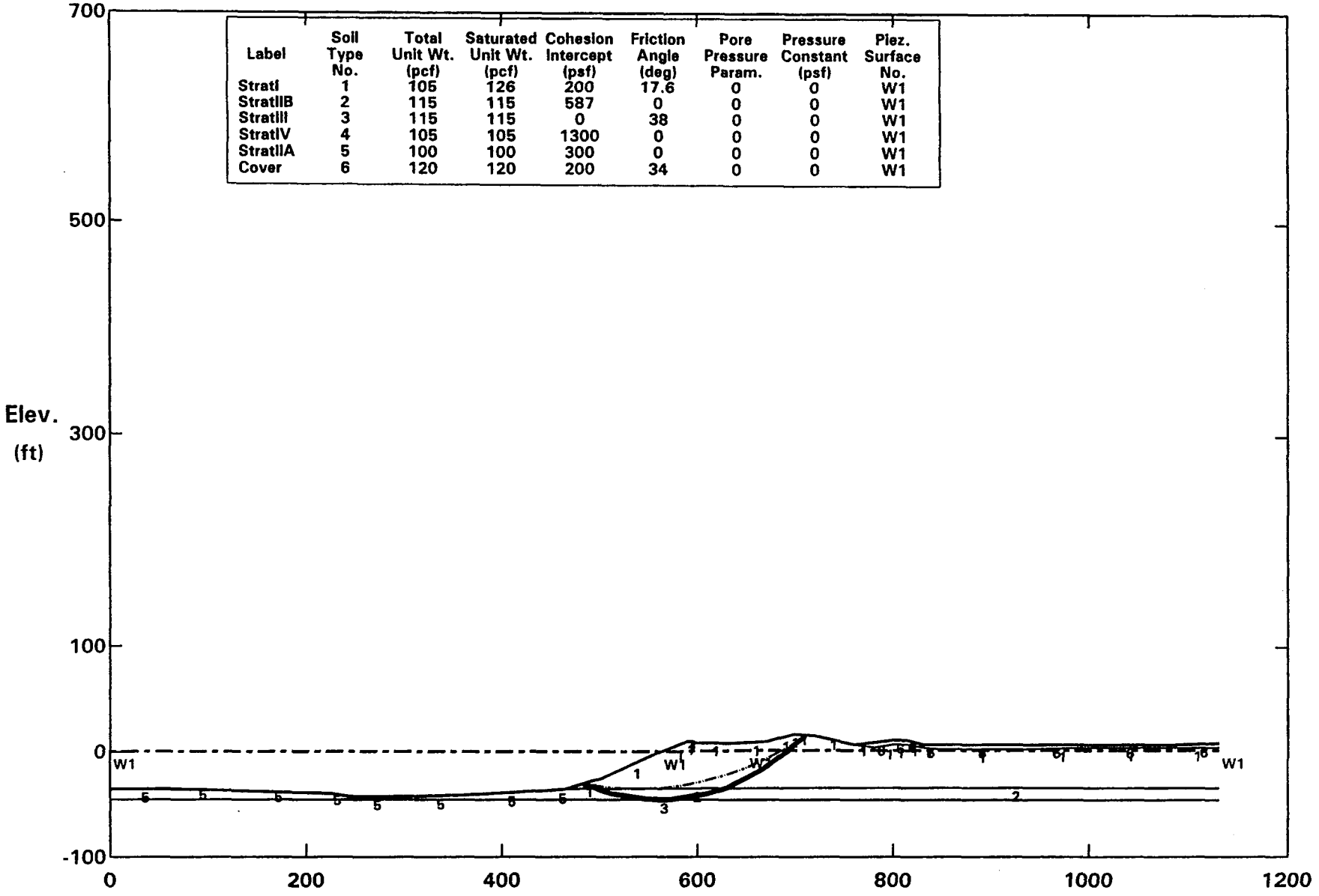
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\F-2\IR2FSSC.IN  PCSTABL Version 5M /O(0. ,-
100. )
* NAS IR Site 2, Section F-F',          Spencer Static Slope Stability (Circ.)
   27
   65.5 70. 65. 5
 70. 65. 125. 64. 5
125. 64. 225. 61. 5
225. 61. 245. 58. 5
245. 58. 300. 58. 5
300. 58. 360. 59. 5
360. 59. 445. 64. 5
445. 64. 465. 65. 5
465. 65. 502. 75. 1
502. 75. 563. 100. 1
563. 100. 590. 110. 1
590. 110. 595. 110. 1
595. 110. 598. 109. 1
598. 109. 638. 109. 1
638. 109. 670. 110. 1
670. 110. 698. 117. 1
698. 117. 700. 117. 1
700. 117. 720. 116. 1
720. 116. 760. 107. 1
760. 107. 800. 111. 6
800. 111. 815. 111. 6
815. 111. 831. 108. 6
831. 108. 846. 107. 6
846. 107. 936. 107. 6
  5. 107. 996. 108. 6
  6. 108. 1086. 108. 6
 86. 108. 1131. 109. 6
760. 107. 780. 105. 1
780. 105. 800. 107. 1
800. 107. 815. 107. 1
815. 107. 831. 104. 1
831. 104. 846. 103. 1
846. 103. 936. 103. 1
936. 103. 996. 104. 1
996. 104. 1086. 104. 1
1086. 104. 1131. 105. 1
465. 65. 720. 66. 2
720. 66. 1131. 66. 2
0. 55. 1131. 55. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 587. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4

   100.
  3. 100.
650. 102.
1131. 102.
SPENCR
```

```
14.
SURBIS #1-IR2FBD.OUT
26
483.33 69.96
492.72 66.52
502.27 63.53
511.94 61.
521.72 58.93
531.59 57.32
541.53 56.18
551.51 55.52
561.51 55.33
571.5 55.61
581.47 56.36
591.4 57.59
601.25 59.29
611.02 61.45
620.67 64.07
630.18 67.14
639.54 70.67
648.72 74.63
657.71 79.02
666.47 83.83
675. 89.06
683.27 94.68
691.27 100.68
698.97 107.06
706.36 113.8
709.1 116.54
EXECUT
```

A-NAS IR Site 2, Section F-F', Spencer Static Slope Stability (Circ.)

Surface #1-IR2FBD.OUT. C:IR2FSSC.PLT By: MMM 08-02-02 7:22pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	587	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FS = 1.55 Theta = 6.28 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\F-2\IR2FSDC.IN  PCSTABL Version 5M /O(0. ,-
100. )
A-NAS IR Site 2, Section F-F', (Circ.)  Spencer Dynamic Slope Stability Ky=.06g
39 27
0. 65.5 70. 65. 5
70. 65. 125. 64. 5
125. 64. 225. 61. 5
225. 61. 245. 58. 5
245. 58. 300. 58. 5
300. 58. 360. 59. 5
360. 59. 445. 64. 5
445. 64. 465. 65. 5
465. 65. 502. 75. 1
502. 75. 563. 100. 1
563. 100. 590. 110. 1
590. 110. 595. 110. 1
595. 110. 598. 109. 1
598. 109. 638. 109. 1
638. 109. 670. 110. 1
670. 110. 698. 117. 1
698. 117. 700. 117. 1
700. 117. 720. 116. 1
720. 116. 760. 107. 1
760. 107. 800. 111. 6
800. 111. 815. 111. 6
815. 111. 831. 108. 6
831. 108. 846. 107. 6
846. 107. 936. 107. 6
936. 107. 996. 108. 6
996. 108. 1086. 108. 6
1086. 108. 1131. 109. 6
760. 107. 780. 105. 1
780. 105. 800. 107. 1
800. 107. 815. 107. 1
815. 107. 831. 104. 1
831. 104. 846. 103. 1
846. 103. 936. 103. 1
936. 103. 996. 104. 1
996. 104. 1086. 104. 1
1086. 104. 1131. 105. 1
465. 65. 720. 66. 2
720. 66. 1131. 66. 2
0. 55. 1131. 55. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 587. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
563. 100.
650. 102.
1131. 102.
EQUAKE
```

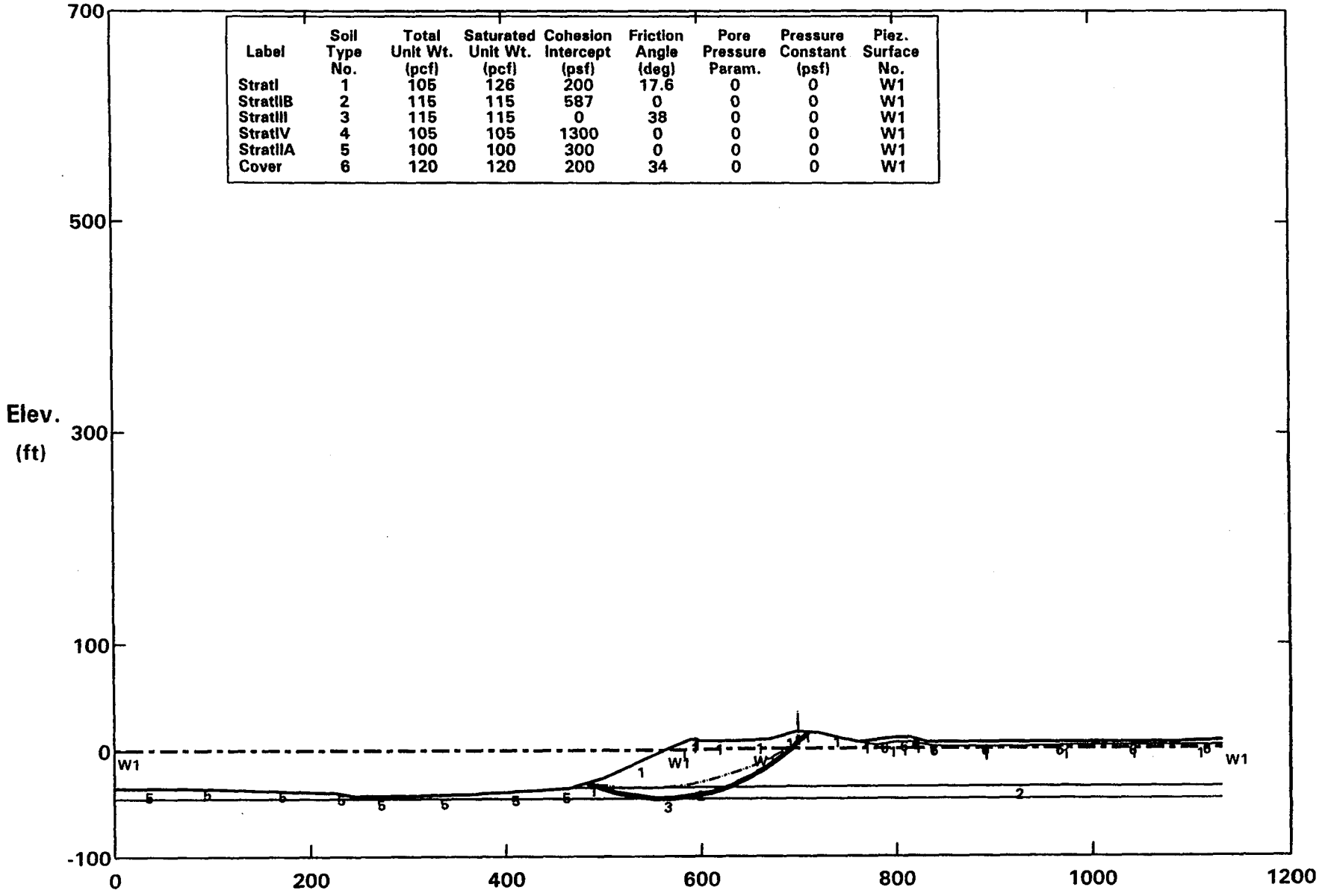
0.062 0. 0.
SPENCR
14.
SURBIS #1-IR2FBD.OUT

43.33 69.96
52.72 66.52
502.27 63.53
511.94 61.
521.72 58.93
531.59 57.32
541.53 56.18
551.51 55.52
561.51 55.33
571.5 55.61
581.47 56.36
591.4 57.59
601.25 59.29
611.02 61.45
620.67 64.07
630.18 67.14
639.54 70.67
648.72 74.63
657.71 79.02
666.47 83.83
675. 89.06
683.27 94.68
691.27 100.68
698.97 107.06
705.36 113.8
709.1 116.54
ECUT

A-NAS IR Site 2, Section F-F', (Circ.) Spencer Dynamic Slope Stability Ky = .06g

Surface #1-IR2FBD.OUT. C:IR2FSDC.PLT By: MMM 08-02-02 7:20pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	587	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FS = 1.00 Theta = 5.25 X-Axis (ft)

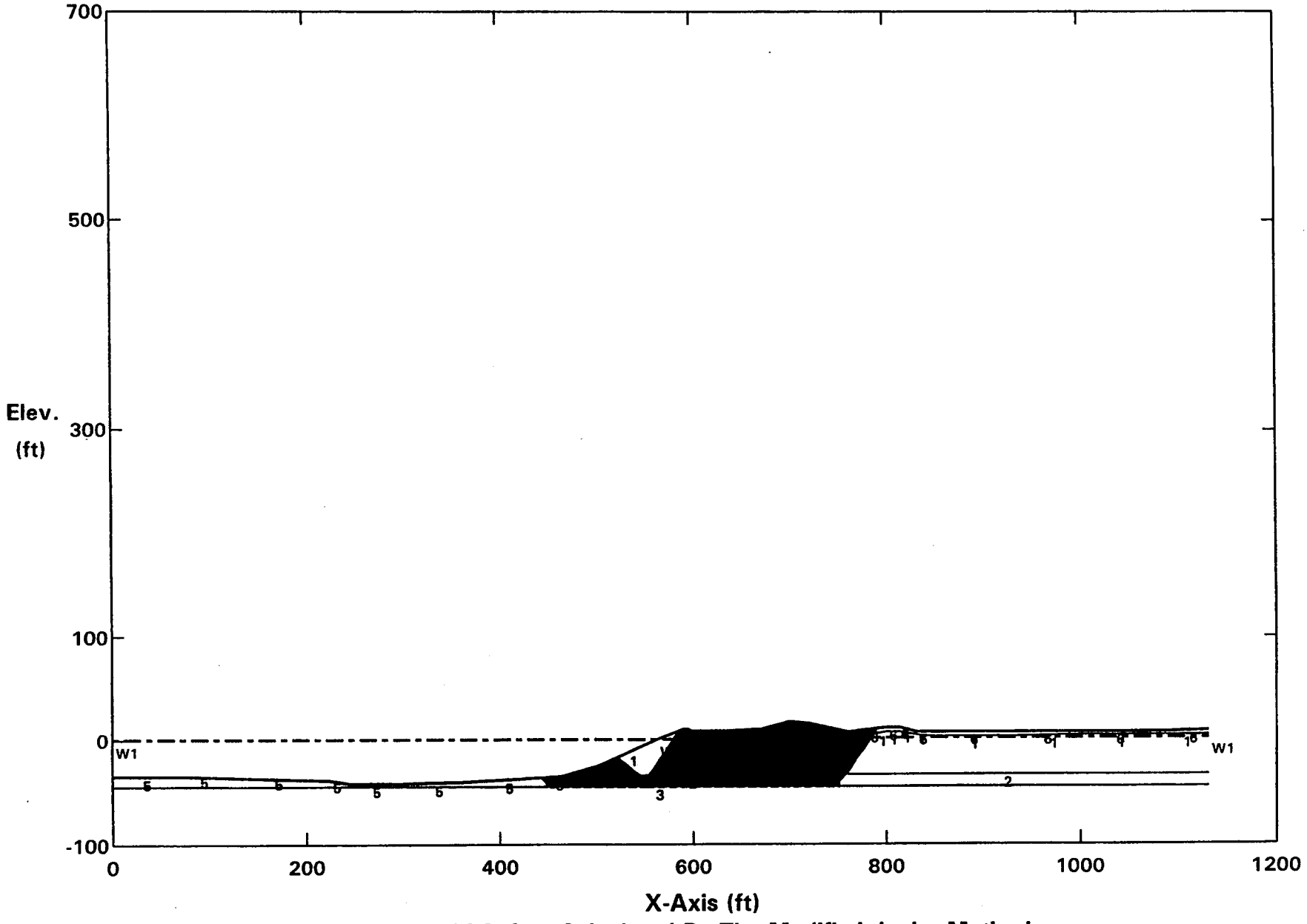
Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\F-2\IR2FJD.IN  PCSTABL Version 5M /O(0. ,-1
00. )
*-NAS IR Site 2, Section F-F',          Dynamic Janbu Block Search, 0.1g
   27
   65.5 70. 65. 5
 0. 65. 125. 64. 5
125. 64. 225. 61. 5
225. 61. 245. 58. 5
245. 58. 300. 58. 5
300. 58. 360. 59. 5
360. 59. 445. 64. 5
445. 64. 465. 65. 5
465. 65. 502. 75. 1
502. 75. 563. 100. 1
563. 100. 590. 110. 1
590. 110. 595. 110. 1
595. 110. 598. 109. 1
598. 109. 638. 109. 1
638. 109. 670. 110. 1
670. 110. 698. 117. 1
698. 117. 700. 117. 1
700. 117. 720. 116. 1
720. 116. 760. 107. 1
760. 107. 800. 111. 6
800. 111. 815. 111. 6
815. 111. 831. 108. 6
831. 108. 846. 107. 6
846. 107. 936. 107. 6
  5. 107. 996. 108. 6
 46. 108. 1086. 108. 6
  86. 108. 1131. 109. 6
760. 107. 780. 105. 1
780. 105. 800. 107. 1
800. 107. 815. 107. 1
815. 107. 831. 104. 1
831. 104. 846. 103. 1
846. 103. 936. 103. 1
936. 103. 996. 104. 1
996. 104. 1086. 104. 1
1086. 104. 1131. 105. 1
465. 65. 720. 66. 2
720. 66. 1131. 66. 2
0. 55. 1131. 55. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 587. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4

   100.
  3. 100.
650. 102.
1131. 102.
EQUAKE
```

```
0.1 0. 0.
BLOCK2-Rankine block, search
0
4000 2 10.
450. 59. 550. 59. 8.
551. 60. 750. 60. 10.
```

A-NAS IR Site 2, Section F-F', Dynamic Janbu Block Search, 0.1g

All surfaces evaluated. C:IR2FJD.PLT By: MMM 08-02-02 7:32pm



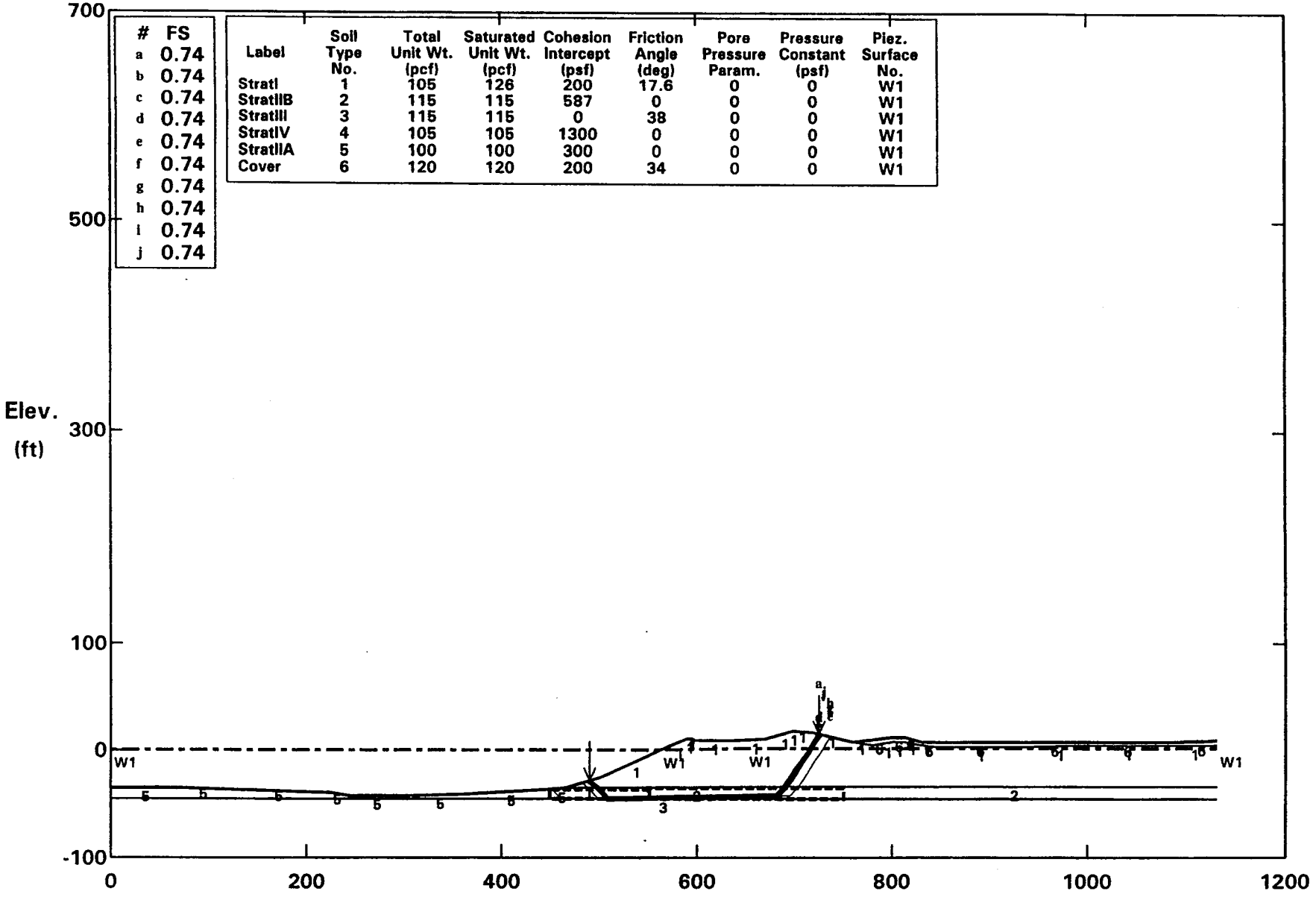
Factors Of Safety Calculated By The Modified Janbu Method

A-NAS IR Site 2, Section F-F', Dynamic Janbu Block Search, 0.1g

Ten Most Critical. C:IR2FJD.PLT By: MMM 08-02-02 7:32pm

#	FS
a	0.74
b	0.74
c	0.74
d	0.74
e	0.74
f	0.74
g	0.74
h	0.74
i	0.74
j	0.74

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	587	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 0.74 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

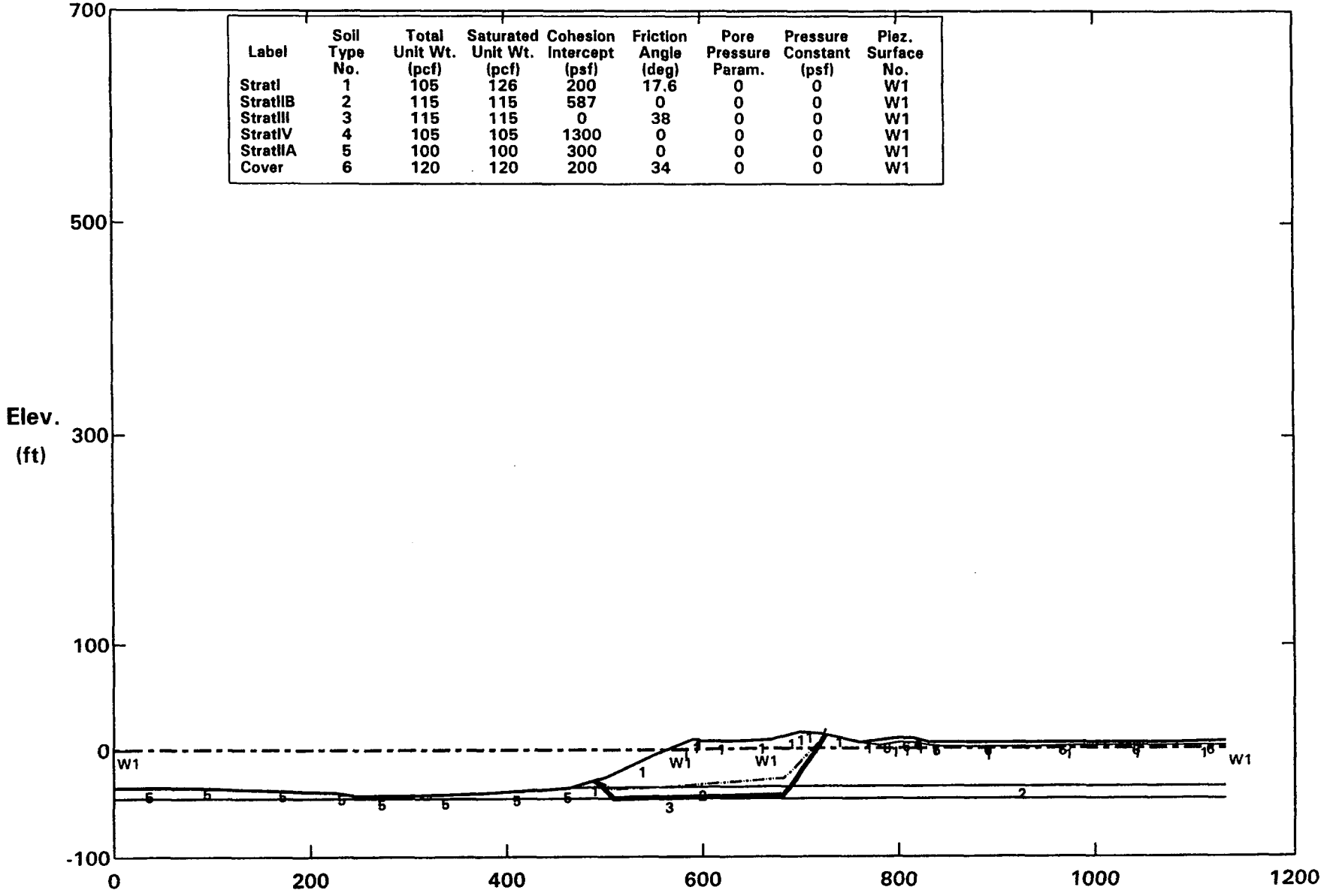
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\F-2\IR2FSSB.IN  PCSTABL Version 5M /O(0. ,-
100. )
A-NAS IR Site 2, Section F-F',          Spencer Static Slope Stability (Block)
   27
   65.5 70. 65. 5
.0. 65. 125. 64. 5
125. 64. 225. 61. 5
225. 61. 245. 58. 5
245. 58. 300. 58. 5
300. 58. 360. 59. 5
360. 59. 445. 64. 5
445. 64. 465. 65. 5
465. 65. 502. 75. 1
502. 75. 563. 100. 1
563. 100. 590. 110. 1
590. 110. 595. 110. 1
595. 110. 598. 109. 1
598. 109. 638. 109. 1
638. 109. 670. 110. 1
670. 110. 698. 117. 1
698. 117. 700. 117. 1
700. 117. 720. 116. 1
720. 116. 760. 107. 1
760. 107. 800. 111. 6
800. 111. 815. 111. 6
815. 111. 831. 108. 6
831. 108. 846. 107. 6
846. 107. 936. 107. 6
  5. 107. 996. 108. 6
  6. 108. 1086. 108. 6
  86. 108. 1131. 109. 6
760. 107. 780. 105. 1
780. 105. 800. 107. 1
800. 107. 815. 107. 1
815. 107. 831. 104. 1
831. 104. 846. 103. 1
846. 103. 936. 103. 1
936. 103. 996. 104. 1
996. 104. 1086. 104. 1
1086. 104. 1131. 105. 1
465. 65. 720. 66. 2
720. 66. 1131. 66. 2
0. 55. 1131. 55. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 587. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4

   100.
  3. 100.
650. 102.
1131. 102.
SPENCR
```

```
8.
SURFAC #1-IR2FJD.OUT
15
489.93 71.74
490.89 71.04
498.96 65.13
501.35 62.75
508.42 55.68
681.92 57.77
688.99 64.84
690.03 65.88
695.94 73.95
701.84 82.02
707.75 90.09
713.66 98.16
719.56 106.23
725.47 114.3
725.76 114.7
EXECUT
```

A-NAS IR Site 2, Section F-F', Spencer Static Slope Stability (Block)

Surface #1-IR2FJD.OUT. C:IR2FSSB.PLT By: MMM 08-02-02 7:35pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	587	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FS = 1.69 Theta = 5.48 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

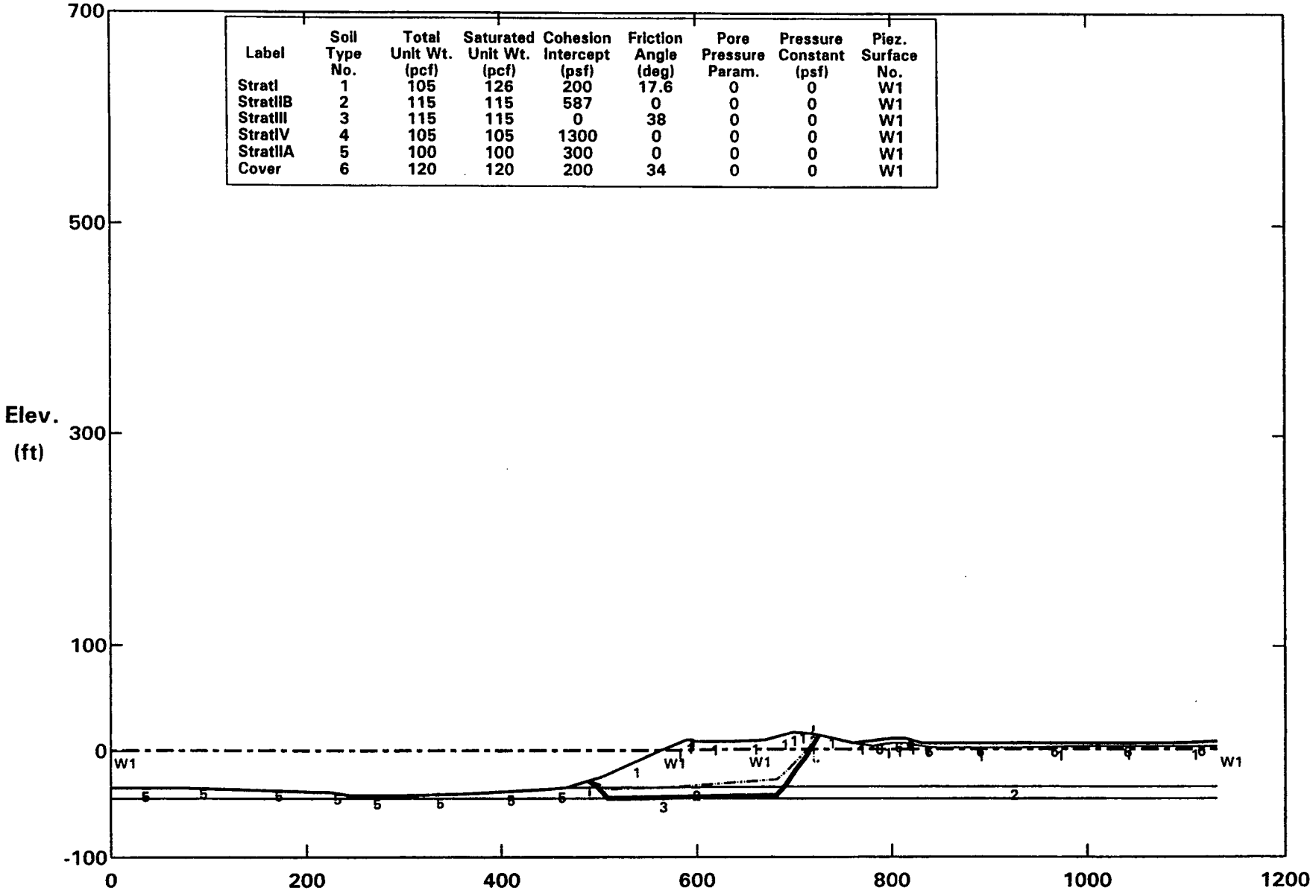
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\F-2\IR2FSDB.IN  PCSTABL Version 5M /O(0. ,-
100. )
A-NAS IR Site 2, Section F-F', (Block)  Spencer Dynamic Slope Stability Ky=.06g
39 27
0. 65.5 70. 65. 5
70. 65. 125. 64. 5
125. 64. 225. 61. 5
225. 61. 245. 58. 5
245. 58. 300. 58. 5
300. 58. 360. 59. 5
360. 59. 445. 64. 5
445. 64. 465. 65. 5
465. 65. 502. 75. 1
502. 75. 563. 100. 1
563. 100. 590. 110. 1
590. 110. 595. 110. 1
595. 110. 598. 109. 1
598. 109. 638. 109. 1
638. 109. 670. 110. 1
670. 110. 698. 117. 1
698. 117. 700. 117. 1
700. 117. 720. 116. 1
720. 116. 760. 107. 1
760. 107. 800. 111. 6
800. 111. 815. 111. 6
815. 111. 831. 108. 6
831. 108. 846. 107. 6
846. 107. 936. 107. 6
936. 107. 996. 108. 6
996. 108. 1086. 108. 6
1086. 108. 1131. 109. 6
760. 107. 780. 105. 1
780. 105. 800. 107. 1
800. 107. 815. 107. 1
815. 107. 831. 104. 1
831. 104. 846. 103. 1
846. 103. 936. 103. 1
936. 103. 996. 104. 1
996. 104. 1086. 104. 1
1086. 104. 1131. 105. 1
465. 65. 720. 66. 2
720. 66. 1131. 66. 2
0. 55. 1131. 55. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 587. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
563. 100.
650. 102.
1131. 102.
EQUAKE
```

```
0.06 0. 0.
SPENCR
8.
SURFAC #1-IR2FJD.OUT

 49.93 71.74
 50.89 71.04
498.96 65.13
501.35 62.75
508.42 55.68
681.92 57.77
688.99 64.84
690.03 65.88
695.94 73.95
701.84 82.02
707.75 90.09
713.66 98.16
719.56 106.23
725.47 114.3
725.76 114.7
EXECUT
```

A-NAS IR Site 2, Section F-F', (Block) Spencer Dynamic Slope Stability Ky = .06g

Surface #1-IR2FJD.OUT. C:IR2FSDB.PLT By: MMM 08-02-02 7:34pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	587	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FS = 1.00 Theta = 4.56 X-Axis (ft)

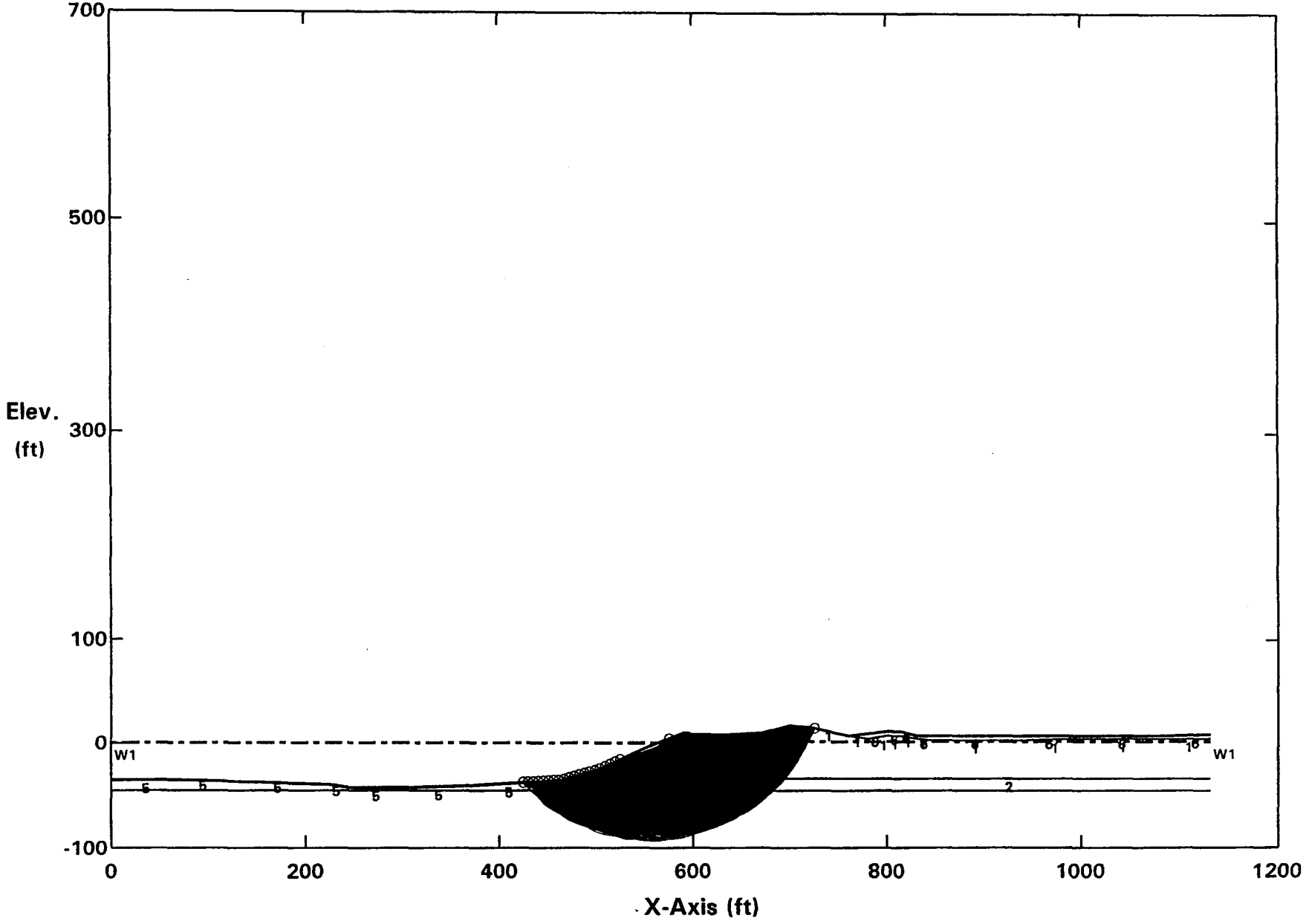
Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\F-2\IR2FEQBS.IN  PCSTABL Version 5M /O(0. ,
-100. )
* NAS IR Site 2, Section F-F', Post-EQ  Static Bishop Circular Search
   27
   65.5 70. 65. 5
 0. 65. 125. 64. 5
125. 64. 225. 61. 5
225. 61. 245. 58. 5
245. 58. 300. 58. 5
300. 58. 360. 59. 5
360. 59. 445. 64. 5
445. 64. 465. 65. 5
465. 65. 502. 75. 1
502. 75. 563. 100. 1
563. 100. 590. 110. 1
590. 110. 595. 110. 1
595. 110. 598. 109. 1
598. 109. 638. 109. 1
638. 109. 670. 110. 1
670. 110. 698. 117. 1
698. 117. 700. 117. 1
700. 117. 720. 116. 1
720. 116. 760. 107. 1
760. 107. 800. 111. 6
800. 111. 815. 111. 6
815. 111. 831. 108. 6
831. 108. 846. 107. 6
846. 107. 936. 107. 6
  5. 107. 996. 108. 6
 ,6. 108. 1086. 108. 6
  86. 108. 1131. 109. 6
760. 107. 780. 105. 1
780. 105. 800. 107. 1
800. 107. 815. 107. 1
815. 107. 831. 104. 1
831. 104. 846. 103. 1
846. 103. 936. 103. 1
936. 103. 996. 104. 1
996. 104. 1086. 104. 1
1086. 104. 1131. 105. 1
465. 65. 720. 66. 2
720. 66. 1131. 66. 2
0. 55. 1131. 55. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4

   100.
  3. 100.
650. 102.
1131. 102.
CIRCL2-Bishop circular, search
```

20 100
425. 525. 575. 725. 0. 10. 0. 0.

A-NAS IR Site 2, Section F-F', Post-EQ Static Bishop Circular Search

All surfaces evaluated. C:IR2FEQBS.PLT By: MMM 08-02-02 7:22pm



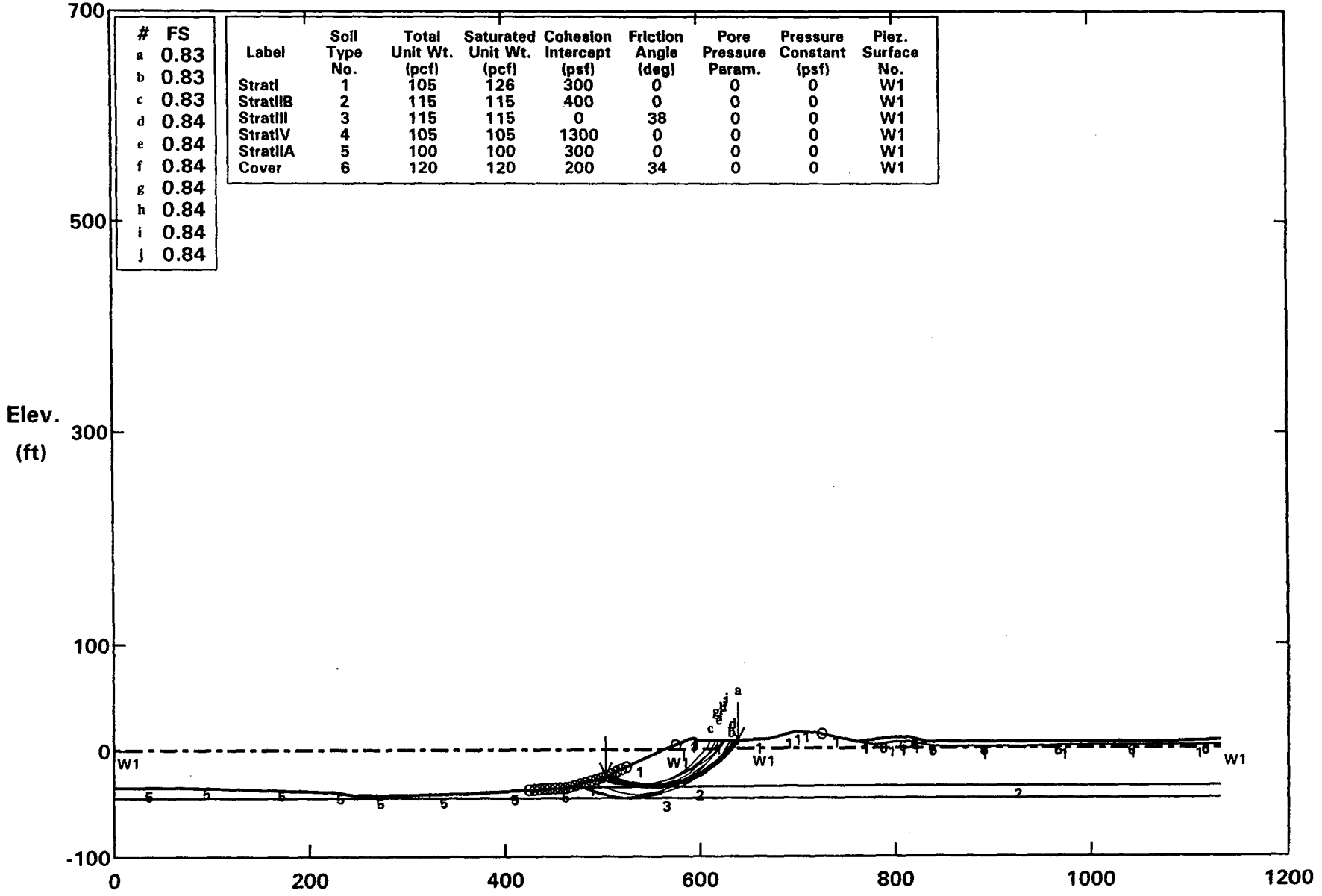
Factors Of Safety Calculated By The Modified Bishop Method

A-NAS IR Site 2, Section F-F', Post-EQ Static Bishop Circular Search

Ten Most Critical. C:IR2FEQBS.PLT By: MMM 08-02-02 7:22pm

#	FS
a	0.83
b	0.83
c	0.83
d	0.84
e	0.84
f	0.84
g	0.84
h	0.84
i	0.84
j	0.84

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 0.83 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

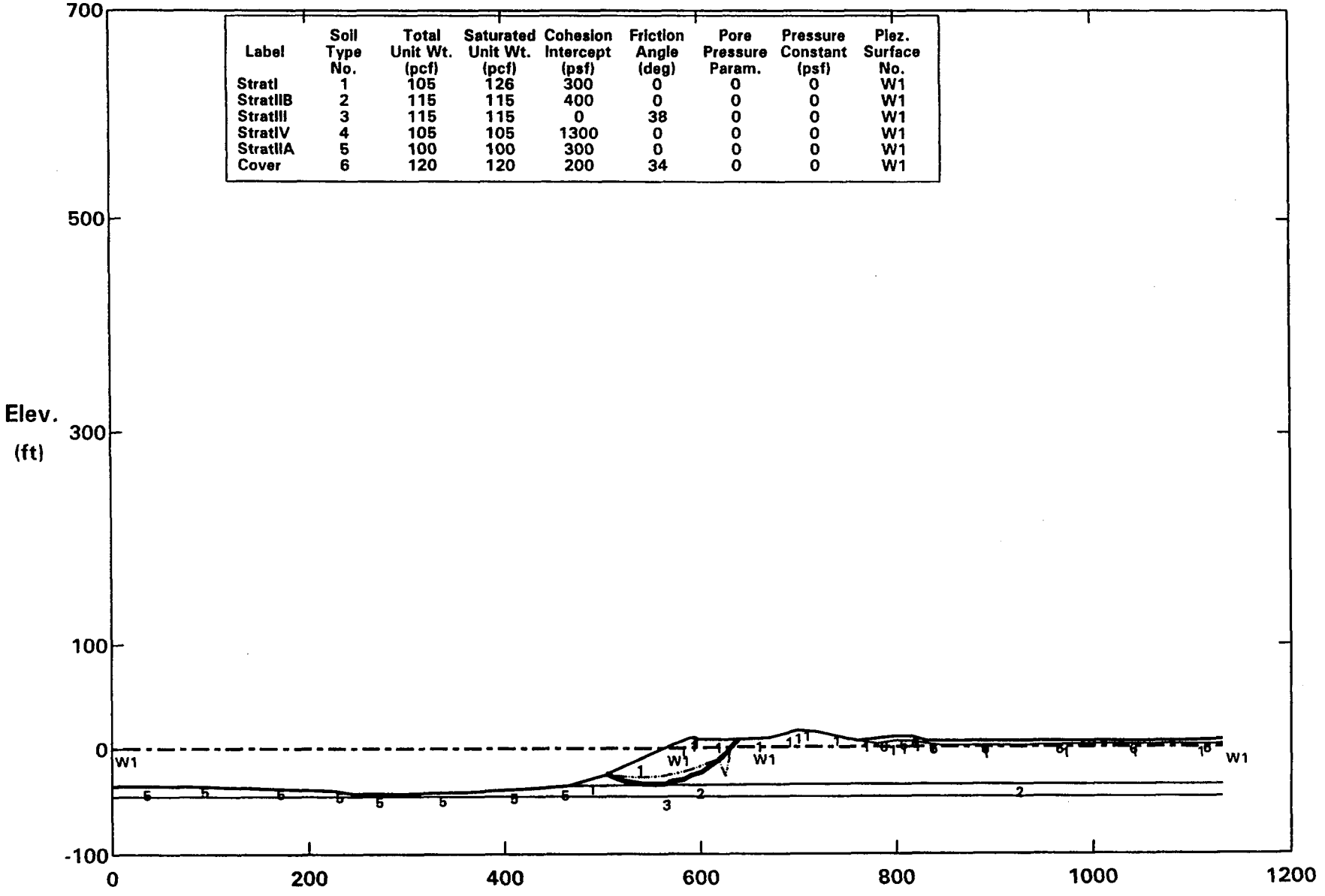
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\F-2\IR2FEQSC.IN  PCSTABL Version 5M /O(0. ,
-100. )
A-NAS IR Site 2, Section F-F', Post-EQ  Spencer Static Slope Stability (Circ.)
   27
   65.5 70. 65. 5
 0. 65. 125. 64. 5
125. 64. 225. 61. 5
225. 61. 245. 58. 5
245. 58. 300. 58. 5
300. 58. 360. 59. 5
360. 59. 445. 64. 5
445. 64. 465. 65. 5
465. 65. 502. 75. 1
502. 75. 563. 100. 1
563. 100. 590. 110. 1
590. 110. 595. 110. 1
595. 110. 598. 109. 1
598. 109. 638. 109. 1
638. 109. 670. 110. 1
670. 110. 698. 117. 1
698. 117. 700. 117. 1
700. 117. 720. 116. 1
720. 116. 760. 107. 1
760. 107. 800. 111. 6
800. 111. 815. 111. 6
815. 111. 831. 108. 6
831. 108. 846. 107. 6
846. 107. 936. 107. 6
  5. 107. 996. 108. 6
 6. 108. 1086. 108. 6
 86. 108. 1131. 109. 6
760. 107. 780. 105. 1
780. 105. 800. 107. 1
800. 107. 815. 107. 1
815. 107. 831. 104. 1
831. 104. 846. 103. 1
846. 103. 936. 103. 1
936. 103. 996. 104. 1
996. 104. 1086. 104. 1
1086. 104. 1131. 105. 1
465. 65. 720. 66. 2
720. 66. 1131. 66. 2
0. 55. 1131. 55. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4

   100.
  3. 100.
650. 102.
1131. 102.
SPENCR
```

8.
SURBIS #1-IR2FEQBS.OUT
16
503.95 75.8
513.27 72.19
522.88 69.42
532.7 67.5
542.64 66.45
552.64 66.28
562.61 66.99
572.49 68.58
582.18 71.02
591.63 74.31
600.75 78.42
609.47 83.31
617.72 88.95
625.45 95.3
632.59 102.3
638.33 109.01
EXECUT

A-NAS IR Site 2, Section F-F', Post-EQ Spencer Static Slope Stability (Circ.)

Surface #1-IR2FEQBS.OUT. C:IR2FEQSC.PLT By: MMM 08-02-02 7:24pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FS = 0.86 Theta = 6.73 X-Axis (ft)

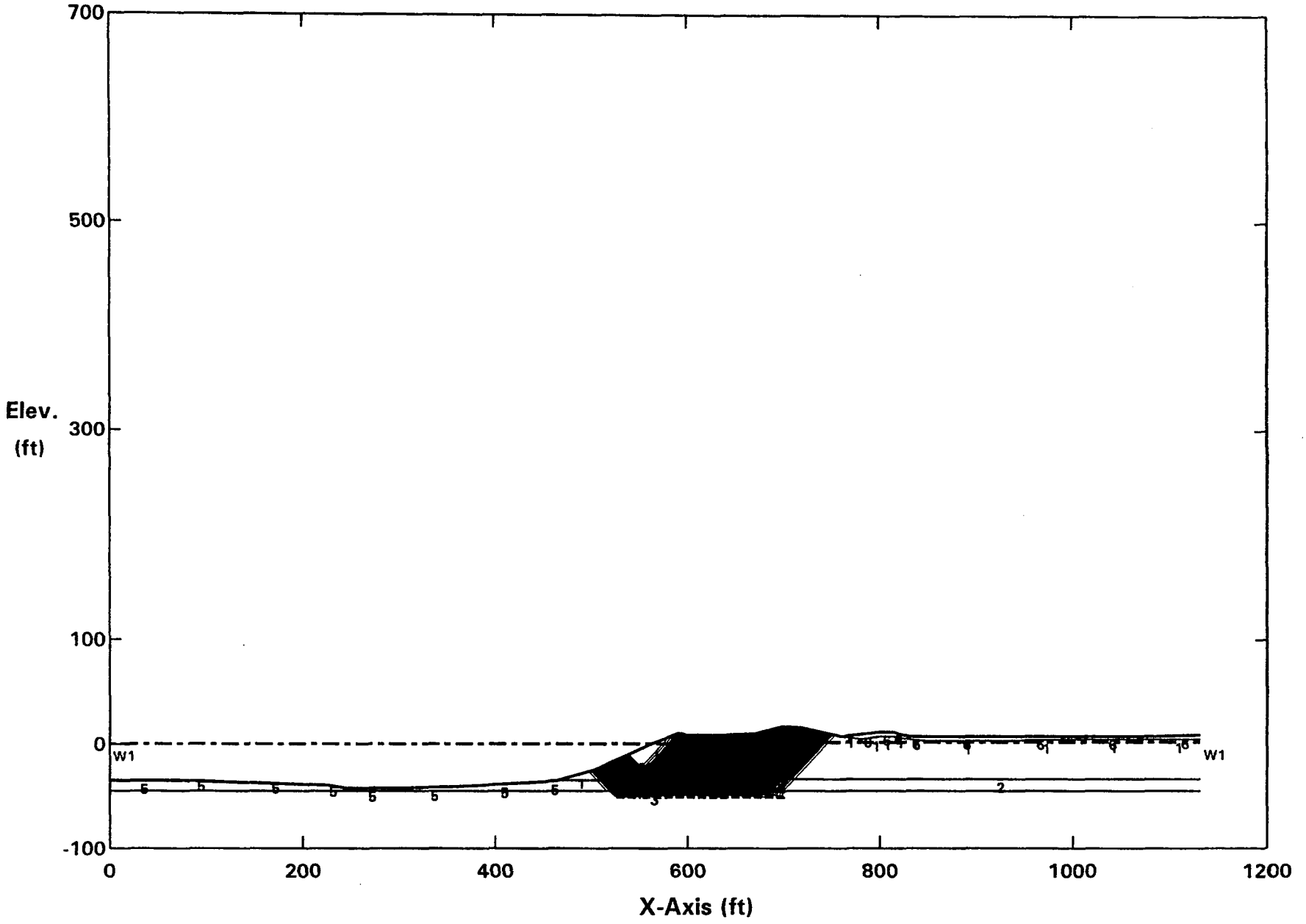
Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\F-2\IR2FEQJS.IN  PCSTABL Version 5M /O(0. ,
-100. )
A-NAS IR Site 2, Section F-F', Post-EQ  Static Janbu Block Search
39 27
0. 65.5 70. 65. 5
70. 65. 125. 64. 5
125. 64. 225. 61. 5
225. 61. 245. 58. 5
245. 58. 300. 58. 5
300. 58. 360. 59. 5
360. 59. 445. 64. 5
445. 64. 465. 65. 5
465. 65. 502. 75. 1
502. 75. 563. 100. 1
563. 100. 590. 110. 1
590. 110. 595. 110. 1
595. 110. 598. 109. 1
598. 109. 638. 109. 1
638. 109. 670. 110. 1
670. 110. 698. 117. 1
698. 117. 700. 117. 1
700. 117. 720. 116. 1
720. 116. 760. 107. 1
760. 107. 800. 111. 6
800. 111. 815. 111. 6
815. 111. 831. 108. 6
831. 108. 846. 107. 6
846. 107. 936. 107. 6
936. 107. 996. 108. 6
996. 108. 1086. 108. 6
1086. 108. 1131. 109. 6
760. 107. 780. 105. 1
780. 105. 800. 107. 1
800. 107. 815. 107. 1
815. 107. 831. 104. 1
831. 104. 846. 103. 1
846. 103. 936. 103. 1
936. 103. 996. 104. 1
996. 104. 1086. 104. 1
1086. 104. 1131. 105. 1
465. 65. 720. 66. 2
720. 66. 1131. 66. 2
0. 55. 1131. 55. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
563. 100.
650. 102.
1131. 102.
BLOCK2-Rankine block, search
```

0
4000 2 10.
525. 65. 550. 65. 30.
551. 65. 700. 65. 30.

A-NAS IR Site 2, Section F-F', Post-EQ Static Janbu Block Search

All surfaces evaluated. C:IR2FEQJS.PLT By: MMM 08-02-02 7:42pm



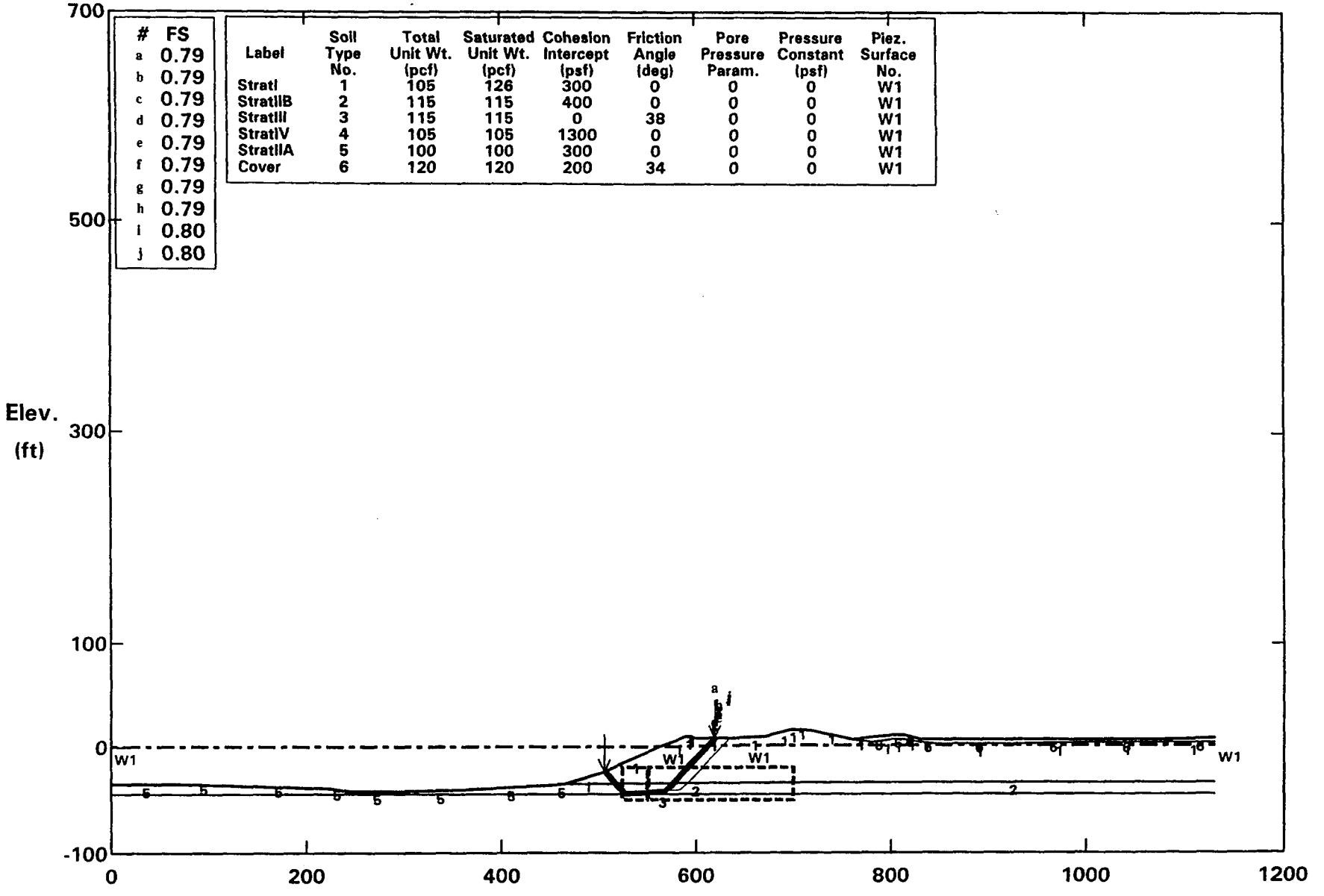
Factors Of Safety Calculated By The Modified Janbu Method

A-NAS IR Site 2, Section F-F', Post-EQ Static Janbu Block Search

Ten Most Critical. C:IR2FEQJS.PLT By: MMM 08-02-02 7:42pm

#	FS
a	0.79
b	0.79
c	0.79
d	0.79
e	0.79
f	0.79
g	0.79
h	0.79
i	0.80
j	0.80

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 0.79 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

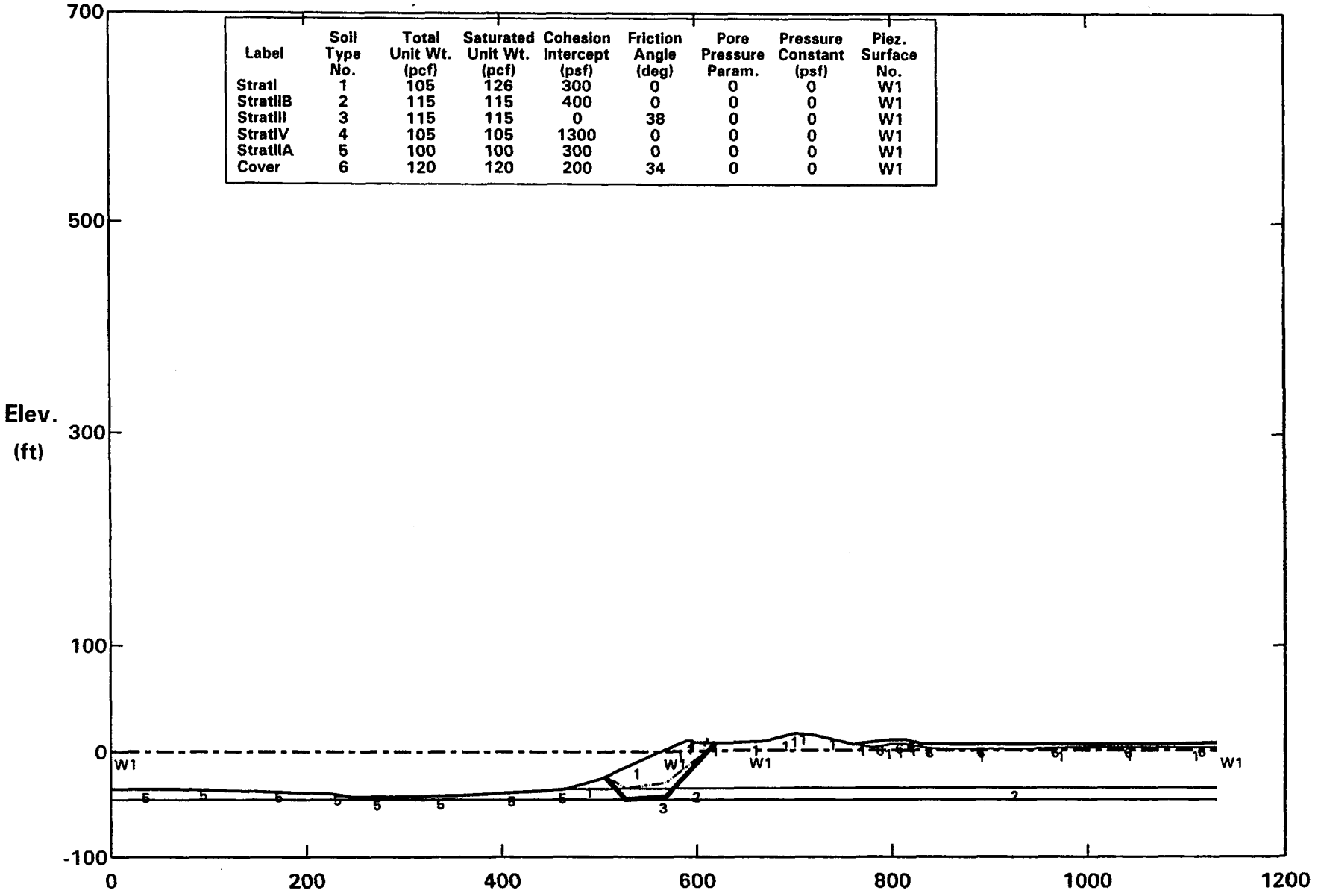
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\F-2\IR2FEQSB.IN  PCSTABL Version 5M /O(0. ,
-100. )
A-NAS IR Site 2, Section F-F', Post-EQ  Spencer Static Slope Stability (Block'
39 27
0. 65.5 70. 65. 5
70. 65. 125. 64. 5
125. 64. 225. 61. 5
225. 61. 245. 58. 5
245. 58. 300. 58. 5
300. 58. 360. 59. 5
360. 59. 445. 64. 5
445. 64. 465. 65. 5
465. 65. 502. 75. 1
502. 75. 563. 100. 1
563. 100. 590. 110. 1
590. 110. 595. 110. 1
595. 110. 598. 109. 1
598. 109. 638. 109. 1
638. 109. 670. 110. 1
670. 110. 698. 117. 1
698. 117. 700. 117. 1
700. 117. 720. 116. 1
720. 116. 760. 107. 1
760. 107. 800. 111. 6
800. 111. 815. 111. 6
815. 111. 831. 108. 6
831. 108. 846. 107. 6
846. 107. 936. 107. 6
936. 107. 996. 108. 6
996. 108. 1086. 108. 6
1086. 108. 1131. 109. 6
760. 107. 780. 105. 1
780. 105. 800. 107. 1
800. 107. 815. 107. 1
815. 107. 831. 104. 1
831. 104. 846. 103. 1
846. 103. 936. 103. 1
936. 103. 996. 104. 1
996. 104. 1086. 104. 1
1086. 104. 1131. 105. 1
465. 65. 720. 66. 2
720. 66. 1131. 66. 2
0. 55. 1131. 55. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
563. 100.
650. 102.
1131. 102.
SPENCR
```

```
8.
SURFAC #1-IR2FEQJS.OUT
15
505.77 76.55
  0.05 72.28
 17.12 65.2
 20.08 62.24
527.15 55.17
567.83 57.67
574.9 64.75
575.59 65.43
582.66 72.5
589.74 79.58
596.81 86.65
603.88 93.72
610.95 100.79
618.02 107.86
619.16 109.
EXECUT
```

A-NAS IR Site 2, Section F-F', Post-EQ Spencer Static Slope Stability (Block)

Surface #1-IR2FEQJS.OUT. C:IR2FEQSB.PLT By: MMM 08-02-02 7:43pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FS = 1.30 Theta = 8.53 X-Axis (ft)

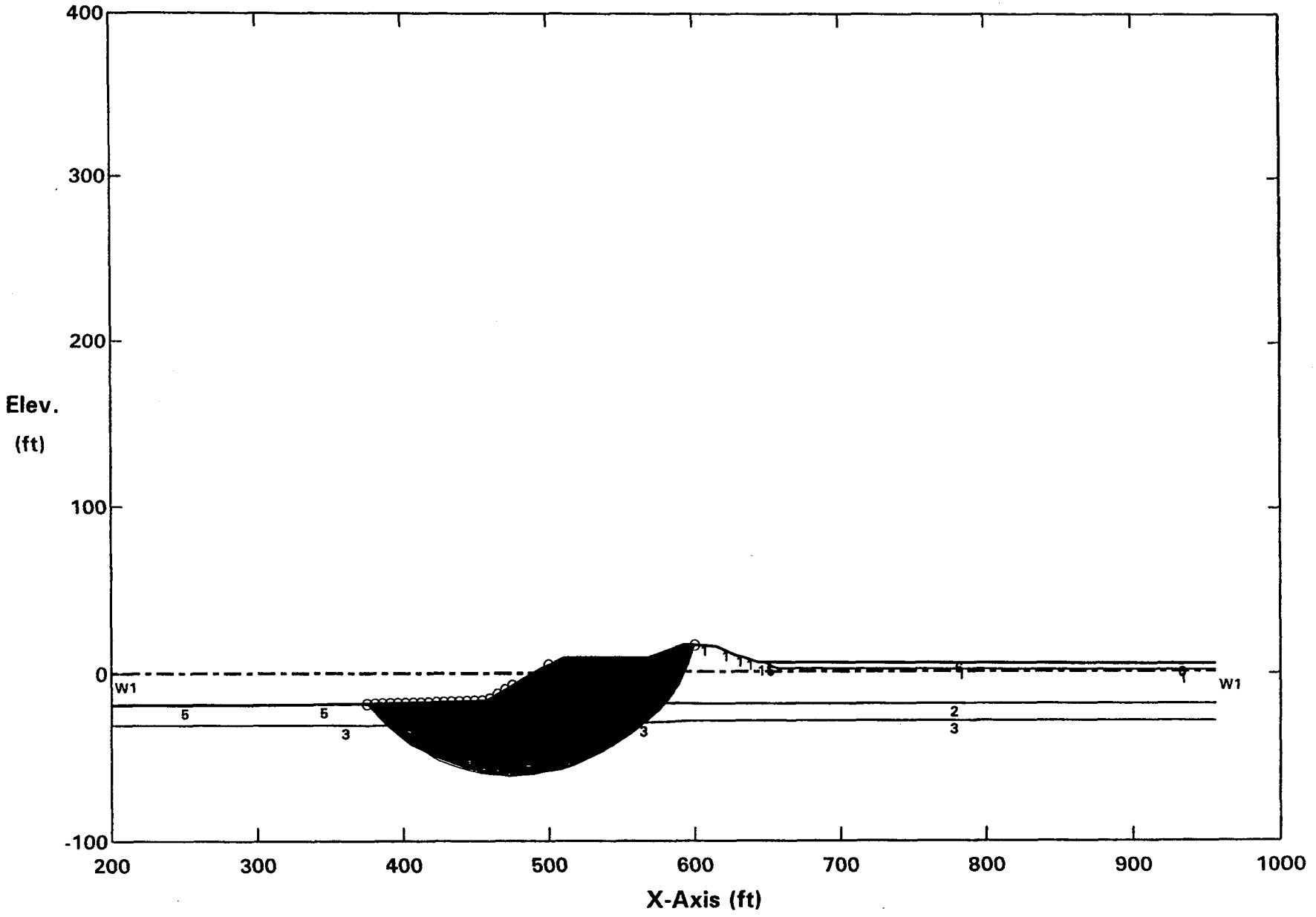
Factors Of Safety Calculated By Spencer`s Method of Slices

SECTION G-G'

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\G-2\IR2GLTBS.IN  PCSTABL Version 5M /O(200.
 ,-100. )
- NAS IR Site 2, Section G-G', Long-TermStatic Bishop Circular Search
   17
   81. 100. 81. 5
100. 81. 181. 82. 5
181. 82. 227. 83. 5
227. 83. 257. 84. 5
257. 84. 295. 103. 1
295. 103. 311. 110. 1
311. 110. 369. 110. 1
369. 110. 392. 117. 1
392. 117. 400. 117. 1
400. 117. 415. 116. 1
415. 116. 429. 111. 1
429. 111. 434. 110. 1
434. 110. 443. 107. 1
443. 107. 447.3 107. 1
447.3 107. 456. 107. 6
456. 107. 711. 106. 6
711. 106. 756. 106. 6
447.3 107. 456. 103. 1
456. 103. 711. 102. 1
711. 102. 756. 102. 1
257. 84. 400. 82. 2
400. 82. 756. 82. 2
0. 69. 320. 69. 3
320. 69. 400. 72. 3
  ). 72. 756. 72. 3
  IL  StratI  StratIIBStratIIIStratIV StratIIACover

105. 126. 100. 32. 0. 0. 1
115. 115. 625. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
289. 100.
350. 101.
756. 101.
CIRCL2-Bishop circular, search
20 100
175. 275. 300. 400. 0. 10. 0. 0.
```

A-NAS IR Site 2, Section G-G', Long-Term Static Bishop Circular Search

All surfaces evaluated. C:IR2GLTBS.PLT By: MMM 07-31-02 11:22am



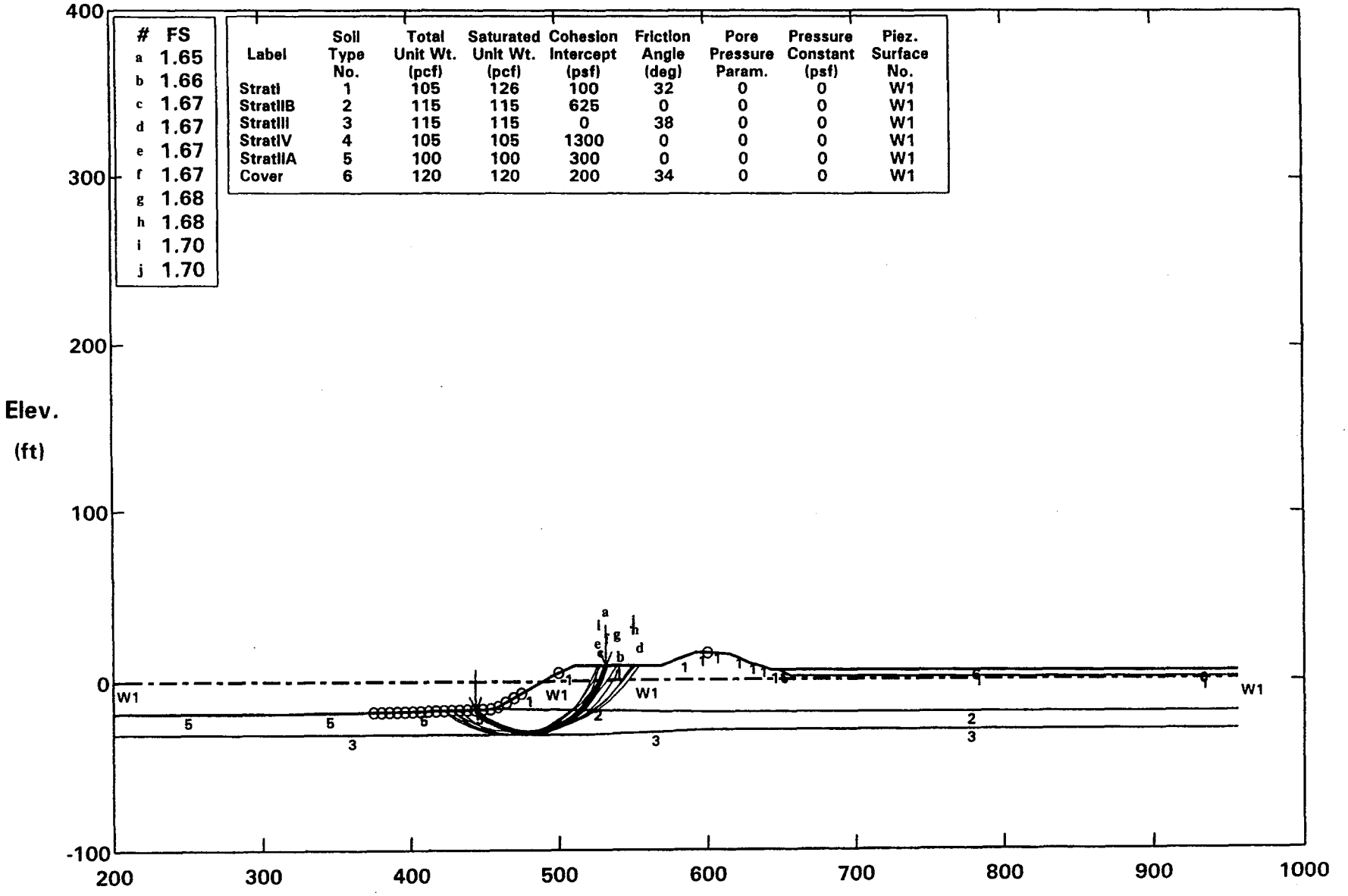
Factors Of Safety Calculated By The Modified Bishop Method

A-NAS IR Site 2, Section G-G', Long-Term Static Bishop Circular Search

Ten Most Critical. C:IR2GLTBS.PLT By: MMM 07-31-02 11:22am

#	FS
a	1.65
b	1.66
c	1.67
d	1.67
e	1.67
f	1.67
g	1.68
h	1.68
i	1.70
j	1.70

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	625	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 1.65 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

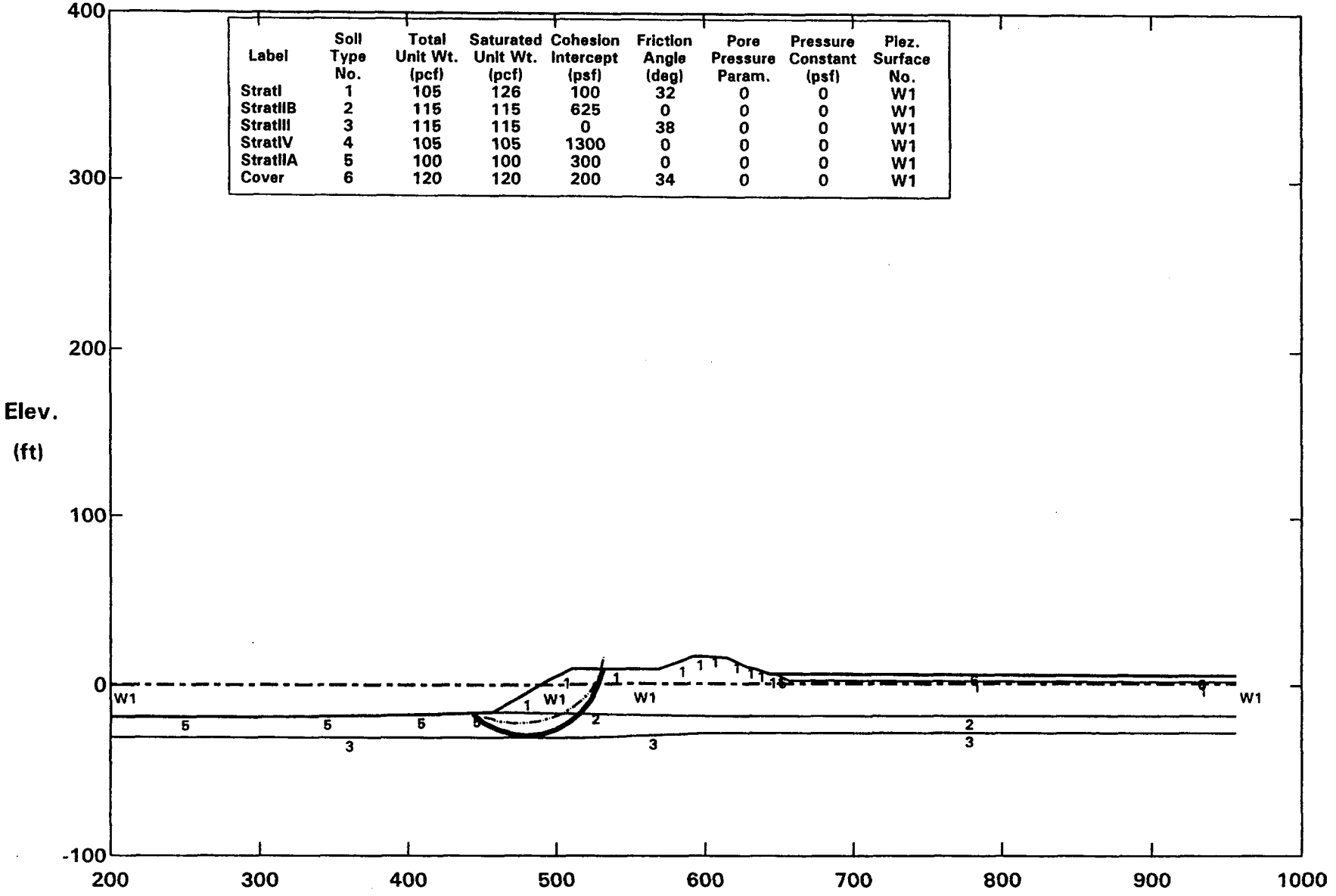
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\G-2\IR2GLTSC.IN  PCSTABL Version 5M /O(200.
 ,-100. )
A-NAS IR Site 2, Section G-G', Long-TermSpencer Static Slope Stability (Circ.'
25 17
0. 81. 100. 81. 5
100. 81. 181. 82. 5
181. 82. 227. 83. 5
227. 83. 257. 84. 5
257. 84. 295. 103. 1
295. 103. 311. 110. 1
311. 110. 369. 110. 1
369. 110. 392. 117. 1
392. 117. 400. 117. 1
400. 117. 415. 116. 1
415. 116. 429. 111. 1
429. 111. 434. 110. 1
434. 110. 443. 107. 1
443. 107. 447.3 107. 1
447.3 107. 456. 107. 6
456. 107. 711. 106. 6
711. 106. 756. 106. 6
447.3 107. 456. 103. 1
456. 103. 711. 102. 1
711. 102. 756. 102. 1
257. 84. 400. 82. 2
400. 82. 756. 82. 2
0. 69. 320. 69. 3
320. 69. 400. 72. 3
400. 72. 756. 72. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 100. 32. 0. 0. 1
115. 115. 625. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
289. 100.
350. 101.
756. 101.
SPENCR
10.
SURBIS #1-IR2GLTBS.OUT
13
243.42 83.55
251.48 77.63
260.49 73.29
270.15 70.68
280.11 69.88
290.06 70.92
299.65 73.76
308.55 78.31
316.47 84.41
323.14 91.87
328.33 100.41
```

```
331.86 109.77
331.91 110.
EXECUT
```

A-NAS IR Site 2, Section G-G', Long-Term Spencer Static Slope Stability (Circ.)

Surface #1-IR2GLTBS.OUT. C:IR2GLTSC.PLT By: MMM 07-31-02 11:23am

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	625	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



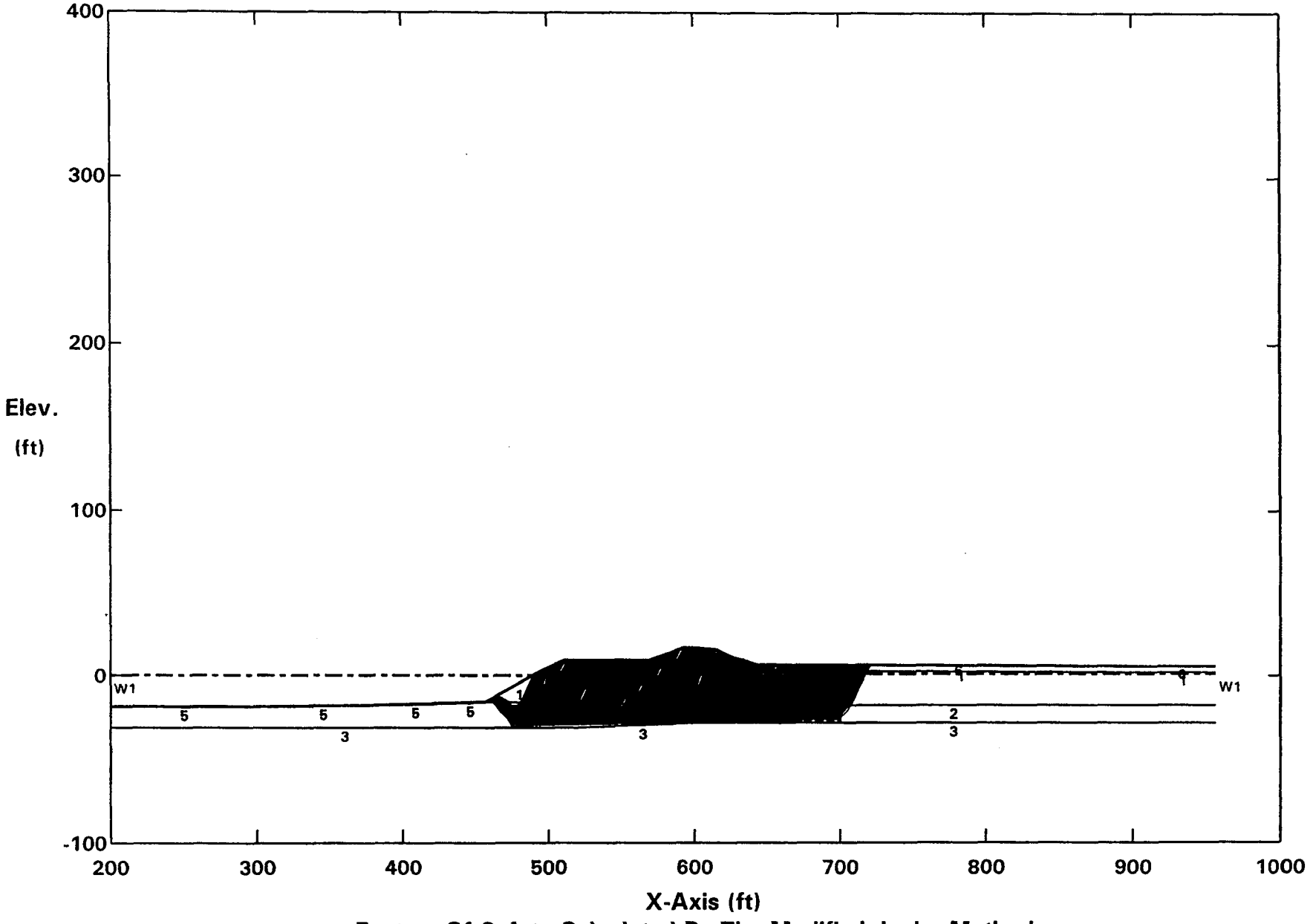
PCSTABL5M FS = 1.72 Theta = 9.01 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\G-2\IR2GLTJS.IN  PCSTABL Version 5M /O(200.
 ,-100. )
- NAS IR Site 2, Section G-G', Long-TermStatic Janbu Block Search
   17
   81. 100. 81. 5
100. 81. 181. 82. 5
181. 82. 227. 83. 5
227. 83. 257. 84. 5
257. 84. 295. 103. 1
295. 103. 311. 110. 1
311. 110. 369. 110. 1
369. 110. 392. 117. 1
392. 117. 400. 117. 1
400. 117. 415. 116. 1
415. 116. 429. 111. 1
429. 111. 434. 110. 1
434. 110. 443. 107. 1
443. 107. 447.3 107. 1
447.3 107. 456. 107. 6
456. 107. 711. 106. 6
711. 106. 756. 106. 6
447.3 107. 456. 103. 1
456. 103. 711. 102. 1
711. 102. 756. 102. 1
257. 84. 400. 82. 2
400. 82. 756. 82. 2
0. 69. 320. 69. 3
320. 69. 400. 72. 3
). 72. 756. 72. 3
  IL  StratI  StratIIBStratIIIStratIV StratIIACover
105. 126. 100. 32. 0. 0. 1
115. 115. 625. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
289. 100.
350. 101.
756. 101.
BLOCK2-Rankine block, search
0
2500 2 6.
275. 75. 275. 77. 10.
276. 77. 500. 77. 8.
```

A-NAS IR Site 2, Section G-G', Long-Term Static Janbu Block Search

All surfaces evaluated. C:IR2GLTJS.PLT By: MMM 07-31-02 11:23am



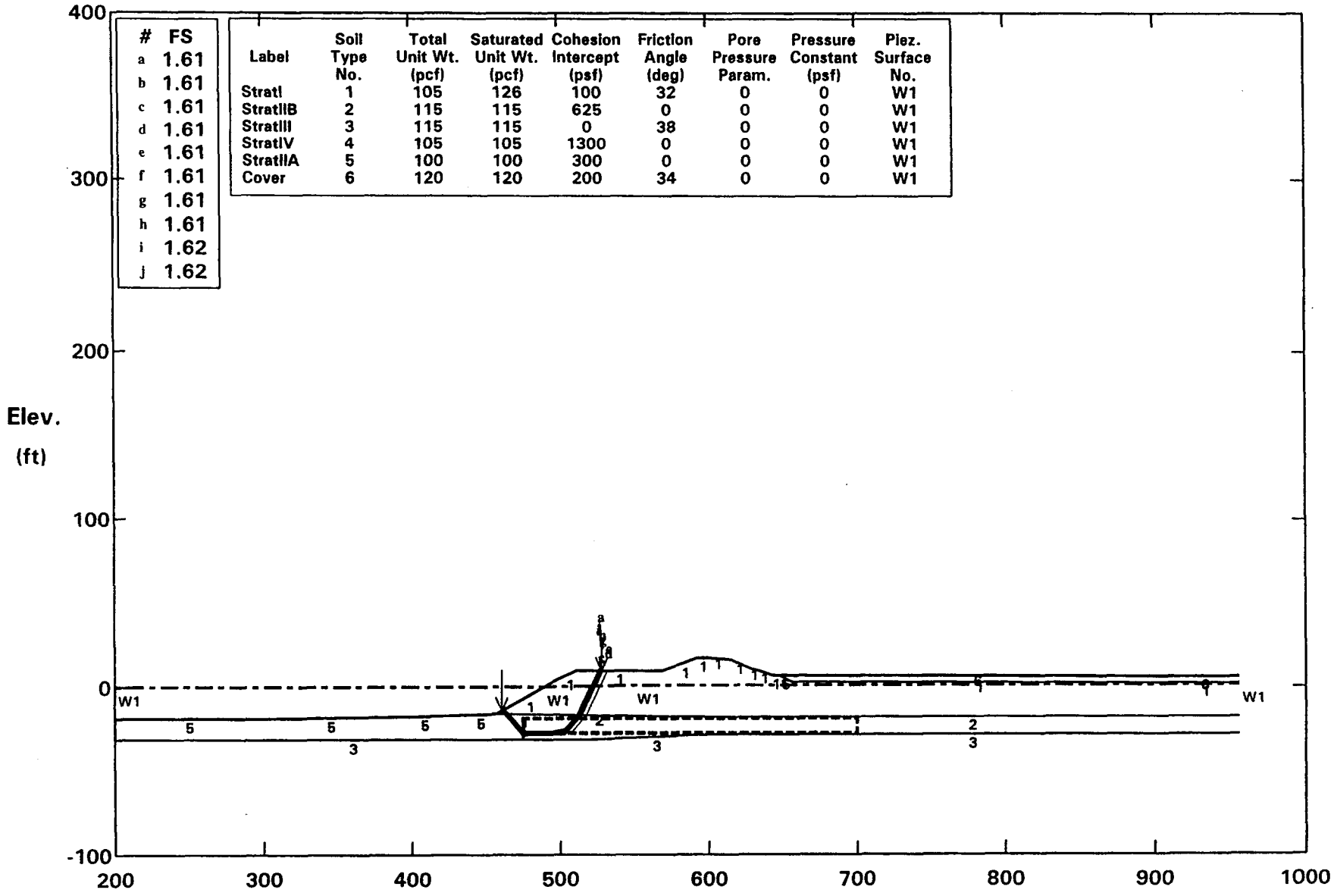
Factors Of Safety Calculated By The Modified Janbu Method

A-NAS IR Site 2, Section G-G', Long-Term Static Janbu Block Search

Ten Most Critical. C:IR2GLTJS.PLT By: MMM 07-31-02 11:23am

#	FS
a	1.61
b	1.61
c	1.61
d	1.61
e	1.61
f	1.61
g	1.61
h	1.61
i	1.62
j	1.62

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	625	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 1.61 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

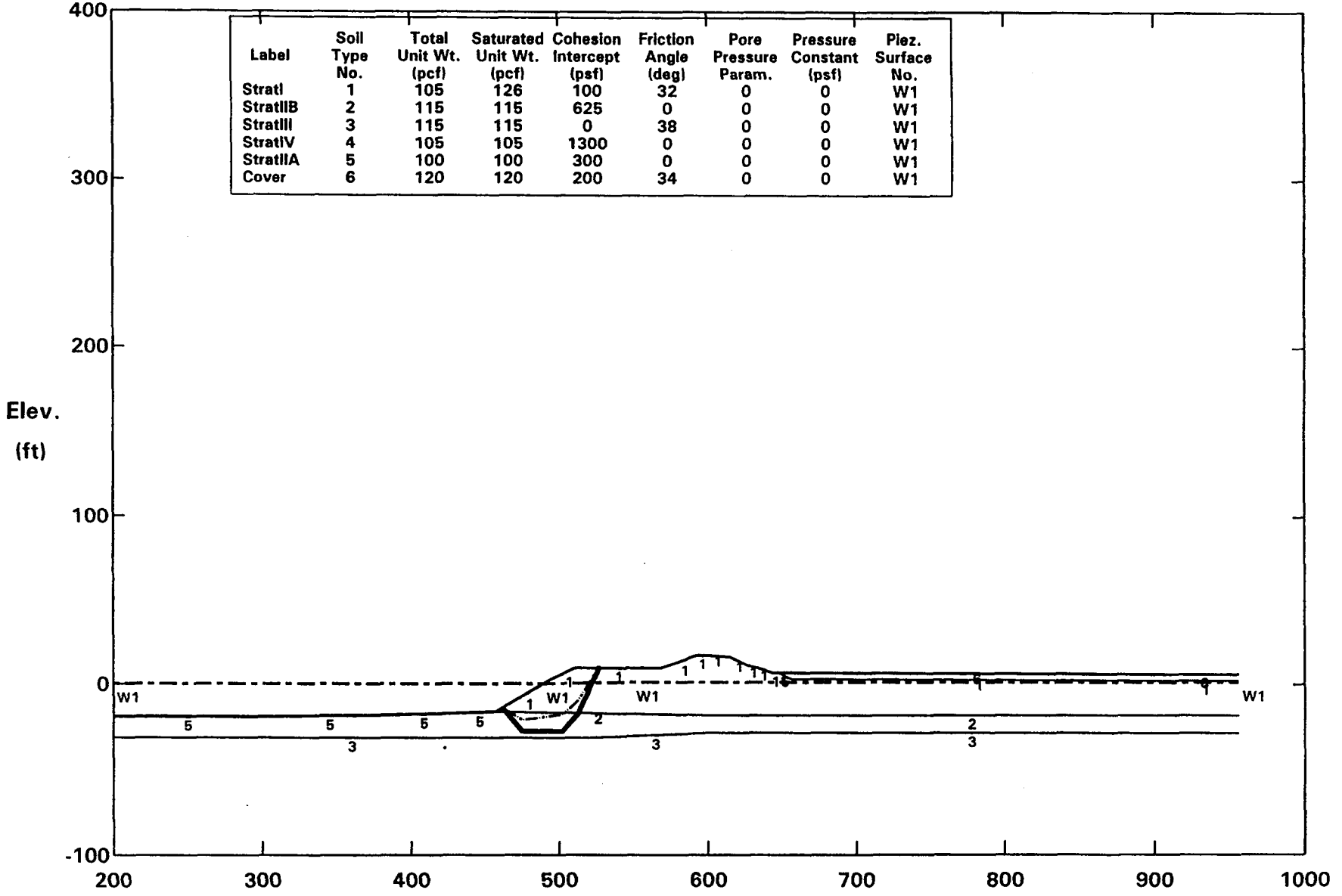
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\G-2\IR2GLTSB.IN  PCSTABL Version 5M /O(200.
 ,-100. )
A-NAS IR Site 2, Section G-G', Long-TermSpencer Static Slope Stability (Block'
25 17
0. 81. 100. 81. 5
100. 81. 181. 82. 5
181. 82. 227. 83. 5
227. 83. 257. 84. 5
257. 84. 295. 103. 1
295. 103. 311. 110. 1
311. 110. 369. 110. 1
369. 110. 392. 117. 1
392. 117. 400. 117. 1
400. 117. 415. 116. 1
415. 116. 429. 111. 1
429. 111. 434. 110. 1
434. 110. 443. 107. 1
443. 107. 447.3 107. 1
447.3 107. 456. 107. 6
456. 107. 711. 106. 6
711. 106. 756. 106. 6
447.3 107. 456. 103. 1
456. 103. 711. 102. 1
711. 102. 756. 102. 1
257. 84. 400. 82. 2
400. 82. 756. 82. 2
0. 69. 320. 69. 3
320. 69. 400. 72. 3
400. 72. 756. 72. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 100. 32. 0. 0. 1
115. 115. 625. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
289. 100.
350. 101.
756. 101.
SPENCR
10.
SURFAC #1-IR2GLTJS.OUT
15
260.43 85.72
263.7 83.91
266.51 81.09
270.76 76.85
275. 72.61
302.62 73.16
306.86 77.4
311.1 81.64
312.68 83.22
315.59 88.47
318.5 93.72
```

321.41 98.96
324.32 104.21
327.23 109.46
327.53 110.
CUT

A-NAS IR Site 2, Section G-G', Long-Term Spencer Static Slope Stability (Block)

Surface #1-IR2GLTJS.OUT. C:IR2GLTSB.PLT By: MMM 07-31-02 11:23am

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	625	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



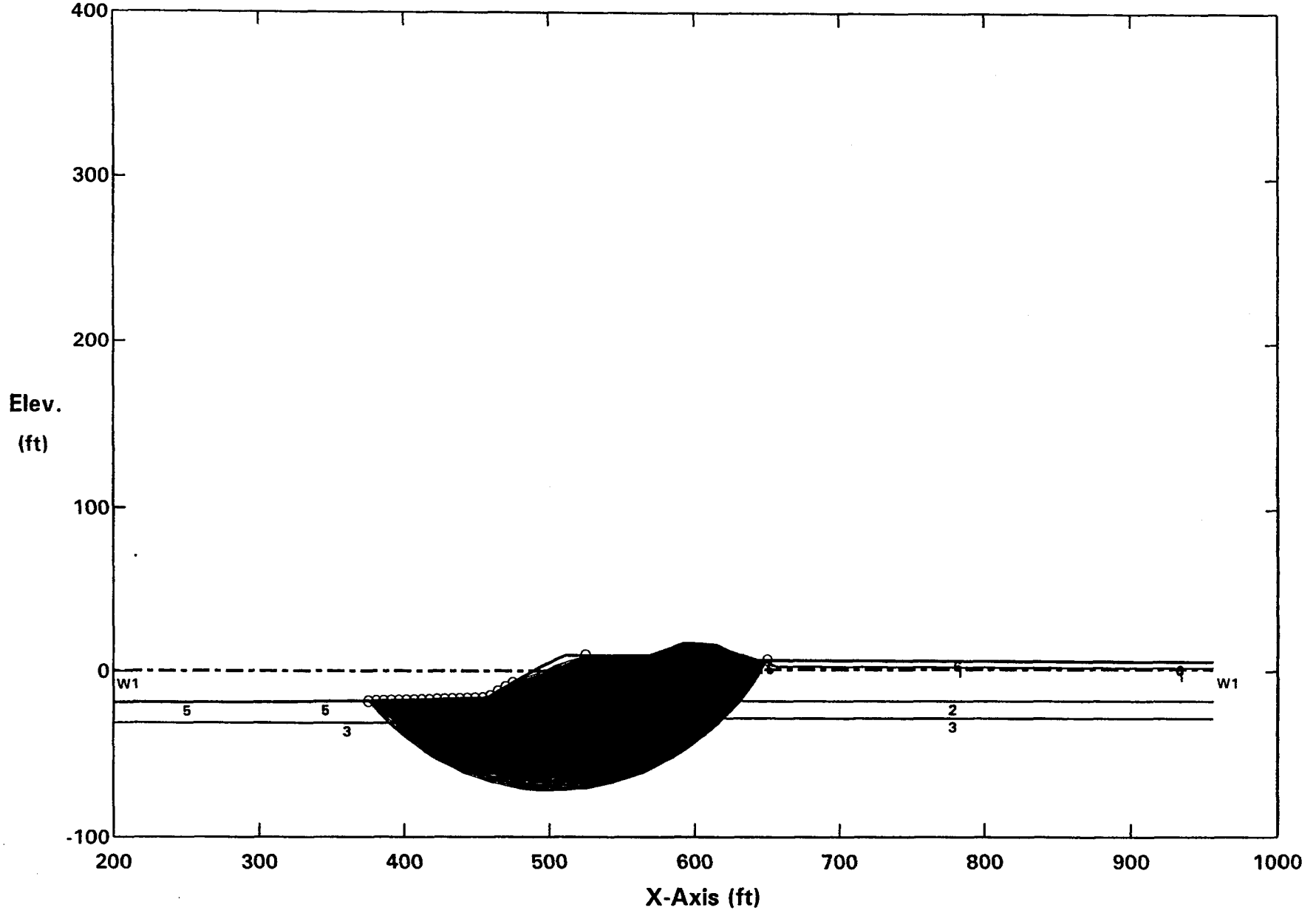
PCSTABL5M FS = 2.48 Theta = 8.9 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL       C:\GEO\STED\A-NAS\SITE2\G-2\IR2GBD.IN  PCSTABL Version 5M /O(200. ,
-100. )
A-NAS IR Site 2, Section G-G',          Dynamic Bishop Circular Search, 0.1g
   17
   81. 100. 81. 5
100. 81. 181. 82. 5
181. 82. 227. 83. 5
227. 83. 257. 84. 5
257. 84. 295. 103. 1
295. 103. 311. 110. 1
311. 110. 369. 110. 1
369. 110. 392. 117. 1
392. 117. 400. 117. 1
400. 117. 415. 116. 1
415. 116. 429. 111. 1
429. 111. 434. 110. 1
434. 110. 443. 107. 1
443. 107. 447.3 107. 1
447.3 107. 456. 107. 6
456. 107. 711. 106. 6
711. 106. 756. 106. 6
447.3 107. 456. 103. 1
456. 103. 711. 102. 1
711. 102. 756. 102. 1
257. 84. 400. 82. 2
400. 82. 756. 82. 2
0. 69. 320. 69. 3
320. 69. 400. 72. 3
   ). 72. 756. 72. 3
 IL  StratI  StratIIBStratIIIStratIV StratIIACover

105. 126. 200. 17.6 0. 0. 1
115. 115. 512. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
289. 100.
350. 101.
756. 101.
EQUAKE
0.1 0. 0.
CIRCL2-Bishop circular, search
20 125
175. 275. 325. 450. 0. 10. 0. 0.
```

A-NAS IR Site 2, Section G-G', Dynamic Bishop Circular Search, 0.1g

All surfaces evaluated. C:IR2GBD.PLT By: MMM 07-31-02 11:26am



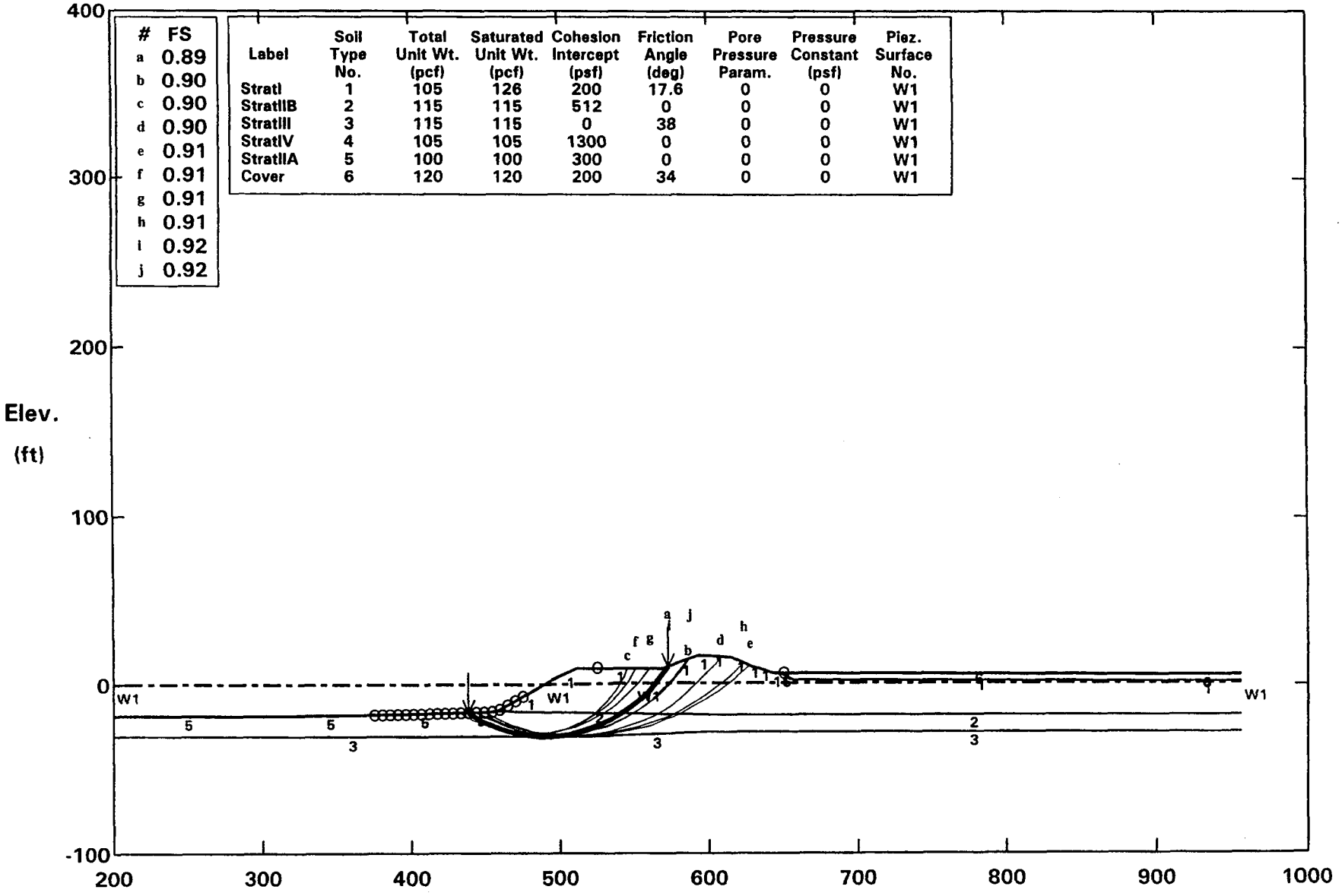
Factors Of Safety Calculated By The Modified Bishop Method

A-NAS IR Site 2, Section G-G', Dynamic Bishop Circular Search, 0.1g

Ten Most Critical. C:IR2GBD.PLT By: MMM 07-31-02 11:26am

#	FS
a	0.89
b	0.90
c	0.90
d	0.90
e	0.91
f	0.91
g	0.91
h	0.91
i	0.92
j	0.92

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	512	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 0.89 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

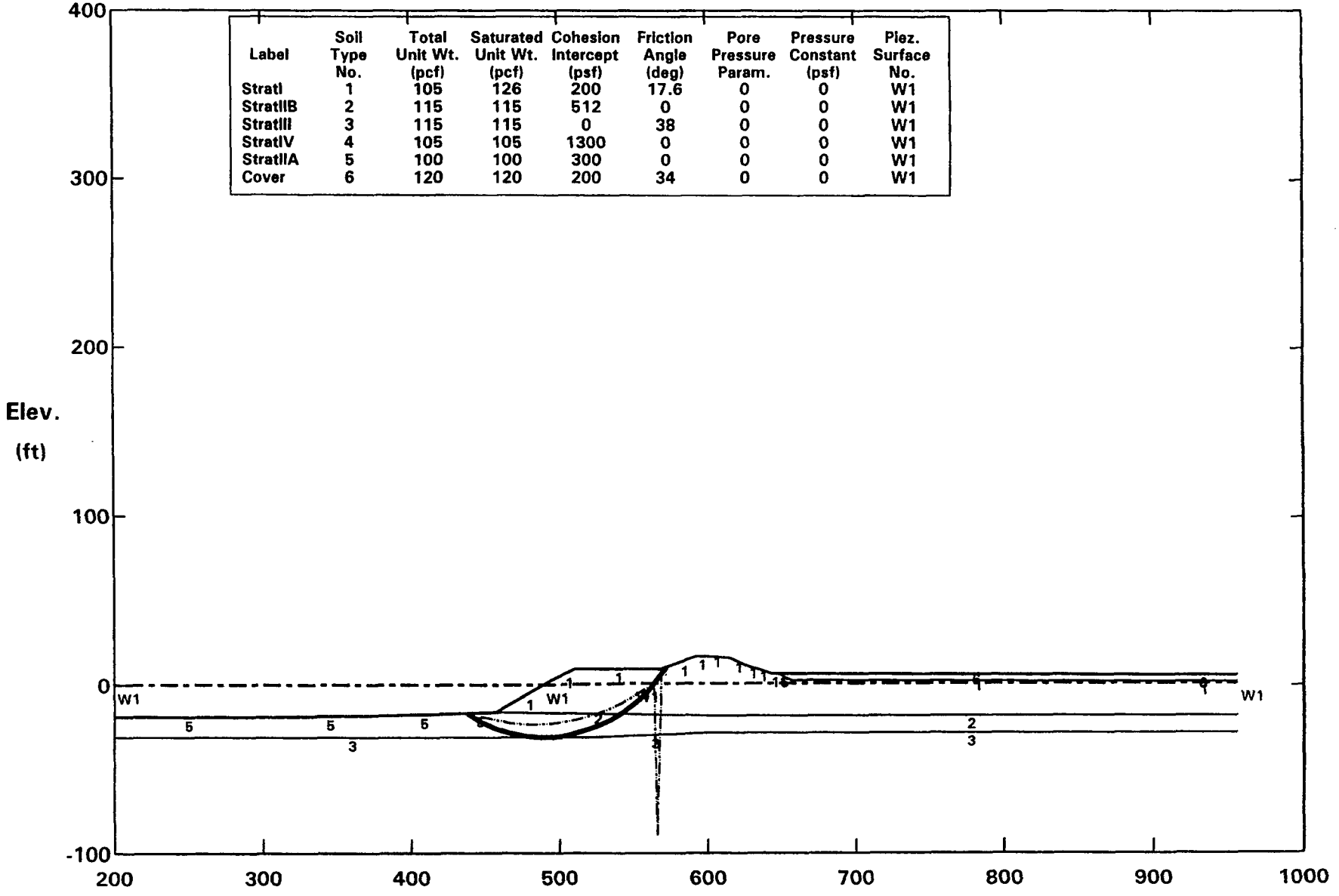
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\G-2\IR2GSSC.IN  PCSTABL Version 5M /O(200.
,-100. )
A-NAS IR Site 2, Section G-G',          Spencer Static Slope Stability (Circ '
25 17
0. 81. 100. 81. 5
100. 81. 181. 82. 5
181. 82. 227. 83. 5
227. 83. 257. 84. 5
257. 84. 295. 103. 1
295. 103. 311. 110. 1
311. 110. 369. 110. 1
369. 110. 392. 117. 1
392. 117. 400. 117. 1
400. 117. 415. 116. 1
415. 116. 429. 111. 1
429. 111. 434. 110. 1
434. 110. 443. 107. 1
443. 107. 447.3 107. 1
447.3 107. 456. 107. 6
456. 107. 711. 106. 6
711. 106. 756. 106. 6
447.3 107. 456. 103. 1
456. 103. 711. 102. 1
711. 102. 756. 102. 1
257. 84. 400. 82. 2
400. 82. 756. 82. 2
0. 69. 320. 69. 3
320. 69. 400. 72. 3
400. 72. 756. 72. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 512. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
289. 100.
350. 101.
756. 101.
SPENCR
12.32
SURBIS #1-IR2GBD.OUT
17
238.16 83.37
247. 78.7
256.25 74.91
265.84 72.05
275.65 70.14
285.61 69.21
295.61 69.26
305.56 70.29
315.35 72.3
324.91 75.25
334.12 79.13
```

342.92 83.89
351.2 89.5
358.89 95.89
[illegible]5.92 103.
[illegible].21 110.77
[illegible]2.39 111.03
[illegible]ECUT

A-NAS IR Site 2, Section G-G', Spencer Static Slope Stability (Circ.)

Surface #1-IR2GBD.OUT. C:IR2GSSC.PLT By: MMM 07-31-02 11:30am

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	512	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FS = 1.46 Theta = 6.16 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

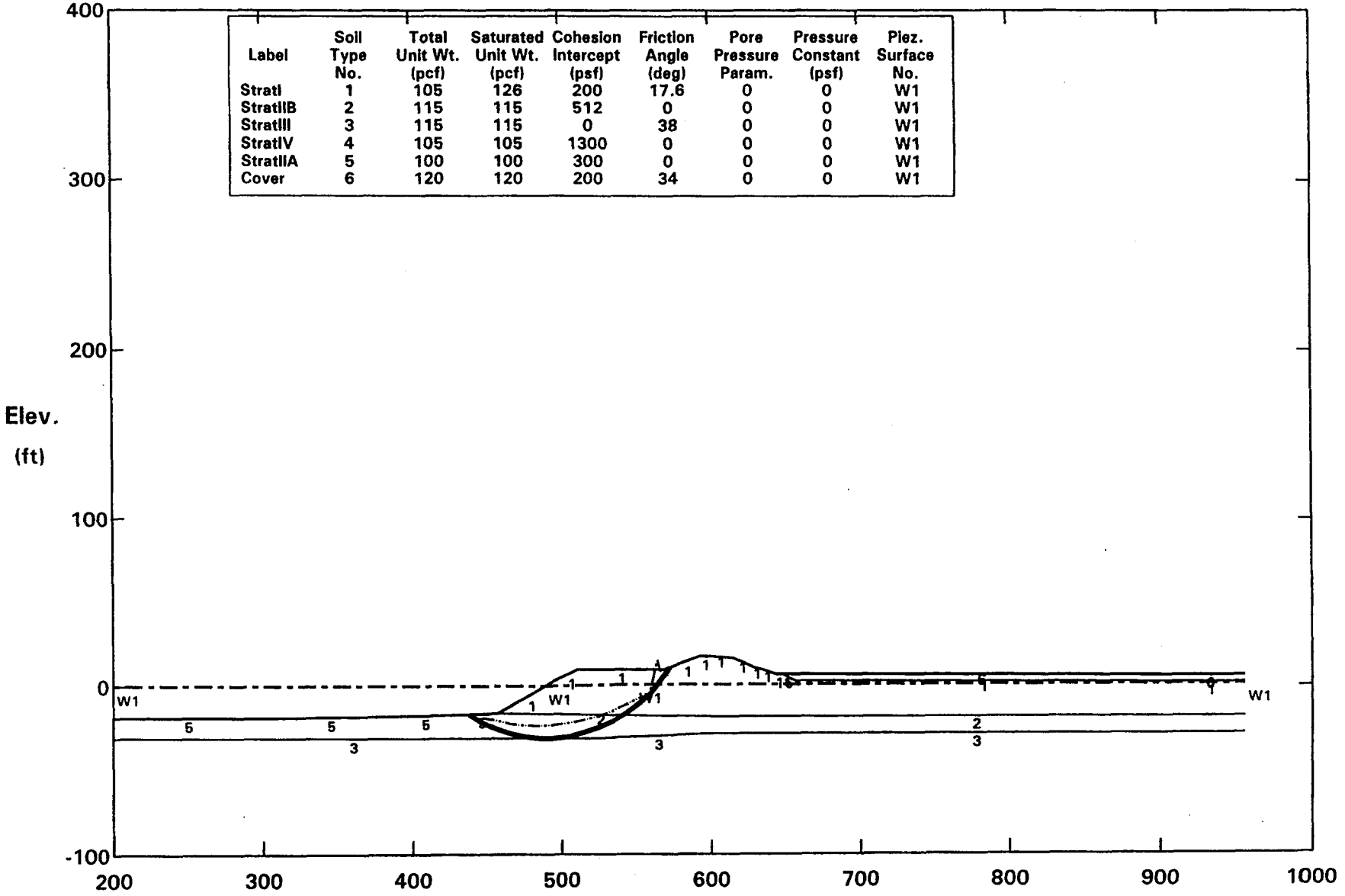
```
PROFIL       C:\GEO\STED\A-NAS\SITE2\G-2\IR2GSDC.IN  PCSTABL Version 5M /O(200.
,-100. )
A-NAS IR Site 2, Section G-G', (Circ.)  Spencer Dynamic Slope Stability Ky=.06g
   17
 . 81. 100. 81. 5
100. 81. 181. 82. 5
181. 82. 227. 83. 5
227. 83. 257. 84. 5
257. 84. 295. 103. 1
295. 103. 311. 110. 1
311. 110. 369. 110. 1
369. 110. 392. 117. 1
392. 117. 400. 117. 1
400. 117. 415. 116. 1
415. 116. 429. 111. 1
429. 111. 434. 110. 1
434. 110. 443. 107. 1
443. 107. 447.3 107. 1
447.3 107. 456. 107. 6
456. 107. 711. 106. 6
711. 106. 756. 106. 6
447.3 107. 456. 103. 1
456. 103. 711. 102. 1
711. 102. 756. 102. 1
257. 84. 400. 82. 2
400. 82. 756. 82. 2
0. 69. 320. 69. 3
320. 69. 400. 72. 3
  0. 72. 756. 72. 3
 OIL  StratI  StratIIBStratIIIStratIV StratIIACover

105. 126. 200. 17.6 0. 0. 1
115. 115. 512. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
289. 100.
350. 101.
756. 101.
EQUAKE
0.064 0. 0.
SPENCR
10.
SURBIS #1-IR2GBD.OUT
17
238.16 83.37
247. 78.7
256.25 74.91
  5.84 72.05
  5.65 70.14
  5.61 69.21
295.61 69.26
305.56 70.29
315.35 72.3
```

```
324.91 75.25
334.12 79.13
342.92 83.89
351.2 89.5
358.89 95.89
365.92 103.
372.21 110.77
372.39 111.03
EXECUT
```

A-NAS IR Site 2, Section G-G', (Circ.) Spencer Dynamic Slope Stability Ky = .06g

Surface #1-IR2GBD.OUT. C:IR2GSDC.PLT By: MMM 07-31-02 11:27am

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	512	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



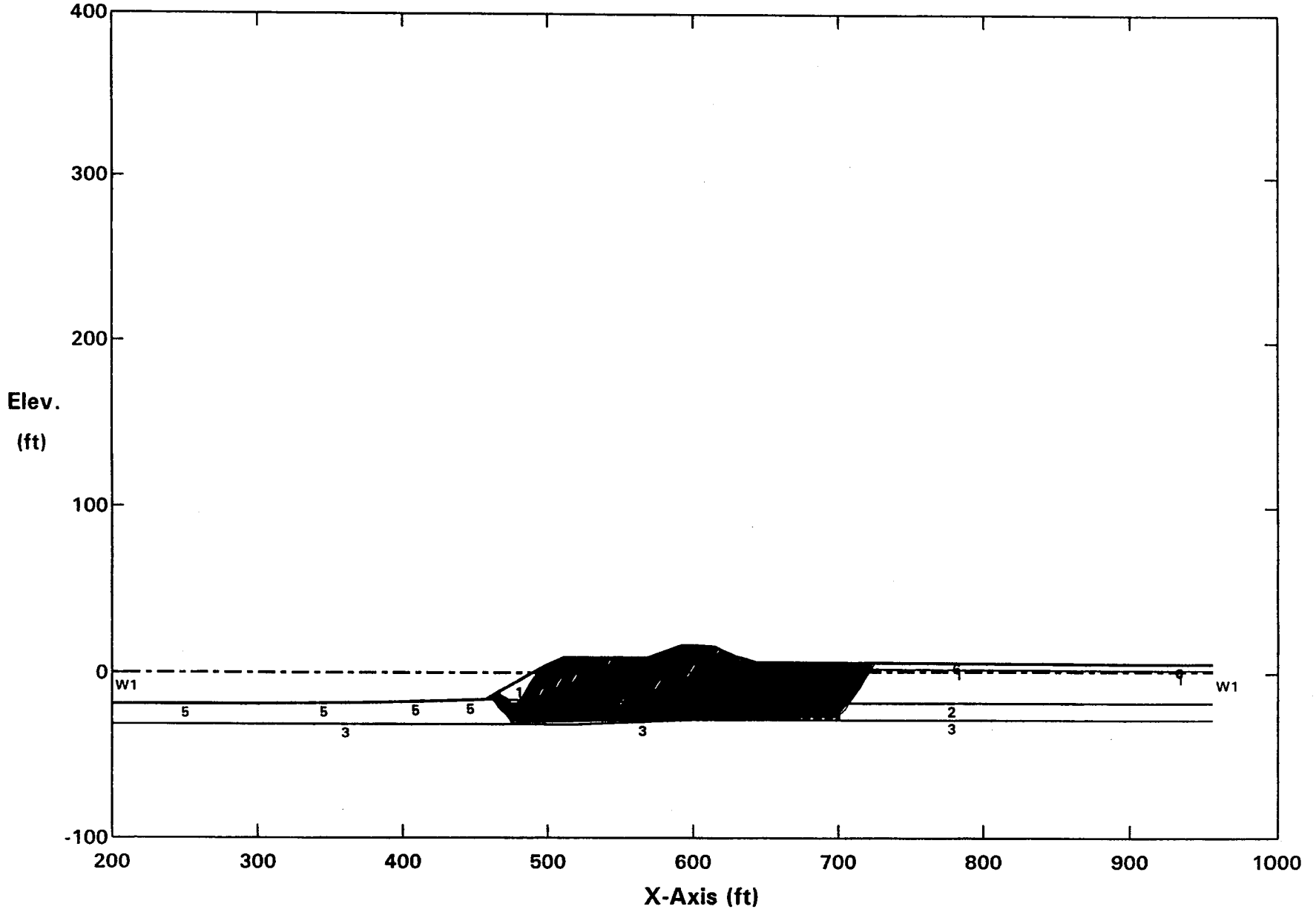
PCSTABL5M FS = 1.00 Theta = 5.05 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\G-2\IR2GJD.IN  PCSTABL Version 5M /O(200.
-100. )
A-NAS IR Site 2, Section G-G',          Dynamic Janbu Block Search, 0.1g
25 17
0. 81. 100. 81. 5
100. 81. 181. 82. 5
181. 82. 227. 83. 5
227. 83. 257. 84. 5
257. 84. 295. 103. 1
295. 103. 311. 110. 1
311. 110. 369. 110. 1
369. 110. 392. 117. 1
392. 117. 400. 117. 1
400. 117. 415. 116. 1
415. 116. 429. 111. 1
429. 111. 434. 110. 1
434. 110. 443. 107. 1
443. 107. 447.3 107. 1
447.3 107. 456. 107. 6
456. 107. 711. 106. 6
711. 106. 756. 106. 6
447.3 107. 456. 103. 1
456. 103. 711. 102. 1
711. 102. 756. 102. 1
257. 84. 400. 82. 2
400. 82. 756. 82. 2
0. 69. 320. 69. 3
320. 69. 400. 72. 3
400. 72. 756. 72. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 512. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
289. 100.
350. 101.
756. 101.
EQUAKE
0.1 0. 0.
BLOCK2-Rankine block, search
0
2500 2 6.
275. 75. 275. 77. 10.
276. 77. 500. 77. 8.
```

A-NAS IR Site 2, Section G-G', Dynamic Janbu Block Search, 0.1g

All surfaces evaluated. C:IR2GJD.PLT By: MMM 07-31-02 11:31am



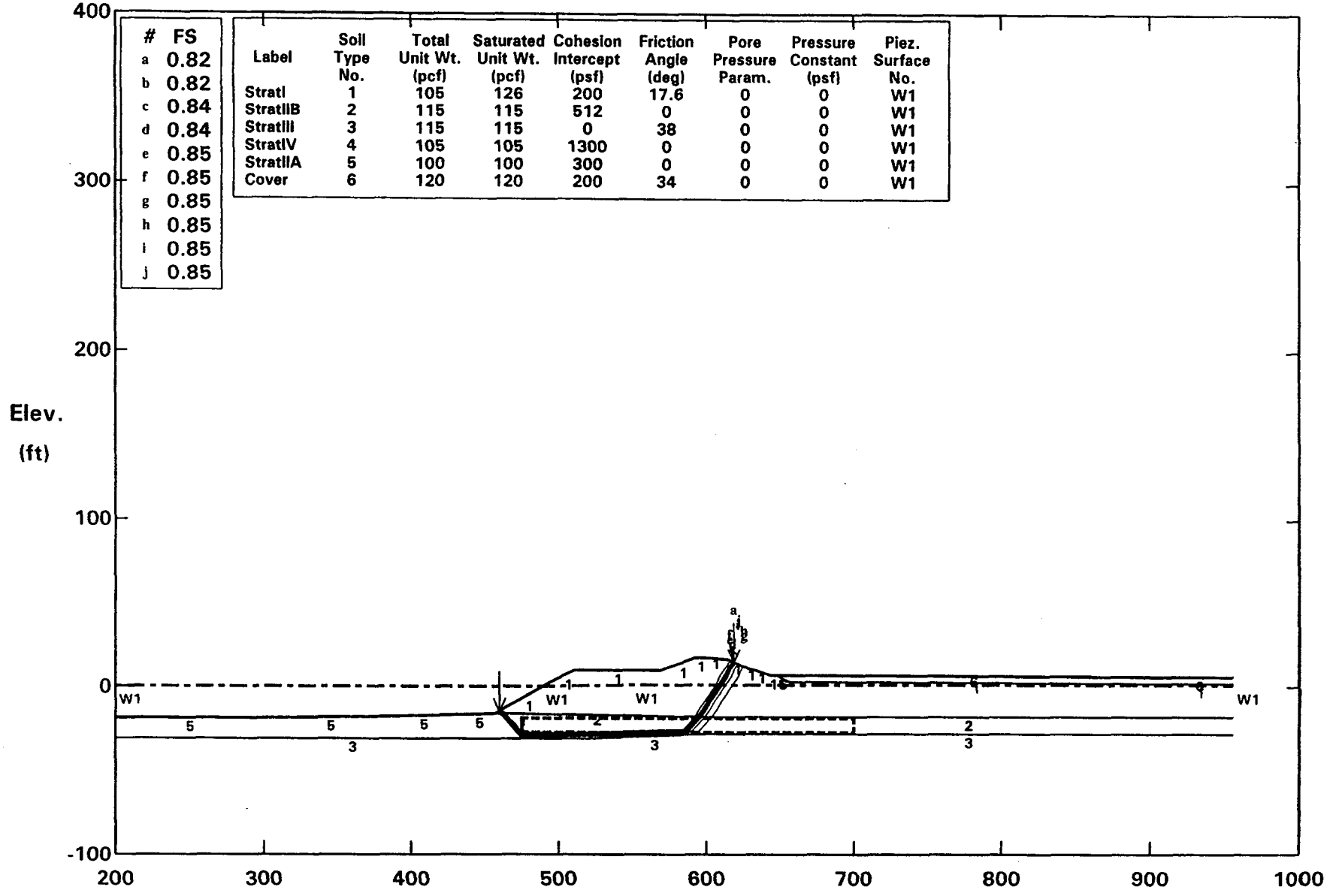
Factors Of Safety Calculated By The Modified Janbu Method

A-NAS IR Site 2, Section G-G', Dynamic Janbu Block Search, 0.1g

Ten Most Critical. C:IR2GJD.PLT By: MMM 07-31-02 11:31am

#	FS
a	0.82
b	0.82
c	0.84
d	0.84
e	0.85
f	0.85
g	0.85
h	0.85
i	0.85
j	0.85

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	512	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 0.82 X-Axis (ft)

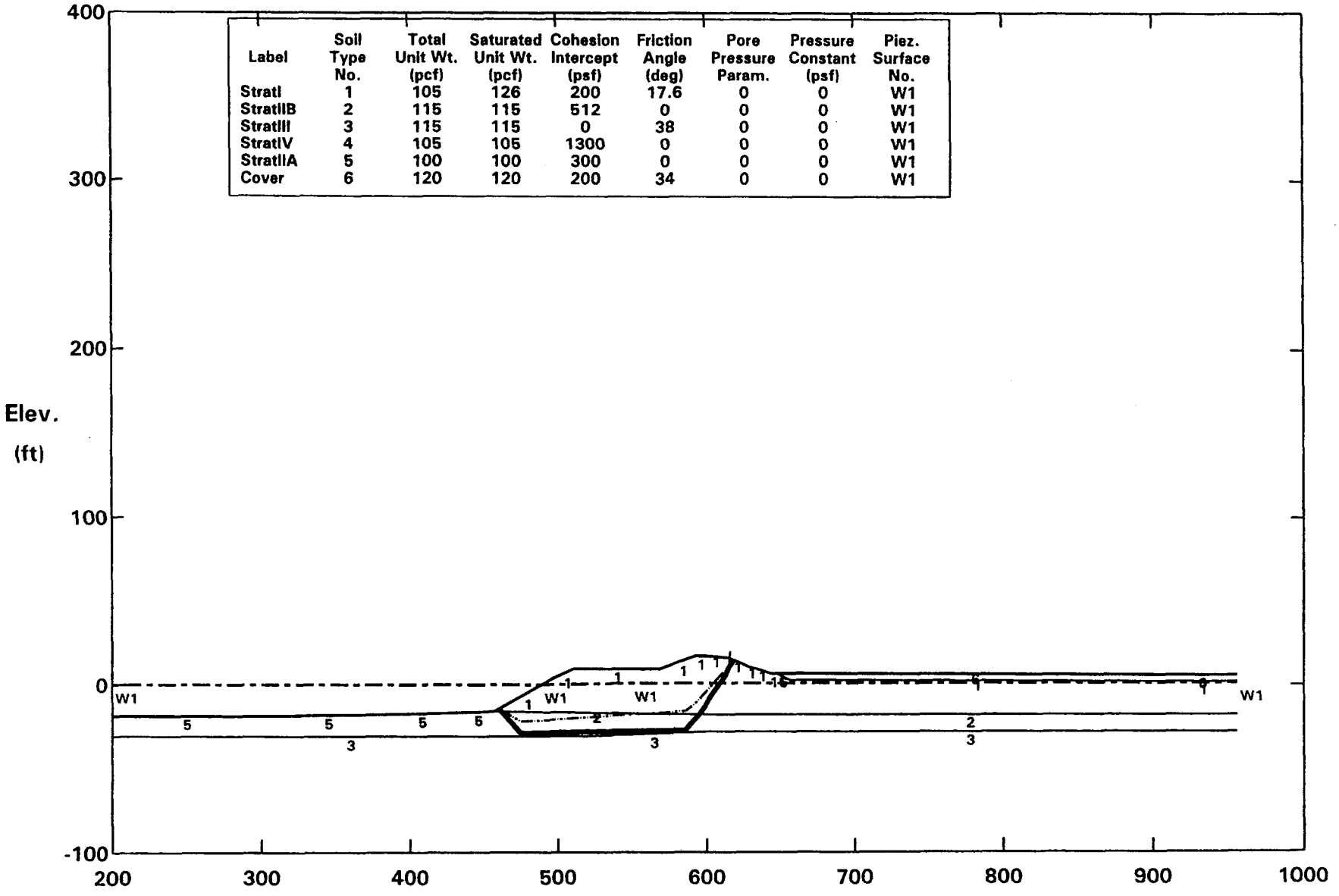
Factors Of Safety Calculated By The Modified Janbu Method

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\G-2\IR2GSSB.IN  PCSTABL Version 5M /O(200.
,-100. )
*-NAS IR Site 2, Section G-G',          Spencer Static Slope Stability (Block)
   17
   81. 100. 81. 5
_00. 81. 181. 82. 5
181. 82. 227. 83. 5
227. 83. 257. 84. 5
257. 84. 295. 103. 1
295. 103. 311. 110. 1
311. 110. 369. 110. 1
369. 110. 392. 117. 1
392. 117. 400. 117. 1
400. 117. 415. 116. 1
415. 116. 429. 111. 1
429. 111. 434. 110. 1
434. 110. 443. 107. 1
443. 107. 447.3 107. 1
447.3 107. 456. 107. 6
456. 107. 711. 106. 6
711. 106. 756. 106. 6
447.3 107. 456. 103. 1
456. 103. 711. 102. 1
711. 102. 756. 102. 1
257. 84. 400. 82. 2
400. 82. 756. 82. 2
0. 69. 320. 69. 3
320. 69. 400. 72. 3
  ). 72. 756. 72. 3
 IL  StratI  StratIIBStratIIIStratIV StratIIACover

105. 126. 200. 17.6 0. 0. 1
115. 115. 512. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
289. 100.
350. 101.
756. 101.
SPENCR
10.
SURFAC #1-IR2GJD.OUT
17
259.81 85.4
261.82 83.93
262.27 83.48
266.51 79.24
270.76 74.99
  5. 70.75
  6.96 73.1
  ).21 77.34
394.45 81.59
394.93 82.07
398.48 86.91
```

```
402.02 91.75
405.56 96.6
409.11 101.44
412.65 106.28
416.19 111.12
418.78 114.65
EXECUT
```

A-NAS IR Site 2, Section G-G', Spencer Static Slope Stability (Block)

Surface #1-IR2GJD.OUT. C:IR2GSSB.PLT By: MMM 07-31-02 11:33am



Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	512	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1

PCSTABL5M FS = 1.73 Theta = 5.23 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

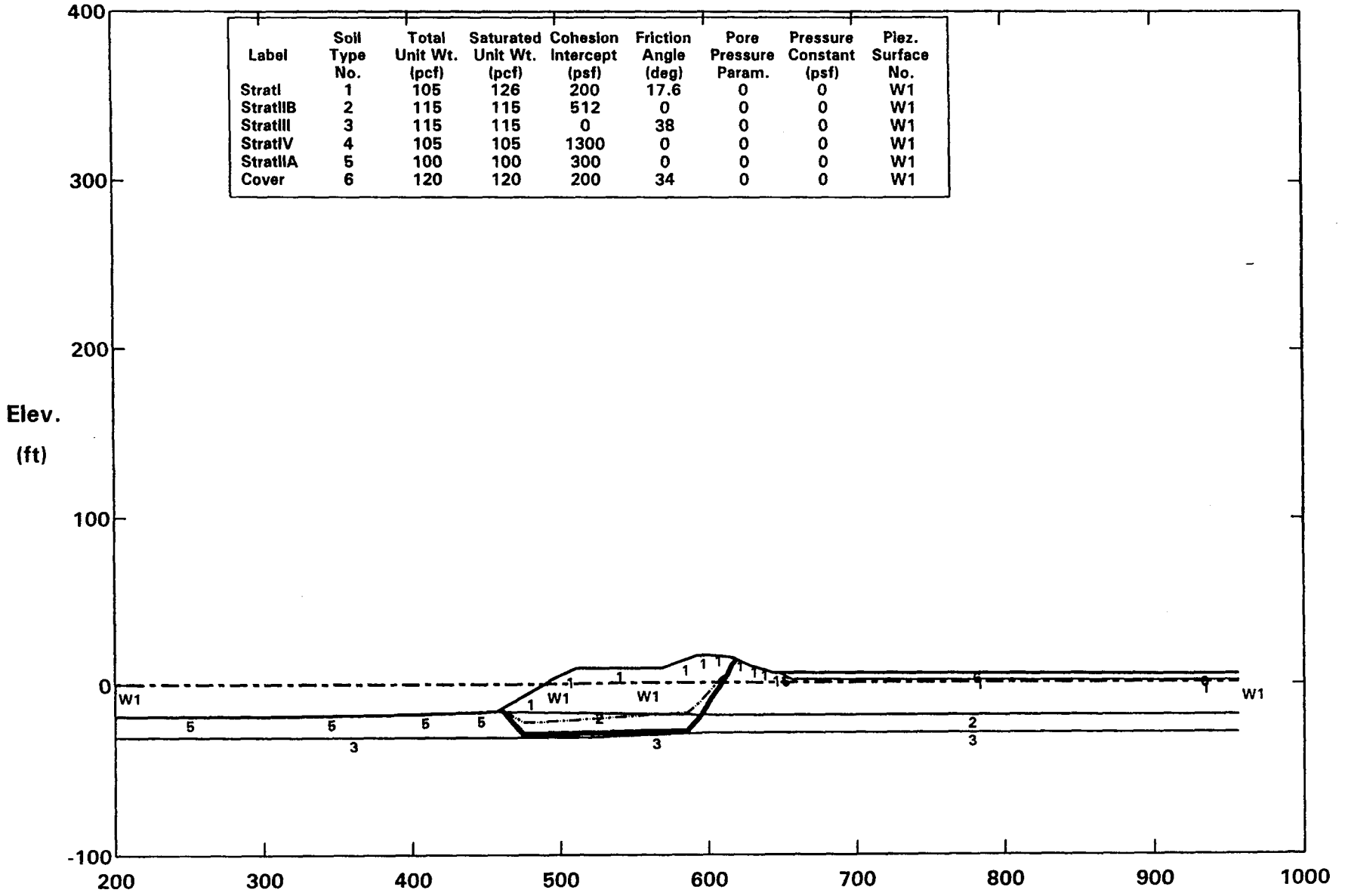
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\G-2\IR2GSDB.IN  PCSTABL Version 5M /O(200.
,-100. )
A-NAS IR Site 2, Section G-G', (Block)  Spencer Dynamic Slope Stability Ky=.07
25 17
0. 81. 100. 81. 5
100. 81. 181. 82. 5
181. 82. 227. 83. 5
227. 83. 257. 84. 5
257. 84. 295. 103. 1
295. 103. 311. 110. 1
311. 110. 369. 110. 1
369. 110. 392. 117. 1
392. 117. 400. 117. 1
400. 117. 415. 116. 1
415. 116. 429. 111. 1
429. 111. 434. 110. 1
434. 110. 443. 107. 1
443. 107. 447.3 107. 1
447.3 107. 456. 107. 6
456. 107. 711. 106. 6
711. 106. 756. 106. 6
447.3 107. 456. 103. 1
456. 103. 711. 102. 1
711. 102. 756. 102. 1
257. 84. 400. 82. 2
400. 82. 756. 82. 2
0. 69. 320. 69. 3
320. 69. 400. 72. 3
400. 72. 756. 72. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 512. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
289. 100.
350. 101.
756. 101.
EQUAKE
0.074 0. 0.
SPENCR
10.
SURFAC #1-IR2GJD.OUT
17
259.81 85.4
261.82 83.93
262.27 83.48
266.51 79.24
270.76 74.99
275. 70.75
385.96 73.1
390.21 77.34
394.45 81.59
```

394.93 82.07
398.48 86.91
402.02 91.75
405.56 96.6
[illegible].11 101.44
[illegible]2.65 106.28
[illegible]6.19 111.12
418.78 114.65
EXECUT

A-NAS IR Site 2, Section G-G', (Block) Spencer Dynamic Slope Stability Ky = .07g

Surface #1-IR2GJD.OUT. C:IR2GSDB.PLT By: MMM 07-31-02 11:33am

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	512	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



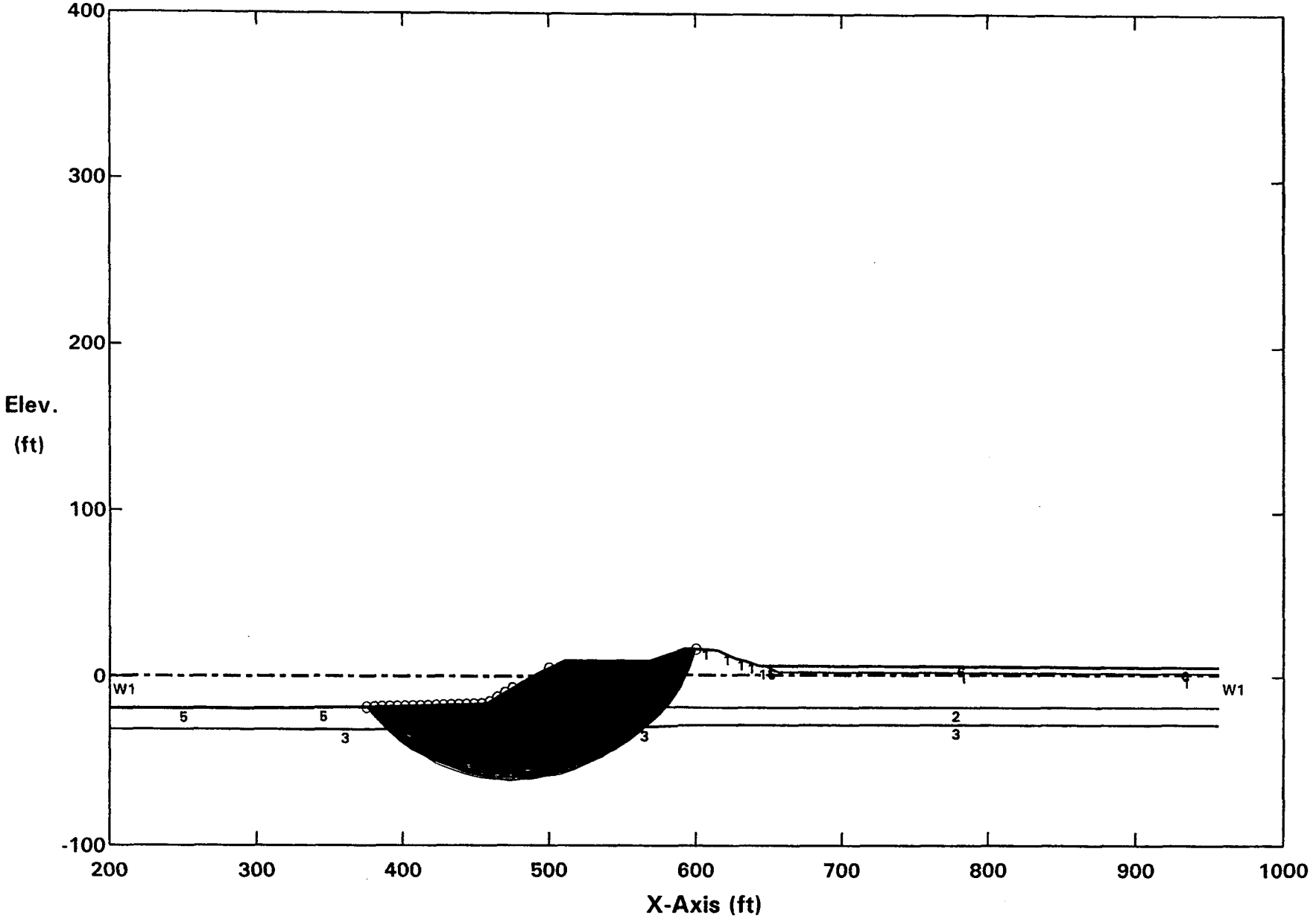
PCSTABL5M FS = 1.00 Theta = 3.92 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\G-2\IR2GEQBS.IN  PCSTABL Version 5M /O(200.
 ,-100. )
* NAS IR Site 2, Section G-G', Post-EQ  Static Bishop Circular Search
   17
   81. 100. 81. 5
100. 81. 181. 82. 5
181. 82. 227. 83. 5
227. 83. 257. 84. 5
257. 84. 295. 103. 1
295. 103. 311. 110. 1
311. 110. 369. 110. 1
369. 110. 392. 117. 1
392. 117. 400. 117. 1
400. 117. 415. 116. 1
415. 116. 429. 111. 1
429. 111. 434. 110. 1
434. 110. 443. 107. 1
443. 107. 447.3 107. 1
447.3 107. 456. 107. 6
456. 107. 711. 106. 6
711. 106. 756. 106. 6
447.3 107. 456. 103. 1
456. 103. 711. 102. 1
711. 102. 756. 102. 1
257. 84. 400. 82. 2
400. 82. 756. 82. 2
0. 69. 320. 69. 3
320. 69. 400. 72. 3
   ). 72. 756. 72. 3
  IL  StratI  StratIIBStratIIIStratIV StratIIACover

105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
289. 100.
350. 101.
756. 101.
CIRCL2-Bishop circular, search
20 100
175. 275. 300. 400. 0. 10. 0. 0.
```

A-NAS IR Site 2, Section G-G', Post-EQ Static Bishop Circular Search

All surfaces evaluated. C:IR2GEQBS.PLT By: MMM 07-31-02 11:34am



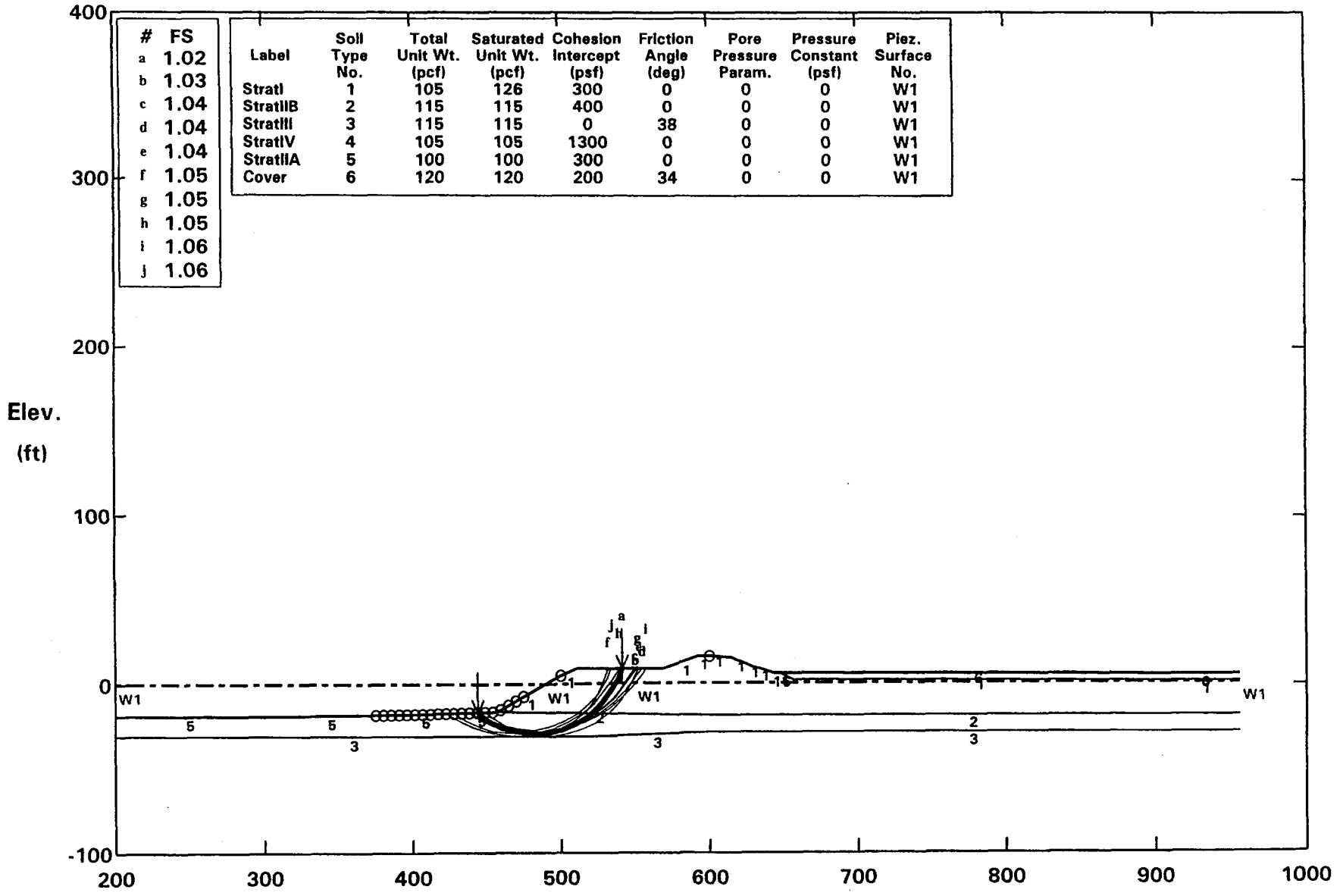
Factors Of Safety Calculated By The Modified Bishop Method

A-NAS IR Site 2, Section G-G', Post-EQ Static Bishop Circular Search

Ten Most Critical. C:IR2GEQBS.PLT By: MMM 07-31-02 11:34am

#	FS
a	1.02
b	1.03
c	1.04
d	1.04
e	1.04
f	1.05
g	1.05
h	1.05
i	1.06
j	1.06

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 1.02 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

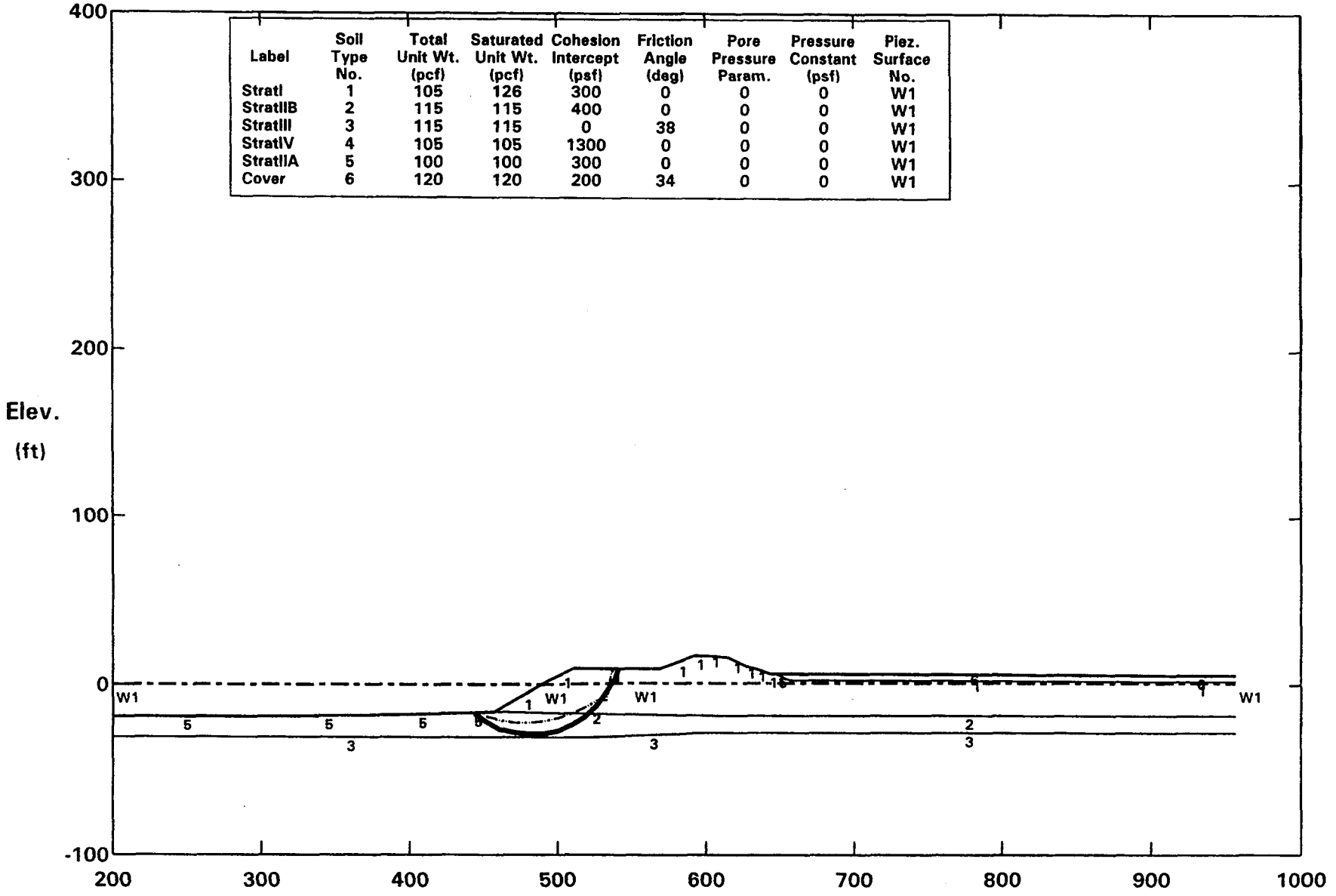
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\G-2\IR2GEQSC.IN  PCSTABL Version 5M /O(200
 ,-100. )
A-NAS IR Site 2, Section G-G', Post-EQ  Spencer Static Slope Stability (Circ `
25 17
0. 81. 100. 81. 5
100. 81. 181. 82. 5
181. 82. 227. 83. 5
227. 83. 257. 84. 5
257. 84. 295. 103. 1
295. 103. 311. 110. 1
311. 110. 369. 110. 1
369. 110. 392. 117. 1
392. 117. 400. 117. 1
400. 117. 415. 116. 1
415. 116. 429. 111. 1
429. 111. 434. 110. 1
434. 110. 443. 107. 1
443. 107. 447.3 107. 1
447.3 107. 456. 107. 6
456. 107. 711. 106. 6
711. 106. 756. 106. 6
447.3 107. 456. 103. 1
456. 103. 711. 102. 1
711. 102. 756. 102. 1
257. 84. 400. 82. 2
400. 82. 756. 82. 2
0. 69. 320. 69. 3
320. 69. 400. 72. 3
400. 72. 756. 72. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
289. 100.
350. 101.
756. 101.
SPENCR
10.
SURBIS #1-IR2GEQBS.OUT
13
243.42 83.55
251.83 78.13
260.97 74.08
270.63 71.5
280.57 70.44
290.56 70.95
300.35 73.
309.7 76.54
318.39 81.49
326.21 87.72
332.96 95.1
```

338.49 103.43
341.5 110.
EXECUT

A-NAS IR Site 2, Section G-G', Post-EQ Spencer Static Slope Stability (Circ.)

Surface #1-IR2GEQBS.OUT. C:IR2GEQSC.PLT By: MMM 07-31-02 11:34am

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



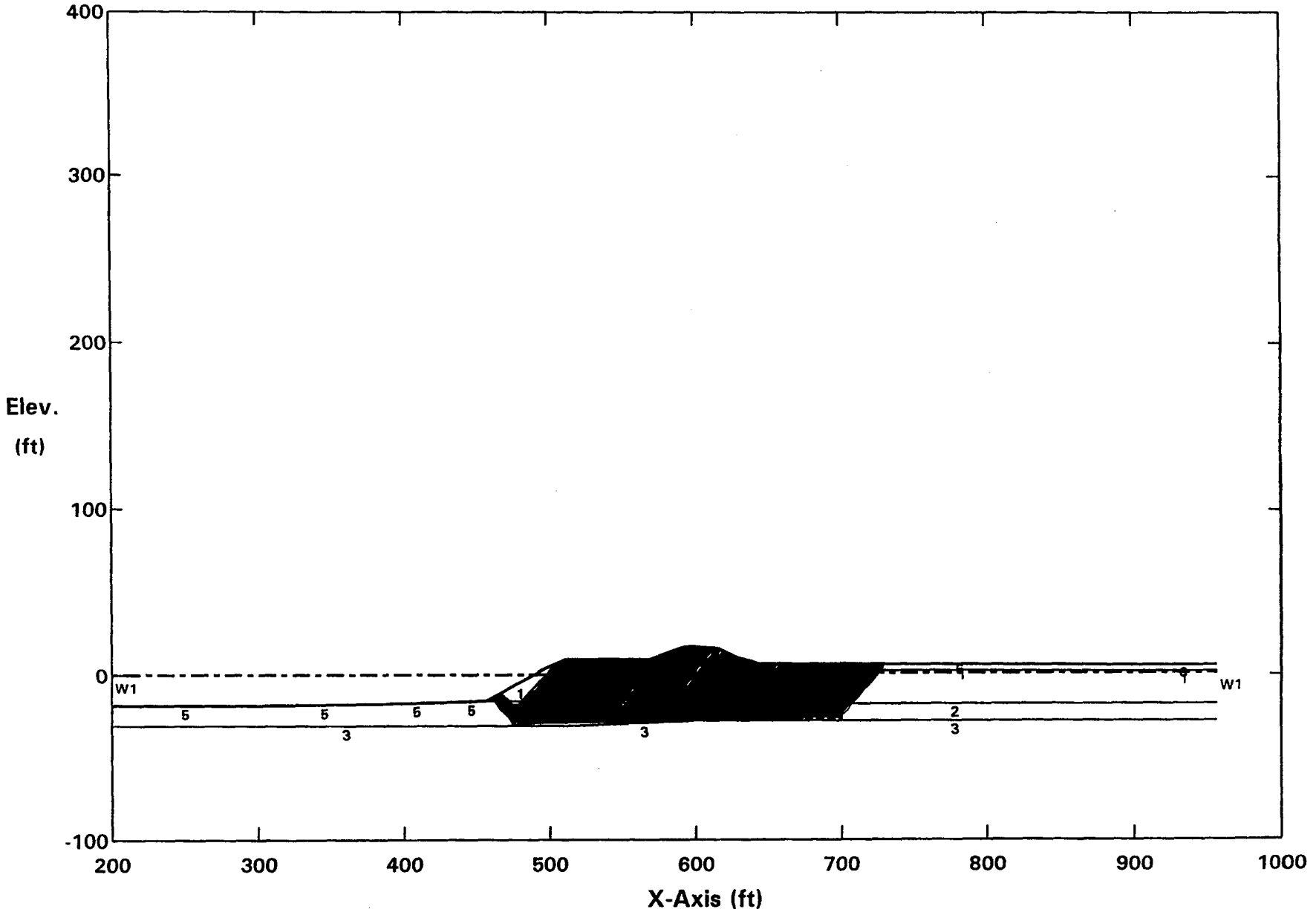
PCSTABL5M FS = 1.08 Theta = 7.38 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\G-2\IR2GEQJS.IN  PCSTABL Version 5M /O(200.
 ,-100. )
-NAS IR Site 2, Section G-G', Post-EQ  Static Janbu Block Search
   17
   81. 100. 81. 5
100. 81. 181. 82. 5
181. 82. 227. 83. 5
227. 83. 257. 84. 5
257. 84. 295. 103. 1
295. 103. 311. 110. 1
311. 110. 369. 110. 1
369. 110. 392. 117. 1
392. 117. 400. 117. 1
400. 117. 415. 116. 1
415. 116. 429. 111. 1
429. 111. 434. 110. 1
434. 110. 443. 107. 1
443. 107. 447.3 107. 1
447.3 107. 456. 107. 6
456. 107. 711. 106. 6
711. 106. 756. 106. 6
447.3 107. 456. 103. 1
456. 103. 711. 102. 1
711. 102. 756. 102. 1
257. 84. 400. 82. 2
400. 82. 756. 82. 2
0. 69. 320. 69. 3
320. 69. 400. 72. 3
  0. 72. 756. 72. 3
 IL  StratI  StratIIBStratIIIStratIV StratIIACover

105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
289. 100.
350. 101.
756. 101.
BLOCK2-Rankine block, search
0
2500 2 6.
275. 75. 275. 77. 10.
276. 77. 500. 77. 8.
```

A-NAS IR Site 2, Section G-G', Post-EQ Static Janbu Block Search

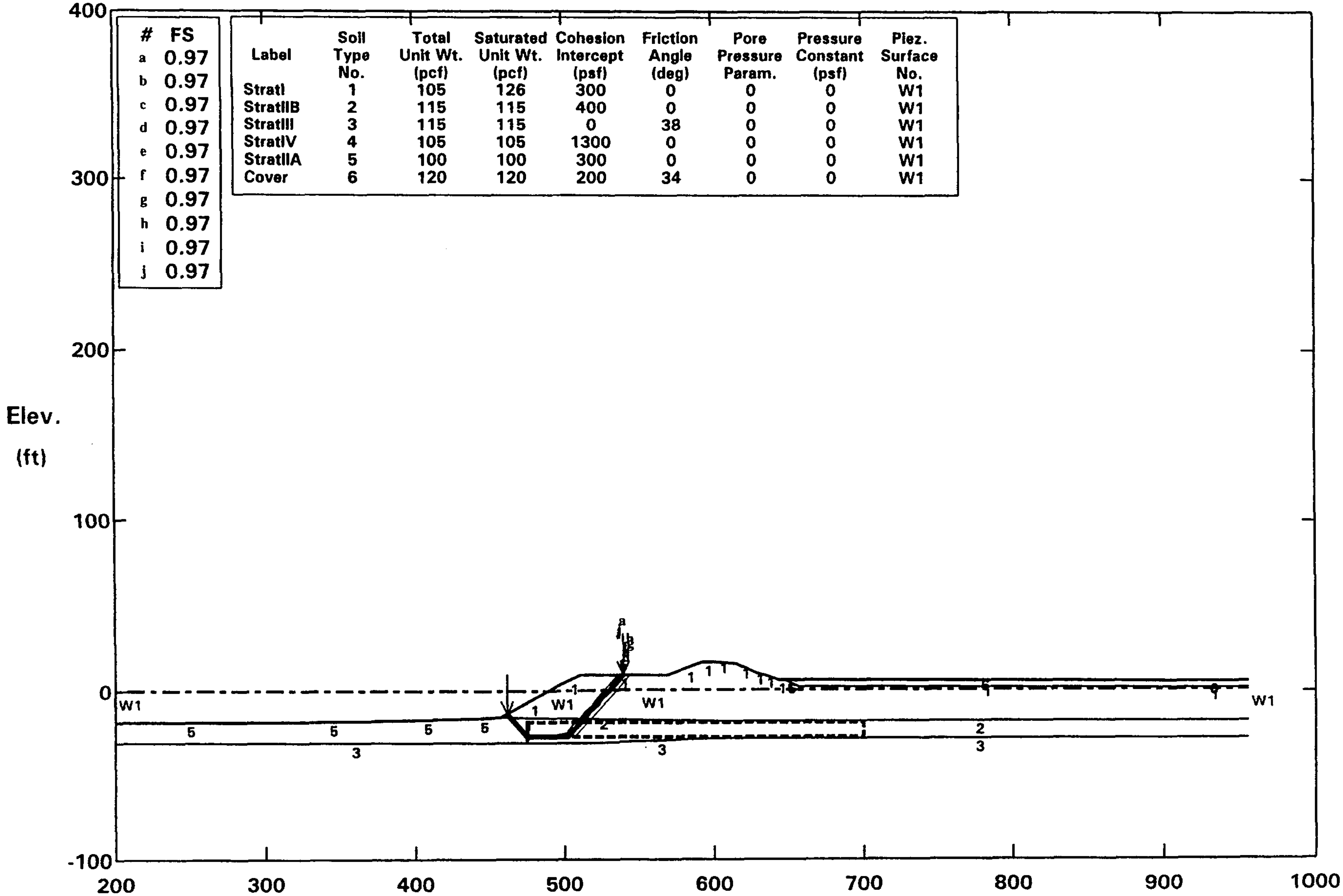
All surfaces evaluated. C:IR2GEQJS.PLT By: MMM 07-31-02 11:35am



Factors Of Safety Calculated By The Modified Janbu Method

A-NAS IR Site 2, Section G-G', Post-EQ Static Janbu Block Search

Ten Most Critical. C:IR2GEQJS.PLT By: MMM 07-31-02 11:35am



Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1

PCSTABL5M FSmin = 0.97 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

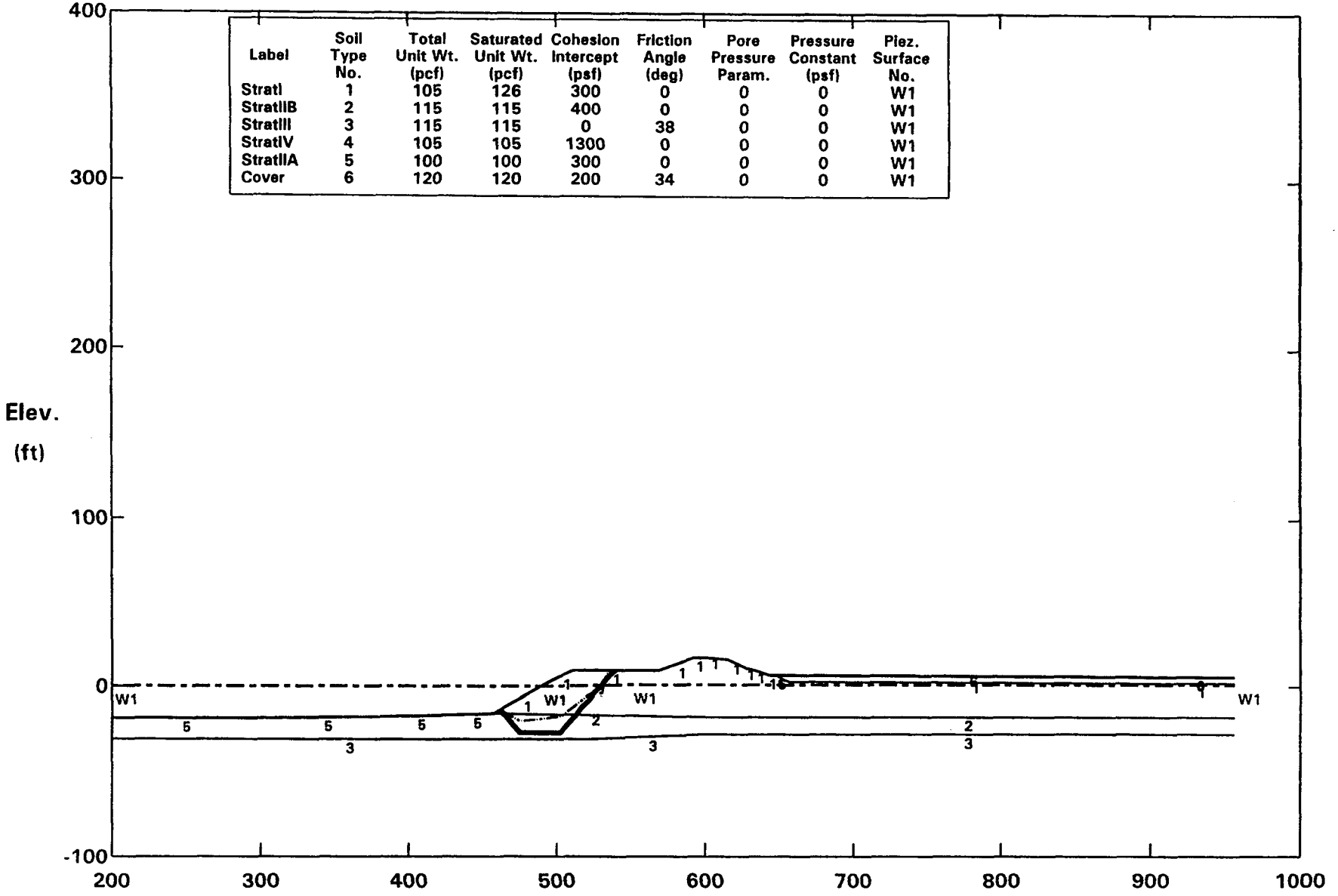
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\G-2\IR2GEQSB.IN  PCSTABL Version 5M /O(200.
 ,-100. )
A-NAS IR Site 2, Section G-G', Post-EQ  Spencer Static Slope Stability (Block'
25 17
0. 81. 100. 81. 5
100. 81. 181. 82. 5
181. 82. 227. 83. 5
227. 83. 257. 84. 5
257. 84. 295. 103. 1
295. 103. 311. 110. 1
311. 110. 369. 110. 1
369. 110. 392. 117. 1
392. 117. 400. 117. 1
400. 117. 415. 116. 1
415. 116. 429. 111. 1
429. 111. 434. 110. 1
434. 110. 443. 107. 1
443. 107. 447.3 107. 1
447.3 107. 456. 107. 6
456. 107. 711. 106. 6
711. 106. 756. 106. 6
447.3 107. 456. 103. 1
456. 103. 711. 102. 1
711. 102. 756. 102. 1
257. 84. 400. 82. 2
400. 82. 756. 82. 2
0. 69. 320. 69. 3
320. 69. 400. 72. 3
400. 72. 756. 72. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
289. 100.
350. 101.
756. 101.
SPENCR
16.8
SURFAC #1-IR2GEQJS.OUT
16
261.4 86.2
263.7 83.91
266.51 81.09
270.76 76.85
275. 72.61
302.62 73.16
306.86 77.4
311.1 81.64
312.68 83.22
316.93 87.46
321.17 91.71
```

325.41 95.95
329.66 100.19
333.9 104.43
338.14 108.68
[illegible]9.46 110.
.ECUT

A-NAS IR Site 2, Section G-G', Post-EQ Spencer Static Slope Stability (Block)

Surface #1-IR2GEQJS.OUT. C:IR2GEQSB.PLT By: MMM 07-31-02 11:35am

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FS = 1.38 Theta = 8.4 X-Axis (ft)

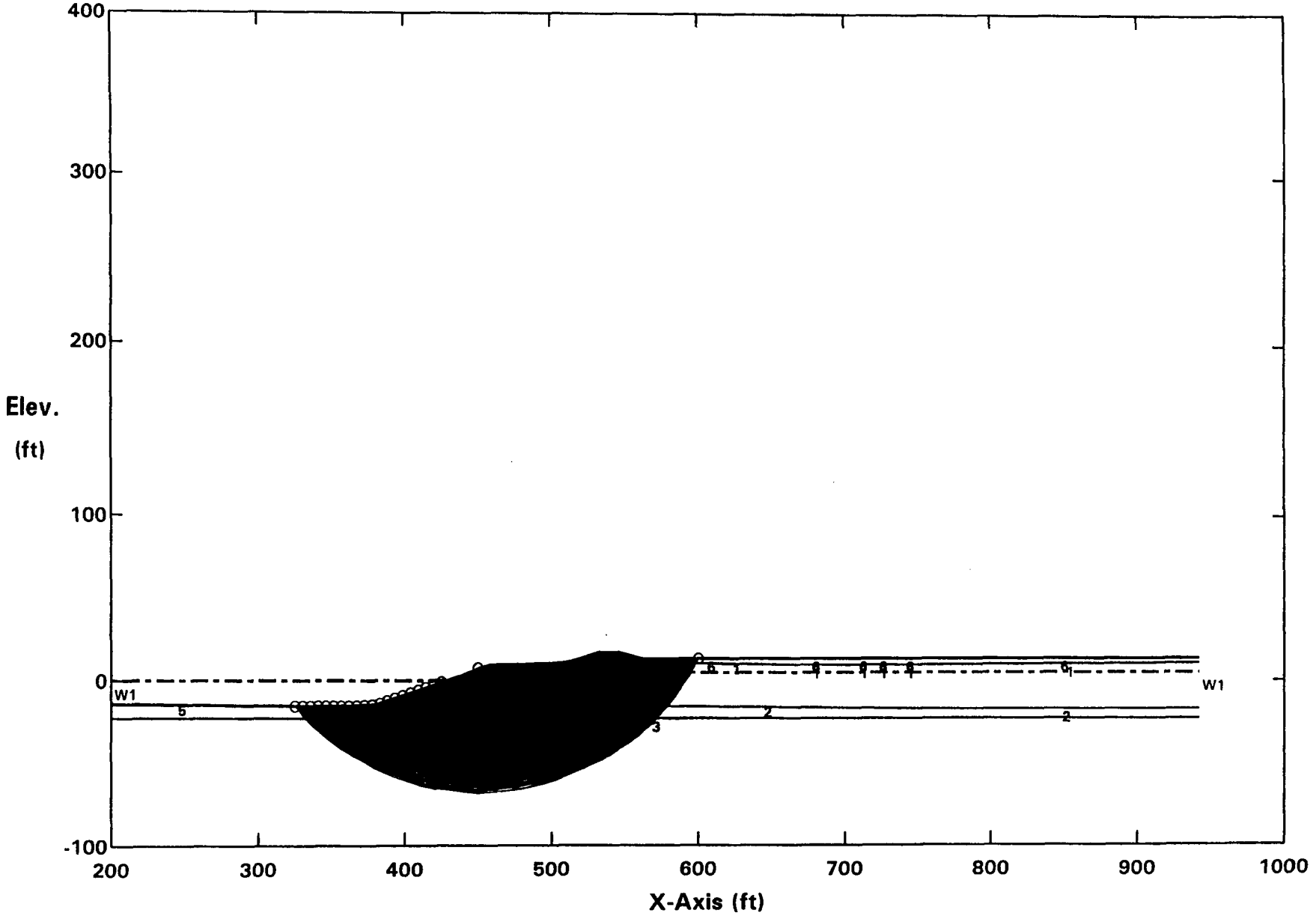
Factors Of Safety Calculated By Spencer`s Method of Slices

SECTION H-H'

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\H-2\IR2HLTBS.IN  PCSTABL Version 5M /O(200.
 ,-100. )
A-NAS IR Site 2, Section H-H', Long-TermStatic Bishop Circular Search
   18
 . 86.5 100. 85. 5
100. 85. 165. 85. 5
165. 85. 181. 86. 1
181. 86. 238. 103. 1
238. 103. 251. 108. 1
251. 108. 258. 109. 1
258. 109. 265. 109. 1
265. 109. 305. 110. 1
305. 110. 313. 111. 1
313. 111. 332. 117. 1
332. 117. 345. 117. 1
345. 117. 362. 113. 1
362. 113. 455. 113. 6
455. 113. 505. 113. 6
505. 113. 520. 113.1 6
520. 113.1 531. 113. 6
531. 113. 557. 113. 6
557. 113. 742. 113. 6
362. 113. 390. 111. 1
390. 111. 398. 110. 1
398. 110. 455. 109. 1
455. 109. 505. 109. 1
505. 109. 520. 109.1 1
520. 109.1 531. 109. 1
  1. 109. 557. 109. 1
 ,7. 109. 742. 110. 1
165. 85. 339. 85. 2
339. 85. 560. 83.5 2
560. 83.5 742. 83.5 2
0. 78. 742. 78. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 100. 32. 0. 0. 1
115. 115. 500. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
228. 100.
300. 105.
742. 105.
CIRCL2-Bishop circular, search
20 125
125. 225. 250. 400. 0. 10. 0. 0.
```

A-NAS IR Site 2, Section H-H', Long-Term Static Bishop Circular Search

All surfaces evaluated. C:IR2HLTBS.PLT By: MMM 08-02-02 8:11pm



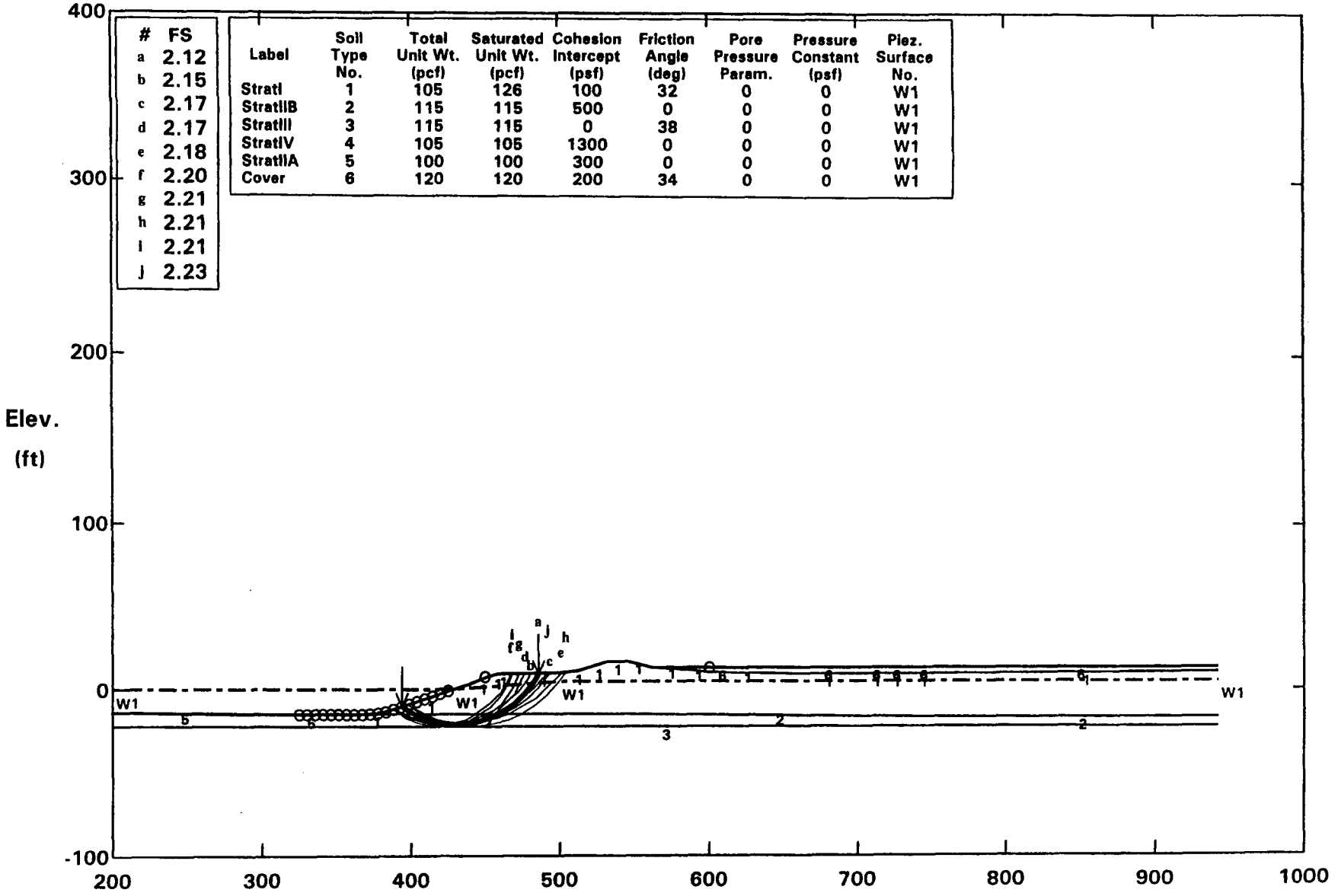
Factors Of Safety Calculated By The Modified Bishop Method

A-NAS IR Site 2, Section H-H', Long-Term Static Bishop Circular Search

Ten Most Critical. C:IR2HLTBS.PLT By: MMM 08-02-02 8:11pm

#	FS
a	2.12
b	2.15
c	2.17
d	2.17
e	2.18
f	2.20
g	2.21
h	2.21
i	2.21
j	2.23

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	500	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



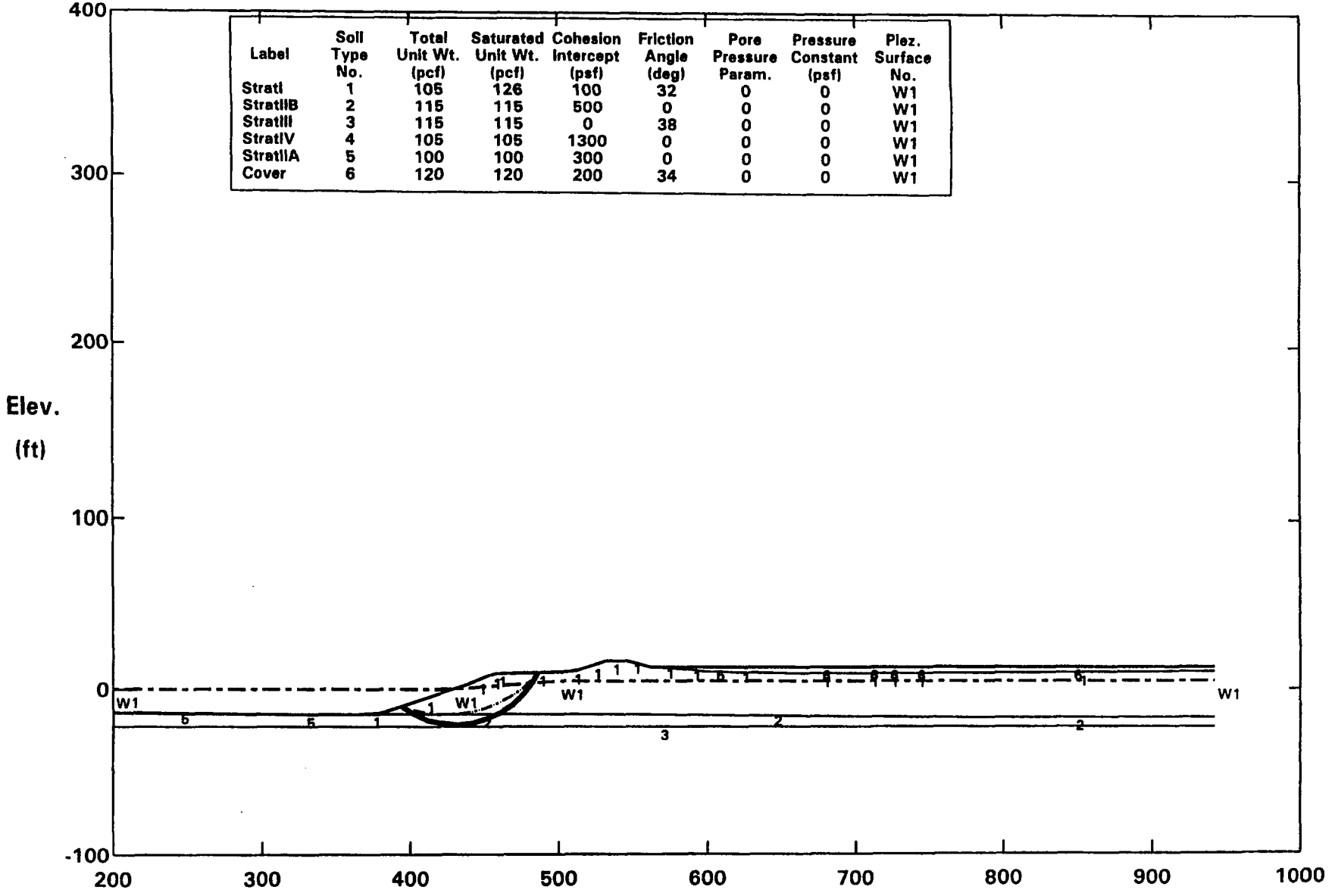
PCSTABL5M FSmin = 2.12 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\H-2\IR2HLTSC.IN  PCSTABL Version 5M /O(200.
 ,-100. )
A-NAS IR Site 2, Section H-H', Long-TermSpencer Static Slope Stability (Circ.`
30 18
0. 86.5 100. 85. 5
100. 85. 165. 85. 5
165. 85. 181. 86. 1
181. 86. 238. 103. 1
238. 103. 251. 108. 1
251. 108. 258. 109. 1
258. 109. 265. 109. 1
265. 109. 305. 110. 1
305. 110. 313. 111. 1
313. 111. 332. 117. 1
332. 117. 345. 117. 1
345. 117. 362. 113. 1
362. 113. 455. 113. 6
455. 113. 505. 113. 6
505. 113. 520. 113.1 6
520. 113.1 531. 113. 6
531. 113. 557. 113. 6
557. 113. 742. 113. 6
362. 113. 390. 111. 1
390. 111. 398. 110. 1
398. 110. 455. 109. 1
455. 109. 505. 109. 1
505. 109. 520. 109.1 1
520. 109.1 531. 109. 1
531. 109. 557. 109. 1
557. 109. 742. 110. 1
165. 85. 339. 85. 2
339. 85. 560. 83.5 2
560. 83.5 742. 83.5 2
0. 78. 742. 78. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 100. 32. 0. 0. 1
115. 115. 500. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
228. 100.
300. 105.
742. 105.
SPENCR
8.
SURBIS #1-IR2HLTBS.OUT
12
193.42 89.7
202.17 84.87
211.55 81.4
221.34 79.37
231.33 78.82
241.28 79.78
```

```
250.98 82.22
260.21 86.08
268.75 91.27
276.42 97.69
   .04 105.18
285.85 109.52
EXECUT
```

A-NAS IR Site 2, Section H-H', Long-Term Spencer Static Slope Stability (Circ.)
Surface #1-IR2HLTBS.OUT. C:IR2HLTSC.PLT By: MMM 08-02-02 8:12pm



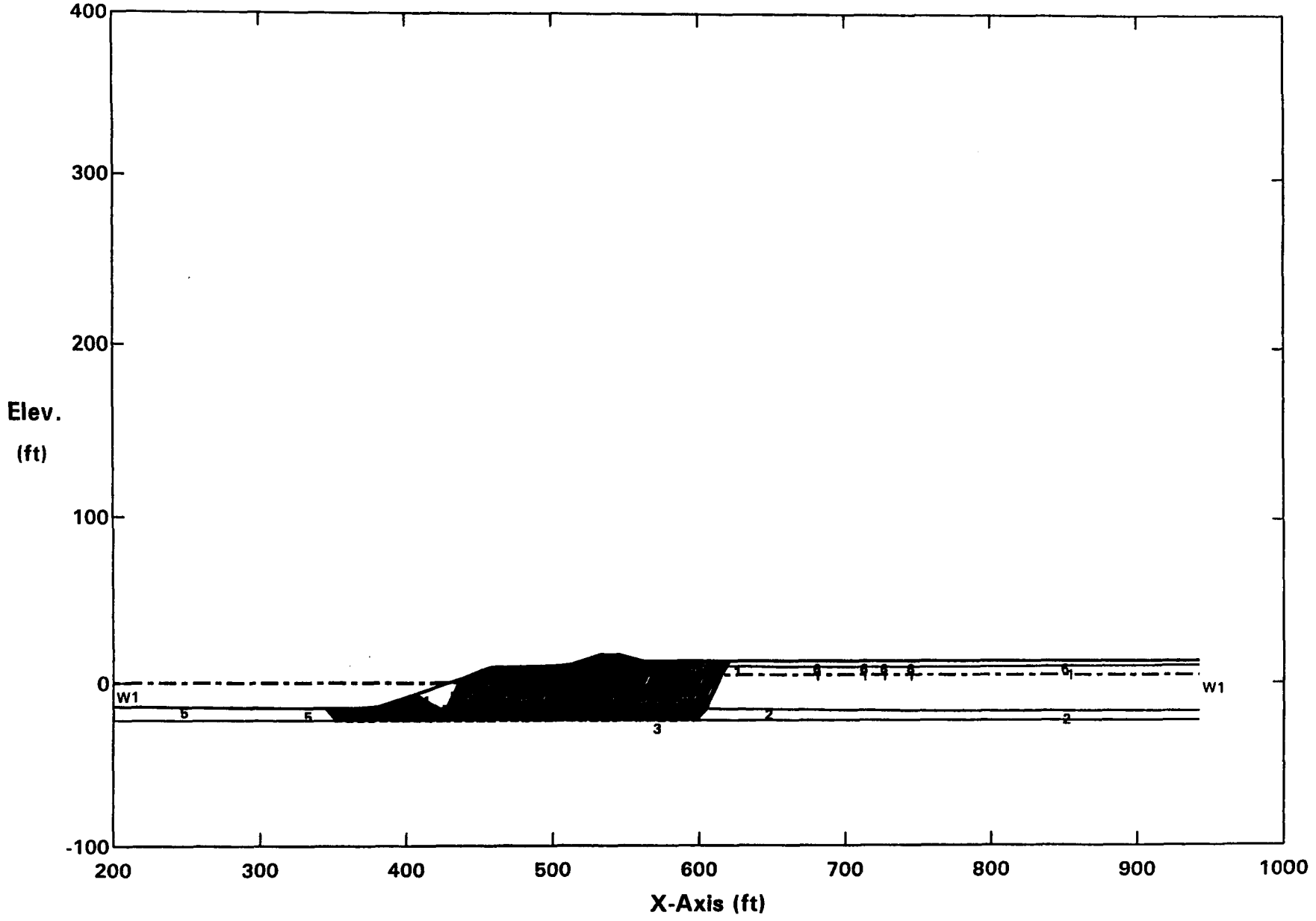
Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	500	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1

PCSTABL5M FS = 2.14 Theta = 6.24 X-Axis (ft)
Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\H-2\IR2HLTJS.IN  PCSTABL Version 5M /O(200.
 ,-100. )
A-NAS IR Site 2, Section H-H', Long-TermStatic Janbu Block Search
20 18
   86.5 100. 85. 5
100. 85. 165. 85. 5
165. 85. 181. 86. 1
181. 86. 238. 103. 1
238. 103. 251. 108. 1
251. 108. 258. 109. 1
258. 109. 265. 109. 1
265. 109. 305. 110. 1
305. 110. 313. 111. 1
313. 111. 332. 117. 1
332. 117. 345. 117. 1
345. 117. 362. 113. 1
362. 113. 455. 113. 6
455. 113. 505. 113. 6
505. 113. 520. 113.1 6
520. 113.1 531. 113. 6
531. 113. 557. 113. 6
557. 113. 742. 113. 6
362. 113. 390. 111. 1
390. 111. 398. 110. 1
398. 110. 455. 109. 1
455. 109. 505. 109. 1
505. 109. 520. 109.1 1
520. 109.1 531. 109. 1
531. 109. 557. 109. 1
   7. 109. 742. 110. 1
 85. 85. 339. 85. 2
339. 85. 560. 83.5 2
560. 83.5 742. 83.5 2
0. 78. 742. 78. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 100. 32. 0. 0. 1
115. 115. 500. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
228. 100.
300. 105.
742. 105.
BLOCK2-Rankine block, search
0
3000 2 6.
150. 81. 225. 81. 6.
226. 82. 400. 82. 8.
```

A-NAS IR Site 2, Section H-H', Long-Term Static Janbu Block Search

All surfaces evaluated. C:IR2HLTJS.PLT By: MMM 08-02-02 8:30pm



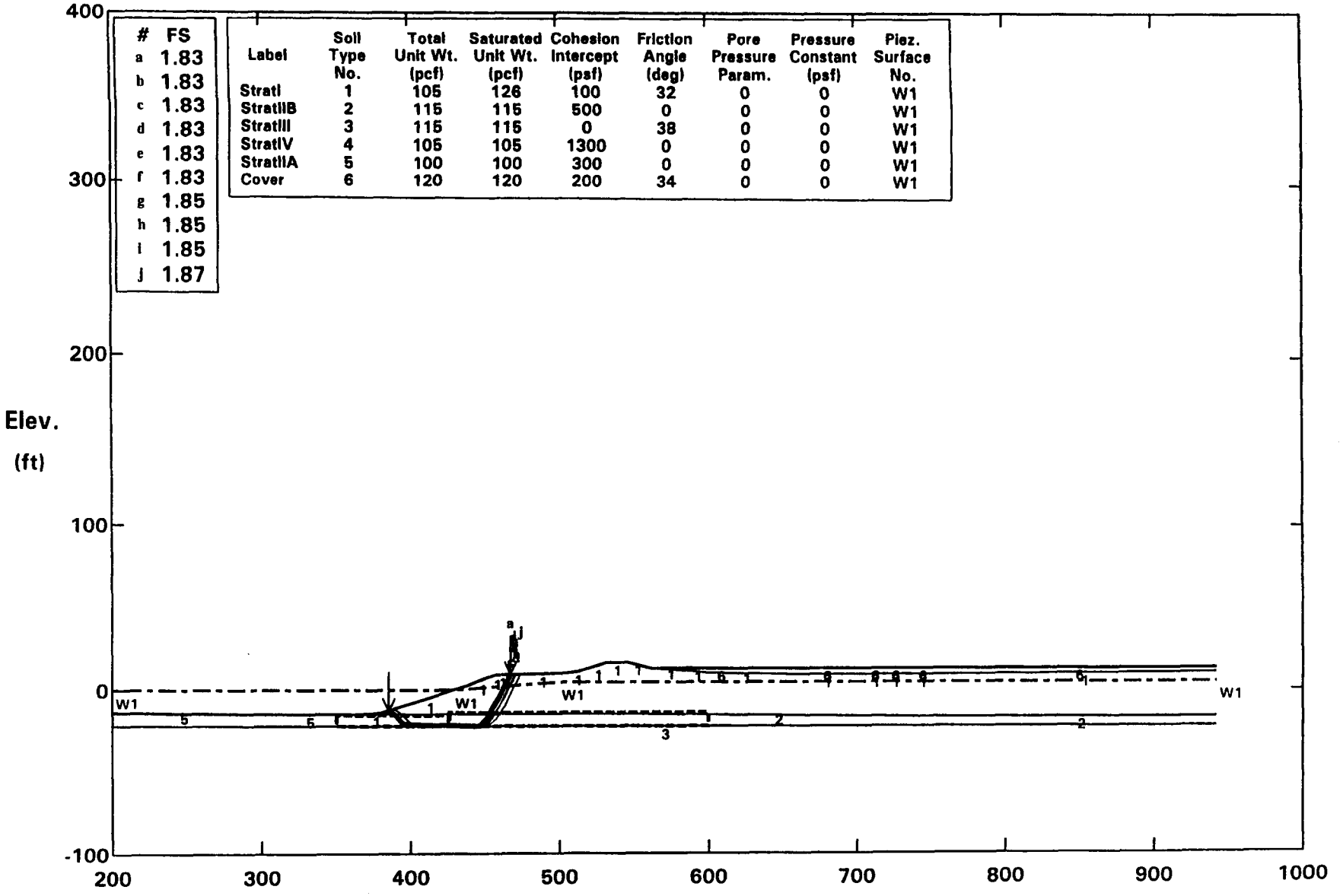
Factors Of Safety Calculated By The Modified Janbu Method

A-NAS IR Site 2, Section H-H', Long-Term Static Janbu Block Search

Ten Most Critical. C:IR2HLTJS.PLT By: MMM 08-02-02 8:30pm

#	FS
a	1.83
b	1.83
c	1.83
d	1.83
e	1.83
f	1.83
g	1.85
h	1.85
i	1.85
j	1.87

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	500	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 1.83 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

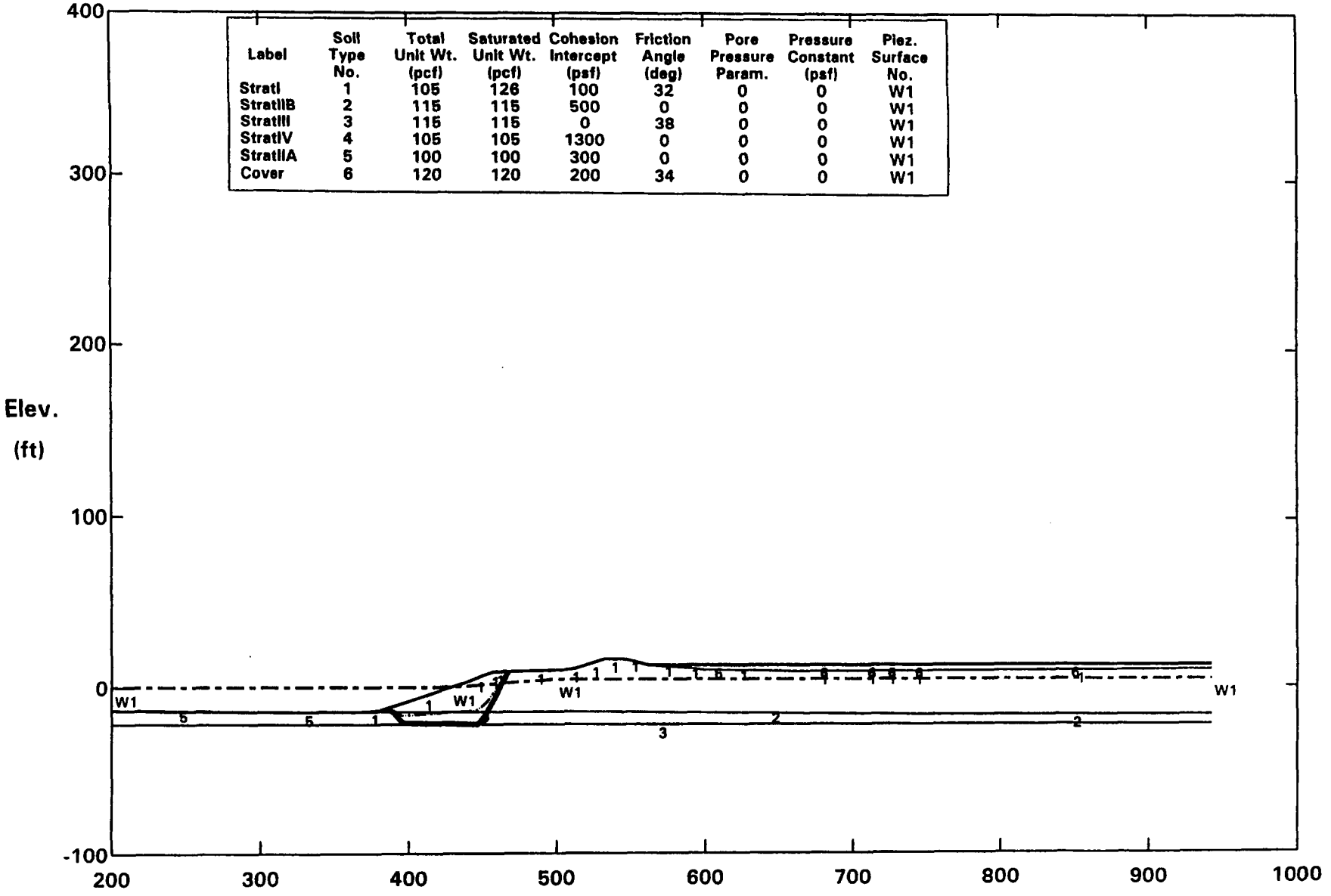
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\H-2\IR2HLTSB.IN  PCSTABL Version 5M /O(200.
 ,-100. )
A-NAS IR Site 2, Section H-H', Long-TermSpencer Static Slope Stability (Block'
30 18
0. 86.5 100. 85. 5
100. 85. 165. 85. 5
165. 85. 181. 86. 1
181. 86. 238. 103. 1
238. 103. 251. 108. 1
251. 108. 258. 109. 1
258. 109. 265. 109. 1
265. 109. 305. 110. 1
305. 110. 313. 111. 1
313. 111. 332. 117. 1
332. 117. 345. 117. 1
345. 117. 362. 113. 1
362. 113. 455. 113. 6
455. 113. 505. 113. 6
505. 113. 520. 113.1 6
520. 113.1 531. 113. 6
531. 113. 557. 113. 6
557. 113. 742. 113. 6
362. 113. 390. 111. 1
390. 111. 398. 110. 1
398. 110. 455. 109. 1
455. 109. 505. 109. 1
505. 109. 520. 109.1 1
520. 109.1 531. 109. 1
531. 109. 557. 109. 1
557. 109. 742. 110. 1
165. 85. 339. 85. 2
339. 85. 560. 83.5 2
560. 83.5 742. 83.5 2
0. 78. 742. 78. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 100. 32. 0. 0. 1
115. 115. 500. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
228. 100.
300. 105.
742. 105.
SPENCR
8.
SURFAC #1-IR2HLTJS.OUT
12
185.29 87.28
189.4 85.
191.33 83.08
195.57 78.83
246.68 78.16
250.92 82.4
```

253.52 85.
256.43 90.25
259.34 95.5
262.25 100.74
[illegible]3.16 105.99
[illegible]6.85 109.05
EXECUT

A-NAS IR Site 2, Section H-H', Long-Term Spencer Static Slope Stability (Block)

Surface #1-IR2HLTJS.OUT. C:IR2HLTSB.PLT By: MMM 08-02-02 8:31pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	500	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



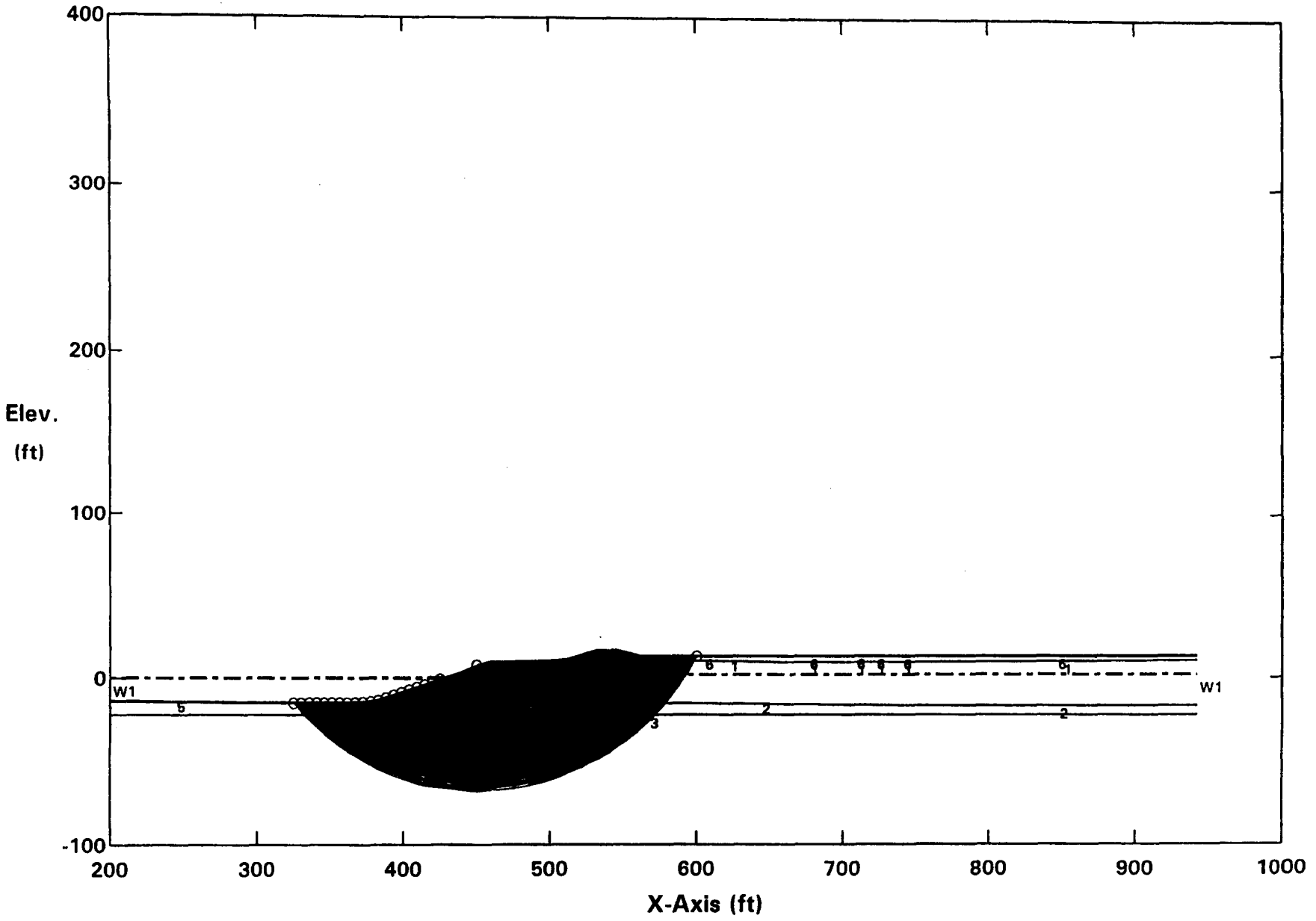
PCSTABL5M FS = 2.36 Theta = 7.31 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\H-2\IR2HBD.IN  PCSTABL Version 5M /O(200. ,
-100. )
 NAS IR Site 2, Section H-H',          Dynamic Bishop Circular Search, 0.1g
   18
0. 86.5 100. 85. 5
100. 85. 165. 85. 5
165. 85. 181. 86. 1
181. 86. 238. 103. 1
238. 103. 251. 108. 1
251. 108. 258. 109. 1
258. 109. 265. 109. 1
265. 109. 305. 110. 1
305. 110. 313. 111. 1
313. 111. 332. 117. 1
332. 117. 345. 117. 1
345. 117. 362. 113. 1
362. 113. 455. 113. 6
455. 113. 505. 113. 6
505. 113. 520. 113.1 6
520. 113.1 531. 113. 6
531. 113. 557. 113. 6
557. 113. 742. 113. 6
362. 113. 390. 111. 1
390. 111. 398. 110. 1
398. 110. 455. 109. 1
455. 109. 505. 109. 1
505. 109. 520. 109.1 1
520. 109.1 531. 109. 1
  1. 109. 557. 109. 1
 57. 109. 742. 110. 1
165. 85. 339. 85. 2
339. 85. 560. 83.5 2
560. 83.5 742. 83.5 2
0. 78. 742. 78. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 450. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
228. 100.
300. 102.
742. 102.
EQUAKE
0.1 0. 0.
CIRCL2-Bishop circular, search
20 125
  5. 225. 250. 400. 0. 10. 0. 0.
```

A-NAS IR Site 2, Section H-H', Dynamic Bishop Circular Search, 0.1g

All surfaces evaluated. C:IR2HBD.PLT By: MMM 08-02-02 8:17pm



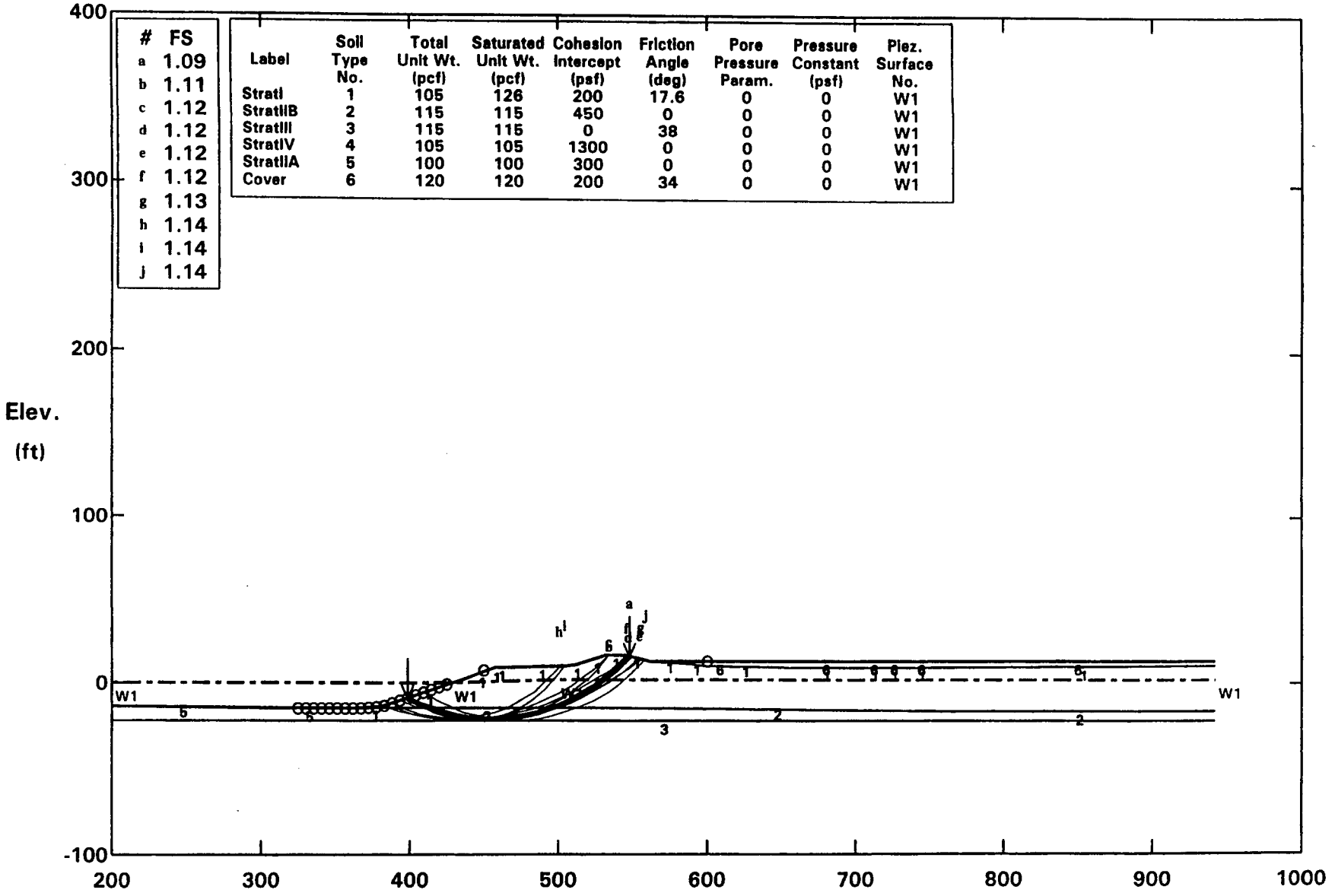
Factors Of Safety Calculated By The Modified Bishop Method

A-NAS IR Site 2, Section H-H', Dynamic Bishop Circular Search, 0.1g

Ten Most Critical. C:IR2HBD.PLT By: MMM 08-02-02 8:17pm

#	FS
a	1.09
b	1.11
c	1.12
d	1.12
e	1.12
f	1.12
g	1.13
h	1.14
i	1.14
j	1.14

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	450	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 1.09 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

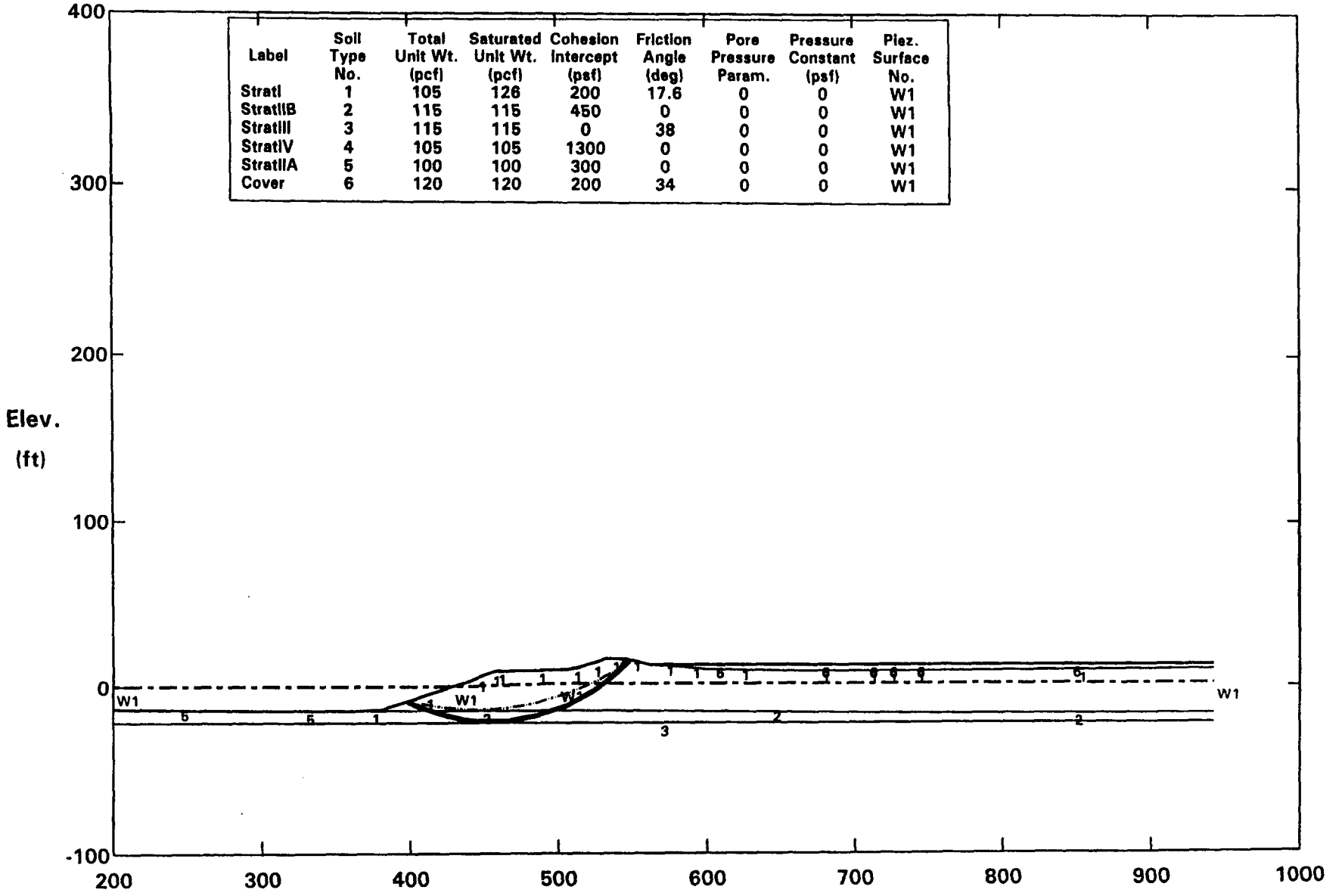
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\H-2\IR2HSSC.IN  PCSTABL Version 5M /O(200.
,-100. )
A-NAS IR Site 2, Section H-H',          Spencer Static Slope Stability (Circ `
30 18
0. 86.5 100. 85. 5
100. 85. 165. 85. 5
165. 85. 181. 86. 1
181. 86. 238. 103. 1
238. 103. 251. 108. 1
251. 108. 258. 109. 1
258. 109. 265. 109. 1
265. 109. 305. 110. 1
305. 110. 313. 111. 1
313. 111. 332. 117. 1
332. 117. 345. 117. 1
345. 117. 362. 113. 1
362. 113. 455. 113. 6
455. 113. 505. 113. 6
505. 113. 520. 113.1 6
520. 113.1 531. 113. 6
531. 113. 557. 113. 6
557. 113. 742. 113. 6
362. 113. 390. 111. 1
390. 111. 398. 110. 1
398. 110. 455. 109. 1
455. 109. 505. 109. 1
505. 109. 520. 109.1 1
520. 109.1 531. 109. 1
531. 109. 557. 109. 1
557. 109. 742. 110. 1
165. 85. 339. 85. 2
339. 85. 560. 83.5 2
560. 83.5 742. 83.5 2
0. 78. 742. 78. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 450. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
228. 100.
300. 102.
742. 102.
SPENCR
8.
SURBIS #1-IR2HBD.OUT
8
198.68 91.27
207.88 87.35
217.35 84.12
227.03 81.61
236.87 79.84
246.82 78.81
```

256.81 78.54
266.8 79.01
276.73 80.23
286.53 82.2
[illegible]5.16 84.9
305.56 88.31
314.68 92.42
323.46 97.2
331.85 102.63
339.82 108.68
347.31 115.31
348.22 116.24
EXECUT

A-NAS IR Site 2, Section H-H', Spencer Static Slope Stability (Circ.)

Surface #1-IR2HBD.OUT. C:IR2HSSC.PLT By: MMM 08-02-02 8:19pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	450	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FS = 1.97 Theta = 5.46 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

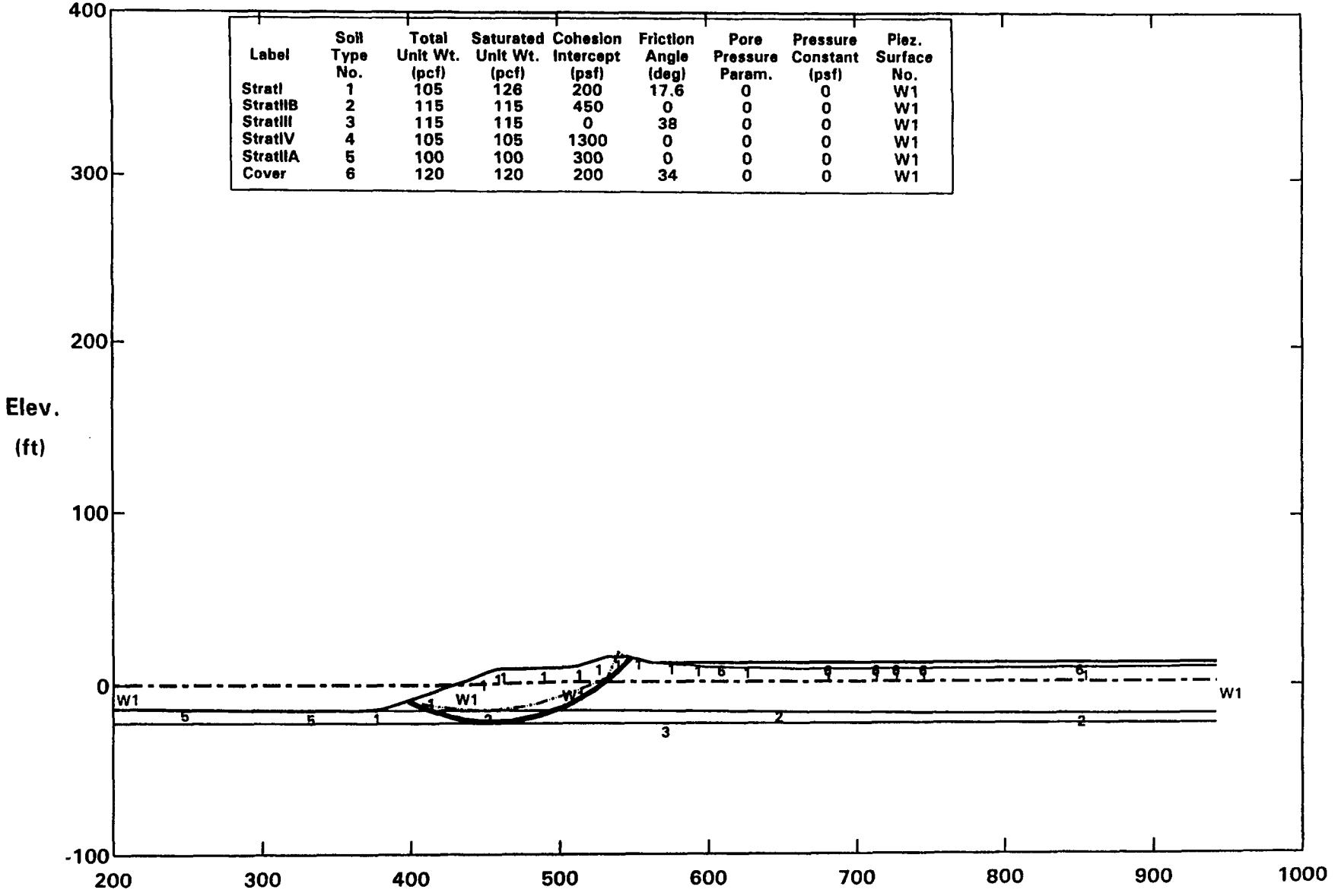
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\H-2\IR2HSDC.IN  PCSTABL Version 5M /O(200.
,-100. )
' NAS IR Site 2, Section H-H', (Circ.)  Spencer Dynamic Slope Stability Ky=.11g
   18
.. 86.5 100. 85. 5
100. 85. 165. 85. 5
165. 85. 181. 86. 1
181. 86. 238. 103. 1
238. 103. 251. 108. 1
251. 108. 258. 109. 1
258. 109. 265. 109. 1
265. 109. 305. 110. 1
305. 110. 313. 111. 1
313. 111. 332. 117. 1
332. 117. 345. 117. 1
345. 117. 362. 113. 1
362. 113. 455. 113. 6
455. 113. 505. 113. 6
505. 113. 520. 113.1 6
520. 113.1 531. 113. 6
531. 113. 557. 113. 6
557. 113. 742. 113. 6
362. 113. 390. 111. 1
390. 111. 398. 110. 1
398. 110. 455. 109. 1
455. 109. 505. 109. 1
505. 109. 520. 109.1 1
520. 109.1 531. 109. 1
  .. 109. 557. 109. 1
 ,7. 109. 742. 110. 1
165. 85. 339. 85. 2
339. 85. 560. 83.5 2
560. 83.5 742. 83.5 2
0. 78. 742. 78. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 450. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
228. 100.
300. 102.
742. 102.
EQUAKE
0.11 0. 0.
SPENCR
8.
  'BIS #1-IR2HBD.OUT

198.68 91.27
207.88 87.35
217.35 84.12
227.03 81.61
```

```
236.87 79.84
246.82 78.81
256.81 78.54
266.8 79.01
276.73 80.23
286.53 82.2
296.16 84.9
305.56 88.31
314.68 92.42
323.46 97.2
331.85 102.63
339.82 108.68
347.31 115.31
348.22 116.24
EXECUT
```

A-NAS IR Site 2, Section H-H', (Circ.) Spencer Dynamic Slope Stability Ky = .11g

Surface #1-IR2HBD.OUT. C:IR2HSDC.PLT By: MMM 08-02-02 8:18pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	450	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



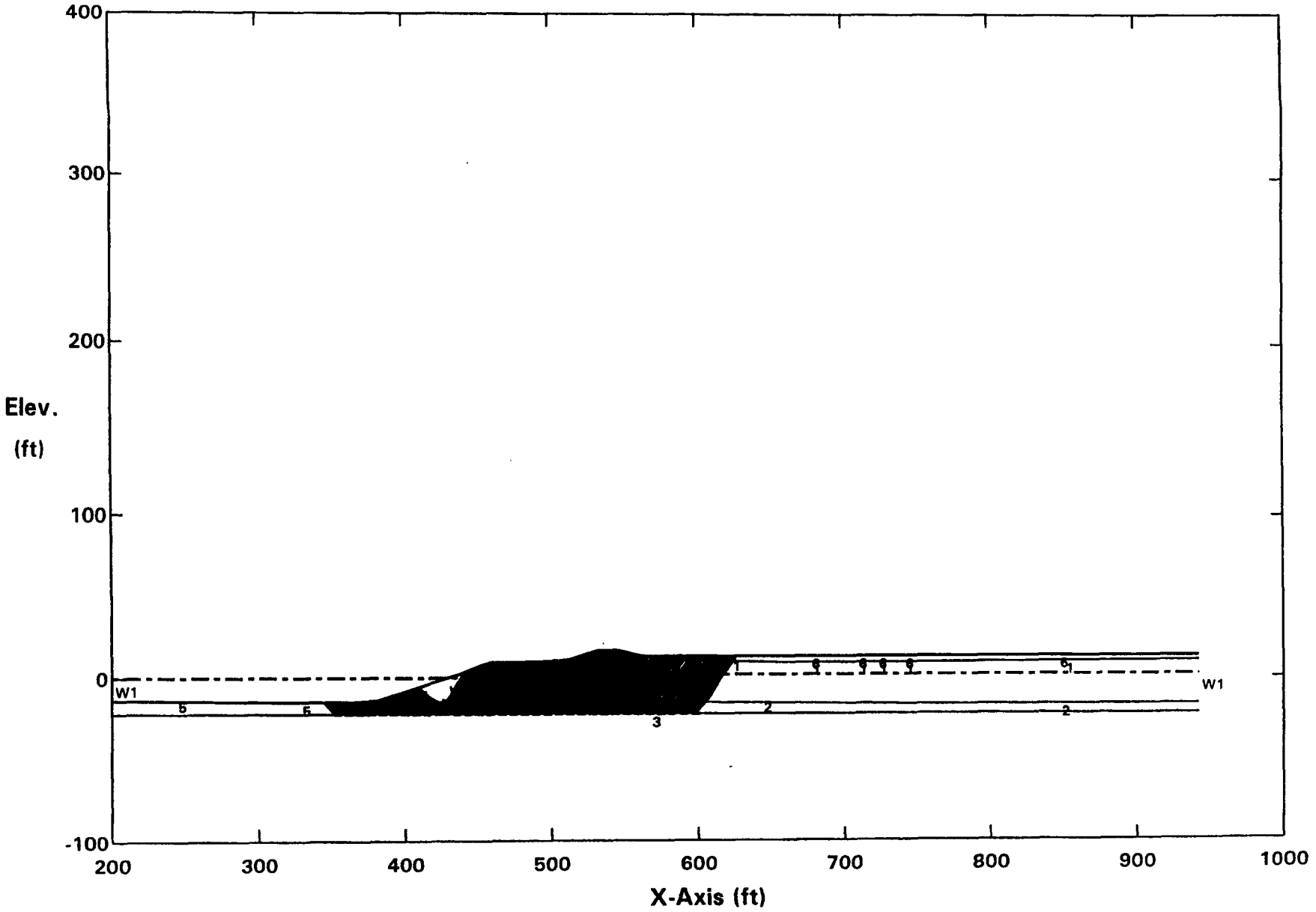
PCSTABL5M FS = 1.00 Theta = 3.09 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL       C:\GEO\STED\A-NAS\SITE2\H-2\IR2HJD.IN  PCSTABL Version 5M /O(200. ,
-100. )
A-NAS IR Site 2, Section H-H',          Dynamic Janbu Block Search, 0.1g
30 18
0. 86.5 100. 85. 5
100. 85. 165. 85. 5
165. 85. 181. 86. 1
181. 86. 238. 103. 1
238. 103. 251. 108. 1
251. 108. 258. 109. 1
258. 109. 265. 109. 1
265. 109. 305. 110. 1
305. 110. 313. 111. 1
313. 111. 332. 117. 1
332. 117. 345. 117. 1
345. 117. 362. 113. 1
362. 113. 455. 113. 6
455. 113. 505. 113. 6
505. 113. 520. 113.1 6
520. 113.1 531. 113. 6
531. 113. 557. 113. 6
557. 113. 742. 113. 6
362. 113. 390. 111. 1
390. 111. 398. 110. 1
398. 110. 455. 109. 1
455. 109. 505. 109. 1
505. 109. 520. 109.1 1
520. 109.1 531. 109. 1
531. 109. 557. 109. 1
557. 109. 742. 110. 1
165. 85. 339. 85. 2
339. 85. 560. 83.5 2
560. 83.5 742. 83.5 2
0. 78. 742. 78. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 450. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
228. 100.
300. 102.
742. 102.
EQUAKE
0.1 0. 0.
BLOCK2-Rankine block, search
0
3000 2 6.
150. 81. 225. 81. 6.
226. 82. 400. 82. 8.
```

A-NAS IR Site 2, Section H-H', Dynamic Janbu Block Search, 0.1g

All surfaces evaluated. C:IR2HJD.PLT By: MMM 08-02-02 8:23pm



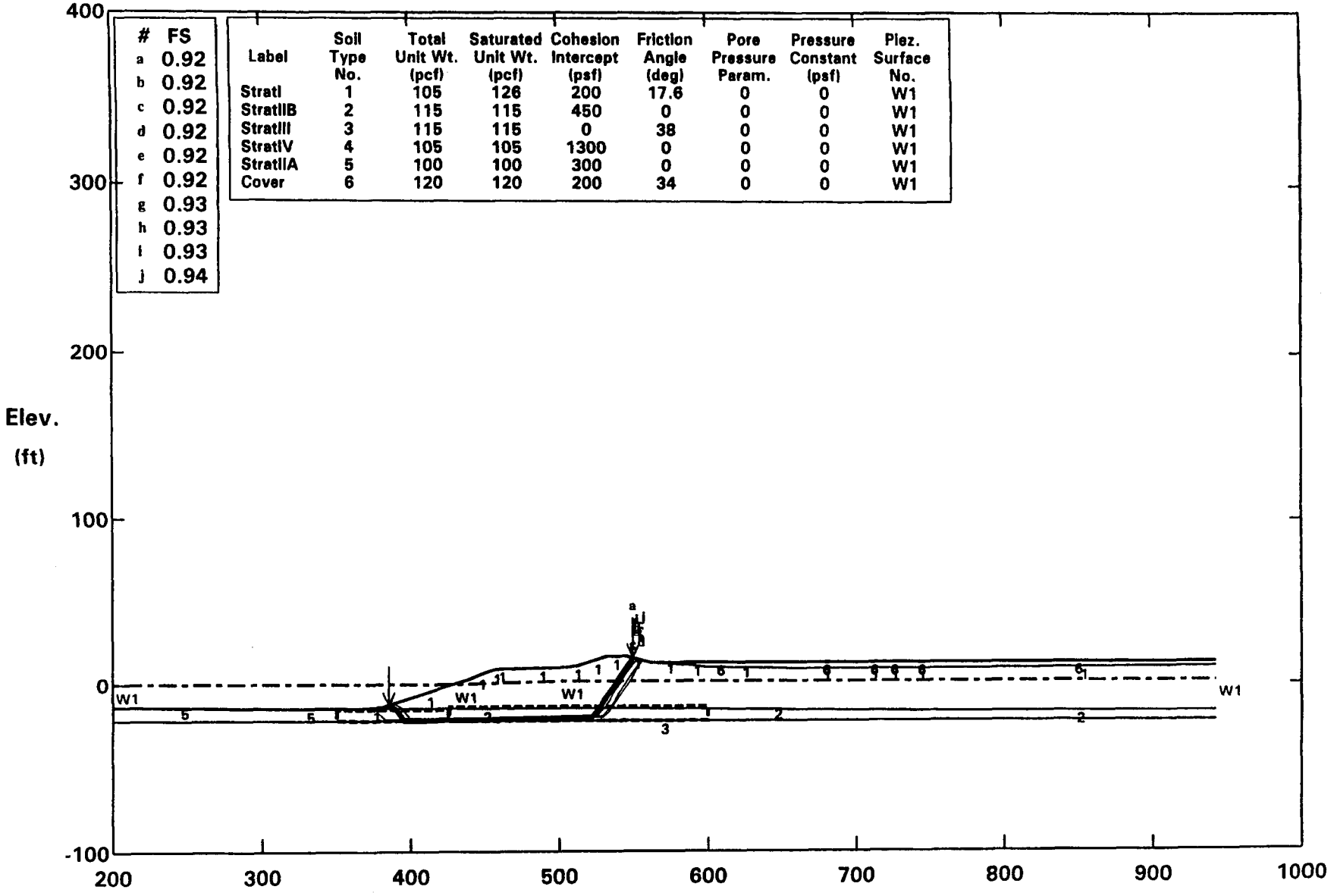
Factors Of Safety Calculated By The Modified Janbu Method

A-NAS IR Site 2, Section H-H', Dynamic Janbu Block Search, 0.1g

Ten Most Critical. C:IR2HJD.PLT By: MMM 08-02-02 8:23pm

#	FS
a	0.92
b	0.92
c	0.92
d	0.92
e	0.92
f	0.92
g	0.93
h	0.93
i	0.93
j	0.94

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	450	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 0.92 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

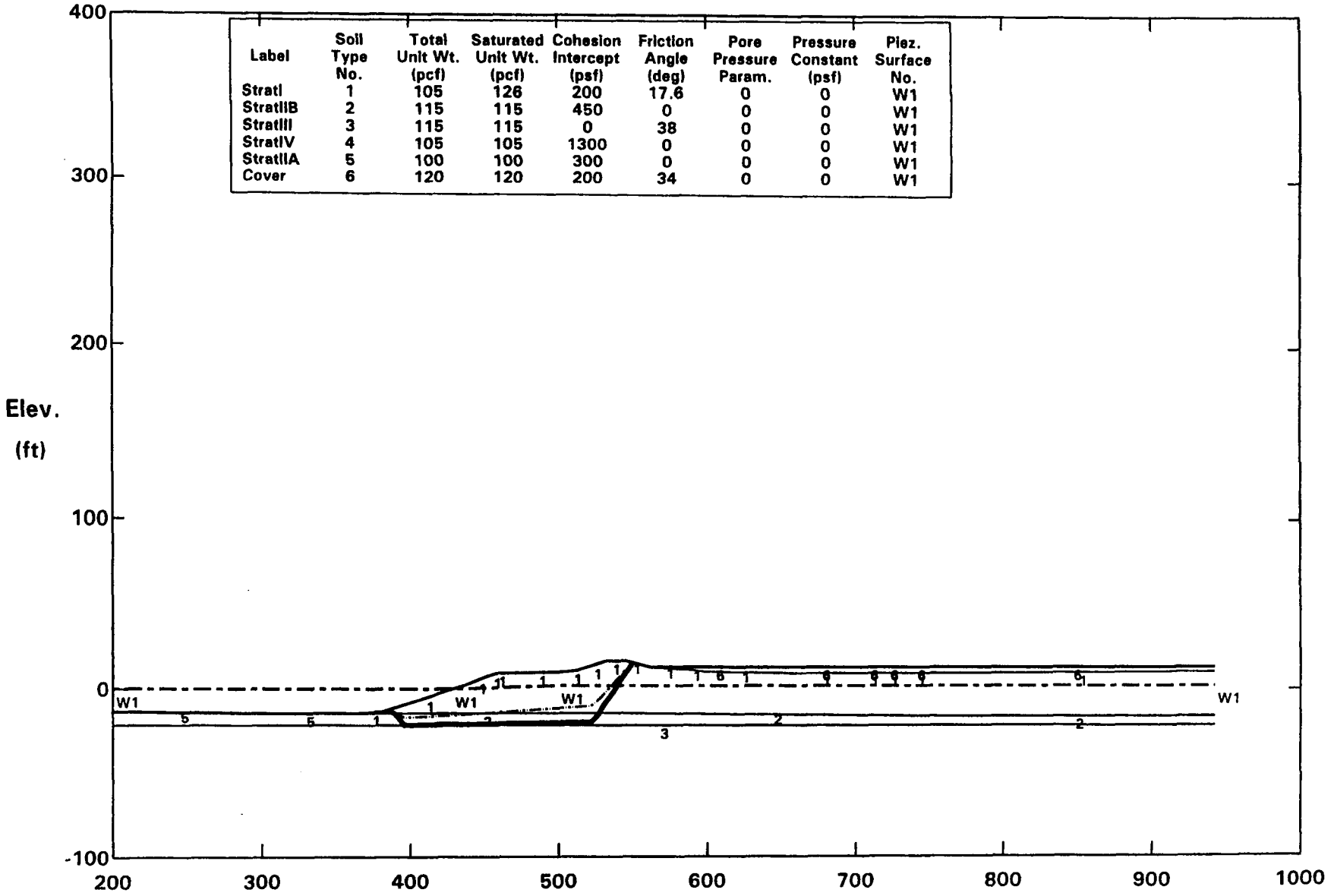
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\H-2\IR2HSSB.IN  PCSTABL Version 5M /O(200.
,-100. )
* NAS IR Site 2, Section H-H',          Spencer Static Slope Stability (Block)
   18
0. 86.5 100. 85. 5
100. 85. 165. 85. 5
165. 85. 181. 86. 1
181. 86. 238. 103. 1
238. 103. 251. 108. 1
251. 108. 258. 109. 1
258. 109. 265. 109. 1
265. 109. 305. 110. 1
305. 110. 313. 111. 1
313. 111. 332. 117. 1
332. 117. 345. 117. 1
345. 117. 362. 113. 1
362. 113. 455. 113. 6
455. 113. 505. 113. 6
505. 113. 520. 113.1 6
520. 113.1 531. 113. 6
531. 113. 557. 113. 6
557. 113. 742. 113. 6
362. 113. 390. 111. 1
390. 111. 398. 110. 1
398. 110. 455. 109. 1
455. 109. 505. 109. 1
505. 109. 520. 109.1 1
520. 109.1 531. 109. 1
   [illegible]. 109. 557. 109. 1
   [illegible]7. 109. 742. 110. 1
165. 85. 339. 85. 2
339. 85. 560. 83.5 2
560. 83.5 742. 83.5 2
0. 78. 742. 78. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 450. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
228. 100.
300. 102.
742. 102.
SPENCR
10.
SURFAC #1-IR2HJD.OUT
14
  [illegible].65 87.39
   .92 85.
191.55 82.37
195.79 78.13
321.95 79.9
326.2 84.14
```

```
327.05 85.
330.6 89.84
334.14 94.68
337.69 99.53
341.23 104.37
344.77 109.21
348.32 114.05
349.67 115.9
EXECUT
```

A-NAS IR Site 2, Section H-H', Spencer Static Slope Stability (Block)

Surface #1-IR2HJD.OUT. C:IR2HSSB.PLT By: MMM 08-02-02 8:28pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	450	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FS = 1.89 Theta = 5.55 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

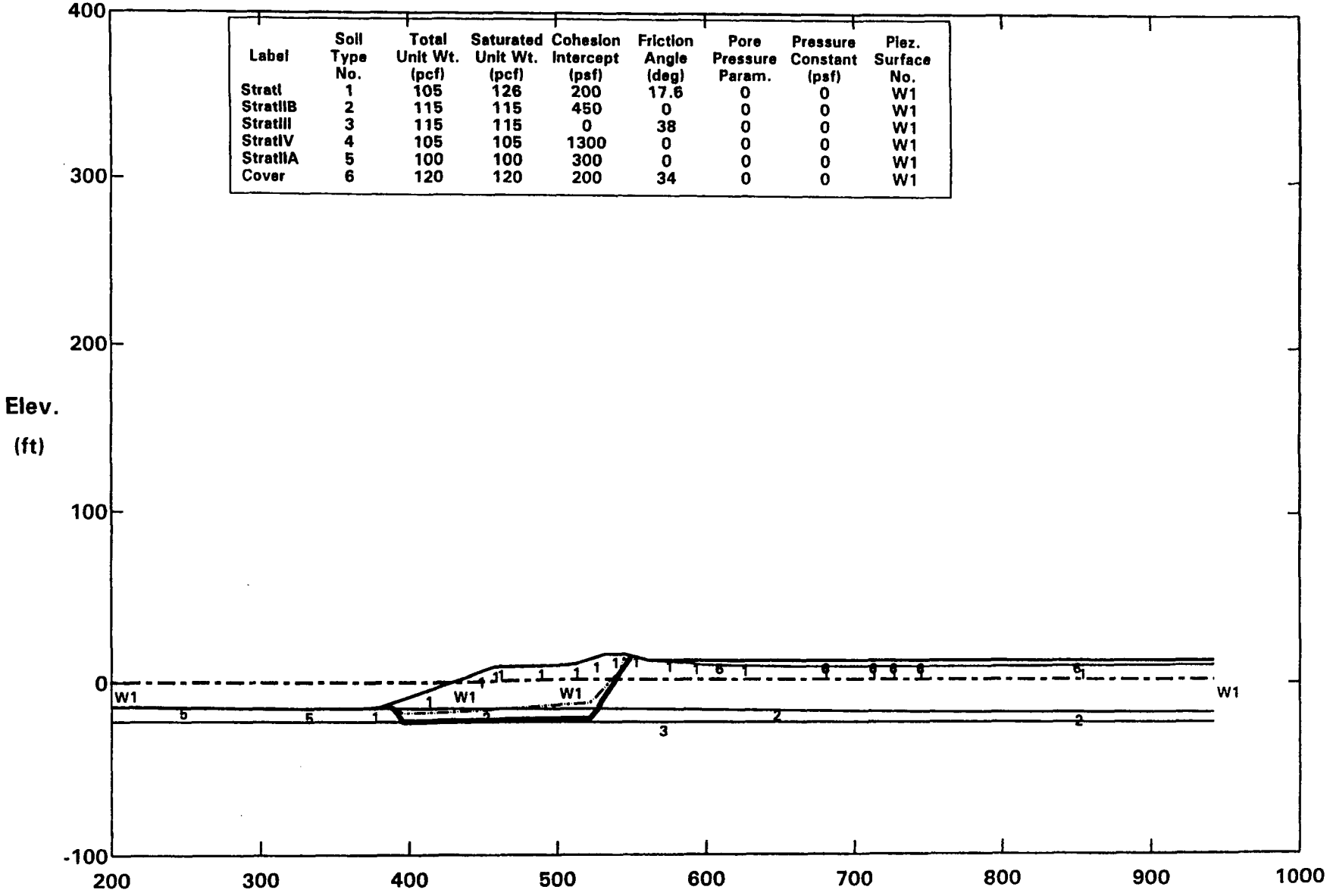
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\H-2\IR2HSDB.IN  PCSTABL Version 5M /O(200.
,-100. )
A-NAS IR Site 2, Section H-H', (Block)  Spencer Dynamic Slope Stability Ky=.0
30 18
0. 86.5 100. 85. 5
100. 85. 165. 85. 5
165. 85. 181. 86. 1
181. 86. 238. 103. 1
238. 103. 251. 108. 1
251. 108. 258. 109. 1
258. 109. 265. 109. 1
265. 109. 305. 110. 1
305. 110. 313. 111. 1
313. 111. 332. 117. 1
332. 117. 345. 117. 1
345. 117. 362. 113. 1
362. 113. 455. 113. 6
455. 113. 505. 113. 6
505. 113. 520. 113.1 6
520. 113.1 531. 113. 6
531. 113. 557. 113. 6
557. 113. 742. 113. 6
362. 113. 390. 111. 1
390. 111. 398. 110. 1
398. 110. 455. 109. 1
455. 109. 505. 109. 1
505. 109. 520. 109.1 1
520. 109.1 531. 109. 1
531. 109. 557. 109. 1
557. 109. 742. 110. 1
165. 85. 339. 85. 2
339. 85. 560. 83.5 2
560. 83.5 742. 83.5 2
0. 78. 742. 78. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 450. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
228. 100.
300. 102.
742. 102.
EQUAKE
0.092 0. 0.
SPENCR
10.
SURFAC #1-IR2HJD.OUT
14
185.65 87.39
188.92 85.
191.55 82.37
195.79 78.13
```

321.95 79.9
326.2 84.14
327.05 85.
330.6 89.84
334.14 94.68
337.69 99.53
341.23 104.37
344.77 109.21
348.32 114.05
349.67 115.9
EXECUT

A-NAS IR Site 2, Section H-H', (Block) Spencer Dynamic Slope Stability Ky = .09g

Surface #1-IR2HJD.OUT. C:IR2HSDB.PLT By: MMM 08-02-02 8:28pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	450	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



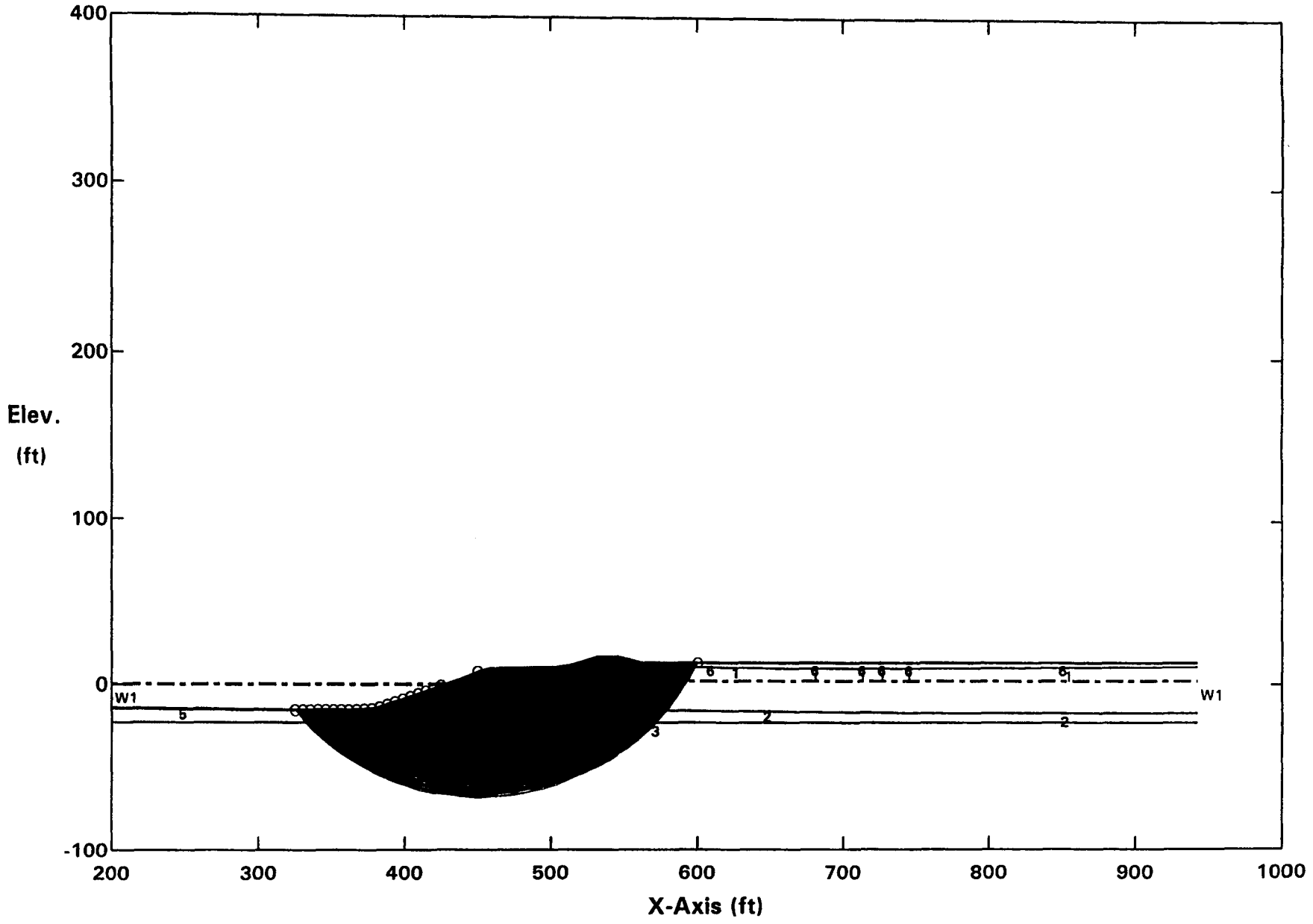
PCSTABL5M FS = 1.00 Theta = 4.08 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL       C:\GEO\STED\A-NAS\SITE2\H-2\IR2HEQBS.IN  PCSTABL Version 5M /O(200.
 ,-100. )
A-NAS IR Site 2, Section H-H', Post-EQ  Static Bishop Circular Search
   18
.. 86.5 100. 85. 5
100. 85. 165. 85. 5
165. 85. 181. 86. 1
181. 86. 238. 103. 1
238. 103. 251. 108. 1
251. 108. 258. 109. 1
258. 109. 265. 109. 1
265. 109. 305. 110. 1
305. 110. 313. 111. 1
313. 111. 332. 117. 1
332. 117. 345. 117. 1
345. 117. 362. 113. 1
362. 113. 455. 113. 6
455. 113. 505. 113. 6
505. 113. 520. 113.1 6
520. 113.1 531. 113. 6
531. 113. 557. 113. 6
557. 113. 742. 113. 6
362. 113. 390. 111. 1
390. 111. 398. 110. 1
398. 110. 455. 109. 1
455. 109. 505. 109. 1
505. 109. 520. 109.1 1
520. 109.1 531. 109. 1
  1. 109. 557. 109. 1
  7. 109. 742. 110. 1
165. 85. 339. 85. 2
339. 85. 560. 83.5 2
560. 83.5 742. 83.5 2
0. 78. 742. 78. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
228. 100.
300. 102.
742. 102.
CIRCL2-Bishop circular, search
20 125
125. 225. 250. 400. 0. 10. 0. 0.
```

A-NAS IR Site 2, Section H-H', Post-EQ Static Bishop Circular Search

All surfaces evaluated. C:IR2HEQBS.PLT By: MMM 08-02-02 8:19pm



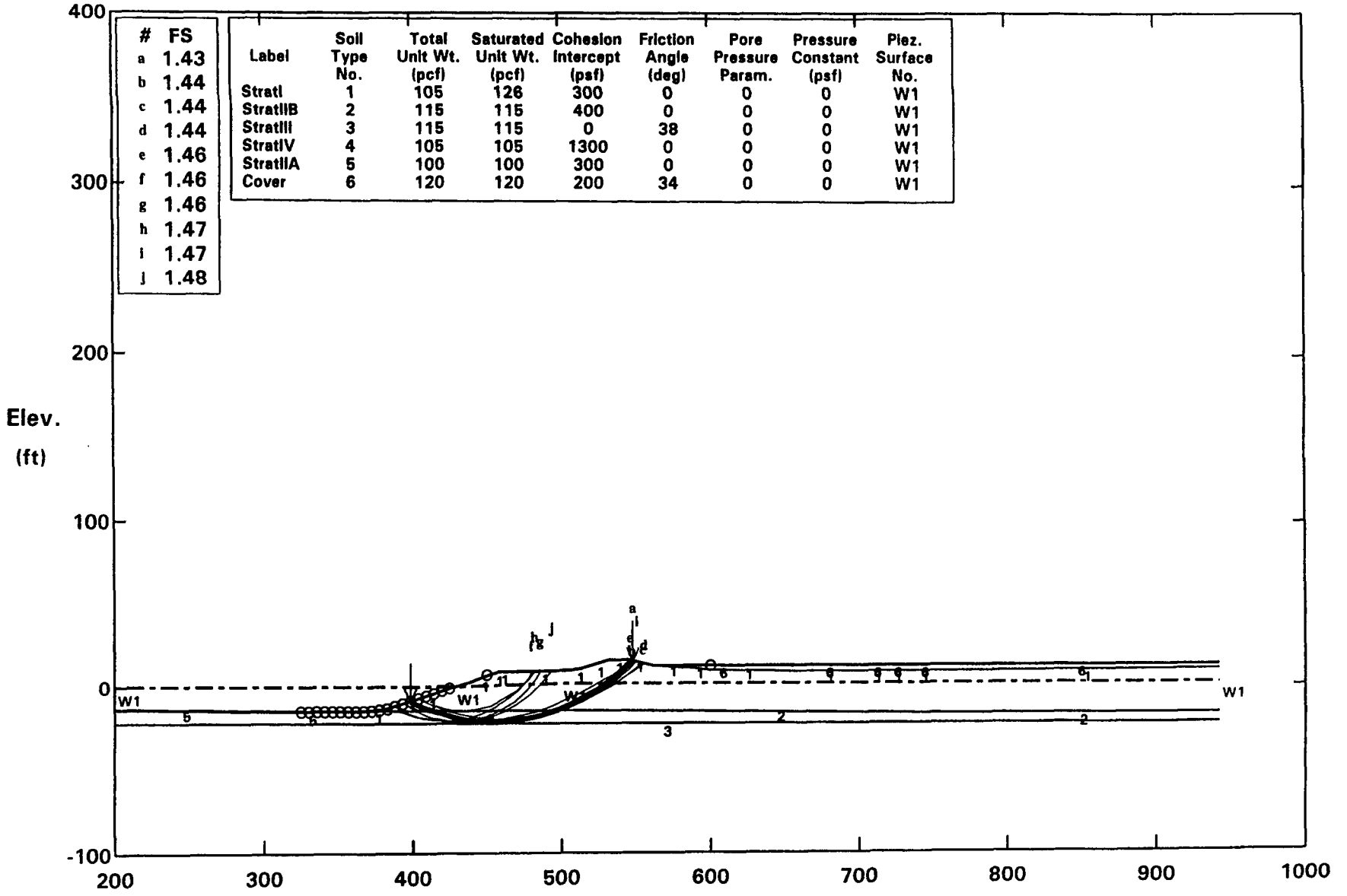
Factors Of Safety Calculated By The Modified Bishop Method

A-NAS IR Site 2, Section H-H', Post-EQ Static Bishop Circular Search

Ten Most Critical. C:IR2HEQBS.PLT By: MMM 08-02-02 8:19pm

#	FS
a	1.43
b	1.44
c	1.44
d	1.44
e	1.46
f	1.46
g	1.46
h	1.47
i	1.47
j	1.48

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 1.43 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

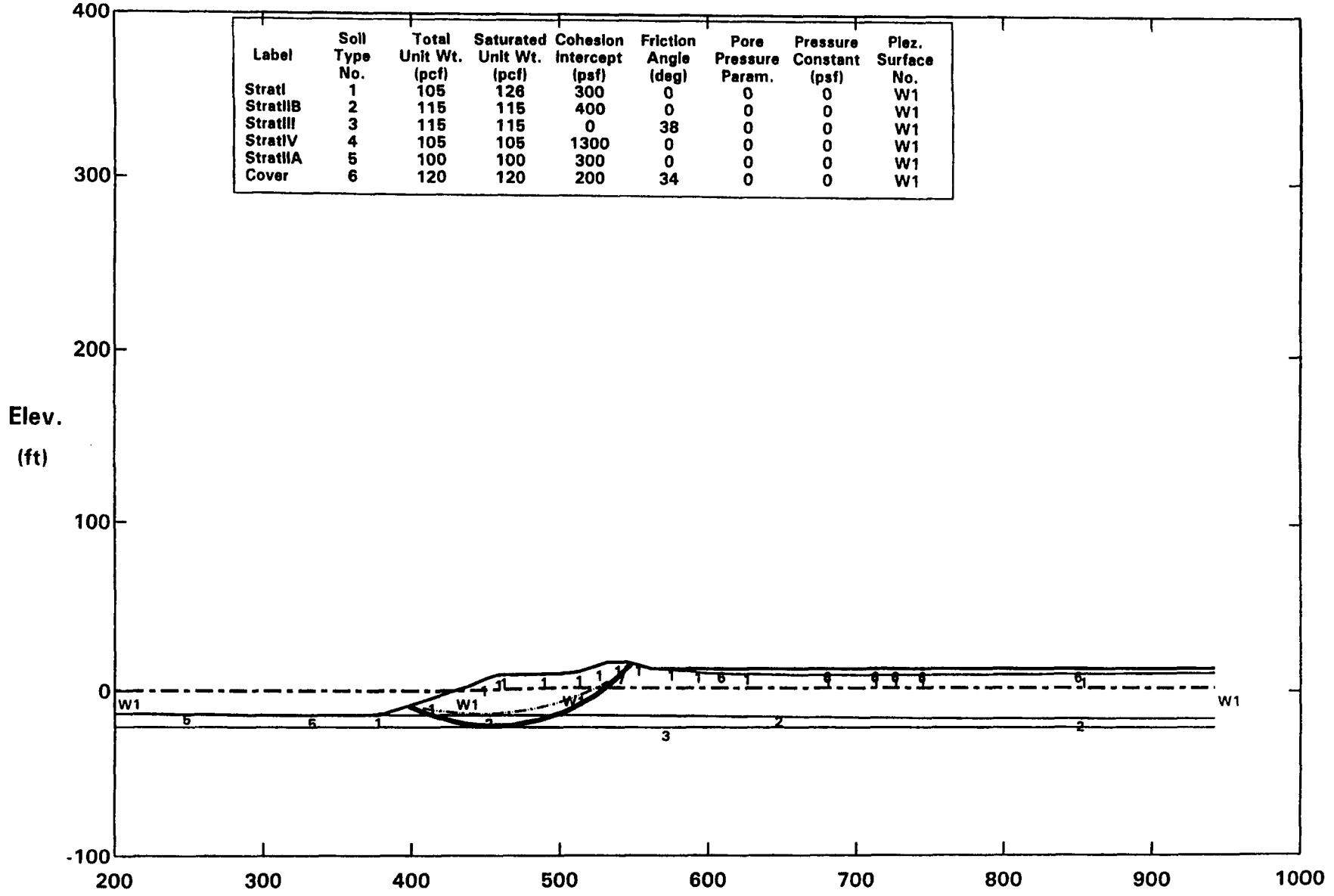
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\H-2\IR2HEQSC.IN  PCSTABL Version 5M /O(200.
 ,-100. )
A-NAS IR Site 2, Section H-H', Post-EQ  Spencer Static Slope Stability (Circ `
30 18
0. 86.5 100. 85. 5
100. 85. 165. 85. 5
165. 85. 181. 86. 1
181. 86. 238. 103. 1
238. 103. 251. 108. 1
251. 108. 258. 109. 1
258. 109. 265. 109. 1
265. 109. 305. 110. 1
305. 110. 313. 111. 1
313. 111. 332. 117. 1
332. 117. 345. 117. 1
345. 117. 362. 113. 1
362. 113. 455. 113. 6
455. 113. 505. 113. 6
505. 113. 520. 113.1 6
520. 113.1 531. 113. 6
531. 113. 557. 113. 6
557. 113. 742. 113. 6
362. 113. 390. 111. 1
390. 111. 398. 110. 1
398. 110. 455. 109. 1
455. 109. 505. 109. 1
505. 109. 520. 109.1 1
520. 109.1 531. 109. 1
531. 109. 557. 109. 1
557. 109. 742. 110. 1
165. 85. 339. 85. 2
339. 85. 560. 83.5 2
560. 83.5 742. 83.5 2
0. 78. 742. 78. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
228. 100.
300. 102.
742. 102.
SPENCR
8.
SURBIS #1-IR2HEQBS.OUT
18
198.68 91.27
207.88 87.35
217.35 84.12
227.03 81.61
236.87 79.84
246.82 78.81
```

256.81 78.54
266.8 79.01
276.73 80.23
286.53 82.2
295.16 84.9
305.56 88.31
314.68 92.42
323.46 97.2
331.85 102.63
339.82 108.68
347.31 115.31
348.22 116.24
EXECUT

A-NAS IR Site 2, Section H-H', Post-EQ Spencer Static Slope Stability (Circ.)

Surface #1-IR2HEQBS.OUT. C:IR2HEQSC.PLT By: MMM 08-02-02 8:20pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



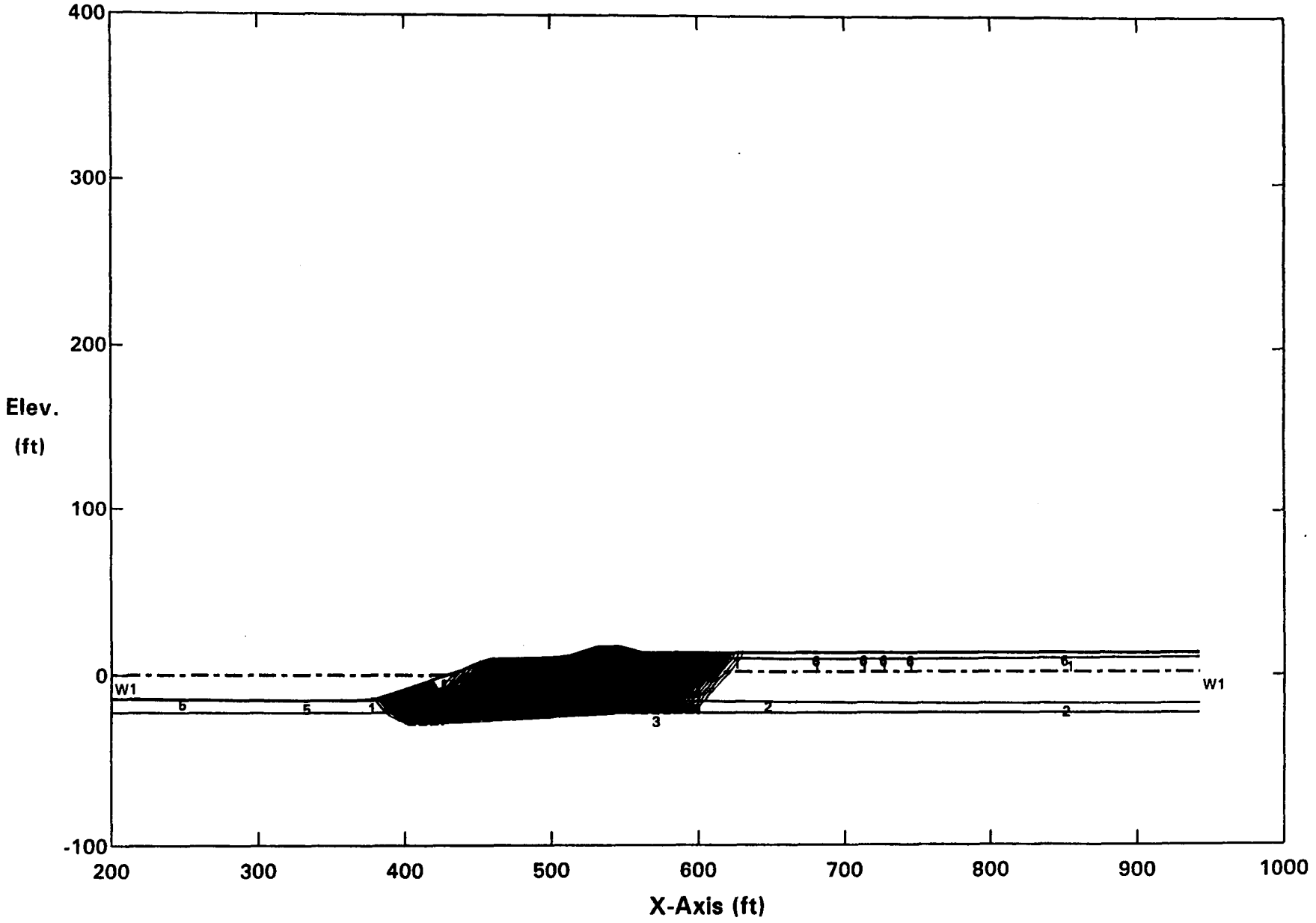
PCSTABL5M FS = 1.43 Theta = 5.66 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\H-2\IR2HEQJS.IN  PCSTABL Version 5M /O(200.
 ,-100. )
* NAS IR Site 2, Section H-H', Post-EQ  Static Janbu Block Search
   18
0. 86.5 100. 85. 5
100. 85. 165. 85. 5
165. 85. 181. 86. 1
181. 86. 238. 103. 1
238. 103. 251. 108. 1
251. 108. 258. 109. 1
258. 109. 265. 109. 1
265. 109. 305. 110. 1
305. 110. 313. 111. 1
313. 111. 332. 117. 1
332. 117. 345. 117. 1
345. 117. 362. 113. 1
362. 113. 455. 113. 6
455. 113. 505. 113. 6
505. 113. 520. 113.1 6
520. 113.1 531. 113. 6
531. 113. 557. 113. 6
557. 113. 742. 113. 6
362. 113. 390. 111. 1
390. 111. 398. 110. 1
398. 110. 455. 109. 1
455. 109. 505. 109. 1
505. 109. 520. 109.1 1
520. 109.1 531. 109. 1
   . 109. 557. 109. 1
 57. 109. 742. 110. 1
165. 85. 339. 85. 2
339. 85. 560. 83.5 2
560. 83.5 742. 83.5 2
0. 78. 742. 78. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
228. 100.
300. 102.
742. 102.
BLOCK2-Rankine block, search
0
3000 2 6.
200. 81. 225. 81. 20.
   . 87. 400. 87. 18.
```

A-NAS IR Site 2, Section H-H', Post-EQ Static Janbu Block Search

All surfaces evaluated. C:IR2HEQJS.PLT By: MMM 08-02-02 8:34pm



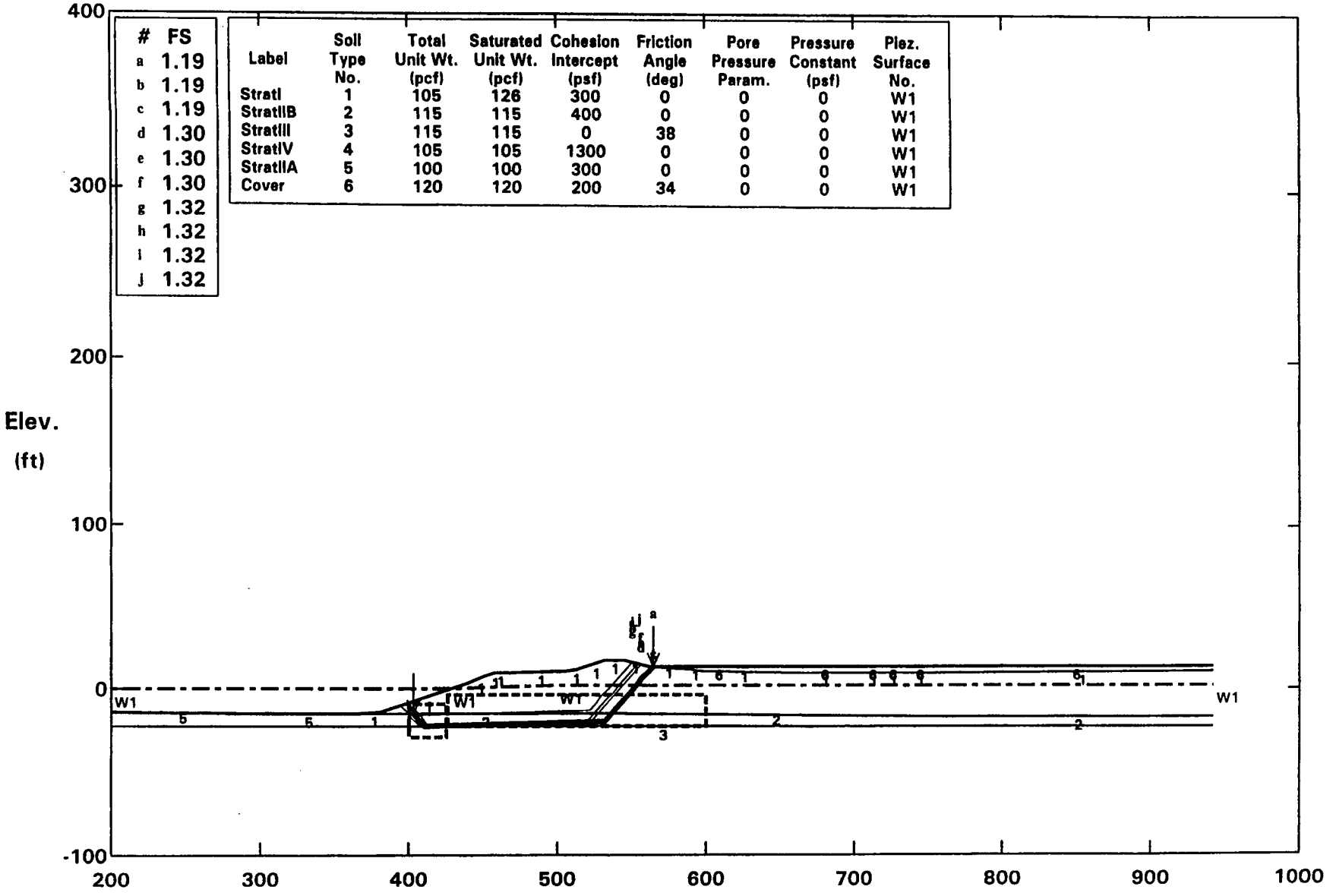
Factors Of Safety Calculated By The Modified Janbu Method

A-NAS IR Site 2, Section H-H', Post-EQ Static Janbu Block Search

Ten Most Critical. C:IR2HEQJS.PLT By: MMM 08-02-02 8:34pm

#	FS
a	1.19
b	1.19
c	1.19
d	1.30
e	1.30
f	1.30
g	1.32
h	1.32
i	1.32
j	1.32

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 1.19 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

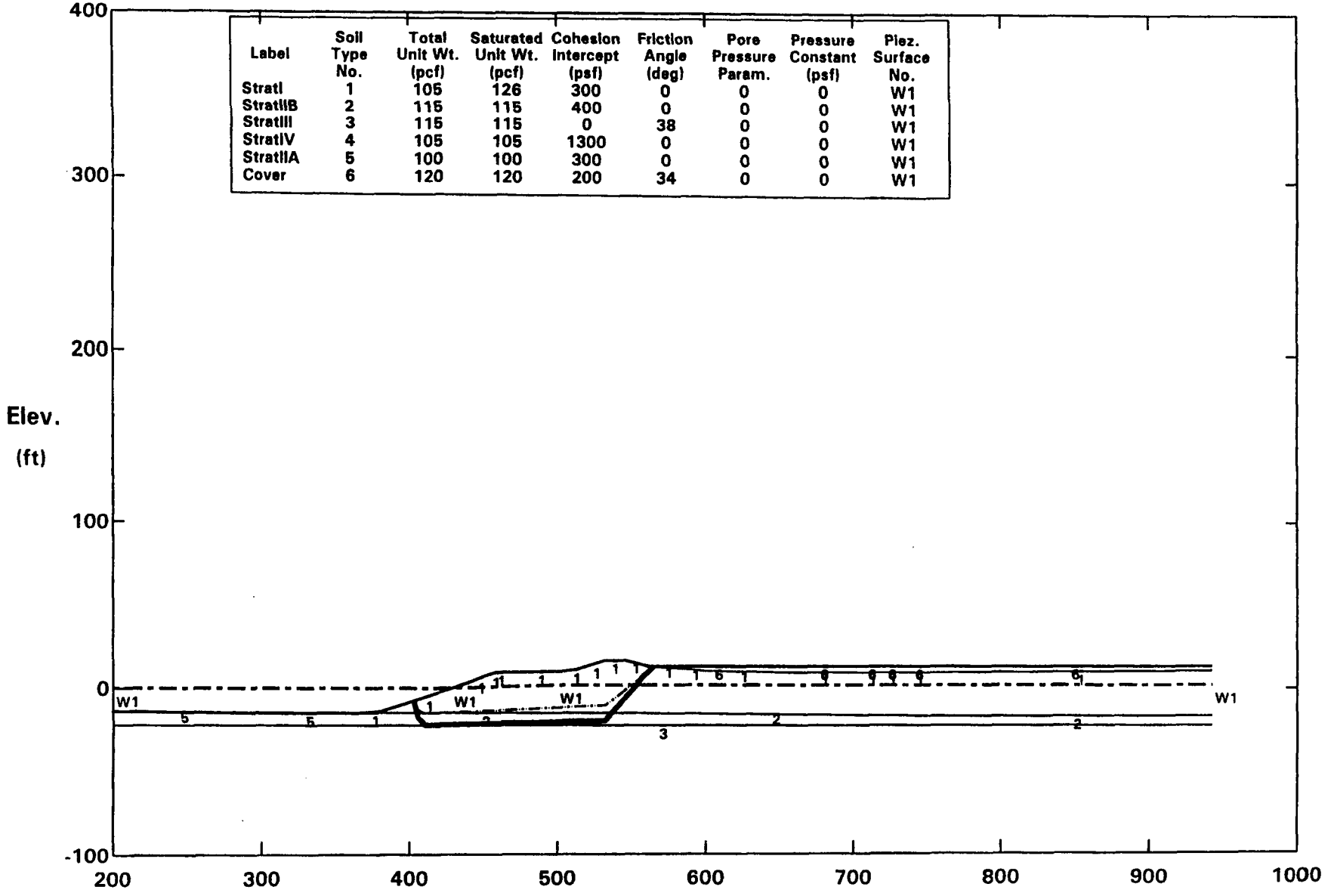
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\H-2\IR2HEQSB.IN  PCSTABL Version 5M /O(200.
 ,-100. )
A-NAS IR Site 2, Section H-H', Post-EQ  Spencer Static Slope Stability (Block'
30 18
0. 86.5 100. 85. 5
100. 85. 165. 85. 5
165. 85. 181. 86. 1
181. 86. 238. 103. 1
238. 103. 251. 108. 1
251. 108. 258. 109. 1
258. 109. 265. 109. 1
265. 109. 305. 110. 1
305. 110. 313. 111. 1
313. 111. 332. 117. 1
332. 117. 345. 117. 1
345. 117. 362. 113. 1
362. 113. 455. 113. 6
455. 113. 505. 113. 6
505. 113. 520. 113.1 6
520. 113.1 531. 113. 6
531. 113. 557. 113. 6
557. 113. 742. 113. 6
362. 113. 390. 111. 1
390. 111. 398. 110. 1
398. 110. 455. 109. 1
455. 109. 505. 109. 1
505. 109. 520. 109.1 1
520. 109.1 531. 109. 1
531. 109. 557. 109. 1
557. 109. 742. 110. 1
165. 85. 339. 85. 2
339. 85. 560. 83.5 2
560. 83.5 742. 83.5 2
0. 78. 742. 78. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
228. 100.
300. 102.
742. 102.
SPENCR
8.
SURFAC #1-IR2HEQJS.OUT
13
203.31 85.
206.07 82.24
210.31 78.
332.32 81.02
336.3 85.
340.54 89.24
```

```
344.78 93.49
349.02 97.73
353.27 101.97
357.51 106.21
  1.75 110.46
364.14 112.85
364.22 113.
EXECUT
```

A-NAS IR Site 2, Section H-H', Post-EQ Spencer Static Slope Stability (Block)

Surface #1-IR2HEQJS.OUT. C:IR2HEQSB.PLT By: MMM 08-02-02 8:34pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FS = 1.93 Theta = 3.66 X-Axis (ft)

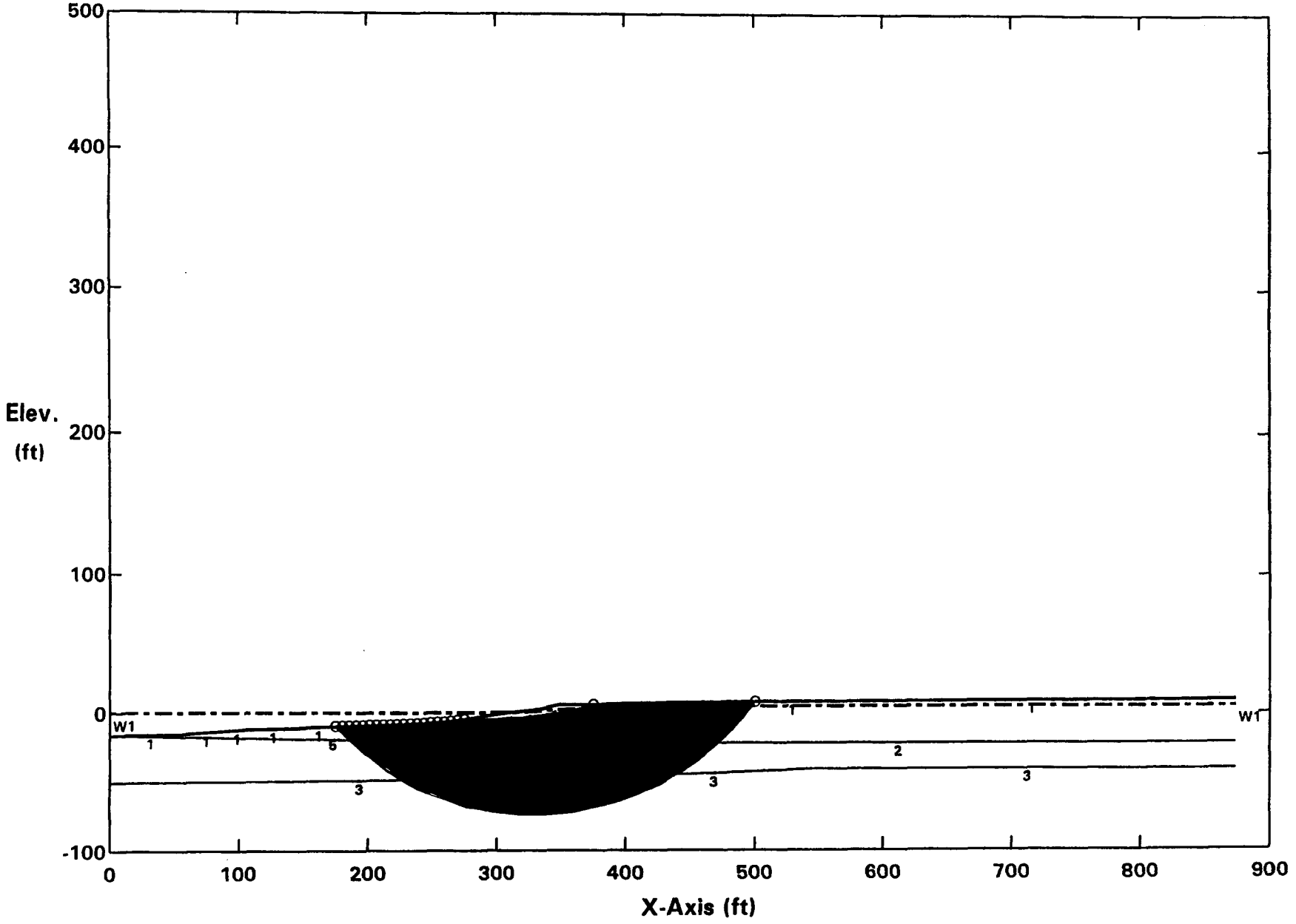
Factors Of Safety Calculated By Spencer`s Method of Slices

SECTION I-I'

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\I-2\IR2ILTBS.IN  PCSTABL Version 5M /O(0. ,
-100. )
* NAS Between IR Sites, I-I', Long-Term Static Bishop Circular Search
   16
0. 84. 53. 85. 1
53. 85. 86. 87. 1
86. 87. 101. 88. 1
101. 88. 143. 90. 1
143. 90. 171. 91. 1
171. 91. 215. 92. 1
215. 92. 240. 93. 1
240. 93. 261. 94. 1
261. 94. 309. 100. 1
309. 100. 333. 103. 1
333. 103. 348. 106. 1
348. 106. 373. 106. 1
373. 106. 408. 107. 1
408. 107. 508. 108. 1
508. 108. 548. 108. 1
548. 108. 873. 109. 1
0. 84. 350. 79. 5
350. 79. 873. 79. 2
0. 50. 375. 54. 3
375. 54. 550. 60. 3
550. 60. 873. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 100. 32. 0. 0. 1
   5. 115. 650. 0. 0. 0. 1
  .5. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
309. 100.
400. 105.
873. 105.
CIRCL2-Bishop circular, search
20 100
175. 275. 375. 500. 0. 10. 0. 0.
```

A-NAS Between IR Sites, I-I', Long-Term Static Bishop Circular Search

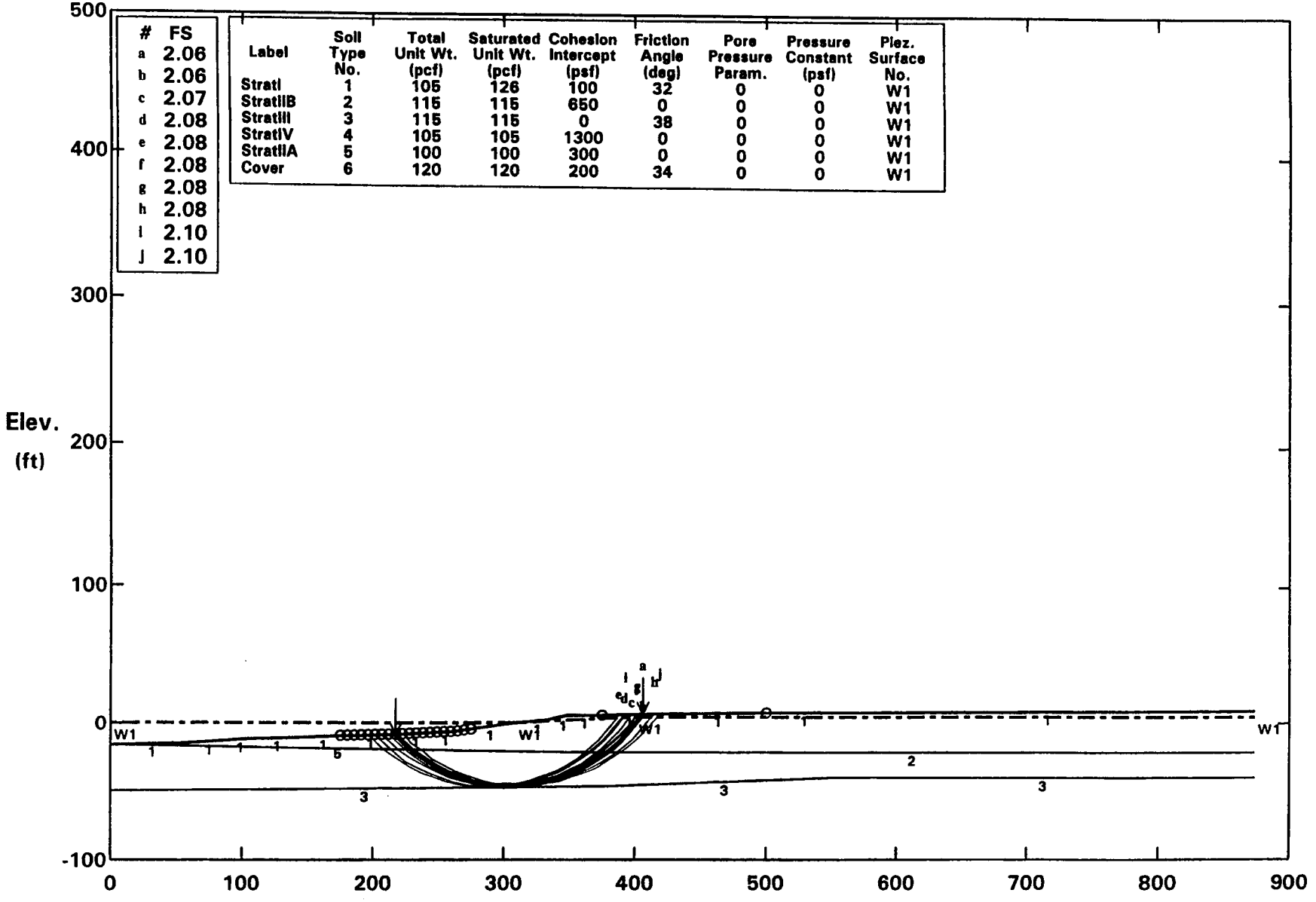
All surfaces evaluated. C:IR2ILTBS.PLT By: MMM 08-02-02 8:42pm



Factors Of Safety Calculated By The Modified Bishop Method

A-NAS Between IR Sites, I-I', Long-Term Static Bishop Circular Search

Ten Most Critical. C:IR2ILTBS.PLT By: MMM 08-02-02 8:42pm



#	FS
a	2.06
b	2.06
c	2.07
d	2.08
e	2.08
f	2.08
g	2.08
h	2.08
I	2.10
J	2.10

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	650	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1

PCSTABL5M FSmin = 2.06 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

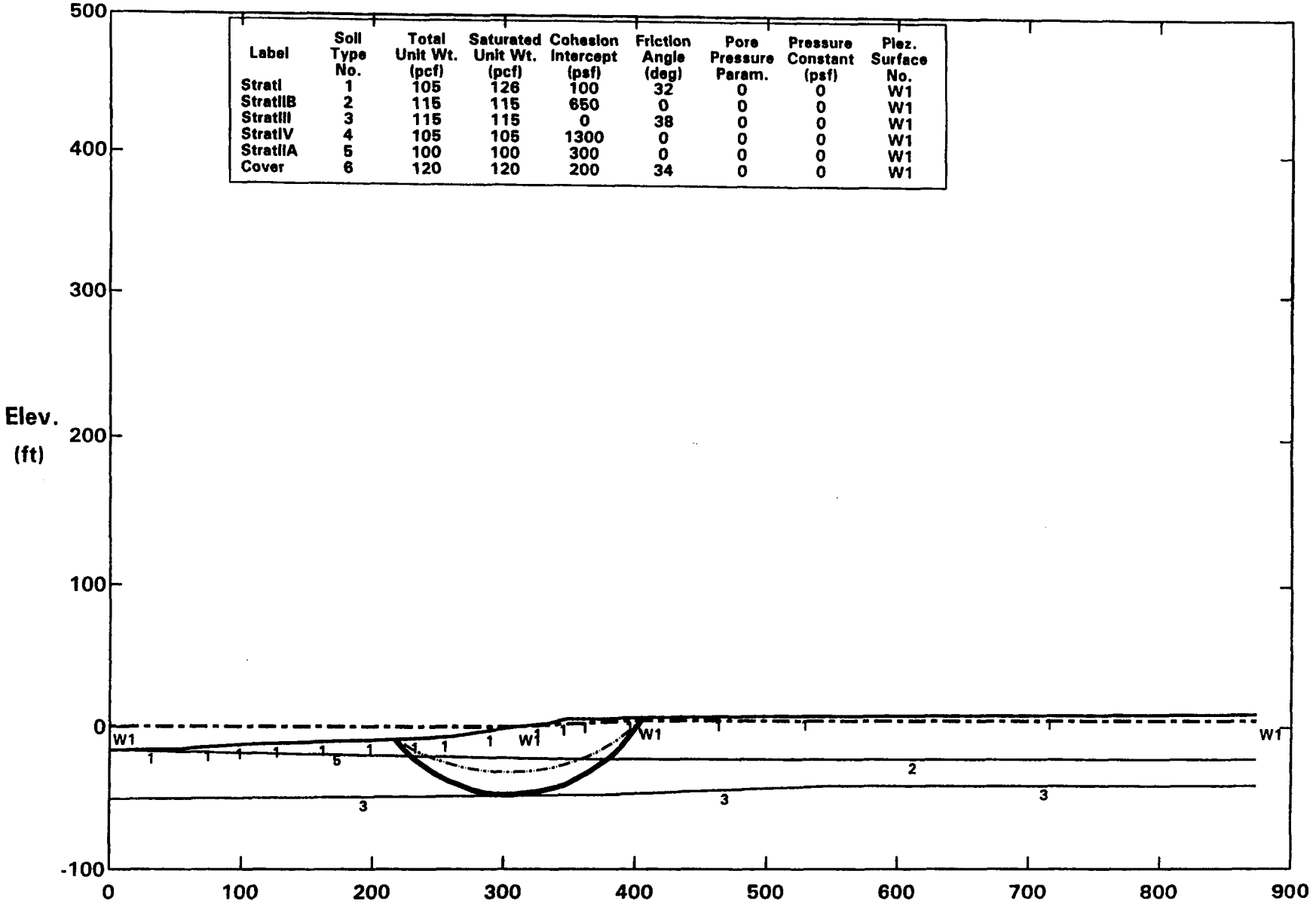
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\I-2\IR2ILTSC.IN  PCSTABL Version 5M /O(0. ,
-100. )
A-NAS Between IR Sites, I-I', Long-Term Spencer Static Slope Stability (Circ
21 16
0. 84. 53. 85. 1
53. 85. 86. 87. 1
86. 87. 101. 88. 1
101. 88. 143. 90. 1
143. 90. 171. 91. 1
171. 91. 215. 92. 1
215. 92. 240. 93. 1
240. 93. 261. 94. 1
261. 94. 309. 100. 1
309. 100. 333. 103. 1
333. 103. 348. 106. 1
348. 106. 373. 106. 1
373. 106. 408. 107. 1
408. 107. 508. 108. 1
508. 108. 548. 108. 1
548. 108. 873. 109. 1
0. 84. 350. 79. 5
350. 79. 873. 79. 2
0. 50. 375. 54. 3
375. 54. 550. 60. 3
550. 60. 873. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 100. 32. 0. 0. 1
115. 115. 650. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
309. 100.
400. 105.
873. 105.
SPENCR
4.
SURBIS #1-IR2ILTBS.OUT
23
217.11 92.08
224.21 85.04
231.87 78.61
240.03 72.84
248.65 67.77
257.66 63.42
266.99 59.84
276.59 57.05
286.39 55.06
296.32 53.88
306.32 53.54
316.31 54.03
326.22 55.34
335.99 57.47
345.55 60.4
```

```
354.84 64.11
363.78 68.58
372.32 73.78
380.41 79.67
   .97 86.21
394.97 93.35
401.36 101.05
405.46 106.93
EXECUT
```

A-NAS Between IR Sites, I-I', Long-Term Spencer Static Slope Stability (Circ.)

Surface #1-IR2ILTBS.OUT. C:IR2ILTSC.PLT By: MMM 08-02-02 8:43pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	650	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



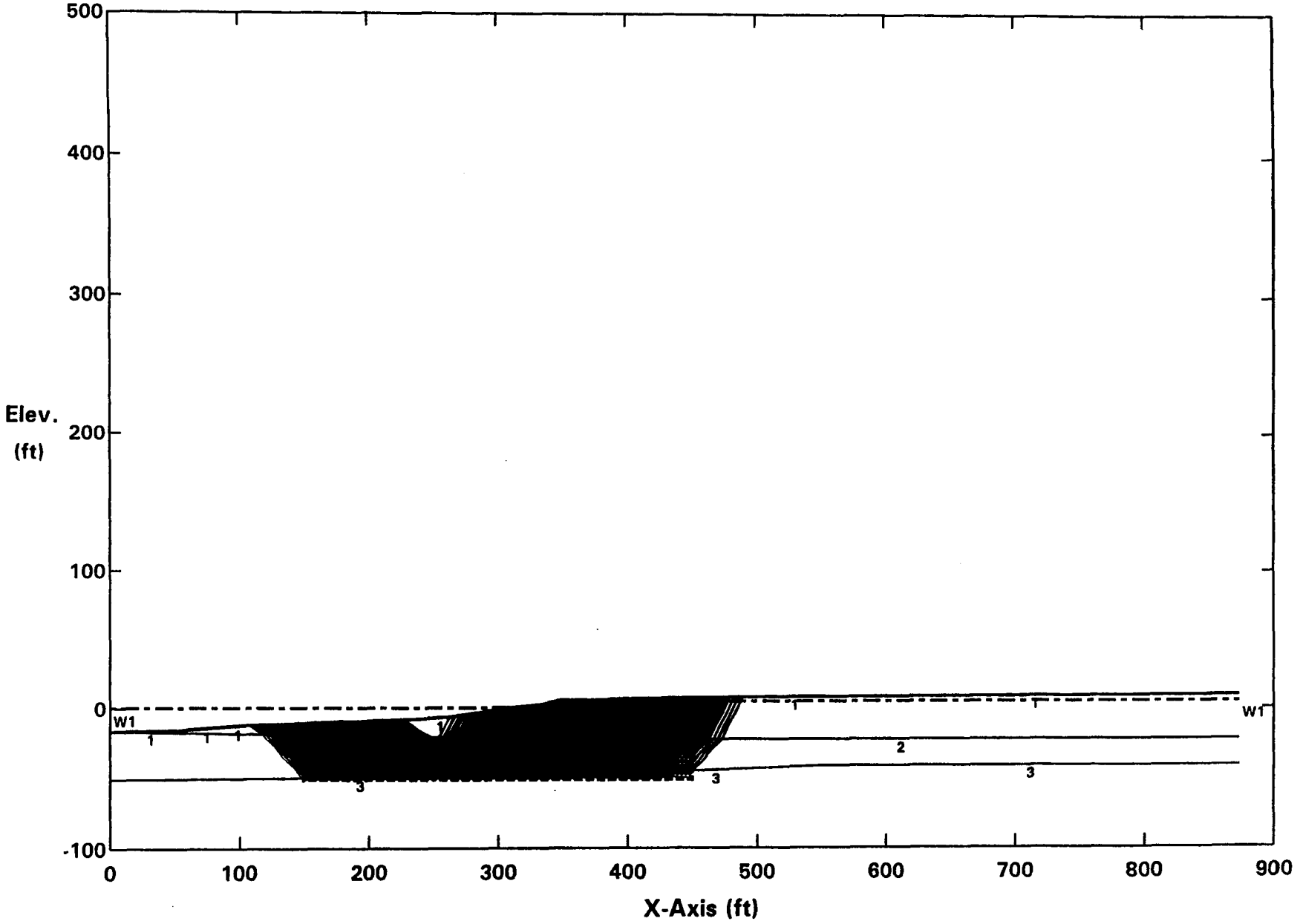
PCSTABL5M FS = 2.08 Theta = 1.49 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\I-2\IR2ILTJS.IN  PCSTABL Version 5M /O(0. ,
-100. )
* NAS Between IR Sites, I-I', Long-Term Static Janbu Block Search
   16
0. 84. 53. 85. 1
53. 85. 86. 87. 1
86. 87. 101. 88. 1
101. 88. 143. 90. 1
143. 90. 171. 91. 1
171. 91. 215. 92. 1
215. 92. 240. 93. 1
240. 93. 261. 94. 1
261. 94. 309. 100. 1
309. 100. 333. 103. 1
333. 103. 348. 106. 1
348. 106. 373. 106. 1
373. 106. 408. 107. 1
408. 107. 508. 108. 1
508. 108. 548. 108. 1
548. 108. 873. 109. 1
0. 84. 350. 79. 5
350. 79. 873. 79. 2
0. 50. 375. 54. 3
375. 54. 550. 60. 3
550. 60. 873. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 100. 32. 0. 0. 1
   . 115. 650. 0. 0. 0. 1
   . 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
309. 100.
400. 105.
873. 105.
BLOCK2-Rankine block, search
0
4000 2 10.
150. 65. 250. 65. 30.
251. 65. 450. 65. 30.
```

A-NAS Between IR Sites, I-I', Long-Term Static Janbu Block Search

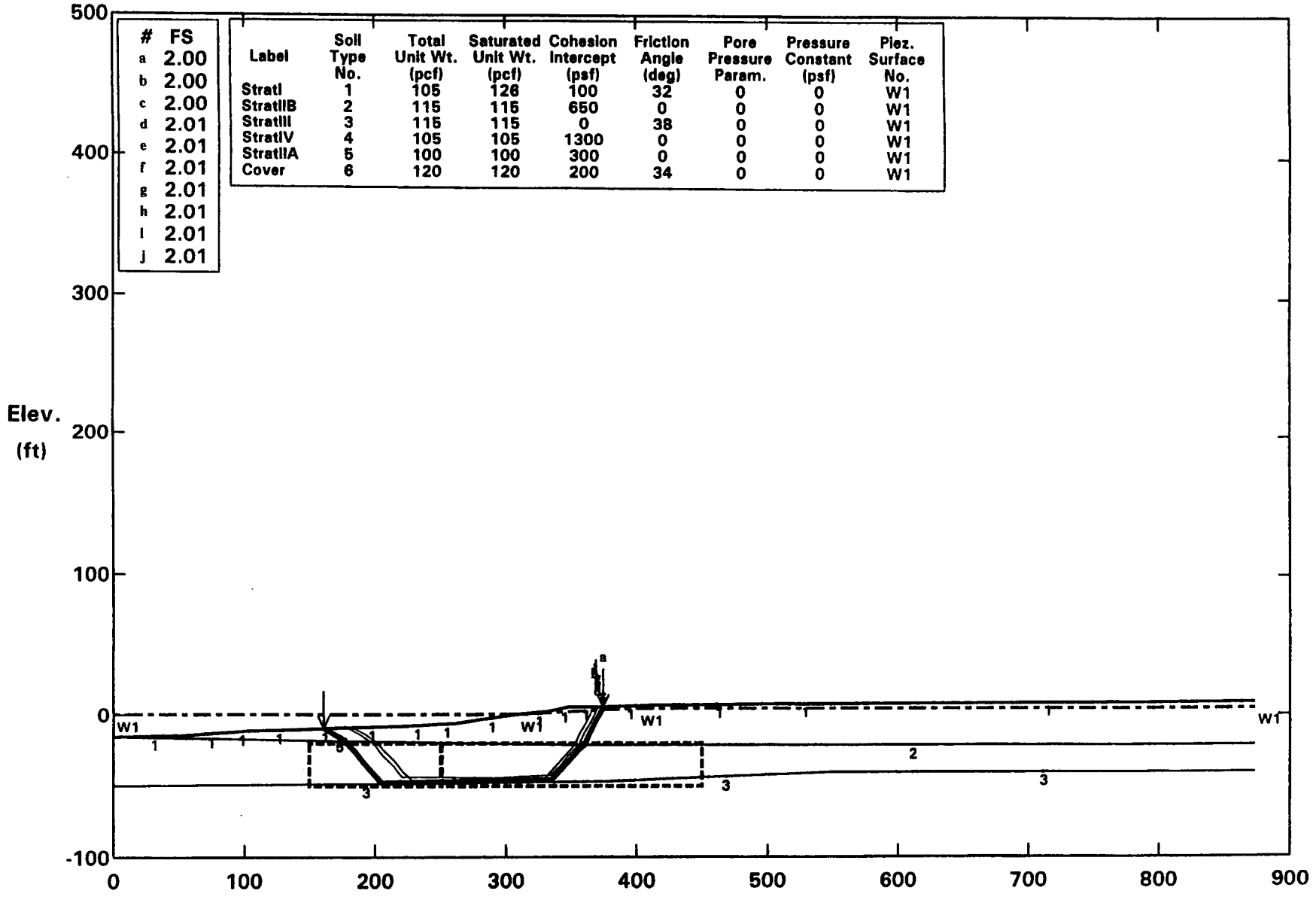
All surfaces evaluated. C:IR2ILTJS.PLT By: MMM 08-02-02 8:56pm



Factors Of Safety Calculated By The Modified Janbu Method

A-NAS Between IR Sites, I-I', Long-Term Static Janbu Block Search

Ten Most Critical. C:IR2ILTJS.PLT By: MMM 08-02-02 8:56pm



#	FS
a	2.00
b	2.00
c	2.00
d	2.01
e	2.01
f	2.01
g	2.01
h	2.01
i	2.01
j	2.01

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	650	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1

PCSTABL5M FSmin = 2.00 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

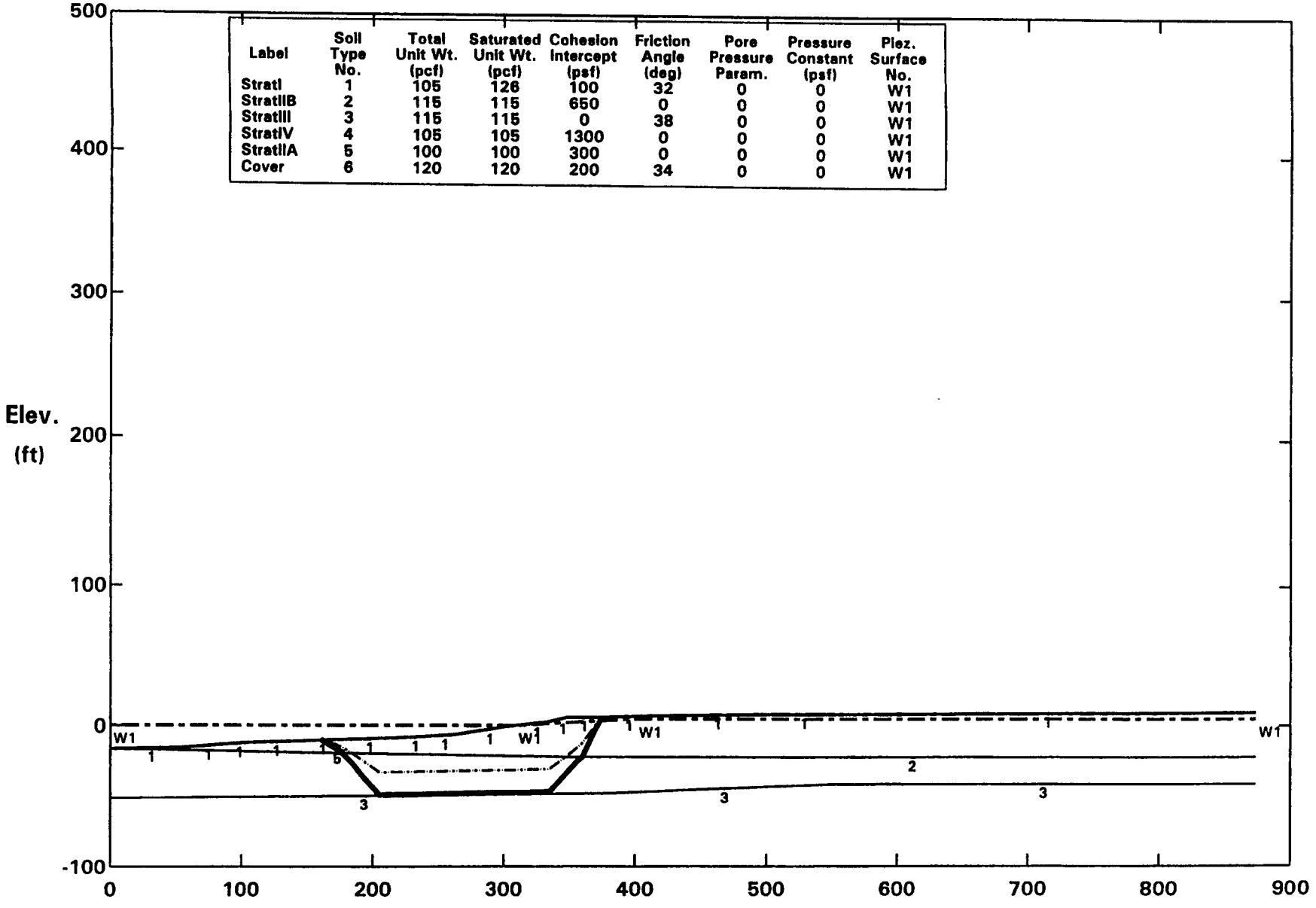
```
PROFIL        C:\GEO\STED\A-NAS\SITE2\I-2\IR2ILTSB.IN  PCSTABL Version 5M /O(0. ,
 100. )
A-NAS Between IR Sites, I-I', Long-Term Spencer Static Slope Stability (Block
21 16
0. 84. 53. 85. 1
53. 85. 86. 87. 1
86. 87. 101. 88. 1
101. 88. 143. 90. 1
143. 90. 171. 91. 1
171. 91. 215. 92. 1
215. 92. 240. 93. 1
240. 93. 261. 94. 1
261. 94. 309. 100. 1
309. 100. 333. 103. 1
333. 103. 348. 106. 1
348. 106. 373. 106. 1
373. 106. 408. 107. 1
408. 107. 508. 108. 1
508. 108. 548. 108. 1
548. 108. 873. 109. 1
0. 84. 350. 79. 5
350. 79. 873. 79. 2
0. 50. 375. 54. 3
375. 54. 550. 60. 3
550. 60. 873. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 100. 32. 0. 0. 1
115. 115. 650. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
309. 100.
400. 105.
873. 105.
SPENCR
3.
SURFAC #1-IR2ILTJS.OUT
17
159.87 90.6
167.58 86.33
176.32 81.48
176.81 80.99
183.88 73.92
190.95 66.85
198.03 59.78
205.1 52.71
334.89 54.28
341.96 61.35
349.03 68.42
356.11 75.49
359.62 79.
364.46 87.75
369.31 96.49
```

374.16 105.24
374.61 106.05
EXECUT

A-NAS Between IR Sites, I-I', Long-Term Spencer Static Slope Stability (Block)

Surface #1-IR2ILTJS.OUT. C:IR2ILTSB.PLT By: MMM 08-02-02 8:57pm

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	100	32	0	0	W1
StratIIB	2	115	115	650	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



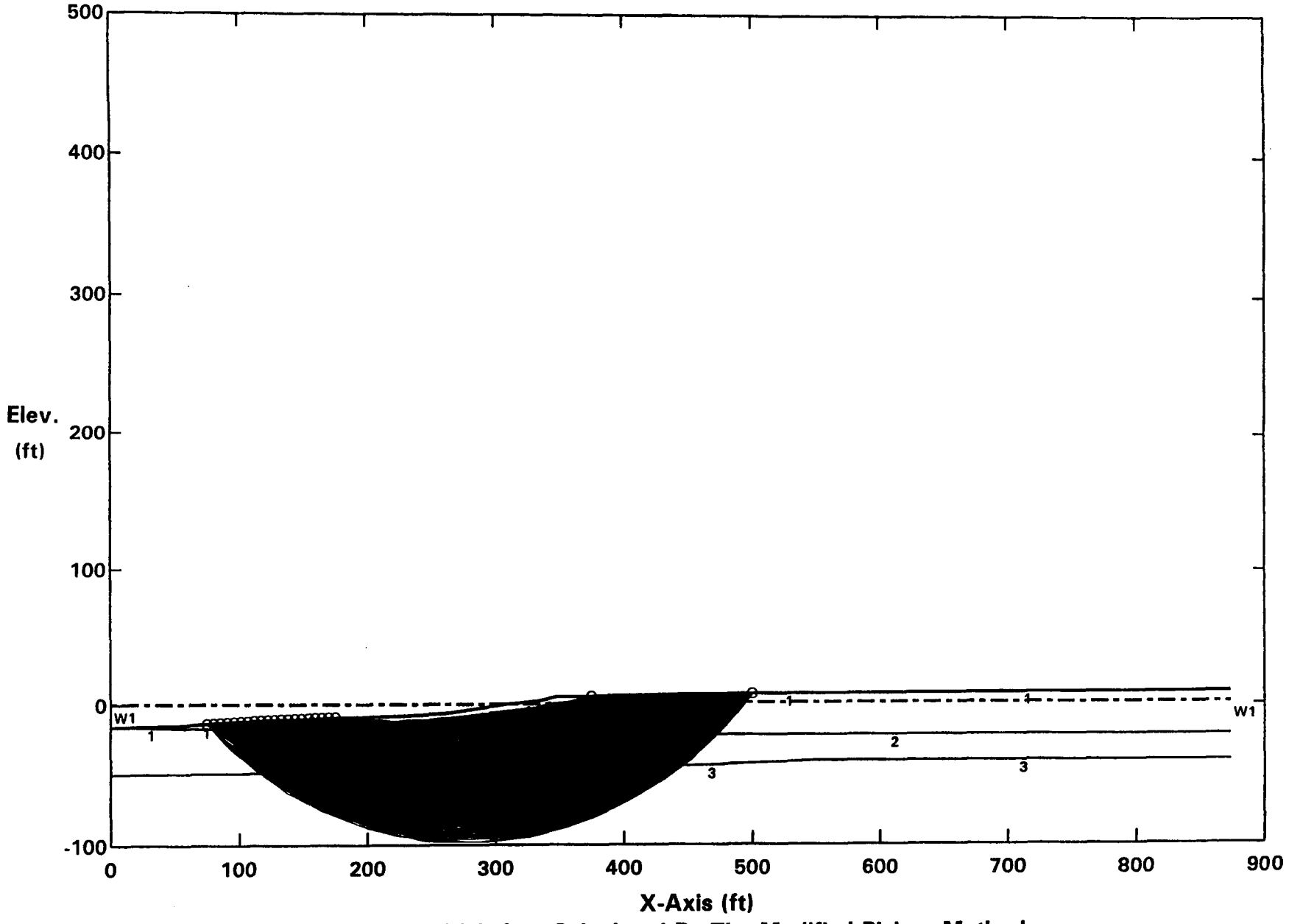
PCSTABL5M FS = 2.30 Theta = 1.58 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\I-2\IR2IBD.IN  PCSTABL Version 5M /O(0. ,-1
00. )
A-NAS Between IR Sites, I-I',            Dynamic Bishop Circular Search, 0.1g
   16
0. 84. 53. 85. 1
53. 85. 86. 87. 1
86. 87. 101. 88. 1
101. 88. 143. 90. 1
143. 90. 171. 91. 1
171. 91. 215. 92. 1
215. 92. 240. 93. 1
240. 93. 261. 94. 1
261. 94. 309. 100. 1
309. 100. 333. 103. 1
333. 103. 348. 106. 1
348. 106. 373. 106. 1
373. 106. 408. 107. 1
408. 107. 508. 108. 1
508. 108. 548. 108. 1
548. 108. 873. 109. 1
0. 84. 350. 79. 5
350. 79. 873. 79. 2
0. 50. 375. 54. 3
375. 54. 550. 60. 3
550. 60. 873. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
   . 115. 525. 0. 0. 0. 1
  0. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
309. 100.
400. 102.
873. 102.
EQUAKE
0.1 0. 0.
CIRCL2-Bishop circular, search
20 100
75. 175. 375. 500. 0. 10. 0. 0.
```

A-NAS Between IR Sites, I-I', Dynamic Bishop Circular Search, 0.1g

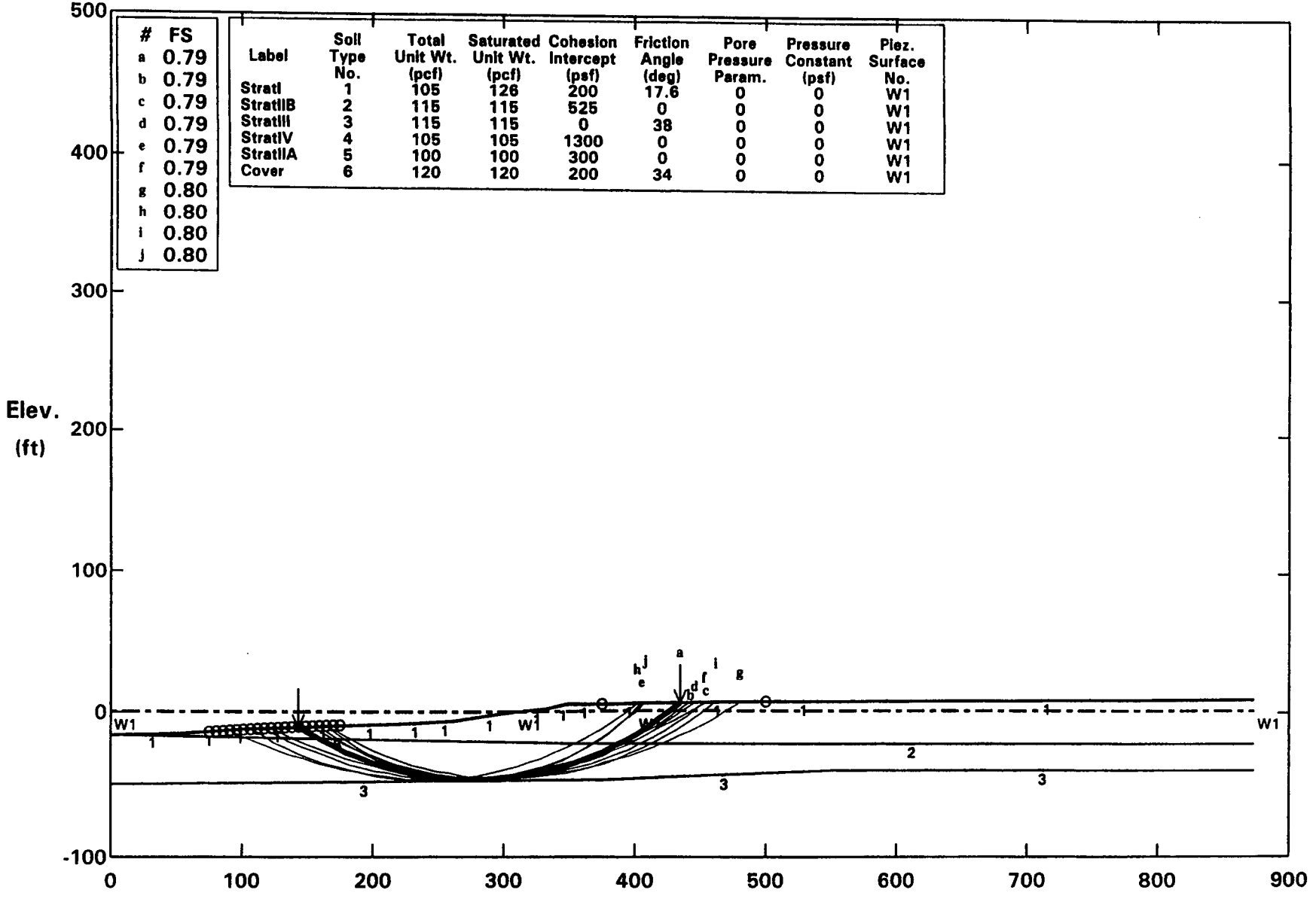
All surfaces evaluated. C:IR2IBD.PLT By: MMM 08-02-02 8:48pm



Factors Of Safety Calculated By The Modified Bishop Method

A-NAS Between IR Sites, I-I', Dynamic Bishop Circular Search, 0.1g

Ten Most Critical. C:IR2IBD.PLT By: MMM 08-02-02 8:48pm



#	FS
a	0.79
b	0.79
c	0.79
d	0.79
e	0.79
f	0.79
g	0.80
h	0.80
i	0.80
j	0.80

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	525	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1

PCSTABL5M FSmin = 0.79 X-Axis (ft)

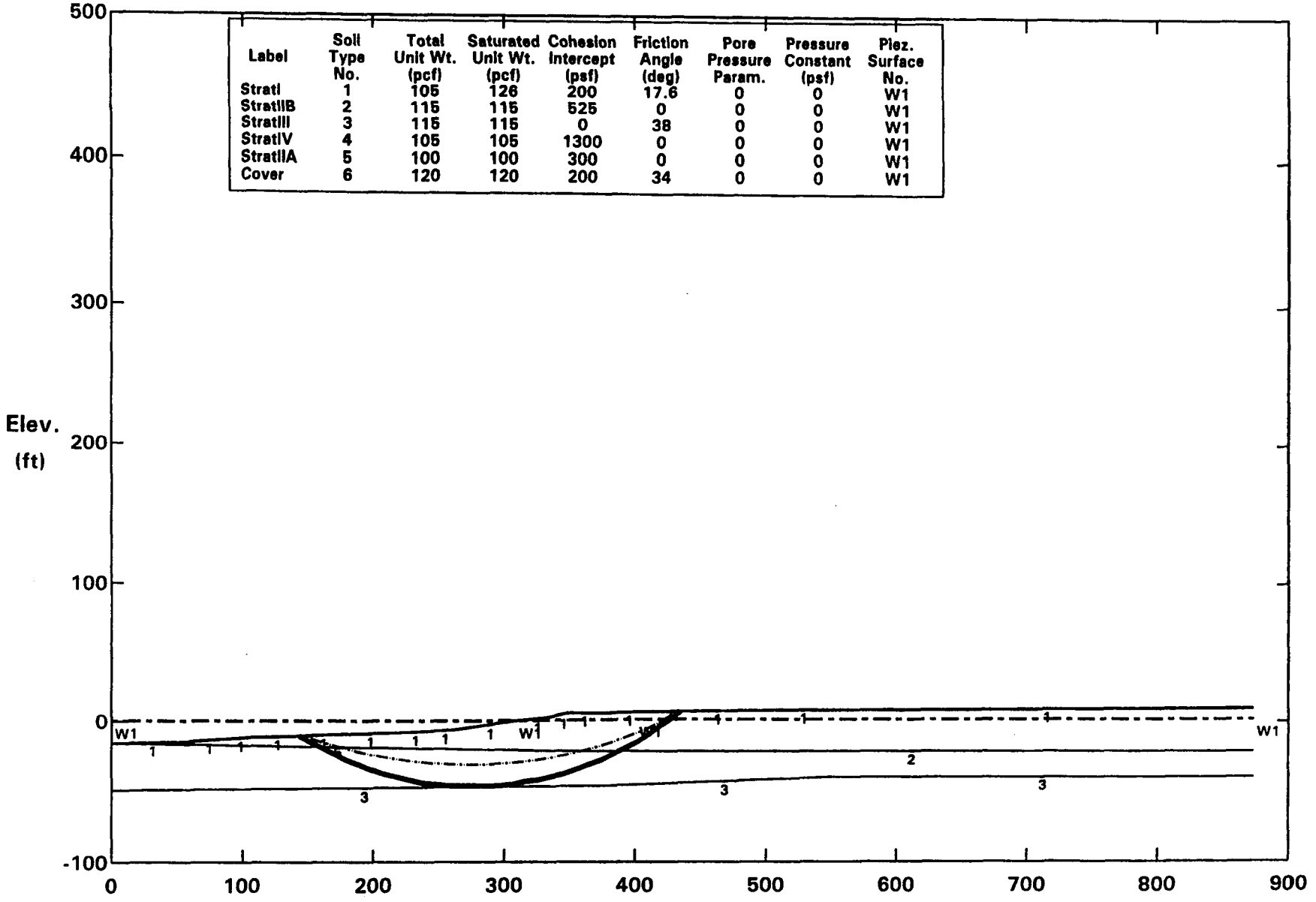
Factors Of Safety Calculated By The Modified Bishop Method

```
PROFIL       C:\GEO\STED\A-NAS\SITE2\I-2\IR2ISSC.IN  PCSTABL Version 5M /O(0. ,-
100. )
A-NAS Between IR Sites, I-I',           Spencer Static Slope Stability (Circ.'
21 16
0. 84. 53. 85. 1
53. 85. 86. 87. 1
86. 87. 101. 88. 1
101. 88. 143. 90. 1
143. 90. 171. 91. 1
171. 91. 215. 92. 1
215. 92. 240. 93. 1
240. 93. 261. 94. 1
261. 94. 309. 100. 1
309. 100. 333. 103. 1
333. 103. 348. 106. 1
348. 106. 373. 106. 1
373. 106. 408. 107. 1
408. 107. 508. 108. 1
508. 108. 548. 108. 1
548. 108. 873. 109. 1
0. 84. 350. 79. 5
350. 79. 873. 79. 2
0. 50. 375. 54. 3
375. 54. 550. 60. 3
550. 60. 873. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 525. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
309. 100.
400. 102.
873. 102.
SPENCR
1.
SURBIS #1-IR2IBD.OUT
32
143.42 90.02
152.09 85.03
160.95 80.39
169.98 76.09
179.16 72.14
188.5 68.55
197.96 65.33
207.55 62.48
217.24 60.
227.01 57.89
236.86 56.17
246.77 54.83
256.73 53.87
266.71 53.3
276.71 53.12
```

```
286.71 53.32
296.69 53.92
306.64 54.89
316.55 56.26
   5.39 58.
336.17 60.13
345.85 62.63
355.43 65.5
364.89 68.75
374.21 72.35
383.39 76.32
392.41 80.64
401.26 85.3
409.91 90.31
418.37 95.64
426.62 101.3
434.63 107.27
EXECUT
```

A-NAS Between IR Sites, I-I', Spencer Static Slope Stability (Circ.)

Surface #1-IR2IBD.OUT. C:IR2ISSC.PLT By: MMM 08-02-02 8:50pm



Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	525	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1

PCSTABL5M FS = 2.18 Theta = 1.49 X-Axis (ft)

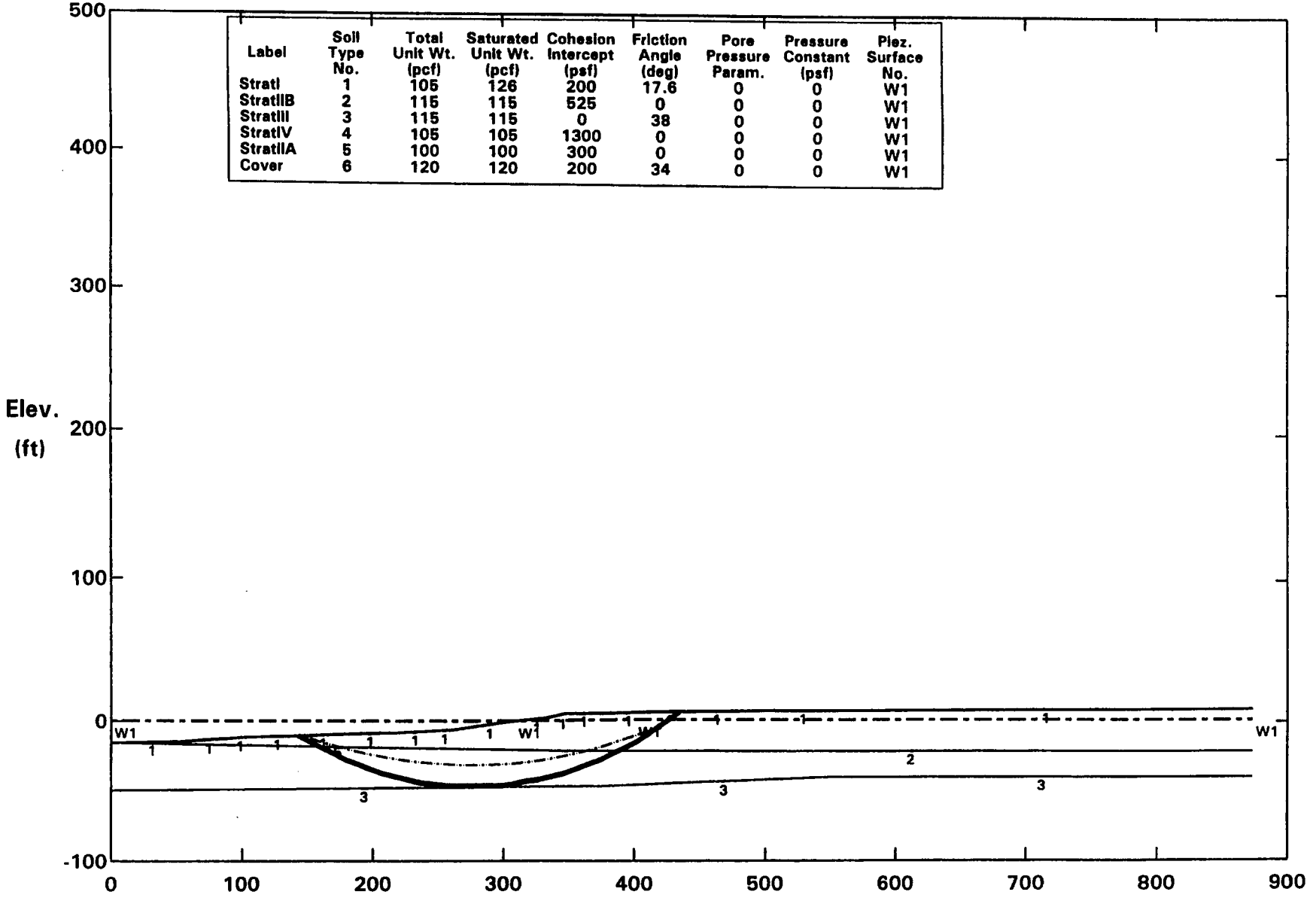
Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\I-2\IR2ISDC.IN  PCSTABL Version 5M /O(0. ,-
100. )
A-NAS Between IR Sites, I-I', (Circ.)   Spencer Dynamic Slope Stability Ky=.06g
   16
0. 84. 53. 85. 1
53. 85. 86. 87. 1
86. 87. 101. 88. 1
101. 88. 143. 90. 1
143. 90. 171. 91. 1
171. 91. 215. 92. 1
215. 92. 240. 93. 1
240. 93. 261. 94. 1
261. 94. 309. 100. 1
309. 100. 333. 103. 1
333. 103. 348. 106. 1
348. 106. 373. 106. 1
373. 106. 408. 107. 1
408. 107. 508. 108. 1
508. 108. 548. 108. 1
548. 108. 873. 109. 1
0. 84. 350. 79. 5
350. 79. 873. 79. 2
0. 50. 375. 54. 3
375. 54. 550. 60. 3
550. 60. 873. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
   . 115. 525. 0. 0. 0. 1
  . 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
309. 100.
400. 102.
873. 102.
EQUAKE
0.062 0. 0.
SPENCR
2.
SURBIS #1-IR2IBD.OUT
32
143.42 90.02
152.09 85.03
160.95 80.39
169.98 76.09
179.16 72.14
188.5 68.55
197.96 65.33
  .55 62.48
   .24 60.
227.01 57.89
236.86 56.17
246.77 54.83
256.73 53.87
```

```
266.71 53.3
276.71 53.12
286.71 53.32
296.69 53.92
306.64 54.89
316.55 56.26
326.39 58.
336.17 60.13
345.85 62.63
355.43 65.5
364.89 68.75
374.21 72.35
383.39 76.32
392.41 80.64
401.26 85.3
409.91 90.31
418.37 95.64
426.62 101.3
434.63 107.27
EXECUT
```

A-NAS Between IR Sites, I-I', (Circ.) Spencer Dynamic Slope Stability Ky = .06g

Surface #1-IR2IBD.OUT. C:IR2ISDC.PLT By: MMM 08-02-02 8:49pm



Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	525	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1

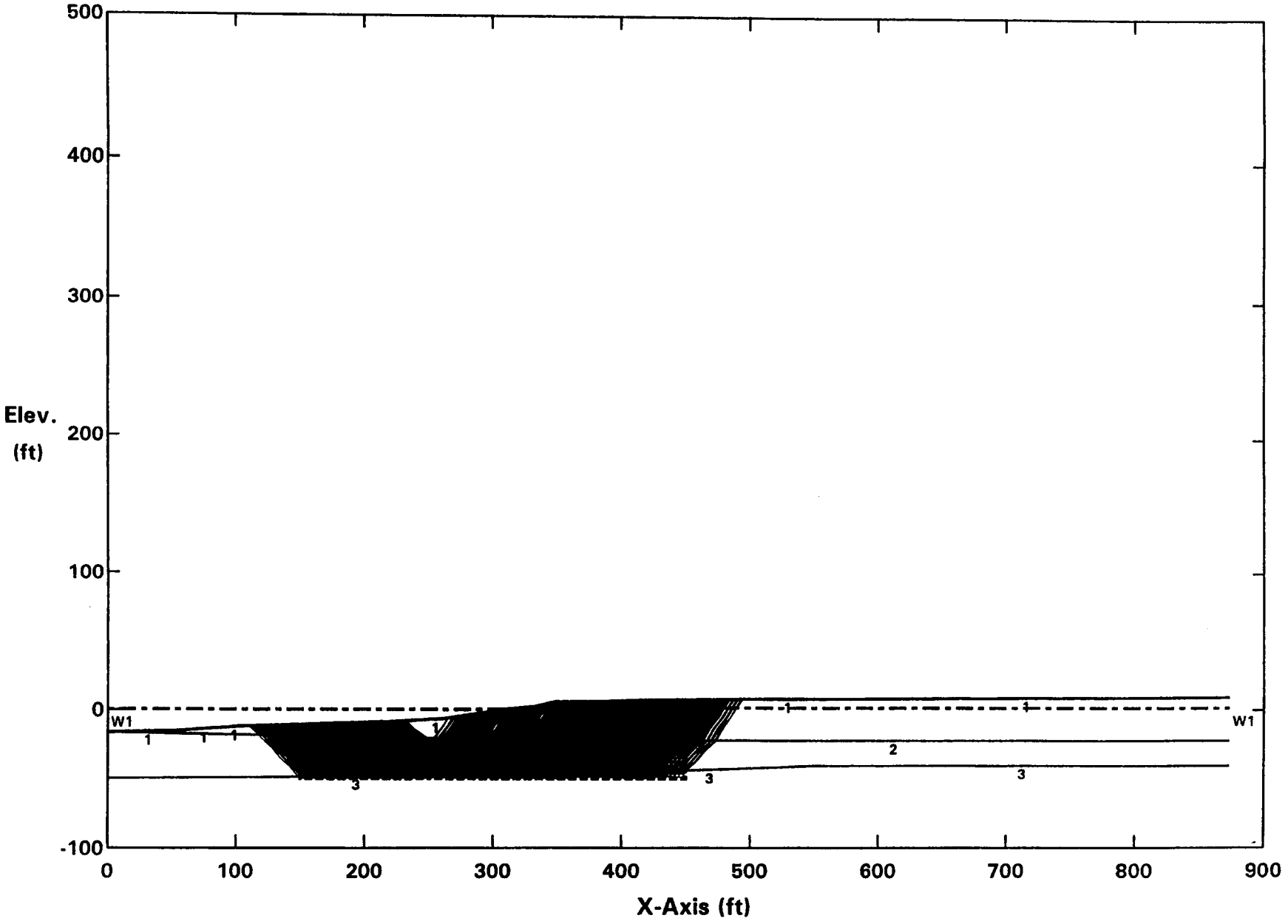
PCSTABL5M FS = 1.00 Theta = .11 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\I-2\IR2IJD.IN  PCSTABL Version 5M /O(0. ,-1
00. )
A-NAS Between IR Sites, I-I',           Dynamic Janbu Block Search, 0.1g
21 16
0. 84. 53. 85. 1
53. 85. 86. 87. 1
86. 87. 101. 88. 1
101. 88. 143. 90. 1
143. 90. 171. 91. 1
171. 91. 215. 92. 1
215. 92. 240. 93. 1
240. 93. 261. 94. 1
261. 94. 309. 100. 1
309. 100. 333. 103. 1
333. 103. 348. 106. 1
348. 106. 373. 106. 1
373. 106. 408. 107. 1
408. 107. 508. 108. 1
508. 108. 548. 108. 1
548. 108. 873. 109. 1
0. 84. 350. 79. 5
350. 79. 873. 79. 2
0. 50. 375. 54. 3
375. 54. 550. 60. 3
550. 60. 873. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 525. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
309. 100.
400. 102.
873. 102.
EQUAKE
0.1 0. 0.
BLOCK2-Rankine block, search
0
4000 2 10.
150. 65. 250. 65. 30.
251. 65. 450. 65. 30.
```

A-NAS Between IR Sites, I-I', Dynamic Janbu Block Search, 0.1g

All surfaces evaluated. C:IR2IJD.PLT By: MMM 08-02-02 8:53pm



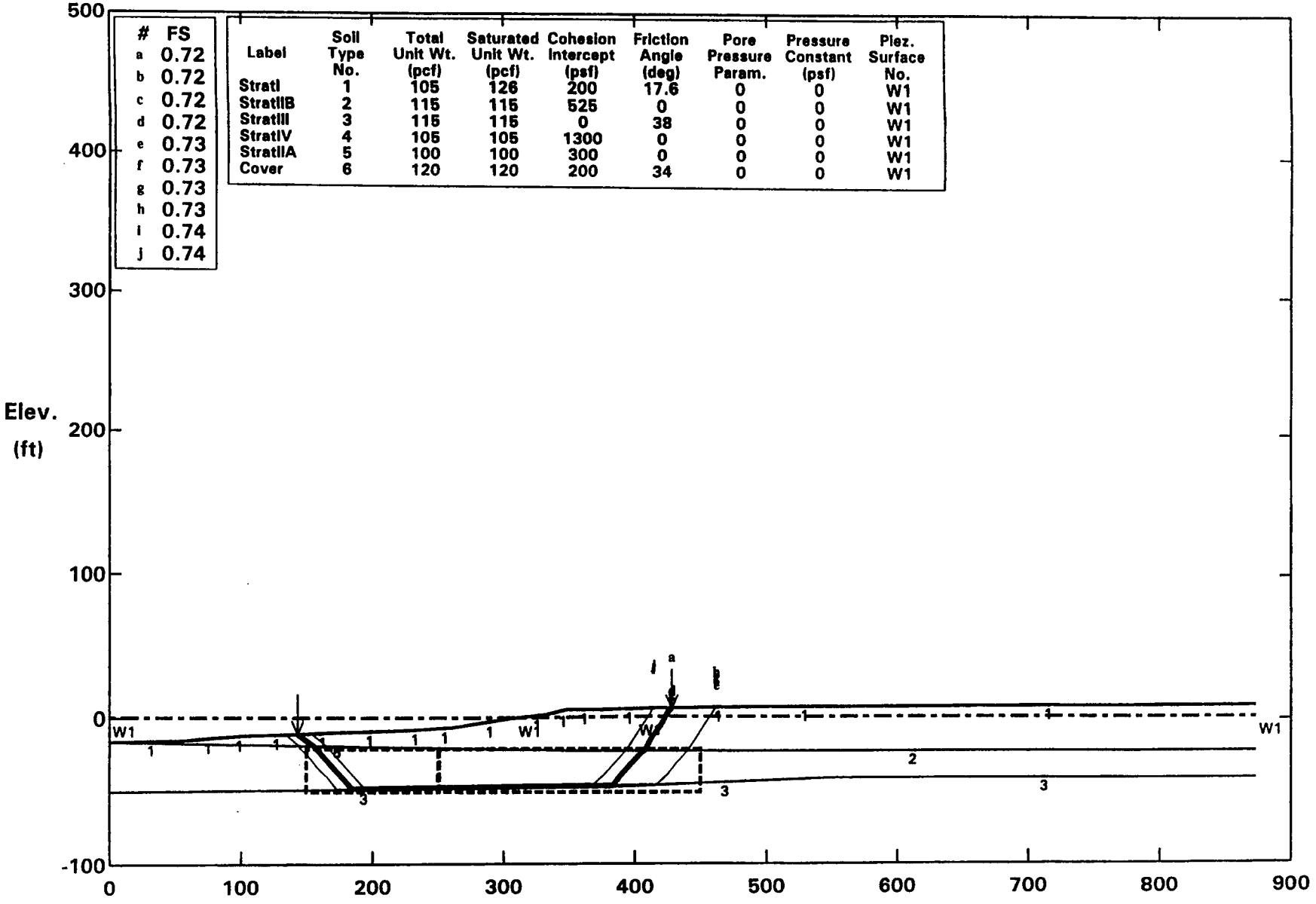
Factors Of Safety Calculated By The Modified Janbu Method

A-NAS Between IR Sites, I-I', Dynamic Janbu Block Search, 0.1g

Ten Most Critical. C:IR2IJD.PLT By: MMM 08-02-02 8:53pm

#	FS
a	0.72
b	0.72
c	0.72
d	0.72
e	0.73
f	0.73
g	0.73
h	0.73
i	0.74
j	0.74

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	525	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 0.72 X-Axis (ft)

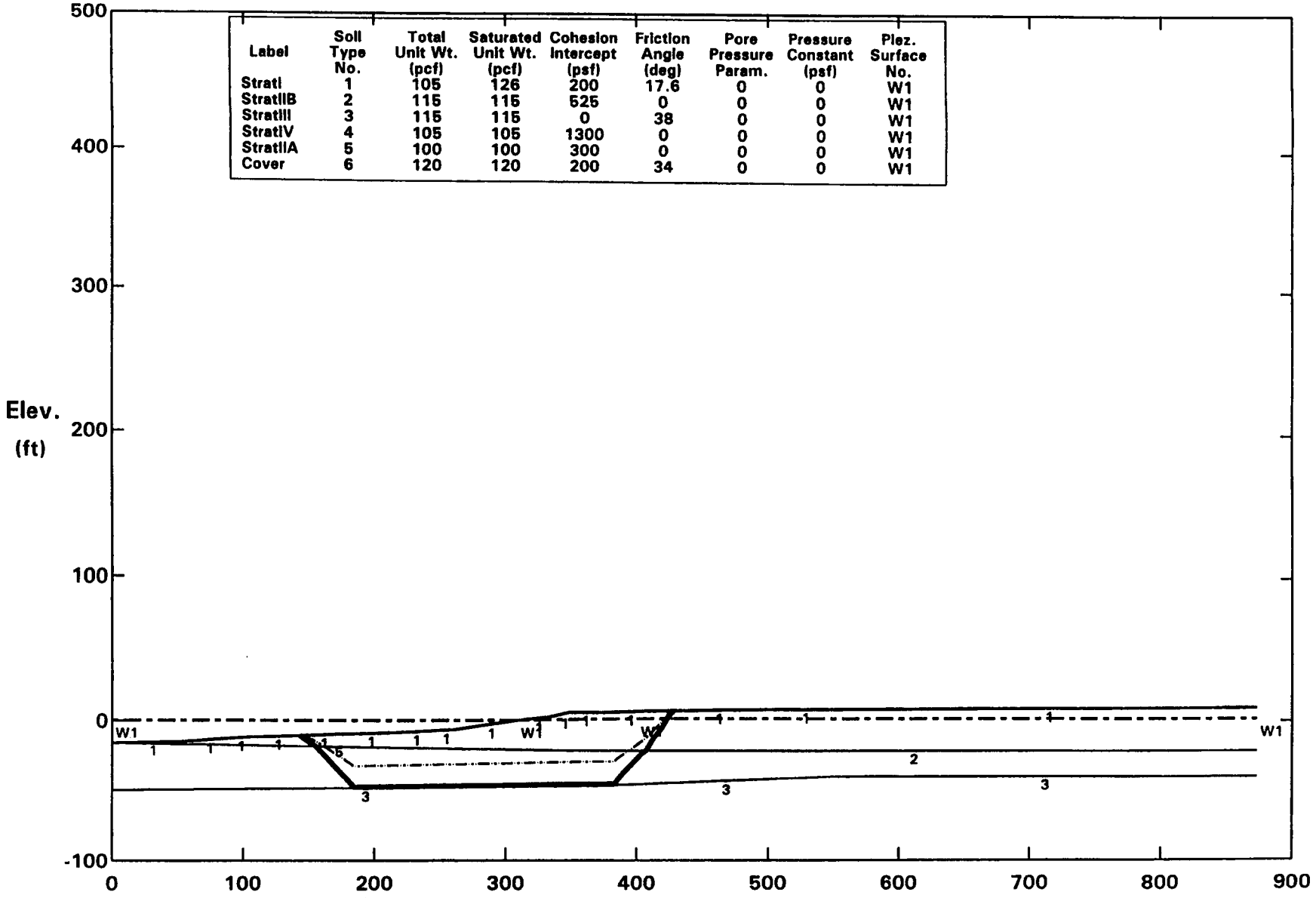
Factors Of Safety Calculated By The Modified Janbu Method

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\I-2\IR2ISSB.IN  PCSTABL Version 5M /O(0. ,-
100. )
A-NAS Between IR Sites, I-I',            Spencer Static Slope Stability (Block)
   16
0. 84. 53. 85. 1
53. 85. 86. 87. 1
86. 87. 101. 88. 1
101. 88. 143. 90. 1
143. 90. 171. 91. 1
171. 91. 215. 92. 1
215. 92. 240. 93. 1
240. 93. 261. 94. 1
261. 94. 309. 100. 1
309. 100. 333. 103. 1
333. 103. 348. 106. 1
348. 106. 373. 106. 1
373. 106. 408. 107. 1
408. 107. 508. 108. 1
508. 108. 548. 108. 1
548. 108. 873. 109. 1
0. 84. 350. 79. 5
350. 79. 873. 79. 2
0. 50. 375. 54. 3
375. 54. 550. 60. 3
550. 60. 873. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
   . 115. 525. 0. 0. 0. 1
  0. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
309. 100.
400. 102.
873. 102.
SPENCR
3.
SURFAC #1-IR2IJD.OUT
17
143.49 90.02
146.67 87.7
154.74 81.79
156.21 80.32
163.28 73.25
170.35 66.18
177.42 59.11
184.49 52.03
382.5 54.77
-   .58 61.84
   .65 68.92
403.72 75.99
406.73 79.
412.64 87.07
418.54 95.14
```

424.45 103.21
427.37 107.19
EXECUT

A-NAS Between IR Sites, I-I', Spencer Static Slope Stability (Block)

Surface #1-IR2IJD.OUT. C:IR2ISSB.PLT By: MMM 08-02-02 8:55pm



Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	525	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1

PCSTABL5M FS = 2.31 Theta = 1.6 X-Axis (ft)

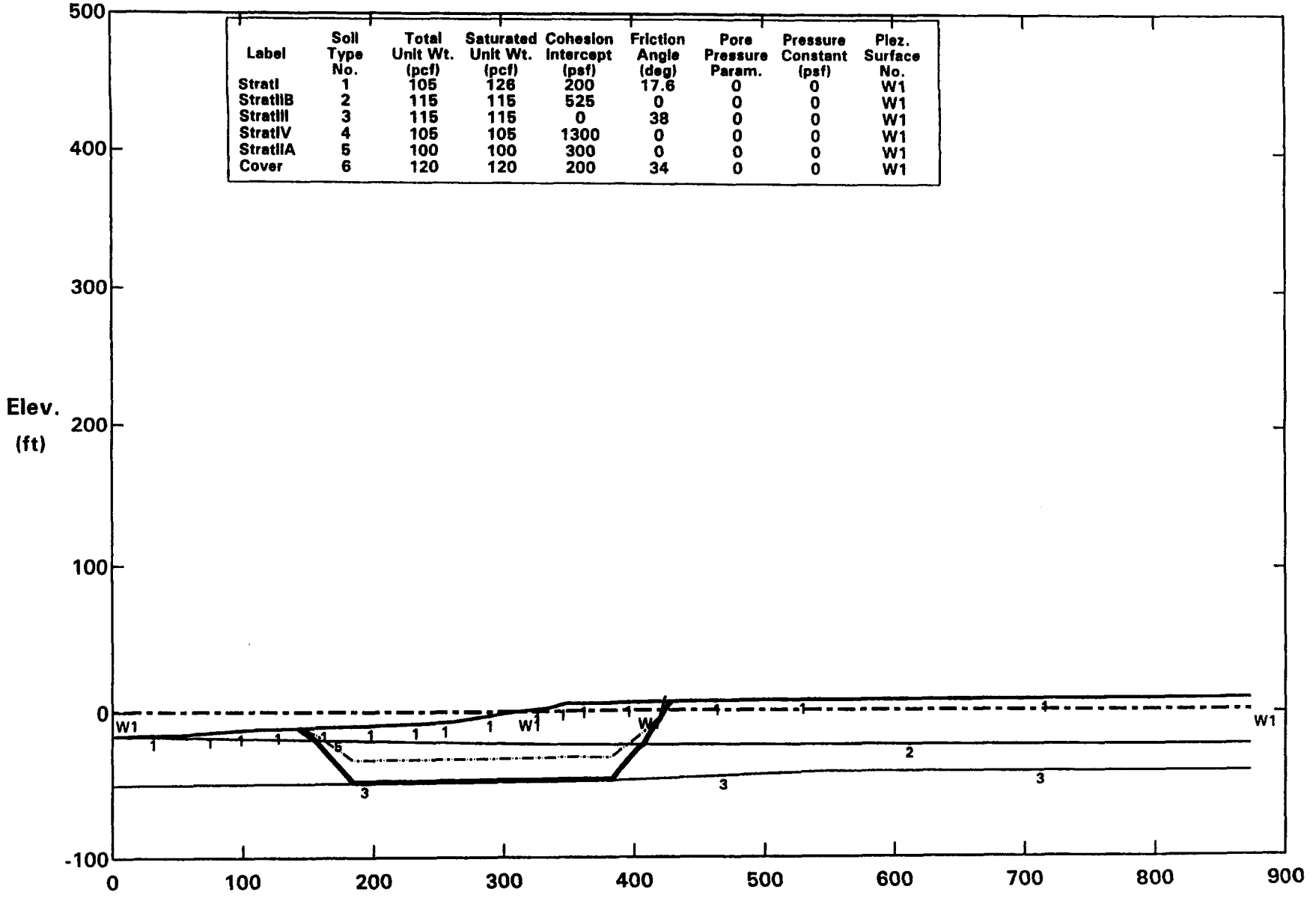
Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\I-2\IR2ISDB.IN  PCSTABL Version 5M /O(0. ,-
100. )
A-NAS Between IR Sites, I-I', (Block)   Spencer Dynamic Slope Stability Ky=.06¬
21 16
0. 84. 53. 85. 1
53. 85. 86. 87. 1
86. 87. 101. 88. 1
101. 88. 143. 90. 1
143. 90. 171. 91. 1
171. 91. 215. 92. 1
215. 92. 240. 93. 1
240. 93. 261. 94. 1
261. 94. 309. 100. 1
309. 100. 333. 103. 1
333. 103. 348. 106. 1
348. 106. 373. 106. 1
373. 106. 408. 107. 1
408. 107. 508. 108. 1
508. 108. 548. 108. 1
548. 108. 873. 109. 1
0. 84. 350. 79. 5
350. 79. 873. 79. 2
0. 50. 375. 54. 3
375. 54. 550. 60. 3
550. 60. 873. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 200. 17.6 0. 0. 1
115. 115. 525. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
309. 100.
400. 102.
873. 102.
EQUAKE
0.059 0. 0.
SPENCR
4.
SURFAC #1-IR2IJD.OUT
17
143.49 90.02
146.67 87.7
154.74 81.79
156.21 80.32
163.28 73.25
170.35 66.18
177.42 59.11
184.49 52.03
382.5 54.77
389.58 61.84
396.65 68.92
403.72 75.99
406.73 79.
```

412.64 87.07
418.54 95.14
424.45 103.21
427.37 107.19
CUT

A-NAS Between IR Sites, I-I', (Block) Spencer Dynamic Slope Stability Ky = .06g

Surface #1-IR2IJD.OUT. C:IR2ISDB.PLT By: MMM 08-02-02 8:55pm



Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	200	17.6	0	0	W1
StratIIB	2	115	115	525	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1

PCSTABL5M FS = 1.00 Theta = .5 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\I-2\IR2IEQBS.IN  PCSTABL Version 5M /O(0. ,
-100. )
A-NAS Between IR Sites, I-I', Post-EQ   Static Bishop Circular Search
   16
0. 84. 53. 85. 1
53. 85. 86. 87. 1
86. 87. 101. 88. 1
101. 88. 143. 90. 1
143. 90. 171. 91. 1
171. 91. 215. 92. 1
215. 92. 240. 93. 1
240. 93. 261. 94. 1
261. 94. 309. 100. 1
309. 100. 333. 103. 1
333. 103. 348. 106. 1
348. 106. 373. 106. 1
373. 106. 408. 107. 1
408. 107. 508. 108. 1
508. 108. 548. 108. 1
548. 108. 873. 109. 1
0. 84. 350. 79. 5
350. 79. 873. 79. 2
0. 50. 375. 54. 3
375. 54. 550. 60. 3
550. 60. 873. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 300. 0. 0. 0. 1
[illegible]. 115. 400. 0. 0. 0. 1
[illegible]. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
309. 100.
400. 102.
873. 102.
CIRCL2-Bishop circular, search
20 100
175. 275. 375. 500. 0. 10. 0. 0.
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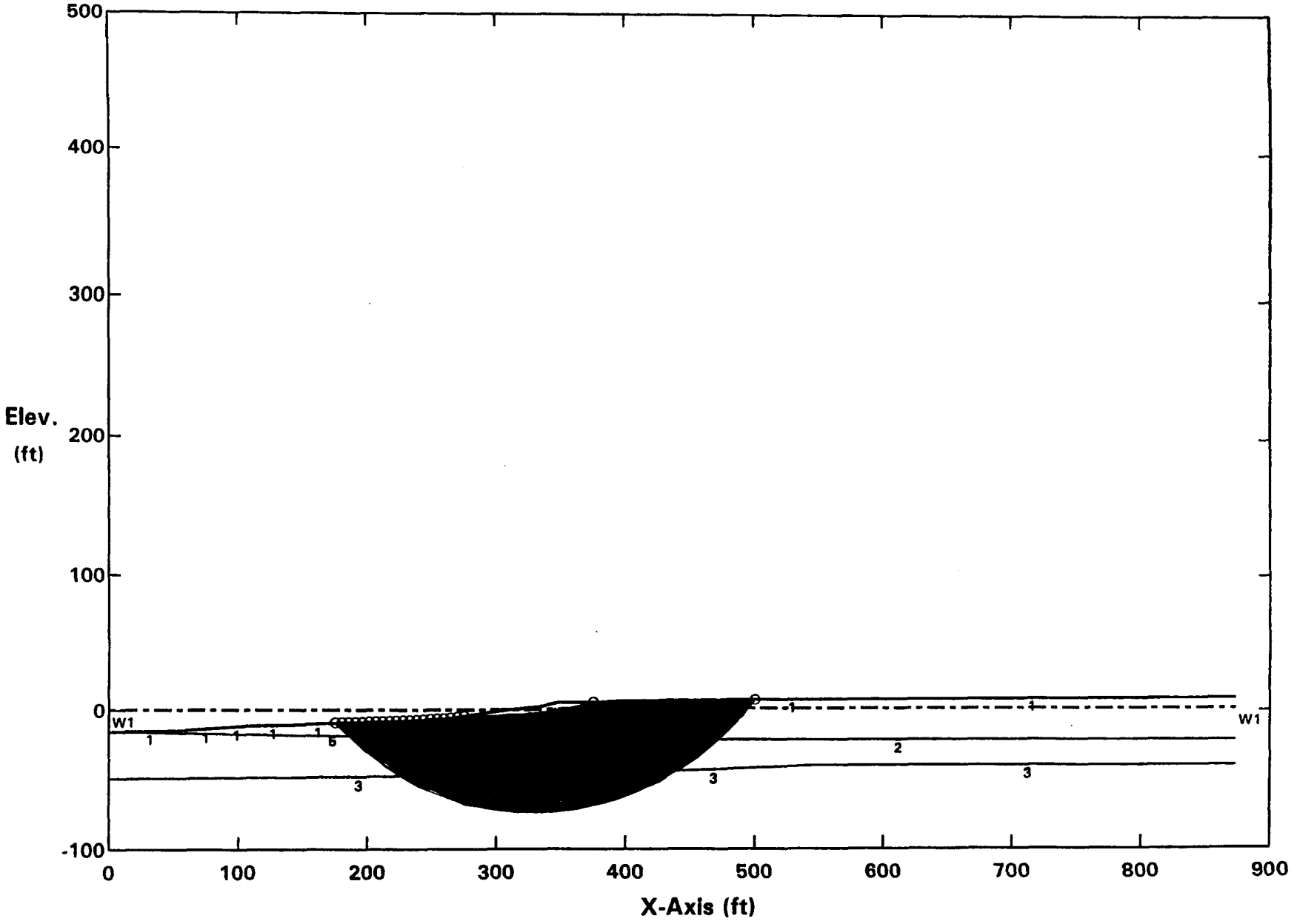
A-NAS Between IR Sites, I-I', Post-EQ Static Bishop Circular Search

All surfaces evaluated. C:IR2IEQBS.PLT By: MMM 08-02-02 8:51pm



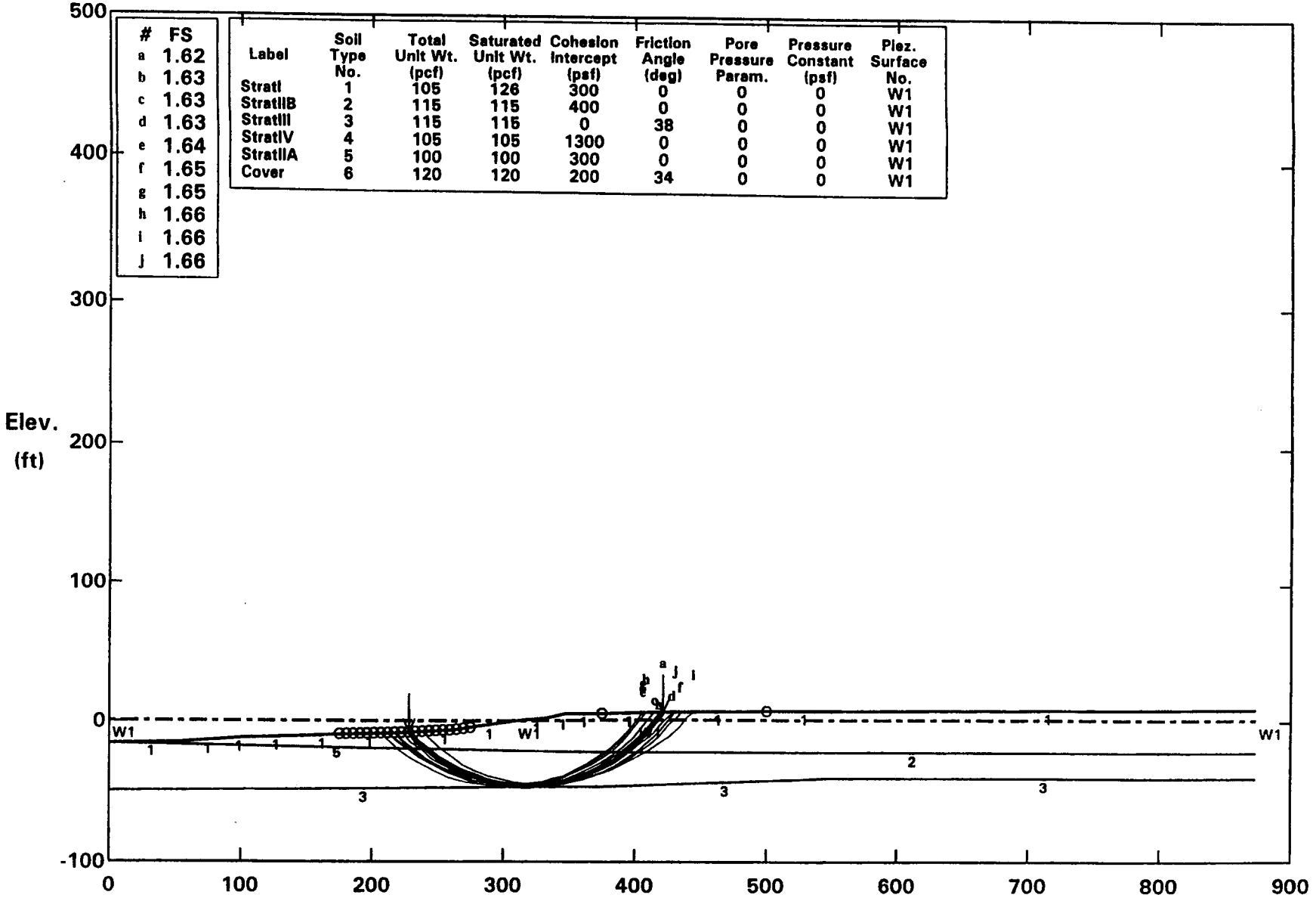
Factors Of Safety Calculated By The Modified Bishop Method

A-NAS Between IR Sites, I-I', Post-EQ Static Bishop Circular Search

Ten Most Critical. C:IR2IEQBS.PLT By: MMM 08-02-02 8:51pm

#	FS
a	1.62
b	1.63
c	1.63
d	1.63
e	1.64
f	1.65
g	1.65
h	1.66
i	1.66
j	1.66

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1



PCSTABL5M FSmin = 1.62 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

```
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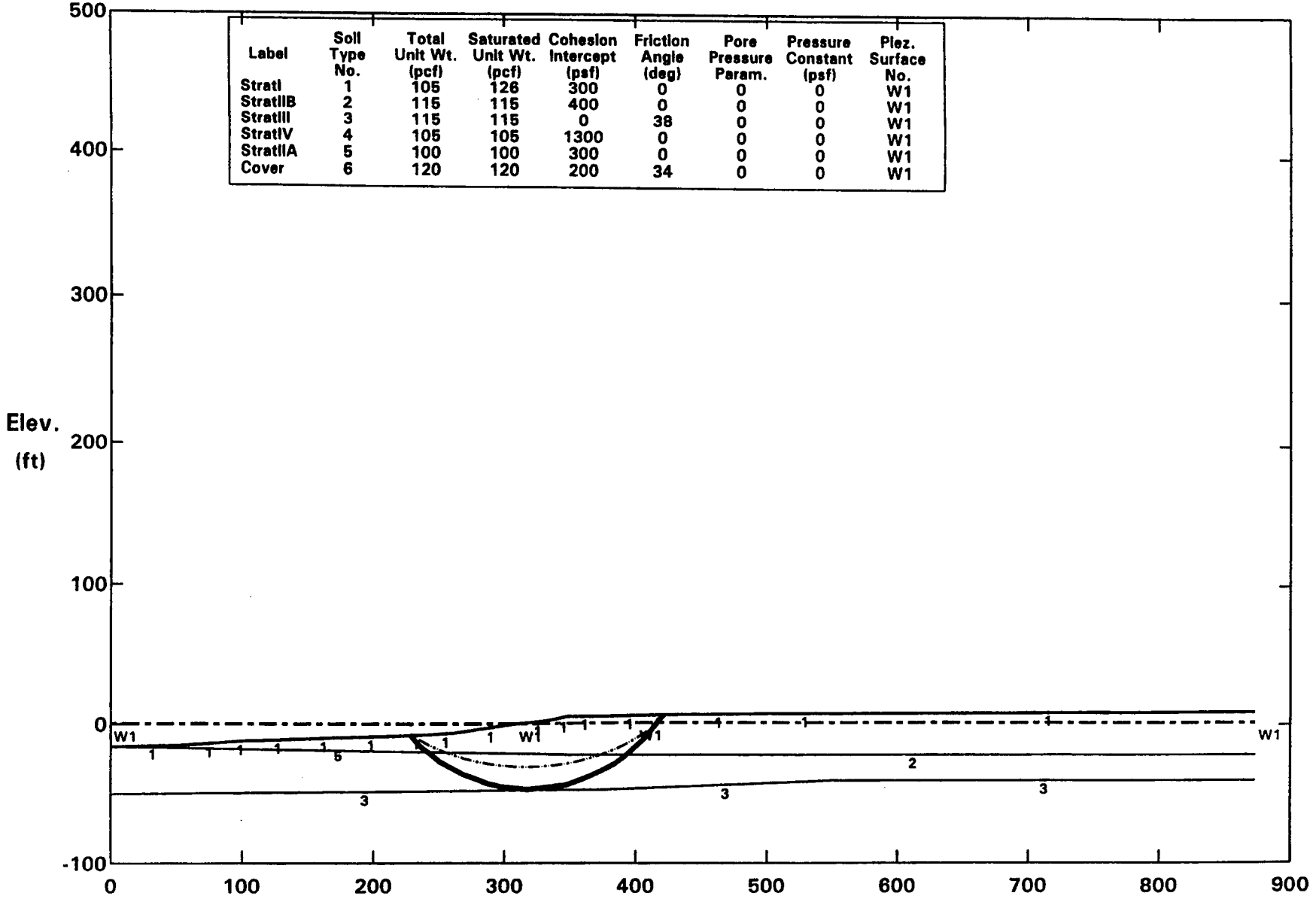
-100. )
A-NAS Between IR Sites, I-I', Post-EQ   Spencer Static Slope Stability (Circ
21 16
0. 84. 53. 85. 1
53. 85. 86. 87. 1
86. 87. 101. 88. 1
101. 88. 143. 90. 1
143. 90. 171. 91. 1
171. 91. 215. 92. 1
215. 92. 240. 93. 1
240. 93. 261. 94. 1
261. 94. 309. 100. 1
309. 100. 333. 103. 1
333. 103. 348. 106. 1
348. 106. 373. 106. 1
373. 106. 408. 107. 1
408. 107. 508. 108. 1
508. 108. 548. 108. 1
548. 108. 873. 109. 1
0. 84. 350. 79. 5
350. 79. 873. 79. 2
0. 50. 375. 54. 3
375. 54. 550. 60. 3
550. 60. 873. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
309. 100.
400. 102.
873. 102.
SPENCR
4.
SURBIS #1-IR2IEQBS.OUT
24
227.63 92.51
234.84 85.58
242.58 79.24
250.8 73.54
259.44 68.52
268.46 64.19
277.79 60.59
287.38 57.75
297.16 55.68
307.08 54.39
317.06 53.9
327.06 54.2
337. 55.29
346.82 57.17
356.46 59.82
```

365.86 63.24
374.96 67.38
383.7 72.24
392.03 77.78
[illegible].89 83.96
[illegible]7.24 90.75
414.02 98.09
420.2 105.96
420.97 107.13
EXECUT

A-NAS Between IR Sites, I-I', Post-EQ Spencer Static Slope Stability (Circ.)

Surface #1-IR2IEQBS.OUT. C:IR2IEQSC.PLT By: MMM 08-02-02 8:51pm



Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1

PCSTABL5M FS = 1.63 Theta = 1.64 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

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PROFIL        C:\GEO\STED\A-NAS\SITE2\I-2\IR2IEQJS.IN  PCSTABL Version 5M /O(0. ,
-100. )
A NAS Between IR Sites, I-I', Post-EQ   Static Janbu Block Search
   16
0. 84. 53. 85. 1
53. 85. 86. 87. 1
86. 87. 101. 88. 1
101. 88. 143. 90. 1
143. 90. 171. 91. 1
171. 91. 215. 92. 1
215. 92. 240. 93. 1
240. 93. 261. 94. 1
261. 94. 309. 100. 1
309. 100. 333. 103. 1
333. 103. 348. 106. 1
348. 106. 373. 106. 1
373. 106. 408. 107. 1
408. 107. 508. 108. 1
508. 108. 548. 108. 1
548. 108. 873. 109. 1
0. 84. 350. 79. 5
350. 79. 873. 79. 2
0. 50. 375. 54. 3
375. 54. 550. 60. 3
550. 60. 873. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 300. 0. 0. 0. 1
   . 115. 400. 0. 0. 0. 1
  .5. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
309. 100.
400. 102.
873. 102.
BLOCK2-Rankine block, search
0
4000 2 10.
150. 65. 250. 65. 40.
251. 70. 450. 70. 46.
```
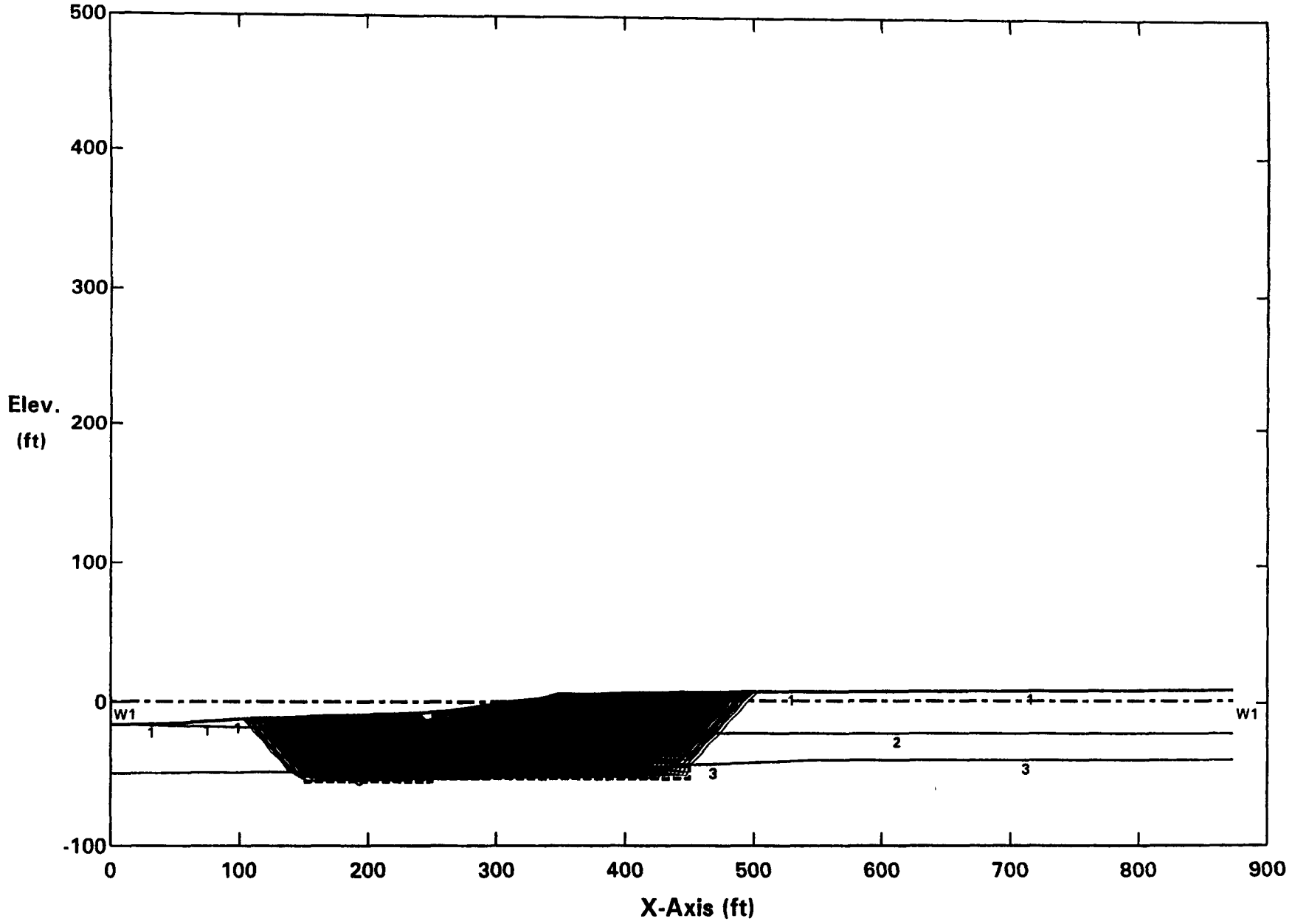

A-NAS Between IR Sites, I-I', Post-EQ Static Janbu Block Search

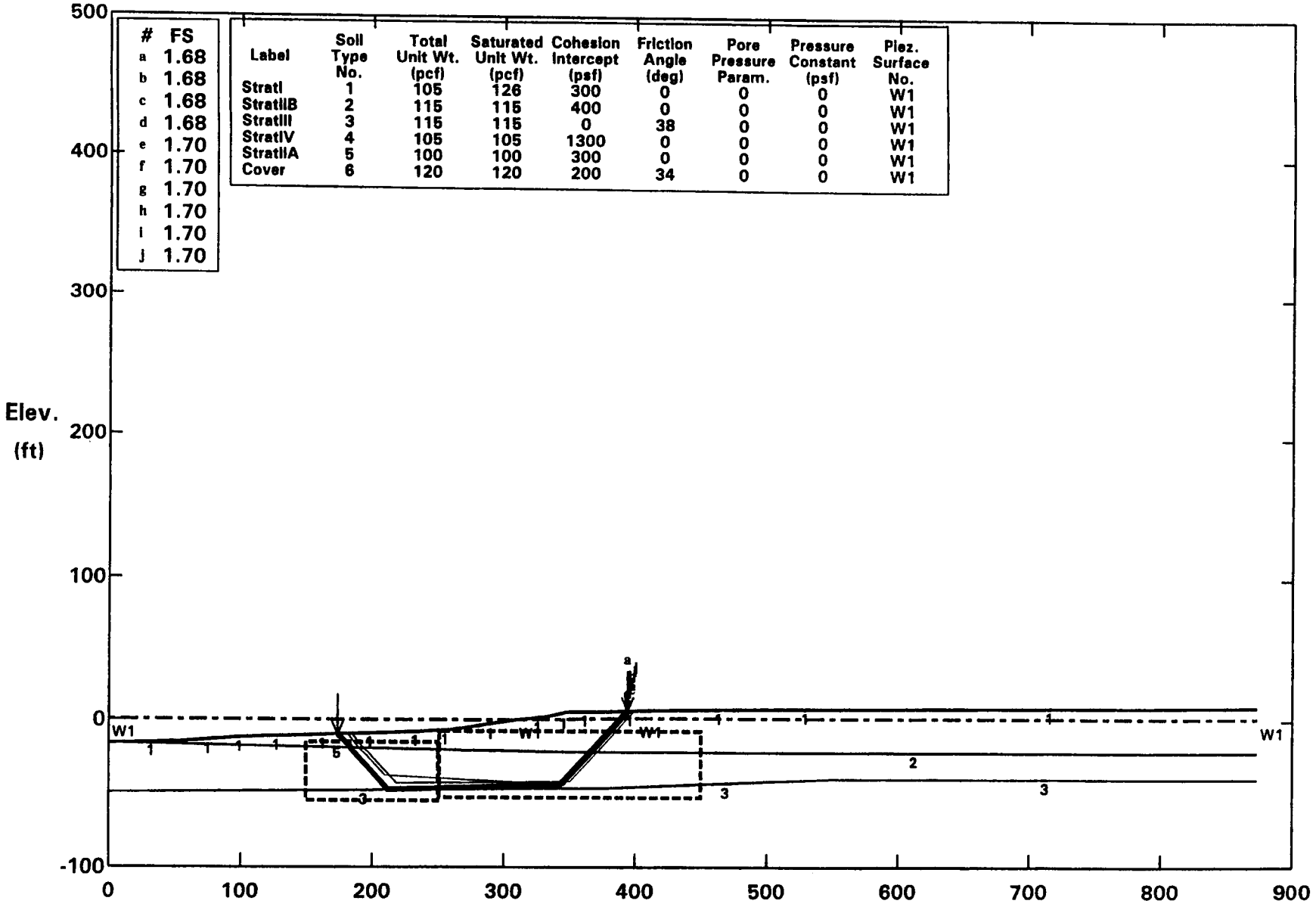
All surfaces evaluated. C:IR2IEQJS.PLT By: MMM 08-02-02 9:01pm



Factors Of Safety Calculated By The Modified Janbu Method

A-NAS Between IR Sites, I-I', Post-EQ Static Janbu Block Search

Ten Most Critical. C:IR2IEQJS.PLT By: MMM 08-02-02 9:01pm



#	FS
a	1.68
b	1.68
c	1.68
d	1.68
e	1.70
f	1.70
g	1.70
h	1.70
i	1.70
j	1.70

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1

PCSTABL5M FSmin = 1.68 X-Axis (ft)

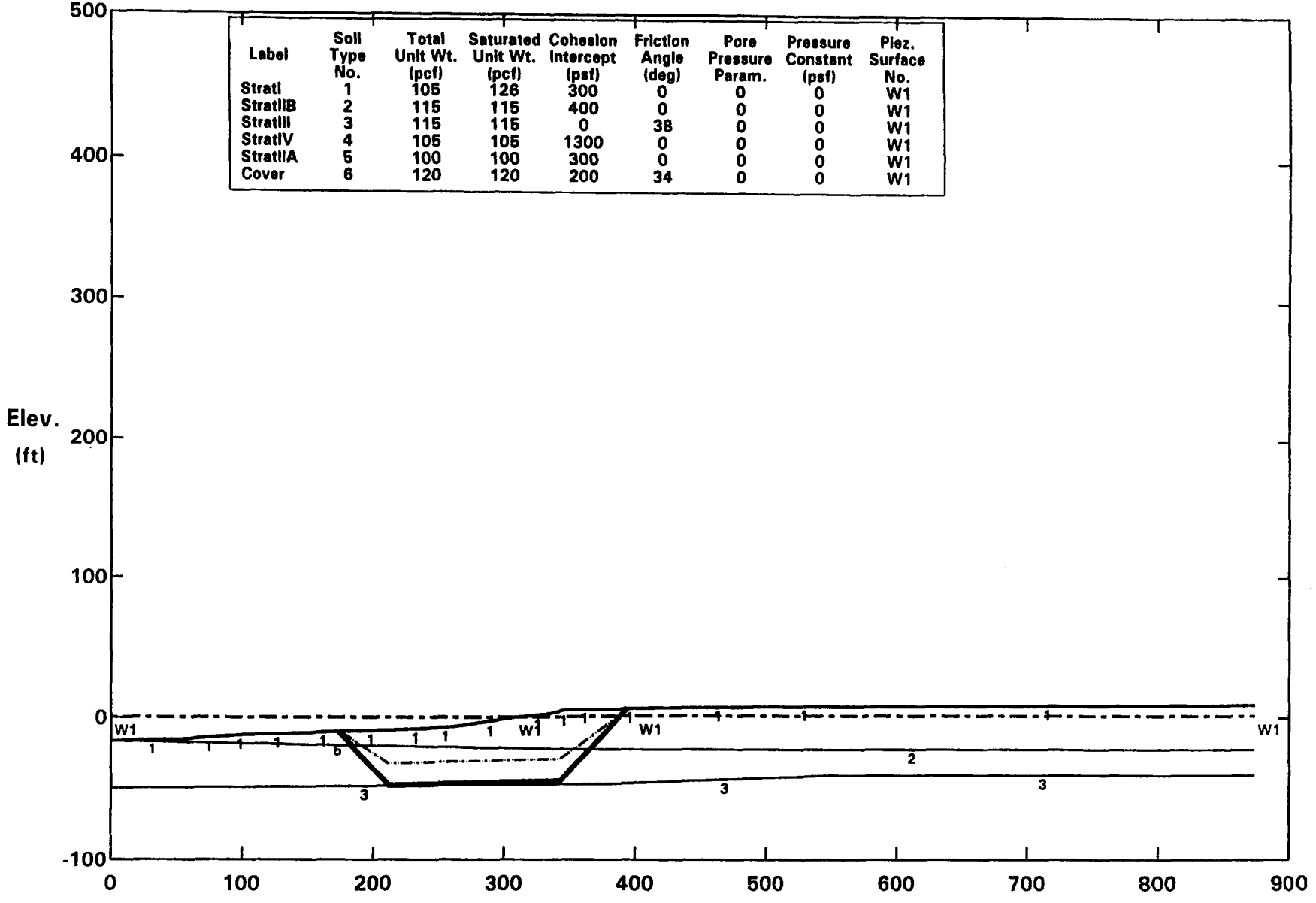
Factors Of Safety Calculated By The Modified Janbu Method

```
PROFIL        C:\GEO\STED\A-NAS\SITE2\I-2\IR2IEQSB.IN  PCSTABL Version 5M /O(0. ,
-100. )
A-NAS Between IR Sites, I-I', Post-EQ   Spencer Static Slope Stability (Block'
21 16
0. 84. 53. 85. 1
53. 85. 86. 87. 1
86. 87. 101. 88. 1
101. 88. 143. 90. 1
143. 90. 171. 91. 1
171. 91. 215. 92. 1
215. 92. 240. 93. 1
240. 93. 261. 94. 1
261. 94. 309. 100. 1
309. 100. 333. 103. 1
333. 103. 348. 106. 1
348. 106. 373. 106. 1
373. 106. 408. 107. 1
408. 107. 508. 108. 1
508. 108. 548. 108. 1
548. 108. 873. 109. 1
0. 84. 350. 79. 5
350. 79. 873. 79. 2
0. 50. 375. 54. 3
375. 54. 550. 60. 3
550. 60. 873. 60. 3
SOIL  StratI  StratIIBStratIIIStratIV StratIIACover
6
105. 126. 300. 0. 0. 0. 1
115. 115. 400. 0. 0. 0. 1
115. 115. 0. 38. 0. 0. 1
105. 105. 1300. 0. 0. 0. 1
100. 100. 300. 0. 0. 0. 1
120. 120. 200. 34. 0. 0. 1
WATER
1 62.4
4
0. 100.
309. 100.
400. 102.
873. 102.
SPENCR
3.
SURFAC #1-IR2IEQJS.OUT
17
173.26 91.05
175.85 88.46
182.93 81.39
183.16 81.15
190.23 74.08
197.3 67.01
204.37 59.94
211.44 52.87
342.86 55.94
349.93 63.01
357. 70.08
364.07 77.15
365.92 79.
372.99 86.07
380.07 93.14
```

387.14 100.21
393.51 106.59
EXECUT

A-NAS Between IR Sites, I-I', Post-EQ Spencer Static Slope Stability (Block)

Surface #1-IR2IEQJS.OUT. C:IR2IEQSB.PLT By: MMM 08-02-02 9:02pm



Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
StratI	1	105	126	300	0	0	0	W1
StratIIB	2	115	115	400	0	0	0	W1
StratIII	3	115	115	0	38	0	0	W1
StratIV	4	105	105	1300	0	0	0	W1
StratIIA	5	100	100	300	0	0	0	W1
Cover	6	120	120	200	34	0	0	W1

PCSTABL5M FS = 1.94 Theta = 1.84 X-Axis (ft)

Factors Of Safety Calculated By Spencer`s Method of Slices

ATTACHMENT 1

COVER LETTER FROM HAI

HAI HUSHMAND ASSOCIATES, INCORPORATED
Geotechnical, Earthquake and Environmental Engineers

October 27, 2003

FOSTER WHEELER
1940 E. Deere Ave., Suite 200
Santa Ana, California 92705
Attn.: Mr. Abid Loan, P.E., Lead Office Engineer

SUBJECT: Draft Final Ordnance and Explosives Waste/Geotechnical Characterization Report, Ordnance and Explosives Waste Characterization, Time-Critical Removal Action, and Geotechnical and Seismic Evaluations at IR Site 2, Alameda Point, Alameda, California DCN # 03-2899

Dear Mr. Loan:

Hushmand Associates, Inc. (HAI) is pleased to provide our services to Foster Wheeler Environmental Corporation (FWENC) in joint preparation of the "Draft Final Ordnance and Explosives Waste/Geotechnical Characterization Report" for Ordnance and Explosives Waste Characterization, Time-Critical Removal Action, and Geotechnical and Seismic Evaluations at IR Site 2 at Alameda Point, Alameda, California. HAI provided input used in the following sections of the FWENC report:

Executive Summary; 1.0 Introduction, 4.0 Geotechnical and Seismic Evaluations, 5.0 Conclusions and Recommendations; Appendix A: Geologic Cross Sections from Previous Remedial Investigation Report. Appendix B: Logs of CPT Soundings and Seismic Velocity Measurements; Appendix H: Description of Test Methods, Summary of Test Results, Teratest Lab Report, and Chain-of-Custody (COC) Records; Appendix L: One-Dimensional Site Response and Liquefaction-Induced Deformation Analyses & Appendix M: Slope Stability Analysis Results.

In addition HAI reviewed the entire report and provided comments. This work was performed in accordance with standard geotechnical engineering practices and procedures. HAI appreciates the opportunity of being of service to FWENC. Should you need additional information or any clarifications please call either of the undersigned.

Sincerely yours,

HUSHMAND ASSOCIATES, INC.

Ben Hushmand

Ben Hushmand, Ph.D., RCE 44777

15451 Red Hill Avenue, Suite A • Tustin, California 92780 • (714) 247-1655 • Fax (714) 247-1652
www.hushmand-associates.com