TIERRA
GEOTECHNICAL • MATERIALS ENGINEERING

July 7, 2006

Mr. David Ruggles, P.E
Stewart Engineering, Inc.
260 Town Hall Drive, Suite C
Morrisville, North Carolina 27560

Re: ***Supplemental Geotechnical Report***
Geotechnical Analysis for Access Ramp
Pedestrian Bridge Replacement over NC 147 (Durham Freeway)
Durham County, North Carolina
Tierra Inc. Project No.: 6211-05-036

Dear Mr. Ruggles:

As authorized, Tierra Inc. has completed geotechnical analysis for the proposed access ramp on the south side of the Pedestrian Bridge over NC 147 in Durham, North Carolina. Our services were performed in general accordance with our proposal number TR-04-015S, dated May 2, 2006. Presented below is a supplemental report to our original report for the bridge structure (Tierra, Inc. Project No. 6211-05-036, dated November 11, 2005). The purpose of this supplemental report is to provide the allowable bearing pressure and factor of safety for global stability for the foundations for the proposed access ramp.

PROJECT DESCRIPTION

Based upon our review of the plans provided by Stewart Engineering, Inc., dated February 8, 2006, it is our understanding that an access ramp is to be constructed immediately to the east of the southern bridge abutment for the Pedestrian Bridge Project located over NC 147 in Durham, North Carolina. The access ramp consists of three parallel structural walls, about 100 feet long, supported on spread footings with concrete slabs at the top of the walls (refer to the Attached Ramp Section and Profile). The walls are anticipated to be constructed of cast-in-place concrete. Wall heights are to vary from about 3 to 14 feet, with base elevations between 386.2 to 389.5 feet and top elevations between 391.3 to 403.1 feet. It is also our understanding that the areas between the walls will not be backfilled with soil, but will be hollow. The proposed footings are anticipated to be 4 feet wide and 3 to 4 feet below existing grades.

SUBSURFACE CONDITIONS

To evaluate the subsurface conditions at the proposed structure location, an additional test boring (WB1) was drilled in the vicinity of the access ramp. The test boring encountered medium stiff to very stiff residual silty soils to the boring termination depth of approximately 17 feet. Auger and split spoon refusal was encountered at the bottom of the boring, likely indicating weathered or Crystalline bedrock. In addition, previous test boring EB2 encountered a thin layer of embankment fill underlain by stiff residual clayey soils to a depth of approximately 23 feet. Groundwater was not encountered at boring WB1 at the time of our exploration, but was measured approximately 18 feet below grade at previous boring EB2. Refer to the attached boring logs and generalized profile for additional information.

GEOTECHNICAL ANALYSIS

A geotechnical analysis was performed to evaluate the allowable bearing pressure and global stability for the access ramp foundations. The results of the analysis are provided in the Attachments and discussed further below.

Allowable bearing pressure

From the results of our investigation, we anticipate that the footings for the walls will bear on medium stiff to very stiff residual silts and clays. Based on our analysis, the footings may be designed for an allowable bearing capacity of 2,000 pounds per square foot (psf). Total settlements associated with this allowable bearing capacity are estimated to be 1 inch or less and differential settlements approximately one half of the total. Due to the stiff nature of the residual soils, it is anticipated that the soils are over consolidated and that most of the settlements will occur as a result of elastic settlement. During construction, the foundation subgrade should be evaluated by a geotechnical engineer to confirm the design bearing capacity.

Global Stability Analysis

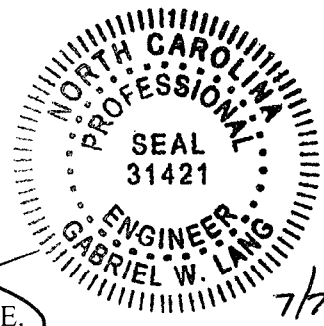
A global stability analysis was performed using a two-dimensional limit equilibrium method from the computer program "STABLPRO 2.0". The slope stability analysis was performed using the modified Bishop method to compute the factor of safety for global stability.

The analysis is based upon an undrained shear strength for the stiff residual soils ranging from 800 to 1,200 psf. In addition, a surcharge load of 2,000 psf was applied at the top of the slope to account for the foundation loadings from the access ramp. Utilizing the topographic information provided, a 1:1 (Horizontal:Vertical) slope was modeled with a height of approximately 6 feet. The safety factor for the most critical failure surface developed was computed to be 1.68. For structures constructed on slopes, a minimum factor of safety of 1.5 is recommended.

If changes in the wall design occur, Tierra, Inc. should be contacted to determine if modifications to our analysis and recommendations will be required. Our professional services for this project have been performed in accordance with generally accepted engineering practices. No other warranty, expressed or implied, is made.

Tierra, Inc., appreciates this opportunity to have provided you with geotechnical engineering services for this project. If you have any questions regarding this supplemental report, please contact our office.

Very truly yours,
TIERRA, INC.

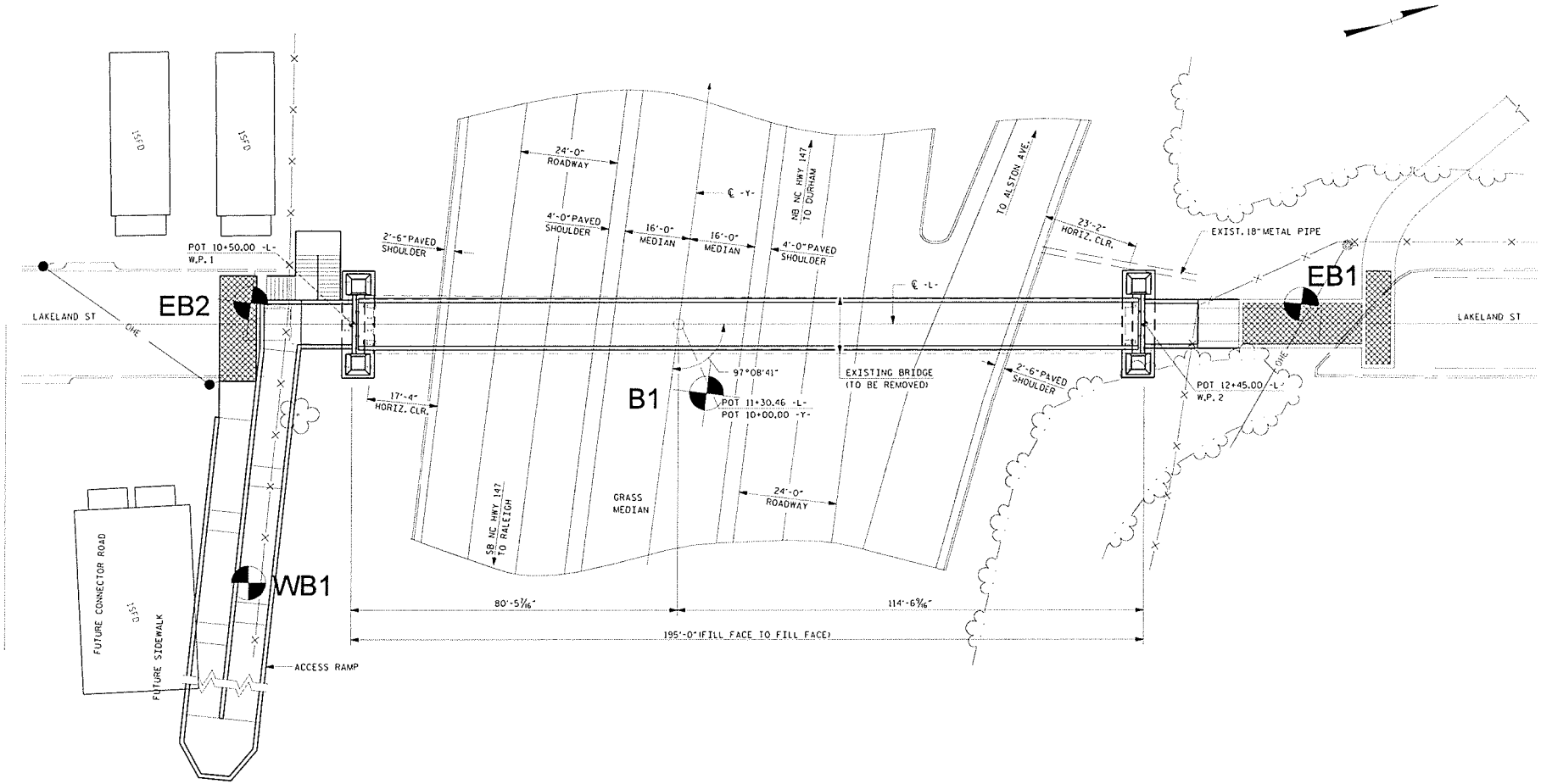


7/7/06

Seungwoon (Sean) Han, Ph.D., P.E.
Geotechnical Engineer

Gabriel W. Lang, P.E.
Sr. Geotechnical Engineer/Manager

Attachments: Boring Location Plan
Boring Logs (EB2 and WB1)
Generalized Profile (Borings EB2 and WB1)
Ramp Section and Profile
Sample Calculations



NOTES:

- APPROXIMATE SPT BORING LOCATION
- PLANS ADOPTED FROM ELECTRONIC FILES RECEIVED FROM STEWART ENGINEERING, DATED JUNE, 2006

BORING LOCATION PLAN

CITY OF DURHAM
PEDESTRIAN BRIDGE OVER NC 147
(DURHAM FREEWAY)
DURHAM CO., NC

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N.C.D.O.T. GEOTECHNICAL UNIT
BORING LOG

PROJECT NO. 6211-05-036	**ID.**	**COUNTY** DURHAM	**GEOLOGIST** J. HOWARD
SITE DESCRIPTION NC 147 PEDESTRIAN BRIDGE			**GROUND WATER (ft)**
BORING NO. EB2	**BORING LOCATION**	**OFFSET**	**ALIGNMENT** **0 HR.** 7.8
COLLAR ELEV. 391 ft	**NORTHING**	**EASTING**	**24 HR.** 18.2
TOTAL DEPTH 40.5 ft	**DRILL MACHINE** DIEDRICH 50	**DRILL METHOD** HSA	**HAMMER TYPE** AUTO
DATE STARTED 10-17-05	**COMPLETED** 10-17-05	**SURFACE WATER DEPTH** N/A	

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
391.0					EXISTING GROUND				
	0.0	3	4	4	8	SS-1			391.0 0.0 390.9 ROOTMAT 0.1 RDWY EMB: TAN, BROWN AND ORANGE, LOOSE, CLAYEY SAND (A-2-6)
390	3.5								388.0 3.0
		4	5	7	12	SS-2			RES: YELLOW, TAN AND BROWN, STIFF, SANDY SILTY CLAY (A-7-5)
	6.0								
385		4	5	5	10	SS-3			
	8.5								
		7	6	7	13	SS-4			
380									
	13.5								
		3	3	5	8	SS-5			
375									
	18.5								
		2	3	5	8	SS-6			
370									
	23.5								
		4	6	10	16	SS-7			368.0 23.0 RES: TAN, MED. DENSE, COARSE SAND (A-1-b) WITH MICA
365									
	28.5								
		8	12	14	26	SS-8			
360									360.5 30.5 WR: BLUE AND GRAY, DIABASE
	33.5								
		100/.5			100/.5	SS-9			356.5 34.5 CR: BLUE AND GRAY, MOD. SEV. WEATHERED TO FRESH, V. HARD, CLOSE TO MOD. CLOSELY FRATURED, DIABASE WITH WEATHERED ZONES
355									350.5 40.5 BORING TERMINATED AT ELEV. 350.5' IN CR: BLUE AND GRAY, DIABASE

NCDOT_BORE 0SNUPD-P.GPJ NCDOT.GDT 7/7/06

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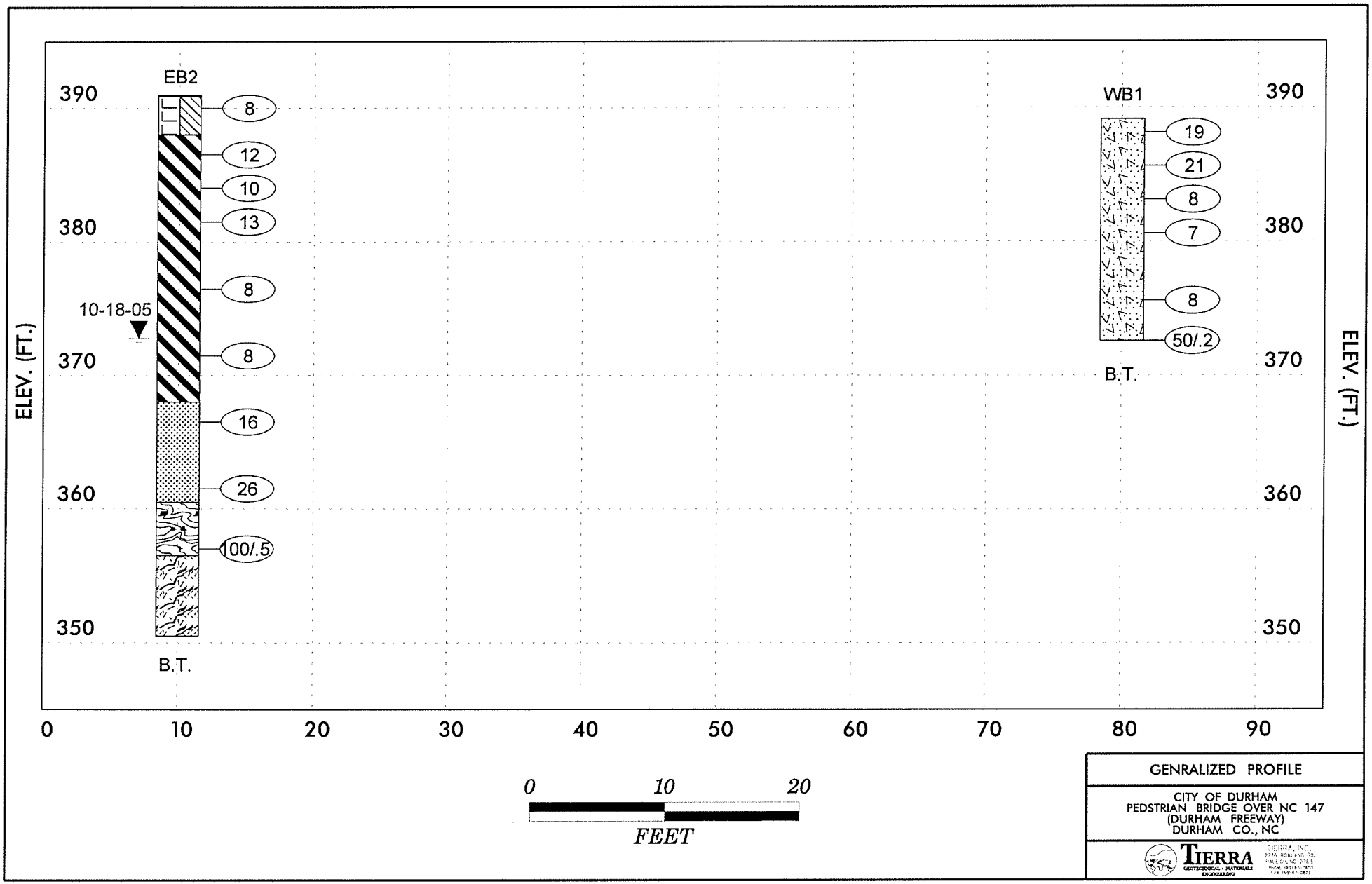
N.C.D.O.T. GEOTECHNICAL UNIT
BORING LOG

PROJECT NO. 6211-05-036	**ID.**	**COUNTY** DURHAM	**GEOLOGIST** S. HAN
SITE DESCRIPTION NC 147 PEDESTRIAN BRIDGE			**GROUND WATER (ft)**
BORING NO. WB1	**BORING LOCATION**	**OFFSET**	**ALIGNMENT** **0 HR.** DRY
COLLAR ELEV. 389 ft	**NORTHING**	**EASTING**	**24 HR.** BACKFILL
TOTAL DEPTH 16.7 ft	**DRILL MACHINE** DK 51	**DRILL METHOD** HSA	**HAMMER TYPE** MANUAL
DATE STARTED 6-22-06	**COMPLETED** 6-22-06	**SURFACE WATER DEPTH** N/A	

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
389.0					EXISTING GROUND				389.0 0.0
	1.0								RES: GRAY AND BROWN, V. STIFF TO MED. STIFF, SANDY CLAYEY SILT (A-5)
		3	7	12	19	SS-1	D		
	3.5								
385		5	8	13	21	SS-2	D		
	6.0								
		2	3	5	8	SS-3	D		
	8.5								
380		1	3	4	7	SS-4	D		
	13.5								
375		1	3	5	8	SS-5	D		
	16.5								372.3 16.7
		50/.2			50/.2	SS-6			BORING TERMINATED AT 16.7' IN WR OR CR; AUGER REFUSAL ENCOUNTERED



GENRALIZED PROFILE

CITY OF DURHAM
PEDSTRIAN BRIDGE OVER NC 147
(DURHAM FREEWAY)
DURHAM CO., NC

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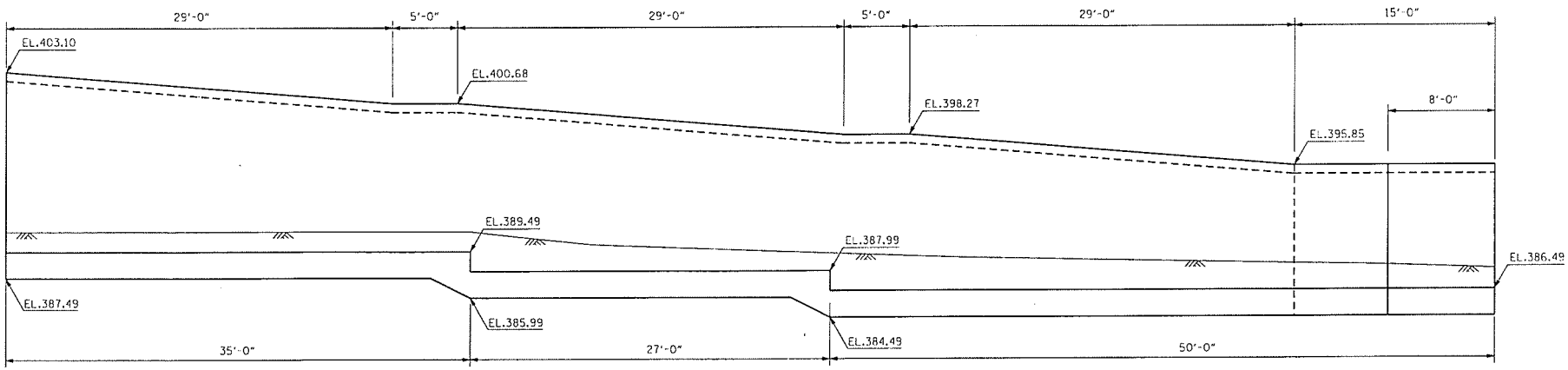
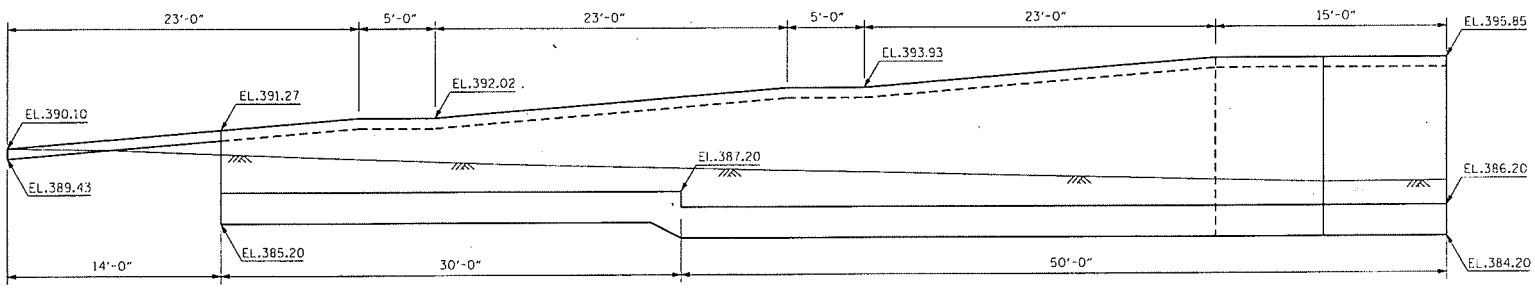
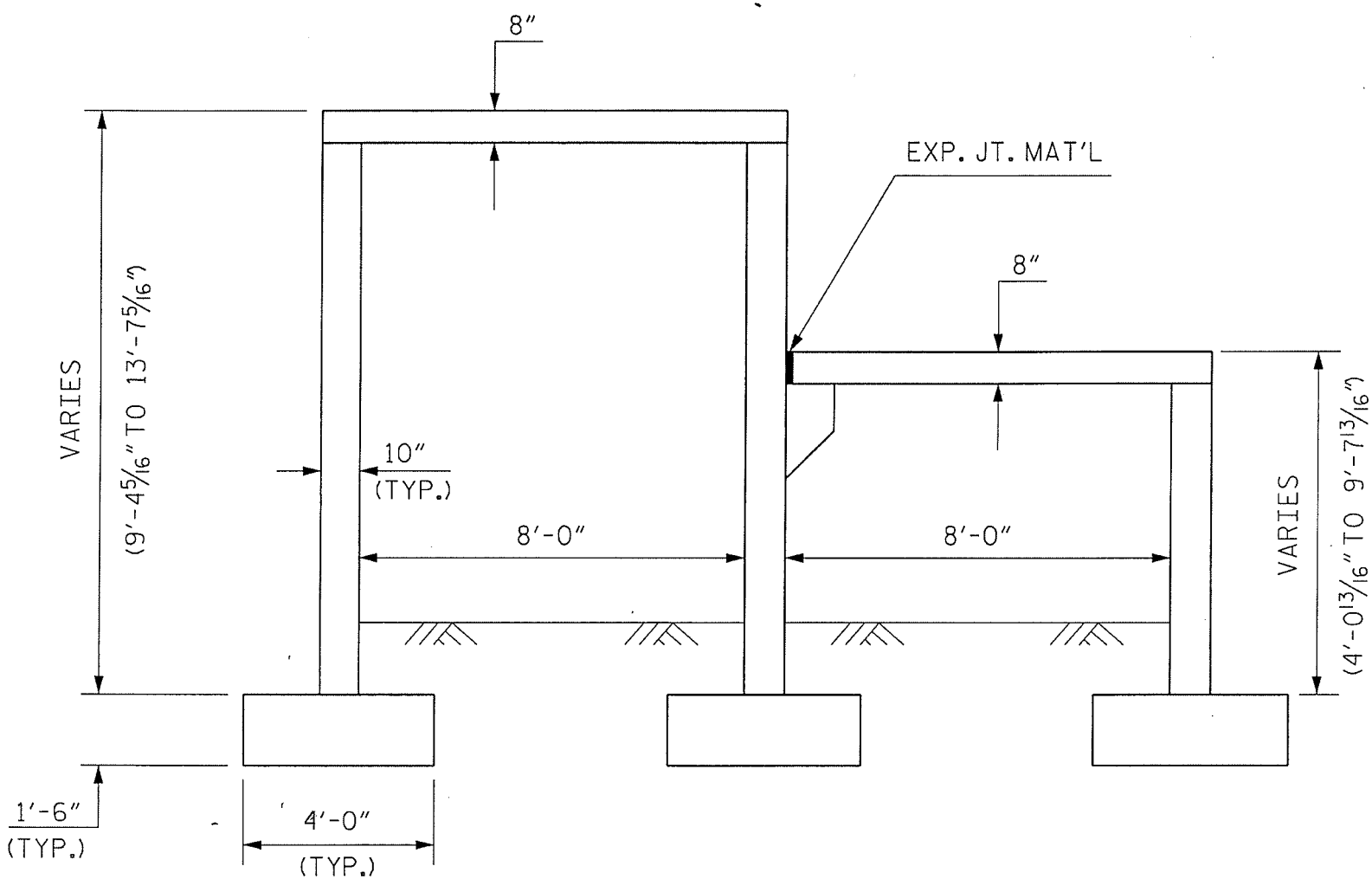
GEOTECHNICAL · MATERIALS ENGINEERING



LEFT & CENTER WALLS



RIGHT WALL



RAMP SECTION

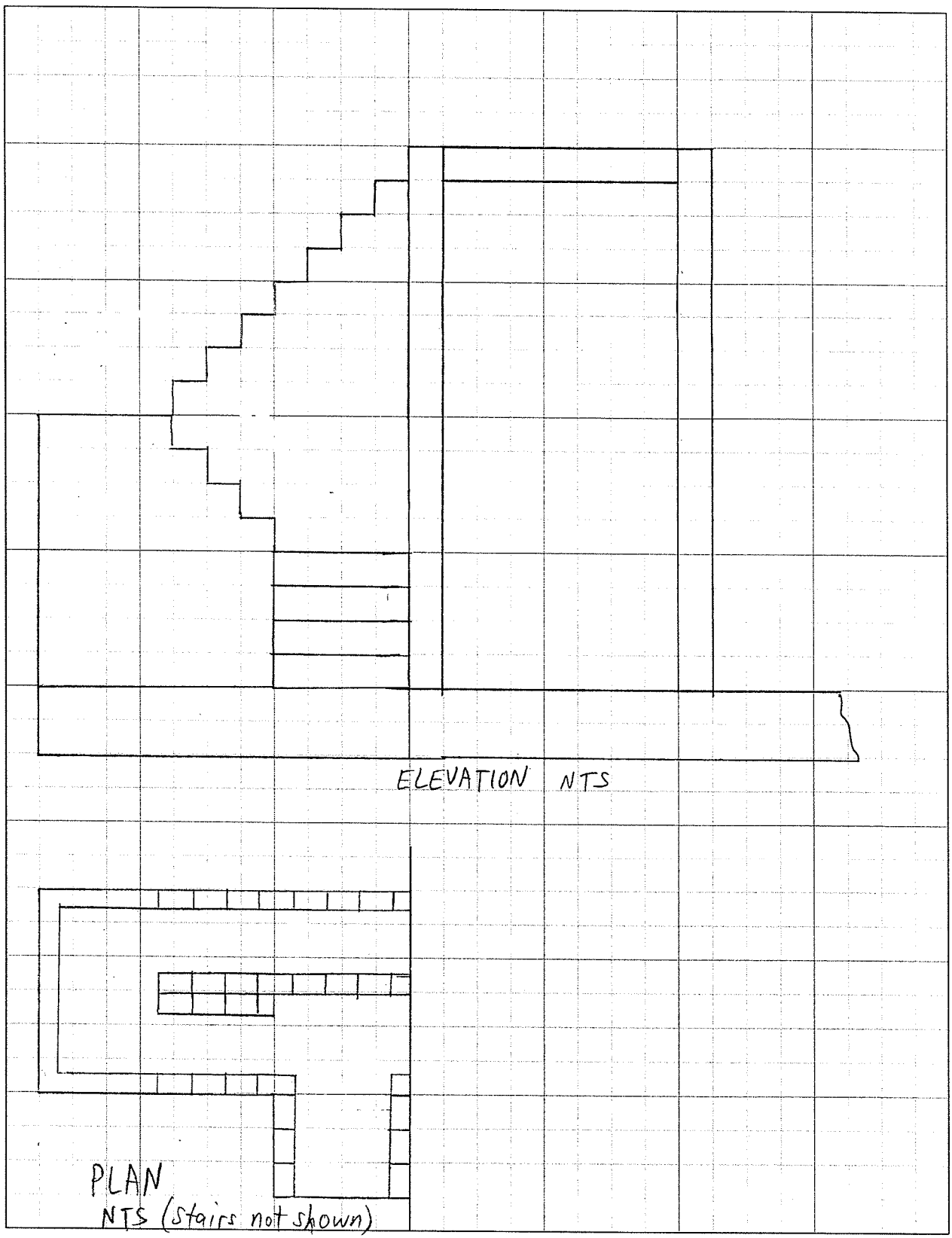
STEWART
ENGINEERING INC

Project _____ Page _____ Of _____

Project No. _____ Subject _____

Client _____ Designer _____ Date _____

_____ Checker _____ Date _____



Morrisville, NC | Tel 919.380.8750 Fax 919.380.8752 www.stewart-eng.com

Tierra, Inc.
2701 Rowland Rd.
Raleigh, NC 27615

SUBJECT NC 147 pedestrian Bridge PROJECT 611-05-036
Durham COUNTY
PREPARED BY SWH DATE 6/29/06 STATION
CHECKED BY GWC DATE 7/7/06 STR. SHEET OF

Based on information regarding the proposed wall height & size, bearing capacity of the proposed wall was estimated for 4ft wide & 4 ft deep footing. In addition, sloping ground adjacent to the footing was taken into account for our analysis. per topo map, existing slope was estimated 45° (1:1).

the borings performed indicated that the soil to be encountered below the footing consisted of stiff residual silt and clay.

* For clay / stiff

For 45° slope, $b/B = 4$, & $D_f/B = 1$ (see Fig 4.4.7.1.1.4B from AASHTO Attached)

$N_c = 7$

bottom of footing elevation varies from 384± to 387.5.
ave. SPT N values below bottom of footing is about 8,

$\therefore q_{ult} = C N_c = 800 \times 7 = 5600$ psf

$q_{all} = \frac{q_{ult}}{FS} = \frac{5600}{3} = 1.9$ ksf

$\therefore$ 2 ksf

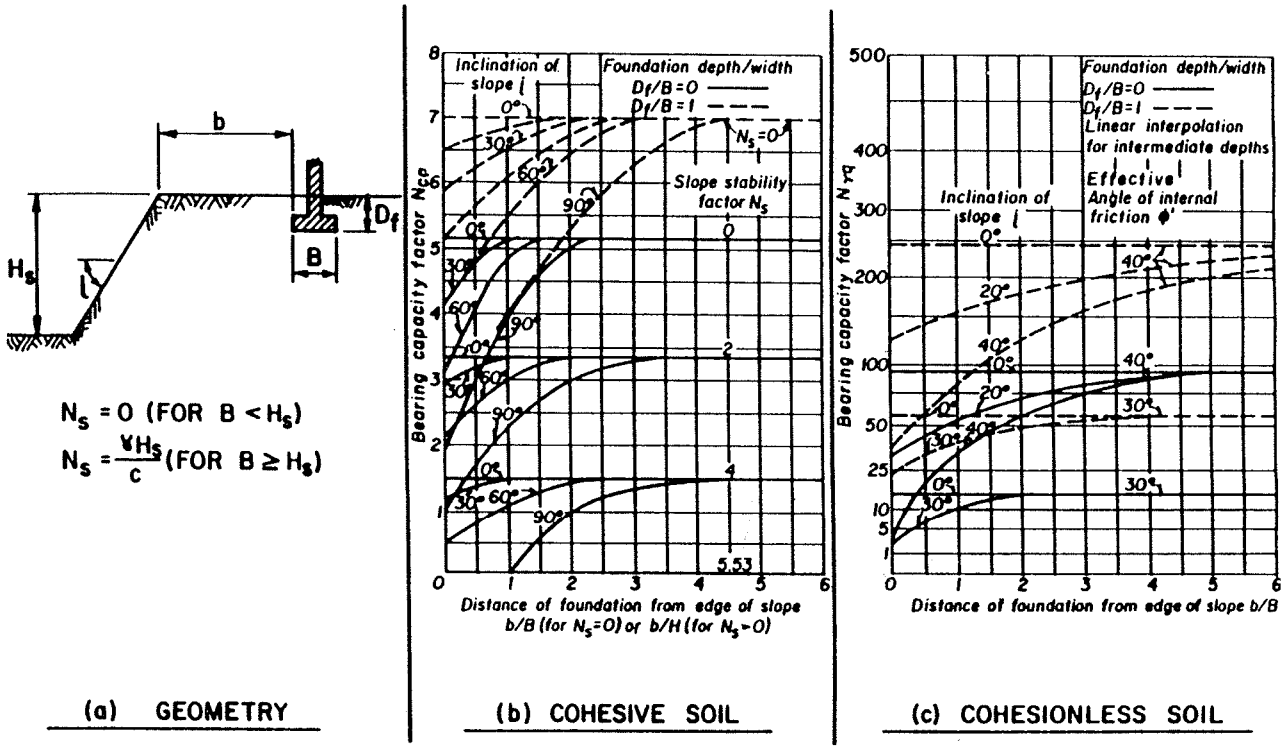


FIGURE 4.4.7.1.1.4A Modified Bearing Capacity Factors for Footing on Sloping Ground
Modified after Meyerhof (1957)

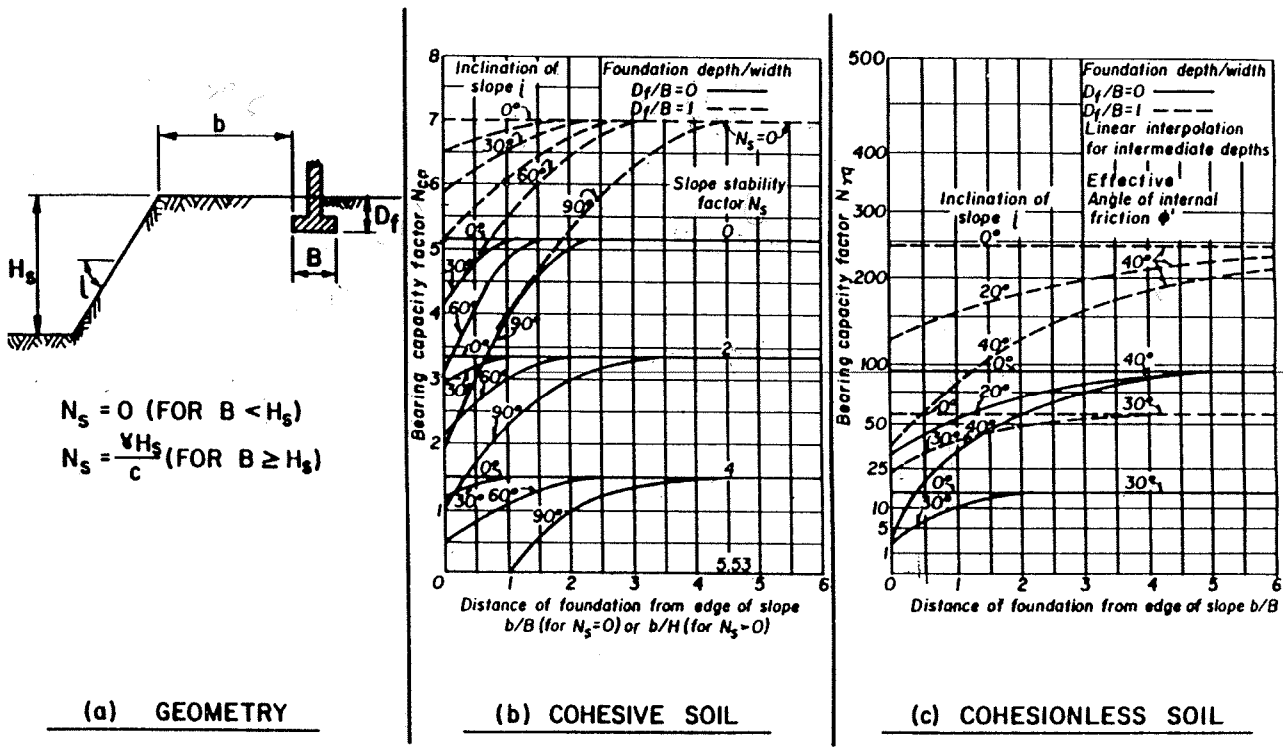


FIGURE 4.4.7.1.1.4B Modified Bearing Capacity Factors for Footing Adjacent Sloping Ground
Modified after Meyerhof (1957)

Tierra, Inc.
2701 Rowland Rd.
Raleigh, NC 27615

SUBJECT NC 147 Ped. Bridge PROJECT 6211-04-036
Durham COUNTY
PREPARED BY SWH DATE 7/7/06 STATION
CHECKED BY GWC DATE 7/7/06 STR. SHEET OF

Based on subsurface exploration performed, a footing is to be founded on clay/silt residual soil. Considering the stiff, likely over-consolidated nature of the soil and deep water table, we used the method proposed by Schmertmann & Hartman (1978) to calculate elastic settlement.

Settlement $S = C_1 C_2 (\bar{q} - q) \sum_0^z \frac{I_z}{E_s} \Delta z$

(112 kPa)

E_s should be drained elastic modulus, it was estimated based upon SPT blow count.

The information for Influence factor & $\frac{\text{footing size}}{(L \times B)}$ is shown in the fig.

$\left(\frac{L}{B} = 20 \rightarrow \text{strip footing}\right)$

I_z	z
0.2	0
0.5	$4' = 1B$
0	$16' = 4B$

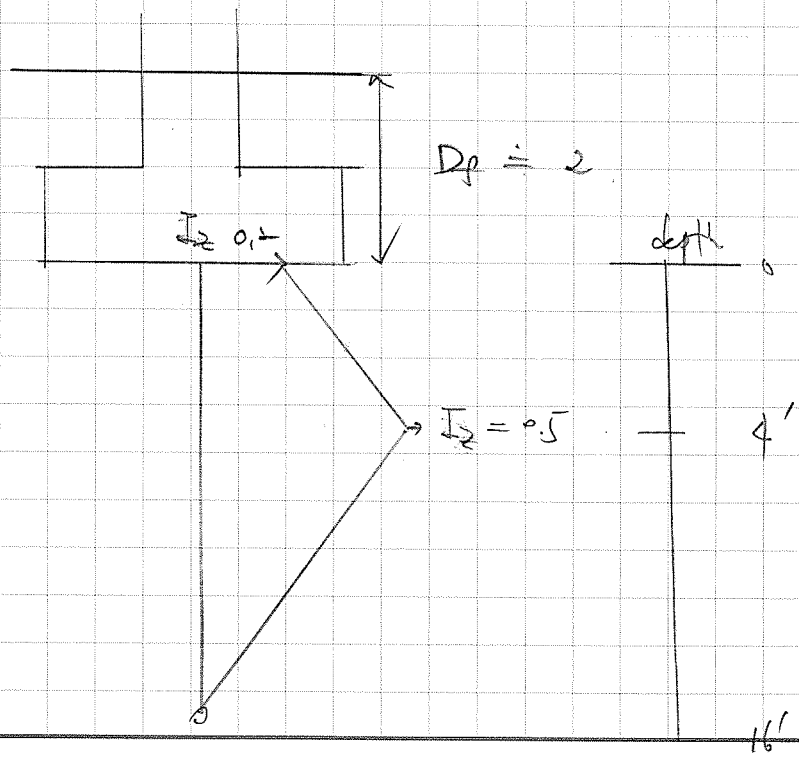


Fig.

Tierra, Inc.
2701 Rowland Rd.
Raleigh, NC 27615

SUBJECT NC 147 Rd. Bridge PROJECT 621-95-036
Durham COUNTY
PREPARED BY SWM DATE 7/6/06 STATION
CHECKED BY GWC DATE 7/7/06 STR. SHEET OF

$C_1 = 0.91$; a correction factor for the depth of foundation embedment.

$\therefore C_2 = 1.2$; creep factor

$q = \gamma D_f = 0.12 \times 2 = 0.24$ ksf

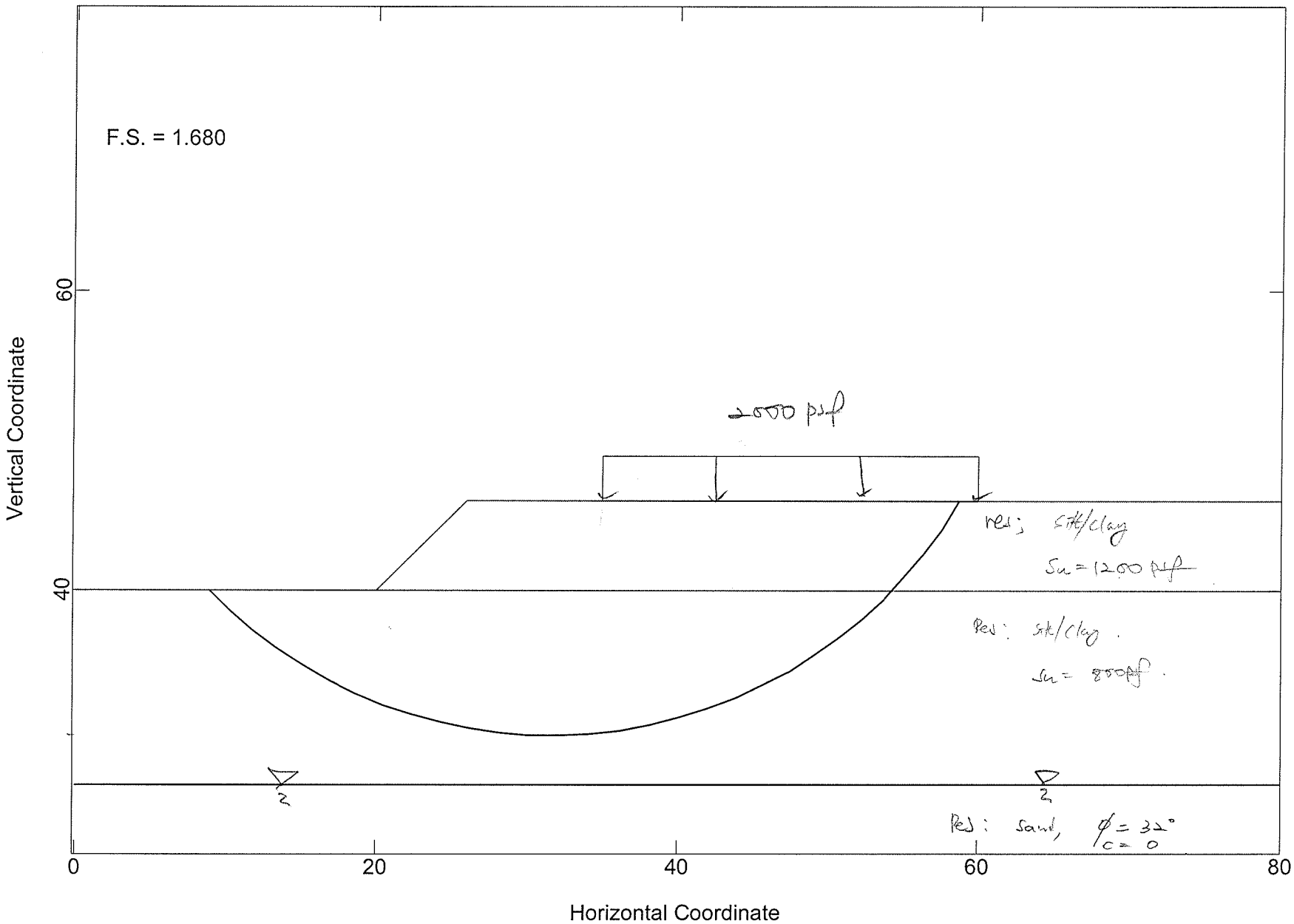
$\bar{q}$ = stress at the level of foundation = 2 ksf

$E = 112$ ksf

$$\therefore S = 0.91 \times 1.2 (2 - 0.24) \left\{ \frac{0.35}{112} \times 4 + \frac{0.25}{112} \times 12 \right\}$$

$$= 1.92 \times \{0.04\} = 0.0768 \text{ ft} = 0.92 \text{ inch} \checkmark$$

$\therefore$ Assume 1 inch total to include consolidation settlement


F.S. = 1.680
2000 psf
res; silt/clay
Su = 1200 psf
Res: silt/clay.
Su = 800 psf.
Res: sand, φ = 32°
c = 0
2
2
Vertical Coordinate
Horizontal Coordinate
0
20
40
60
80
40
60

** PCSTABL4M **

by
Purdue University

1

--Slope Stability Analysis--
Simplified Janbu Method of Slices
or Simplified Bishop Method
(Consistent Units, F=Force, L=Length)

Run Date:	6/27/2006
Time of Run:	4:01:48 PM
Run By:	
Input Data Filename:	ENS1F2B.tmp
Output Filename:	ENS1F2C.tmp
Plotted Output Filename:	ENS1F2D.tmp

PROBLEM DESCRIPTION Pedestrian Bridge - Footing on slope

BOUNDARY COORDINATES

3 Top Boundaries
5 Total Boundaries

Boundary No.	X-Left (L)	Y-Left (L)	X-Right (L)	Y-Right (L)	Soil Type Below Bnd
1	.00	40.00	20.00	40.00	2
2	20.00	40.00	26.00	46.00	1
3	26.00	46.00	80.00	46.00	1
4	20.00	40.00	80.00	40.00	2
5	.00	22.00	80.00	22.00	3

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. F/L^3	Saturated Unit Wt. F/L^3	Cohesion Intercept F/L^2	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant F/L^2	Piez. Surface No.
1	120.0	120.0	1200.0	.0	.00	.0	0
2	115.0	115.0	800.0	.0	.00	.0	1

3	120.0	120.0	.0	32.0	.00	.0	1

1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

THE POREPRESSURE MODEL CHOSEN IS:

Perpendicular

Unit Weight of Water = 62.40 F/L^3

Piezometric Surface No. 1 Specified by 2 Coordinate Points

Point No.	X-Water (L)	Y-Water (L)
1	.00	27.00
2	80.00	27.00

1

BOUNDARY LOAD(S)

1 Load(s) Specified

Load No.	X-Left (L)	X-Right (L)	Intensity (F/L^2)	Deflection (deg)
1	35.00	60.00	2000.0	.0

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.

1

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

100 Trial Surfaces Have Been Generated.

10 Surfaces Initiate From Each Of 10 Points Equally Spaced Along The Ground Surface Between X = .00 L
and X = 20.00 L

Each Surface Terminates Between X = 26.00 L
and X = 60.00 L

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = .00 L

2.00 ft. Line Segments Define Each Trial Failure Surface.

1

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Examined. They Are Ordered - Most Critical
First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 31 Coordinate Points

Point No.	X-Surf (L)	Y-Surf (L)
1	8.89	40.00
2	10.32	38.60
3	11.83	37.29
4	13.42	36.08
5	15.09	34.98
6	16.82	33.98
7	18.62	33.10
8	20.46	32.33
9	22.36	31.68
10	24.29	31.15
11	26.25	30.75
12	28.23	30.48
13	30.22	30.33
14	32.22	30.30
15	34.22	30.41
16	36.20	30.64
17	38.17	31.00
18	40.11	31.48
19	42.02	32.09
20	43.88	32.81
21	45.70	33.66
22	47.45	34.61
23	49.14	35.68
24	50.76	36.85
25	52.31	38.13
26	53.76	39.50
27	55.13	40.96
28	56.40	42.50
29	57.57	44.12
30	58.64	45.81

31 58.74 46.00

Circle Center At X = 31.6 ; Y = 61.7 and Radius, 31.4

*** 1.680 ***

Individual data on the 34 slices

Slice No.	Width (L)	Weight (F)	Water Force Top (F)	Water Force Bot (F)	Tie Force Norm (F)	Tie Force Tan (F)	Earthquake Force Hor (F)	Earthquake Force Ver (F)	Surcharge Load (F)
1	1.4	115.0	.0	.0	.0	.0	.0	.0	.0
2	1.5	357.7	.0	.0	.0	.0	.0	.0	.0
3	1.6	607.2	.0	.0	.0	.0	.0	.0	.0
4	1.7	857.2	.0	.0	.0	.0	.0	.0	.0
5	1.7	1101.1	.0	.0	.0	.0	.0	.0	.0
6	1.8	1333.1	.0	.0	.0	.0	.0	.0	.0
7	1.4	1142.7	.0	.0	.0	.0	.0	.0	.0
8	.5	417.9	.0	.0	.0	.0	.0	.0	.0
9	1.9	2059.9	.0	.0	.0	.0	.0	.0	.0
10	1.9	2673.4	.0	.0	.0	.0	.0	.0	.0
11	1.7	2835.4	.0	.0	.0	.0	.0	.0	.0
12	.2	437.2	.0	.0	.0	.0	.0	.0	.0
13	2.0	3564.2	.0	.0	.0	.0	.0	.0	.0
14	2.0	3637.6	.0	.0	.0	.0	.0	.0	.0
15	2.0	3667.4	.0	.0	.0	.0	.0	.0	.0
16	2.0	3653.1	.0	.0	.0	.0	.0	.0	.0
17	.8	1421.9	.0	.0	.0	.0	.0	.0	.0
18	1.2	2173.0	.0	.0	.0	.0	.0	.0	2408.5
19	2.0	3493.9	.0	.0	.0	.0	.0	.0	3935.3
20	1.9	3352.4	.0	.0	.0	.0	.0	.0	3881.6
21	1.9	3173.1	.0	.0	.0	.0	.0	.0	3812.1
22	1.9	2959.6	.0	.0	.0	.0	.0	.0	3727.2
23	1.8	2716.5	.0	.0	.0	.0	.0	.0	3627.0
24	1.8	2448.7	.0	.0	.0	.0	.0	.0	3512.2
25	1.7	2161.7	.0	.0	.0	.0	.0	.0	3383.0
26	1.6	1861.8	.0	.0	.0	.0	.0	.0	3240.1
27	1.5	1555.2	.0	.0	.0	.0	.0	.0	3084.0
28	1.5	1248.6	.0	.0	.0	.0	.0	.0	2915.4
29	.5	352.8	.0	.0	.0	.0	.0	.0	942.1
30	.9	594.0	.0	.0	.0	.0	.0	.0	1792.8
31	1.3	651.8	.0	.0	.0	.0	.0	.0	2543.3
32	1.2	377.7	.0	.0	.0	.0	.0	.0	2341.4
33	1.1	131.8	.0	.0	.0	.0	.0	.0	2129.9
34	.1	1.1	.0	.0	.0	.0	.0	.0	201.2

Failure Surface Specified By 30 Coordinate Points

Point No.	X-Surf (L)	Y-Surf (L)

1	8.89	40.00
2	10.34	38.62
3	11.87	37.33
4	13.48	36.15
5	15.16	35.07
6	16.91	34.09
7	18.71	33.23
8	20.57	32.49
9	22.47	31.87
10	24.41	31.37
11	26.37	30.99
12	28.36	30.74
13	30.35	30.62
14	32.35	30.62
15	34.35	30.75
16	36.33	31.01
17	38.30	31.39
18	40.23	31.90
19	42.13	32.53
20	43.98	33.28
21	45.79	34.14
22	47.53	35.12
23	49.21	36.21
24	50.82	37.40
25	52.34	38.69
26	53.78	40.08
27	55.14	41.55
28	56.39	43.11
29	57.54	44.74
30	58.31	46.00

Circle Center At X = 31.3 ; Y = 62.0 and Radius, 31.4

*** 1.686 ***

1

Failure Surface Specified By 29 Coordinate Points

Point No.	X-Surf (L)	Y-Surf (L)
1	8.89	40.00
2	10.30	38.59
3	11.81	37.27
4	13.41	36.07
5	15.08	34.98
6	16.83	34.00
7	18.64	33.15
8	20.51	32.43
9	22.42	31.84
10	24.36	31.38
11	26.34	31.06
12	28.33	30.87

13	30.33	30.82
14	32.33	30.91
15	34.31	31.14
16	36.28	31.51
17	38.21	32.01
18	40.11	32.65
19	41.96	33.41
20	43.75	34.30
21	45.48	35.31
22	47.13	36.44
23	48.70	37.68
24	50.18	39.03
25	51.56	40.47
26	52.84	42.01
27	54.01	43.63
28	55.06	45.33
29	55.42	46.00

Circle Center At X = 30.0 ; Y = 59.7 and Radius, 28.9

*** 1.688 ***

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf (L)	Y-Surf (L)
1	17.78	40.00
2	19.23	38.62
3	20.79	37.37
4	22.45	36.27
5	24.21	35.30
6	26.04	34.50
7	27.93	33.86
8	29.88	33.38
9	31.85	33.07
10	33.85	32.93
11	35.85	32.97
12	37.84	33.18
13	39.80	33.56
14	41.72	34.11
15	43.59	34.82
16	45.39	35.69
17	47.11	36.71
18	48.73	37.88
19	50.25	39.18
20	51.65	40.61
21	52.92	42.16
22	54.05	43.81
23	55.03	45.55
24	55.24	46.00

Circle Center At X = 34.4 ; Y = 56.0 and Radius, 23.1

*** 1.734 ***

1

Failure Surface Specified By 35 Coordinate Points

Point No.	X-Surf (L)	Y-Surf (L)
1	.00	40.00
2	1.45	38.62
3	2.97	37.32
4	4.55	36.10
5	6.20	34.97
6	7.91	33.93
7	9.67	32.98
8	11.48	32.12
9	13.33	31.37
10	15.22	30.71
11	17.14	30.15
12	19.09	29.70
13	21.06	29.35
14	23.04	29.11
15	25.04	28.97
16	27.04	28.94
17	29.04	29.02
18	31.03	29.20
19	33.01	29.49
20	34.97	29.89
21	36.91	30.38
22	38.81	30.98
23	40.69	31.68
24	42.52	32.48
25	44.31	33.38
26	46.04	34.37
27	47.73	35.45
28	49.35	36.62
29	50.91	37.88
30	52.40	39.21
31	53.81	40.63
32	55.15	42.11
33	56.41	43.67
34	57.58	45.29
35	58.04	46.00

Circle Center At X = 26.6 ; Y = 66.5 and Radius, 37.5

*** 1.740 ***

Failure Surface Specified By 34 Coordinate Points

Point No.	X-Surf (L)	Y-Surf (L)
1	2.22	40.00
2	3.75	38.70
3	5.33	37.49
4	6.98	36.35
5	8.69	35.31
6	10.44	34.35
7	12.24	33.49
8	14.09	32.71
9	15.97	32.04
10	17.89	31.46
11	19.83	30.99
12	21.80	30.61
13	23.78	30.34
14	25.77	30.17
15	27.77	30.10
16	29.77	30.13
17	31.76	30.27
18	33.75	30.51
19	35.72	30.86
20	37.67	31.30
21	39.59	31.85
22	41.49	32.49
23	43.34	33.23
24	45.16	34.06
25	46.93	34.99
26	48.66	36.01
27	50.32	37.11
28	51.93	38.30
29	53.47	39.58
30	54.95	40.93
31	56.35	42.35
32	57.68	43.84
33	58.93	45.41
34	59.36	46.00

Circle Center At X = 28.1 ; Y = 68.8 and Radius, 38.7

*** 1.750 ***

1

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (L)	Y-Surf (L)
1	13.33	40.00
2	14.75	38.59
3	16.30	37.32

4	17.96	36.21
5	19.72	35.25
6	21.56	34.47
7	23.46	33.87
8	25.42	33.45
9	27.41	33.21
10	29.41	33.17
11	31.40	33.31
12	33.37	33.65
13	35.30	34.16
14	37.18	34.86
15	38.98	35.74
16	40.68	36.78
17	42.29	37.98
18	43.77	39.32
19	45.11	40.80
20	46.32	42.40
21	47.36	44.10
22	48.24	45.90
23	48.27	46.00

Circle Center At X = 28.9 ; Y = 54.2 and Radius, 21.1

*** 1.758 ***

Failure Surface Specified By 32 Coordinate Points

Point No.	X-Surf (L)	Y-Surf (L)
1	2.22	40.00
2	3.70	38.65
3	5.24	37.38
4	6.86	36.21
5	8.55	35.13
6	10.29	34.14
7	12.08	33.27
8	13.93	32.49
9	15.81	31.82
10	17.74	31.27
11	19.68	30.82
12	21.66	30.49
13	23.64	30.27
14	25.64	30.17
15	27.64	30.18
16	29.64	30.31
17	31.62	30.55
18	33.59	30.90
19	35.54	31.37
20	37.45	31.95
21	39.33	32.64
22	41.16	33.44
23	42.95	34.34

24	44.68	35.34
25	46.35	36.44
26	47.96	37.63
27	49.49	38.92
28	50.94	40.29
29	52.32	41.74
30	53.61	43.27
31	54.81	44.87
32	55.56	46.00

Circle Center At X = 26.4 ; Y = 64.9 and Radius, 34.7

*** 1.760 ***

1

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (L)	Y-Surf (L)
1	17.78	40.00
2	19.41	38.85
3	21.13	37.82
4	22.92	36.93
5	24.78	36.19
6	26.68	35.59
7	28.63	35.14
8	30.61	34.84
9	32.61	34.70
10	34.61	34.71
11	36.60	34.88
12	38.57	35.20
13	40.52	35.67
14	42.42	36.30
15	44.26	37.07
16	46.04	37.98
17	47.75	39.02
18	49.37	40.20
19	50.89	41.49
20	52.31	42.91
21	53.61	44.42
22	54.76	46.00

Circle Center At X = 33.4 ; Y = 60.4 and Radius, 25.7

*** 1.760 ***

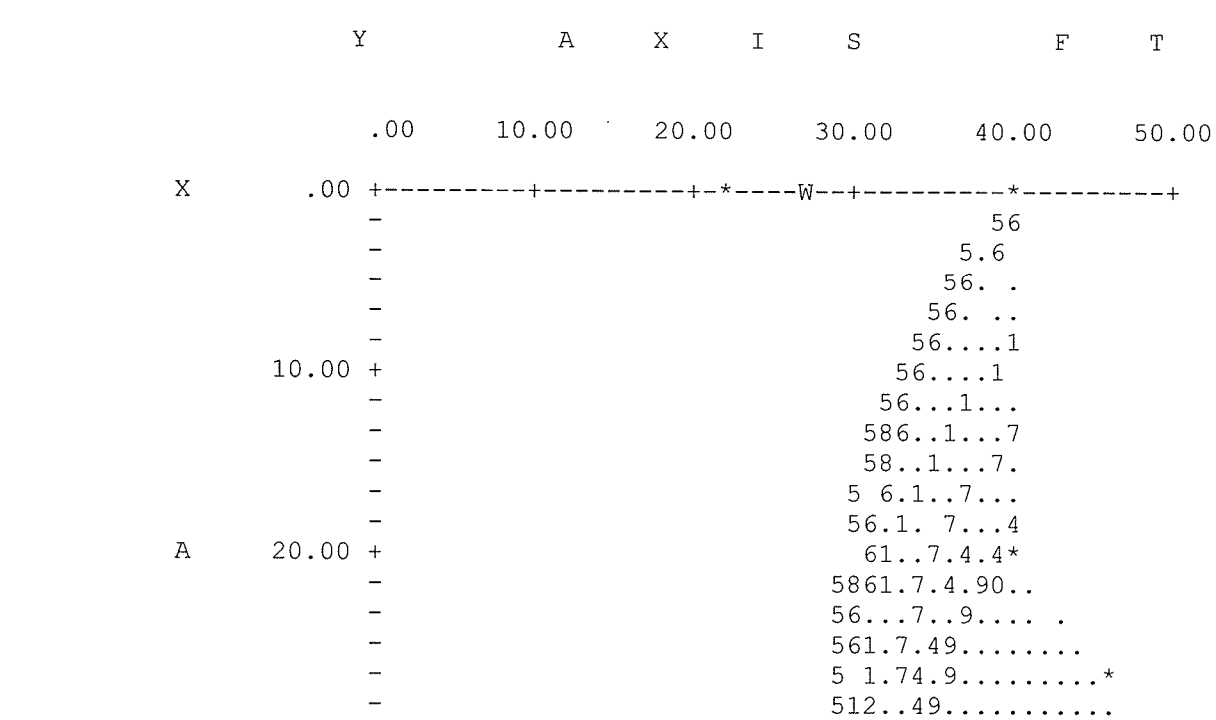
Failure Surface Specified By 21 Coordinate Points

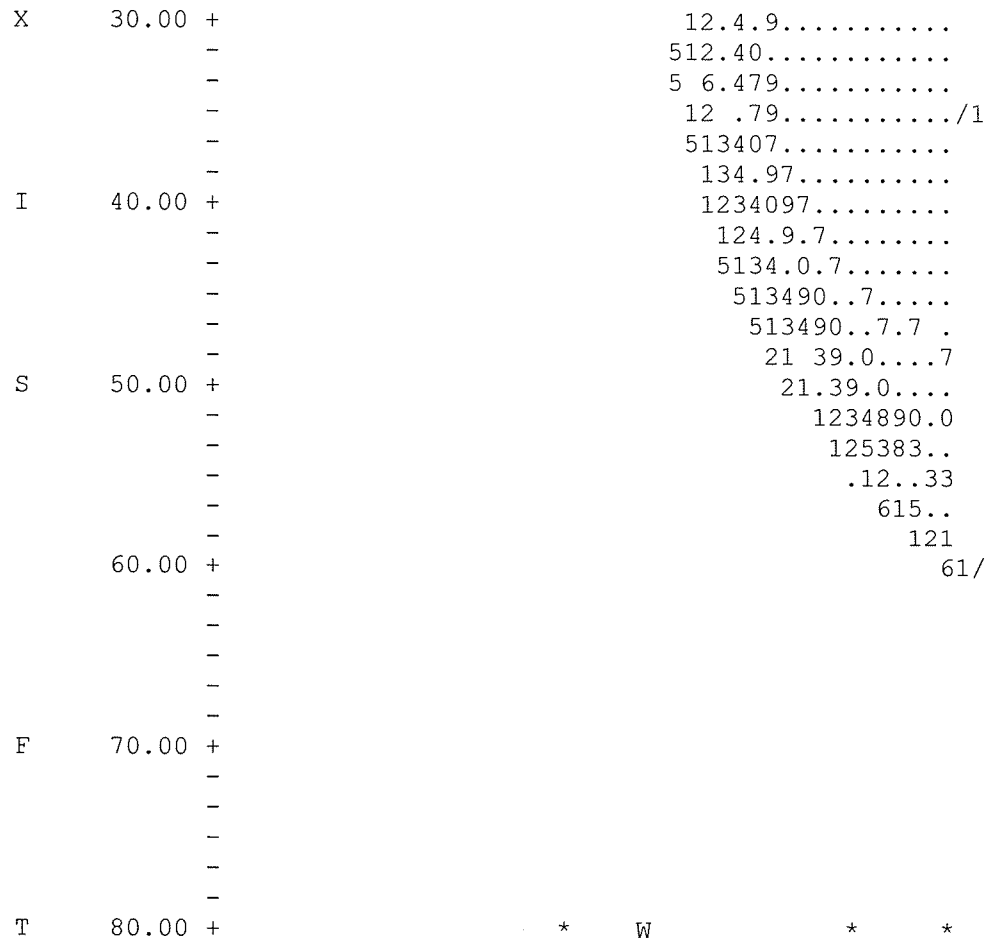
Point No.	X-Surf (L)	Y-Surf (L)
1	20.00	40.00
2	21.49	38.67
3	23.11	37.50
4	24.84	36.49
5	26.66	35.67
6	28.56	35.03
7	30.51	34.59
8	32.50	34.35
9	34.50	34.31
10	36.49	34.47
11	38.46	34.83
12	40.38	35.39
13	42.23	36.14
14	44.00	37.07
15	45.66	38.18
16	47.21	39.45
17	48.62	40.87
18	49.88	42.42
19	50.97	44.10
20	51.89	45.87
21	51.94	46.00

Circle Center At X = 33.9 ; Y = 54.1 and Radius, 19.8

*** 1.761 ***

1

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