WEST COAST SELF STORAGE
EXCAVATION PLAN

REV #0

DESIGN CALCULATIONS
February 7, 2026

PREPARED BY:
SCOTT F CANNON, PE

MZB ENGINEERING, INC

TEL:949.254.4792 engineering@mzbinc.com www.mzbinc.com

1192 Athlone Lane Corona, CA 92882

Table of Contents

1. Drawings……1-3
2. Slope Stability Analysis……4-77
3. Reference Documents……78-88

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February 7, 2026

PLANS FOR CONSTRUCTION ON

WEST COAST SELF STORAGE

IN RIVERSIDE COUNTY

-

STORM DRAIN EXCAVATION PLAN
REVISION 0

INDEX TO PLANS

SHEET NO.	TITLE
1	COVER
2	NOTES
3	PLAN VIEW / SECTION VIEW

LOCATION MAP

Underground Service Alert

Call: TOLL FREE
1-800-422-4133

TWO WORKING DAYS BEFORE YOU DIG

REGISTERED PROFESSIONAL ENGINEER
SCOTT T. CANNON
84327
Exp. 09-30-27
CIVIL
STATE OF CALIFORNIA

REV.	DATE	DESCRIPTION
0	2-7-26	ISSUED FOR CONSTRUCTION

DESIGN BY: SCANNON
DRAWN BY: SCANNON
SCALE: AS SHOWN

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MZB ENGINEERING

STORM DRAIN EXCAVATION

COVER

PROJECT: CITY OF MORENO VALLEY

CONTRACTOR: KANA PIPELINE

CONTRACT NO: -

SHEET NUMBER:
1
OF 3 SHEETS

West Coast Self Storage File

GENERAL NOTES:
1. ALL EXCAVATIONS SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH OSHA CFR 29, PART 1926, SUBPART P, AND CAL/OSHA SAFETY ORDERS TITLE 8, SECTION 1504, AND 1539–1547.

2. THE DESIGN OF THIS EXCAVATION IS IN ACCORDANCE WITH THE 2024 CALTRANS STANDARD SPECIFICATIONS AND THE 2011 CT TRENCHING AND SHORING MANUAL

LOCATION AND PROTECTION OF EXISTING UTILITIES:
1. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING UTILITIES, OTHER OBSTACLES, DIMENSIONS, OFFSETS, ELEVATIONS AND CONDITIONS IN THE FIELD PRIOR TO STARTING ANY WORK. ALL EXISTING UTILITIES SHOWN ON THE CONTRACT PLANS WITHIN THE WORK ZONE SHALL BE POSITIVELY IDENTIFIED PRIOR TO STARTING WORK. THE CONTRACTOR IS RESPONSIBLE TO POTHOLE ALL UTILITIES (AS NEEDED) BEFORE SHORING WALL CONSTRUCTION IS TO BEGIN. THE ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCIES OR INCONSISTENCIES BEFORE PROCEEDING FURTHER WITH THE WORK.

SURVEYING AND GROUND ELEVATION INFORMATION:
1. EXISTING GROUND ELEVATIONS AND CONSEQUENTIAL ELEVATION HEIGHTS HAVE BEEN DETERMINED BASED ON TOPOGRAPHICAL INFORMATION PROVIDED BY THE PLANS AND OR ACTUAL FIELD DATA.

COMPETENT PERSONS:
1. A COMPETENT PERSON IS CAPABLE OF IDENTIFYING EXISTING AND PREDICTABLE HAZARDS IN THE SURROUNDINGS, OR WORKING CONDITIONS WHICH ARE UNSANITARY, HAZARDOUS, OR DANGEROUS TO EMPLOYEES AND WHO HAS AUTHORIZATION TO TAKE PROMPT CORRECTIVE MEASURES TO ELIMINATE THEM.

2. BEFORE COMMENCING ANY EXCAVATION, THE CONTRACTOR SHALL OBTAIN UNDERGROUND SERVICE ALERT (USA) INQUIRY I.D. NUMBER. A MINIMUM OF 3 DAYS SHALL BE ALLOWED AFTER THE I.D. NUMBER IS OBTAINED AND BEFORE THE EXCAVATION WORK IS STARTED TO NOTIFY UTILITY OWNERS. IF THE UTILITY OWNER IS THE CITY, A CONFIRMATION NUMBER INDICATING THE CITY HAS BEEN NOTIFIED SHALL BE OBTAINED BY USA AND/OR THE CONTRACTOR FROM THE APPROPRIATE CITY DEPARTMENT. THE I.D. NUMBER TOGETHER WITH THE DATE ACQUIRED SHALL BE REPORTED TO THE INSPECTOR WHEN CALLING FOR INSPECTION. USA I.D. NUMBERS WILL NOT BE GIVEN MORE THAN TEN (10) WORK DAYS BEFORE STARTING EXCAVATION WORK.

3. THE CONTRACTORS COMPETENT PERSON SHALL BE ON–SITE OBSERVING THE EXCAVATION PROCESS AND SHALL BE THE RESPONSIBLE PARTY IN THE DETERMINATION OF THE SOIL TYPE EXPOSED IN THE EXCAVATION WALLS. IF THE SOIL TYPE ENCOUNTERED IS DIFFERENT THAN THAT SPECIFIED ON THE PLANS, THE DESIGN ENGINEER MUST BE NOTIFIED.

4. THE COMPETENT PERSON SHALL INSPECT THE TRENCH OR EXCAVATION AT THE BEGINNING OF EACH SHIFT PRIOR TO WORKERS ENTERING THE TRENCH OR EXCAVATION AND/OR IF WEATHER HAS CHANGED OR EFFECTED THE WORK AREA.

ENVIRONMENTAL/SWPPP COMPLIANCE:
1. DESIGN OF EXCAVATIONS IS BASED ON ASSUMPTIONS THAT SOIL PROPERTIES AND GROUND CONDITIONS REMAIN CONSTANT THROUGH THE LIFE OF THE EXCAVATION. WATER CAN EFFECT THE STRENGTH OF SOILS AND GREAT CARE SHOULD BE TAKEN TO PREVENT CHANGES FROM EXISTING SOIL CONDITIONS. SLOPES MUST BE PROTECTED FROM EXCESSIVE SOIL SATURATION AND EROSION DURING CONSTRUCTION. WATER PONDING IN THE BASE OF EXCAVATIONS IS UNACCEPTABLE AND SHOULD BE DIVERTED OR REMOVED. PROPER SWPPP AND BMP MEASURES SHALL BE USED TO PREVENT ENVIRONMENTAL INDUCED SLOPE INSTABILITY.

CAL/OSHA REQUIREMENTS:
1. A CAL/OSHA EXCAVATION PERMIT MUST BE OBTAINED PRIOR TO ANY EXCAVATION.

2. A COPY OF THIS SHORING PLAN MUST BE AT THE JOB SITE DURING CONSTRUCTION.

3. INGRESS AND EGRESS TO THE EXCAVATION SHALL CONFORM TO ALL OSHA REQUIREMENTS INCLUDING: HANDRAILS, LADDER ACCESS AND FALL PROTECTION AS REQUIRED.

4. CONTINGENCY PLANS FOR EMERGENCY SITUATIONS SHALL BE ADDRESSED IN JHA.

CONSTRUCTION REQUIREMENTS:
1. CONTACT THE DESIGN ENGINEER IF EXCAVATION SHOWS SIGNS OF SLOUGHING, SWELLING OR PUMPING.

2. CAUTION SHALL BE TAKEN WHEN EXCAVATIONS ARE ADJACENT TO TRAFFIC AND THE TRAVELING PUBLIC.

3. THESE EXCAVATIONS SHOULD NOT BE ALLOWED TO BECOME SATURATED OR TO DRY OUT.

CONTROLLING FIELD DIMENSIONS
1. THE FIELD SUPERINTENDENT WILL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING, FABRICATING, OR INSTALLING SHORING. UPON APPROVAL BY THE DESIGN ENGINEER DIMENSIONS OF THE SHORING WILL BE ADJUSTED TO FIT THE ACTUAL DIMENSIONS.

2. IF AT ANY POINT THE EXCAVATION EXCEEDS THE DEPTH SHOWN ON THE PLANS BY MORE THAN 1FT, NOTIFY THE DESIGN ENGINEER IMMEDIATELY.

LAVENDER

SOIL LAYER DESCRIPTIONS:
1. THE FOLLOWING SOIL DESCRIPTIONS ARE ASSUMED TO BE PRESENT DURING EXCAVATION. IF SOILS DIFFER FROM THOSE DESCRIBED BELOW, STOP THE EXCAVATION AND CONSULT WITH THE DESIGN ENGINEER.

SOIL TYPES & DESCRIPTIONS:
0.0' TO 4.0' – (ML) SANDY SILT
4.0' to 18.0' – (SM) SILTY SAND

DESIGN PARAMETERS:
EXCAVATION SLOPE DESIGN BASED ON BORING LOGS B–5 TO B–8 OF THE INFORMATION PROVIDED IN THE REPORT OF GEOTECHNICAL ENGINEERING EXPLORATION AND ANALYSIS, WEST COAST SELF STORAGE FACILITY, CITY OF MORENO VALLEY, CA DATED MARCH 15, 2023.

SOIL PARAMETERS:

0.0' TO 4'	4.0' TO 18.0'
γ = 100 PCF	γ = 110 PCF
Φ = 27°	Φ = 28°
Su = 10 PSF	Su = 25 PSF

DESIGN SURCHARGE PARAMETERS:
1. IF K–RAIL IS LESS THAN 2FT FROM TOP OF SLOPE IT MUST BE PINNED. SEE 2015 CALTRANS STANDARD PLAN T3B.
2. K–RAIL MAY NOT BE PLACED CLOSER THAN 3" FROM TOP OF SLOPE. (200PSF).
3. SLOPES WERE DESIGNED WITH A HS20–44 TRAFFIC SURCHARGE (300PSF) PLACED 2FT FROM TOP OF SLOPE OR AS SHOWN IN THE SURCHARGE TABLE(S) IN THESE PLANS.
4. FOR SURCHARGE OFFSETS REFER TO "ASSUMED SURCHARGES & MIN. OFFSETS" TABLES ON SECTION VIEWS..
5. IF HIGHER GROUND PRESSURE IS ANTICIPATED, CONSULT WITH THE DESIGN ENGINEER.

February 7, 2026

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MZB ENGINEERING

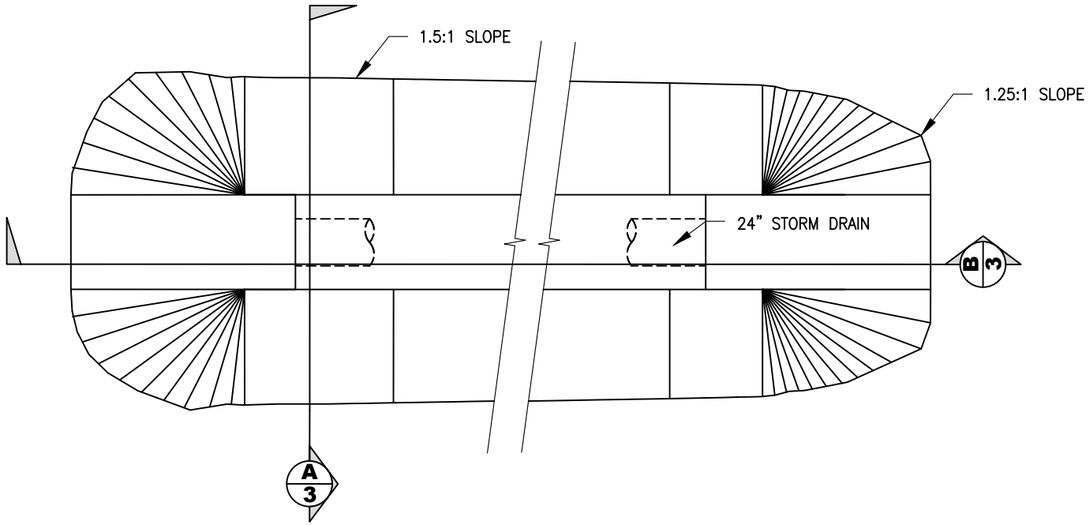
STORM DRAIN EXCAVATION

NOTES

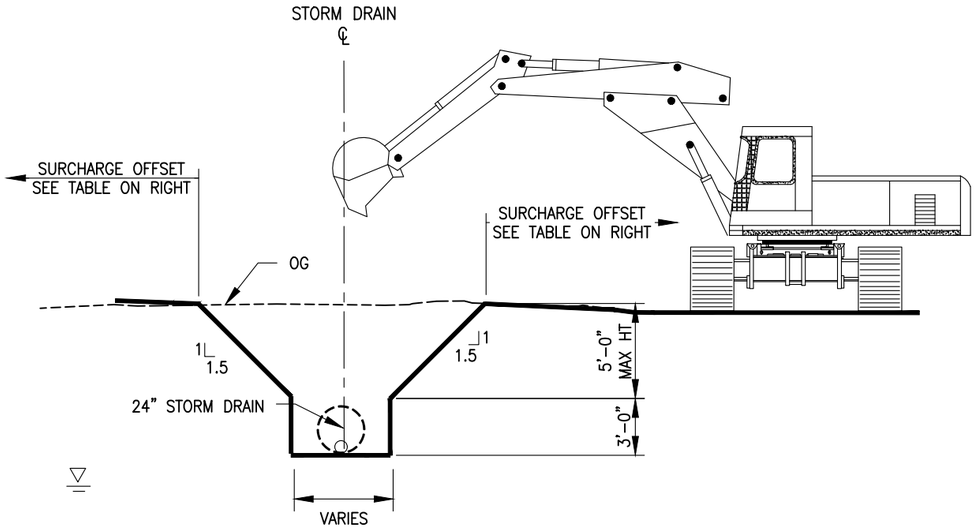
PROJECT: CITY OF MORENO VALLEY
CONTRACTOR: KANA PIPELINE
CONTRACT NO: -

SHEET NUMBER: 2 OF 3 SHEETS

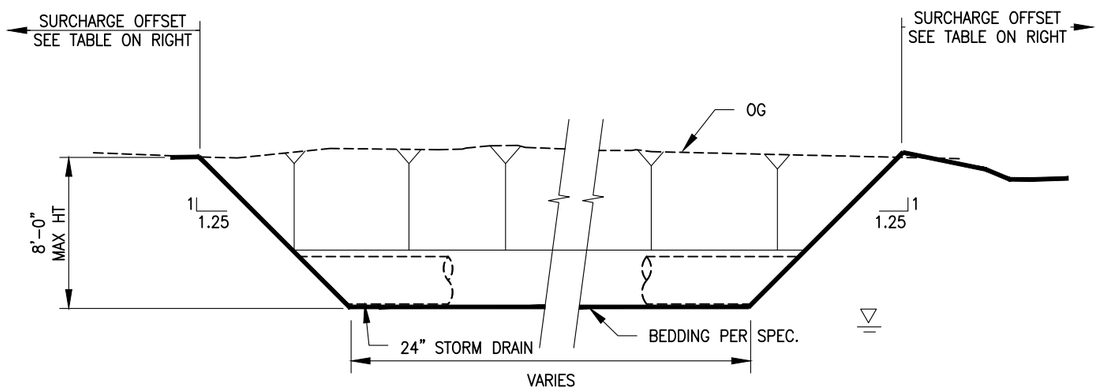
West Coast Self Storage File



SITE PLAN
SCALE: 1:8
WEST COAST STORAGE



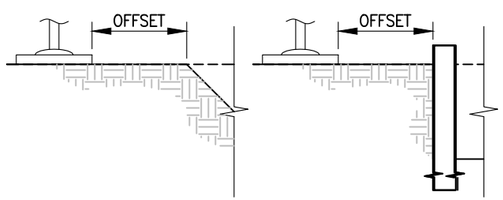
SECTION VIEW A
SCALE: 1:8
WEST COAST STORAGE



SECTION VIEW B
SCALE: 1:8
WEST COAST STORAGE

ASSUMED MINIMUM OFFSETS	
SURCHARGE	OFFSET
HS 20-44 TRAFFIC	6 FT
CAT 315 EXCAVATOR	5 FT
3 CY LOADER	11 FT
K-RAIL	3 FT
CONCRETE TRUCK	12 FT
SPOIL PILE*	3.5 FT

*SPOIL PILE HT = 8 FT W/ 1:1 SLOPE



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MZB ENGINEERING

STORM DRAIN EXCAVATION

4 FT - PLAN VIEW / SECTION VIEW

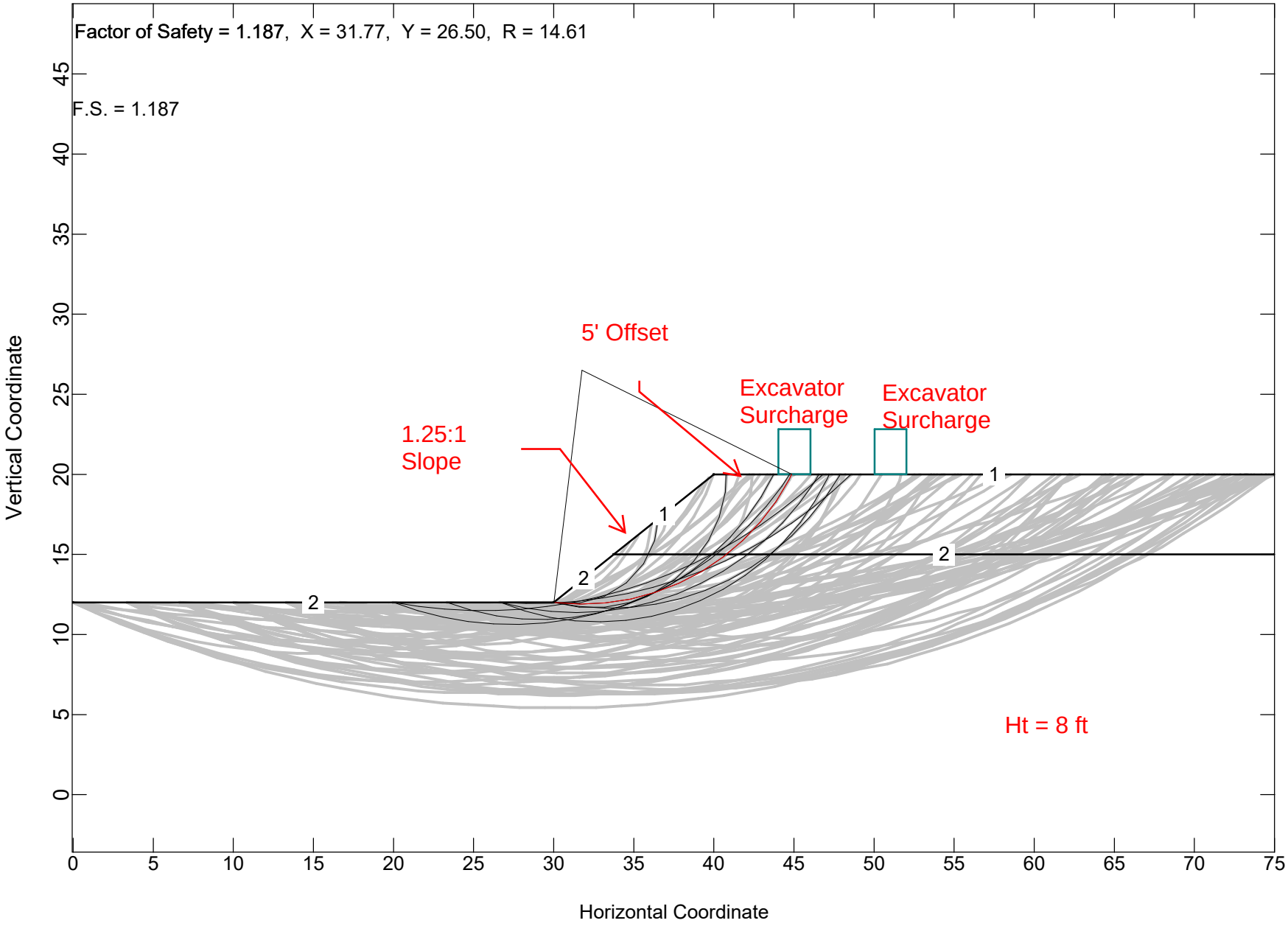
PROJECT: CITY OF MORENO VALLEY
CONTRACTOR: KANA PIPELINE
CONTRACT NO: -

SHEET NUMBER: 3
OF 3 SHEETS

West Coast Self Storage File

Slope Stability Analysis

900 PSF Excavator Surcharge



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=========================================================================

                 STABLPro for Windows, Version 2015.4.5

                        Upgraded from:
                        FHWA-PCSTABLE

                  Serial Number :  357267753

                     --Slope Stability Analysis--
                  Simplified Janbu, Simplified Bishop
                    or Spencer Method of Slices

=========================================================================


This program is licensed to :

Korpi Cannon Engineering PLLC
Las Vegas, NV, USA

Path to file locations      :
D:\Dropbox\Korpi_Cannon_Engineering\Projects\KC-0119 - MZB Engineering\Design\Excav
- Shoring\15.0 West Coast Self Storage\Design\4 ft\
Name of input data file     : 2. Excavator - 1.1.sl4d
Name of output file         : 2. Excavator - 1.1.sl4o
Name of plot output file    : 2. Excavator - 1.1.sl4p

-------------------------------------------------------------------------
                      Time and Date of Analysis
-------------------------------------------------------------------------

          Date:  February 07, 2026     Time:  13:19:48



1
        PROBLEM DESCRIPTION   New Slope



        BOUNDARY COORDINATES

            4 Top   Boundaries
            5 Total Boundaries
```

Boundary No.	X-Left ft.	Y-Left ft.	X-Right ft.	Y-Right ft.	Soil Type Below Bnd
1	0.00	12.00	30.00	12.00	2
2	30.00	12.00	33.75	15.00	2
3	33.75	15.00	40.00	20.00	1
4	40.00	20.00	75.00	20.00	1
5	33.75	15.00	75.00	15.00	2

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

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.
1	100.0	100.0	10.0	27.0	0.00	0.0	0
2	110.0	110.0	30.0	28.0	0.00	0.0	0

1

BOUNDARY LOAD(S)

2 Load(s) Specified

Load No.	X-Left ft.	X-Right ft.	Intensity psf	Deflection (deg)
1	44.00	46.00	900.0	0.0
2	50.00	52.00	900.0	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 = 0.00 ft.
and X = 30.00 ft.

Each Surface Terminates Between X = 34.00 ft.
and X = 75.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00 ft.

1.60 ft. Line Segments Define Each Trial Failure Surface.

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -25.0
And 0.0 deg.

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 13 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	30.00	12.00
2	31.60	11.89
3	33.20	11.96
4	34.78	12.21
5	36.32	12.62
6	37.81	13.20
7	39.23	13.94
8	40.56	14.84
9	41.78	15.87
10	42.88	17.03
11	43.85	18.30
12	44.68	19.67

13	44.83	20.00

Circle Center At X = 31.8 ; Y = 26.5 and Radius, 14.6

*** 1.187 ***

Individual data on the 16 slices

Slice No.	Width Ft	Weight Lbs	Water Force Top Lbs	Water Force Bot Lbs	Tie Force Norm Lbs	Tie Force Tan Lbs	Earthquake Force Hor Lbs	Earthquake Force Ver Lbs	Surcharge Load Lbs
1	1.6	0.12E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2	1.6	0.35E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3	0.6	0.17E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	1.0	0.37E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5	1.5	0.66E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	1.5	0.74E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7	1.4	0.76E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8	0.8	0.43E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9	0.6	0.30E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10	0.2	0.99E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
11	1.0	0.47E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12	1.1	0.39E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13	1.0	0.23E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
14	0.1	0.23E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
15	0.7	0.61E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.61E+03
16	0.2	0.25E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.14E+03

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.67	12.00
2	28.23	11.65
3	29.81	11.43
4	31.41	11.37
5	33.01	11.44
6	34.59	11.66
7	36.15	12.03
8	37.67	12.53

9	39.14	13.17
10	40.54	13.94
11	41.87	14.83
12	43.11	15.84
13	44.26	16.96
14	45.30	18.17
15	46.22	19.48
16	46.53	20.00

Circle Center At X = 31.4 ; Y = 29.0 and Radius, 17.7

*** 1.200 ***

1

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	20.00	12.00
2	21.58	11.75
3	23.17	11.58
4	24.77	11.49
5	26.37	11.49
6	27.97	11.57
7	29.56	11.74
8	31.14	11.99
9	32.71	12.32
10	34.25	12.73
11	35.77	13.22
12	37.27	13.79
13	38.73	14.44
14	40.16	15.16
15	41.55	15.96
16	42.89	16.83
17	44.19	17.76
18	45.43	18.77
19	46.63	19.83
20	46.79	20.00

Circle Center At X = 25.6 ; Y = 42.1 and Radius, 30.6

*** 1.296 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.67	12.00
2	28.27	11.93
3	29.87	11.96
4	31.46	12.07
5	33.05	12.27
6	34.62	12.56
7	36.18	12.94
8	37.71	13.40
9	39.21	13.95
10	40.68	14.58
11	42.11	15.30
12	43.50	16.09
13	44.84	16.96
14	46.14	17.91
15	47.37	18.92
16	48.55	20.00

Circle Center At X = 28.7 ; Y = 40.5 and Radius, 28.5

*** 1.325 ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.67	12.00
2	28.17	11.46
3	29.73	11.08
4	31.31	10.85
5	32.91	10.78
6	34.51	10.88
7	36.09	11.13
8	37.63	11.54
9	39.13	12.11
10	40.56	12.82
11	41.91	13.68
12	43.17	14.66

13	44.33	15.77
14	45.37	16.99
15	46.28	18.30
16	47.05	19.70
17	47.18	20.00

Circle Center At X = 32.8 ; Y = 26.7 and Radius, 15.9

*** 1.342 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	30.00	12.00
2	31.58	11.74
3	33.18	11.64
4	34.78	11.69
5	36.36	11.89
6	37.92	12.25
7	39.44	12.75
8	40.90	13.40
9	42.30	14.18
10	43.61	15.10
11	44.83	16.14
12	45.94	17.29
13	46.93	18.54
14	47.80	19.88
15	47.86	20.00

Circle Center At X = 33.5 ; Y = 28.2 and Radius, 16.6

*** 1.345 ***

1

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	30.00	12.00

2	31.57	11.70
3	33.17	11.70
4	34.74	12.00
5	36.23	12.59
6	37.57	13.46
7	38.73	14.57
8	39.65	15.87
9	40.32	17.33
10	40.69	18.88
11	40.74	20.00

Circle Center At X = 32.4 ; Y = 20.1 and Radius, 8.4

*** 1.380 ***

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	30.00	12.00
2	31.60	11.97
3	33.14	12.38
4	34.51	13.22
5	35.58	14.41
6	36.28	15.85
7	36.50	17.20

Circle Center At X = 30.9 ; Y = 17.5 and Radius, 5.6

*** 1.450 ***

1

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	20.00	12.00
2	21.51	11.48
3	23.06	11.09
4	24.64	10.81

5	26.23	10.65
6	27.83	10.62
7	29.43	10.72
8	31.02	10.93
9	32.58	11.27
10	34.11	11.73
11	35.60	12.31
12	37.05	13.00
13	38.43	13.80
14	39.75	14.70
15	41.00	15.71
16	42.16	16.80
17	43.24	17.99
18	44.22	19.25
19	44.72	20.00

Circle Center At X = 27.4 ; Y = 31.3 and Radius, 20.7

*** 1.473 ***

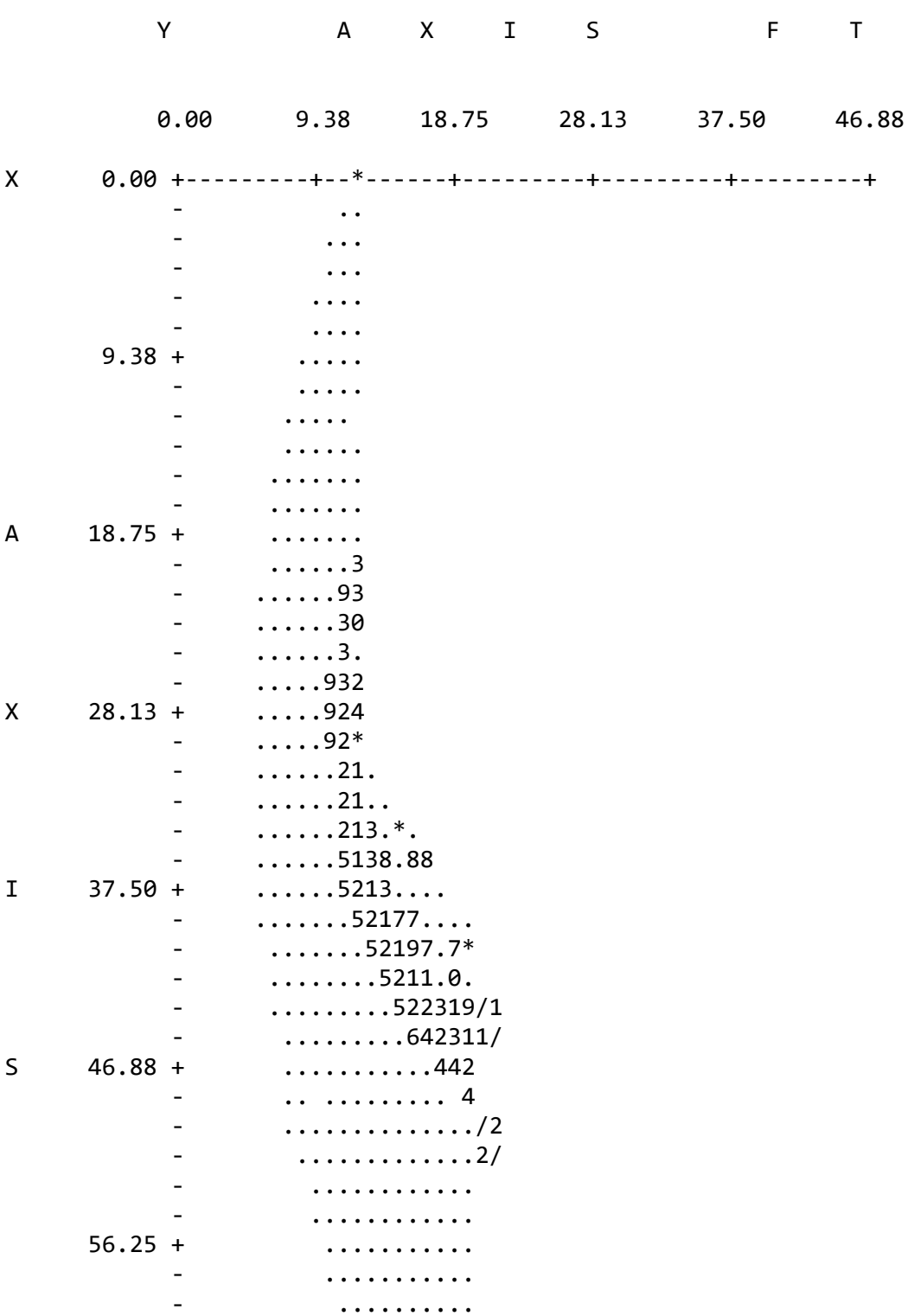
Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.33	12.00
2	24.85	11.50
3	26.42	11.16
4	28.01	10.97
5	29.61	10.94
6	31.20	11.06
7	32.78	11.34
8	34.32	11.78
9	35.81	12.36
10	37.23	13.09
11	38.58	13.96
12	39.83	14.95
13	40.98	16.06
14	42.02	17.28
15	42.93	18.59
16	43.71	19.99
17	43.71	20.00

Circle Center At X = 29.1 ; Y = 27.2 and Radius, 16.3

*** 1.478 ***

1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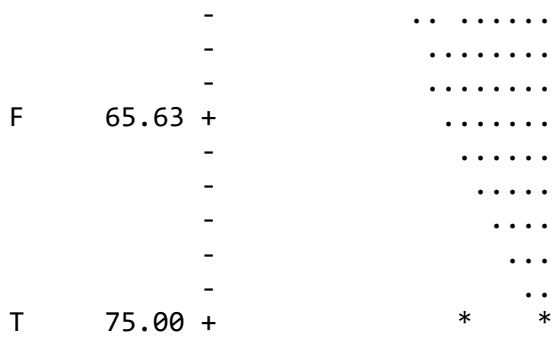
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T
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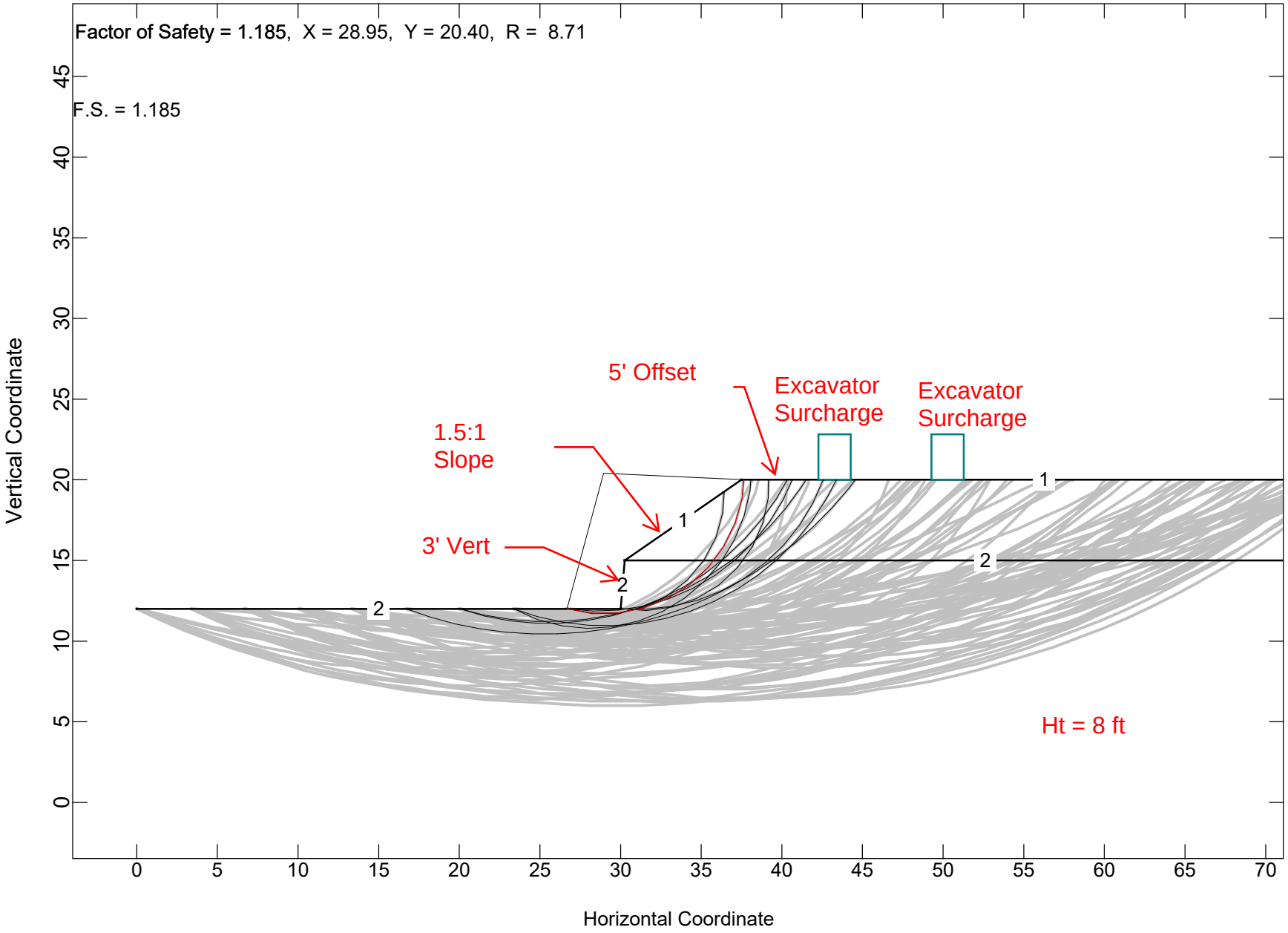
900 PSF Excavator Surcharge



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                      STABLPro for Windows, Version 2015.4.5

                              Upgraded from:
                              FHWA-PCSTABLE

                       Serial Number :  357267753

                          --Slope Stability Analysis--
                         Simplified Janbu, Simplified Bishop
                           or Spencer Method of Slices

     ==========================================================================


     This program is licensed to :

     Korpi Cannon Engineering PLLC
     Las Vegas, NV, USA

     Path to file locations      :
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     Name of plot output file    : 3. Excavator.sl4p

     --------------------------------------------------------------------------
                           Time and Date of Analysis
     --------------------------------------------------------------------------

               Date:  February 06, 2026     Time:  15:19:17




1
          PROBLEM DESCRIPTION   New Slope




          BOUNDARY COORDINATES

              4 Top   Boundaries
              5 Total Boundaries
```

Boundary No.	X-Left ft.	Y-Left ft.	X-Right ft.	Y-Right ft.	Soil Type Below Bnd
1	0.00	12.00	30.00	12.00	2
2	30.00	12.00	30.25	15.00	2
3	30.25	15.00	37.50	20.00	1
4	37.50	20.00	75.00	20.00	1
5	30.25	15.00	75.00	15.00	2

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

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.
1	100.0	100.0	10.0	27.0	0.00	0.0	0
2	110.0	110.0	30.0	28.0	0.00	0.0	0

1

BOUNDARY LOAD(S)

2 Load(s) Specified

Load No.	X-Left ft.	X-Right ft.	Intensity psf	Deflection (deg)
1	42.25	44.25	900.0	0.0
2	49.25	51.25	900.0	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 = 0.00 ft.
and X = 30.00 ft.

Each Surface Terminates Between X = 35.00 ft.
and X = 75.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00 ft.

1.60 ft. Line Segments Define Each Trial Failure Surface.

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -25.0
And 0.0 deg.

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 11 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.67	12.00
2	28.24	11.72
3	29.84	11.74
4	31.41	12.05
5	32.90	12.64
6	34.25	13.49
7	35.43	14.58
8	36.38	15.86
9	37.09	17.30
10	37.52	18.84
11	37.62	20.00

Circle Center At X = 29.0 ; Y = 20.4 and Radius, 8.7

*** 1.185 ***

Individual data on the 14 slices

Slice No.	Width Ft	Weight Lbs	Water Force Top Lbs	Water Force Bot Lbs	Tie Force Norm Lbs	Tie Force Tan Lbs	Earthquake Force Hor Lbs	Earthquake Force Ver Lbs	Surcharge Load Lbs
1	1.6	0.24E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2	1.6	0.47E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3	0.2	0.42E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	0.2	0.47E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5	1.2	0.44E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	1.5	0.63E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7	1.4	0.60E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8	1.2	0.50E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9	0.3	0.12E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10	0.6	0.23E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
11	0.7	0.20E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12	0.4	0.75E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13	0.0	0.20E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
14	0.1	0.59E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.67	12.00
2	28.24	11.70
3	29.84	11.73
4	31.39	12.10
5	32.84	12.79
6	34.10	13.77
7	35.13	14.99
8	35.88	16.41
9	36.32	17.95
10	36.40	19.24

Circle Center At X = 28.9 ; Y = 19.2 and Radius, 7.6

*** 1.201 ***

1

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.67	12.00
2	28.26	11.86
3	29.86	11.92
4	31.44	12.17
5	32.98	12.62
6	34.45	13.25
7	35.83	14.06
8	37.10	15.03
9	38.24	16.16
10	39.23	17.41
11	40.07	18.77
12	40.62	20.00

Circle Center At X = 28.6 ; Y = 24.8 and Radius, 13.0

*** 1.205 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.33	12.00
2	24.85	11.50
3	26.42	11.16
4	28.01	10.98
5	29.61	10.96
6	31.20	11.10
7	32.77	11.40
8	34.31	11.85
9	35.79	12.46
10	37.20	13.21
11	38.53	14.10

12	39.76	15.12
13	40.89	16.26
14	41.89	17.50
15	42.77	18.84
16	43.37	20.00

Circle Center At X = 29.0 ; Y = 26.9 and Radius, 15.9

*** 1.293 ***

1

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	30.00	12.01
2	31.60	11.97
3	33.19	12.15
4	34.74	12.53
5	36.24	13.11
6	37.64	13.88
7	38.93	14.83
8	40.08	15.93
9	41.08	17.18
10	41.91	18.55
11	42.55	20.00

Circle Center At X = 31.1 ; Y = 24.2 and Radius, 12.2

*** 1.367 ***

Failure Surface Specified By 21 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.67	12.00
2	18.18	11.48
3	19.73	11.07
4	21.30	10.76
5	22.88	10.55

6	24.48	10.44
7	26.08	10.44
8	27.68	10.55
9	29.26	10.76
10	30.83	11.08
11	32.37	11.50
12	33.89	12.02
13	35.36	12.64
14	36.79	13.36
15	38.17	14.16
16	39.50	15.06
17	40.76	16.04
18	41.96	17.11
19	43.08	18.25
20	44.12	19.46
21	44.53	20.00

Circle Center At X = 25.2 ; Y = 34.7 and Radius, 24.2

*** 1.402 ***

1

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.33	12.00
2	24.80	11.35
3	26.34	10.94
4	27.93	10.78
5	29.53	10.88
6	31.09	11.24
7	32.58	11.83
8	33.95	12.66
9	35.17	13.69
10	36.21	14.91
11	37.04	16.28
12	37.64	17.76
13	38.00	19.32
14	38.05	20.00

Circle Center At X = 28.1 ; Y = 20.8 and Radius, 10.0

*** 1.411 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	20.00	12.00
2	21.54	11.55
3	23.11	11.25
4	24.70	11.11
5	26.30	11.11
6	27.89	11.26
7	29.46	11.57
8	31.00	12.02
9	32.48	12.62
10	33.91	13.35
11	35.25	14.22
12	36.51	15.21
13	37.67	16.31
14	38.71	17.52
15	39.64	18.83
16	40.32	20.00

Circle Center At X = 25.5 ; Y = 27.9 and Radius, 16.9

*** 1.422 ***

1

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	30.00	12.01
2	31.60	11.89
3	33.18	12.11
4	34.69	12.64
5	36.06	13.46
6	37.23	14.55
7	38.16	15.85
8	38.81	17.32
9	39.14	18.88
10	39.15	20.00

Circle Center At X = 31.4 ; Y = 19.7 and Radius, 7.8

*** 1.424 ***

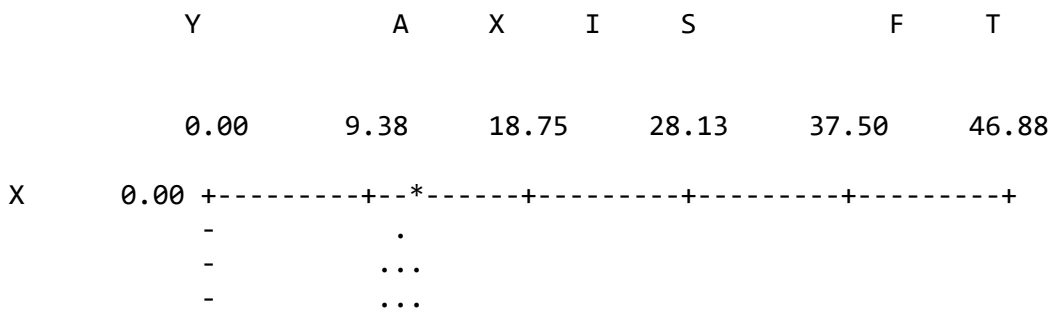
Failure Surface Specified By 17 Coordinate Points

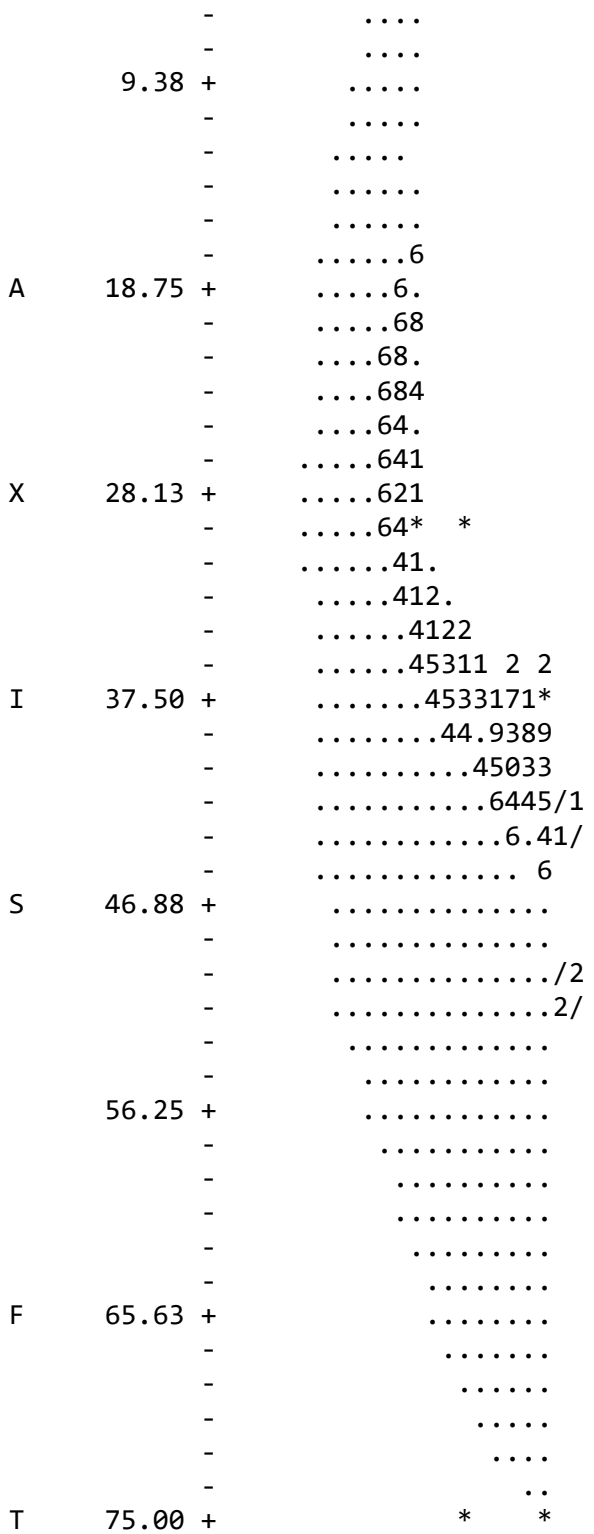
Point No.	X-Surf ft.	Y-Surf ft.
1	20.00	12.00
2	21.55	11.61
3	23.13	11.34
4	24.72	11.22
5	26.32	11.22
6	27.92	11.36
7	29.49	11.64
8	31.04	12.04
9	32.55	12.58
10	34.01	13.23
11	35.41	14.01
12	36.73	14.91
13	37.98	15.91
14	39.14	17.01
15	40.20	18.21
16	41.16	19.49
17	41.48	20.00

Circle Center At X = 25.5 ; Y = 30.2 and Radius, 19.0

*** 1.424 ***

1

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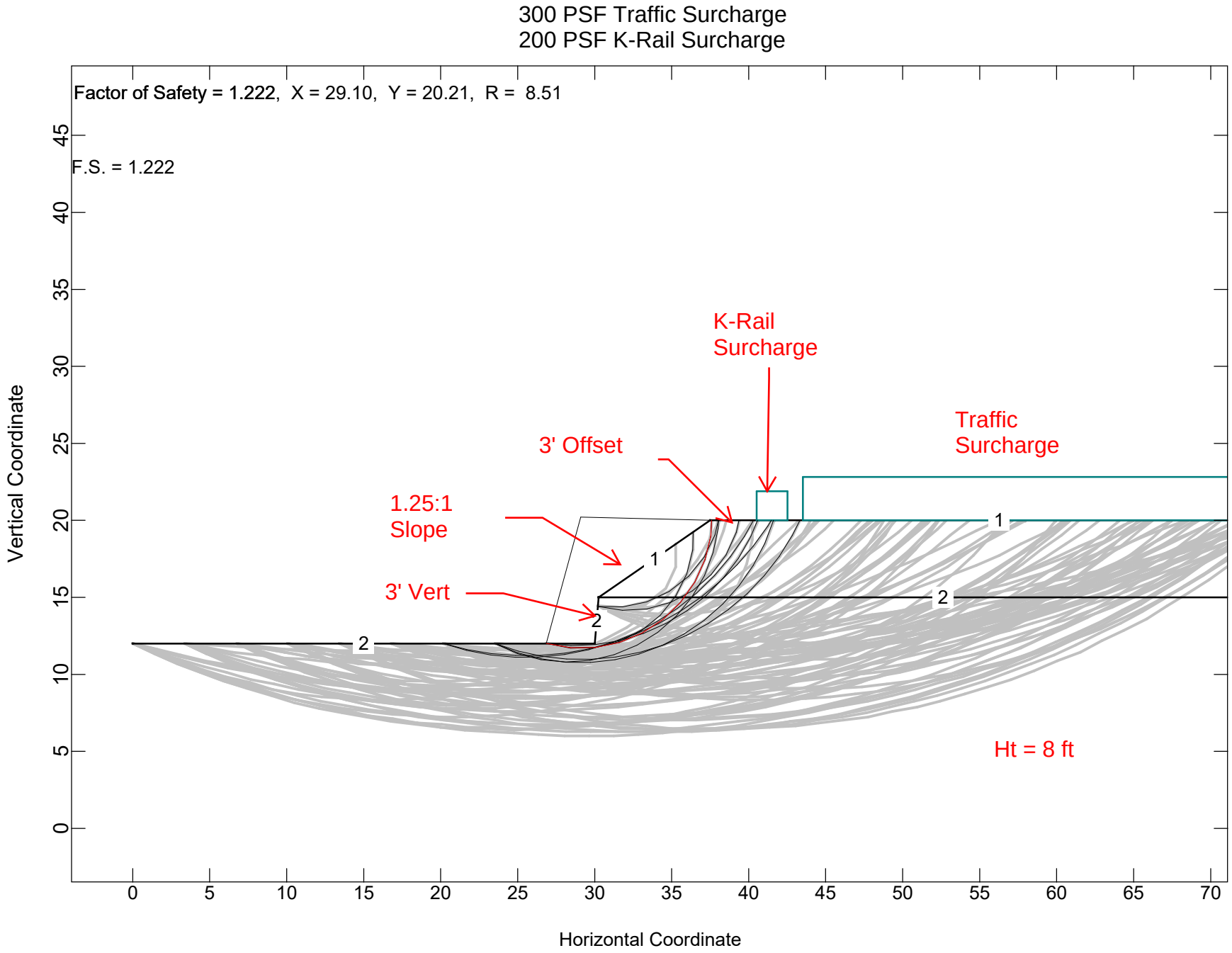
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Surcharge
Traffic
Surcharge
3' Offset
1.25:1
Slope
3' Vert
Ht = 8 ft
Vertical Coordinate
Horizontal Coordinate

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                 STABLPro for Windows, Version 2015.4.5

                        Upgraded from:
                        FHWA-PCSTABLE

                  Serial Number :  357267753

                     --Slope Stability Analysis--
                  Simplified Janbu, Simplified Bishop
                    or Spencer Method of Slices

=========================================================================


     This program is licensed to :

     Korpi Cannon Engineering PLLC
     Las Vegas, NV, USA

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                        Time and Date of Analysis
     -------------------------------------------------------------------------

               Date:  February 06, 2026     Time:  14:59:35



1
          PROBLEM DESCRIPTION   New Slope



          BOUNDARY COORDINATES

              4 Top   Boundaries
              5 Total Boundaries
```

Boundary No.	X-Left ft.	Y-Left ft.	X-Right ft.	Y-Right ft.	Soil Type Below Bnd
1	0.00	12.00	30.00	12.00	2
2	30.00	12.00	30.25	15.00	2
3	30.25	15.00	37.50	20.00	1
4	37.50	20.00	75.00	20.00	1
5	30.25	15.00	75.00	15.00	2

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

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.
1	100.0	100.0	10.0	27.0	0.00	0.0	0
2	110.0	110.0	30.0	29.0	0.00	0.0	0

1

BOUNDARY LOAD(S)

2 Load(s) Specified

Load No.	X-Left ft.	X-Right ft.	Intensity psf	Deflection (deg)
1	40.50	42.50	200.0	0.0
2	43.50	75.00	300.0	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 = 0.00 ft.
and X = 30.20 ft.

Each Surface Terminates Between X = 35.00 ft.
and X = 75.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00 ft.

1.60 ft. Line Segments Define Each Trial Failure Surface.

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -25.0
And 0.0 deg.

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 11 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.84	12.00
2	28.42	11.72
3	30.02	11.75
4	31.59	12.07
5	33.07	12.68
6	34.41	13.56
7	35.56	14.67
8	36.48	15.97
9	37.14	17.43
10	37.52	18.99
11	37.57	20.00

Circle Center At X = 29.1 ; Y = 20.2 and Radius, 8.5

*** 1.222 ***

Individual data on the 14 slices

Slice No.	Width Ft	Weight Lbs	Water Force Top Lbs	Water Force Bot Lbs	Tie Force Norm Lbs	Tie Force Tan Lbs	Earthquake Force Hor Lbs	Earthquake Force Ver Lbs	Surcharge Load Lbs
1	1.6	0.24E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2	1.6	0.46E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3	0.0	0.86E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	0.2	0.47E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5	1.3	0.51E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	1.5	0.64E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7	1.3	0.60E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8	1.2	0.49E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9	0.2	0.92E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10	0.7	0.25E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
11	0.7	0.19E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12	0.4	0.61E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13	0.0	0.20E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
14	0.1	0.26E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.84	12.00
2	28.44	11.86
3	30.04	11.92
4	31.62	12.19
5	33.15	12.65
6	34.61	13.30
7	35.98	14.13
8	37.23	15.12
9	38.35	16.27
10	39.31	17.54
11	40.11	18.93
12	40.56	20.00

Circle Center At X = 28.7 ; Y = 24.5 and Radius, 12.7

*** 1.234 ***

1

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.84	12.00
2	28.42	11.70
3	30.02	11.74
4	31.57	12.12
5	33.00	12.83
6	34.25	13.84
7	35.25	15.09
8	35.96	16.52
9	36.34	18.07
10	36.37	19.22

Circle Center At X = 29.0 ; Y = 19.1 and Radius, 7.4

*** 1.236 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	30.20	14.41
2	31.80	14.37
3	33.37	14.70
4	34.82	15.37
5	36.08	16.35
6	37.09	17.60
7	37.79	19.04
8	38.01	20.00

Circle Center At X = 31.2 ; Y = 21.4 and Radius, 7.0

*** 1.380 ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	20.13	12.00
2	21.68	11.61
3	23.26	11.35
4	24.86	11.22
5	26.46	11.23
6	28.05	11.38
7	29.63	11.66
8	31.17	12.07
9	32.68	12.62
10	34.13	13.29
11	35.52	14.08
12	36.84	14.98
13	38.08	16.00
14	39.22	17.11
15	40.27	18.32
16	41.21	19.62
17	41.45	20.00

Circle Center At X = 25.5 ; Y = 30.0 and Radius, 18.8

*** 1.395 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	12.00
2	24.98	11.41
3	26.52	11.00
4	28.11	10.79
5	29.71	10.77
6	31.30	10.95
7	32.86	11.31

8	34.36	11.87
9	35.78	12.60
10	37.10	13.50
11	38.30	14.56
12	39.37	15.76
13	40.28	17.07
14	41.02	18.49
15	41.59	19.99
16	41.59	20.00

Circle Center At X = 29.1 ; Y = 23.9 and Radius, 13.1

*** 1.446 ***

1

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	12.00
2	24.95	11.35
3	26.50	10.94
4	28.09	10.79
5	29.69	10.90
6	31.25	11.27
7	32.72	11.89
8	34.08	12.73
9	35.28	13.79
10	36.30	15.02
11	37.11	16.40
12	37.68	17.90
13	38.00	19.47
14	38.02	20.00

Circle Center At X = 28.2 ; Y = 20.6 and Radius, 9.9

*** 1.449 ***

Failure Surface Specified By 16 Coordinate Points

Point	X-Surf	Y-Surf

No.	ft.	ft.
1	20.13	12.00
2	21.67	11.55
3	23.24	11.26
4	24.84	11.11
5	26.44	11.12
6	28.03	11.28
7	29.60	11.60
8	31.13	12.06
9	32.61	12.67
10	34.02	13.41
11	35.36	14.29
12	36.61	15.29
13	37.75	16.41
14	38.78	17.63
15	39.70	18.95
16	40.28	20.00

Circle Center At X = 25.5 ; Y = 27.8 and Radius, 16.7

*** 1.450 ***

1

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	12.00
2	25.01	11.50
3	26.57	11.16
4	28.16	10.99
5	29.76	10.97
6	31.36	11.12
7	32.93	11.43
8	34.46	11.90
9	35.93	12.52
10	37.33	13.29
11	38.65	14.20
12	39.87	15.23
13	40.98	16.39
14	41.96	17.65
15	42.81	19.01
16	43.30	20.00

Circle Center At X = 29.1 ; Y = 26.6 and Radius, 15.7

*** 1.453 ***

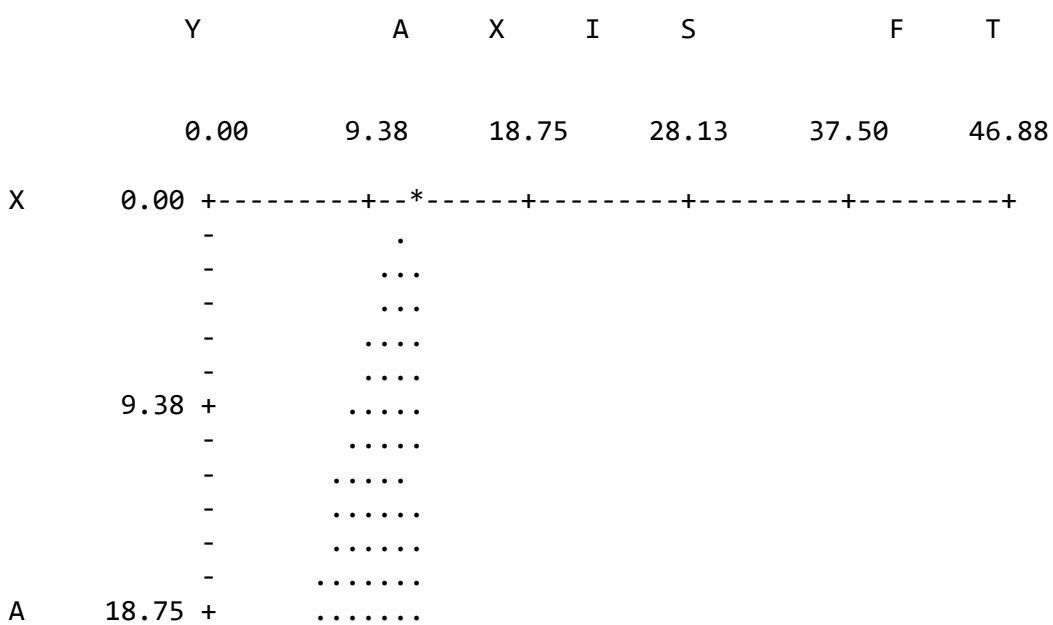
Failure Surface Specified By 9 Coordinate Points

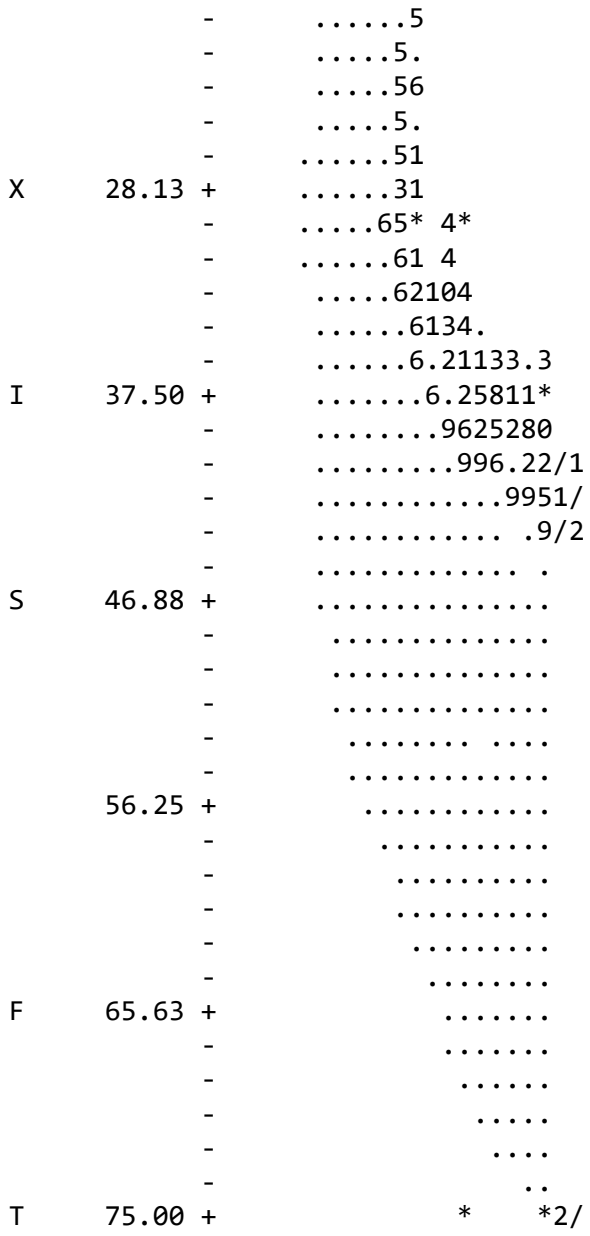
Point No.	X-Surf ft.	Y-Surf ft.
1	30.20	14.41
2	31.78	14.15
3	33.38	14.24
4	34.92	14.67
5	36.33	15.42
6	37.54	16.46
7	38.51	17.74
8	39.17	19.20
9	39.34	20.00

Circle Center At X = 32.2 ; Y = 21.5 and Radius, 7.4

*** 1.580 ***

1

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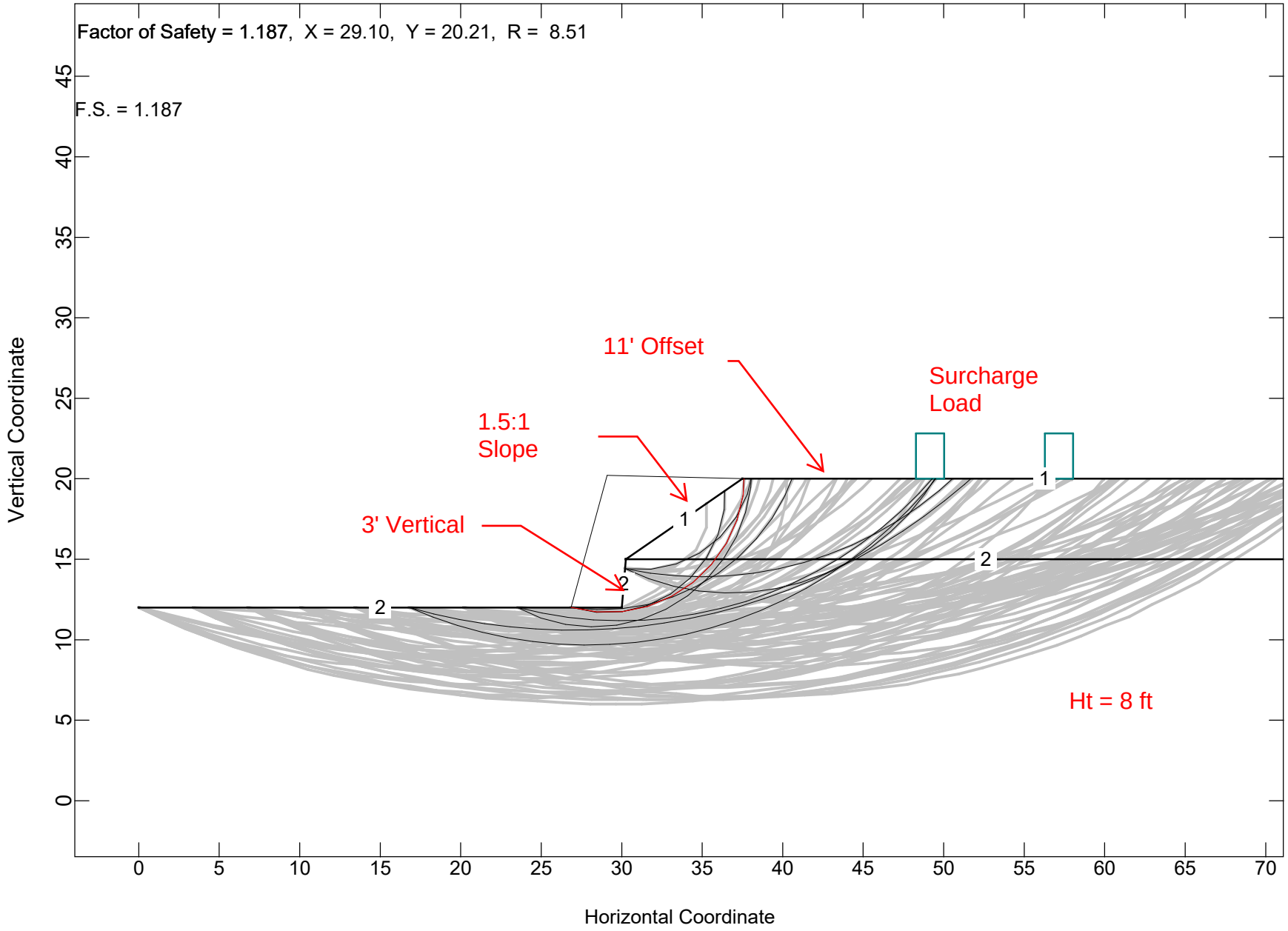
3 CY Loader Surcharge



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                 STABLPro for Windows, Version 2015.4.5

                        Upgraded from:
                        FHWA-PCSTABLE

                  Serial Number :  357267753

                     --Slope Stability Analysis--
                  Simplified Janbu, Simplified Bishop
                    or Spencer Method of Slices

=========================================================================


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     Korpi Cannon Engineering PLLC
     Las Vegas, NV, USA

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     -------------------------------------------------------------------------
                        Time and Date of Analysis
     -------------------------------------------------------------------------

               Date:  February 06, 2026     Time:  15:30:36



1
          PROBLEM DESCRIPTION   New Slope



          BOUNDARY COORDINATES

              4 Top   Boundaries
              5 Total Boundaries
```

Boundary No.	X-Left ft.	Y-Left ft.	X-Right ft.	Y-Right ft.	Soil Type Below Bnd
1	0.00	12.00	30.00	12.00	2
2	30.00	12.00	30.25	15.00	2
3	30.25	15.00	37.50	20.00	1
4	37.50	20.00	75.00	20.00	1
5	30.25	15.00	75.00	15.00	2

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

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.
1	100.0	100.0	10.0	27.0	0.00	0.0	0
2	110.0	110.0	30.0	28.0	0.00	0.0	0

1

BOUNDARY LOAD(S)

2 Load(s) Specified

Load No.	X-Left ft.	X-Right ft.	Intensity psf	Deflection (deg)
1	48.25	50.00	4700.0	0.0
2	56.25	58.00	4700.0	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 = 0.00 ft.
and X = 30.20 ft.

Each Surface Terminates Between X = 35.00 ft.
and X = 75.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00 ft.

1.60 ft. Line Segments Define Each Trial Failure Surface.

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -25.0
And 0.0 deg.

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 11 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.84	12.00
2	28.42	11.72
3	30.02	11.75
4	31.59	12.07
5	33.07	12.68
6	34.41	13.56
7	35.56	14.67
8	36.48	15.97
9	37.14	17.43
10	37.52	18.99
11	37.57	20.00

Circle Center At X = 29.1 ; Y = 20.2 and Radius, 8.5

*** 1.187 ***

Individual data on the 14 slices

Slice No.	Width Ft	Weight Lbs	Water Force Top Lbs	Water Force Bot Lbs	Tie Force Norm Lbs	Tie Force Tan Lbs	Earthquake Force Hor Lbs	Earthquake Force Ver Lbs	Surcharge Load Lbs
1	1.6	0.24E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2	1.6	0.46E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3	0.0	0.86E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	0.2	0.47E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5	1.3	0.51E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	1.5	0.64E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7	1.3	0.60E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8	1.2	0.49E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9	0.2	0.92E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10	0.7	0.25E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
11	0.7	0.19E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12	0.4	0.61E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13	0.0	0.20E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
14	0.1	0.26E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.84	12.00
2	28.42	11.70
3	30.02	11.74
4	31.57	12.12
5	33.00	12.83
6	34.25	13.84
7	35.25	15.09
8	35.96	16.52
9	36.34	18.07
10	36.37	19.22

Circle Center At X = 29.0 ; Y = 19.1 and Radius, 7.4

*** 1.201 ***

1

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.84	12.00
2	28.44	11.86
3	30.04	11.92
4	31.62	12.19
5	33.15	12.65
6	34.61	13.30
7	35.98	14.13
8	37.23	15.12
9	38.35	16.27
10	39.31	17.54
11	40.11	18.93
12	40.56	20.00

Circle Center At X = 28.7 ; Y = 24.5 and Radius, 12.7

*** 1.204 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	12.00
2	25.05	11.65
3	26.63	11.39
4	28.22	11.23
5	29.82	11.17
6	31.42	11.22
7	33.01	11.36
8	34.59	11.60
9	36.16	11.94
10	37.70	12.38
11	39.21	12.91

12	40.68	13.54
13	42.11	14.25
14	43.49	15.06
15	44.82	15.95
16	46.09	16.92
17	47.30	17.97
18	48.44	19.09
19	49.26	20.00

Circle Center At X = 29.9 ; Y = 36.8 and Radius, 25.6

*** 1.234 ***

1

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	30.20	14.41
2	31.78	14.13
3	33.37	13.96
4	34.97	13.90
5	36.57	13.96
6	38.16	14.13
7	39.73	14.40
8	41.29	14.79
9	42.81	15.28
10	44.29	15.88
11	45.73	16.58
12	47.12	17.38
13	48.44	18.27
14	49.70	19.26
15	50.53	20.00

Circle Center At X = 35.0 ; Y = 36.8 and Radius, 22.9

*** 1.244 ***

Failure Surface Specified By 24 Coordinate Points

Point	X-Surf	Y-Surf

No.	ft.	ft.
1	16.78	12.00
2	18.26	11.40
3	19.78	10.89
4	21.32	10.46
5	22.88	10.13
6	24.47	9.88
7	26.06	9.73
8	27.66	9.67
9	29.26	9.70
10	30.85	9.83
11	32.44	10.04
12	34.01	10.35
13	35.56	10.75
14	37.08	11.23
15	38.58	11.80
16	40.04	12.46
17	41.45	13.20
18	42.83	14.02
19	44.15	14.92
20	45.42	15.90
21	46.63	16.94
22	47.78	18.06
23	48.86	19.23
24	49.49	20.00

Circle Center At X = 27.9 ; Y = 37.4 and Radius, 27.7

*** 1.334 ***

1

Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	12.00
2	18.33	11.60
3	19.89	11.26
4	21.47	10.99
5	23.06	10.79
6	24.65	10.66
7	26.25	10.60
8	27.85	10.60
9	29.45	10.68

10	31.04	10.82
11	32.63	11.03
12	34.20	11.31
13	35.76	11.65
14	37.31	12.07
15	38.84	12.55
16	40.34	13.09
17	41.82	13.70
18	43.27	14.37
19	44.70	15.10
20	46.09	15.90
21	47.44	16.75
22	48.76	17.66
23	50.03	18.62
24	51.26	19.64
25	51.66	20.00

Circle Center At X = 26.9 ; Y = 47.8 and Radius, 37.2

*** 1.353 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	30.20	14.41
2	31.80	14.37
3	33.37	14.70
4	34.82	15.37
5	36.08	16.35
6	37.09	17.60
7	37.79	19.04
8	38.01	20.00

Circle Center At X = 31.2 ; Y = 21.4 and Radius, 7.0

*** 1.358 ***

1

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	30.20	14.41
2	31.67	13.78
3	33.21	13.32
4	34.78	13.03
5	36.37	12.90
6	37.97	12.95
7	39.56	13.17
8	41.11	13.55
9	42.61	14.10
10	44.05	14.81
11	45.40	15.67
12	46.65	16.67
13	47.79	17.79
14	48.80	19.03
15	49.43	20.00

Circle Center At X = 36.7 ; Y = 27.8 and Radius, 14.9

*** 1.367 ***

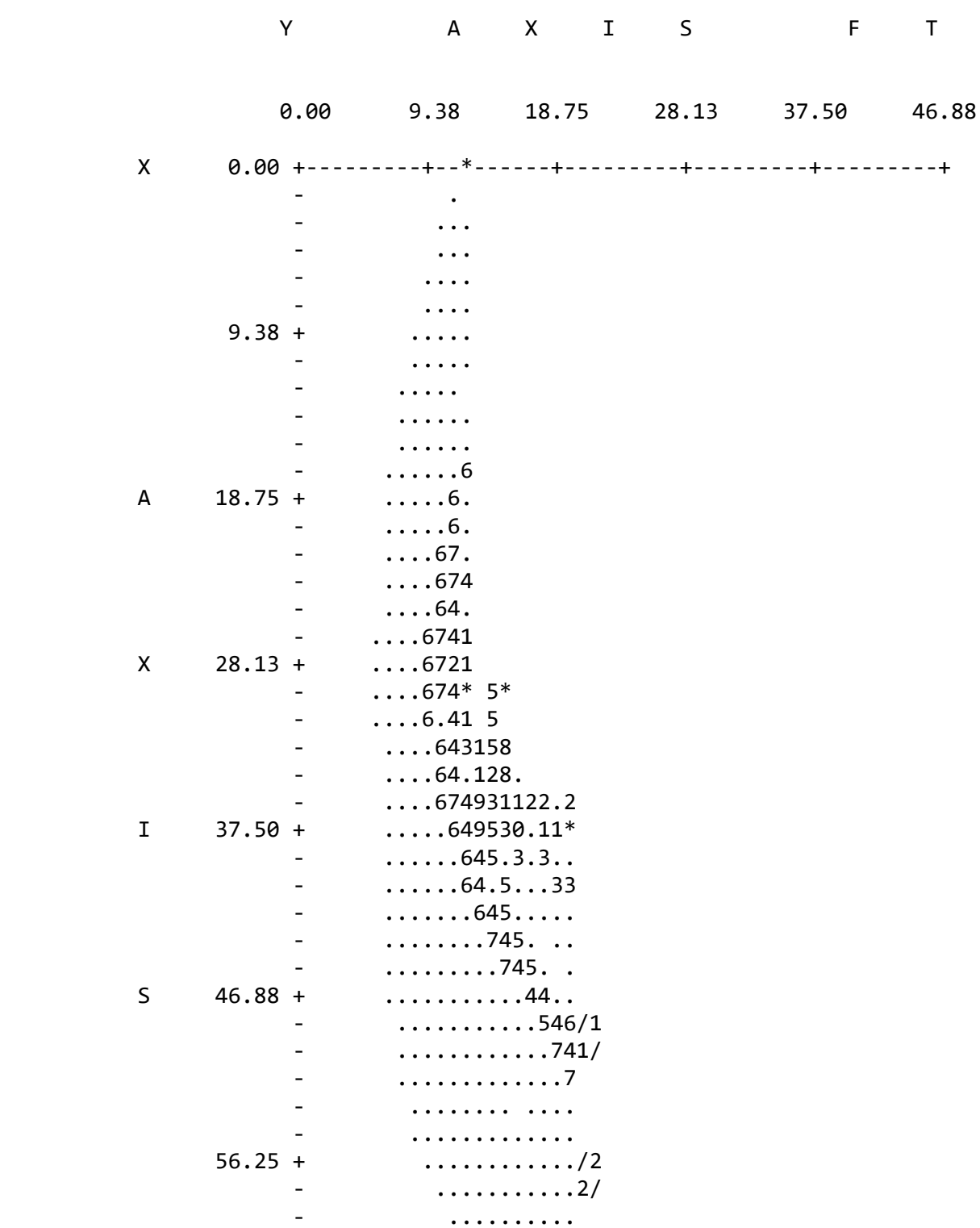
Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	12.00
2	24.95	11.35
3	26.50	10.94
4	28.09	10.79
5	29.69	10.90
6	31.25	11.27
7	32.72	11.89
8	34.08	12.73
9	35.28	13.79
10	36.30	15.02
11	37.11	16.40
12	37.68	17.90
13	38.00	19.47
14	38.02	20.00

Circle Center At X = 28.2 ; Y = 20.6 and Radius, 9.9

*** 1.406 ***

1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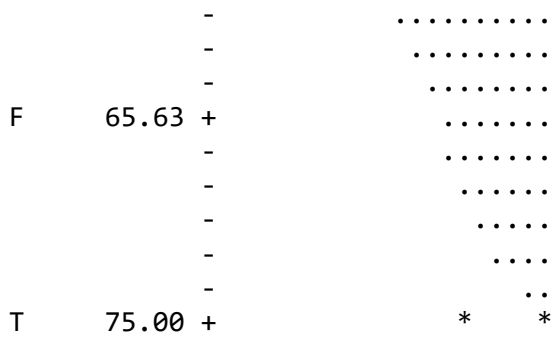
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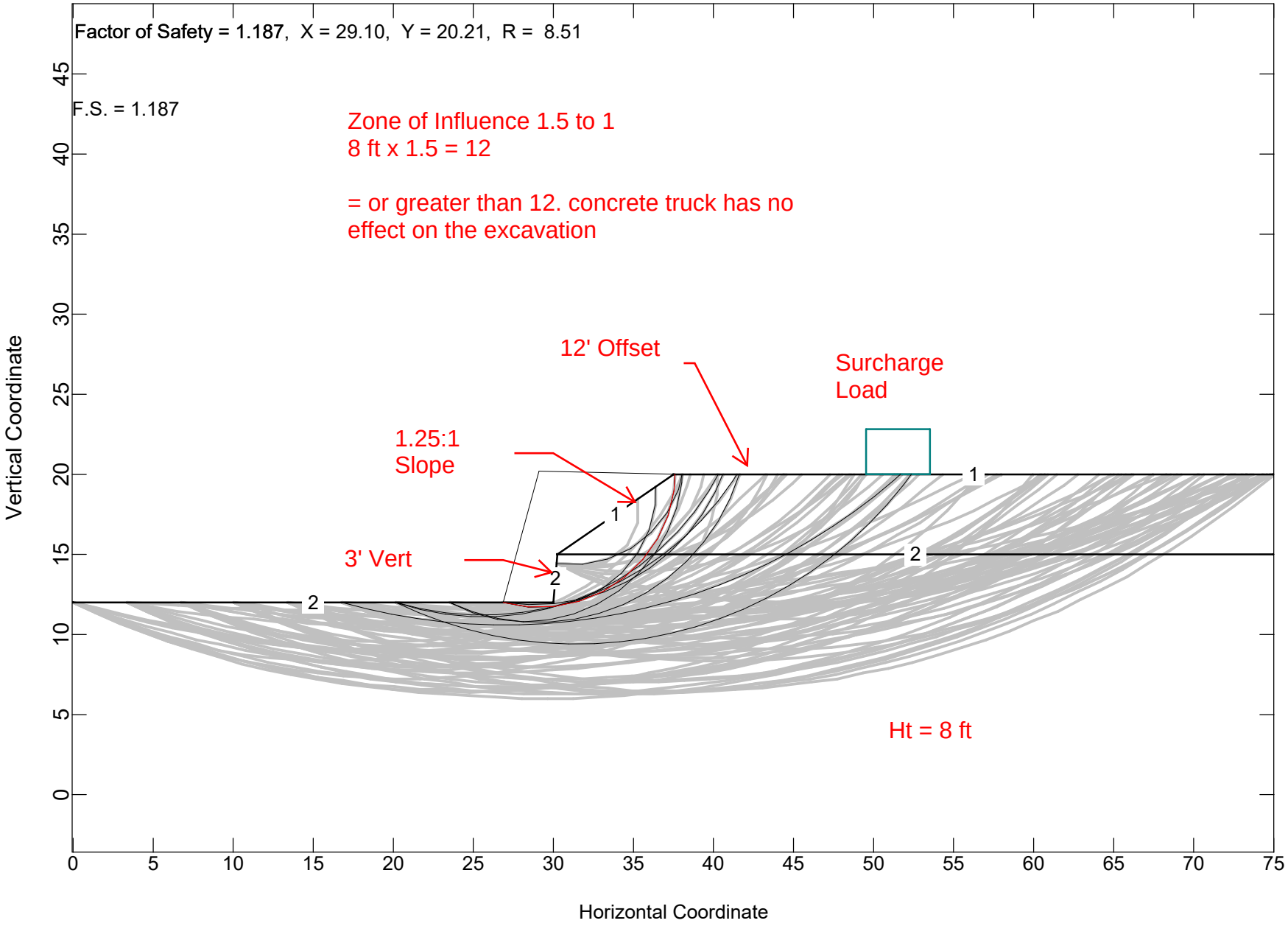
Concrete Truck Surcharge Load



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                         Upgraded from:
                         FHWA-PCSTABLE

                   Serial Number :  357267753

                      --Slope Stability Analysis--
                   Simplified Janbu, Simplified Bishop
                     or Spencer Method of Slices

=========================================================================


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     Las Vegas, NV, USA

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1
          PROBLEM DESCRIPTION   New Slope




          BOUNDARY COORDINATES

              4 Top   Boundaries
              5 Total Boundaries
```

Boundary No.	X-Left ft.	Y-Left ft.	X-Right ft.	Y-Right ft.	Soil Type Below Bnd
1	0.00	12.00	30.00	12.00	2
2	30.00	12.00	30.25	15.00	2
3	30.25	15.00	37.50	20.00	1
4	37.50	20.00	75.00	20.00	1
5	30.25	15.00	75.00	15.00	2

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

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.
1	100.0	100.0	10.0	27.0	0.00	0.0	0
2	110.0	110.0	30.0	28.0	0.00	0.0	0

1

BOUNDARY LOAD(S)

1 Load(s) Specified

Load No.	X-Left ft.	X-Right ft.	Intensity psf	Deflection (deg)
1	49.50	53.50	3361.0	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 = 0.00 ft.
and X = 30.20 ft.

Each Surface Terminates Between X = 35.00 ft.
and X = 75.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00 ft.

1.60 ft. Line Segments Define Each Trial Failure Surface.

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -25.0
And 0.0 deg.

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 11 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.84	12.00
2	28.42	11.72
3	30.02	11.75
4	31.59	12.07
5	33.07	12.68
6	34.41	13.56
7	35.56	14.67
8	36.48	15.97
9	37.14	17.43
10	37.52	18.99
11	37.57	20.00

Circle Center At X = 29.1 ; Y = 20.2 and Radius, 8.5

*** 1.187 ***

Individual data on the 14 slices

Slice No.	Width Ft	Weight Lbs	Water Force Top Lbs	Water Force Bot Lbs	Tie Force Norm Lbs	Tie Force Tan Lbs	Earthquake Force Hor Lbs	Earthquake Force Ver Lbs	Surcharge Load Lbs
1	1.6	0.24E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2	1.6	0.46E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3	0.0	0.86E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	0.2	0.47E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5	1.3	0.51E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	1.5	0.64E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7	1.3	0.60E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8	1.2	0.49E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9	0.2	0.92E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10	0.7	0.25E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
11	0.7	0.19E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12	0.4	0.61E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13	0.0	0.20E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
14	0.1	0.26E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.84	12.00
2	28.42	11.70
3	30.02	11.74
4	31.57	12.12
5	33.00	12.83
6	34.25	13.84
7	35.25	15.09
8	35.96	16.52
9	36.34	18.07
10	36.37	19.22

Circle Center At X = 29.0 ; Y = 19.1 and Radius, 7.4

*** 1.201 ***

1

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.84	12.00
2	28.44	11.86
3	30.04	11.92
4	31.62	12.19
5	33.15	12.65
6	34.61	13.30
7	35.98	14.13
8	37.23	15.12
9	38.35	16.27
10	39.31	17.54
11	40.11	18.93
12	40.56	20.00

Circle Center At X = 28.7 ; Y = 24.5 and Radius, 12.7

*** 1.204 ***

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	20.13	12.00
2	21.59	11.35
3	23.09	10.78
4	24.62	10.31
5	26.18	9.94
6	27.75	9.66
7	29.34	9.48
8	30.94	9.40
9	32.54	9.42
10	34.14	9.53
11	35.72	9.75
12	37.29	10.06

13	38.84	10.47
14	40.36	10.97
15	41.84	11.57
16	43.29	12.26
17	44.68	13.03
18	46.03	13.89
19	47.33	14.83
20	48.56	15.85
21	49.73	16.95
22	50.83	18.11
23	51.85	19.34
24	52.33	20.00

Circle Center At X = 31.5 ; Y = 35.3 and Radius, 25.9

*** 1.282 ***

1

Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	12.00
2	18.33	11.60
3	19.89	11.26
4	21.47	10.99
5	23.06	10.79
6	24.65	10.66
7	26.25	10.60
8	27.85	10.60
9	29.45	10.68
10	31.04	10.82
11	32.63	11.03
12	34.20	11.31
13	35.76	11.65
14	37.31	12.07
15	38.84	12.55
16	40.34	13.09
17	41.82	13.70
18	43.27	14.37
19	44.70	15.10
20	46.09	15.90
21	47.44	16.75
22	48.76	17.66
23	50.03	18.62

24	51.26	19.64
25	51.66	20.00

Circle Center At X = 26.9 ; Y = 47.8 and Radius, 37.2

*** 1.345 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	30.20	14.41
2	31.80	14.37
3	33.37	14.70
4	34.82	15.37
5	36.08	16.35
6	37.09	17.60
7	37.79	19.04
8	38.01	20.00

Circle Center At X = 31.2 ; Y = 21.4 and Radius, 7.0

*** 1.358 ***

1

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	12.00
2	24.95	11.35
3	26.50	10.94
4	28.09	10.79
5	29.69	10.90
6	31.25	11.27
7	32.72	11.89
8	34.08	12.73
9	35.28	13.79
10	36.30	15.02
11	37.11	16.40

12	37.68	17.90
13	38.00	19.47
14	38.02	20.00

Circle Center At X = 28.2 ; Y = 20.6 and Radius, 9.9

*** 1.406 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	20.13	12.00
2	21.67	11.55
3	23.24	11.26
4	24.84	11.11
5	26.44	11.12
6	28.03	11.28
7	29.60	11.60
8	31.13	12.06
9	32.61	12.67
10	34.02	13.41
11	35.36	14.29
12	36.61	15.29
13	37.75	16.41
14	38.78	17.63
15	39.70	18.95
16	40.28	20.00

Circle Center At X = 25.5 ; Y = 27.8 and Radius, 16.7

*** 1.414 ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	20.13	12.00
2	21.68	11.61

3	23.26	11.35
4	24.86	11.22
5	26.46	11.23
6	28.05	11.38
7	29.63	11.66
8	31.17	12.07
9	32.68	12.62
10	34.13	13.29
11	35.52	14.08
12	36.84	14.98
13	38.08	16.00
14	39.22	17.11
15	40.27	18.32
16	41.21	19.62
17	41.45	20.00

Circle Center At X = 25.5 ; Y = 30.0 and Radius, 18.8

*** 1.417 ***

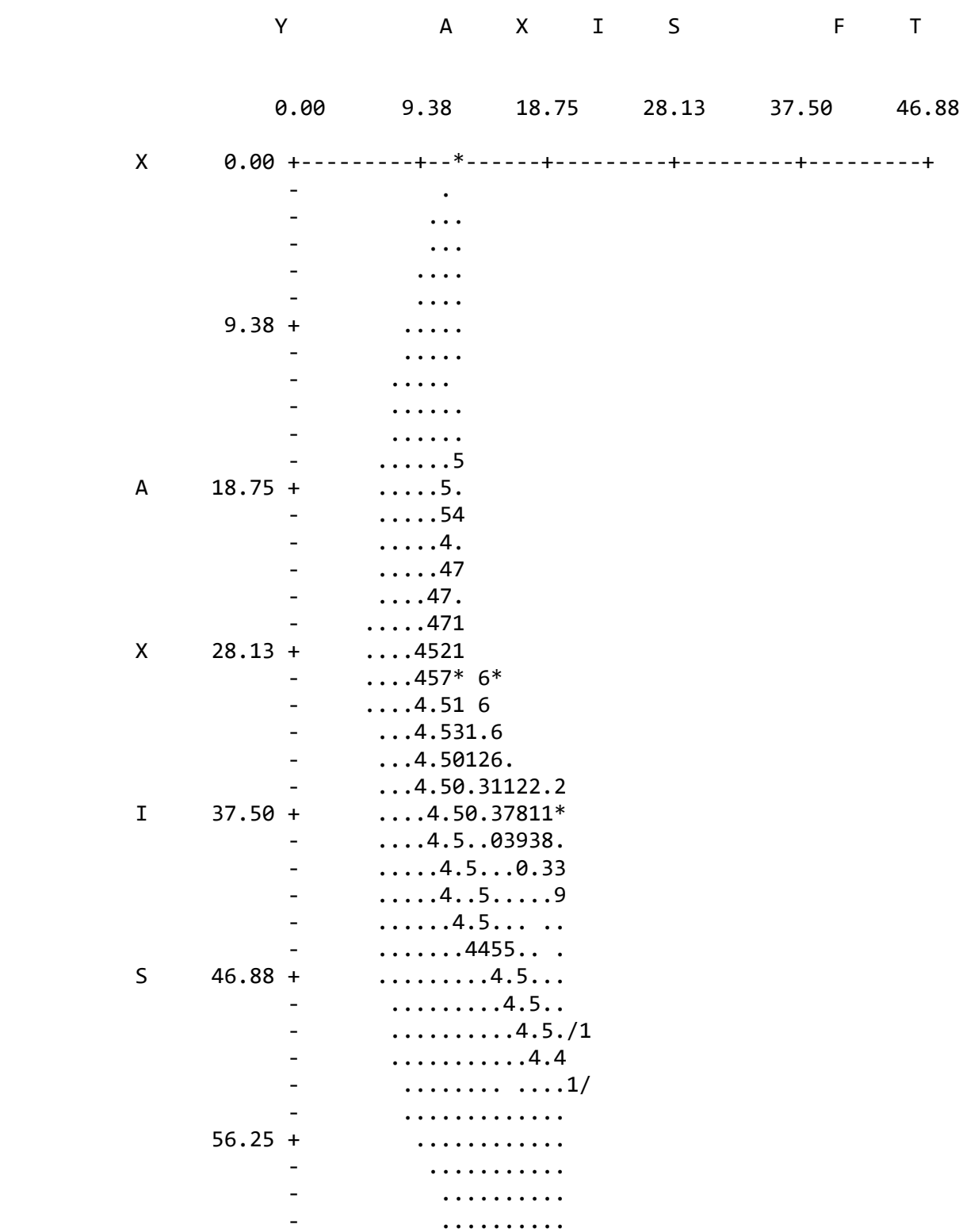
Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	12.00
2	24.98	11.41
3	26.52	11.00
4	28.11	10.79
5	29.71	10.77
6	31.30	10.95
7	32.86	11.31
8	34.36	11.87
9	35.78	12.60
10	37.10	13.50
11	38.30	14.56
12	39.37	15.76
13	40.28	17.07
14	41.02	18.49
15	41.59	19.99
16	41.59	20.00

Circle Center At X = 29.1 ; Y = 23.9 and Radius, 13.1

*** 1.458 ***

1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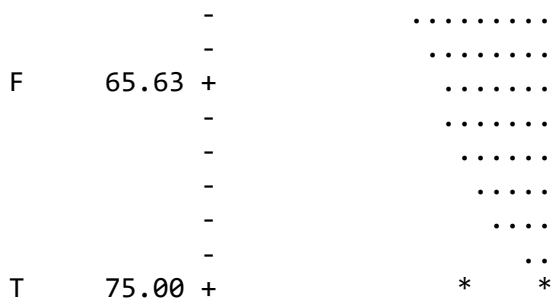
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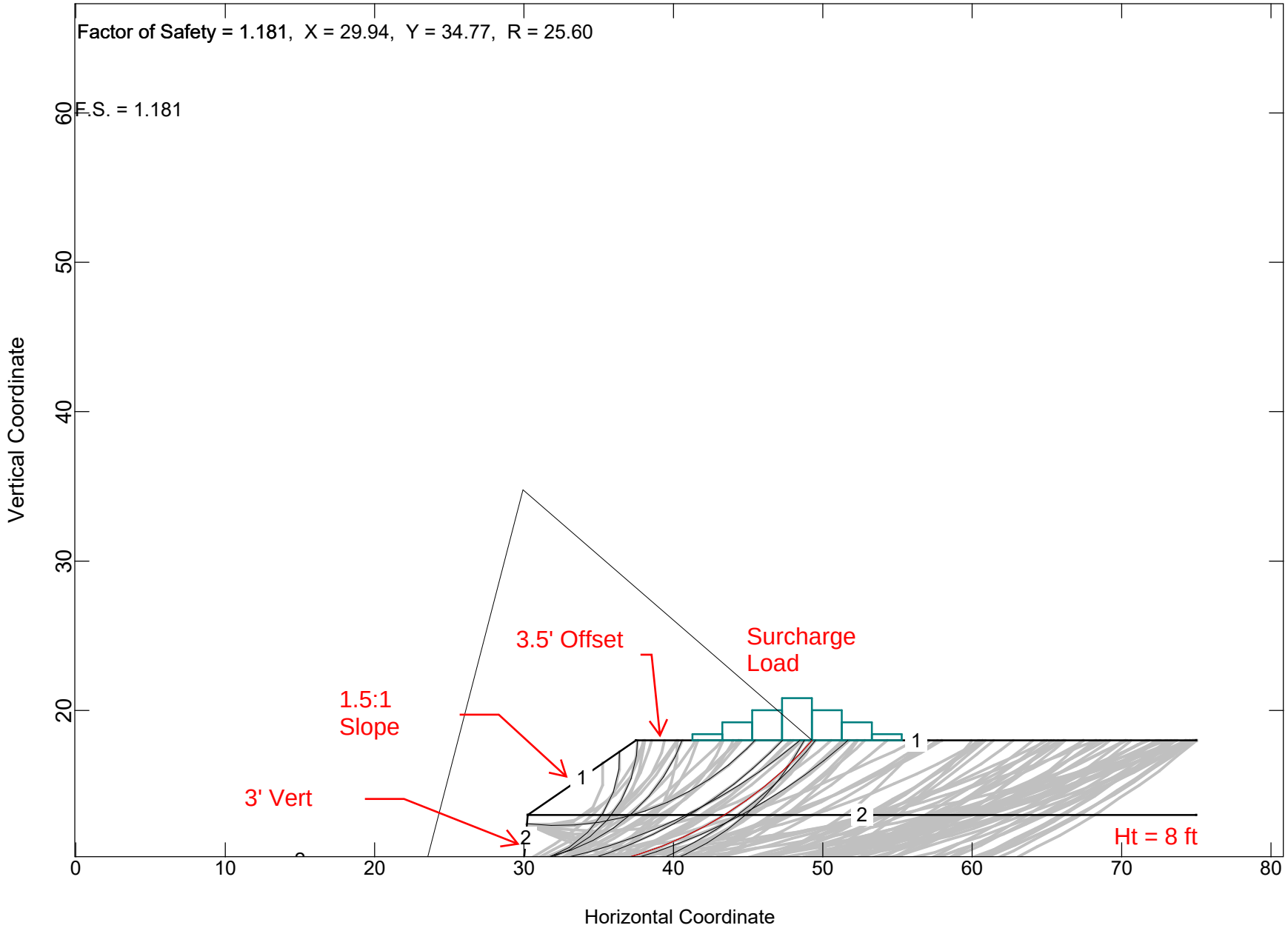

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                 STABLPro for Windows, Version 2015.4.5

                        Upgraded from:
                        FHWA-PCSTABLE

                  Serial Number :  357267753

                     --Slope Stability Analysis--
                  Simplified Janbu, Simplified Bishop
                    or Spencer Method of Slices

=========================================================================


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Name of plot output file    : 7. Spoil - Vert.sl4p

-------------------------------------------------------------------------
                      Time and Date of Analysis
-------------------------------------------------------------------------

          Date:  February 06, 2026     Time:  15:56:57



1
      PROBLEM DESCRIPTION   New Slope



      BOUNDARY COORDINATES

          4 Top   Boundaries
          5 Total Boundaries
```

Boundary No.	X-Left ft.	Y-Left ft.	X-Right ft.	Y-Right ft.	Soil Type Below Bnd
1	0.00	10.00	30.00	10.00	2
2	30.00	10.00	30.25	13.00	2
3	30.25	13.00	37.50	18.00	1
4	37.50	18.00	75.00	18.00	1
5	30.25	13.00	75.00	13.00	2

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

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.
1	100.0	100.0	10.0	27.0	0.00	0.0	0
2	110.0	110.0	30.0	28.0	0.00	0.0	0

1

BOUNDARY LOAD(S)

7 Load(s) Specified

Load No.	X-Left ft.	X-Right ft.	Intensity psf	Deflection (deg)
1	41.25	43.25	230.0	0.0
2	43.25	45.25	690.0	0.0
3	45.25	47.25	1150.0	0.0
4	47.25	49.25	1610.0	0.0
5	49.25	51.25	1150.0	0.0
6	51.25	53.25	690.0	0.0
7	53.25	55.25	230.0	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 = 0.00 ft.
and X = 30.20 ft.

Each Surface Terminates Between X = 35.00 ft.
and X = 75.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00 ft.

1.60 ft. Line Segments Define Each Trial Failure Surface.

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -25.0
And 0.0 deg.

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 19 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	10.00
2	25.05	9.65
3	26.63	9.39
4	28.22	9.23
5	29.82	9.17
6	31.42	9.22
7	33.01	9.36

8	34.59	9.60
9	36.16	9.94
10	37.70	10.38
11	39.21	10.91
12	40.68	11.54
13	42.11	12.25
14	43.49	13.06
15	44.82	13.95
16	46.09	14.92
17	47.30	15.97
18	48.44	17.09
19	49.26	18.00

Circle Center At X = 29.9 ; Y = 34.8 and Radius, 25.6

*** 1.181 ***

Individual data on the 27 slices

Slice No.	Width Ft	Weight Lbs	Water Force Top Lbs	Water Force Bot Lbs	Tie Force Norm Lbs	Tie Force Tan Lbs	Earthquake Force Hor Lbs	Earthquake Force Ver Lbs	Surcharge Load Lbs
1	1.6	0.30E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2	1.6	0.84E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3	1.6	0.12E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	1.6	0.14E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5	0.2	0.16E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	0.2	0.64E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7	1.2	0.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8	1.6	0.87E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9	1.6	0.10E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10	1.6	0.11E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
11	1.3	0.10E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12	0.2	0.16E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13	1.5	0.11E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
14	1.5	0.10E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
15	0.6	0.37E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
16	0.9	0.52E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.20E+03
17	1.1	0.62E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.26E+03
18	0.1	0.72E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.99E+02
19	0.1	0.49E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.69E+02
20	1.3	0.60E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.92E+03
21	0.4	0.17E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.29E+03

22	0.8	0.29E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.97E+03
23	1.2	0.30E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.13E+04
24	0.1	0.11E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.86E+02
25	1.1	0.17E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.18E+04
26	0.8	0.37E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.13E+04
27	0.0	0.98E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.15E+02

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.84	10.00
2	28.42	9.72
3	30.02	9.75
4	31.59	10.07
5	33.07	10.68
6	34.41	11.56
7	35.56	12.67
8	36.48	13.97
9	37.14	15.43
10	37.52	16.99
11	37.57	18.00

Circle Center At X = 29.1 ; Y = 18.2 and Radius, 8.5

*** 1.187 ***

1

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.84	10.00
2	28.42	9.70
3	30.02	9.74
4	31.57	10.12
5	33.00	10.83
6	34.25	11.84
7	35.25	13.09
8	35.96	14.52
9	36.34	16.07
10	36.37	17.22

Circle Center At X = 29.0 ; Y = 17.1 and Radius, 7.4

*** 1.201 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.84	10.00
2	28.44	9.86
3	30.04	9.92
4	31.62	10.19
5	33.15	10.65
6	34.61	11.30
7	35.98	12.13
8	37.23	13.12
9	38.35	14.27
10	39.31	15.54
11	40.11	16.93
12	40.56	18.00

Circle Center At X = 28.7 ; Y = 22.5 and Radius, 12.7

*** 1.204 ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.84	10.00
2	28.35	9.46
3	29.90	9.07
4	31.48	8.81
5	33.08	8.71
6	34.68	8.75
7	36.27	8.94
8	37.83	9.28
9	39.36	9.76

10	40.83	10.38
11	42.24	11.14
12	43.58	12.02
13	44.83	13.02
14	45.98	14.13
15	47.02	15.34
16	47.95	16.65
17	48.73	18.00

Circle Center At X = 33.4 ; Y = 26.0 and Radius, 17.3

*** 1.252 ***

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	10.00
2	18.35	9.70
3	19.93	9.47
4	21.53	9.31
5	23.12	9.22
6	24.72	9.19
7	26.32	9.24
8	27.92	9.35
9	29.51	9.54
10	31.09	9.79
11	32.66	10.11
12	34.21	10.50
13	35.74	10.95
14	37.26	11.47
15	38.74	12.05
16	40.21	12.70
17	41.64	13.41
18	43.04	14.19
19	44.41	15.02
20	45.74	15.91
21	47.03	16.85
22	48.28	17.86
23	48.44	18.00

Circle Center At X = 24.5 ; Y = 46.2 and Radius, 37.1

*** 1.270 ***

1

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	10.00
2	18.26	9.40
3	19.78	8.89
4	21.32	8.46
5	22.88	8.13
6	24.47	7.88
7	26.06	7.73
8	27.66	7.67
9	29.26	7.70
10	30.85	7.83
11	32.44	8.04
12	34.01	8.35
13	35.56	8.75
14	37.08	9.23
15	38.58	9.80
16	40.04	10.46
17	41.45	11.20
18	42.83	12.02
19	44.15	12.92
20	45.42	13.90
21	46.63	14.94
22	47.78	16.06
23	48.86	17.23
24	49.49	18.00

Circle Center At X = 27.9 ; Y = 35.4 and Radius, 27.7

*** 1.311 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	10.00
2	18.32	9.58

3	19.89	9.24
4	21.46	8.98
5	23.06	8.81
6	24.65	8.72
7	26.25	8.72
8	27.85	8.80
9	29.44	8.97
10	31.02	9.22
11	32.59	9.55
12	34.13	9.97
13	35.65	10.47
14	37.14	11.05
15	38.60	11.70
16	40.03	12.43
17	41.41	13.24
18	42.75	14.12
19	44.03	15.07
20	45.27	16.08
21	46.45	17.16
22	47.28	18.00

Circle Center At X = 25.5 ; Y = 38.9 and Radius, 30.2

*** 1.312 ***

1

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	30.20	12.41
2	31.80	12.30
3	33.40	12.33
4	34.99	12.51
5	36.56	12.82
6	38.09	13.27
7	39.58	13.85
8	41.02	14.56
9	42.38	15.39
10	43.67	16.34
11	44.87	17.40
12	45.44	18.00

Circle Center At X = 32.2 ; Y = 30.5 and Radius, 18.2

*** 1.342 ***

Failure Surface Specified By 25 Coordinate Points

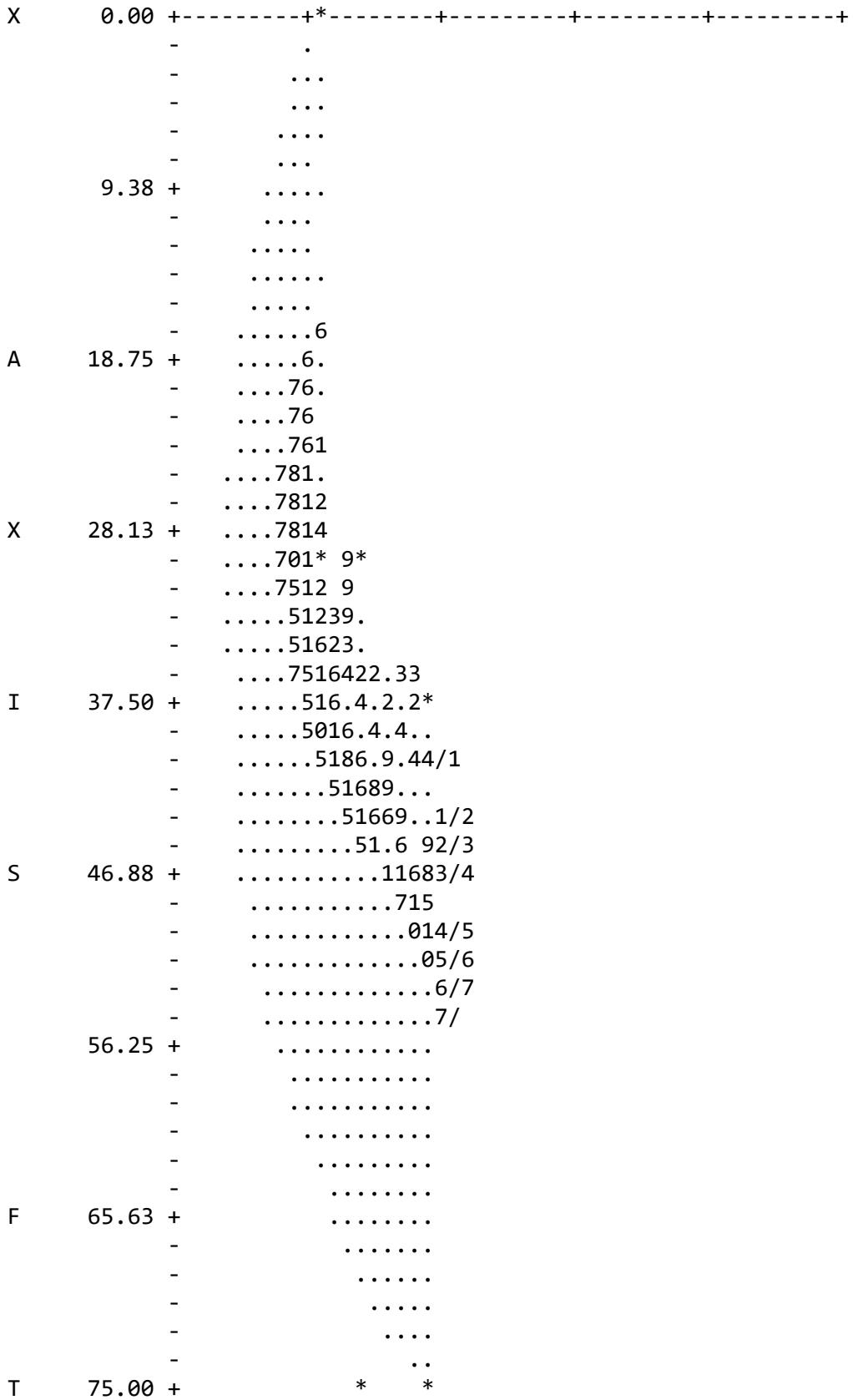
Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	10.00
2	18.33	9.60
3	19.89	9.26
4	21.47	8.99
5	23.06	8.79
6	24.65	8.66
7	26.25	8.60
8	27.85	8.60
9	29.45	8.68
10	31.04	8.82
11	32.63	9.03
12	34.20	9.31
13	35.76	9.65
14	37.31	10.07
15	38.84	10.55
16	40.34	11.09
17	41.82	11.70
18	43.27	12.37
19	44.70	13.10
20	46.09	13.90
21	47.44	14.75
22	48.76	15.66
23	50.03	16.62
24	51.26	17.64
25	51.66	18.00

Circle Center At X = 26.9 ; Y = 45.8 and Radius, 37.2

*** 1.352 ***

1

Y	A	X	I	S	F	T
0.00	9.38	18.75	28.13	37.50	46.88	


X 0.00
9.38
A 18.75
X 28.13
I 37.50
S 46.88
56.25
F 65.63
T 75.00

CAT 315 EXCAVATOR SURCHARGE LOADING ANALYSIS

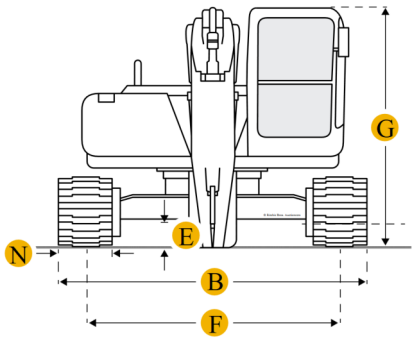
Total Equipment Weight $P := 36930 \cdot lb$ Per Richie Specs

Equipment Weight Per Track $P2 := \frac{P}{2} = 18465\ lb$ Number of Tracks = 2

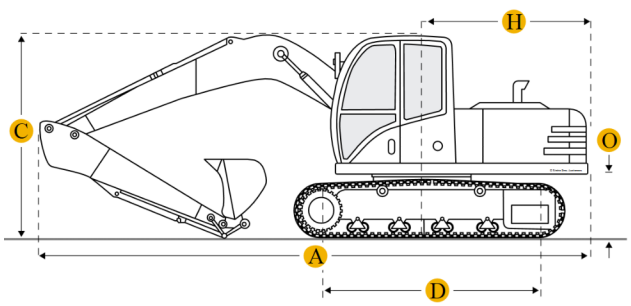
Width of Equipment Track (N2) $N2 := \frac{23.63 \cdot in}{12 \cdot \frac{in}{ft}} = 1.969\ ft$ $N := 24 \cdot in$

Length of Track (D) $D := 10.42 \cdot ft$

Excavator Surcharge Weight (wt) $wt := \frac{P2}{D \cdot N2} = 900\ \frac{lb}{ft^2}$ Per Track



$F := 6.5 \cdot ft$



Created with PTC Mathcad Express. See www.mathcad.com for more information.

Corrected N-value for (ML) Sandy Silt

$N_{field} := 7$ Field measured Blow Counts

$E_H := 0.6$ Donut/Ring

$C_B := 1$ 2.0 inch

$C_S := 1$ Standard Sampler

$C_R := 0.75$ Rod Length (10ft-13ft)

$N_{60} := E_H \cdot C_B \cdot C_S \cdot C_R \cdot N_{field} = 3.15$ Corrected N-value

Cohesion

$c := 20\ psf$ Typical for Compacted soil

Internal angle of Friction

$\phi := 27\ deg$ Caltrans Trench & Shoring Manuel (Table 3.1)

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Corrected N-value for (SM) Silty Sand

$N_{field} := 10$ Field measured Blow Counts

$E_H := 0.6$ Donut/Ring

$C_B := 1$ 2.0 inch

$C_S := 1$ Standard Sampler

$C_R := 0.75$ Rod Length (10ft-13ft)

$N_{60} := E_H \cdot C_B \cdot C_S \cdot C_R \cdot N_{field} = 4.5$ Corrected N-value

Cohesion

$c := 30\ psf$ Typical for Compacted soil

Internal angle of Friction

$\phi := 40\ deg$ Caltrans Trench & Shoring Manuel (Table 3.1)

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Reference Documents

Geotechnical Engineering Exploration and Analysis

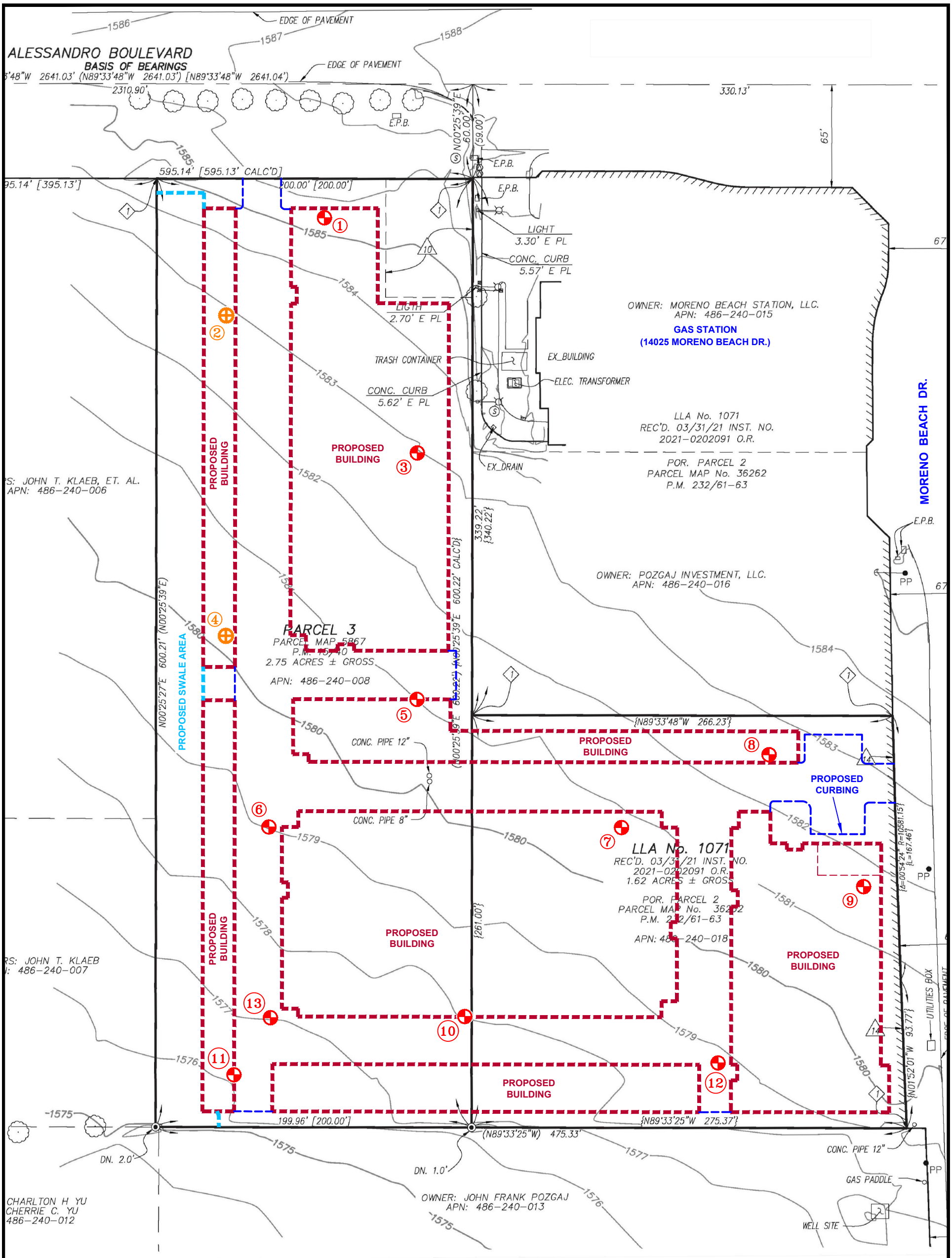
Proposed West Coast Self-Storage Facility
SWQ of Alessandro Boulevard and Moreno Beach Drive
Moreno Valley, California

Prepared for:

West Coast Self-Storage Group
Everett, Washington

March 15, 2023
Project No. 2G-2301004

GILES ENGINEERING ASSOCIATES, INC.



GILES ENGINEERING ASSOCIATES, INC.
1965 N. MAIN STREET
ORANGE, CA 92865 (714)279-0817
www.gilesengr.com

FIGURE 1
TEST BORING LOCATION PLAN
PROPOSED WEST COAST SELF-STORAGE FACILITY
SWQ OF ALESSANDRO BLVD. AND MORENO BEACH DR.
MORENO VALLEY, CALIFORNIA

DESIGNED	DRAWN	SCALE	DATE	REVISED
WML	Jdid	approx. 1"=60'	03-09-23	--
PROJECT NO.: 2G-2301004			CAD No. 2g2301004-blp	

LEGEND:

① GEOTECHNICAL TEST BORING

② GEOTECHNICAL TEST BORING / PERCOLATION TEST BORING

NOTES:

1.) TEST BORING LOCATIONS ARE APPROXIMATE.

2.) BASE MAP DEVELOPED FROM THE "ALTA/NSPS LAND TITLE SURVEY", DATED 1-3-2023, PREPARED BY INLAND VALLEY SURVEYING, INC.

3.) PROPOSED FEATURES ARE APPROXIMATE BASED ON THE "SITE PLAN" (SHEET A-1), DATED 1-16-2023, PREPARED BY SITE+PLAN+MIX, LLC.

APPROXIMATE SCALE

BORING NO. & LOCATION: B- 5	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 1581 feet	PROPOSED WEST COAST SELF-STORAGE FACILITY	
COMPLETION DATE: 02/14/23	SWQ OF ALESSANDRO BOULEVARD AND MORENO BEACH DRIVE MORENO VALLEY, CA	
FIELD REP: D. CALLEJAS	PROJECT NO: 2G-2301004	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
Light Brown, fine Sandy Silt - Moist (Possible Fill)		1580	1-SS	8				7		
Tan, fine Sandy Silt, trace coarse Sand - Moist (Native)	5		2-SS	9		2.0		6		
Some calcium carbonate filaments		1575	3-SS	13		2.0		8		
Light Brown	10	1570	4-SS	18		2.5		7		
Some Clay, some cementation, some mica	15	1565	5-SS	25		2.5		5		
Boring Terminated at about 16.5 feet (EL. 1564.5')										

Water Observation Data	Remarks:
Water Encountered During Drilling: None	SS = Standard Penetration Test
Water Level At End of Drilling:	
Cave Depth At End of Drilling:	
Water Level After Drilling:	
Cave Depth After Drilling:	

GILES LOG REPORT 2G-2301004.GPJ GILES.GDT 3/15/23

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

BORING NO. & LOCATION: B- 6	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 1579 feet	PROPOSED WEST COAST SELF-STORAGE FACILITY	
COMPLETION DATE: 02/14/23	SWQ OF ALESSANDRO BOULEVARD AND MORENO BEACH DRIVE MORENO VALLEY, CA	
FIELD REP: D. CALLEJAS	PROJECT NO: 2G-2301004	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
Tan, fine Sandy Silt - Moist (Native)										
			1-SS	12		1.0		6		
		1575	2-SS	12		2.25		5		
	5		3-SS	14		2.25		7		
Grayish Brown, some calcium carbonate filaments		1570								
	10		4-SS	17		2.5		8		
		1565								
Brown, Clayey Sand, fine to medium grained, trace Gravel, some calcium carbonate filaments - Moist	15		5-SS	36				7		
Boring Terminated at about 16.5 feet (EL. 1562.5')										

Water Observation Data	Remarks:
Water Encountered During Drilling: None	SS = Standard Penetration Test
Water Level At End of Drilling:	
Cave Depth At End of Drilling:	
Water Level After Drilling:	
Cave Depth After Drilling:	

GILES LOG REPORT 2G-2301004.GPJ GILES.GDT 3/15/23

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

BORING NO. & LOCATION: B- 7	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 1580.8 feet	PROPOSED WEST COAST SELF-STORAGE FACILITY	
COMPLETION DATE: 02/14/23	SWQ OF ALESSANDRO BOULEVARD AND MORENO BEACH DRIVE MORENO VALLEY, CA	
FIELD REP: D. CALLEJAS	PROJECT NO: 2G-2301004	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
Tan to Brown, fine Sandy Silt, fine to medium Sand - Moist (Possible Fill)		1580	1-SS	4		2.0		8		
Tan, Silty Sand, fine to medium grained - Moist (Native)	5		2-SS	10				5		P_{200}=45%
Tan, fine Sandy Silt - Moist		1575	3-CS	35				6		Dd=97.4 pcf
Some cementation, some calcium carbonate filaments, some mica	10	1570	4-SS	22		2.5		7		
Brown, trace fine to medium Gravel - Moist	15	1565	5-SS	29		3.5		7		
Boring Terminated at about 16.5 feet (EL. 1564.3')										

Water Observation Data	Remarks:
Water Encountered During Drilling: None	SS = Standard Penetration Test
Water Level At End of Drilling:	CS = California Split Spoon
Cave Depth At End of Drilling:	
Water Level After Drilling:	
Cave Depth After Drilling:	

GILES LOG REPORT 2G-2301004.GPJ GILES.GDT 3/15/23

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

BORING NO. & LOCATION: B- 8	TEST BORING LOG	GILES ENGINEERING ASSOCIATES, INC.
SURFACE ELEVATION: 1582.6 feet	PROPOSED WEST COAST SELF-STORAGE FACILITY	
COMPLETION DATE: 02/14/23	SWQ OF ALESSANDRO BOULEVARD AND MORENO BEACH DRIVE MORENO VALLEY, CA	
FIELD REP: D. CALLEJAS	PROJECT NO: 2G-2301004	

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q_u (tsf)	Q_p (tsf)	Q_s (tsf)	W (%)	PID	NOTES
Tan, fine Sandy Silt - Moist (Possible Fill)										
			1-SS	4				7		
		1580								
Tan, fine Sandy Silt, trace fine Gravel - Moist (Native)			2-SS	10				6		
	5									
Some Clay			3-SS	20		2.25		8		
		1575								
Brown	10		4-SS	19		2.5		9		
		1570								
	15									
Fine to medium Sand, trace coarse Sand, trace fine Gravel, some cementation, more Clay			5-SS	20		>4.5		5		
Boring Terminated at about 16.5 feet (EL. 1566.1')										

	Water Observation Data	Remarks:
▽	Water Encountered During Drilling: None	SS = Standard Penetration Test
▼	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
▼	Water Level After Drilling:	
	Cave Depth After Drilling:	

GILES LOG REPORT 2G-2301004.GPJ GILES.GDT 3/15/23

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

GENERAL NOTES

SAMPLE IDENTIFICATION

All samples are visually classified in general accordance with the Unified Soil Classification System (ASTM D-2487-75 or D-2488-75)

DESCRIPTIVE TERM (% BY DRY WEIGHT)

Trace:	1-10%
Little:	11-20%
Some:	21-35%
And/Adjective	36-50%

PARTICLE SIZE (DIAMETER)

Boulders:	8 inch and larger
Cobbles:	3 inch to 8 inch
Gravel:	coarse - ¾ to 3 inch
	fine – No. 4 (4.76 mm) to ¾ inch
Sand:	coarse – No. 4 (4.76 mm) to No. 10 (2.0 mm)
	medium – No. 10 (2.0 mm) to No. 40 (0.42 mm)
	fine – No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt:	No. 200 (0.074 mm) and smaller (non-plastic)
Clay:	No 200 (0.074 mm) and smaller (plastic)

SOIL PROPERTY SYMBOLS

Dd:	Dry Density (pcf)
LL:	Liquid Limit, percent
PL:	Plastic Limit, percent
PI:	Plasticity Index (LL-PL)
LOI:	Loss on Ignition, percent
Gs:	Specific Gravity
K:	Coefficient of Permeability
w:	Moisture content, percent
qp:	Calibrated Penetrometer Resistance, tsf
qs:	Vane-Shear Strength, tsf
qu:	Unconfined Compressive Strength, tsf
qc:	Static Cone Penetrometer Resistance (correlated to Unconfined Compressive Strength, tsf)
PID:	Results of vapor analysis conducted on representative samples utilizing a Photoionization Detector calibrated to a benzene standard. Results expressed in HNU-Units. (BDL=Below Detection Limit)

DRILLING AND SAMPLING SYMBOLS

SS:	Split-Spoon
ST:	Shelby Tube – 3 inch O.D. (except where noted)
CS:	3 inch O.D. California Ring Sampler
DC:	Dynamic Cone Penetrometer per ASTM Special Technical Publication No. 399
AU:	Auger Sample
DB:	Diamond Bit
CB:	Carbide Bit
WS:	Wash Sample
RB:	Rock-Roller Bit
BS:	Bulk Sample
Note:	Depth intervals for sampling shown on Record of Subsurface Exploration are not indicative of sample recovery, but position where sampling initiated

N: Penetration Resistance per 12 inch interval, or fraction thereof, for a standard 2 inch O.D. (1⅜ inch I.D.) split spoon sampler driven with a 140 pound weight free-falling 30 inches. Performed in general accordance with Standard Penetration Test Specifications (ASTM D-1586). N in blows per foot equals sum of N-Values where plus sign (+) is shown.

Nc: Penetration Resistance per 1¾ inches of Dynamic Cone Penetrometer. Approximately equivalent to Standard Penetration Test N-Value in blows per foot.

Nr: Penetration Resistance per 12 inch interval, or fraction thereof, for California Ring Sampler driven with a 140 pound weight free-falling 30 inches per ASTM D-3550. Not equivalent to Standard Penetration Test N-Value.

SOIL STRENGTH CHARACTERISTICS

COHESIVE (CLAYEY) SOILS

COMPARATIVE CONSISTENCY	BLOWS PER FOOT (N)	UNCONFINED COMPRESSIVE STRENGTH (TSF)
Very Soft	0 - 2	0 - 0.25
Soft	3 - 4	0.25 - 0.50
Medium Stiff	5 – 8	0.50 - 1.00
Stiff	9 – 15	1.00 - 2.00
Very Stiff	16 – 30	2.00 - 4.00
Hard	31+	4.00+

NON-COHESIVE (GRANULAR) SOILS

RELATIVE DENSITY	BLOWS PER FOOT (N)
Very Loose	0 - 4
Loose	5 - 10
Firm	11 - 30
Dense	31 - 50
Very Dense	51+

DEGREE OF PLASTICITY	PI	DEGREE OF EXPANSIVE POTENTIAL	PI
None to Slight	0 - 4	Low	0 - 15
Slight	5 - 10	Medium	15 - 25
Medium	11 - 30	High	25+
High to Very High	31+		

3.3 *STANDARD PENETRATION TEST (SPT)*

The Standard Penetration Test (SPT) obtains a disturbed sample of soil for visual identification and description, and/or laboratory testing (particle size analysis, plasticity index). The number of hammer blows required to drive the 12^k sampler, is referred to as N value. When corrected for the SPT hammer's energy efficiency, it becomes N_{60}. This can be used to determine the apparent density of a granular soil. Empirical relationships to approximate the soil friction angle (ϕ) and density are shown in Table 3-1.

Table 3-1. Properties Granular Soils

Apparent Density	Relative Density (%)	SPT, N_{60} (blows/ft)	Friction Angle, Ø (deg)	Unit Weight (pcf)	
				Moist	Submerged
Very Loose	0-15	$N_{60} < 5$	<28	<100	<60
Loose	16-35	$5 \le N_{60} < 10$	28-30	95-125	55-65
Medium Dense	36-65	$10 \le N_{60} < 30$	31-36	110-130	60-70
Dense	66-85	$30 \le N_{60} < 50$	37-41	110-140	65-85
Very Dense	86-100	$N_{60} \ge 50$	>41	>130	>75

Note that both the LOTB and BR report the SPT blow count observed in the field as the N value, not N_{60} as used above to determine the apparent density descriptor. The reader is encouraged to read the Logging Manual on Apparent Density and Appendix A.8 on SPT prior to using Table 3-1. Note: there are a variety of correction factors that can be applied to the N value such as for overburden pressure. It is important to know what, if any, correction factors have been applied to the N value for the correct interpretation of Table 3-1.

The Division of Engineering Services, Office of Geotechnical Services has prepared a summary of "simplified typical soil values." For average trench conditions, the Engineer will find the data very useful to establish basic properties or evaluate data submitted by the contractor. Table 3-2 lists approximate values.

- Are site constraints such that slopes steeper than 2H:1V are required (1.5:1 embankments are common in mountainous areas)? If so, a detailed slope stability assessment is needed to evaluate the various alternatives.
- Is the embankment temporary or permanent? Factors of safety for temporary embankments may be lower than for permanent ones, depending on the site conditions and the potential for variability.
- Will the new embankment impact nearby structures or bridge abutments? If so, more elaborate sampling, testing and analysis are required.
- Are there potentially liquefiable soils at the site? If so, seismic analysis to evaluate this may be warranted and ground improvement may be needed. For a bridge approach embankment or if seismic distress to the embankment would impact a bridge or building, then liquefaction (settlement, lateral spreading, and deformation) must be evaluated and the embankment should be designed to remain stable during seismic events. It is not common perform liquefaction mitigation for highway embankments due to the high cost of applying such a policy uniformly to all highway embankments statewide. In the latter case, if liquefaction is identified, a risk discussion must be held with the Project Development Team (PDT).

3.3.1 Safety Factors

The minimum Factor of Safety (FS) to be used in stability analyses for an embankment depends on many factors such as:

1. The degree of uncertainty in the stability analysis inputs
2. The level of investigation and data collection
3. Costs of constructing the slope to be more stable
4. Costs, risks to the travelling public, risks to the roadway, and other consequences should the slope fail
5. Whether the slope is temporary or permanent

Use the FS values below; however, higher or lower values may be appropriate, depending on specifics of the project and considerations listed above.

- Highway embankments (embankments that neither support nor potentially impact structures) should have a minimum factor of safety of 1.25. When repairing an embankment slide or slipout, and a factor of safety for the embankment can be reliably calculated, a minimum factor of safety of 1.15 may be used.
- Highway embankments supporting or potentially impacting structures should have a minimum factor of safety of 1.3.
- Bridge Approach Embankments and embankments supporting important (see MTD 20-1) structures should have a minimum factor of safety of 1.5.
- Under seismic conditions, only those portions of the new embankment that could impact an adjacent structure such as bridge abutments and foundations or nearby buildings require an overall minimum factor of safety of 1.1 using a

pseudo-static analysis. Utilize 1/3 PGA or 0.2 g (maximum) for the horizontal pseudo-static coefficient.

- Temporary embankments, i.e. short-term conditions during construction can be lower than long term factor of safety, typically about 1.1 to 1.2, but no lower than 1.1. Refer to considerations above.

3.3.2 Strength Parameters

Strength parameters are required for both stability and settlement analyses. Use FHWA Geotechnical Engineering Circular No. 5 (Sabatini, et al., 2002), the Soils Correlations Module, or other appropriate references for guidance on the selection of needed strength parameters. Obtain the parameters by a combination of laboratory testing and in-situ testing; in cases for low risk situations, soil correlations may be appropriate.

Tables 2 and 3 present the typical field and laboratory tests used to determine soil strength parameters. These tables are not exhaustive but do contain the most common tests.

Consider the applicable operating ranges of these tests, and that the values that these tests yield are dependent upon various rates and types of loading, boundary conditions, and stress history, etc.