Appendix M

Settlement Calculations

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	I-85 - 2
Client:	CECS
Designer:	MEH
Station Number:	223+00

Description:

I-85 Cross Pipe STA 223+00. Boring R85-54 and R85-55. PWR ~ 932 ft.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... \I-85\I-85 No. 2 223+25 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 1 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 5 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.30	Loose Clayey/ Silty Sand
2	110.00	0.30	Medium Dense Silty Sand
3	105.00	0.30	Loose Silty Sand
4	110.00	0.30	Stiff Fat Clay
5	105.00	0.30	Loose Silty Sand

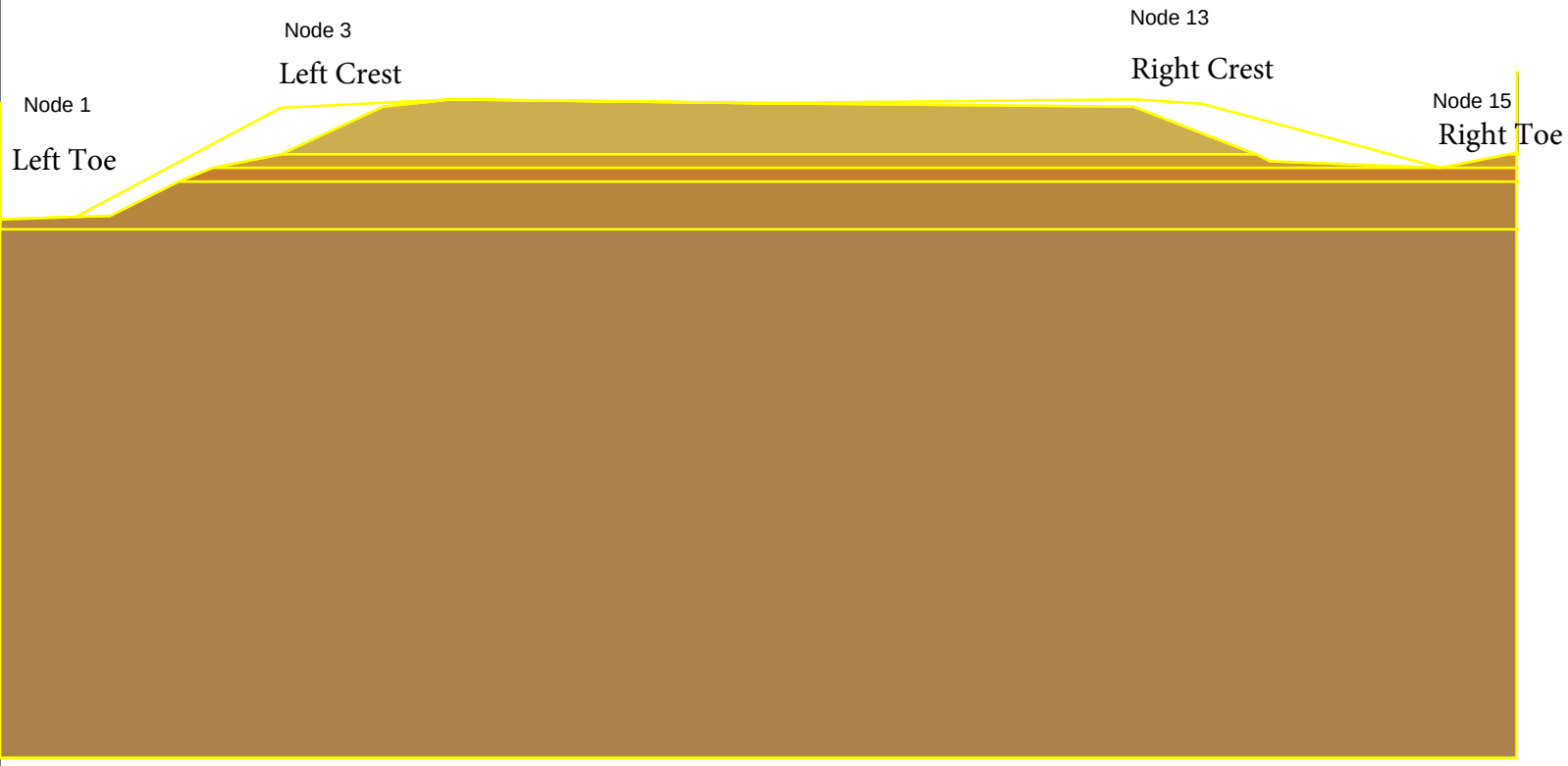
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-150.00	943.00
2	-125.00	943.00
3	100.00	950.00
4	155.00	950.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-100.00	0.00	1	194616	0.3000	0.0000	945.83	945.83	0.00
			2	435877	0.3000	0.0000			
			3	166799	0.3000	0.0000			
			4	137088	0.3000	-0.0000			
			5	189965	0.3000	0.0019			
2	-85.71	0.00	1	194616	0.3000	0.0000	950.64	950.62	0.02
			2	435877	0.3000	0.0000			
			3	166799	0.3000	0.0000			
			4	137088	0.3000	0.0087			
			5	189965	0.3000	0.0130			
3	-71.43	0.00	1	194616	0.3000	0.0000	954.71	954.66	0.06
			2	435877	0.3000	0.0019			
			3	166799	0.3000	0.0058			
			4	137088	0.3000	0.0219			
			5	189965	0.3000	0.0259			
4	-57.14	0.00	1	194616	0.3000	0.0043	961.00	960.98	0.02
			2	435877	0.3000	0.0006			
			3	166799	0.3000	0.0013			
			4	137088	0.3000	0.0043			
			5	189965	0.3000	0.0069			
5	-42.86	0.00	1	194616	0.3000	-0.0003	962.98	962.98	-0.00
			2	435877	0.3000	-0.0001			
			3	166799	0.3000	-0.0003			
			4	137088	0.3000	-0.0003			
			5	189965	0.3000	-0.0009			
6	-28.57	0.00	1	194616	0.3000	-0.0008	962.82	962.82	-0.00
			2	435877	0.3000	-0.0001			
			3	166799	0.3000	-0.0001			
			4	137088	0.3000	-0.0001			
			5	189965	0.3000	-0.0008			
7	-14.29	0.00	1	194616	0.3000	-0.0007	962.66	962.66	-0.00
			2	435877	0.3000	-0.0000			
			3	166799	0.3000	-0.0001			
			4	137088	0.3000	-0.0000			
			5	189965	0.3000	-0.0005			
8	0.00	0.00	1	194616	0.3000	-0.0005	962.50	962.50	-0.00
			2	435877	0.3000	-0.0000			
			3	166799	0.3000	-0.0000			
			4	137088	0.3000	0.0000			
			5	189965	0.3000	-0.0004			
9	14.29	0.00	1	194616	0.3000	0.0001	962.37	962.37	0.00
			2	435877	0.3000	0.0000			
			3	166799	0.3000	0.0002			
			4	137088	0.3000	0.0009			
			5	189965	0.3000	0.0006			
10	28.57	0.00	1	194616	0.3000	0.0008	962.24	962.24	0.00
			2	435877	0.3000	0.0001			
			3	166799	0.3000	0.0004			
			4	137088	0.3000	0.0018			
			5	189965	0.3000	0.0017			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
11	42.86	0.00	1	194616	0.3000	0.0016	962.11	962.10	0.01
			2	435877	0.3000	0.0002			
			3	166799	0.3000	0.0005			
			4	137088	0.3000	0.0025			
			5	189965	0.3000	0.0026			
12	57.14	0.00	1	194616	0.3000	0.0047	961.17	961.15	0.02
			2	435877	0.3000	0.0007			
			3	166799	0.3000	0.0015			
			4	137088	0.3000	0.0053			
			5	189965	0.3000	0.0079			
13	71.43	0.00	1	194616	0.3000	0.0012	955.61	955.56	0.05
			2	435877	0.3000	0.0019			
			3	166799	0.3000	0.0050			
			4	137088	0.3000	0.0174			
			5	189965	0.3000	0.0225			
14	85.71	0.00	1	194616	0.3000	0.0000	953.57	953.54	0.03
			2	435877	0.3000	0.0003			
			3	166799	0.3000	0.0031			
			4	137088	0.3000	0.0109			
			5	189965	0.3000	0.0145			
15	100.00	0.00	1	194616	0.3000	0.0000	953.00	953.00	0.00
			2	435877	0.3000	0.0000			
			3	166799	0.3000	-0.0000			
			4	137088	0.3000	-0.0002			
			5	189965	0.3000	0.0005			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	-100.00	0.00	945.83	0.00	945.83
2	-85.71	0.00	950.64	0.02	950.62
3	-71.43	0.00	954.71	0.02	954.70
4	-57.14	0.00	961.00	0.00	961.00
5	-42.86	0.00	962.98	0.00	962.98
6	-28.57	0.00	962.82	0.00	962.82
7	-14.29	0.00	962.66	0.00	962.66
8	0.00	0.00	962.50	0.00	962.50
9	14.29	0.00	962.37	0.00	962.37
10	28.57	0.00	962.24	0.00	962.24
11	42.86	0.00	962.11	0.00	962.11
12	57.14	0.00	961.17	0.00	961.16
13	71.43	0.00	955.61	0.02	955.60
14	85.71	0.00	953.57	0.02	953.56
15	100.00	0.00	953.00	0.00	953.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	DESCRIPTION
1	1	-150.00	945.00	Loose Clayey/ Silty Sand
	2	-125.00	945.00	
	3	-95.00	946.00	
	4	-85.00	951.00	
	5	-80.00	953.00	
	6	-70.00	955.00	
	7	-55.00	962.00	
	8	-45.00	963.00	
	9	0.00	962.50	
	10	55.00	962.00	
	11	73.00	955.00	
	12	75.00	954.00	
	13	100.00	953.00	
	14	110.00	955.00	
	15	155.00	967.00	
2	1	-150.00	945.00	Medium Dense Silty Sand
	2	-125.00	945.00	
	3	-95.00	946.00	
	4	-85.00	951.00	
	5	-80.00	953.00	
	6	-70.00	955.00	
	7	73.00	955.00	
	8	75.00	954.00	
	9	100.00	953.00	
	10	110.00	955.00	
3	1	-150.00	945.00	Loose Silty Sand
	2	-125.00	945.00	
	3	-95.00	946.00	
	4	-85.00	951.00	
	5	-80.00	953.00	
	6	150.00	953.00	
4	1	-150.00	945.00	Stiff Fat Clay
	2	-125.00	945.00	
	3	-95.00	946.00	
	4	-85.00	951.00	
	5	150.00	951.00	
5	1	-120.00	944.00	Loose Silty Sand
	2	-10.00	944.00	
	3	230.00	944.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -100.00 [ft]	1	-70.00	961.80	Embankment Fill
	X2 = 100.00 [ft]	2	-45.00	963.00	
		3	0.00	962.50	
		4	55.00	963.00	
		5	65.00	962.40	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	I-85 - 4
Client:	CECS
Designer:	MEH
Station Number:	234+00

Description:

I-85 Cross Pipe STA 234+00. Boring R85-57. PWR ~900 ft.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... \I-85\I-85 No. 4 234+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 1 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 3 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.30	Medium Dense SM
2	105.00	0.30	Loose SM
3	110.00	0.30	Silty Sand

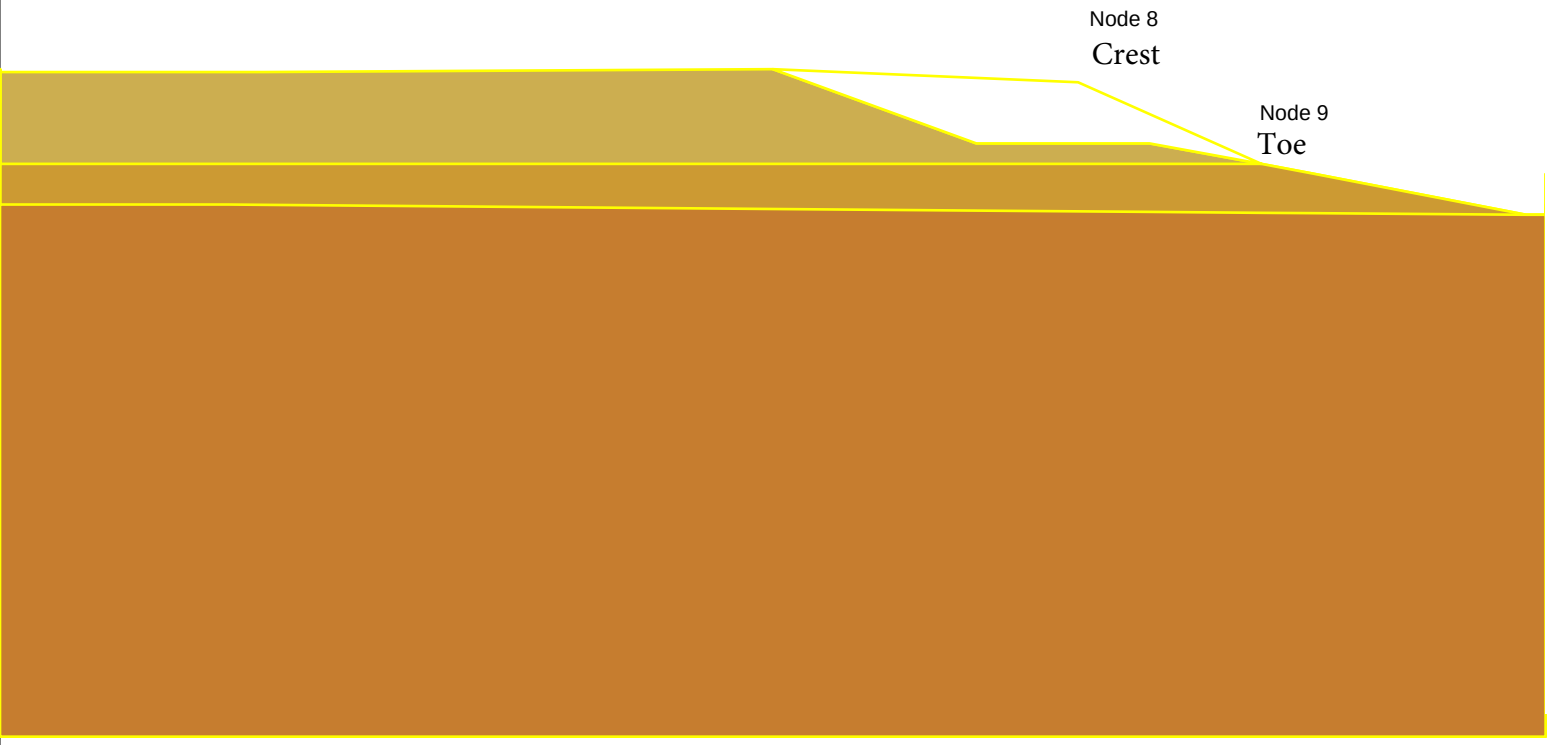
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	964.50
2	-10.00	964.50
3	0.00	964.50
4	50.00	964.50
5	103.00	964.50

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	0.00	0.00	1	296820	0.3000	-0.0000	972.00	972.00	-0.00
			2	189965	0.3000	-0.0000			
			3	301297	0.3000	-0.0005			
2	12.25	0.00	1	296820	0.3000	-0.0000	972.07	972.07	0.00
			2	189965	0.3000	-0.0000			
			3	301297	0.3000	0.0006			
3	24.50	0.00	1	296820	0.3000	-0.0001	972.15	972.14	0.00
			2	189965	0.3000	-0.0001			
			3	301297	0.3000	0.0029			
4	36.75	0.00	1	296820	0.3000	-0.0002	972.22	972.21	0.01
			2	189965	0.3000	-0.0003			
			3	301297	0.3000	0.0078			
5	49.00	0.00	1	296820	0.3000	-0.0003	972.29	972.28	0.02
			2	189965	0.3000	-0.0004			
			3	301297	0.3000	0.0193			
6	61.25	0.00	1	296820	0.3000	0.0040	968.19	968.14	0.05
			2	189965	0.3000	0.0058			
			3	301297	0.3000	0.0409			
7	73.50	0.00	1	296820	0.3000	0.0030	965.00	964.93	0.07
			2	189965	0.3000	0.0113			
			3	301297	0.3000	0.0536			
8	85.75	0.00	1	296820	0.3000	0.0016	965.00	964.95	0.05
			2	189965	0.3000	0.0060			
			3	301297	0.3000	0.0407			
9	98.00	0.00	1	296820	0.3000	0.0000	963.00	962.98	0.02
			2	189965	0.3000	-0.0002			
			3	301297	0.3000	0.0194			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-120.00	969.00	Medium Dense SM
	2	-79.00	969.00	
	3	-55.00	972.00	
	4	0.00	972.00	
	5	50.00	972.30	
	6	70.00	965.00	
	7	87.00	965.00	
	8	98.00	963.00	
	9	124.00	958.00	
	10	131.00	958.00	
	11	160.00	962.00	
2	1	-150.00	963.00	Loose SM
	2	-96.00	963.00	
	3	-3.50	963.00	
	4	98.00	963.00	
	5	124.00	958.00	
	6	131.00	958.00	
	7	160.00	962.00	
3	1	-150.00	959.00	Silty Sand
	2	-96.00	959.00	
	3	-3.50	959.00	
	4	124.00	958.00	
	5	131.00	958.00	
	6	150.00	959.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = 50.00 [ft] X2 = 98.00 [ft]	1	80.00	971.00	Embankment Fill

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	I-85 - 14
Client:	CECS
Designer:	MEH
Station Number:	357+00

Description:

I-85 Cross Pipe STA 357+00. Broing R85-78. PWR ~850 ft.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... 5 No. 14 357+00 Settlement Estimate_2D - Maybe.2ST
Original date and time of creating this file: Tue Sept 1 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 5 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.30	Medium Dense SM
2	110.00	0.30	Medium Dense SC
3	105.00	0.30	Loose SC
4	110.00	0.30	Medium Dense MH
5	137.00	0.30	PWR

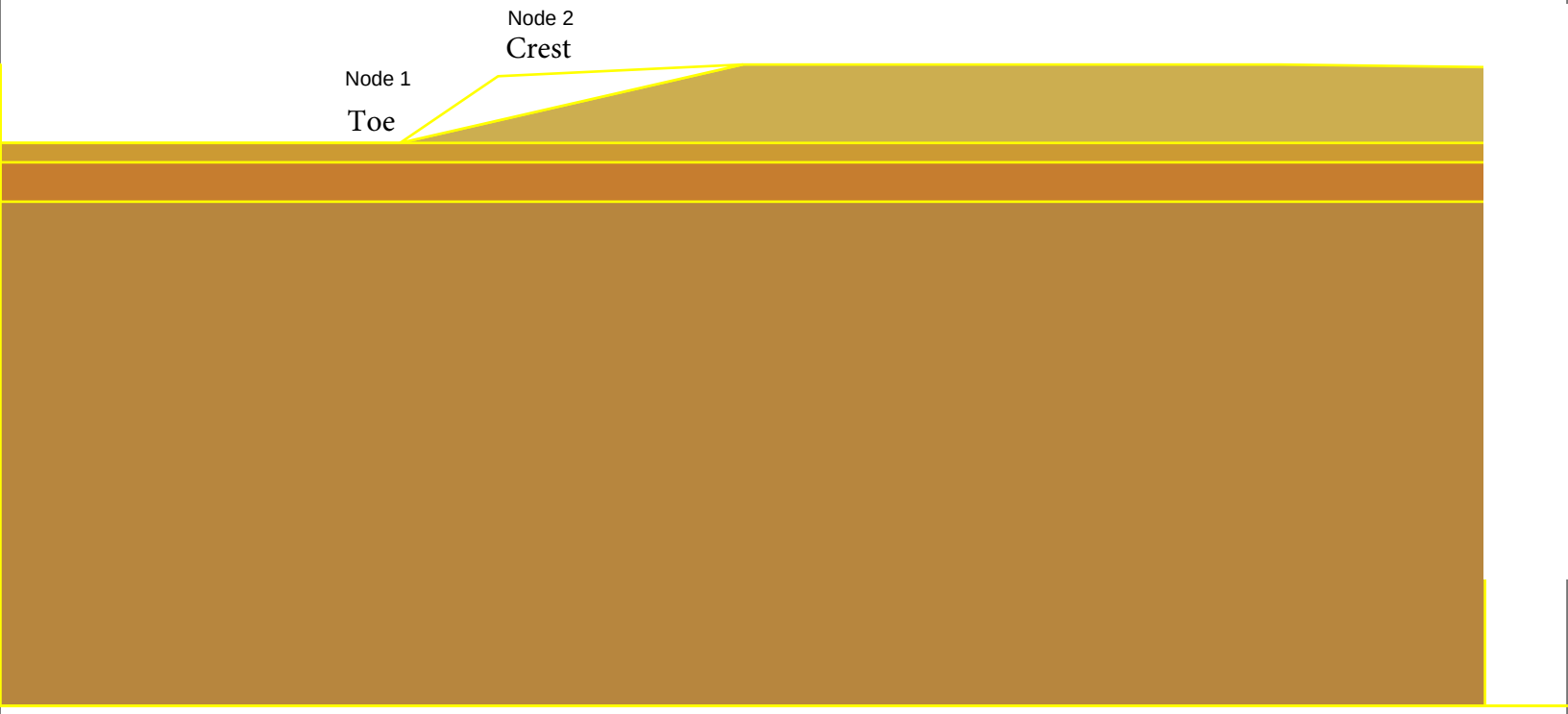
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	919.00
2	-10.00	919.00
3	0.00	919.00
4	50.00	919.00
5	103.00	919.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-90.00	0.00	1	261202	0.3000	0.0000	921.00	920.97	0.03
			2	178214	0.3000	0.0007			
			3	89107	0.3000	0.0035			
			4	214418	0.3000	0.0238			
			5	2040192	0.3000	0.0000			
2	-67.50	0.00	1	261202	0.3000	0.0032	926.14	926.10	0.04
			2	178214	0.3000	0.0022			
			3	89107	0.3000	0.0080			
			4	214418	0.3000	0.0304			
			5	2040192	0.3000	0.0000			
3	-45.00	0.00	1	261202	0.3000	-0.0002	929.00	928.99	0.01
			2	178214	0.3000	-0.0001			
			3	89107	0.3000	-0.0004			
			4	214418	0.3000	0.0108			
			5	2040192	0.3000	0.0000			
4	-22.50	0.00	1	261202	0.3000	-0.0000	929.00	929.00	0.00
			2	178214	0.3000	-0.0001			
			3	89107	0.3000	-0.0003			
			4	214418	0.3000	0.0028			
			5	2040192	0.3000	0.0000			
5	0.00	0.00	1	261202	0.3000	-0.0000	929.00	929.00	0.00
			2	178214	0.3000	-0.0000			
			3	89107	0.3000	-0.0001			
			4	214418	0.3000	0.0003			
			5	2040192	0.3000	0.0000			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	-90.00	0.00	921.00	0.02	920.98
2	-67.50	0.00	926.14	0.02	926.13
3	-45.00	0.00	929.00	0.01	928.99
4	-22.50	0.00	929.00	0.00	929.00
5	0.00	0.00	929.00	0.00	929.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-135.00	921.00	Medium Dense SM
	2	-90.00	921.00	
	3	-55.00	929.00	
	4	0.00	929.00	
	5	85.00	927.90	
	6	98.00	927.00	
	7	160.00	932.00	
2	1	-135.00	921.00	Medium Dense SC
	2	-105.00	921.00	
	3	-90.00	921.00	
	4	98.00	921.00	
	5	124.00	921.00	
	6	131.00	921.00	
	7	160.00	921.00	
3	1	-150.00	919.00	Loose SC
	2	-96.00	919.00	
	3	-3.50	919.00	
	4	124.00	919.00	
	5	131.00	919.00	
	6	150.00	919.00	
4	1	-120.00	915.00	Medium Dense MH
	2	97.80	915.00	
	3	120.27	915.00	
	4	142.00	915.00	
	5	230.00	915.00	
5	1	-120.00	850.00	PWR
	2	-10.00	850.00	
	3	230.00	850.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -90.00 [ft] X2 = -55.00 [ft]	1	-80.00	927.80	Embankment Fill

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	I-85 - 15
Client:	CECS
Designer:	MEH
Station Number:	362+00

Description:

I-85 Cross Pipe STA 362+00. Boring R85-79. PWR ~850 ft.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... I-85\I-85 No. 15 362+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 1 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 3 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.30	Medium Dense SC
2	110.00	0.30	Medium Dense SM
3	120.00	0.30	Very Dense to Dense SM

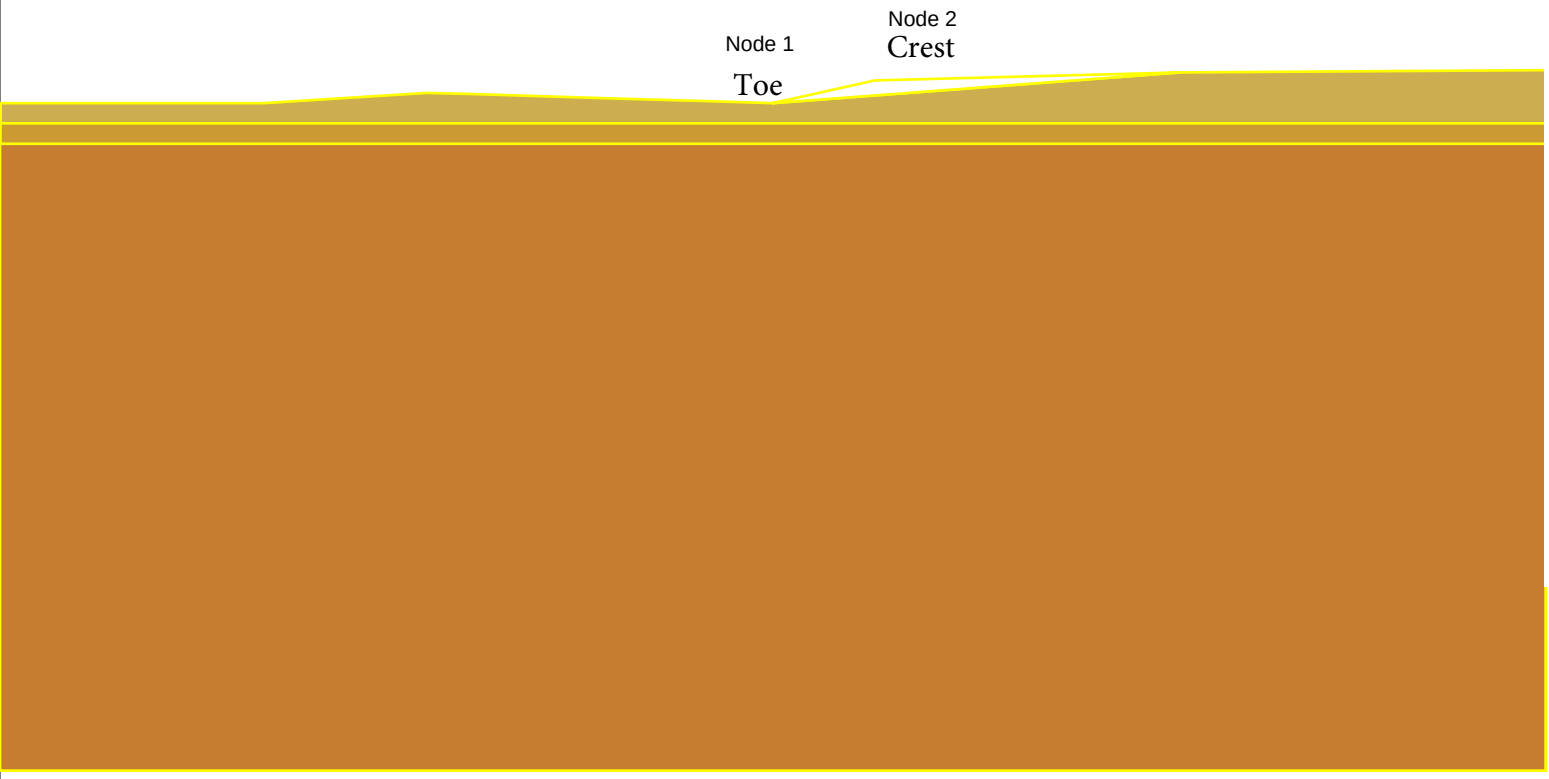
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	911.00
2	-10.00	911.00
3	0.00	911.00
4	50.00	911.00
5	103.00	911.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-90.00	0.00	1	178214	0.3000	0.0000	917.00	917.00	0.00
			2	451166	0.3000	0.0000			
			3	1028822	0.3000	0.0017			
2	-67.50	0.00	1	178214	0.3000	0.0013	918.69	918.68	0.00
			2	451166	0.3000	0.0003			
			3	1028822	0.3000	0.0026			
3	-45.00	0.00	1	178214	0.3000	-0.0000	920.03	920.03	0.00
			2	451166	0.3000	-0.0000			
			3	1028822	0.3000	0.0008			
4	-22.50	0.00	1	178214	0.3000	-0.0000	920.16	920.16	0.00
			2	451166	0.3000	-0.0000			
			3	1028822	0.3000	0.0002			
5	0.00	0.00	1	178214	0.3000	-0.0000	920.30	920.30	0.00
			2	451166	0.3000	-0.0000			
			3	1028822	0.3000	0.0000			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-140.00	917.00	Medium Dense SC
	2	-124.00	918.00	
	3	-90.00	917.00	
	4	-50.00	920.00	
	5	0.00	920.30	
	6	85.00	919.30	
	7	160.00	922.00	
2	1	-135.00	915.00	Medium Dense SM
	2	-105.00	915.00	
	3	-90.00	915.00	
	4	98.00	915.00	
	5	124.00	915.00	
	6	131.00	915.00	
	7	160.00	915.00	
3	1	-150.00	913.00	Very Dense to Dense SM
	2	-96.00	913.00	
	3	-3.50	913.00	
	4	124.00	913.00	
	5	131.00	913.00	
	6	150.00	913.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -90.00 [ft] X2 = -50.00 [ft]	1	-80.00	919.20	Embankment Fill

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	I-85 - 16
Client:	CECS
Designer:	MEH
Station Number:	367+00

Description:

I-85 Cross Pipe STA 367+00. Broing R85-17. PWR ~850 ft.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... I-85\I-85 No. 16 367+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 1 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 3 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.30	Loose SM
2	100.00	0.30	Very Loose SC
3	120.00	0.30	Very Dense SC

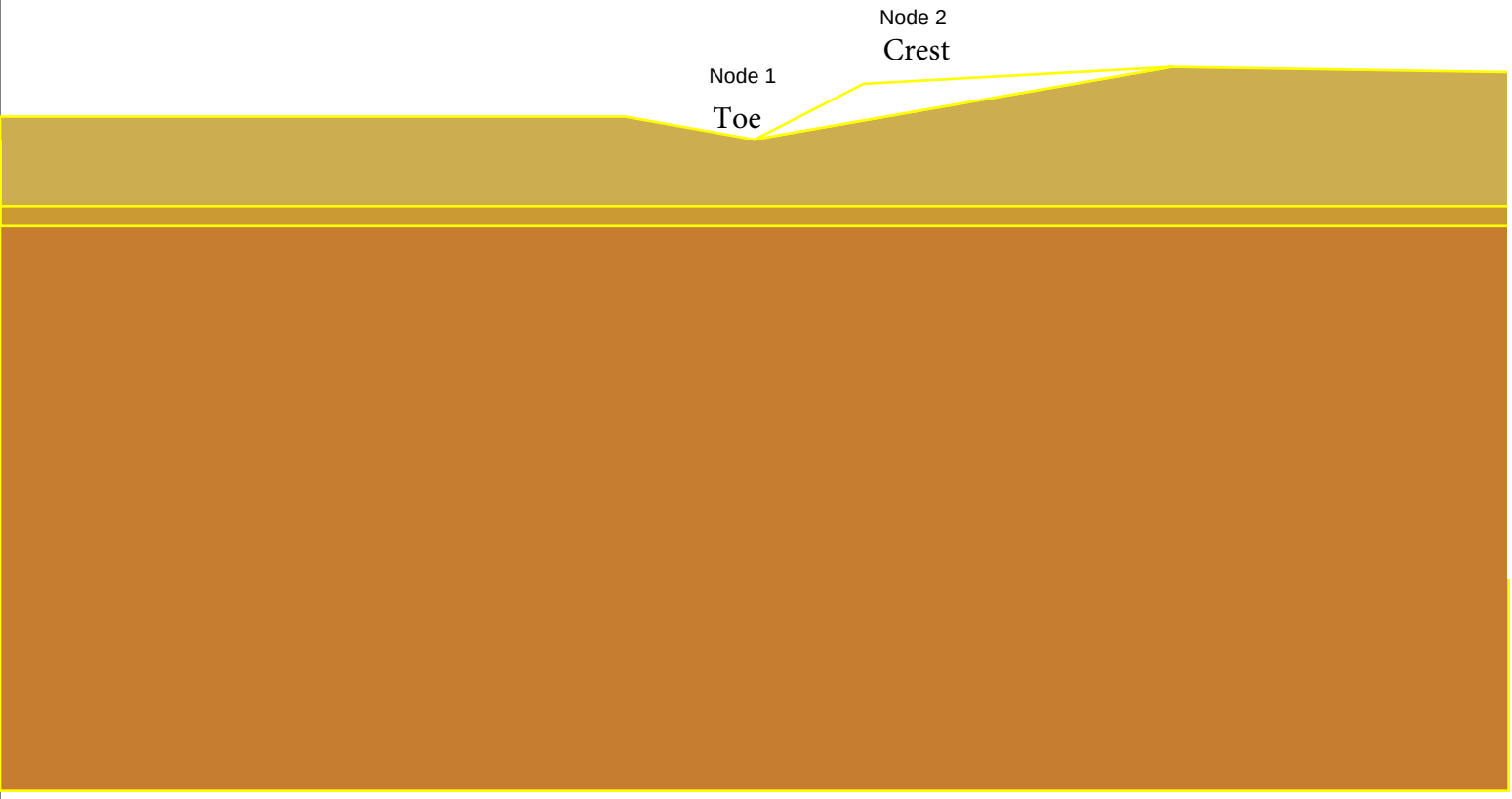
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	899.00
2	-10.00	899.00
3	0.00	899.00
4	50.00	899.00
5	103.00	899.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-92.00	0.00	1	84016	0.3000	0.0004	904.70	904.69	0.01
			2	54835	0.3000	0.0013			
			3	515260	0.3000	0.0065			
2	-69.00	0.00	1	84016	0.3000	0.0193	908.70	908.66	0.04
			2	54835	0.3000	0.0070			
			3	515260	0.3000	0.0110			
3	-46.00	0.00	1	84016	0.3000	-0.0010	911.94	911.93	0.00
			2	54835	0.3000	-0.0003			
			3	515260	0.3000	0.0029			
4	-23.00	0.00	1	84016	0.3000	-0.0001	911.57	911.57	-0.00
			2	54835	0.3000	-0.0002			
			3	515260	0.3000	0.0002			
5	0.00	0.00	1	84016	0.3000	-0.0000	911.20	911.20	-0.00
			2	54835	0.3000	-0.0001			
			3	515260	0.3000	-0.0002			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-140.00	907.00	Loose SM
	2	-105.00	907.00	
	3	-92.00	904.70	
	4	-50.00	912.00	
	5	0.00	911.20	
	6	80.00	910.30	
	7	160.00	912.00	
2	1	-135.00	898.00	Very Loose SC
	2	-105.00	898.00	
	3	-90.00	898.00	
	4	98.00	898.00	
	5	124.00	898.00	
	6	131.00	898.00	
	7	160.00	898.00	
3	1	-150.00	896.00	Very Dense SC
	2	-96.00	896.00	
	3	-3.50	896.00	
	4	124.00	896.00	
	5	131.00	896.00	
	6	150.00	896.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -92.00 [ft] X2 = -50.00 [ft]	1	-81.00	910.30	Embankment Fill

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	I-85 - 17
Client:	CECS
Designer:	MEH
Station Number:	371+00

Description:

I-85 Cross Pipe STA 371+00. Boring R85-81. PWR ~850 ft.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... I-85\I-85 No. 17 371+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 1 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

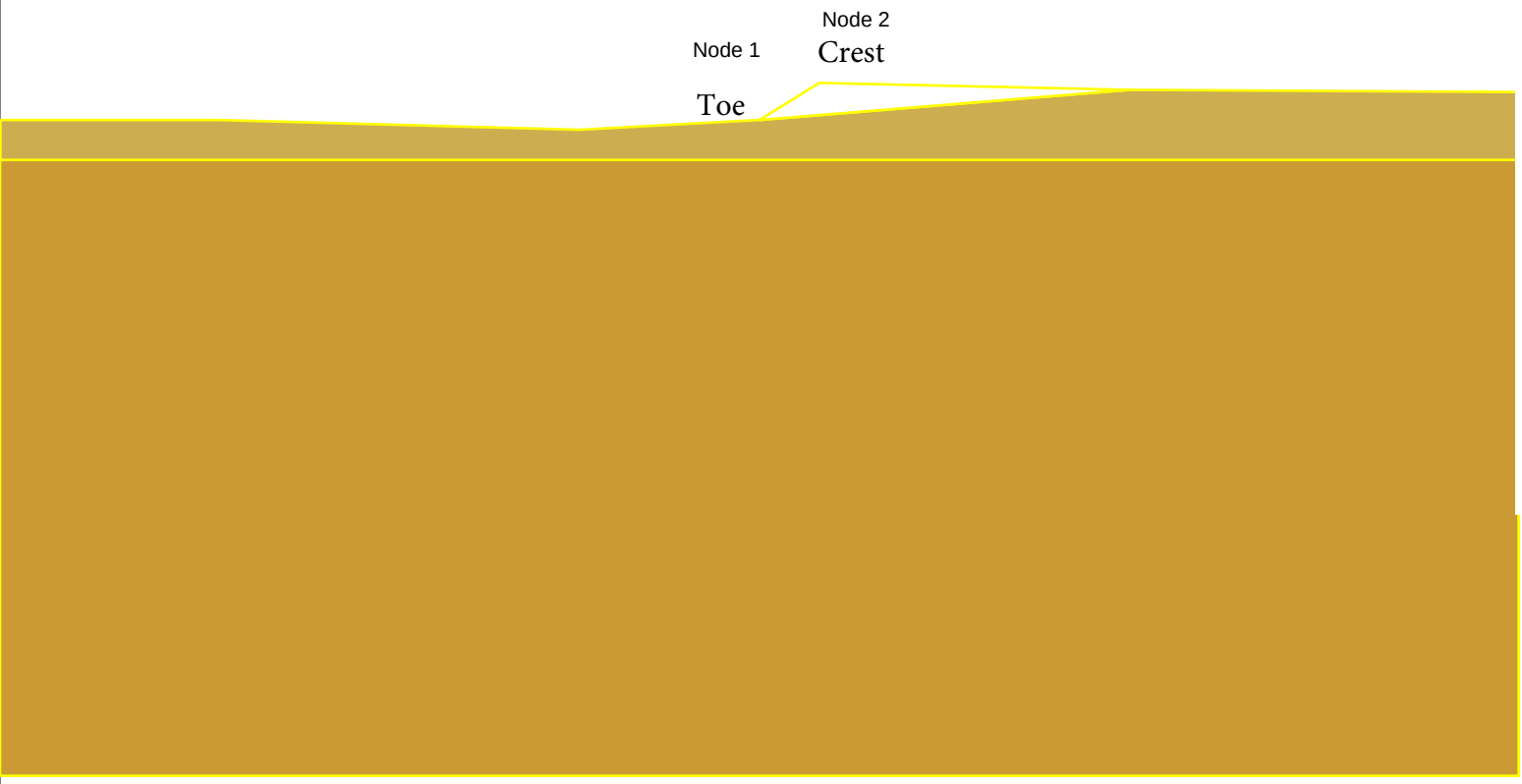
INPUT DATA -- FOUNDATION LAYERS -- 2 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.30	Medium Dense to Dense
2	120.00	0.30	Very Dense SC

INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-87.00	0.00	1	475452	0.3000	0.0003	902.00	901.99	0.01
			2	593820	0.3000	0.0055			
2	-65.25	0.00	1	475452	0.3000	0.0013	903.76	903.75	0.01
			2	593820	0.3000	0.0074			
3	-43.50	0.00	1	475452	0.3000	-0.0001	904.96	904.96	0.00
			2	593820	0.3000	0.0017			
4	-21.75	0.00	1	475452	0.3000	-0.0000	904.83	904.83	0.00
			2	593820	0.3000	0.0001			
5	0.00	0.00	1	475452	0.3000	-0.0000	904.70	904.70	-0.00
			2	593820	0.3000	-0.0001			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-141.00	902.00	Medium Dense to Dense
	2	-105.00	901.00	
	3	-87.00	902.00	
	4	-50.00	905.00	
	5	0.00	904.70	
	6	80.00	903.10	
	7	112.00	912.00	
	8	139.00	913.90	
	9	141.00	914.00	
	10	160.00	914.00	
2	1	-135.00	898.00	Very Dense SC
	2	-105.00	898.00	
	3	-90.00	898.00	
	4	98.00	898.00	
	5	124.00	898.00	
	6	131.00	898.00	
	7	160.00	898.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -87.00 [ft] X2 = -50.00 [ft]	1	-81.00	905.70	Embankment Fill

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	I-85 - 26
Client:	CECS
Designer:	MEH
Station Number:	329+00

Description:

I-85/ Ramp 1/ Ramp 2A Cross Pipe STA 329+00. Boring R85-13. PWR ~840 ft.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... \I-85\I85 No. 26 329+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 1 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 3 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	100.00	0.30	Very Loose SC
2	100.00	0.30	Very Loose to Loose SM
3	110.00	0.30	Medium Dense SM

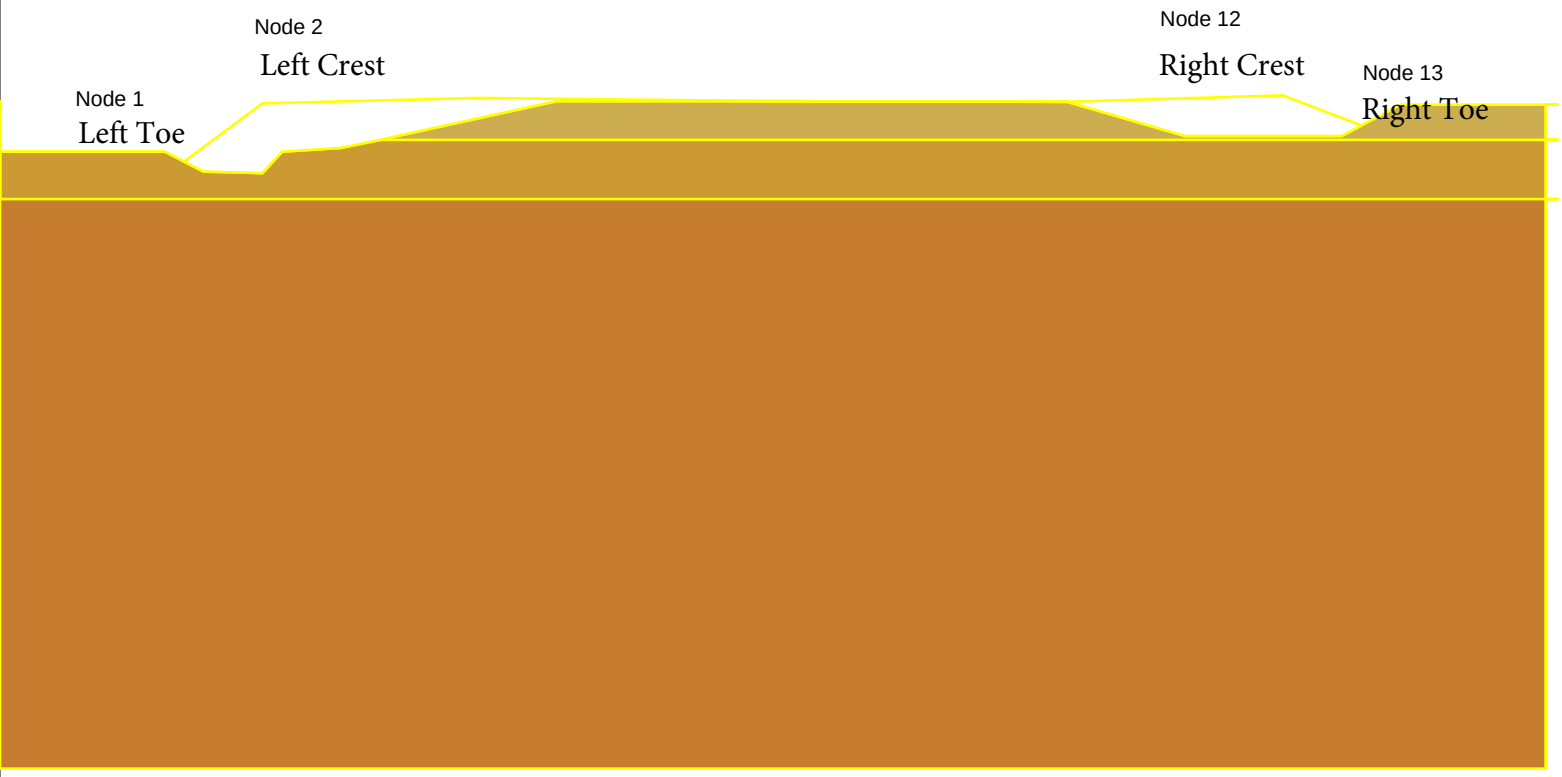
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-250.00	886.00
2	-200.00	886.00
3	-145.00	886.00
4	145.00	896.00
5	150.00	896.00
6	155.00	896.00
7	200.00	896.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-150.00	0.00	1	158337	0.3000	0.0000	890.50	890.48	0.02
			2	180891	0.3000	-0.0006			
			3	609902	0.3000	0.0191			
2	-125.00	0.00	1	158337	0.3000	0.0000	893.00	892.89	0.11
			2	180891	0.3000	0.0551			
			3	609902	0.3000	0.0579			
3	-100.00	0.00	1	158337	0.3000	0.0000	896.00	895.90	0.10
			2	180891	0.3000	0.0523			
			3	609902	0.3000	0.0470			
4	-75.00	0.00	1	158337	0.3000	0.0112	901.50	901.44	0.06
			2	180891	0.3000	0.0263			
			3	609902	0.3000	0.0236			
5	-50.00	0.00	1	158337	0.3000	-0.0001	905.90	905.90	0.00
			2	180891	0.3000	0.0013			
			3	609902	0.3000	0.0035			
6	-25.00	0.00	1	158337	0.3000	-0.0012	905.90	905.90	-0.00
			2	180891	0.3000	0.0011			
			3	609902	0.3000	-0.0014			
7	0.00	0.00	1	158337	0.3000	-0.0017	905.90	905.90	-0.00
			2	180891	0.3000	-0.0001			
			3	609902	0.3000	-0.0027			
8	25.00	0.00	1	158337	0.3000	-0.0017	905.83	905.84	-0.00
			2	180891	0.3000	-0.0001			
			3	609902	0.3000	-0.0028			
9	50.00	0.00	1	158337	0.3000	-0.0024	905.77	905.77	-0.00
			2	180891	0.3000	-0.0005			
			3	609902	0.3000	-0.0019			
10	75.00	0.00	1	158337	0.3000	0.0009	905.70	905.69	0.01
			2	180891	0.3000	-0.0011			
			3	609902	0.3000	0.0063			
11	100.00	0.00	1	158337	0.3000	0.0090	898.45	898.36	0.09
			2	180891	0.3000	0.0427			
			3	609902	0.3000	0.0341			
12	125.00	0.00	1	158337	0.3000	0.0059	897.00	896.90	0.10
			2	180891	0.3000	0.0550			
			3	609902	0.3000	0.0419			
13	150.00	0.00	1	158337	0.3000	0.0017	899.67	899.65	0.01
			2	180891	0.3000	0.0003			
			3	609902	0.3000	0.0128			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-155.00	893.00	Very Loose SC
	2	-145.00	888.00	
	3	-130.00	887.50	
	4	-125.00	893.00	
	5	-110.00	894.00	
	6	-100.00	896.00	
	7	-55.00	905.90	
	8	0.00	905.90	
	9	75.00	905.70	
	10	105.00	897.00	
	11	145.00	897.00	
	12	160.00	905.00	
2	1	-155.00	893.00	Very Loose to Loose SM
	2	-145.00	888.00	
	3	-130.00	887.50	
	4	-125.00	893.00	
	5	-110.00	894.00	
	6	-100.00	896.00	
	7	160.00	896.00	
3	1	-150.00	881.00	Medium Dense SM
	2	-96.00	881.00	
	3	-3.50	881.00	
	4	124.00	881.00	
	5	131.00	881.00	
	6	150.00	881.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -150.00 [ft]	1	-130.00	905.30	Embankment Fill
	X2 = 150.00 [ft]	2	-75.00	906.70	
		3	0.00	905.90	
		4	75.00	905.70	
		5	130.00	907.30	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	I-385 - 19
Client:	CECS
Designer:	MEH
Station Number:	335+00

Description:

I-385 Cross Pipe STA 335+00. Boring R385-82. PWR ~850 ft.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... -385\I385 No. 19 335+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 1 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 6 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	100.00	0.30	Loose SM
2	110.00	0.30	Medium Dense SC
3	120.00	0.30	Very Stiff CH
4	100.00	0.30	Very Loose SC
5	115.00	0.30	Stiff ML
6	110.00	0.30	Meidum Dense to Dense SM

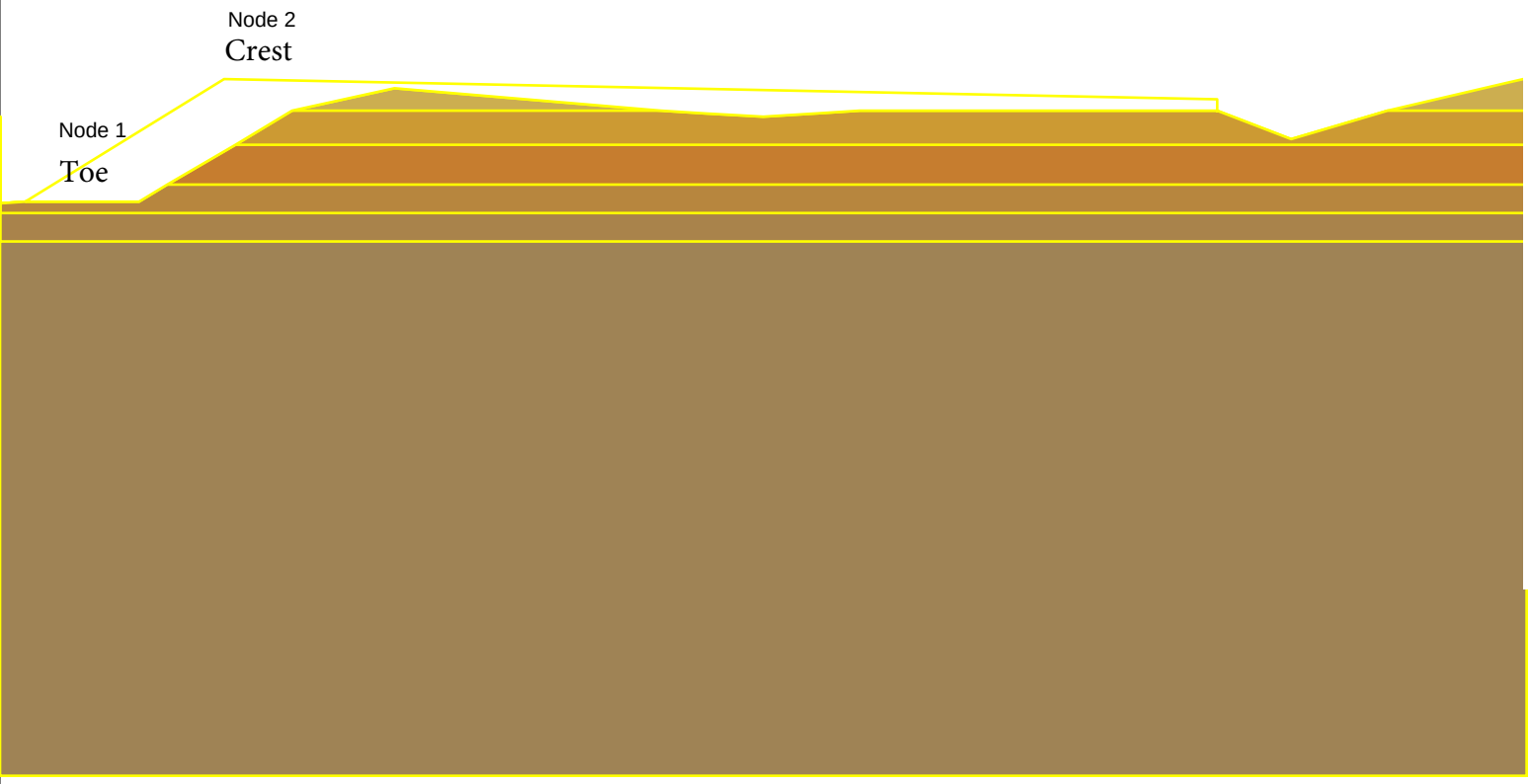
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	893.00
2	-10.00	893.00
3	0.00	893.00
4	50.00	893.00
5	103.00	893.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-130.00	0.00	1	422078	0.3000	0.0000	912.00	911.96	0.04
			2	19597	0.3000	0.0000			
			3	187294	0.3000	0.0000			
			4	35006	0.3000	-0.0006			
			5	76884	0.3000	-0.0012			
			6	301973	0.3000	0.0382			
2	-103.75	0.00	1	422078	0.3000	0.0000	915.73	915.43	0.30
			2	19597	0.3000	0.0000			
			3	187294	0.3000	0.0043			
			4	35006	0.3000	0.1156			
			5	76884	0.3000	0.0575			
			6	301973	0.3000	0.1182			
3	-77.50	0.00	1	422078	0.3000	0.0009	929.22	929.01	0.21
			2	19597	0.3000	0.0864			
			3	187294	0.3000	0.0088			
			4	35006	0.3000	0.0361			
			5	76884	0.3000	0.0153			
			6	301973	0.3000	0.0654			
4	-51.25	0.00	1	422078	0.3000	0.0006	930.83	930.75	0.08
			2	19597	0.3000	0.0243			
			3	187294	0.3000	0.0034			
			4	35006	0.3000	0.0176			
			5	76884	0.3000	0.0067			
			6	301973	0.3000	0.0319			
5	-25.00	0.00	1	422078	0.3000	0.0003	928.60	928.43	0.17
			2	19597	0.3000	0.0699			
			3	187294	0.3000	0.0086			
			4	35006	0.3000	0.0334			
			5	76884	0.3000	0.0152			
			6	301973	0.3000	0.0424			
6	1.25	0.00	1	422078	0.3000	0.0000	927.07	926.87	0.20
			2	19597	0.3000	0.0767			
			3	187294	0.3000	0.0112			
			4	35006	0.3000	0.0428			
			5	76884	0.3000	0.0199			
			6	301973	0.3000	0.0491			
7	27.50	0.00	1	422078	0.3000	0.0000	928.00	927.85	0.15
			2	19597	0.3000	0.0627			
			3	187294	0.3000	0.0074			
			4	35006	0.3000	0.0288			
			5	76884	0.3000	0.0130			
			6	301973	0.3000	0.0389			
8	53.75	0.00	1	422078	0.3000	0.0000	928.00	927.88	0.12
			2	19597	0.3000	0.0524			
			3	187294	0.3000	0.0063			
			4	35006	0.3000	0.0240			
			5	76884	0.3000	0.0110			
			6	301973	0.3000	0.0291			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
9	80.00	0.00	1	422078	0.3000	0.0000	928.00	927.95	0.05
			2	19597	0.3000	0.0182			
			3	187294	0.3000	0.0023			
			4	35006	0.3000	0.0095			
			5	76884	0.3000	0.0041			
			6	301973	0.3000	0.0117			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-200.00	910.00	Loose SM
	2	-160.00	910.00	
	3	-130.00	912.00	
	4	-110.00	912.00	
	5	-105.00	915.00	
	6	-93.00	922.00	
	7	-83.00	928.00	
	8	-65.00	932.00	
	9	-18.00	928.00	
	10	0.00	927.00	
	11	17.00	928.00	
	12	80.00	928.00	
	13	93.00	923.00	
	14	110.00	928.00	
	15	140.00	935.00	
2	1	-200.00	910.00	Medium Dense SC
	2	-160.00	910.00	
	3	-130.00	912.00	
	4	-110.00	912.00	
	5	-105.00	915.00	
	6	-93.00	922.00	
	7	-83.00	928.00	
	8	-18.00	928.00	
	9	0.00	927.00	
	10	17.00	928.00	
	11	80.00	928.00	
	12	93.00	923.00	
	13	110.00	928.00	
	14	140.00	928.00	
3	1	-200.00	910.00	Very Stiff CH
	2	-160.00	910.00	
	3	-130.00	912.00	
	4	-110.00	912.00	
	5	-105.00	915.00	
	6	-93.00	922.00	
	7	131.00	922.00	
	8	150.00	922.00	
4	1	-200.00	910.00	Very Loose SC
	2	-160.00	910.00	
	3	-130.00	912.00	
	4	-110.00	912.00	
	5	-105.00	915.00	
	6	230.00	915.00	
5	1	-120.00	910.00	Stiff ML
	2	-10.00	910.00	
	3	230.00	910.00	
6	1	-120.00	905.00	Meidum Dense to Dense SM
	2	10.00	905.00	
	3	230.00	905.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -130.00 [ft]	1	-95.00	933.60	Embankment Fill
	X2 = 80.01 [ft]	2	80.00	930.00	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	I-385 - 83
Client:	CECS
Designer:	MEH
Station Number:	381+00

Description:

I-385/ I-385 NBCD/ Ramp 4 Cross Pipe STA 381+00. Boring R385-36.
PWR/GWT B01-SPT-10.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... -385\I385 No. 83 381+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 3 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.30	Medium Dense SM
2	105.00	0.30	Loose SM
3	110.00	0.30	Medium Dense SM

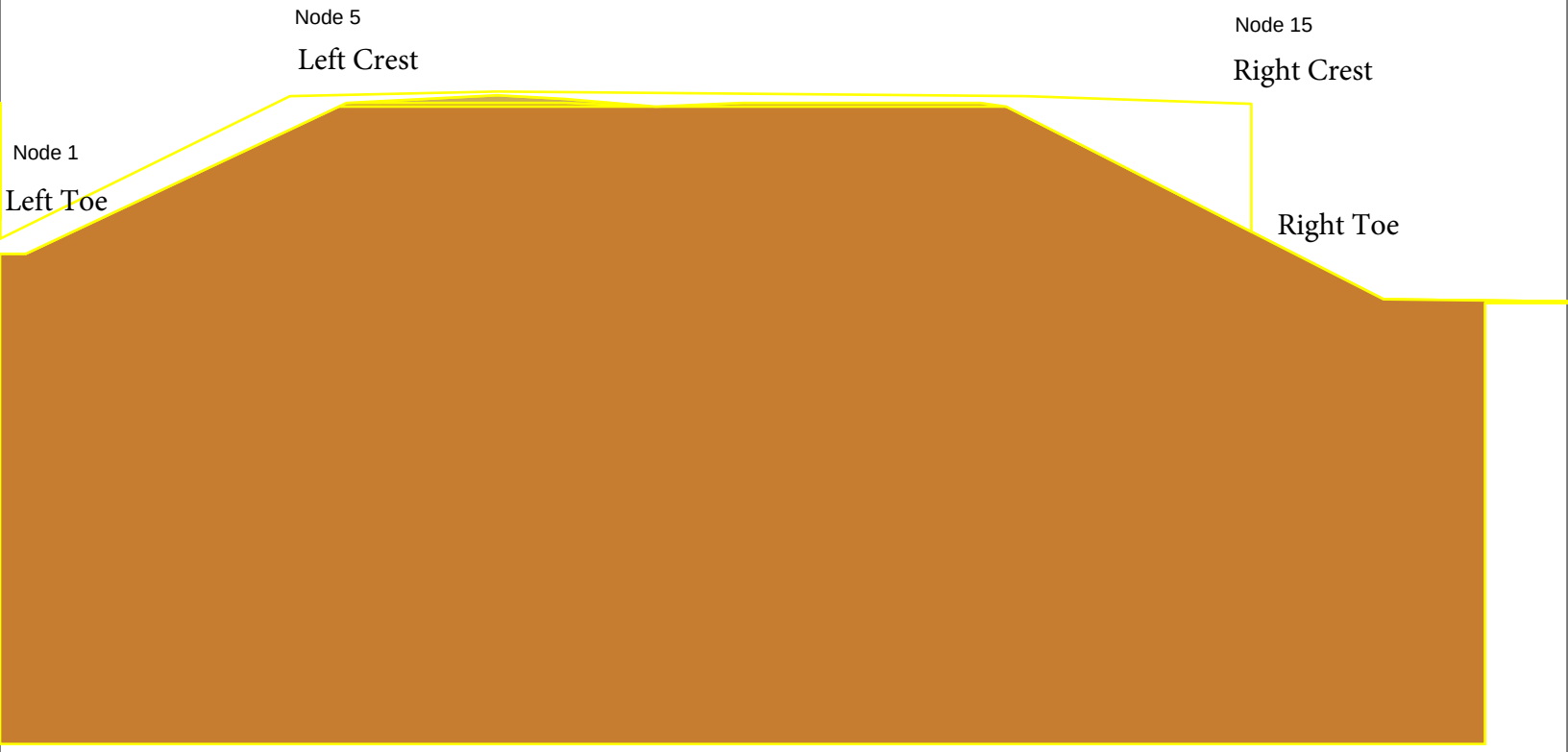
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	943.00
2	-10.00	943.00
3	0.00	943.00
4	50.00	943.00
5	103.00	943.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-205.00	0.00	1	609668	0.3000	0.0000	967.00	966.97	0.03
			2	211039	0.3000	0.0000			
			3	457449	0.3000	0.0253			
2	-180.71	0.00	1	609668	0.3000	0.0000	971.36	971.28	0.08
			2	211039	0.3000	0.0000			
			3	457449	0.3000	0.0811			
3	-156.43	0.00	1	609668	0.3000	0.0000	982.77	982.67	0.11
			2	211039	0.3000	0.0000			
			3	457449	0.3000	0.1094			
4	-132.14	0.00	1	609668	0.3000	0.0000	994.19	994.06	0.12
			2	211039	0.3000	0.0000			
			3	457449	0.3000	0.1234			
5	-107.86	0.00	1	609668	0.3000	0.0000	1005.60	1005.53	0.07
			2	211039	0.3000	0.0000			
			3	457449	0.3000	0.0717			
6	-83.57	0.00	1	609668	0.3000	0.0003	1008.07	1008.04	0.03
			2	211039	0.3000	0.0007			
			3	457449	0.3000	0.0275			
7	-59.29	0.00	1	609668	0.3000	0.0002	1008.68	1008.66	0.02
			2	211039	0.3000	0.0004			
			3	457449	0.3000	0.0201			
8	-35.00	0.00	1	609668	0.3000	0.0001	1007.00	1006.96	0.04
			2	211039	0.3000	0.0004			
			3	457449	0.3000	0.0364			
9	-10.71	0.00	1	609668	0.3000	0.0000	1006.53	1006.49	0.04
			2	211039	0.3000	0.0004			
			3	457449	0.3000	0.0404			
10	13.57	0.00	1	609668	0.3000	0.0000	1007.00	1006.97	0.03
			2	211039	0.3000	0.0007			
			3	457449	0.3000	0.0327			
11	37.86	0.00	1	609668	0.3000	0.0000	1007.00	1006.96	0.04
			2	211039	0.3000	0.0008			
			3	457449	0.3000	0.0344			
12	62.14	0.00	1	609668	0.3000	0.0000	1007.00	1006.94	0.06
			2	211039	0.3000	0.0019			
			3	457449	0.3000	0.0614			
13	86.43	0.00	1	609668	0.3000	0.0000	997.62	997.44	0.18
			2	211039	0.3000	0.0000			
			3	457449	0.3000	0.1813			
14	110.71	0.00	1	609668	0.3000	0.0000	985.24	984.95	0.28
			2	211039	0.3000	0.0000			
			3	457449	0.3000	0.2834			
15	135.00	0.00	1	609668	0.3000	0.0000	972.85	972.68	0.17
			2	211039	0.3000	0.0000			
			3	457449	0.3000	0.1737			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-235.00	976.00	Medium Dense SM
	2	-215.00	967.00	
	3	-190.00	967.00	
	4	-107.00	1006.00	
	5	-105.00	1007.00	
	6	-65.00	1009.00	
	7	-47.00	1008.00	
	8	-23.00	1006.00	
	9	0.00	1007.00	
	10	63.00	1007.00	
	11	70.00	1006.00	
	12	170.00	955.00	
	13	255.00	954.00	
2	1	-235.00	976.00	Loose SM
	2	-215.00	967.00	
	3	-190.00	967.00	
	4	-107.00	1006.00	
	5	-105.00	1007.00	
	6	-47.00	1007.00	
	7	-23.00	1006.00	
	8	0.00	1007.00	
	9	63.00	1007.00	
	10	70.00	1006.00	
	11	170.00	955.00	
	12	255.00	954.00	
3	1	-235.00	976.00	Medium Dense SM
	2	-215.00	967.00	
	3	-190.00	967.00	
	4	-107.00	1006.00	
	5	-23.00	1006.00	
	6	70.00	1006.00	
	7	170.00	955.00	
	8	255.00	954.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -205.00 [ft]	1	-120.00	1008.70	Embankment Fill
	X2 = 135.01 [ft]	2	-65.00	1010.00	
		3	75.00	1008.70	
		4	135.00	1006.70	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

Version 2.0 FoSSA Version 2.0

FoSSA -- Foundation Stress & Settlement Analysis I85/385 Interchange Improvements
Present Date/Time: Wed Oct 28 10:16:57 2015 I:\..... Reports\Roadway\Cross Pipe Settlement\I-385\I385 No. 83 381+00 Settlement Estimate_2D.2ST

Version 2.0 FoSSA Version 2.0

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	USER'S DESCRIPTION
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

Version 2.0 FoSSA Version 2.0

I85/385 Interchange Improvements Page 9 of 9
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I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 1 - 27
Client:	CECS
Designer:	MEH
Station Number:	77+25

Description:

Ramp 1 Cross Pipe STA 77+25. Broing W1A-1R-01.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... and 1A\R1 No. 27 77+25 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 1 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 5 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.30	Soft CL
2	100.00	0.30	Very Loose SM
3	100.00	0.30	Loose SC
4	100.00	0.30	Very Loose to Loose SM
5	110.00	0.30	Medium Dense SM

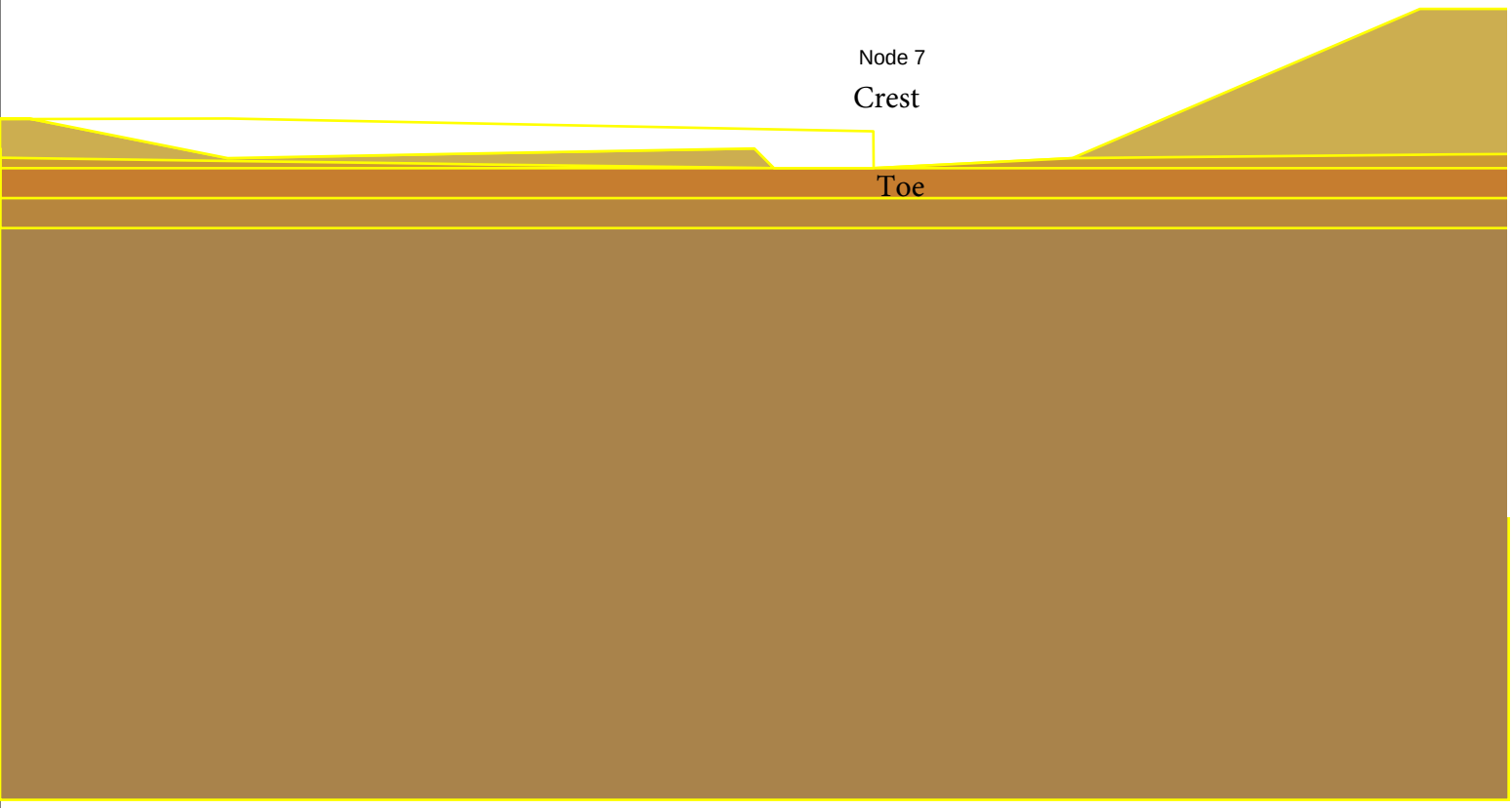
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	901.00
2	-10.00	901.00
3	0.00	901.00
4	50.00	901.00
5	103.00	901.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-90.00	0.00	1	40612	0.3000	-0.0000	910.00	910.00	-0.00
			2	70346	0.3000	-0.0000			
			3	40612	0.3000	-0.0001			
			4	78594	0.3000	-0.0002			
			5	244172	0.3000	-0.0004			
2	-68.33	0.00	1	40612	0.3000	-0.0000	910.00	910.00	-0.00
			2	70346	0.3000	-0.0001			
			3	40612	0.3000	-0.0005			
			4	78594	0.3000	-0.0005			
			5	244172	0.3000	-0.0006			
3	-46.67	0.00	1	40612	0.3000	-0.0007	910.00	910.00	-0.00
			2	70346	0.3000	-0.0002			
			3	40612	0.3000	-0.0009			
			4	78594	0.3000	-0.0001			
			5	244172	0.3000	0.0007			
4	-25.00	0.00	1	40612	0.3000	0.0000	906.00	905.96	0.04
			2	70346	0.3000	0.0036			
			3	40612	0.3000	0.0207			
			4	78594	0.3000	0.0104			
			5	244172	0.3000	0.0088			
5	-3.33	0.00	1	40612	0.3000	0.0048	906.41	906.37	0.04
			2	70346	0.3000	0.0019			
			3	40612	0.3000	0.0167			
			4	78594	0.3000	0.0090			
			5	244172	0.3000	0.0086			
6	18.33	0.00	1	40612	0.3000	0.0068	906.82	906.79	0.03
			2	70346	0.3000	0.0000			
			3	40612	0.3000	0.0117			
			4	78594	0.3000	0.0065			
			5	244172	0.3000	0.0066			
7	40.00	0.00	1	40612	0.3000	0.0000	905.00	904.98	0.02
			2	70346	0.3000	0.0000			
			3	40612	0.3000	0.0098			
			4	78594	0.3000	0.0050			
			5	244172	0.3000	0.0043			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	-100.00	0.00	945.83	0.00	945.83
2	-85.71	0.00	950.64	0.02	950.62
3	-71.43	0.00	954.71	0.02	954.70
4	-57.14	0.00	961.00	0.00	961.00
5	-42.86	0.00	962.98	0.00	962.98
6	-28.57	0.00	962.82	0.00	962.82
7	-14.29	0.00	962.66	0.00	962.66

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-130.00	910.00	Soft CL
	2	-92.00	910.00	
	3	-90.00	910.00	
	4	-45.00	910.00	
	5	-25.00	906.00	
	6	28.00	907.00	
	7	30.00	905.00	
	8	40.00	905.00	
	9	60.00	906.00	
	10	95.00	921.00	
2	1	-135.00	907.00	Very Loose SM
	2	-105.00	907.00	
	3	-45.00	906.00	
	4	30.00	905.00	
	5	40.00	905.00	
	6	60.00	906.00	
	7	160.00	907.00	
3	1	-150.00	905.00	Loose SC
	2	-96.00	905.00	
	3	-3.50	905.00	
	4	124.00	905.00	
	5	131.00	905.00	
	6	150.00	905.00	
4	1	-120.00	902.00	Very Loose to Loose SM
	2	97.80	902.00	
	3	120.27	902.00	
	4	142.00	902.00	
	5	230.00	902.00	
5	1	-120.00	899.00	Medium Dense SM
	2	-10.00	899.00	
	3	230.00	899.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -90.01 [ft]	1	-90.00	909.80	Embankment Fill
	X2 = 40.01 [ft]	2	-25.00	910.00	
		3	40.00	908.70	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 1A - 28
Client:	CECS
Designer:	MEH
Station Number:	64+00

Description:

Ramp 1A Cross Pipe STA 64+00. Boring R1A-76. PWR ~ 900 ft.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... and 1A\R1A No. 28 64+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 1 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 6 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.30	Medium Dense SC
2	120.00	0.30	Very Stiff ML
3	115.00	0.30	Stiff CH
4	105.00	0.30	Loose SM
5	110.00	0.30	Medium Dense SM
6	105.00	0.30	Loose SM

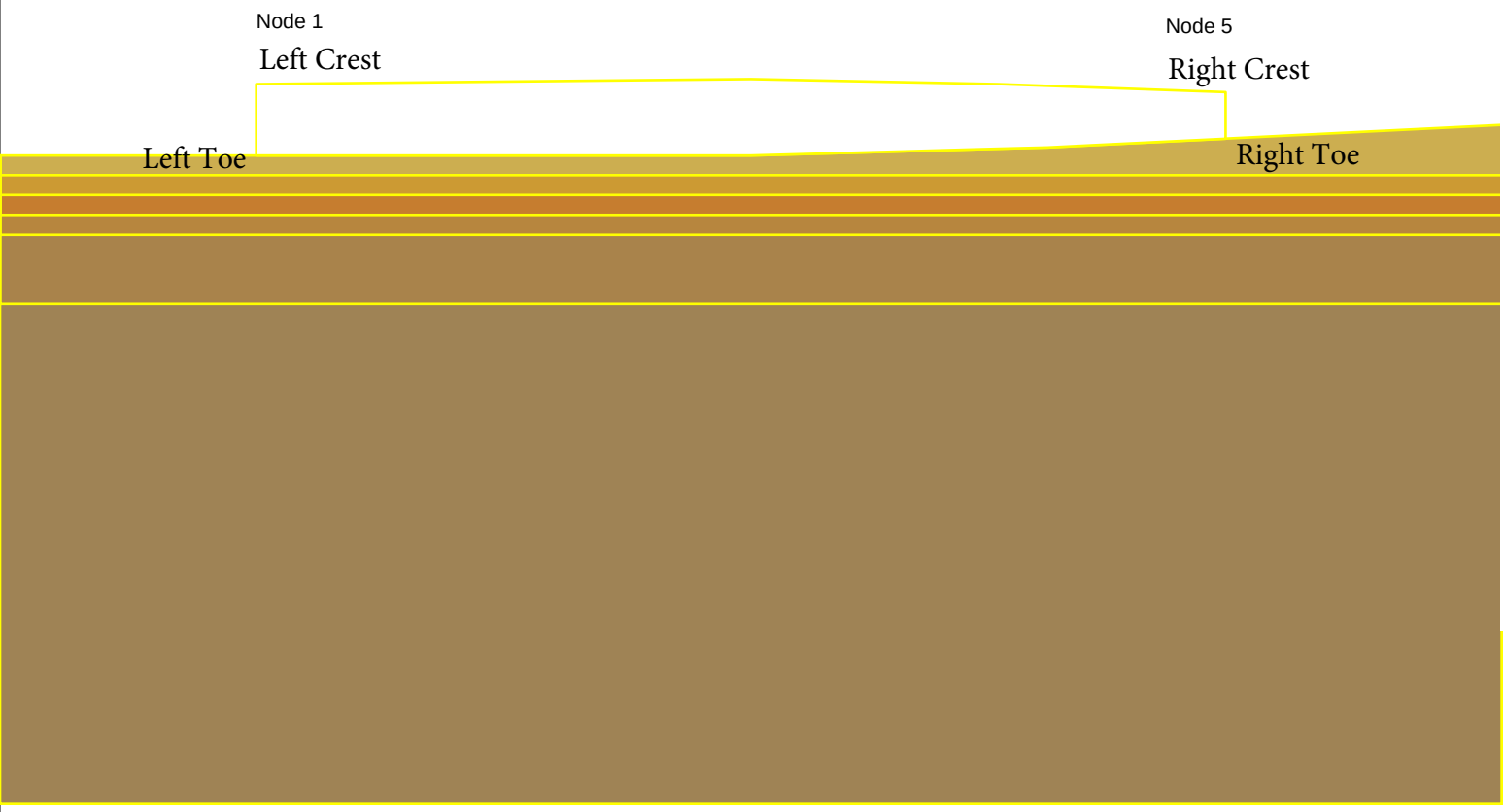
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	965.00
2	-10.00	965.00
3	0.00	965.00
4	50.00	965.00
5	103.00	965.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-75.00	0.00	1	286514	0.3000	0.0020	975.00	974.90	0.10
			2	196036	0.3000	0.0025			
			3	141846	0.3000	0.0034			
			4	329793	0.3000	0.0015			
			5	267007	0.3000	0.0058			
			6	173834	0.3000	0.0877			
2	-50.50	0.00	1	286514	0.3000	0.0036	975.00	974.80	0.20
			2	196036	0.3000	0.0054			
			3	141846	0.3000	0.0077			
			4	329793	0.3000	0.0034			
			5	267007	0.3000	0.0139			
			6	173834	0.3000	0.1614			
3	-26.00	0.00	1	286514	0.3000	0.0038	975.00	974.79	0.21
			2	196036	0.3000	0.0056			
			3	141846	0.3000	0.0078			
			4	329793	0.3000	0.0034			
			5	267007	0.3000	0.0139			
			6	173834	0.3000	0.1749			
4	-1.50	0.00	1	286514	0.3000	0.0037	975.63	975.45	0.18
			2	196036	0.3000	0.0048			
			3	141846	0.3000	0.0068			
			4	329793	0.3000	0.0030			
			5	267007	0.3000	0.0121			
			6	173834	0.3000	0.1456			
5	23.00	0.00	1	286514	0.3000	0.0020	976.69	976.60	0.08
			2	196036	0.3000	0.0016			
			3	141846	0.3000	0.0022			
			4	329793	0.3000	0.0009			
			5	267007	0.3000	0.0039			
			6	173834	0.3000	0.0721			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	-90.00	0.00	921.00	0.02	920.98
2	-67.50	0.00	926.14	0.02	926.13
3	-45.00	0.00	929.00	0.01	928.99
4	-22.50	0.00	929.00	0.00	929.00
5	0.00	0.00	929.00	0.00	929.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-115.00	975.00	Medium Dense SC
	2	-75.00	975.00	
	3	-25.00	975.00	
	4	5.00	975.80	
	5	70.00	979.00	
2	1	-135.00	973.00	Very Stiff ML
	2	-105.00	973.00	
	3	-90.00	973.00	
	4	98.00	973.00	
	5	124.00	973.00	
	6	131.00	973.00	
	7	160.00	973.00	
3	1	-150.00	971.00	Stiff CH
	2	-96.00	971.00	
	3	-3.50	971.00	
	4	124.00	971.00	
	5	131.00	971.00	
	6	150.00	971.00	
4	1	-120.00	969.00	Loose SM
	2	97.80	969.00	
	3	120.27	969.00	
	4	142.00	969.00	
	5	230.00	969.00	
5	1	-120.00	967.00	Medium Dense SM
	2	-10.00	967.00	
	3	230.00	967.00	
6	1	-120.00	960.00	Loose SM
	2	10.00	960.00	
	3	230.00	960.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -75.01 [ft]	1	-75.00	982.20	Embankment Fill
	X2 = 23.01 [ft]	2	-25.00	982.70	
		3	0.00	982.20	
		4	23.00	981.40	

Version 2.0 FoSSA Version 2.0

FoSSA -- Foundation Stress & Settlement Analysis I85/385 Interchange Improvements
Present Date/Time: Fri Sep 11 12:17:06 2015 I:\.....ts\Roadway\Cross Pipe Settlement\Ramp 1 and 1A\R1A No. 28 64+00 Settlement Estimate_2D.2ST

Version 2.0 FoSSA Version 2.0

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	USER'S DESCRIPTION
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

Version 2.0 FoSSA Version 2.0

I85/385 Interchange Improvements Page 8 of 9
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HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 1A - 101
Client:	CECS
Designer:	MEH
Station Number:	90+00

Description:

Ramp 1A/ Ramp 2B Cross Pipe STA 90+00. Boring W2B-1R-01. GWT W2B-1R-03.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... nd 1A\R1A No. 101 90+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 5 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.30	Medium Dense SM
2	105.00	0.30	Loose SM
3	110.00	0.30	Medium Dense SM
4	105.00	0.30	Loose SM
5	110.00	0.30	Medium Dense SM

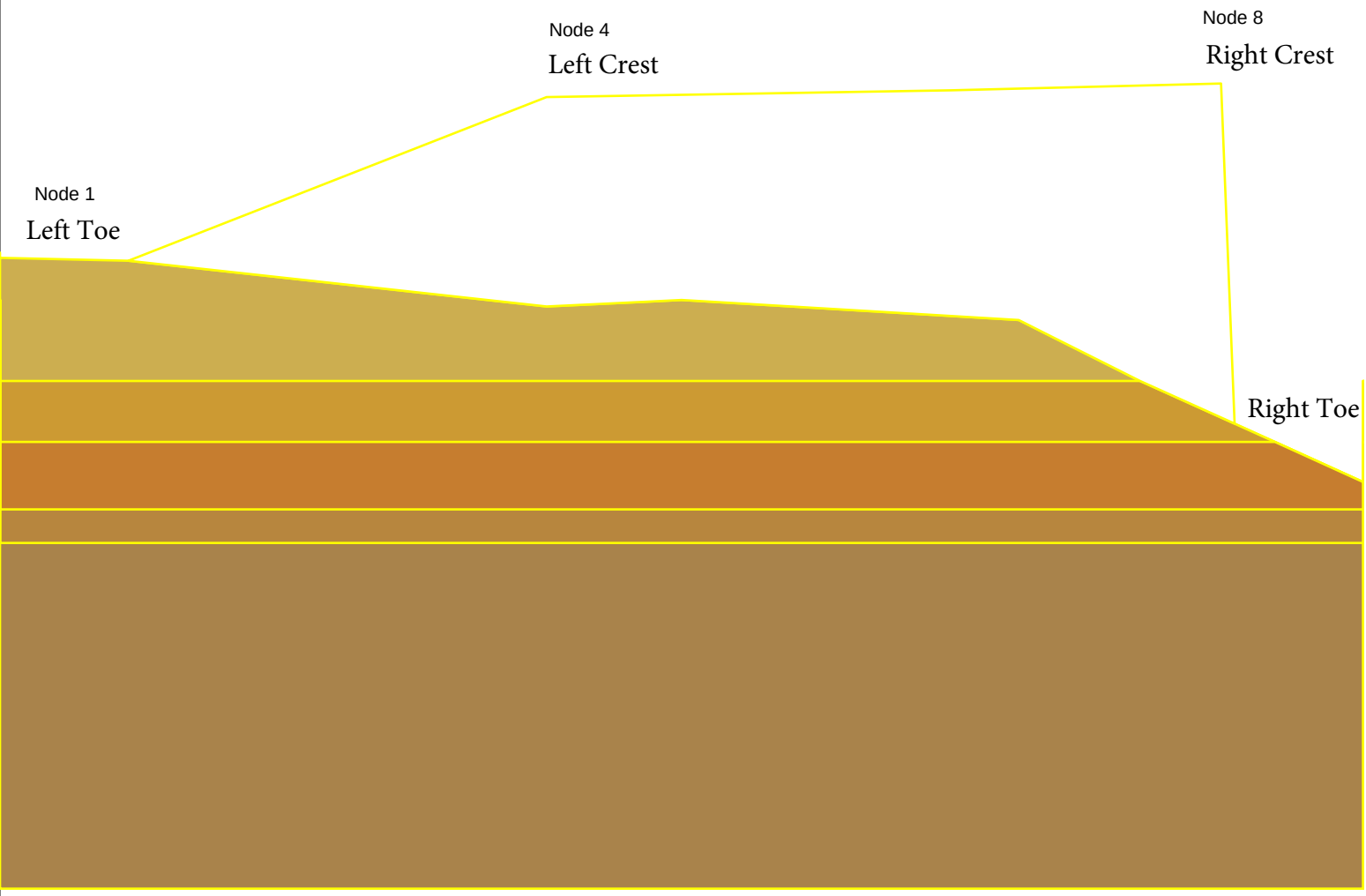
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	968.00
2	-10.00	968.00
3	0.00	968.00
4	50.00	968.00
5	103.00	968.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-87.00	0.00	1	396289	0.3000	-0.0022	1003.80	1003.80	0.00
			2	183104	0.3000	-0.0033			
			3	321125	0.3000	0.0003			
			4	100470	0.3000	0.0045			
			5	303679	0.3000	0.0024			
2	-63.57	0.00	1	396289	0.3000	0.0266	1001.23	1001.09	0.14
			2	183104	0.3000	0.0335			
			3	321125	0.3000	0.0224			
			4	100470	0.3000	0.0394			
			5	303679	0.3000	0.0136			
3	-40.14	0.00	1	396289	0.3000	0.0462	998.66	998.38	0.28
			2	183104	0.3000	0.0766			
			3	321125	0.3000	0.0495			
			4	100470	0.3000	0.0820			
			5	303679	0.3000	0.0271			
4	-16.71	0.00	1	396289	0.3000	0.0547	997.41	997.05	0.37
			2	183104	0.3000	0.1016			
			3	321125	0.3000	0.0659			
			4	100470	0.3000	0.1096			
			5	303679	0.3000	0.0363			
5	6.71	0.00	1	396289	0.3000	0.0546	997.30	996.91	0.39
			2	183104	0.3000	0.1032			
			3	321125	0.3000	0.0699			
			4	100470	0.3000	0.1196			
			5	303679	0.3000	0.0401			
6	30.14	0.00	1	396289	0.3000	0.0515	995.89	995.48	0.41
			2	183104	0.3000	0.1109			
			3	321125	0.3000	0.0755			
			4	100470	0.3000	0.1286			
			5	303679	0.3000	0.0429			
7	53.57	0.00	1	396289	0.3000	0.0320	990.71	990.29	0.43
			2	183104	0.3000	0.1358			
			3	321125	0.3000	0.0843			
			4	100470	0.3000	0.1330			
			5	303679	0.3000	0.0425			
8	77.00	0.00	1	396289	0.3000	0.0000	979.70	979.53	0.17
			2	183104	0.3000	0.0224			
			3	321125	0.3000	0.0447			
			4	100470	0.3000	0.0744			
			5	303679	0.3000	0.0247			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-140.00	1005.00	Medium Dense SM
	2	-87.00	1003.80	
	3	-25.00	997.00	
	4	-5.00	998.00	
	5	45.00	995.00	
	6	63.00	986.00	
	7	83.00	977.00	
	8	105.00	967.00	
	9	120.00	971.00	
	10	135.00	977.00	
	11	145.00	981.00	
	12	155.00	986.00	
2	1	-140.00	986.00	Loose SM
	2	63.00	986.00	
	3	83.00	977.00	
	4	105.00	967.00	
	5	120.00	971.00	
	6	135.00	977.00	
	7	145.00	981.00	
	8	155.00	986.00	
3	1	-150.00	977.00	Medium Dense SM
	2	83.00	977.00	
	3	105.00	967.00	
	4	120.00	971.00	
	5	135.00	977.00	
	6	150.00	977.00	
4	1	-120.00	967.00	Loose SM
	2	97.80	967.00	
	3	120.27	967.00	
	4	142.00	967.00	
	5	230.00	967.00	
5	1	-120.00	962.00	Medium Dense SM
	2	-10.00	962.00	
	3	230.00	962.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -87.00 [ft]	1	-25.00	1028.00	Embankment Fill
	X2 = 77.01 [ft]	2	35.00	1029.00	
		3	75.00	1030.00	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	USER'S DESCRIPTION
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

Version 2.0 FoSSA Version 2.0
FoSSA -- Foundation Stress & Settlement Analysis I85/385 Interchange Improvements
Present Date/Time: Wed Oct 28 11:07:44 2015 I:\.....s\Roadway\Cross Pipe Settlement\Ramp 1 and 1A\R1A No. 101 90+00 Settlement Estimate_2D.2ST
Version 2.0 FoSSA Version 2.0

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	USER'S DESCRIPTION
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
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11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

Version 2.0 FoSSA Version 2.0
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I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 1A - 102
Client:	CECS
Designer:	MEH
Station Number:	91+00

Description:

Ramp 1A/ Ramp 2B STA 91+00. Boring W2B-1R-03.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... nd 1A\R1A No. 102 91+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 5 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	100.00	0.30	Very Loose SM
2	110.00	0.30	Medium Dense SM
3	110.00	0.30	Medium Dense SC
4	100.00	0.30	Very Loose SM
5	110.00	0.30	Medium Dense SM

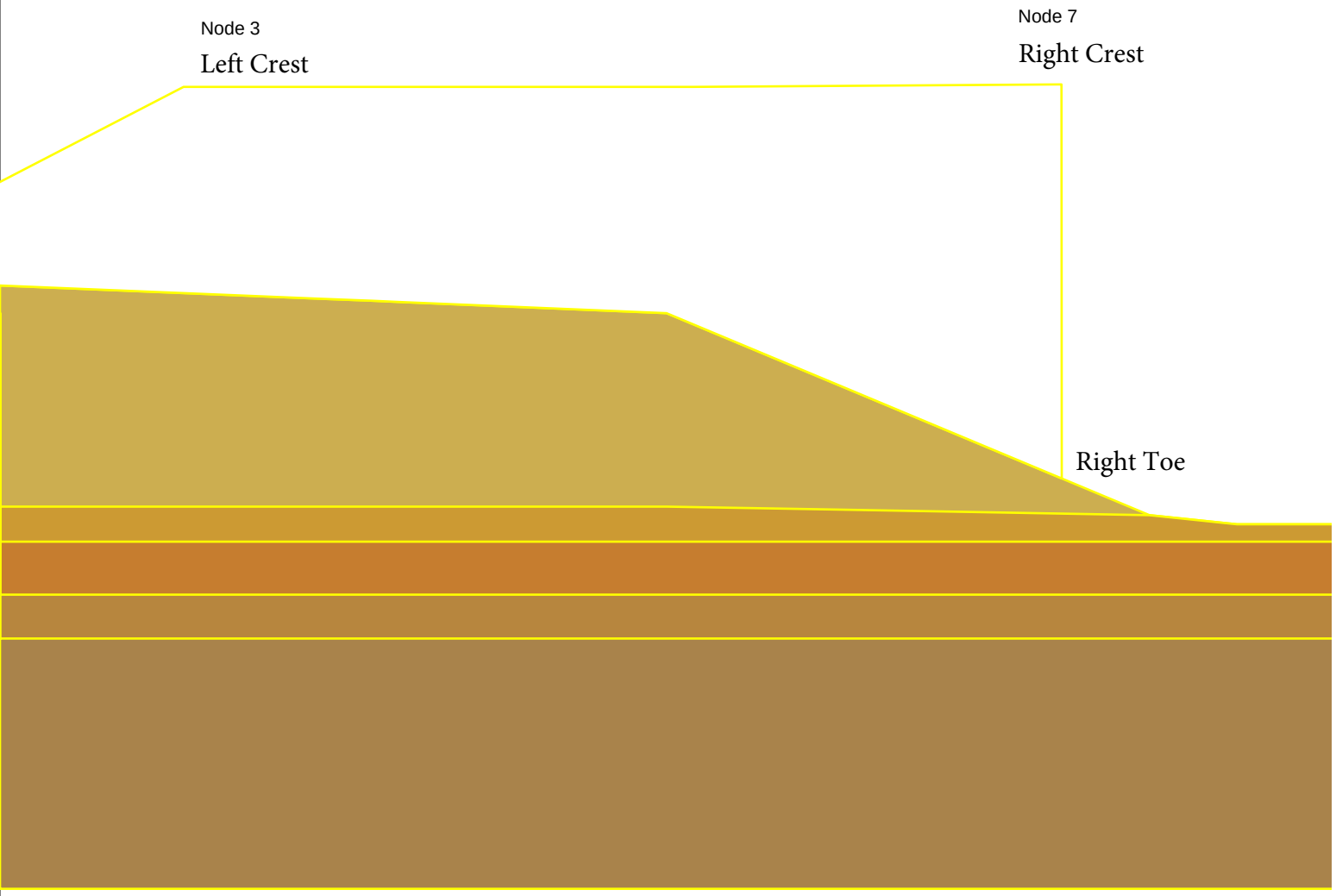
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	968.00
2	-10.00	968.00
3	0.00	968.00
4	50.00	968.00
5	103.00	968.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]	
1	-67.00	0.00	1	94982	0.3000	-0.0075	1001.00	1000.96	0.04	Left Toe
			2	356184	0.3000	0.0009				
			3	199798	0.3000	0.0041				
			4	50534	0.3000	0.0199				
			5	307002	0.3000	0.0236				
2	-43.33	0.00	1	94982	0.3000	0.2155	1000.02	999.61	0.41	
			2	356184	0.3000	0.0101				
			3	199798	0.3000	0.0268				
			4	50534	0.3000	0.0908				
			5	307002	0.3000	0.0660				
3	-19.67	0.00	1	94982	0.3000	0.3864	999.05	998.33	0.72	
			2	356184	0.3000	0.0185				
			3	199798	0.3000	0.0478				
			4	50534	0.3000	0.1578				
			5	307002	0.3000	0.1075				
4	4.00	0.00	1	94982	0.3000	0.3882	998.07	997.29	0.79	
			2	356184	0.3000	0.0210				
			3	199798	0.3000	0.0559				
			4	50534	0.3000	0.1890				
			5	307002	0.3000	0.1324				
5	27.67	0.00	1	94982	0.3000	0.3984	997.10	996.25	0.85	
			2	356184	0.3000	0.0235				
			3	199798	0.3000	0.0630				
			4	50534	0.3000	0.2134				
			5	307002	0.3000	0.1473				
6	51.33	0.00	1	94982	0.3000	0.3539	988.08	987.25	0.83	
			2	356184	0.3000	0.0264				
			3	199798	0.3000	0.0720				
			4	50534	0.3000	0.2300				
			5	307002	0.3000	0.1454				
7	75.00	0.00	1	94982	0.3000	0.0616	978.18	977.83	0.35	
			2	356184	0.3000	0.0127				
			3	199798	0.3000	0.0424				
			4	50534	0.3000	0.1394				
			5	307002	0.3000	0.0947				

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	-90.00	0.00	921.00	0.02	920.98
2	-67.50	0.00	926.14	0.02	926.13
3	-45.00	0.00	929.00	0.01	928.99
4	-22.50	0.00	929.00	0.00	929.00
5	0.00	0.00	929.00	0.00	929.00
6	25.00	0.00	962.27	0.00	962.27
7	50.00	0.00	962.05	0.00	962.04

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-135.00	1007.00	Very Loose SM
	2	-67.00	1001.00	
	3	30.00	997.00	
	4	85.00	974.00	
	5	95.00	973.00	
	6	137.00	973.00	
	7	140.00	978.00	
	8	150.00	982.00	
2	1	-135.00	975.00	Medium Dense SM
	2	-105.00	975.00	
	3	30.00	975.00	
	4	85.00	974.00	
	5	95.00	973.00	
	6	137.00	973.00	
	7	140.00	975.00	
3	1	-150.00	971.00	Medium Dense SC
	2	-96.00	971.00	
	3	-3.50	971.00	
	4	124.00	971.00	
	5	131.00	971.00	
	6	150.00	971.00	
4	1	-120.00	965.00	Very Loose SM
	2	97.80	965.00	
	3	120.27	965.00	
	4	142.00	965.00	
	5	230.00	965.00	
5	1	-120.00	960.00	Medium Dense SM
	2	-10.00	960.00	
	3	230.00	960.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -67.00 [ft]	1	-25.00	1022.70	Embankment Fill
	X2 = 75.01 [ft]	2	33.00	1022.70	
		3	75.00	1023.00	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 1B - 30
Client:	CECS
Designer:	MEH
Station Number:	76+00

Description:

Ramp 1B Cross Section STA 76+00. Boring R1B-04.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... and 1A\R1B No. 30 76+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 1 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

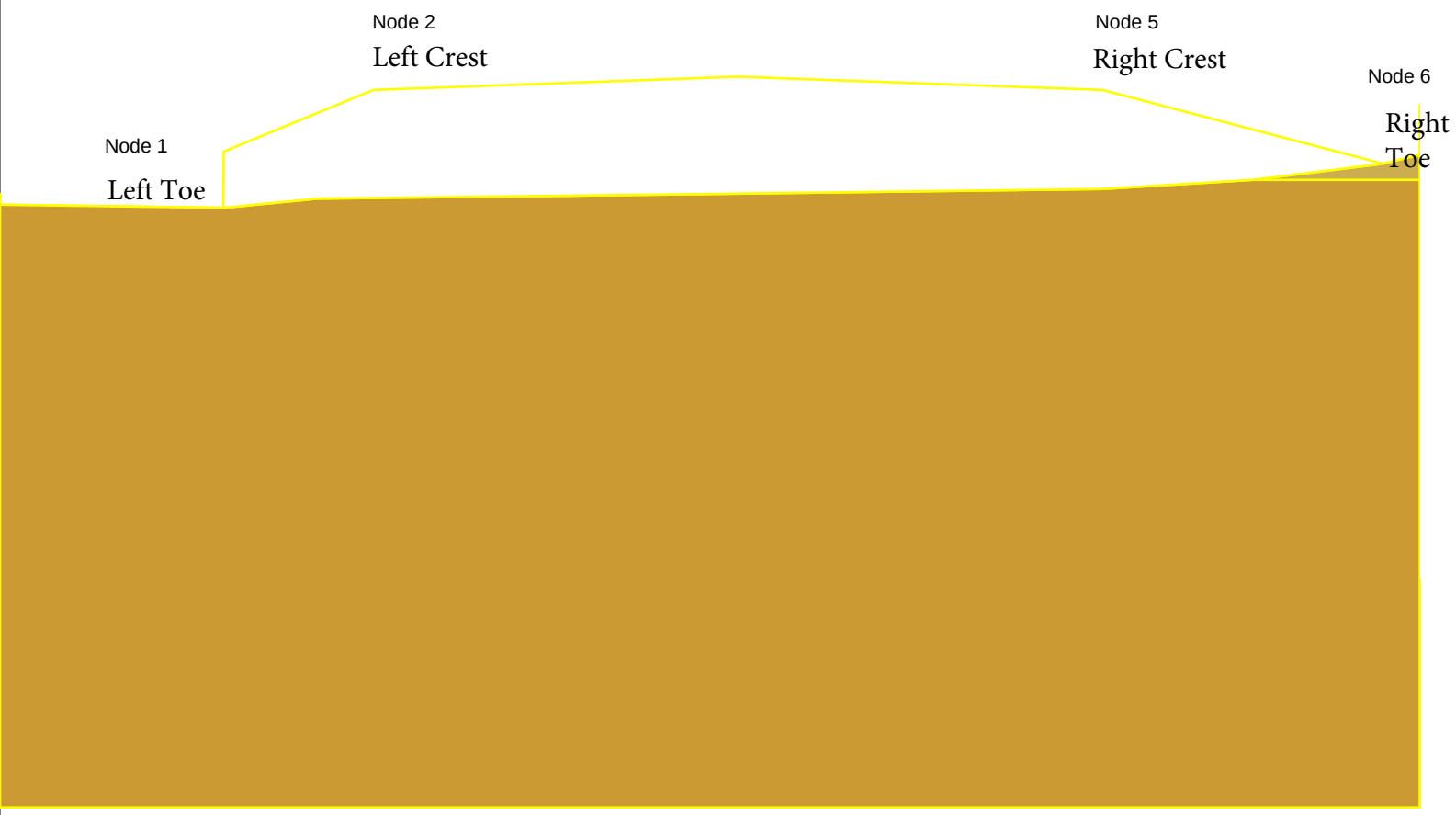
INPUT DATA -- FOUNDATION LAYERS -- 2 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.30	Medium Dense SC
2	120.00	0.30	Dense SM

INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-55.00	0.00	1	271434	0.3000	0.0000	1004.00	1004.00	0.00
			2	1024991	0.3000	0.0000			
2	-30.20	0.00	1	271434	0.3000	0.0000	1005.18	1005.18	0.00
			2	1024991	0.3000	0.0009			
3	-5.40	0.00	1	271434	0.3000	0.0000	1005.47	1005.47	0.00
			2	1024991	0.3000	0.0012			
4	19.40	0.00	1	271434	0.3000	0.0000	1005.77	1005.77	0.00
			2	1024991	0.3000	0.0013			
5	44.20	0.00	1	271434	0.3000	0.0000	1006.33	1006.32	0.00
			2	1024991	0.3000	0.0014			
6	69.00	0.00	1	271434	0.3000	-0.0002	1008.70	1008.70	-0.00
			2	1024991	0.3000	-0.0000			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-150.00	1005.00	Medium Dense SC
	2	-125.00	1005.00	
	3	-55.00	1004.00	
	4	-45.00	1005.00	
	5	-3.00	1005.50	
	6	39.00	1006.00	
	7	55.00	1007.00	
	8	69.00	1008.70	
	9	91.00	1014.00	
	10	150.00	1015.00	
	11	160.00	1015.00	
2	1	-150.00	1005.00	Dense SM
	2	-125.00	1005.00	
	3	-55.00	1004.00	
	4	-45.00	1005.00	
	5	-3.00	1005.50	
	6	39.00	1006.00	
	7	55.00	1007.00	
	8	69.00	1007.00	
	9	91.00	1007.00	
	10	150.00	1007.00	
	11	160.00	1007.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -55.01 [ft]	1	-55.00	1010.00	Embankment Fill
	X2 = 69.00 [ft]	2	-39.00	1016.60	
		3	0.00	1018.00	
		4	39.00	1016.60	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

Version 2.0 FoSSA Version 2.0

FoSSA -- Foundation Stress & Settlement Analysis I85/385 Interchange Improvements

Present Date/Time: Wed Oct 28 11:12:46 2015 I:\.....ts\Roadway\Cross Pipe Settlement\Ramp 1 and 1A\R1B No. 30 76+00 Settlement Estimate_2D.2ST

Version 2.0 FoSSA Version 2.0

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	USER'S DESCRIPTION
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

Version 2.0 FoSSA Version 2.0

I85/385 Interchange Improvements Page 9 of 9

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 2 - 31
Client:	CECS
Designer:	MEH
Station Number:	59+00

Description:

Ramp 2/Ramp 2A Cross Pipe STA 59+00. Boring R2-70. PWR ~940 ft.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... and 2A\R2 No. 31 59+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 1 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 5 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.30	Medium Dense Silty Sand
2	115.00	0.30	Firm to Stiff Sand Fat Clay
3	120.00	0.30	Very Stiff to Stiff Sand Fat Clay
4	100.00	0.30	Very Loose to Loose Silty Sand
5	110.00	0.30	Medium Dense Silty Sand

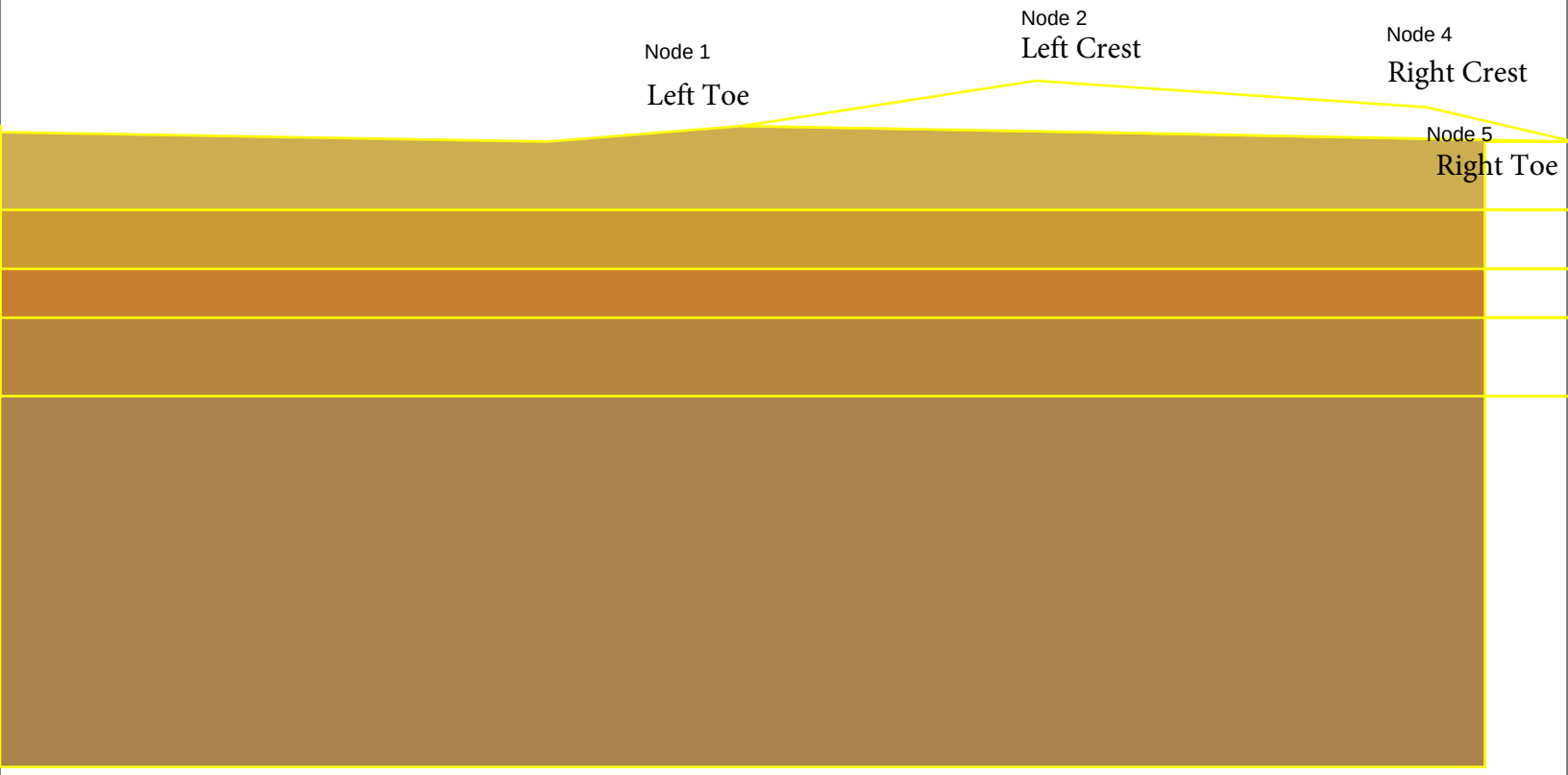
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-250.00	997.00
2	-200.00	997.00
3	-145.00	997.00
4	145.00	997.00
5	150.00	997.00
6	200.00	997.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-55.00	0.00	1	374389	0.3000	-0.0001	1006.60	1006.58	0.02
			2	115280	0.3000	0.0002			
			3	207923	0.3000	0.0006			
			4	137038	0.3000	0.0028			
			5	270569	0.3000	0.0138			
2	-33.75	0.00	1	374389	0.3000	0.0052	1006.20	1006.13	0.07
			2	115280	0.3000	0.0137			
			3	207923	0.3000	0.0064			
			4	137038	0.3000	0.0148			
			5	270569	0.3000	0.0304			
3	-12.50	0.00	1	374389	0.3000	0.0062	1005.80	1005.71	0.09
			2	115280	0.3000	0.0175			
			3	207923	0.3000	0.0084			
			4	137038	0.3000	0.0196			
			5	270569	0.3000	0.0379			
4	8.75	0.00	1	374389	0.3000	0.0046	1005.40	1005.33	0.07
			2	115280	0.3000	0.0130			
			3	207923	0.3000	0.0061			
			4	137038	0.3000	0.0141			
			5	270569	0.3000	0.0299			
5	30.00	0.00	1	374389	0.3000	-0.0001	1005.00	1004.98	0.02
			2	115280	0.3000	0.0007			
			3	207923	0.3000	0.0008			
			4	137038	0.3000	0.0033			
			5	270569	0.3000	0.0141			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	-55.00	0.00	1006.60	0.00	1006.60
2	-33.75	0.00	1006.20	0.01	1006.19
3	-12.50	0.00	1005.80	0.02	1005.78
4	8.75	0.00	1005.40	0.01	1005.39
5	30.00	0.00	1005.00	0.00	1005.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	DESCRIPTION
1	1	-135.00	1006.00	Medium Dense Silty Sand
	2	-75.00	1005.00	
	3	-55.00	1006.60	
	4	30.00	1005.00	
	5	60.00	1000.00	
	6	100.00	1005.00	
2	1	-145.00	998.00	Firm to Stiff Sand Fat Clay
	2	160.00	998.00	
3	1	-150.00	992.00	Very Stiff to Stiff Sand Fat Clay
	2	150.00	992.00	
4	1	-120.00	987.00	Very Loose to Loose Silty Sand
	2	97.80	987.00	
	3	120.27	987.00	
	4	142.00	987.00	
5	1	-120.00	979.00	Medium Dense Silty Sand
	2	-10.00	979.00	
	3	230.00	979.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -55.00 [ft]	1	-25.00	1011.20	Embankment Fill
	X2 = 30.00 [ft]	2	15.00	1008.50	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 2B - 104
Client:	CECS
Designer:	MEH
Station Number:	33+00

Description:

Ramp 2B Cross Pipe STA 33+00. Boring B-16. GWT B6-SPT-09.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... nd 2A\R2B No. 104 32+50 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

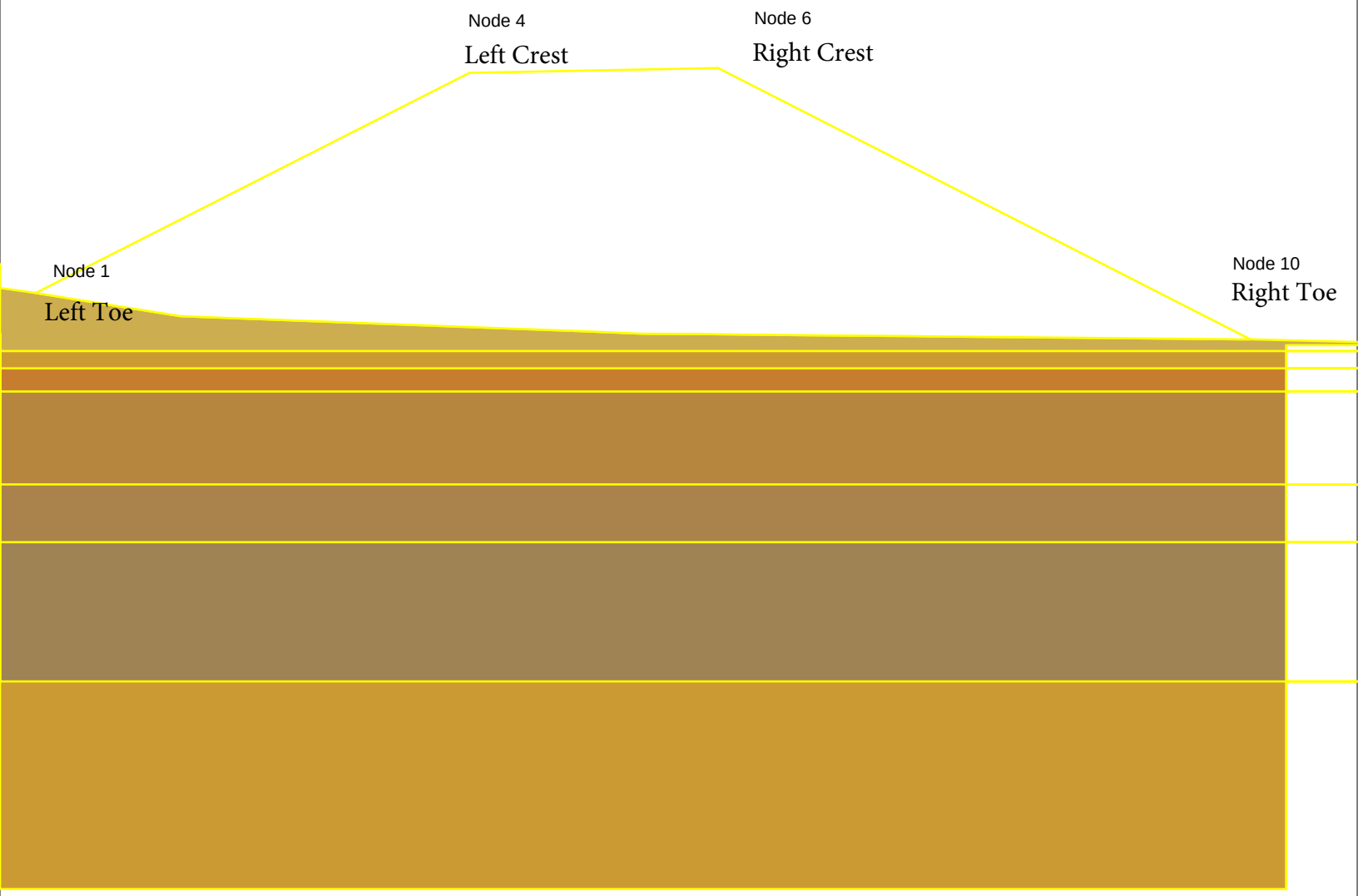
INPUT DATA -- FOUNDATION LAYERS -- 7 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.30	Loose SM
2	110.00	0.30	Medium Dense SC
3	110.00	0.30	Medium Dense GC
4	100.00	0.30	Very Loose SM
5	110.00	0.30	Medium Dense SM
6	110.00	0.30	Medium Dense SM
7	120.00	0.30	Very Dense SM

INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-105.00	0.00	1	226672	0.3000	-0.0018	1002.00	1001.97	0.03
			2	272221	0.3000	-0.0012			
			3	451490	0.3000	-0.0010			
			4	60000	0.3000	-0.0073			
			5	75000	0.3000	0.0182			
			6	609970	0.3000	0.0145			
			7	1050881	0.3000	0.0098			
2	-81.67	0.00	1	226672	0.3000	0.0267	998.27	997.79	0.48
			2	272221	0.3000	0.0107			
			3	451490	0.3000	0.0082			
			4	60000	0.3000	0.2379			
			5	75000	0.3000	0.1313			
			6	609970	0.3000	0.0440			
			7	1050881	0.3000	0.0201			
3	-58.33	0.00	1	226672	0.3000	0.0392	997.19	996.23	0.96
			2	272221	0.3000	0.0209			
			3	451490	0.3000	0.0168			
			4	60000	0.3000	0.5053			
			5	75000	0.3000	0.2670			
			6	609970	0.3000	0.0793			
			7	1050881	0.3000	0.0319			
4	-35.00	0.00	1	226672	0.3000	0.0506	996.31	994.93	1.38
			2	272221	0.3000	0.0311			
			3	451490	0.3000	0.0251			
			4	60000	0.3000	0.7412			
			5	75000	0.3000	0.3813			
			6	609970	0.3000	0.1089			
			7	1050881	0.3000	0.0417			
5	-11.67	0.00	1	226672	0.3000	0.0431	995.44	993.89	1.54
			2	272221	0.3000	0.0339			
			3	451490	0.3000	0.0276			
			4	60000	0.3000	0.8354			
			5	75000	0.3000	0.4347			
			6	609970	0.3000	0.1234			
			7	1050881	0.3000	0.0466			
6	11.67	0.00	1	226672	0.3000	0.0365	994.89	993.39	1.50
			2	272221	0.3000	0.0346			
			3	451490	0.3000	0.0278			
			4	60000	0.3000	0.8193			
			5	75000	0.3000	0.4203			
			6	609970	0.3000	0.1194			
			7	1050881	0.3000	0.0453			
7	35.00	0.00	1	226672	0.3000	0.0273	994.67	993.49	1.18
			2	272221	0.3000	0.0259			
			3	451490	0.3000	0.0210			
			4	60000	0.3000	0.6345			
			5	75000	0.3000	0.3345			
			6	609970	0.3000	0.0978			
			7	1050881	0.3000	0.0383			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
8	58.33	0.00	1	226672	0.3000	0.0160	994.44	993.69	0.76
			2	272221	0.3000	0.0168			
			3	451490	0.3000	0.0134			
			4	60000	0.3000	0.4004			
			5	75000	0.3000	0.2154			
			6	609970	0.3000	0.0664			
			7	1050881	0.3000	0.0277			
9	81.67	0.00	1	226672	0.3000	0.0067	994.22	993.89	0.34
			2	272221	0.3000	0.0077			
			3	451490	0.3000	0.0058			
			4	60000	0.3000	0.1688			
			5	75000	0.3000	0.0964			
			6	609970	0.3000	0.0344			
			7	1050881	0.3000	0.0167			
10	105.00	0.00	1	226672	0.3000	-0.0007	994.00	994.00	0.00
			2	272221	0.3000	-0.0011			
			3	451490	0.3000	-0.0010			
			4	60000	0.3000	-0.0174			
			5	75000	0.3000	0.0071			
			6	609970	0.3000	0.0099			
			7	1050881	0.3000	0.0076			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	-100.00	0.00	945.83	0.00	945.83
2	-85.71	0.00	950.64	0.02	950.62
3	-71.43	0.00	954.71	0.02	954.70
4	-57.14	0.00	961.00	0.00	961.00
5	-42.86	0.00	962.98	0.00	962.98
6	-28.57	0.00	962.82	0.00	962.82
7	-14.29	0.00	962.66	0.00	962.66
8	0.00	0.00	962.50	0.00	962.50
9	14.29	0.00	962.37	0.00	962.37
10	28.57	0.00	962.24	0.00	962.24

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-140.00	1007.00	Loose SM
	2	-105.00	1002.00	
	3	-80.00	998.00	
	4	0.00	995.00	
	5	105.00	994.00	
	6	145.00	993.00	
2	1	-140.00	992.00	Medium Dense SC
	2	-25.00	992.00	
	3	13.00	992.00	
	4	140.00	992.00	
3	1	-140.00	989.00	Medium Dense GC
	2	30.00	989.00	
	3	35.00	989.00	
	4	47.00	989.00	
	5	140.00	989.00	
4	1	-140.00	985.00	Very Loose SM
	2	-30.00	985.00	
	3	0.00	985.00	
	4	50.00	985.00	
	5	142.00	985.00	
5	1	-120.00	969.00	Medium Dense SM
	2	-10.00	969.00	
	3	230.00	969.00	
6	1	-120.00	959.00	Medium Dense SM
	2	10.00	959.00	
	3	230.00	959.00	
7	1	-120.00	935.00	Very Dense SM
	2	10.00	935.00	
	3	230.00	935.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -105.00 [ft]	1	-30.00	1040.00	Embankment Fill
	X2 = 105.00 [ft]	2	13.00	1040.80	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
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10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 2B - 105
Client:	CECS
Designer:	MEH
Station Number:	44+25

Description:

Ramp 2B Cross Pipe STA 44+25. Boring B-32. GWT W2B-1R-03.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... nd 2A\R2B No. 105 44+25 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

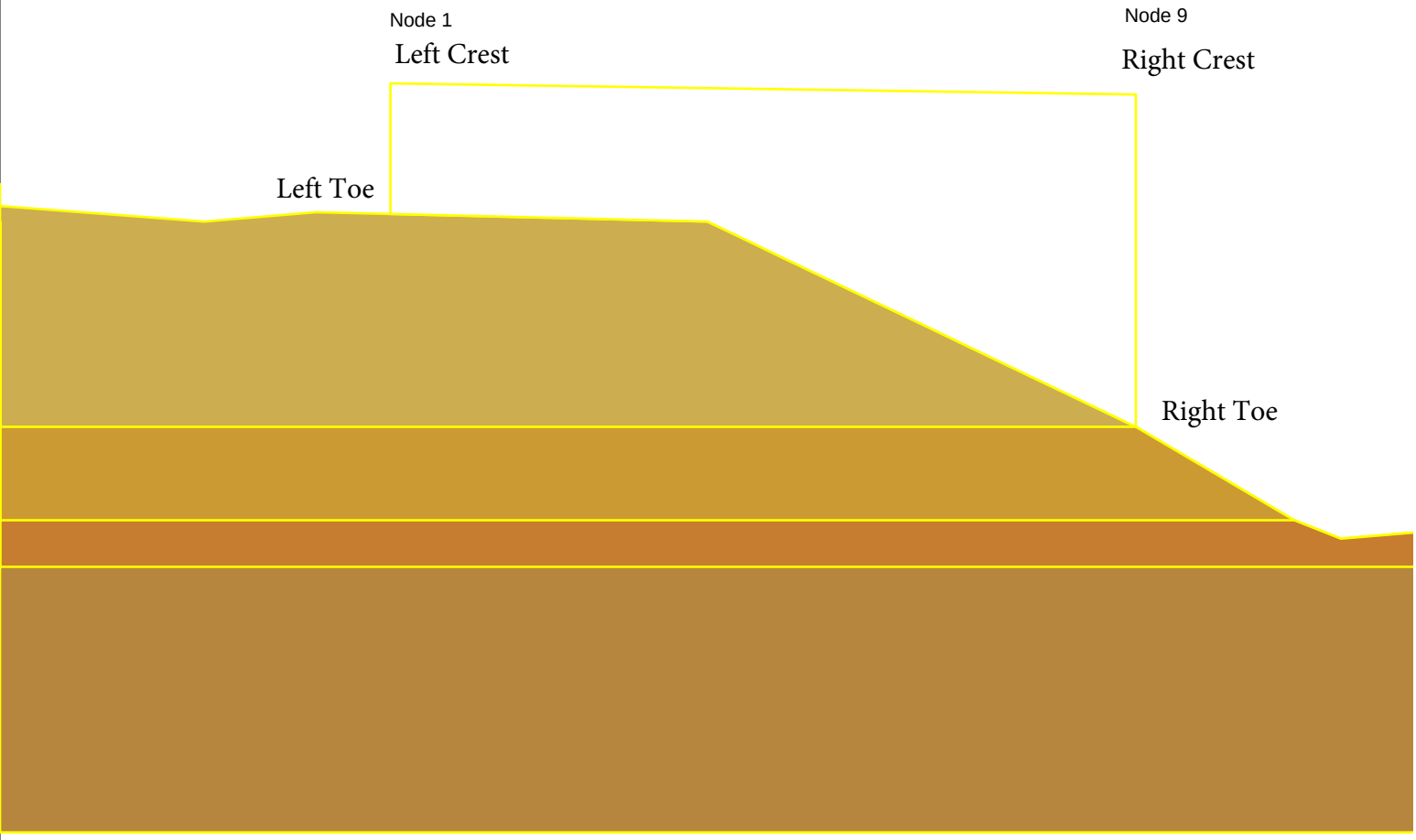
INPUT DATA -- FOUNDATION LAYERS -- 4 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.30	Medium Dense SM
2	105.00	0.30	Loose to Medium Dense SM
3	110.00	0.30	Medium Dense SC
4	110.00	0.30	Medium Dense SM

INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-70.00	0.00	1	381183	0.3000	0.0078	1002.88	1002.82	0.06
			2	266687	0.3000	0.0132			
			3	156249	0.3000	0.0134			
			4	469124	0.3000	0.0234			
2	-59.63	0.00	1	381183	0.3000	0.0489	1002.63	1002.50	0.13
			2	266687	0.3000	0.0262			
			3	156249	0.3000	0.0229			
			4	469124	0.3000	0.0344			
3	-49.25	0.00	1	381183	0.3000	0.0544	1002.39	1002.22	0.17
			2	266687	0.3000	0.0358			
			3	156249	0.3000	0.0314			
			4	469124	0.3000	0.0451			
4	-38.88	0.00	1	381183	0.3000	0.0553	1002.14	1001.95	0.19
			2	266687	0.3000	0.0428			
			3	156249	0.3000	0.0384			
			4	469124	0.3000	0.0546			
5	-28.50	0.00	1	381183	0.3000	0.0588	999.85	999.63	0.22
			2	266687	0.3000	0.0507			
			3	156249	0.3000	0.0451			
			4	469124	0.3000	0.0625			
6	-18.13	0.00	1	381183	0.3000	0.0596	994.89	994.65	0.24
			2	266687	0.3000	0.0600			
			3	156249	0.3000	0.0512			
			4	469124	0.3000	0.0677			
7	-7.75	0.00	1	381183	0.3000	0.0498	989.92	989.69	0.24
			2	266687	0.3000	0.0663			
			3	156249	0.3000	0.0538			
			4	469124	0.3000	0.0681			
8	2.63	0.00	1	381183	0.3000	0.0253	984.96	984.76	0.20
			2	266687	0.3000	0.0618			
			3	156249	0.3000	0.0489			
			4	469124	0.3000	0.0615			
9	13.00	0.00	1	381183	0.3000	0.0000	980.00	979.87	0.13
			2	266687	0.3000	0.0414			
			3	156249	0.3000	0.0354			
			4	469124	0.3000	0.0483			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-140.00	1006.00	Medium Dense SM
	2	-87.00	1002.00	
	3	-75.00	1003.00	
	4	-33.00	1002.00	
	5	13.00	980.00	
	6	30.00	970.00	
	7	35.00	968.00	
	8	47.00	969.00	
	9	57.00	967.00	
	10	67.00	967.00	
	11	90.00	970.00	
	12	91.00	980.00	
	13	93.00	982.00	
	14	107.00	985.00	
	15	140.00	985.00	
2	1	-140.00	980.00	Loose to Medium Dense SM
	2	-25.00	980.00	
	3	13.00	980.00	
	4	30.00	970.00	
	5	35.00	968.00	
	6	47.00	969.00	
	7	57.00	967.00	
	8	67.00	967.00	
	9	90.00	970.00	
	10	91.00	980.00	
	11	140.00	980.00	
3	1	-140.00	970.00	Medium Dense SC
	2	30.00	970.00	
	3	35.00	968.00	
	4	47.00	969.00	
	5	57.00	967.00	
	6	67.00	967.00	
	7	90.00	970.00	
	8	140.00	970.00	
4	1	-140.00	965.00	Medium Dense SM
	2	-30.00	965.00	
	3	0.00	965.00	
	4	50.00	965.00	
	5	142.00	965.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -67.01 [ft]	1	-67.00	1016.80	Embankment Fill
	X2 = 13.01 [ft]	2	13.00	1015.60	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 2B -
Client:	CECS
Designer:	MEH
Station Number:	29+25

Description:

Ramp 2B Cross Pipe STA 29+25.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... oadway\Cross Pipe Settlement\Ramp 2B\R2B 29+25.2ST
Original date and time of creating this file: Tue Sept 1 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 4 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.30	Medium Dense SM
2	110.00	0.30	Very Loose to Medium Dense SM
3	105.00	0.30	Very Loose to Medium Dense SM
4	110.00	0.30	Dense to Very Dense SM

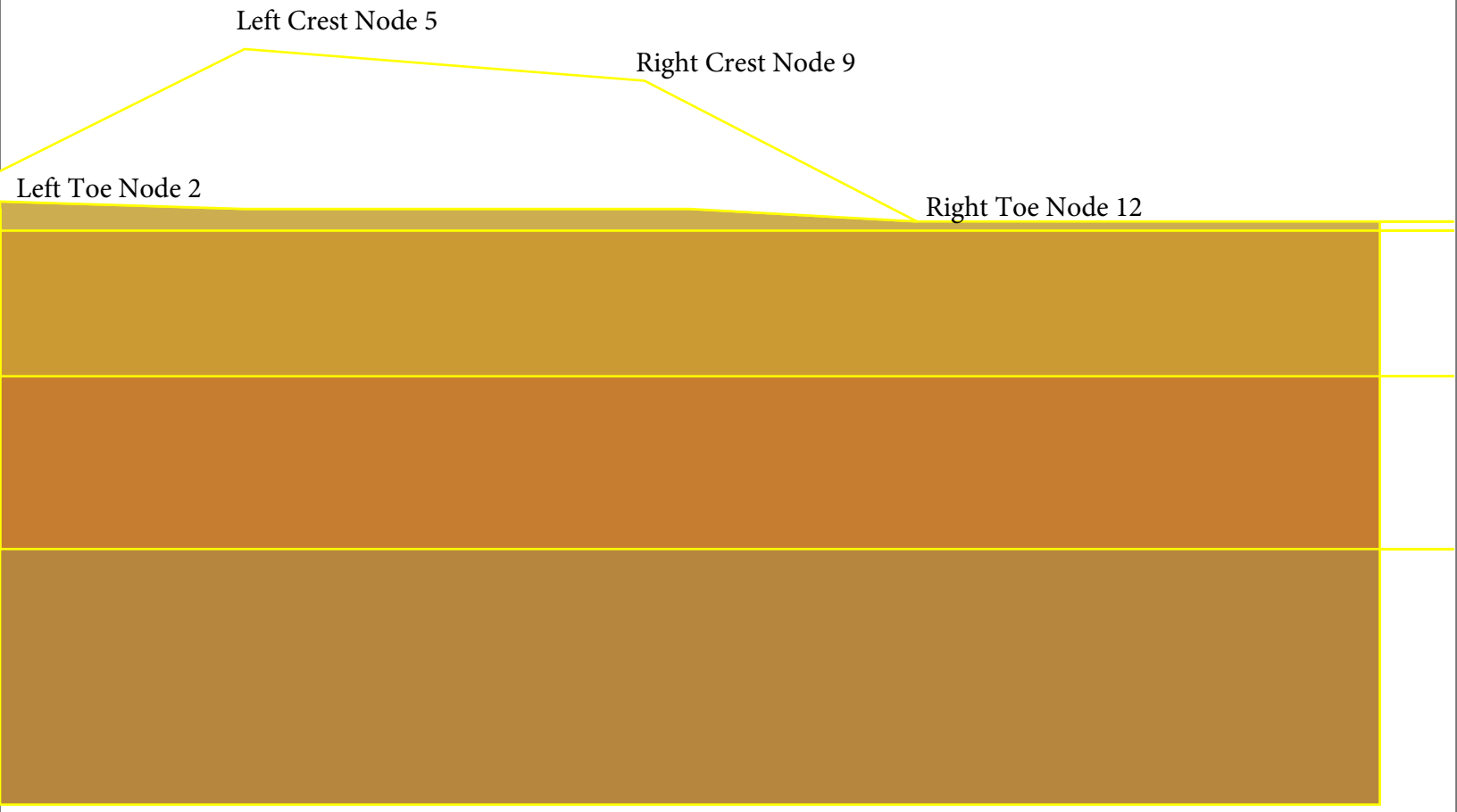
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	103.00	970.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-75.00	0.00	1	281385	0.3000	-0.0000	1006.82	1006.80	0.02
			2	278396	0.3000	-0.0037			
			3	41115	0.3000	0.0053			
			4	533886	0.3000	0.0147			
2	-64.50	0.00	1	281385	0.3000	-0.0002	1006.43	1006.33	0.09
			2	278396	0.3000	-0.0013			
			3	41115	0.3000	0.0686			
			4	533886	0.3000	0.0239			
3	-54.00	0.00	1	281385	0.3000	0.0034	1006.11	1005.87	0.24
			2	278396	0.3000	0.0162			
			3	41115	0.3000	0.1855			
			4	533886	0.3000	0.0354			
4	-43.50	0.00	1	281385	0.3000	0.0066	1005.80	1005.37	0.43
			2	278396	0.3000	0.0394			
			3	41115	0.3000	0.3318			
			4	533886	0.3000	0.0476			
5	-33.00	0.00	1	281385	0.3000	0.0091	1005.48	1004.89	0.59
			2	278396	0.3000	0.0607			
			3	41115	0.3000	0.4590			
			4	533886	0.3000	0.0582			
6	-22.50	0.00	1	281385	0.3000	0.0095	1005.39	1004.72	0.67
			2	278396	0.3000	0.0664			
			3	41115	0.3000	0.5271			
			4	533886	0.3000	0.0651			
7	-12.00	0.00	1	281385	0.3000	0.0090	1005.39	1004.71	0.68
			2	278396	0.3000	0.0633			
			3	41115	0.3000	0.5366			
			4	533886	0.3000	0.0674			
8	-1.50	0.00	1	281385	0.3000	0.0086	1005.39	1004.75	0.64
			2	278396	0.3000	0.0598			
			3	41115	0.3000	0.5083			
			4	533886	0.3000	0.0650			
9	9.00	0.00	1	281385	0.3000	0.0082	1005.39	1004.82	0.57
			2	278396	0.3000	0.0555			
			3	41115	0.3000	0.4465			
			4	533886	0.3000	0.0585			
10	19.50	0.00	1	281385	0.3000	0.0064	1005.36	1004.92	0.44
			2	278396	0.3000	0.0426			
			3	41115	0.3000	0.3445			
			4	533886	0.3000	0.0488			
11	30.00	0.00	1	281385	0.3000	0.0027	1004.78	1004.50	0.28
			2	278396	0.3000	0.0227			
			3	41115	0.3000	0.2155			
			4	533886	0.3000	0.0373			
12	40.50	0.00	1	281385	0.3000	0.0004	1004.19	1004.07	0.13
			2	278396	0.3000	0.0039			
			3	41115	0.3000	0.0966			
			4	533886	0.3000	0.0260			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
13	51.00	0.00	1	281385	0.3000	-0.0000	1004.00	1003.97	0.03
			2	278396	0.3000	-0.0033			
			3	41115	0.3000	0.0202			
			4	533886	0.3000	0.0165			
14	61.50	0.00	1	281385	0.3000	-0.0000	1004.00	1004.01	-0.01
			2	278396	0.3000	-0.0031			
			3	41115	0.3000	-0.0135			
			4	533886	0.3000	0.0094			
15	72.00	0.00	1	281385	0.3000	-0.0000	1004.00	1004.02	-0.02
			2	278396	0.3000	-0.0024			
			3	41115	0.3000	-0.0243			
			4	533886	0.3000	0.0046			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-87.00	1007.30	Medium Dense SM
	2	-67.00	1006.50	
	3	-30.00	1005.39	
	4	19.00	1005.39	
	5	44.00	1004.00	
2	1	0.00	1003.00	Very Loose to Medium Dense SM
3	1	0.00	987.00	Very Loose to Medium Dense SM
4	1	-120.00	968.00	Dense to Very Dense SM

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -64.00 [ft]	1	-64.00	1006.00	Embankment Fill
	X2 = 44.00 [ft]	2	-30.00	1022.94	
		3	14.00	1019.47	
		4	44.00	1004.00	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title: I85/385 Interchange Improvements
Project Number: Ramp 4 - 108
Client: CECS
Designer: MEH
Station Number: 47+00

Description:

Ramp 4 Cross Pipe STA 47+00. Boring W4-1R-07. PWR B-7.

Company's information:

Name: ECS Carolinas, LLP
Street: 1812 Centerpark Drive, Suite D
Charlotte, NC 28217
Telephone #: (704) 525-5152
Fax #: (704) 357-0023
E-Mail:

Original file path and name: I:\2GEOTEC ..... Ramp 4\R4 No. 108 47+25 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 1 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 7 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.30	Loose SM
2	110.00	0.30	Medium Dense SM
3	105.00	0.30	Loose SM
4	110.00	0.30	Medium Dense SM
5	110.00	0.30	Firm ML
6	105.00	0.30	Loose SM
7	110.00	0.30	Medium Dense SM

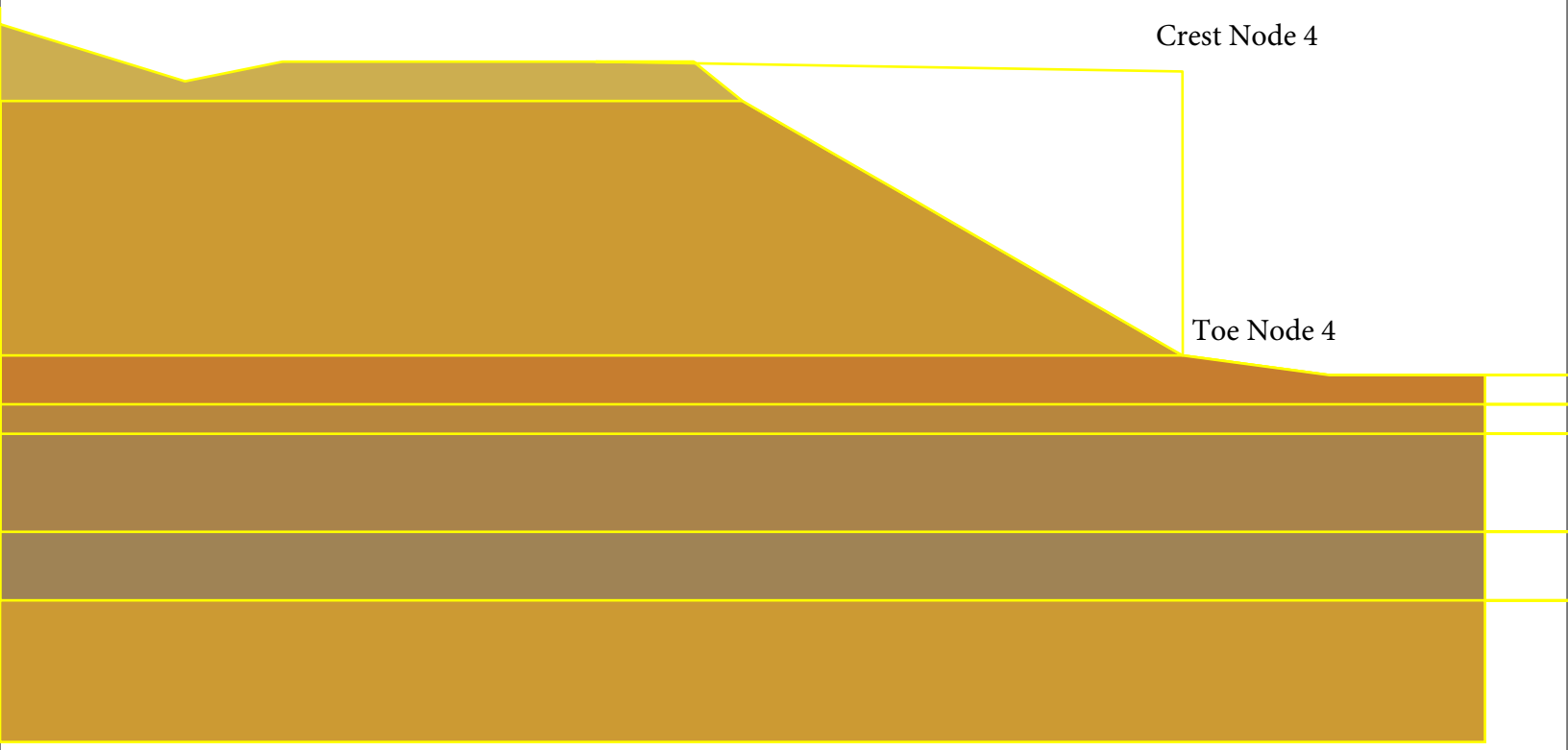
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	977.00
2	-10.00	977.00
3	0.00	977.00
4	50.00	977.00
5	103.00	977.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-35.00	0.00	1	140693	0.3000	-0.0004	1007.00	1006.61	0.39
			2	356294	0.3000	-0.0011			
			3	1119173	0.3000	0.0006			
			4	209827	0.3000	0.0024			
			5	43939	0.3000	0.0467			
			6	80232	0.3000	0.0222			
			7	17576	0.3000	0.3210			
2	-15.00	0.00	1	140693	0.3000	0.0000	1000.11	999.33	0.78
			2	356294	0.3000	0.0312			
			3	1119173	0.3000	0.0026			
			4	209827	0.3000	0.0089			
			5	43939	0.3000	0.1299			
			6	80232	0.3000	0.0487			
			7	17576	0.3000	0.5628			
3	5.00	0.00	1	140693	0.3000	0.0000	988.56	987.51	1.05
			2	356294	0.3000	0.0396			
			3	1119173	0.3000	0.0049			
			4	209827	0.3000	0.0152			
			5	43939	0.3000	0.2026			
			6	80232	0.3000	0.0684			
			7	17576	0.3000	0.7183			
4	25.00	0.00	1	140693	0.3000	0.0000	977.00	976.14	0.86
			2	356294	0.3000	0.0000			
			3	1119173	0.3000	0.0037			
			4	209827	0.3000	0.0118			
			5	43939	0.3000	0.1628			
			6	80232	0.3000	0.0575			
			7	17576	0.3000	0.6276			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	-100.00	0.00	945.83	0.00	945.83
2	-85.71	0.00	950.64	0.02	950.62
3	-71.43	0.00	954.71	0.02	954.70
4	-57.14	0.00	961.00	0.00	961.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	DESCRIPTION
1	1	-140.00	1012.50	Loose SM
	2	-103.00	1013.00	
	3	-77.00	1005.00	
	4	-67.00	1007.00	
	5	-25.00	1007.00	
	6	-20.00	1003.00	
	7	25.00	977.00	
	8	40.00	975.00	
	9	130.00	975.00	
2	1	-135.00	1003.00	Medium Dense SM
	2	-105.00	1003.00	
	3	-45.00	1003.00	
	4	-20.00	1003.00	
	5	25.00	977.00	
	6	40.00	975.00	
	7	130.00	975.00	
3	1	-150.00	977.00	Loose SM
	2	-96.00	977.00	
	3	-3.50	977.00	
	4	25.00	977.00	
	5	40.00	975.00	
	6	130.00	975.00	
4	1	-120.00	972.00	Medium Dense SM
	2	97.80	972.00	
	3	120.27	972.00	
	4	142.00	972.00	
	5	230.00	972.00	
5	1	-120.00	969.00	Firm ML
	2	-10.00	969.00	
	3	230.00	969.00	
6	1	-120.00	959.00	Loose SM
	2	10.00	959.00	
	3	230.00	959.00	
7	1	-120.00	952.00	Medium Dense SM
	2	10.00	952.00	
	3	230.00	952.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -35.00 [ft] X2 = 25.01 [ft]	1	25.00	1006.00	Embankment Fill

Version 2.0 FoSSA Version 2.0

FoSSA -- Foundation Stress & Settlement Analysis I85/385 Interchange Improvements
Present Date/Time: Wed Oct 28 10:23:31 2015 I:\.....l Reports\Roadway\Cross Pipe Settlement\Ramp 4\R4 No. 108 47+25 Settlement Estimate_2D.2ST

Version 2.0 FoSSA Version 2.0

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	USER'S DESCRIPTION
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

Version 2.0 FoSSA Version 2.0

I85/385 Interchange Improvements Page 8 of 9
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HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 4B -
Client:	CECS
Designer:	MEH
Station Number:	420+00

Description:

Ramp 4B Cross Pipe STA 420+00.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... adway\Cross Pipe Settlement\Ramp 4B\R4B 420+00.2ST
Original date and time of creating this file: Tue Sept 1 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 2 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.30	Loose SM
2	110.00	0.30	Medium Dense to Dense SC

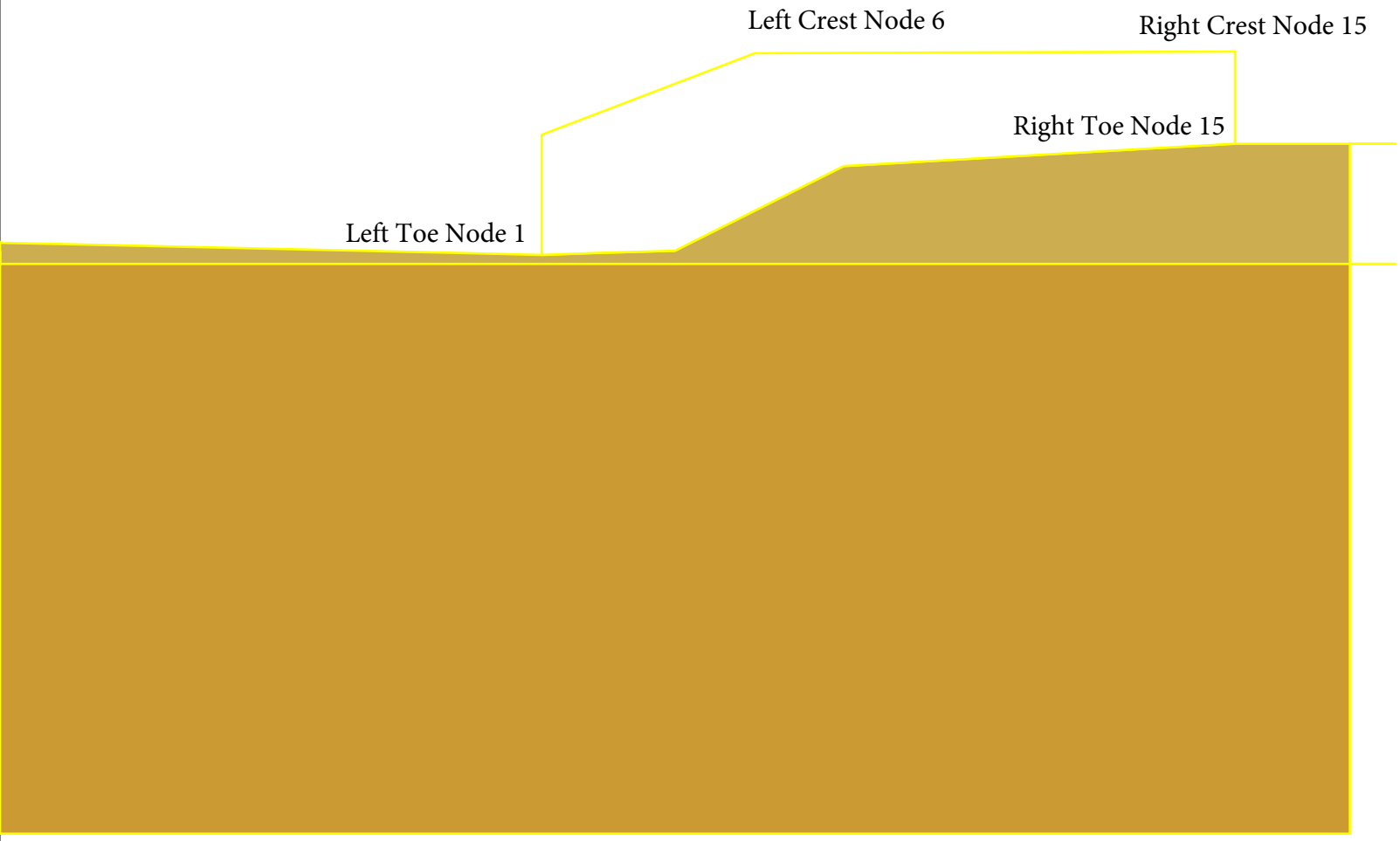
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	103.00	993.50

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	34.00	0.00	1	201845	0.3000	0.0026	1000.52	1000.48	0.04
			2	356294	0.3000	0.0352			
2	39.57	0.00	1	201845	0.3000	0.0061	1000.70	1000.63	0.07
			2	356294	0.3000	0.0645			
3	45.14	0.00	1	201845	0.3000	0.0085	1000.88	1000.79	0.09
			2	356294	0.3000	0.0789			
4	50.71	0.00	1	201845	0.3000	0.0145	1001.86	1001.76	0.10
			2	356294	0.3000	0.0852			
5	56.29	0.00	1	201845	0.3000	0.0286	1004.64	1004.53	0.11
			2	356294	0.3000	0.0839			
6	61.86	0.00	1	201845	0.3000	0.0397	1007.43	1007.31	0.12
			2	356294	0.3000	0.0768			
7	67.43	0.00	1	201845	0.3000	0.0440	1010.21	1010.10	0.11
			2	356294	0.3000	0.0679			
8	73.00	0.00	1	201845	0.3000	0.0438	1010.78	1010.68	0.11
			2	356294	0.3000	0.0627			
9	78.57	0.00	1	201845	0.3000	0.0440	1011.10	1011.00	0.10
			2	356294	0.3000	0.0598			
10	84.14	0.00	1	201845	0.3000	0.0445	1011.42	1011.32	0.10
			2	356294	0.3000	0.0575			
11	89.71	0.00	1	201845	0.3000	0.0450	1011.73	1011.63	0.10
			2	356294	0.3000	0.0555			
12	95.29	0.00	1	201845	0.3000	0.0456	1012.05	1011.95	0.10
			2	356294	0.3000	0.0530			
13	100.86	0.00	1	201845	0.3000	0.0459	1012.37	1012.27	0.10
			2	356294	0.3000	0.0492			
14	106.43	0.00	1	201845	0.3000	0.0439	1012.68	1012.60	0.09
			2	356294	0.3000	0.0420			
15	112.00	0.00	1	201845	0.3000	0.0212	1013.00	1012.96	0.04
			2	356294	0.3000	0.0234			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-32.00	1002.00	Loose SM
	2	34.00	1000.52	
	3	49.00	1001.00	
	4	68.00	1010.50	
	5	112.00	1013.00	
2	1	-135.00	999.50	Medium Dense to Dense SC
	2	-105.00	999.50	
	3	-45.00	999.50	
	4	-20.00	999.50	
	5	25.00	999.50	
	6	40.00	999.50	
	7	130.00	999.50	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = 34.00 [ft]	1	34.00	1014.00	Embankment Fill
	X2 = 112.00 [ft]	2	58.00	1023.16	
		3	112.00	1023.36	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	USER'S DESCRIPTION
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	USER'S DESCRIPTION
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	I-85 -
Client:	CECS
Designer:	MEH
Station Number:	373+00

Description:

Embankment I-85 STA 373+00. Boring R85-81. GWT R85-18. PWR ~850 ft.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... nkments\I-85\I85 373+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.30	Medium dense to Very Dense Clayey Sand

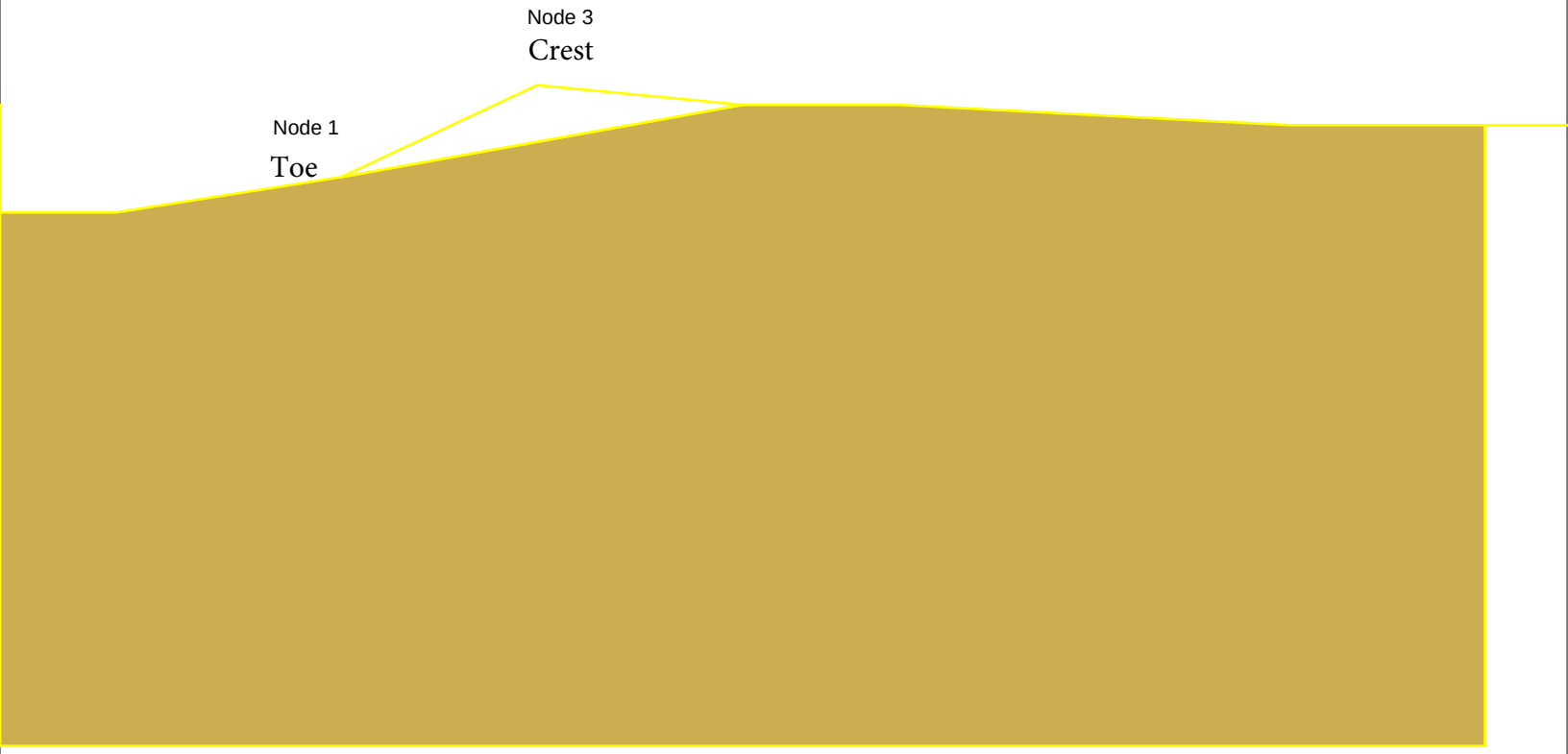
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	884.00
2	-10.00	884.00
3	0.00	884.00
4	50.00	884.00
5	103.00	884.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-97.00	0.00	1	475452	0.3000	0.0083	895.60	895.59	0.01
2	-76.50	0.00	1	475452	0.3000	0.0243	899.30	899.28	0.02
3	-56.00	0.00	1	475452	0.3000	0.0081	903.00	902.99	0.01

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-120.00	892.00	Medium dense to Very Dense Clayey Sand
	2	-97.00	895.60	
	3	-56.00	903.00	
	4	-40.00	903.00	
	5	0.00	900.90	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -97.00 [ft] X2 = -56.00 [ft]	1	-77.00	905.00	Embankment Fill

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	I-85 -
Client:	CECS
Designer:	MEH
Station Number:	389+00

Description:

Embankment I-85 STA 389+00. Boring R85-19. GWT ~845ft. PWR ~835 ft.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... nkments\I-85\I85 389+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 2 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.30	Medium Dense Clayey sand
2	115.00	0.30	Medium Dense to Dense Silty Sand

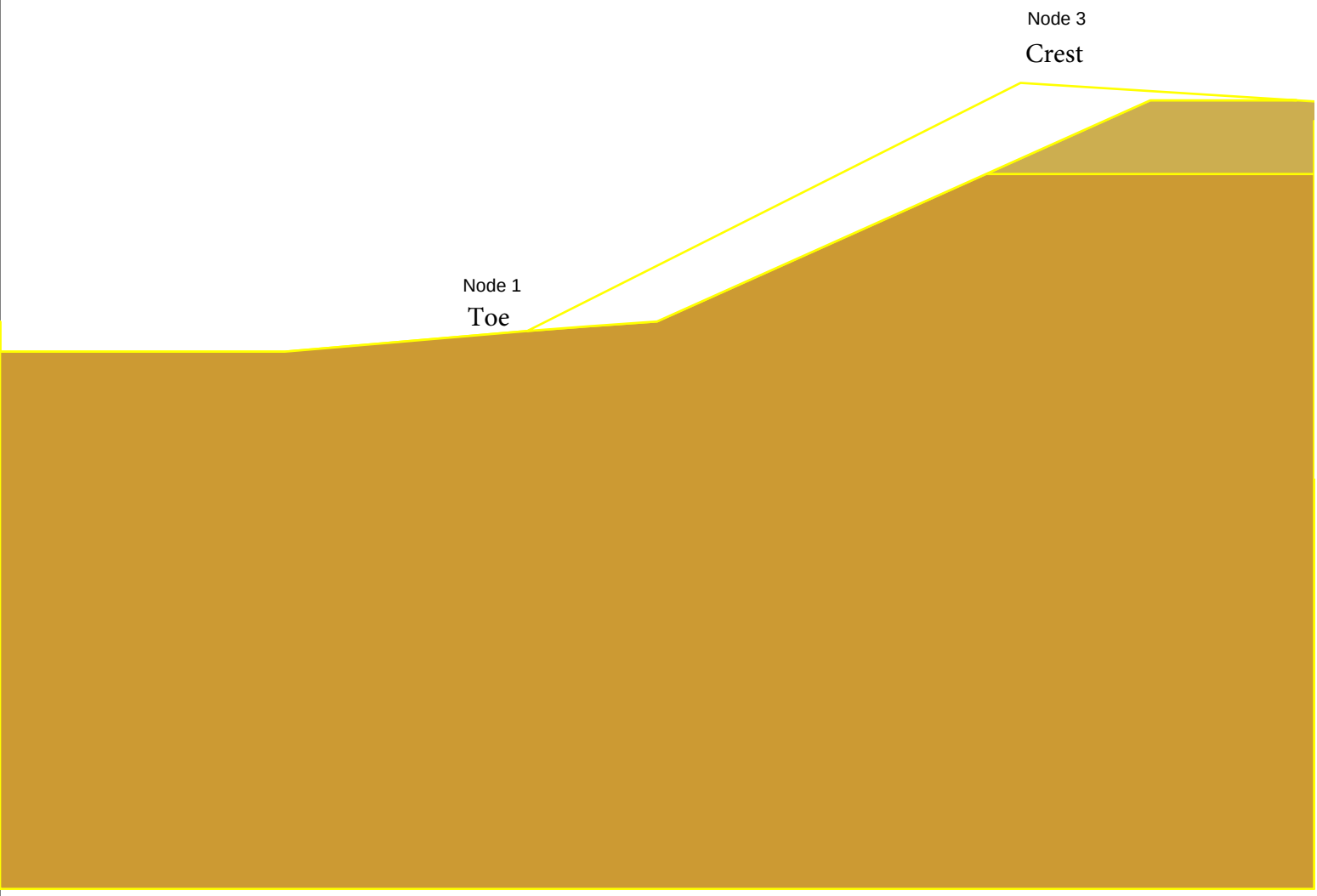
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	845.00
2	-10.00	845.00
3	0.00	845.00
4	50.00	845.00
5	103.00	845.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-111.00	0.00	1	191923	0.3000	0.0000	854.45	854.45	0.00
			2	676513	0.3000	0.0000			
2	-88.17	0.00	1	191923	0.3000	0.0000	864.66	864.66	0.00
			2	676513	0.3000	0.0000			
3	-65.33	0.00	1	191923	0.3000	0.0000	874.88	874.88	0.00
			2	676513	0.3000	0.0000			
4	-42.50	0.00	1	191923	0.3000	0.0000	879.50	879.50	0.00
			2	676513	0.3000	0.0000			
5	-19.67	0.00	1	191923	0.3000	0.0000	878.34	878.34	0.00
			2	676513	0.3000	0.0000			
6	3.17	0.00	1	191923	0.3000	0.0000	877.10	877.10	0.00
			2	676513	0.3000	0.0000			
7	26.00	0.00	1	191923	0.3000	0.0000	877.10	877.10	0.00
			2	676513	0.3000	0.0000			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-155.00	850.50	Medium Dense Clayey sand
	2	-127.00	852.90	
	3	-112.00	854.00	
	4	-74.00	871.00	
	5	-55.00	879.50	
	6	-38.10	879.50	
	7	0.00	877.10	
2	1	-155.00	850.50	Medium Dense to Dense Silty Sand
	2	-127.00	852.90	
	3	-112.00	854.00	
	4	-74.00	871.00	
	5	0.00	871.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -127.00 [ft] X2 = -38.10 [ft]	1	-70.00	881.50	Embankment Fill

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	I-385 -
Client:	CECS
Designer:	MEH
Station Number:	334+50

Description:

Embankment I-385 STA 334+50. Boring R385-82. PWR ~850 ft.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... ments\I-385\I385 334+50 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 6 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.30	Medium Dense Silty Sand
2	105.00	0.30	Medium Dense Calyey Sand
3	105.00	0.30	Stiff to Very Stiff Plastic Clay
4	100.00	0.30	Loose Clayey Sand
5	105.00	0.30	Stiff Sandy Silt
6	110.00	0.30	Medium Dense Silty Sand

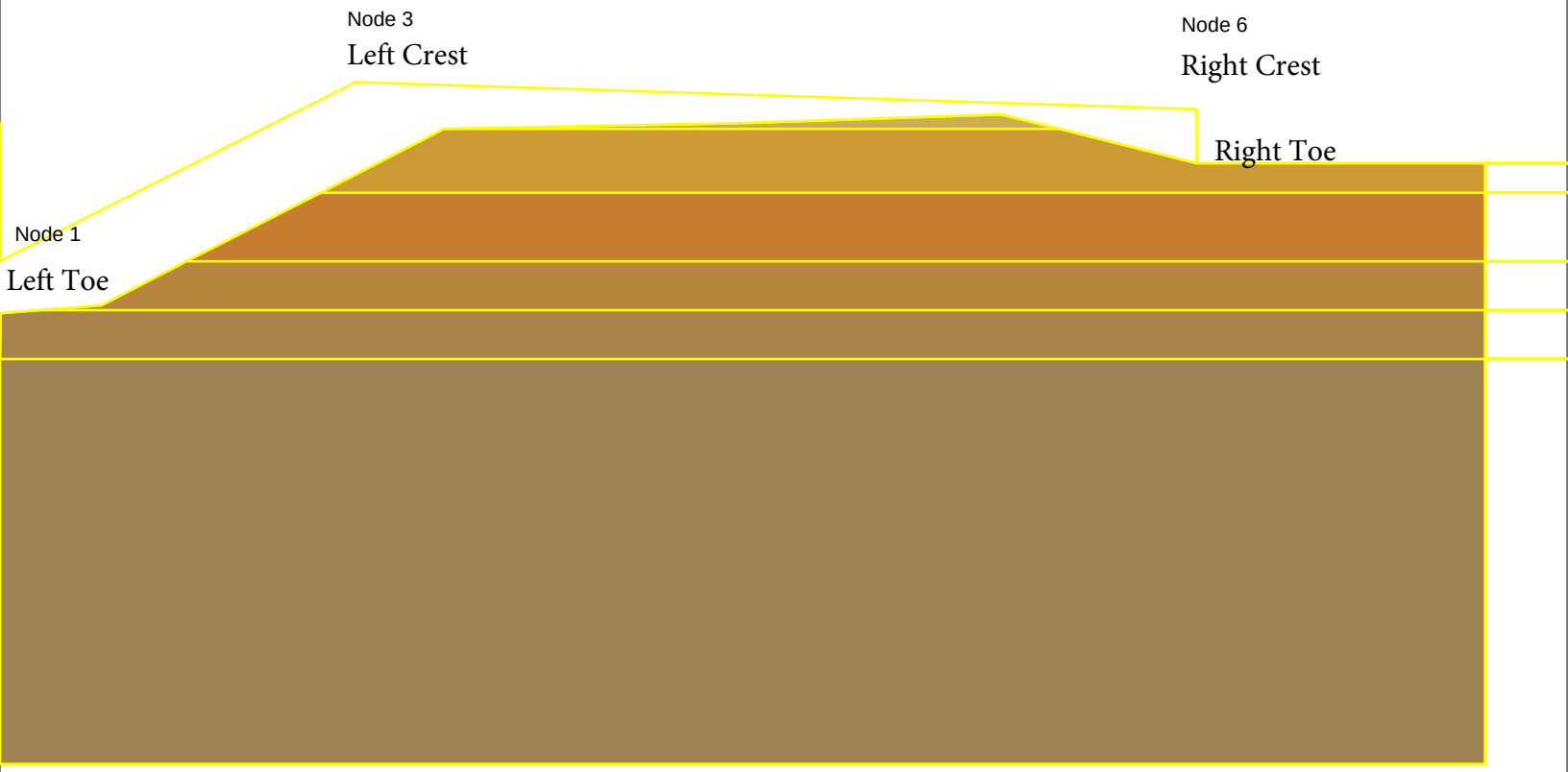
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	893.00
2	-10.00	893.00
3	0.00	893.00
4	50.00	893.00
5	103.00	893.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-135.00	0.00	1	422078	0.3000	0.0000	908.70	908.67	0.03
			2	201574	0.3000	0.0000			
			3	187294	0.3000	0.0000			
			4	35006	0.3000	0.0000			
			5	76884	0.3000	-0.0008			
			6	301973	0.3000	0.0269			
2	-108.00	0.00	1	422078	0.3000	0.0000	912.57	912.38	0.19
			2	201574	0.3000	0.0000			
			3	187294	0.3000	0.0000			
			4	35006	0.3000	0.0451			
			5	76884	0.3000	0.0419			
			6	301973	0.3000	0.1015			
3	-81.00	0.00	1	422078	0.3000	0.0000	926.44	926.23	0.20
			2	201574	0.3000	0.0108			
			3	187294	0.3000	0.0172			
			4	35006	0.3000	0.0618			
			5	76884	0.3000	0.0281			
			6	301973	0.3000	0.0857			
4	-54.00	0.00	1	422078	0.3000	0.0003	928.97	928.87	0.10
			2	201574	0.3000	0.0065			
			3	187294	0.3000	0.0074			
			4	35006	0.3000	0.0302			
			5	76884	0.3000	0.0138			
			6	301973	0.3000	0.0452			
5	-27.00	0.00	1	422078	0.3000	0.0004	929.77	929.72	0.05
			2	201574	0.3000	0.0034			
			3	187294	0.3000	0.0033			
			4	35006	0.3000	0.0141			
			5	76884	0.3000	0.0065			
			6	301973	0.3000	0.0256			
6	0.00	0.00	1	422078	0.3000	0.0000	925.00	924.94	0.06
			2	201574	0.3000	0.0022			
			3	187294	0.3000	0.0060			
			4	35006	0.3000	0.0258			
			5	76884	0.3000	0.0117			
			6	301973	0.3000	0.0193			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	-100.00	0.00	945.83	0.00	945.83
2	-85.71	0.00	950.64	0.02	950.62
3	-71.43	0.00	954.71	0.02	954.70
4	-57.14	0.00	961.00	0.00	961.00
5	-42.86	0.00	962.98	0.00	962.98
6	-28.57	0.00	962.82	0.00	962.82

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	DESCRIPTION
1	1	-160.00	907.00	Medium Dense Silty Sand
	2	-135.00	908.70	
	3	-118.40	910.00	
	4	-112.00	910.50	
	5	-103.30	915.00	
	6	-89.60	922.00	
	7	-77.00	928.50	
	8	-46.45	929.12	
	9	-20.00	930.00	
	10	-14.00	928.50	
	11	0.00	925.00	
2	1	-160.00	907.00	Medium Dense Calyey Sand
	2	-135.00	908.70	
	3	-118.40	910.00	
	4	-112.00	910.50	
	5	-103.30	915.00	
	6	-89.60	922.00	
	7	-77.00	928.50	
	8	-14.00	928.50	
	9	0.00	925.00	
3	1	-160.00	907.00	Stiff to Very Stiff Plastic Clay
	2	-135.00	908.70	
	3	-118.40	910.00	
	4	-112.00	910.50	
	5	-103.30	915.00	
	6	-89.60	922.00	
	7	0.00	922.00	
4	1	-160.00	907.00	Loose Clayey Sand
	2	-135.00	908.70	
	3	-118.40	910.00	
	4	-112.00	910.50	
	5	-103.30	915.00	
	6	0.00	915.00	
5	1	-160.00	907.00	Stiff Sandy Silt
	2	-135.00	908.70	
	3	-118.40	910.00	
	4	-85.97	910.00	
6	1	-120.00	905.00	Medium Dense Silty Sand
	2	10.00	905.00	
	3	230.00	905.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -135.00 [ft]	1	-86.00	933.30	Embankment Fill
	X2 = 0.00 [ft]	2	-0.01	930.50	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	I-385 NBCD -
Client:	CECS
Designer:	MEH
Station Number:	374+00

Description:

Embankment I-385 NBCD STA 374+00. Boring B01-SPT-06.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... \I-385\I385 NBCD 374+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 3 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.30	Loose Silty Sand
2	105.00	0.30	Medium Dense Clayey Sand
3	110.00	0.30	Loose to Medium Dense Silty Sand

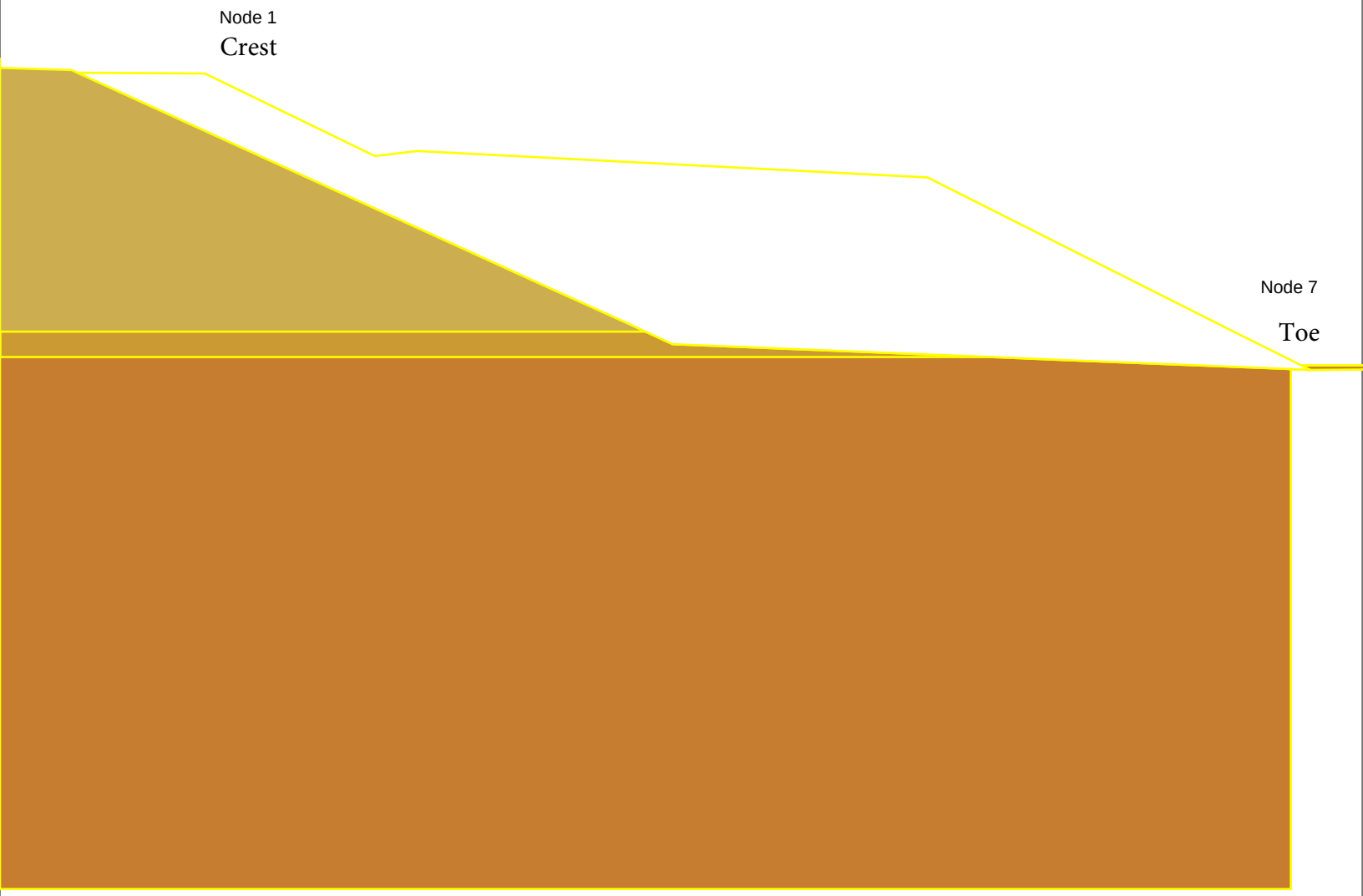
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	941.00
2	-10.00	941.00
3	0.00	941.00
4	50.00	941.00
5	103.00	941.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-65.00	0.00	1	161181	0.3000	0.0008	1003.38	1003.37	0.01
			2	147426	0.3000	-0.0004			
			3	174856	0.3000	0.0103			
2	-40.83	0.00	1	161181	0.3000	0.0465	992.39	992.26	0.13
			2	147426	0.3000	0.0083			
			3	174856	0.3000	0.0753			
3	-16.67	0.00	1	161181	0.3000	0.0393	981.40	981.18	0.22
			2	147426	0.3000	0.0168			
			3	174856	0.3000	0.1604			
4	7.50	0.00	1	161181	0.3000	0.0000	971.40	971.13	0.27
			2	147426	0.3000	0.0153			
			3	174856	0.3000	0.2592			
5	31.67	0.00	1	161181	0.3000	0.0000	970.43	970.17	0.26
			2	147426	0.3000	0.0061			
			3	174856	0.3000	0.2555			
6	55.83	0.00	1	161181	0.3000	0.0000	969.47	969.33	0.14
			2	147426	0.3000	0.0000			
			3	174856	0.3000	0.1379			
7	80.00	0.00	1	161181	0.3000	0.0000	968.50	968.48	0.02
			2	147426	0.3000	0.0000			
			3	174856	0.3000	0.0162			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-110.00	1005.00	Loose Silty Sand
	2	-65.70	1003.70	
	3	1.80	973.00	
	4	5.00	971.50	
	5	42.50	970.00	
	6	80.00	968.50	
	7	150.00	969.00	
2	1	-110.00	973.00	Medium Dense Clayey Sand
	2	1.80	973.00	
	3	5.00	971.50	
	4	42.50	970.00	
	5	80.00	968.50	
	6	150.00	969.00	
3	1	-110.00	970.00	Loose to Medium Dense Silty Sand
	2	42.50	970.00	
	3	80.00	968.50	
	4	150.00	969.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -65.00 [ft]	1	-50.00	1003.30	Embankment Fill
	X2 = 80.00 [ft]	2	-30.00	993.60	
		3	-25.00	994.20	
		4	35.00	991.10	
		5	71.00	973.00	
		6	77.00	970.00	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	I-385 SBCD -
Client:	CECS
Designer:	MEH
Station Number:	102+50

Description:

Embankment I-385 SBCD STA 102+50. Boring R385-36. PWR/GWT B01-SPT-10.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... \I-385\I385 SBCD 102+50 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

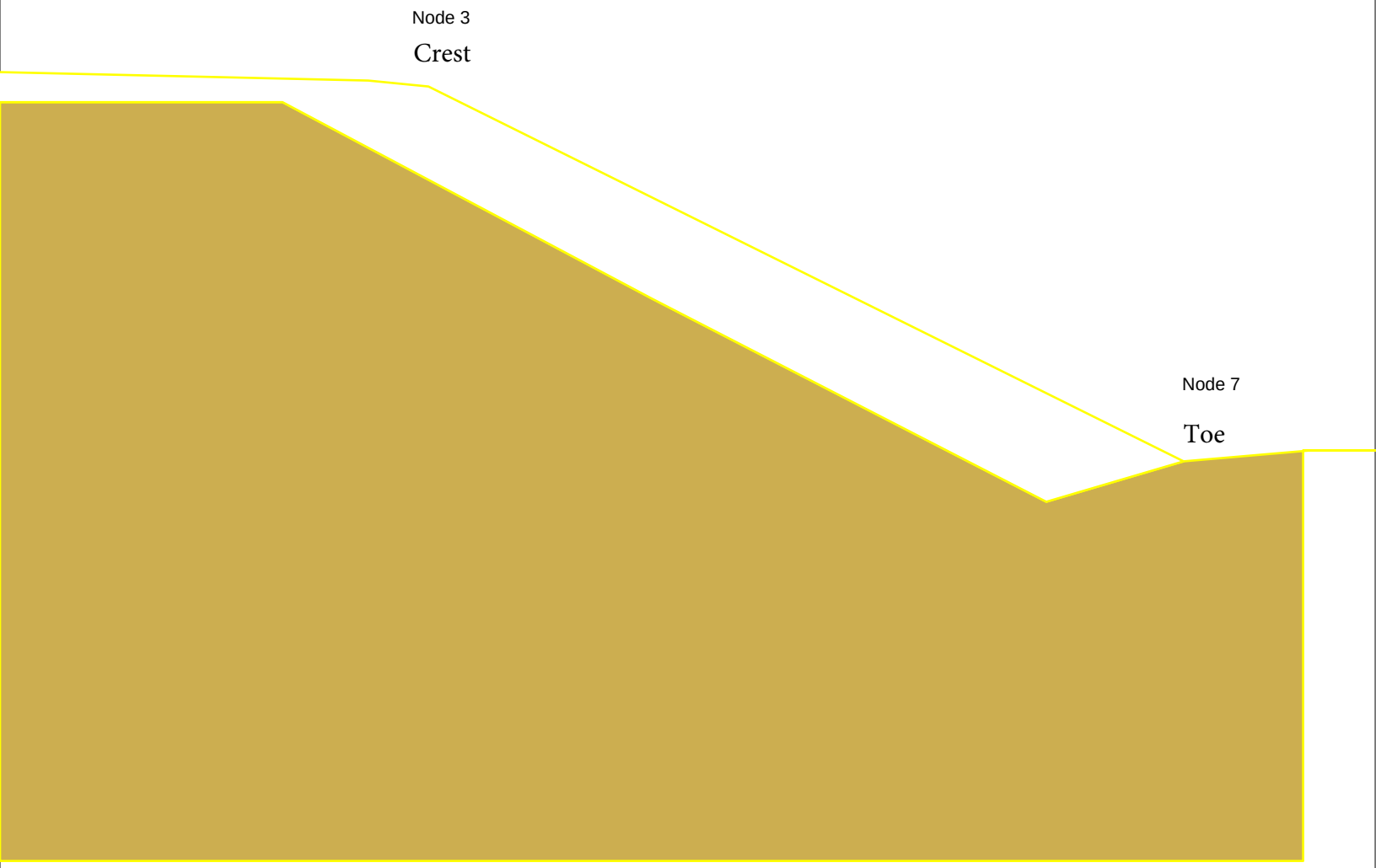
INPUT DATA -- FOUNDATION LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.30	Medium Dense Silty Sand

INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-22.00	0.00	1	438611	0.3000	0.0395	1007.50	1007.46	0.04
2	2.50	0.00	1	438611	0.3000	0.0757	1007.50	1007.42	0.08
3	27.00	0.00	1	438611	0.3000	0.1260	1003.78	1003.66	0.13
4	51.50	0.00	1	438611	0.3000	0.1598	990.77	990.61	0.16
5	76.00	0.00	1	438611	0.3000	0.1465	977.97	977.83	0.15
6	100.50	0.00	1	438611	0.3000	0.1035	965.37	965.27	0.10
7	125.00	0.00	1	438611	0.3000	0.0664	965.70	965.63	0.07

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-22.00	1007.50	Medium Dense Silty Sand
	2	20.00	1007.50	
	3	63.00	984.66	
	4	109.00	961.00	
	5	125.00	965.70	
	6	140.00	967.00	
	7	150.00	967.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -22.01 [ft]	1	-22.00	1011.20	Embankment Fill
	X2 = 125.00 [ft]	2	30.00	1010.00	
		3	37.00	1009.30	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 1 -
Client:	CECS
Designer:	MEH
Station Number:	63+00

Description:

Embankment Ramp 1 STA 63+00. Boring R85-15.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... nkments\Ramp 1\R1 63+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

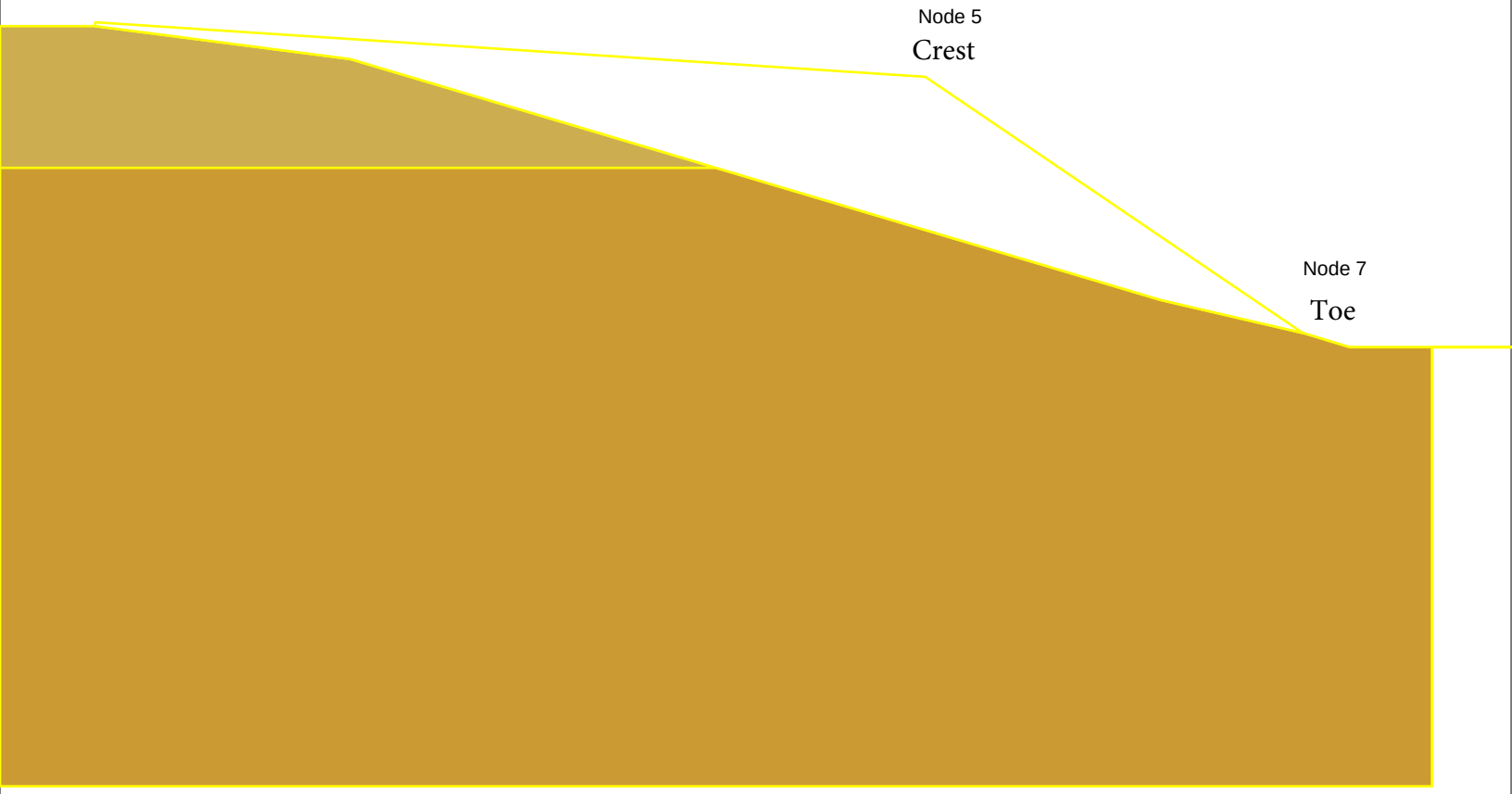
INPUT DATA -- FOUNDATION LAYERS -- 2 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.30	Medium Dense Silty Sand
2	120.00	0.30	Dense to Very Dense Silty Sand

INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-48.00	0.00	1	308693	0.3000	-0.0002	933.00	933.00	-0.00
			2	437797	0.3000	0.0000			
2	-26.67	0.00	1	308693	0.3000	0.0030	930.23	930.23	0.00
			2	437797	0.3000	0.0000			
3	-5.33	0.00	1	308693	0.3000	0.0068	924.86	924.85	0.01
			2	437797	0.3000	0.0000			
4	16.00	0.00	1	308693	0.3000	0.0000	918.53	918.53	0.00
			2	437797	0.3000	0.0000			
5	37.33	0.00	1	308693	0.3000	0.0000	912.21	912.21	0.00
			2	437797	0.3000	0.0000			
6	58.67	0.00	1	308693	0.3000	0.0000	905.88	905.88	0.00
			2	437797	0.3000	0.0000			
7	80.00	0.00	1	308693	0.3000	0.0000	900.50	900.50	0.00
			2	437797	0.3000	0.0000			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-48.00	933.00	Medium Dense Silty Sand
	2	-21.00	929.50	
	3	17.80	918.00	
	4	65.00	904.00	
	5	80.00	900.50	
	6	85.00	899.00	
	7	140.00	899.00	
2	1	-48.00	918.00	Dense to Very Dense Silty Sand
	2	17.80	918.00	
	3	65.00	904.00	
	4	80.00	900.50	
	5	85.00	899.00	
	6	140.00	899.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -48.01 [ft]	1	-48.00	933.40	Embankment Fill
	X2 = 80.00 [ft]	2	40.00	927.60	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 1 -
Client:	CECS
Designer:	MEH
Station Number:	115+50

Description:

Embankment Ramp 1 STA 115+50. Boring R1-06. PWR ~950 ft.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... kments\Ramp 1\R1 115+50 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 3 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.30	Loose Silty Sand
2	110.00	0.30	Medium Dense Silty Sand
3	110.00	0.30	Loose to Medium Dense Silty Sand

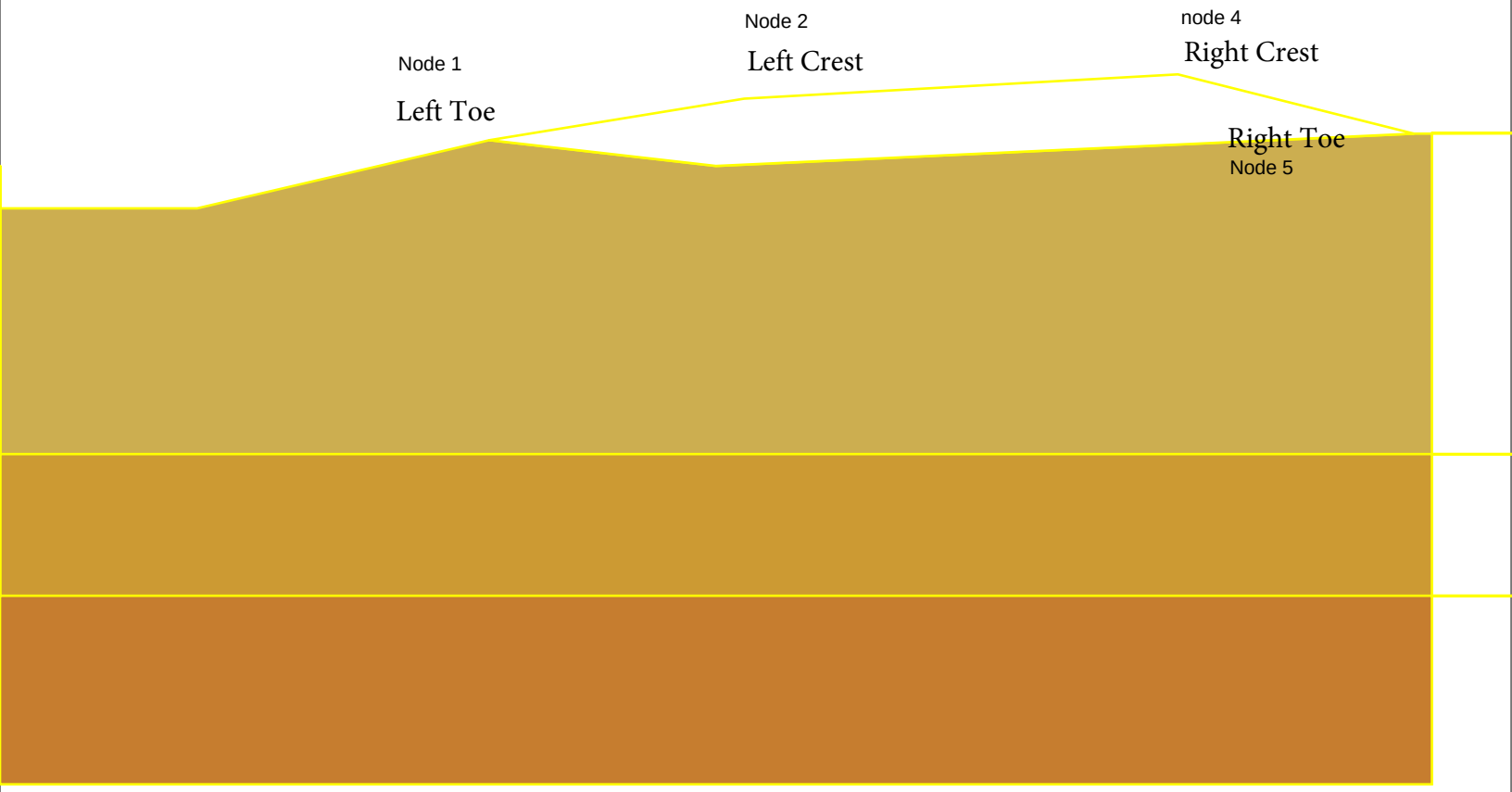
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	968.00
2	-10.00	968.00
3	0.00	968.00
4	50.00	968.00
5	103.00	968.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-49.00	0.00	1	213024	0.3000	0.0048	1008.20	1008.18	0.02
			2	880738	0.3000	0.0022			
			3	186453	0.3000	0.0089			
2	-24.50	0.00	1	213024	0.3000	0.0605	1005.52	1005.44	0.09
			2	880738	0.3000	0.0065			
			3	186453	0.3000	0.0192			
3	0.00	0.00	1	213024	0.3000	0.0748	1006.65	1006.54	0.11
			2	880738	0.3000	0.0085			
			3	186453	0.3000	0.0244			
4	24.50	0.00	1	213024	0.3000	0.0694	1007.77	1007.68	0.10
			2	880738	0.3000	0.0068			
			3	186453	0.3000	0.0199			
5	49.00	0.00	1	213024	0.3000	0.0054	1008.90	1008.88	0.02
			2	880738	0.3000	0.0024			
			3	186453	0.3000	0.0094			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-80.00	1001.00	Loose Silty Sand
	2	-49.00	1008.20	
	3	-25.00	1005.50	
	4	49.00	1008.90	
	5	90.00	1009.00	
2	1	-200.00	975.00	Medium Dense Silty Sand
	2	-160.00	975.00	
	3	80.00	975.00	
	4	110.00	975.00	
	5	140.00	975.00	
3	1	-200.00	960.00	Loose to Medium Dense Silty Sand
	2	-160.00	960.00	
	3	-130.00	960.00	
	4	131.00	960.00	
	5	150.00	960.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -49.00 [ft]	1	-22.00	1012.60	Embankment Fill
	X2 = 49.00 [ft]	2	24.00	1015.20	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 1B -
Client:	CECS
Designer:	MEH
Station Number:	77+00

Description:

Embankment Ramp 1B STA 77+00. Boring W85-1L-02.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... kments\Ramp 1\R1B 77+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

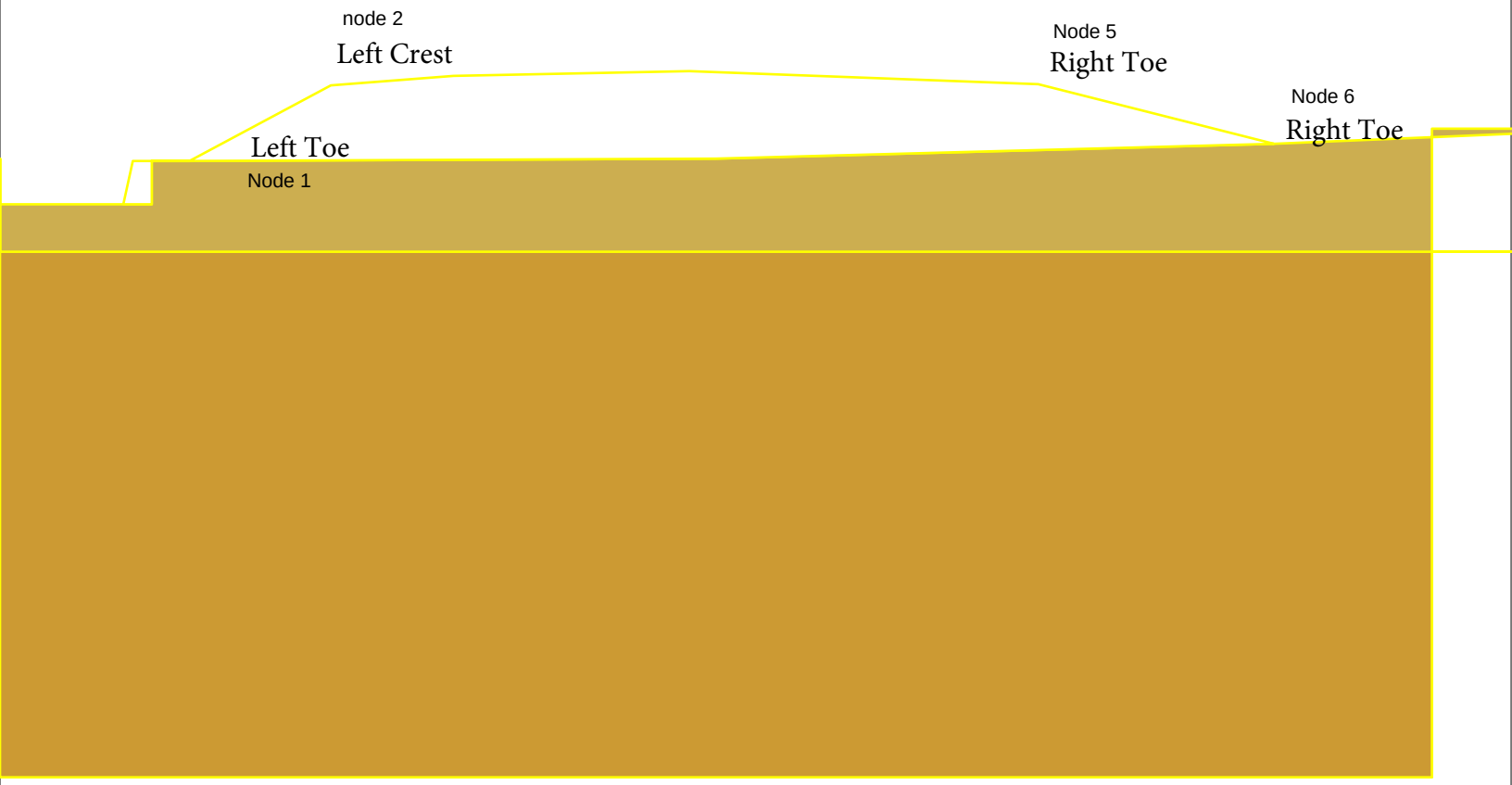
INPUT DATA -- FOUNDATION LAYERS -- 2 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.30	Loose Silty Sand
2	120.00	0.30	Poorly Graded Gravel

INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-60.00	0.00	1	208961	0.3000	0.0000	1005.00	1005.00	0.00
			2	1933420	0.3000	0.0000			
2	-35.60	0.00	1	208961	0.3000	0.0121	1009.68	1009.67	0.01
			2	1933420	0.3000	0.0000			
3	-11.20	0.00	1	208961	0.3000	0.0132	1009.79	1009.78	0.01
			2	1933420	0.3000	0.0000			
4	13.20	0.00	1	208961	0.3000	0.0131	1010.12	1010.11	0.01
			2	1933420	0.3000	0.0000			
5	37.60	0.00	1	208961	0.3000	0.0120	1010.76	1010.75	0.01
			2	1933420	0.3000	0.0000			
6	62.00	0.00	1	208961	0.3000	-0.0004	1011.40	1011.40	-0.00
			2	1933420	0.3000	0.0000			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	-100.00	0.00	945.83	0.00	945.83
2	-85.71	0.00	950.64	0.02	950.62
3	-71.43	0.00	954.71	0.02	954.70
4	-57.14	0.00	961.00	0.00	961.00
5	-42.86	0.00	962.98	0.00	962.98
6	-28.57	0.00	962.82	0.00	962.82

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-100.00	1005.00	Loose Silty Sand
	2	-60.00	1005.00	
	3	-57.01	1005.00	
	4	-57.00	1009.60	
	5	-53.00	1009.60	
	6	2.81	1009.85	
	7	62.00	1011.40	
	8	100.00	1013.00	
2	1	-200.00	1000.00	Poorly Graded Gravel
	2	-160.00	1000.00	
	3	80.00	1000.00	
	4	110.00	1000.00	
	5	140.00	1000.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -60.00 [ft]	1	-59.00	1009.60	Embankment Fill
	X2 = 62.00 [ft]	2	-57.00	1009.60	
		3	-53.00	1009.60	
		4	-38.00	1017.60	
		5	-25.00	1018.60	
		6	0.00	1019.10	
		7	37.00	1017.70	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 2 -
Client:	CECS
Designer:	MEH
Station Number:	62+50

Description:

Embankment Ramp 2 STA 62+50. Boring R2-39. PWR B06-SPT-12.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... nkments\Ramp 2\R2 62+50 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 5 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.30	Stiff to Vey Stiff Plastic Clay
2	100.00	0.30	Loose Clayey Sand
3	105.00	0.30	Stiff to Very Stiif Plastic Clay
4	110.00	0.30	Loose Clayey Sand
5	110.00	0.30	Loose to Medium Dense Silty Sand

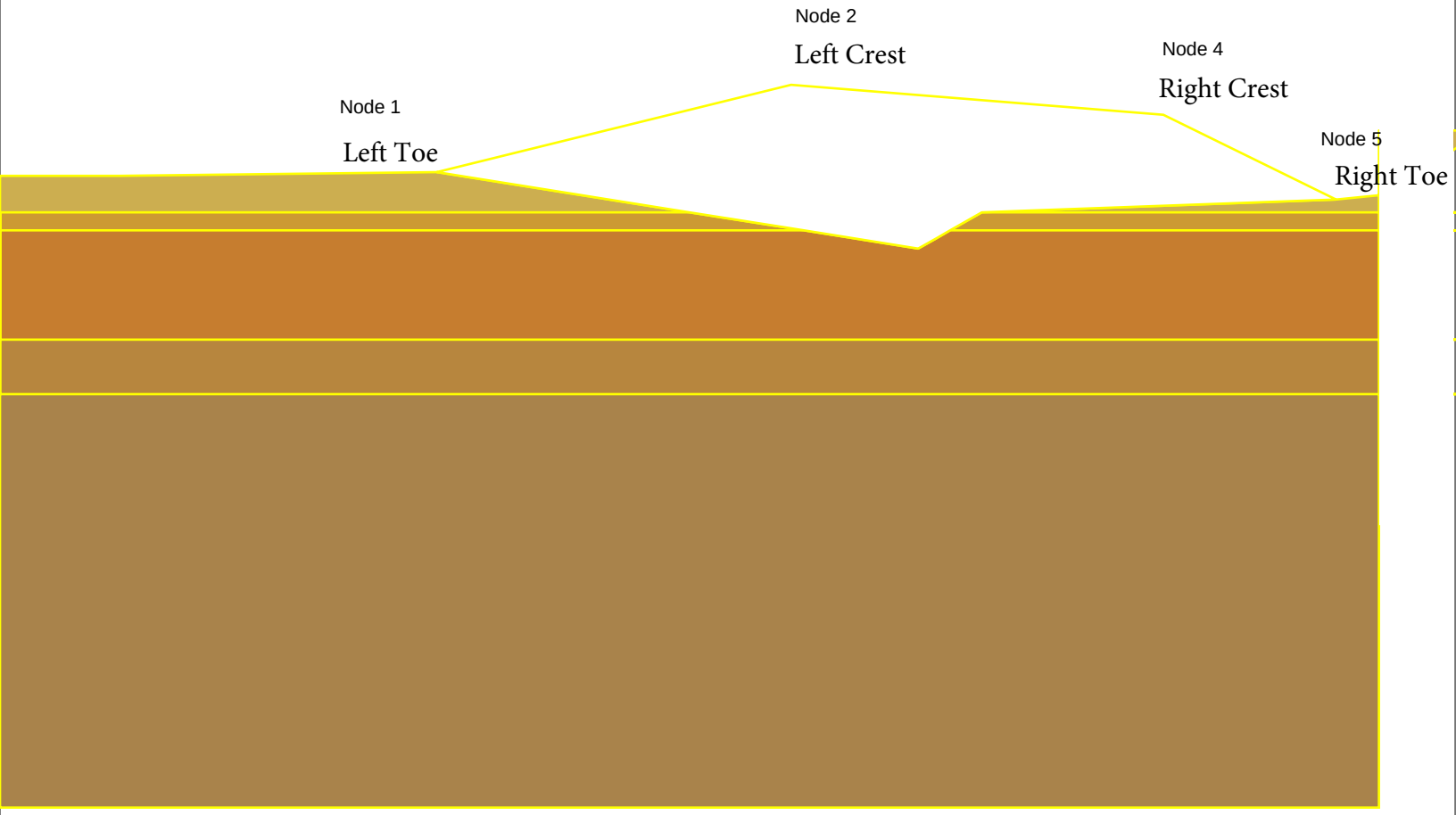
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	986.00
2	-10.00	986.00
3	0.00	986.00
4	50.00	986.00
5	103.00	986.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-65.00	0.00	1	135717	0.3000	-0.0005	1004.40	1004.33	0.07
			2	135717	0.3000	-0.0001			
			3	172177	0.3000	-0.0014			
			4	43637	0.3000	0.0053			
			5	191853	0.3000	0.0699			
2	-40.25	0.00	1	135717	0.3000	0.0029	1000.48	1000.14	0.35
			2	135717	0.3000	0.0088			
			3	172177	0.3000	0.0460			
			4	43637	0.3000	0.1005			
			5	191853	0.3000	0.1869			
3	-15.50	0.00	1	135717	0.3000	0.0000	996.56	996.07	0.48
			2	135717	0.3000	0.0000			
			3	172177	0.3000	0.0701			
			4	43637	0.3000	0.1602			
			5	191853	0.3000	0.2516			
4	9.25	0.00	1	135717	0.3000	0.0031	1000.51	1000.16	0.35
			2	135717	0.3000	0.0094			
			3	172177	0.3000	0.0488			
			4	43637	0.3000	0.1032			
			5	191853	0.3000	0.1898			
5	34.00	0.00	1	135717	0.3000	-0.0001	1001.40	1001.31	0.09
			2	135717	0.3000	-0.0001			
			3	172177	0.3000	-0.0005			
			4	43637	0.3000	0.0098			
			5	191853	0.3000	0.0763			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-100.00	1004.00	Stiff to Vey Stiff Plastic Clay
	2	-65.00	1004.40	
	3	-37.20	1000.00	
	4	-24.60	998.00	
	5	-12.00	996.00	
	6	-8.50	998.00	
	7	-5.00	1000.00	
	8	34.00	1001.40	
	9	40.00	1002.00	
	10	50.00	1009.00	
2	1	-100.00	1000.00	Loose Clayey Sand
	2	-37.20	1000.00	
	3	-24.60	998.00	
	4	-12.00	996.00	
	5	-8.50	998.00	
	6	-5.00	1000.00	
	7	50.00	1000.00	
3	1	-100.00	998.00	Stiff to Very Stiif Plastic Clay
	2	-24.60	998.00	
	3	-12.00	996.00	
	4	-8.50	998.00	
	5	50.00	998.00	
4	1	-110.00	986.00	Loose Clayey Sand
	2	-105.00	986.00	
	3	230.00	986.00	
5	1	-120.00	980.00	Loose to Medium Dense Silty Sand
	2	-10.00	980.00	
	3	230.00	980.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -65.00 [ft]	1	-26.00	1014.00	Embankment Fill
	X2 = 34.00 [ft]	2	15.00	1010.70	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 2A -
Client:	CECS
Designer:	MEH
Station Number:	71+00

Description:

Embankment Ramp 2A STA 71+00. Boring B12-SPT-03.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... kments\Ramp 2\R2A 71+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 6 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.30	Existing Fill ML
2	110.00	0.30	Loose to Medium Dense Silty Sand
3	105.00	0.30	Medium Stiff Plastic Silt
4	105.00	0.30	Loose Silty Sand
5	110.00	0.30	Medium Dense Silty Sand
6	120.00	0.30	Dense to Very Dense Silty Sand

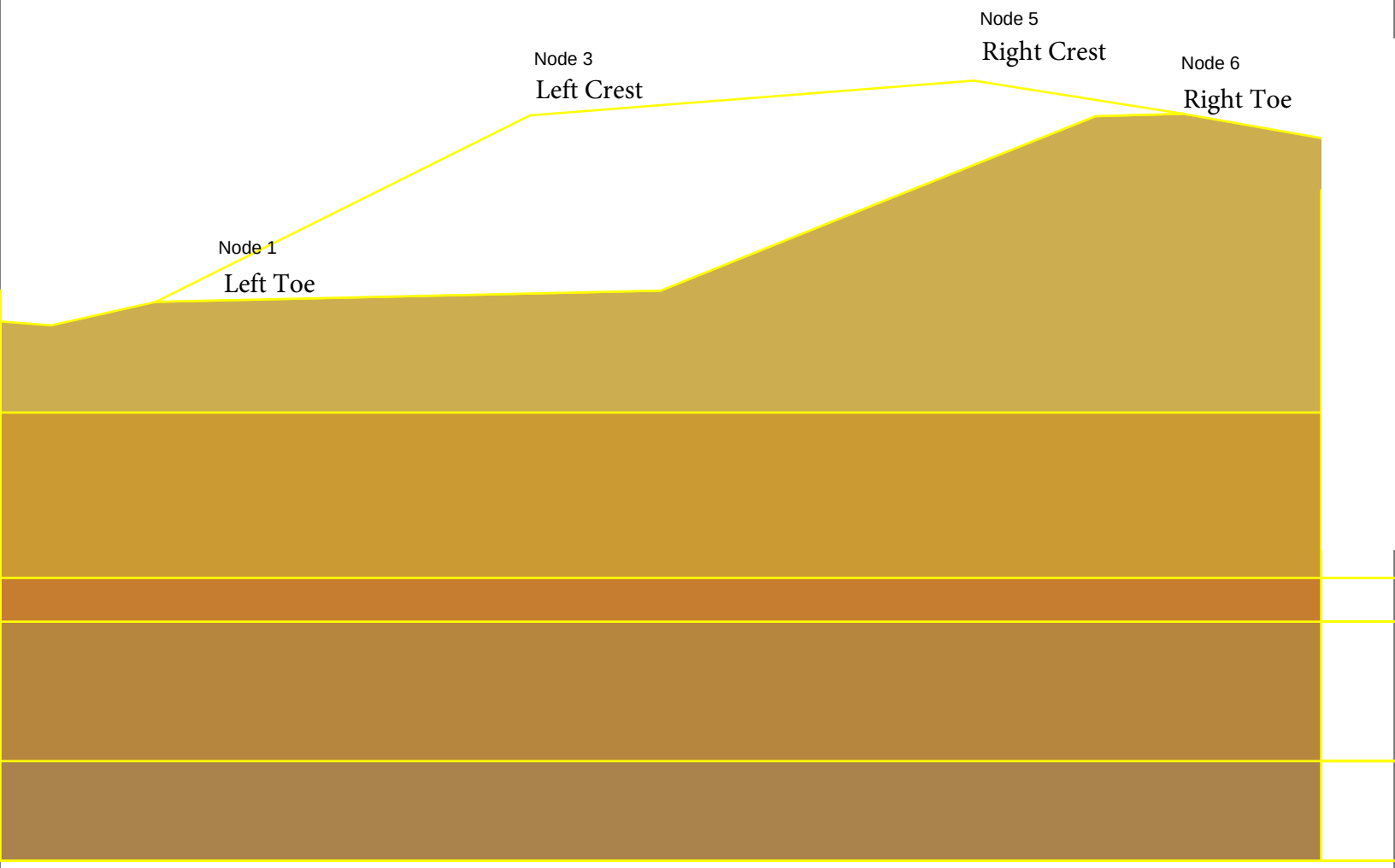
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	940.00
2	-10.00	940.00
3	0.00	940.00
4	50.00	940.00
5	103.00	940.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-68.00	0.00	1	119828	0.3000	-0.0033	994.70	994.57	0.13
			2	108660	0.3000	0.0168			
			3	60754	0.3000	0.0191			
			4	87754	0.3000	0.0555			
			5	401588	0.3000	0.0274			
			6	546669	0.3000	0.0106			
2	-44.40	0.00	1	119828	0.3000	0.0793	995.23	994.73	0.50
			2	108660	0.3000	0.1382			
			3	60754	0.3000	0.0701			
			4	87754	0.3000	0.1466			
			5	401588	0.3000	0.0503			
			6	546669	0.3000	0.0162			
3	-20.80	0.00	1	119828	0.3000	0.1564	995.76	994.94	0.82
			2	108660	0.3000	0.2451			
			3	60754	0.3000	0.1121			
			4	87754	0.3000	0.2175			
			5	401588	0.3000	0.0664			
			6	546669	0.3000	0.0198			
4	2.80	0.00	1	119828	0.3000	0.1773	1001.12	1000.34	0.78
			2	108660	0.3000	0.2149			
			3	60754	0.3000	0.1023			
			4	87754	0.3000	0.2026			
			5	401588	0.3000	0.0635			
			6	546669	0.3000	0.0192			
5	26.40	0.00	1	119828	0.3000	0.1370	1010.56	1010.08	0.48
			2	108660	0.3000	0.1052			
			3	60754	0.3000	0.0555			
			4	87754	0.3000	0.1211			
			5	401588	0.3000	0.0443			
			6	546669	0.3000	0.0148			
6	50.00	0.00	1	119828	0.3000	-0.0120	1016.30	1016.22	0.08
			2	108660	0.3000	0.0049			
			3	60754	0.3000	0.0119			
			4	87754	0.3000	0.0401			
			5	401588	0.3000	0.0225			
			6	546669	0.3000	0.0092			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	-100.00	0.00	945.83	0.00	945.83
2	-85.71	0.00	950.64	0.02	950.62
3	-71.43	0.00	954.71	0.02	954.70
4	-57.14	0.00	961.00	0.00	961.00
5	-42.86	0.00	962.98	0.00	962.98
6	-28.57	0.00	962.82	0.00	962.82

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-120.00	995.00	Existing Fill ML
	2	-80.00	992.00	
	3	-68.00	994.70	
	4	-10.00	996.00	
	5	40.00	1016.00	
	6	50.00	1016.30	
	7	100.00	1007.50	
2	1	-160.00	982.00	Loose to Medium Dense Silty Sand
	2	80.00	982.00	
	3	140.00	982.00	
3	1	-160.00	963.00	Medium Stiff Plastic Silt
	2	-130.00	963.00	
	3	150.00	963.00	
4	1	-130.00	958.00	Loose Silty Sand
	2	-105.00	958.00	
	3	230.00	958.00	
5	1	-120.00	942.00	Medium Dense Silty Sand
	2	-10.00	942.00	
	3	230.00	942.00	
6	1	-120.00	915.00	Dense to Very Dense Silty Sand
	2	10.00	915.00	
	3	230.00	915.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -68.00 [ft]	1	-25.00	1016.10	Embankment Fill
	X2 = 50.00 [ft]	2	26.00	1020.10	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 3 -
Client:	CECS
Designer:	MEH
Station Number:	40+50

Description:

Embankment Ramp 3 STA 40+50. Boring R3-38. PWR B12-SPT-01.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... nkments\Ramp 3\R3 40+50 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 2 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.30	Loose Silty Sand
2	110.00	0.30	Medium Dense Silty Sand

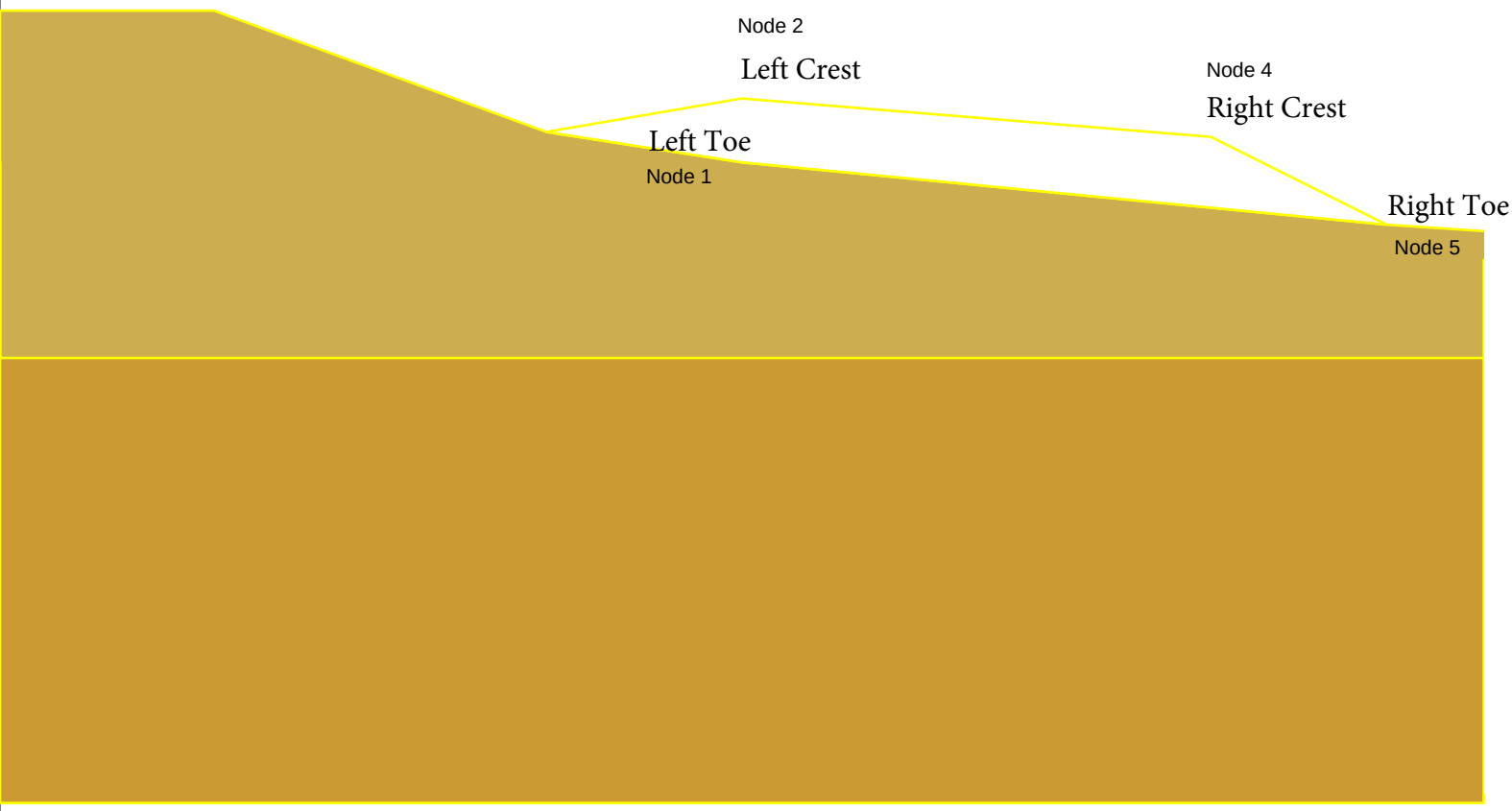
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	990.00
2	-10.00	990.00
3	0.00	990.00
4	50.00	990.00
5	103.00	990.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-46.00	0.00	1	142051	0.3000	0.0023	1010.10	1010.05	0.05
			2	264771	0.3000	0.0515			
2	-24.50	0.00	1	142051	0.3000	0.0586	1006.85	1006.70	0.16
			2	264771	0.3000	0.0968			
3	-3.00	0.00	1	142051	0.3000	0.0605	1004.77	1004.59	0.18
			2	264771	0.3000	0.1179			
4	18.50	0.00	1	142051	0.3000	0.0525	1002.68	1002.53	0.16
			2	264771	0.3000	0.1027			
5	40.00	0.00	1	142051	0.3000	0.0043	1000.60	1000.54	0.06
			2	264771	0.3000	0.0565			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-80.00	1022.50	Loose Silty Sand
	2	-46.00	1010.10	
	3	-26.00	1007.00	
	4	40.00	1000.60	
	5	96.00	997.00	
2	1	-160.00	987.00	Medium Dense Silty Sand
	2	80.00	987.00	
	3	140.00	987.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -46.00 [ft]	1	-26.00	1013.50	Embankment Fill
	X2 = 40.00 [ft]	2	22.00	1009.60	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 8 - 8A
Client:	CECS
Designer:	MEH
Station Number:	21+00

Description:

Embankment Ramp 8-8A STA 21+00. Boring W385-2R-04.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... nkments\Ramp 8\R8 21+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

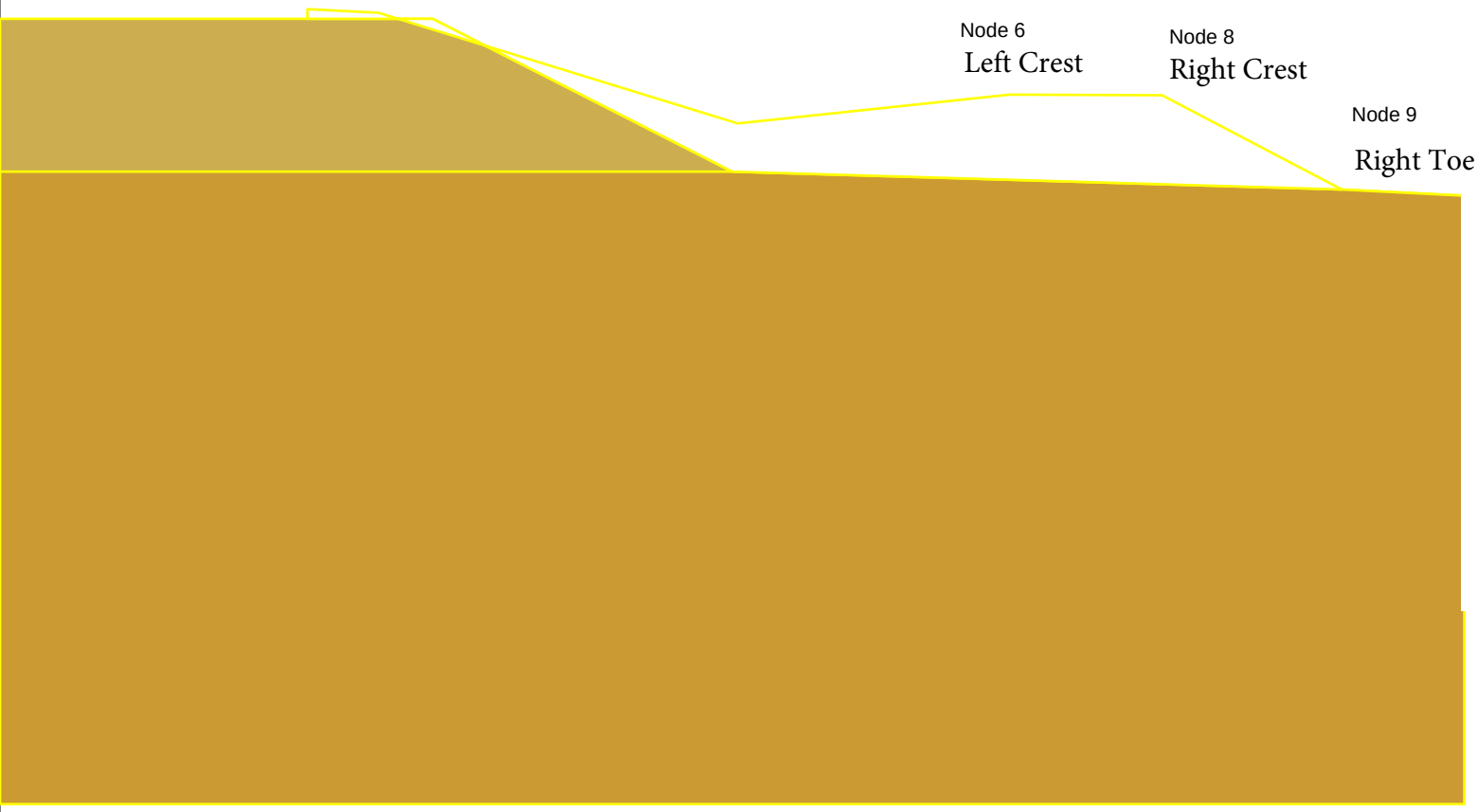
INPUT DATA -- FOUNDATION LAYERS -- 2 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.30	Loose to Medium Dense Clayey Sand
2	120.00	0.30	Dense Silty Sand

INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-143.00	0.00	1	128606	0.3000	0.0041	992.00	992.00	0.00
			2	304834	0.3000	-0.0002			
2	-119.25	0.00	1	128606	0.3000	-0.0065	991.62	991.62	-0.01
			2	304834	0.3000	-0.0000			
3	-95.50	0.00	1	128606	0.3000	0.0191	979.53	979.51	0.02
			2	304834	0.3000	0.0014			
4	-71.75	0.00	1	128606	0.3000	0.0141	967.44	967.42	0.02
			2	304834	0.3000	0.0038			
5	-48.00	0.00	1	128606	0.3000	0.0000	963.50	963.49	0.00
			2	304834	0.3000	0.0043			
6	-24.25	0.00	1	128606	0.3000	0.0000	962.80	962.80	0.00
			2	304834	0.3000	0.0033			
7	-0.50	0.00	1	128606	0.3000	0.0000	962.10	962.10	0.00
			2	304834	0.3000	0.0012			
8	23.25	0.00	1	128606	0.3000	0.0000	961.40	961.40	0.00
			2	304834	0.3000	0.0000			
9	47.00	0.00	1	128606	0.3000	0.0000	960.70	960.70	0.00
			2	304834	0.3000	0.0000			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-143.00	992.00	Loose to Medium Dense Clayey Sand
	2	-120.00	992.00	
	3	-65.00	964.00	
	4	47.00	960.70	
	5	100.00	958.00	
2	1	-160.00	964.00	Dense Silty Sand
	2	-65.00	964.00	
	3	47.00	960.70	
	4	100.00	958.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -143.01 [ft]	1	-143.00	993.80	Embankment Fill
	X2 = 47.00 [ft]	2	-130.00	993.10	
		3	-64.00	972.80	
		4	-14.00	978.10	
		5	14.00	978.00	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

Version 2.0 FoSSA Version 2.0
FoSSA -- Foundation Stress & Settlement Analysis I85/385 Interchange Improvements
Present Date/Time: Fri Oct 30 13:32:58 2015 I:\.....01 Final Reports\Roadway\Settlement Embankments\Ramp 8\R8 21+00 Settlement Estimate_2D.2ST
Version 2.0 FoSSA Version 2.0

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	USER'S DESCRIPTION
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

Version 2.0 FoSSA Version 2.0
I85/385 Interchange Improvements Page 9 of 9

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 9 -
Client:	CECS
Designer:	MEH
Station Number:	52+50

Description:

Embankment Ramp 9 STA 52+50. Boring B01-SPT-01.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... nkments\Ramp 9\R9 52+50 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

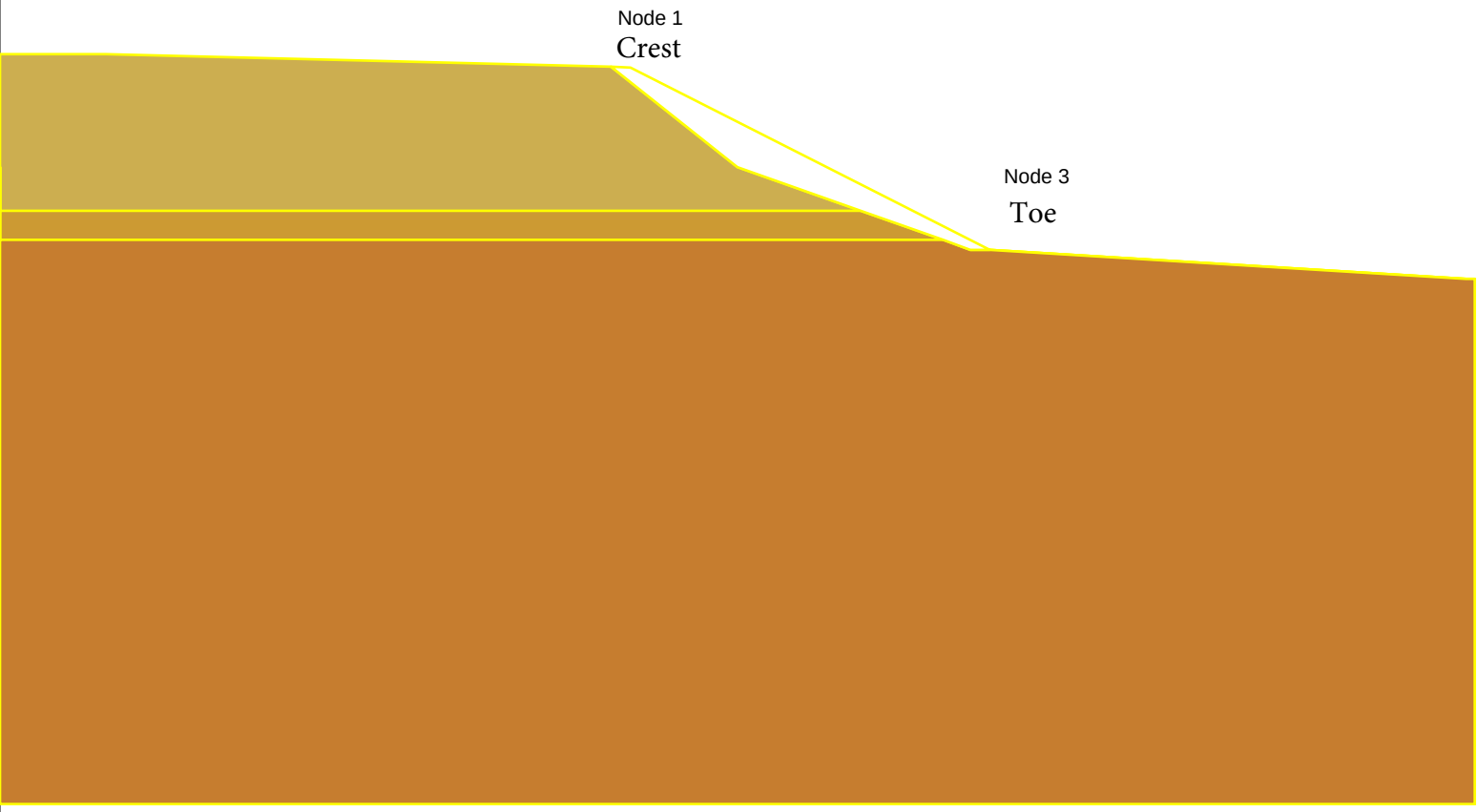
INPUT DATA -- FOUNDATION LAYERS -- 3 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.30	Loose to Medium Dense Clayey Sand
2	105.00	0.30	Loose Silty Sand
3	105.00	0.30	Loose to Medium Dense Clayey Sand

INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	12.00	0.00	1	104141	0.3000	0.0031	997.80	997.79	0.01
			2	141478	0.3000	0.0008			
			3	93044	0.3000	0.0072			
2	31.50	0.00	1	104141	0.3000	0.0055	985.20	985.16	0.04
			2	141478	0.3000	0.0061			
			3	93044	0.3000	0.0255			
3	51.00	0.00	1	104141	0.3000	0.0000	979.00	979.00	0.00
			2	141478	0.3000	0.0000			
			3	93044	0.3000	0.0038			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-40.00	999.10	Loose to Medium Dense Clayey Sand
	2	12.00	997.80	
	3	25.00	987.50	
	4	37.70	983.00	
	5	46.20	980.00	
	6	49.00	979.00	
	7	51.00	979.00	
	8	100.00	976.00	
2	1	-40.00	983.00	Loose Silty Sand
	2	37.70	983.00	
	3	46.20	980.00	
	4	49.00	979.00	
	5	51.00	979.00	
	6	100.00	976.00	
3	1	-40.00	980.00	Loose to Medium Dense Clayey Sand
	2	46.20	980.00	
	3	49.00	979.00	
	4	51.00	979.00	
	5	100.00	976.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = 12.00 [ft] X2 = 51.00 [ft]	1	14.00	997.70	Embankment Fill

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title: I85/385 Interchange Improvements
Project Number: I-385 NBCD -
Client: CECS
Designer: MEH
Station Number: 368+00

Description:
MSE Wall I-385 NBCD STA 368+00. Boring W385-2L-03.

Company's information:

Name: ECS Carolinas, LLP
Street: 1812 Centerpark Drive, Suite D
Charlotte, NC 28217
Telephone #: (704) 525-5152
Fax #: (704) 357-0023
E-Mail:

Original file path and name: I:\2GEOTEC ..... d NBCD\I385 NBCD 368+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 2 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.30	ML
2	105.00	0.30	Medium Dense SM

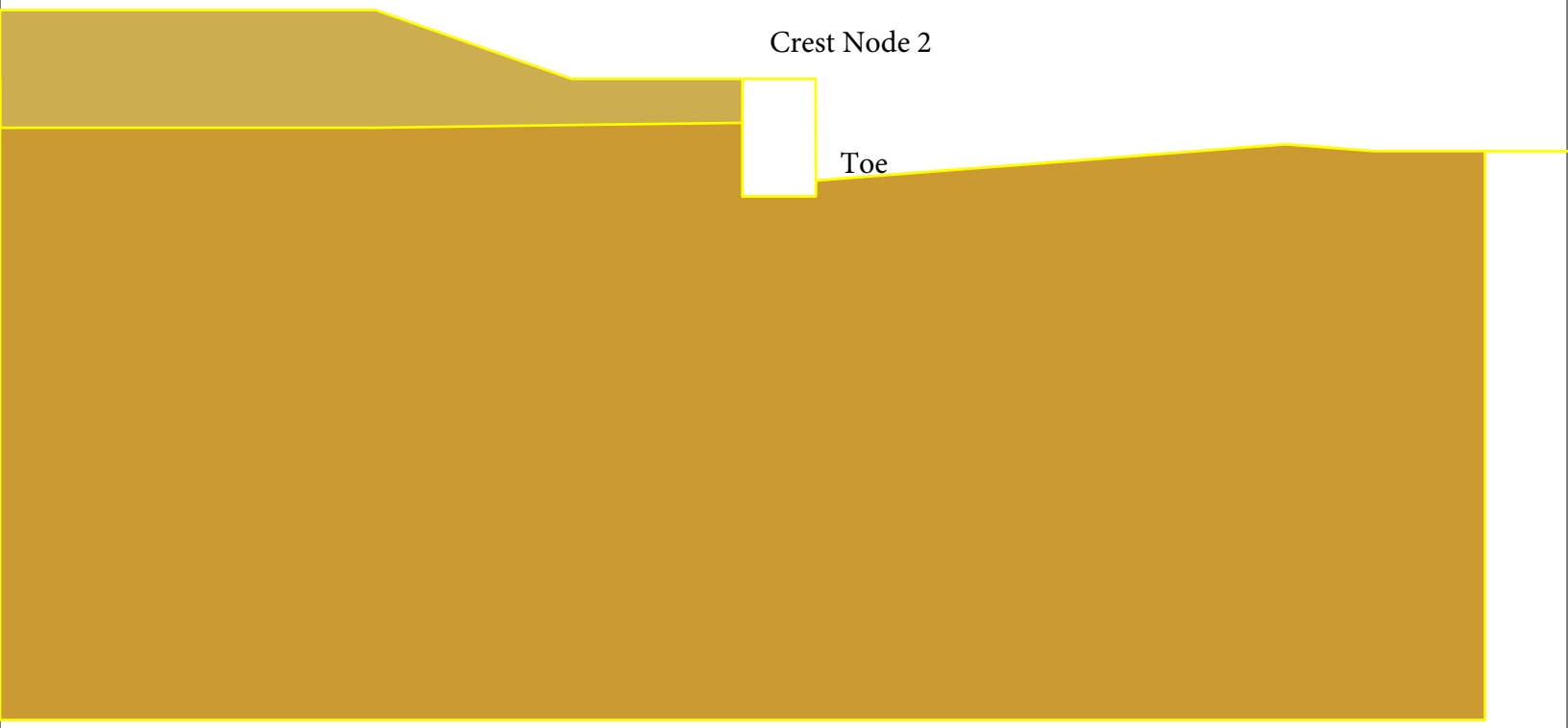
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	958.00
2	-10.00	958.00
3	0.00	958.00
4	50.00	958.00
5	103.00	958.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-32.00	0.00	1	257211	0.3000	0.0000	958.00	958.00	0.00
			2	375180	0.3000	0.0027			
2	-25.00	0.00	1	257211	0.3000	0.0000	959.60	959.60	0.00
			2	375180	0.3000	0.0023			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-70.00	977.00	ML
	2	-50.00	970.00	
	3	-32.51	970.00	
	4	-32.50	958.00	
	5	-25.01	958.00	
	6	-25.00	959.60	
	7	23.00	963.30	
	8	32.00	962.60	
2	1	-70.00	965.00	Medium Dense SM
	2	-32.51	965.50	
	3	-32.50	958.00	
	4	-25.01	958.00	
	5	-25.00	959.60	
	6	23.00	963.30	
	7	32.00	962.60	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -32.51 [ft]	1	-32.50	970.00	Embankment Fill
	X2 = -25.00 [ft]	2	-25.01	970.00	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title: I85/385 Interchange Improvements
Project Number: Ramp 1A -
Client: CECS
Designer: MEH
Station Number: 70+50

Description:
MSE Wall Ramp 1A STA 70+50. Boring W1A-1R-10.

Company's information:

Name: ECS Carolinas, LLP
Street: 1812 Centerpark Drive, Suite D
Charlotte, NC 28217
Telephone #: (704) 525-5152
Fax #: (704) 357-0023
E-Mail:

Original file path and name: I:\2GEOTEC ..... amp 1A and 1B\R1A 70+50 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 3 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.30	Medium Dense SM
2	110.00	0.30	Very Stiff MH
3	105.00	0.30	Loose to Medium Dense SM

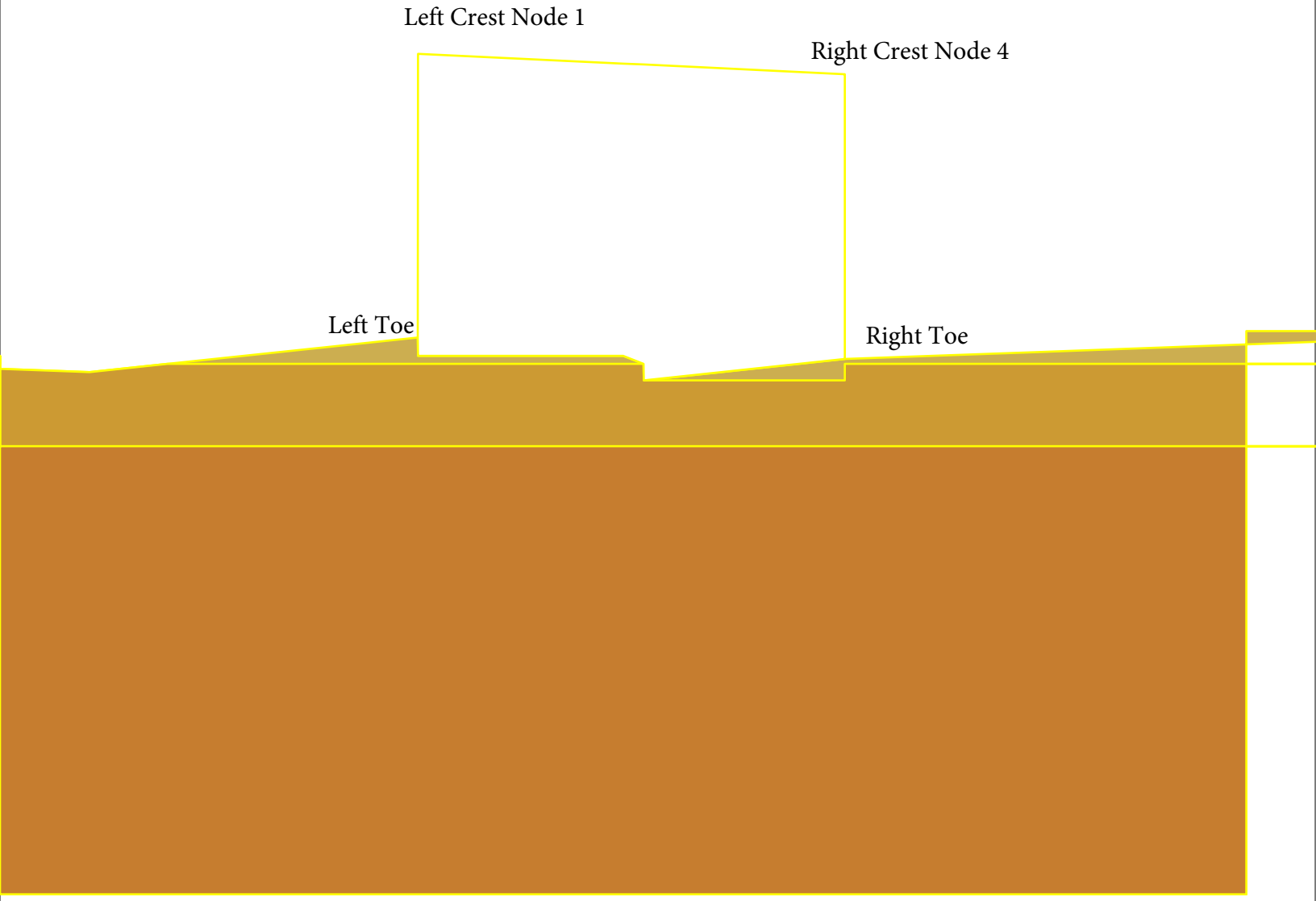
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	964.00
2	-10.00	964.00
3	0.00	964.00
4	50.00	964.00
5	103.00	964.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-25.00	0.00	1	379930	0.3000	0.0046	985.00	984.75	0.25
			2	292692	0.3000	0.0409			
			3	200783	0.3000	0.2064			
2	-7.67	0.00	1	379930	0.3000	0.0073	985.00	984.58	0.42
			2	292692	0.3000	0.0821			
			3	200783	0.3000	0.3349			
3	9.67	0.00	1	379930	0.3000	0.0059	982.76	982.37	0.39
			2	292692	0.3000	0.0700			
			3	200783	0.3000	0.3171			
4	27.00	0.00	1	379930	0.3000	0.0069	984.60	984.41	0.19
			2	292692	0.3000	0.0285			
			3	200783	0.3000	0.1522			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	-100.00	0.00	945.83	0.00	945.83
2	-85.71	0.00	950.64	0.02	950.62
3	-71.43	0.00	954.71	0.02	954.70
4	-57.14	0.00	961.00	0.00	961.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-120.00	985.00	Medium Dense SM
	2	-92.50	984.00	
	3	-65.00	983.00	
	4	-55.50	984.00	
	5	-25.01	987.20	
	6	-25.00	985.00	
	7	0.00	985.00	
	8	2.50	984.00	
	9	2.51	982.00	
	10	27.00	984.60	
	11	120.00	988.00	
2	1	-120.00	984.00	Very Stiff MH
	2	-92.50	984.00	
	3	-65.00	983.00	
	4	-55.50	984.00	
	5	2.50	984.00	
	6	2.51	982.00	
	7	27.00	982.00	
	8	27.01	984.00	
	9	120.00	984.00	
3	1	-200.00	974.00	Loose to Medium Dense SM
	2	-160.00	974.00	
	3	-130.00	974.00	
	4	-110.00	974.00	
	5	-105.00	974.00	
	6	-93.00	974.00	
	7	131.00	974.00	
	8	150.00	974.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -25.01 [ft]	1	-25.00	1021.70	Embankment Fill
	X2 = 27.01 [ft]	2	0.00	1020.50	
		3	2.50	1020.40	
		4	27.00	1019.20	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
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10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 1B -
Client:	CECS
Designer:	MEH
Station Number:	76+00

Description:

MSE Wall Ramp 1B STA 76+00. Boring W85-1L-03.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... amp 1A and 1B\R1B 76+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

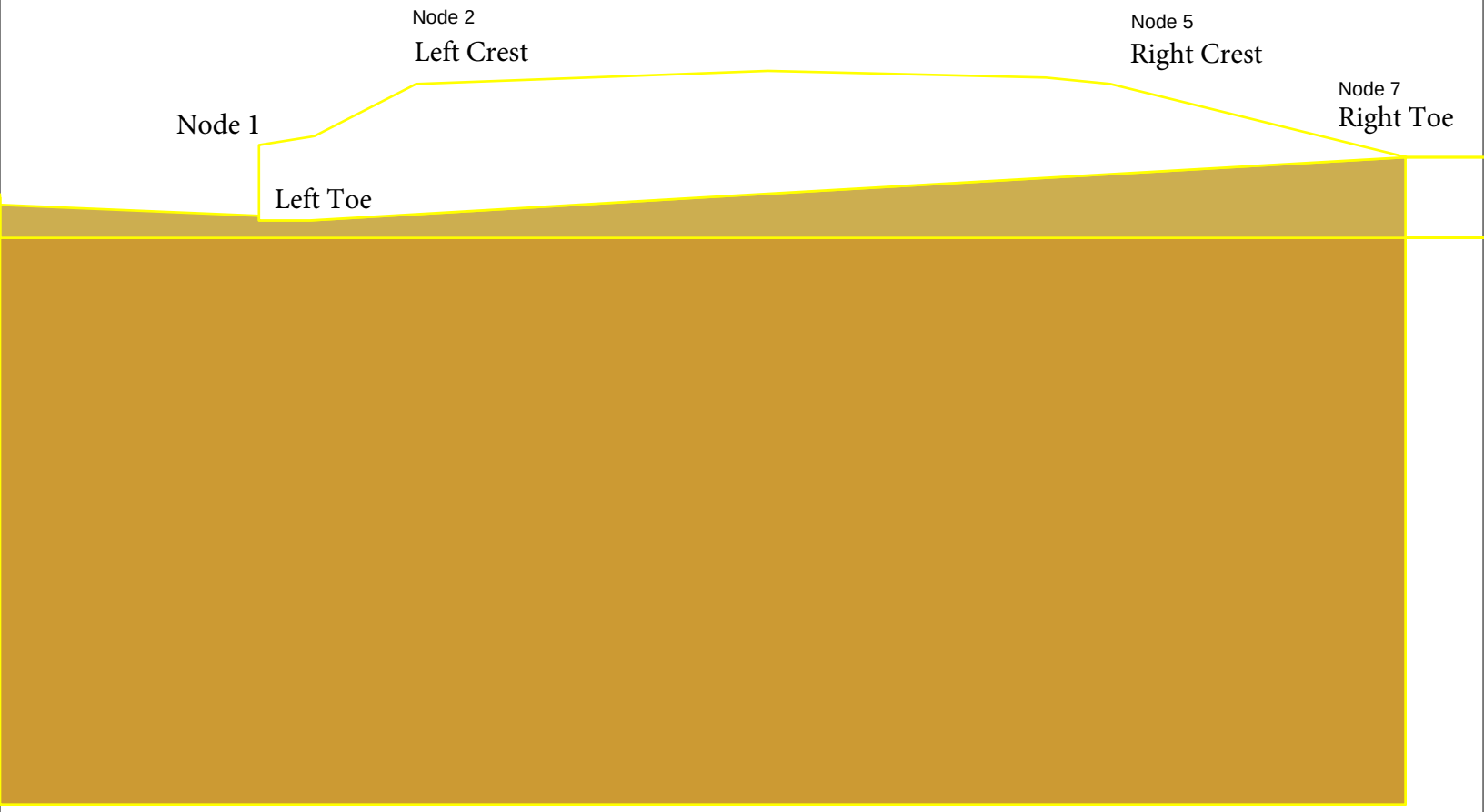
INPUT DATA -- FOUNDATION LAYERS -- 2 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.30	Medium Dense SM
2	115.00	0.30	Dense Silty Sand

INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-55.00	0.00	1	574644	0.3000	0.0010	1001.90	1001.90	0.00
			2	1420992	0.3000	0.0005			
2	-34.33	0.00	1	574644	0.3000	0.0043	1002.79	1002.78	0.01
			2	1420992	0.3000	0.0020			
3	-13.67	0.00	1	574644	0.3000	0.0060	1004.00	1003.99	0.01
			2	1420992	0.3000	0.0019			
4	7.00	0.00	1	574644	0.3000	0.0070	1005.18	1005.17	0.01
			2	1420992	0.3000	0.0018			
5	27.67	0.00	1	574644	0.3000	0.0077	1006.35	1006.34	0.01
			2	1420992	0.3000	0.0016			
6	48.33	0.00	1	574644	0.3000	0.0050	1007.53	1007.52	0.01
			2	1420992	0.3000	0.0009			
7	69.00	0.00	1	574644	0.3000	-0.0002	1008.70	1008.70	-0.00
			2	1420992	0.3000	-0.0000			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	-100.00	0.00	945.83	0.00	945.83
2	-85.71	0.00	950.64	0.02	950.62
3	-71.43	0.00	954.71	0.02	954.70
4	-57.14	0.00	961.00	0.00	961.00
5	-42.86	0.00	962.98	0.00	962.98
6	-28.57	0.00	962.82	0.00	962.82
7	-14.29	0.00	962.66	0.00	962.66

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-110.00	1004.70	Medium Dense SM
	2	-55.01	1002.40	
	3	-55.00	1001.90	
	4	-49.50	1001.90	
	5	-7.06	1004.38	
	6	69.00	1008.70	
2	1	-200.00	1000.00	Dense Silty Sand
	2	-160.00	1000.00	
	3	80.00	1000.00	
	4	93.00	1000.00	
	5	110.00	1000.00	
	6	140.00	1000.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -55.01 [ft]	1	-55.00	1010.00	Embankment Fill
	X2 = 69.00 [ft]	2	-49.50	1010.90	
		3	-49.00	1011.00	
		4	-38.00	1016.60	
		5	0.00	1018.00	
		6	30.00	1017.30	
		7	37.00	1016.60	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title: I85/385 Interchange Improvements
Project Number: Ramp 2B -
Client: CECS
Designer: MEH
Station Number: 40+50

Description:
MSE Wall Ramp 2B STA 40+50. Boring W2B-1R-03.

Company's information:

Name: ECS Carolinas, LLP
Street: 1812 Centerpark Drive, Suite D
Charlotte, NC 28217
Telephone #: (704) 525-5152
Fax #: (704) 357-0023
E-Mail:

Original file path and name: I:\2GEOTEC ..... Walls\Ramp 2B\R2B 40+50 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 3 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.30	Loose to Medium Dense SM
2	110.00	0.30	Medium Dense SC
3	105.00	0.30	Loose to Medium Dense SM

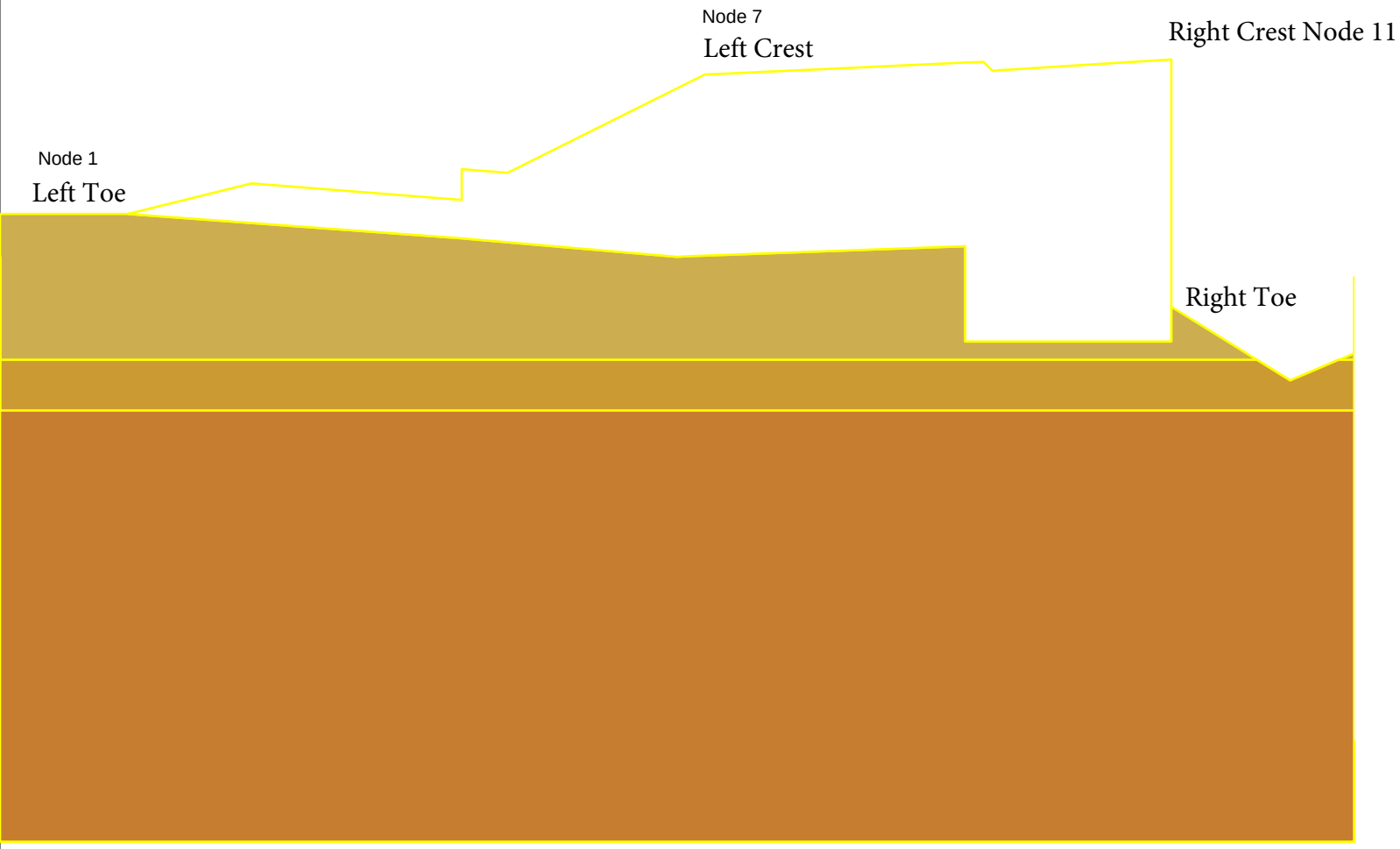
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	953.00
2	-10.00	953.00
3	0.00	953.00
4	50.00	953.00
5	103.00	953.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-215.00	0.00	1	269117	0.3000	-0.0046	1002.80	1002.80	-0.00
			2	199798	0.3000	-0.0011			
			3	255709	0.3000	0.0022			
2	-192.20	0.00	1	269117	0.3000	0.0402	1001.14	1001.07	0.07
			2	199798	0.3000	0.0135			
			3	255709	0.3000	0.0195			
3	-169.40	0.00	1	269117	0.3000	0.0463	999.49	999.38	0.11
			2	199798	0.3000	0.0245			
			3	255709	0.3000	0.0388			
4	-146.60	0.00	1	269117	0.3000	0.0514	997.83	997.68	0.16
			2	199798	0.3000	0.0407			
			3	255709	0.3000	0.0650			
5	-123.80	0.00	1	269117	0.3000	0.1144	995.95	995.65	0.30
			2	199798	0.3000	0.0751			
			3	255709	0.3000	0.1120			
6	-101.00	0.00	1	269117	0.3000	0.1840	994.01	993.54	0.47
			2	199798	0.3000	0.1211			
			3	255709	0.3000	0.1643			
7	-78.20	0.00	1	269117	0.3000	0.2239	994.11	993.53	0.58
			2	199798	0.3000	0.1520			
			3	255709	0.3000	0.2046			
8	-55.40	0.00	1	269117	0.3000	0.2371	994.95	994.30	0.64
			2	199798	0.3000	0.1688			
			3	255709	0.3000	0.2380			
9	-32.60	0.00	1	269117	0.3000	0.3125	995.78	995.01	0.77
			2	199798	0.3000	0.1991			
			3	255709	0.3000	0.2566			
10	-9.80	0.00	1	269117	0.3000	0.0626	975.00	974.48	0.52
			2	199798	0.3000	0.2065			
			3	255709	0.3000	0.2545			
11	13.00	0.00	1	269117	0.3000	0.0324	975.00	974.70	0.30
			2	199798	0.3000	0.1171			
			3	255709	0.3000	0.1532			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	-100.00	0.00	945.83	0.00	945.83
2	-85.71	0.00	950.64	0.02	950.62
3	-71.43	0.00	954.71	0.02	954.70
4	-57.14	0.00	961.00	0.00	961.00
5	-42.86	0.00	962.98	0.00	962.98
6	-28.57	0.00	962.82	0.00	962.82
7	-14.29	0.00	962.66	0.00	962.66
8	0.00	0.00	962.50	0.00	962.50
9	14.29	0.00	962.37	0.00	962.37
10	28.57	0.00	962.24	0.00	962.24
11	42.86	0.00	962.11	0.00	962.11

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-215.00	1002.80	Loose to Medium Dense SM
	2	-142.00	997.50	
	3	-95.00	993.50	
	4	-32.01	995.80	
	5	-32.00	975.00	
	6	13.00	975.00	
	7	13.01	982.60	
	8	31.70	971.00	
	9	39.00	966.50	
	10	49.60	971.00	
	11	92.00	989.00	
	12	130.00	989.00	
2	1	-215.00	971.00	Medium Dense SC
	2	31.70	971.00	
	3	39.00	966.50	
	4	49.60	971.00	
	5	130.00	971.00	
3	1	-200.00	960.00	Loose to Medium Dense SM
	2	-105.00	960.00	
	3	-93.00	960.00	
	4	131.00	960.00	
	5	150.00	960.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -215.00 [ft]	1	-188.00	1009.50	Embankment Fill
	X2 = 13.01 [ft]	2	-142.01	1005.90	
		3	-142.00	1012.60	
		4	-137.00	1012.20	
		5	-132.00	1011.80	
		6	-89.00	1033.20	
		7	-32.00	1035.80	
		8	-28.00	1036.00	
		9	-26.00	1034.00	
		10	-25.00	1034.10	
		11	13.00	1036.50	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
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10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
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13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 2B -
Client:	CECS
Designer:	MEH
Station Number:	44+00

Description:

MSE Wall Ramp 2B STA 44+00. Boring W2B-1R-04.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... Walls\Ramp 2B\R2B 44+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 3 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.30	Medium Dense SM
2	105.00	0.30	Loose SM
3	110.00	0.30	Medium Dense to Dense SM

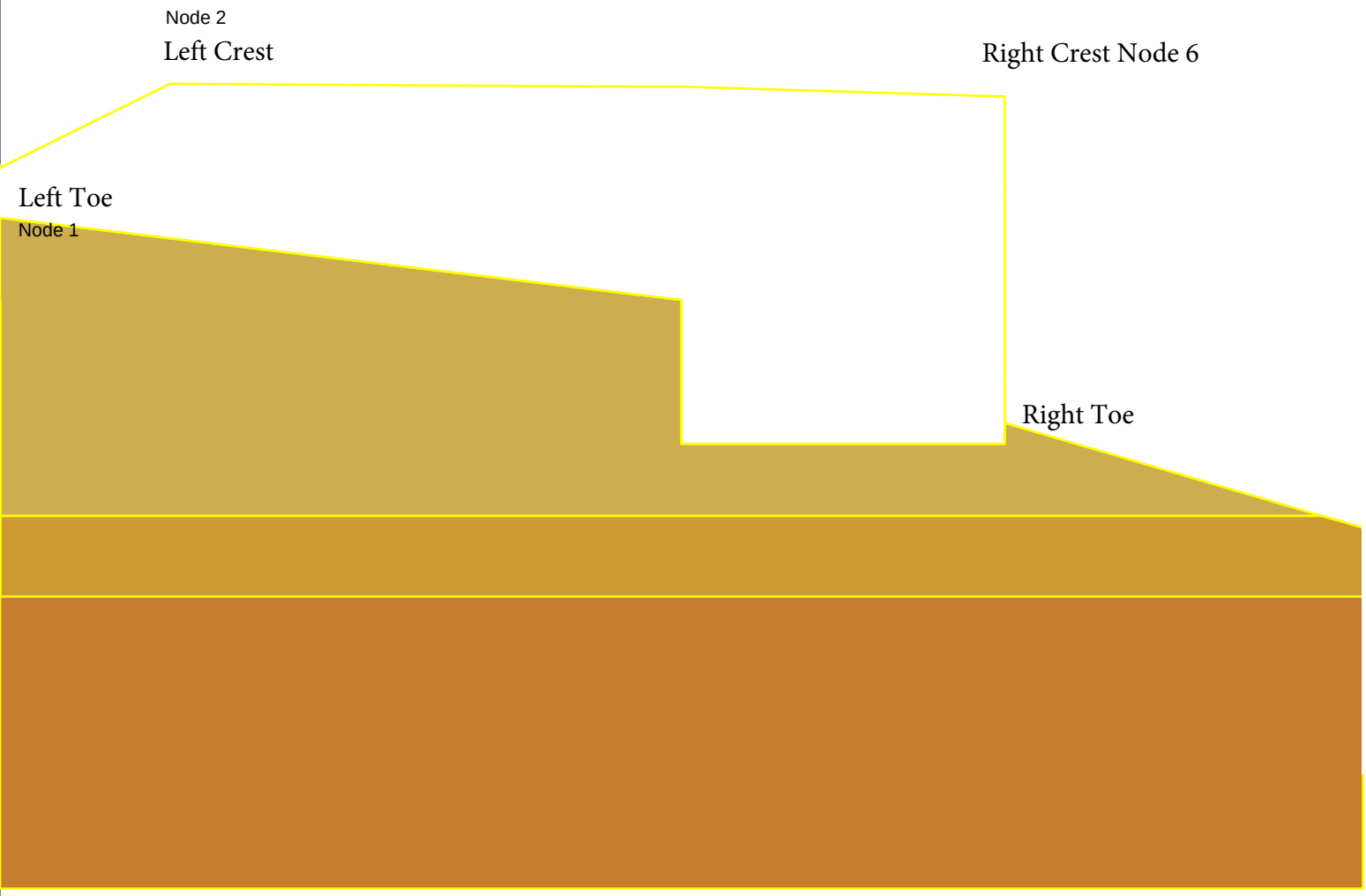
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	973.00
2	-10.00	973.00
3	0.00	973.00
4	50.00	973.00
5	103.00	973.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-108.00	0.00	1	477918	0.3000	-0.0013	1003.20	1003.19	0.01
			2	199450	0.3000	0.0065			
			3	609702	0.3000	0.0088			
2	-83.80	0.00	1	477918	0.3000	0.0598	1000.30	1000.17	0.13
			2	199450	0.3000	0.0402			
			3	609702	0.3000	0.0291			
3	-59.60	0.00	1	477918	0.3000	0.0738	997.39	997.21	0.18
			2	199450	0.3000	0.0636			
			3	609702	0.3000	0.0466			
4	-35.40	0.00	1	477918	0.3000	0.0786	994.49	994.26	0.22
			2	199450	0.3000	0.0845			
			3	609702	0.3000	0.0616			
5	-11.20	0.00	1	477918	0.3000	0.0469	977.00	976.77	0.23
			2	199450	0.3000	0.1141			
			3	609702	0.3000	0.0702			
6	13.00	0.00	1	477918	0.3000	0.0226	977.00	976.87	0.13
			2	199450	0.3000	0.0622			
			3	609702	0.3000	0.0437			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-150.00	1008.00	Medium Dense SM
	2	-108.00	1003.20	
	3	-23.01	993.00	
	4	-23.00	977.00	
	5	13.00	977.00	
	6	13.01	979.30	
	7	48.30	969.00	
	8	62.00	965.00	
	9	69.80	969.00	
	10	100.00	985.00	
	11	150.00	985.00	
2	1	-160.00	969.00	Loose SM
	2	48.30	969.00	
	3	62.00	965.00	
	4	69.80	969.00	
	5	150.00	969.00	
3	1	-200.00	960.00	Medium Dense to Dense SM
	2	-160.00	960.00	
	3	131.00	960.00	
	4	150.00	960.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -108.00 [ft]	1	-80.00	1017.00	Embankment Fill
	X2 = 13.01 [ft]	2	-28.00	1016.70	
		3	-23.00	1016.70	
		4	13.00	1015.60	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
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12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 3A -
Client:	CECS
Designer:	MEH
Station Number:	296+00

Description:

MSE Wall Ramp 3A STA 296+00. Boring W2A-MB1-02.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... alls\Ramp 3A\R3A 296+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 6 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	100.00	0.30	SC
2	105.00	0.30	Medium stiff to Stiff CL
3	105.00	0.30	Soft to Medium Stiff Sandy ML
4	105.00	0.30	Very Loose to Medium Dense SM
5	105.00	0.30	Soft to Stiff Sandy ML
6	110.00	0.30	Loose SM

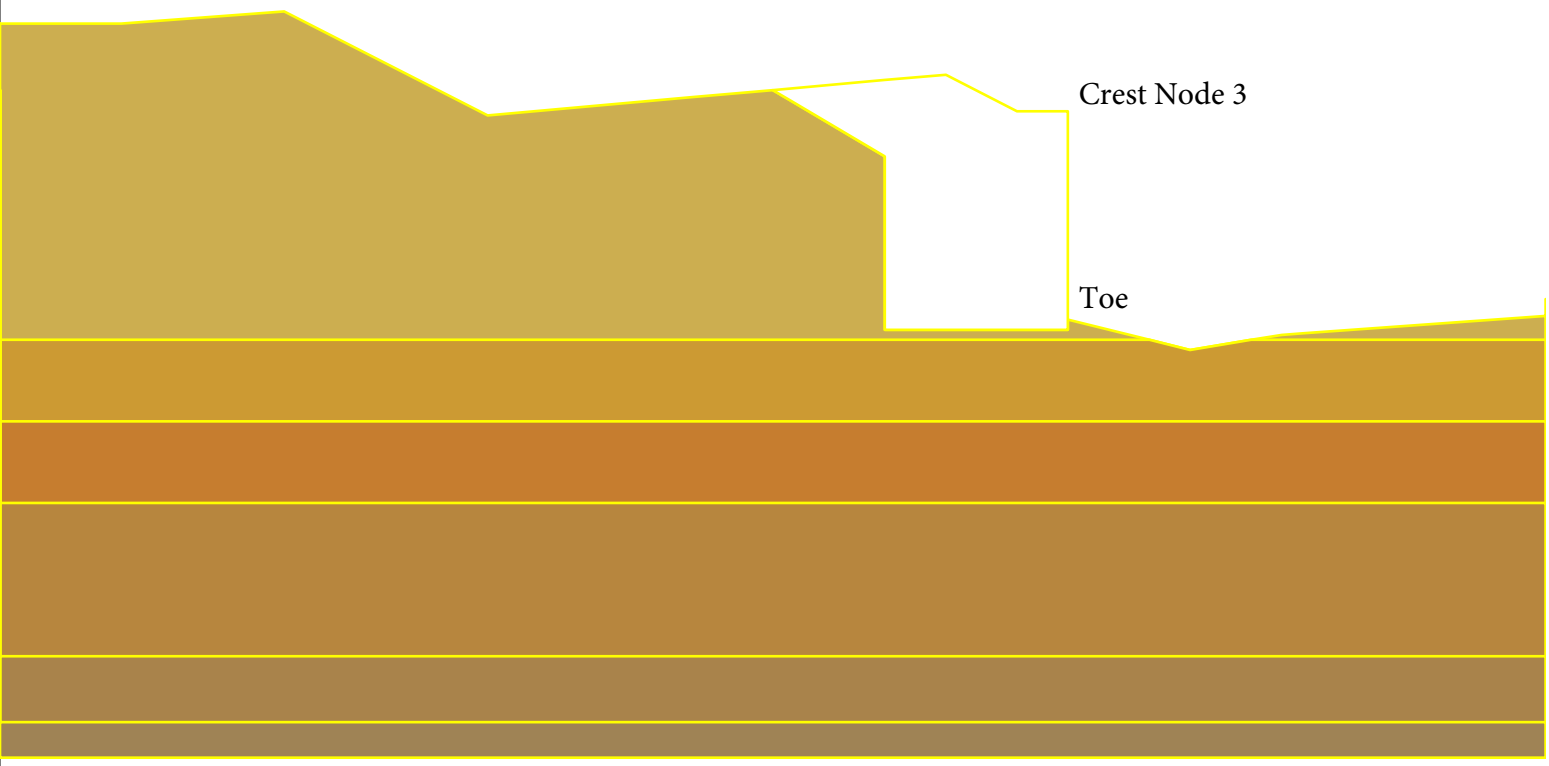
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	960.00
2	-10.00	960.00
3	0.00	960.00
4	50.00	960.00
5	103.00	960.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-2.00	0.00	1	125968	0.3000	0.0274	1008.50	1008.28	0.22
			2	154866	0.3000	0.0262			
			3	50748	0.3000	0.0664			
			4	130386	0.3000	0.0439			
			5	48393	0.3000	0.0481			
			6	125968	0.3000	0.0094			
2	12.50	0.00	1	125968	0.3000	0.0101	985.00	984.69	0.31
			2	154866	0.3000	0.0520			
			3	50748	0.3000	0.1111			
			4	130386	0.3000	0.0610			
			5	48393	0.3000	0.0602			
			6	125968	0.3000	0.0114			
3	27.00	0.00	1	125968	0.3000	0.0078	985.00	984.74	0.26
			2	154866	0.3000	0.0365			
			3	50748	0.3000	0.0959			
			4	130386	0.3000	0.0563			
			5	48393	0.3000	0.0549			
			6	125968	0.3000	0.0104			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	-100.00	0.00	945.83	0.00	945.83
2	-85.71	0.00	950.64	0.02	950.62
3	-71.43	0.00	954.71	0.02	954.70

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-66.00	1015.00	SC
	2	-50.00	1016.20	
	3	-30.00	1006.00	
	4	-2.00	1008.50	
	5	9.00	1002.00	
	6	9.01	985.00	
	7	27.00	985.00	
	8	27.01	986.00	
	9	35.00	984.00	
	10	39.00	983.00	
	11	45.00	984.00	
	12	48.00	984.50	
	13	97.00	988.00	
2	1	-66.00	984.00	Medium stiff to Stiff CL
	2	35.00	984.00	
	3	39.00	983.00	
	4	45.00	984.00	
	5	97.00	984.00	
3	1	-200.00	976.00	Soft to Medium Stiff Sandy ML
	2	-160.00	976.00	
	3	-130.00	976.00	
	4	131.00	976.00	
	5	150.00	976.00	
4	1	-200.00	968.00	Very Loose to Medium Dense SM
	2	-160.00	968.00	
	3	-130.00	968.00	
	4	-110.00	968.00	
	5	-105.00	968.00	
	6	230.00	968.00	
5	1	-120.00	953.00	Soft to Stiff Sandy ML
	2	-10.00	953.00	
	3	230.00	953.00	
6	1	-120.00	946.50	Loose SM
	2	10.00	946.50	
	3	230.00	946.50	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -2.00 [ft]	1	9.00	1009.50	Embankment Fill
	X2 = 27.01 [ft]	2	15.00	1010.00	
		3	22.00	1006.40	
		4	27.00	1006.40	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 4 -
Client:	CECS
Designer:	MEH
Station Number:	40+00

Description:

MSE Wall Ramp 4 STA 40+00. Boring W4-1R-09. PWR B06-SPT-01.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... \Ramp 4 and 4B\R4 40+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 4 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.30	Existing Fill SM
2	105.00	0.30	Loose to Medium Dense SM
3	137.00	0.30	PWR
4	110.00	0.30	Medium Dense SM

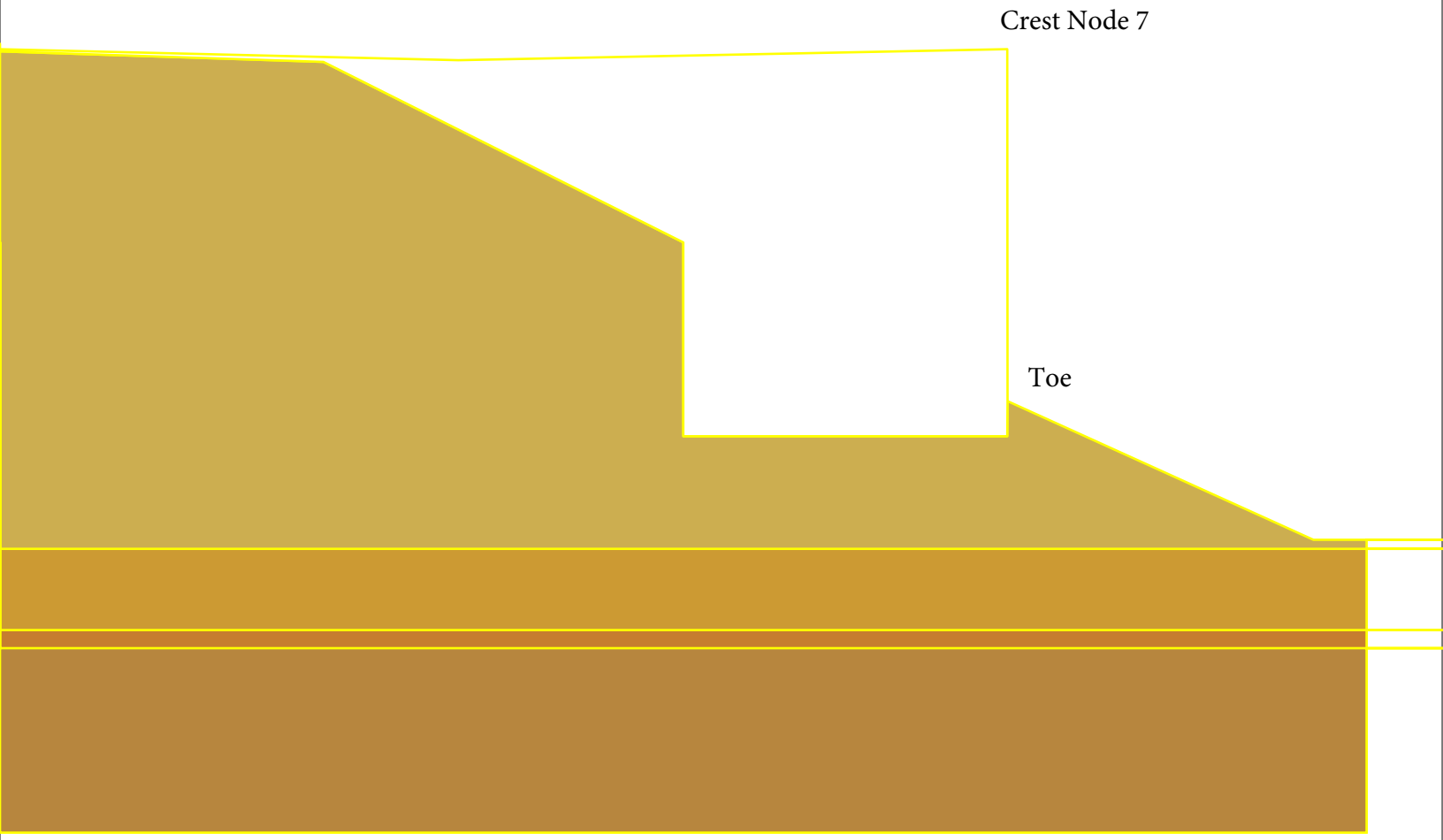
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	950.00
2	-10.00	950.00
3	0.00	950.00
4	50.00	950.00
5	103.00	950.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-111.00	0.00	1	292956	0.3000	-0.0119	1010.00	1010.01	-0.01
			2	292956	0.3000	-0.0006			
			3	1575287	0.3000	-0.0000			
			4	559585	0.3000	0.0061			
2	-88.17	0.00	1	292956	0.3000	-0.0080	1009.25	1009.24	0.01
			2	292956	0.3000	0.0020			
			3	1575287	0.3000	0.0001			
			4	559585	0.3000	0.0139			
3	-65.33	0.00	1	292956	0.3000	0.0037	1008.50	1008.46	0.04
			2	292956	0.3000	0.0087			
			3	1575287	0.3000	0.0005			
			4	559585	0.3000	0.0293			
4	-42.50	0.00	1	292956	0.3000	0.0700	1004.25	1004.10	0.15
			2	292956	0.3000	0.0225			
			3	1575287	0.3000	0.0011			
			4	559585	0.3000	0.0520			
5	-19.67	0.00	1	292956	0.3000	0.1973	992.83	992.51	0.32
			2	292956	0.3000	0.0414			
			3	1575287	0.3000	0.0018			
			4	559585	0.3000	0.0757			
6	3.17	0.00	1	292956	0.3000	0.0832	966.50	966.28	0.22
			2	292956	0.3000	0.0516			
			3	1575287	0.3000	0.0022			
			4	559585	0.3000	0.0859			
7	26.00	0.00	1	292956	0.3000	0.0606	966.50	966.32	0.18
			2	292956	0.3000	0.0402			
			3	1575287	0.3000	0.0018			
			4	559585	0.3000	0.0732			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-111.00	1010.00	Existing Fill SM
	2	-50.00	1008.00	
	3	-10.01	988.00	
	4	-10.00	966.50	
	5	26.00	966.50	
	6	26.01	970.40	
	7	60.00	955.00	
	8	150.00	955.00	
2	1	-200.00	954.00	Loose to Medium Dense SM
	2	-160.00	954.00	
	3	80.00	954.00	
	4	110.00	954.00	
	5	140.00	954.00	
3	1	-200.00	945.00	PWR
	2	-160.00	945.00	
	3	-130.00	945.00	
	4	131.00	945.00	
	5	150.00	945.00	
4	1	-200.00	943.00	Medium Dense SM
	2	-160.00	943.00	
	3	-130.00	943.00	
	4	-110.00	943.00	
	5	-105.00	943.00	
	6	230.00	943.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -111.00 [ft]	1	-35.00	1008.20	Embankment Fill
	X2 = 26.01 [ft]	2	-10.00	1008.70	
		3	26.00	1009.40	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

Version 2.0 FoSSA Version 2.0

FoSSA -- Foundation Stress & Settlement Analysis I85/385 Interchange Improvements
Present Date/Time: Thu Sep 10 11:27:35 2015 I:\.....nal Reports\Roadway\Settlement MSE Walls\Ramp 4 and 4B\R4 40+00 Settlement Estimate_2D.2ST
Version 2.0 FoSSA Version 2.0

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	USER'S DESCRIPTION
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
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14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

Version 2.0 FoSSA Version 2.0

I85/385 Interchange Improvements Page 9 of 9
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I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 4 -
Client:	CECS
Designer:	MEH
Station Number:	43+50

Description:

MSE Wall Ramp 4 STA 43+50. Boring W4-1r-11. GWT W4-1R-09.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... \Ramp 4 and 4B\R4 43+50 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 3 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.30	Loose SC
2	105.00	0.30	Loose to Medium Dense SM
3	105.00	0.30	Loose SC

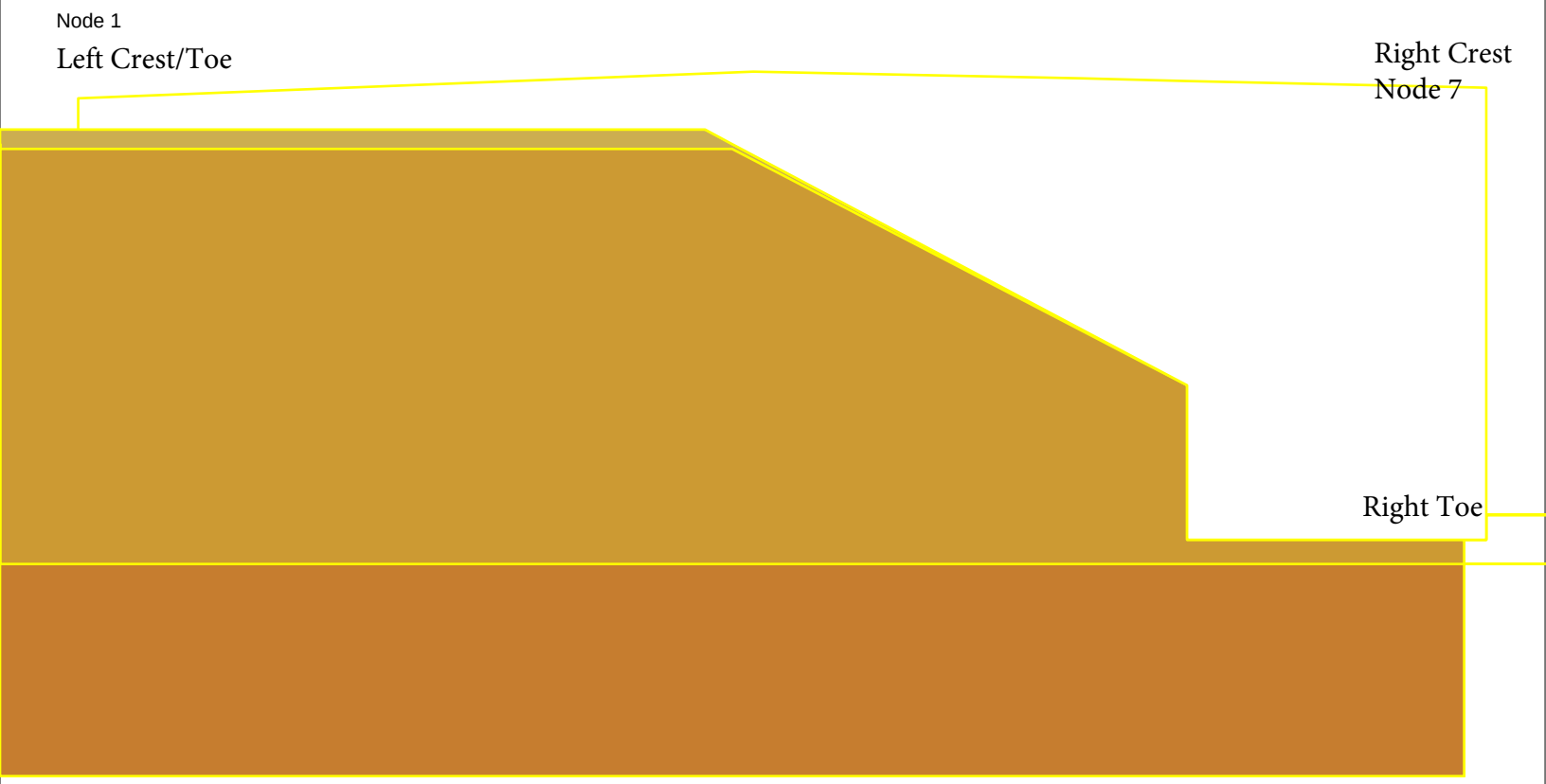
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	953.00
2	-10.00	953.00
3	0.00	953.00
4	50.00	953.00
5	103.00	953.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-120.00	0.00	1	135374	0.3000	0.0019	1004.00	1003.98	0.02
			2	325548	0.3000	0.0065			
			3	48390	0.3000	0.0101			
2	-95.67	0.00	1	135374	0.3000	0.0044	1004.00	1003.93	0.07
			2	325548	0.3000	0.0266			
			3	48390	0.3000	0.0353			
3	-71.33	0.00	1	135374	0.3000	0.0054	1004.00	1003.88	0.12
			2	325548	0.3000	0.0403			
			3	48390	0.3000	0.0729			
4	-47.00	0.00	1	135374	0.3000	0.0027	999.75	999.50	0.24
			2	325548	0.3000	0.0896			
			3	48390	0.3000	0.1483			
5	-22.67	0.00	1	135374	0.3000	0.0000	986.85	986.41	0.44
			2	325548	0.3000	0.1493			
			3	48390	0.3000	0.2906			
6	1.67	0.00	1	135374	0.3000	0.0000	961.50	961.15	0.35
			2	325548	0.3000	0.0189			
			3	48390	0.3000	0.3300			
7	26.00	0.00	1	135374	0.3000	0.0000	961.50	961.26	0.24
			2	325548	0.3000	0.0128			
			3	48390	0.3000	0.2291			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-120.00	1004.00	Loose SC
	2	-55.00	1004.00	
	3	-52.20	1002.50	
	4	-5.01	977.50	
	5	-5.00	961.50	
	6	26.00	961.50	
	7	26.01	964.10	
	8	100.00	964.10	
2	1	-120.00	1002.00	Loose to Medium Dense SM
	2	-55.00	1002.00	
	3	-52.20	1002.00	
	4	-5.01	977.50	
	5	-5.00	961.50	
	6	26.00	961.50	
	7	26.01	964.10	
	8	100.00	964.10	
3	1	-200.00	959.00	Loose SC
	2	-160.00	959.00	
	3	-130.00	959.00	
	4	131.00	959.00	
	5	150.00	959.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -120.01 [ft]	1	-120.00	1007.20	Embankment Fill
	X2 = 26.01 [ft]	2	-50.00	1010.00	
		3	-16.00	1009.30	
		4	-5.00	1009.00	
		5	26.00	1008.30	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 4B -
Client:	CECS
Designer:	MEH
Station Number:	388+00

Description:

MSE Wall Ramp 4B STA 388+00. Boring W4-1R-05. PWR B06-SPT-01.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... amp 4 and 4B\R4B 388+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 6 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.30	Medium Dense SM
2	105.00	0.30	Medium Stiff to Stiff CH
3	100.00	0.30	Very Loose SM
4	105.00	0.30	Medium Stiff Sandy ML
5	105.00	0.30	Loose to Medium Dense SM
6	110.00	0.30	Medium Dense to Dense SM

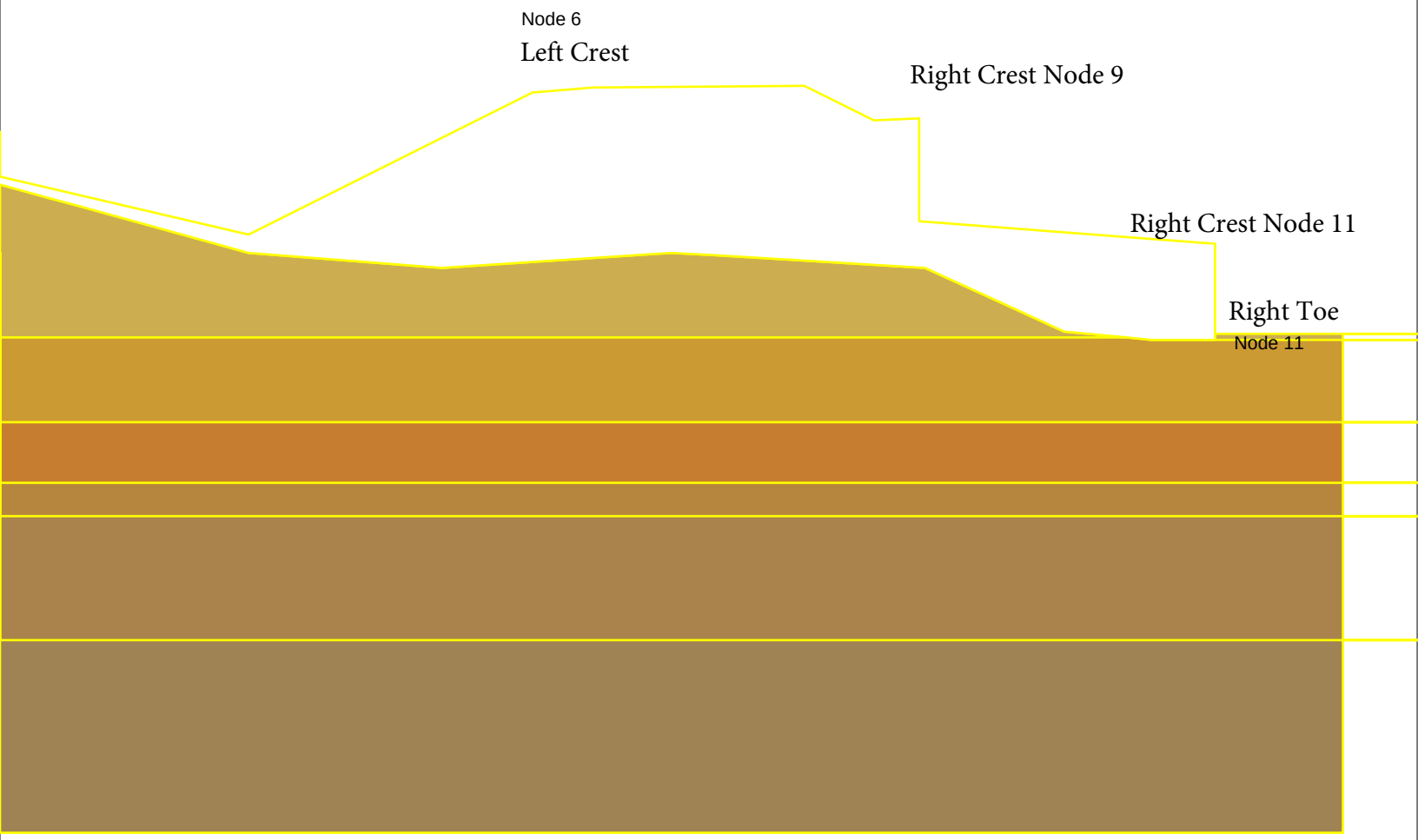
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	960.00
2	-10.00	960.00
3	0.00	960.00
4	50.00	960.00
5	103.00	960.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-150.00	0.00	1	338914	0.3000	-0.0034	1015.00	1015.02	-0.02
			2	134499	0.3000	-0.0082			
			3	72694	0.3000	-0.0095			
			4	55430	0.3000	-0.0053			
			5	89223	0.3000	-0.0031			
			6	347505	0.3000	0.0054			
2	-126.70	0.00	1	338914	0.3000	-0.0001	1008.62	1008.59	0.03
			2	134499	0.3000	-0.0041			
			3	72694	0.3000	-0.0013			
			4	55430	0.3000	0.0022			
			5	89223	0.3000	0.0196			
			6	347505	0.3000	0.0151			
3	-103.40	0.00	1	338914	0.3000	0.0013	1002.23	1002.09	0.14
			2	134499	0.3000	0.0057			
			3	72694	0.3000	0.0184			
			4	55430	0.3000	0.0189			
			5	89223	0.3000	0.0643			
			6	347505	0.3000	0.0308			
4	-80.10	0.00	1	338914	0.3000	0.0080	995.85	995.49	0.36
			2	134499	0.3000	0.0360			
			3	72694	0.3000	0.0652			
			4	55430	0.3000	0.0535			
			5	89223	0.3000	0.1425			
			6	347505	0.3000	0.0533			
5	-56.80	0.00	1	338914	0.3000	0.0353	993.42	992.69	0.73
			2	134499	0.3000	0.1075			
			3	72694	0.3000	0.1489			
			4	55430	0.3000	0.1086			
			5	89223	0.3000	0.2512			
			6	347505	0.3000	0.0801			
6	-33.50	0.00	1	338914	0.3000	0.0649	993.26	992.16	1.10
			2	134499	0.3000	0.1808			
			3	72694	0.3000	0.2320			
			4	55430	0.3000	0.1619			
			5	89223	0.3000	0.3527			
			6	347505	0.3000	0.1036			
7	-10.20	0.00	1	338914	0.3000	0.0820	994.79	993.52	1.27
			2	134499	0.3000	0.2089			
			3	72694	0.3000	0.2689			
			4	55430	0.3000	0.1870			
			5	89223	0.3000	0.4028			
			6	347505	0.3000	0.1158			
8	13.10	0.00	1	338914	0.3000	0.0730	993.80	992.61	1.19
			2	134499	0.3000	0.1944			
			3	72694	0.3000	0.2517			
			4	55430	0.3000	0.1765			
			5	89223	0.3000	0.3859			
			6	347505	0.3000	0.1128			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
9	36.40	0.00	1	338914	0.3000	0.0376	991.86	990.94	0.92
			2	134499	0.3000	0.1379			
			3	72694	0.3000	0.1933			
			4	55430	0.3000	0.1401			
			5	89223	0.3000	0.3177			
			6	347505	0.3000	0.0972			
10	59.70	0.00	1	338914	0.3000	0.0028	981.84	981.19	0.64
			2	134499	0.3000	0.1014			
			3	72694	0.3000	0.1366			
			4	55430	0.3000	0.0992			
			5	89223	0.3000	0.2301			
			6	347505	0.3000	0.0744			
11	83.00	0.00	1	338914	0.3000	0.0000	980.60	980.24	0.36
			2	134499	0.3000	0.0495			
			3	72694	0.3000	0.0726			
			4	55430	0.3000	0.0551			
			5	89223	0.3000	0.1373			
			6	347505	0.3000	0.0497			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-150.00	1015.00	Medium Dense SM
	2	-77.00	995.00	
	3	-45.00	992.50	
	4	-7.00	995.00	
	5	35.00	992.50	
	6	58.00	982.00	
	7	68.40	981.00	
	8	72.50	980.60	
	9	83.00	980.60	
	10	83.01	981.60	
	11	150.00	981.60	
2	1	-150.00	981.00	Medium Stiff to Stiff CH
	2	68.40	981.00	
	3	72.50	980.60	
	4	83.00	980.60	
	5	150.00	980.60	
3	1	-200.00	967.00	Very Loose SM
	2	-160.00	967.00	
	3	-130.00	967.00	
	4	-110.00	967.00	
	5	131.00	967.00	
	6	150.00	967.00	
4	1	-200.00	957.00	Medium Stiff Sandy ML
	2	-160.00	957.00	
	3	-130.00	957.00	
	4	-110.00	957.00	
	5	-105.00	957.00	
	6	230.00	957.00	
5	1	-120.00	951.50	Loose to Medium Dense SM
	2	-10.00	951.50	
	3	230.00	951.50	
6	1	-120.00	931.00	Medium Dense to Dense SM
	2	10.00	931.00	
	3	230.00	931.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -150.00 [ft]	1	-77.00	998.00	Embankment Fill
	X2 = 83.01 [ft]	2	-30.00	1021.50	
		3	-20.00	1022.30	
		4	15.00	1022.60	
		5	26.50	1016.90	
		6	34.00	1017.20	
		7	34.01	1000.20	
		8	72.50	997.30	
		9	83.00	996.50	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

I85/385 Interchange Improvements

PROJECT IDENTIFICATION

Title:	I85/385 Interchange Improvements
Project Number:	Ramp 4B -
Client:	CECS
Designer:	MEH
Station Number:	389+00

Description:

MSE Wall Ramp 4B STA 389+00. Boring W4-1R-05. PWR B06-SPT-01.

Company's information:

Name:	ECS Carolinas, LLP
Street:	1812 Centerpark Drive, Suite D Charlotte, NC 28217
Telephone #:	(704) 525-5152
Fax #:	(704) 357-0023
E-Mail:	

Original file path and name: I:\2GEOTEC ..... amp 4 and 4B\R4B 389+00 Settlement Estimate_2D.2ST
Original date and time of creating this file: Tue Sept 8 11:53:27 2015

GEOMETRY: Analysis of a 2D geometry

INPUT DATA -- FOUNDATION LAYERS -- 6 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.30	Medium Dense SM
2	105.00	0.30	Medium Stiff to Stiff CH
3	100.00	0.30	Very Loose SM
4	105.00	0.30	Medium Stiff Sandy ML
5	105.00	0.30	Loose to Medium Dense SM
6	110.00	0.30	Medium Dense to Dense SM

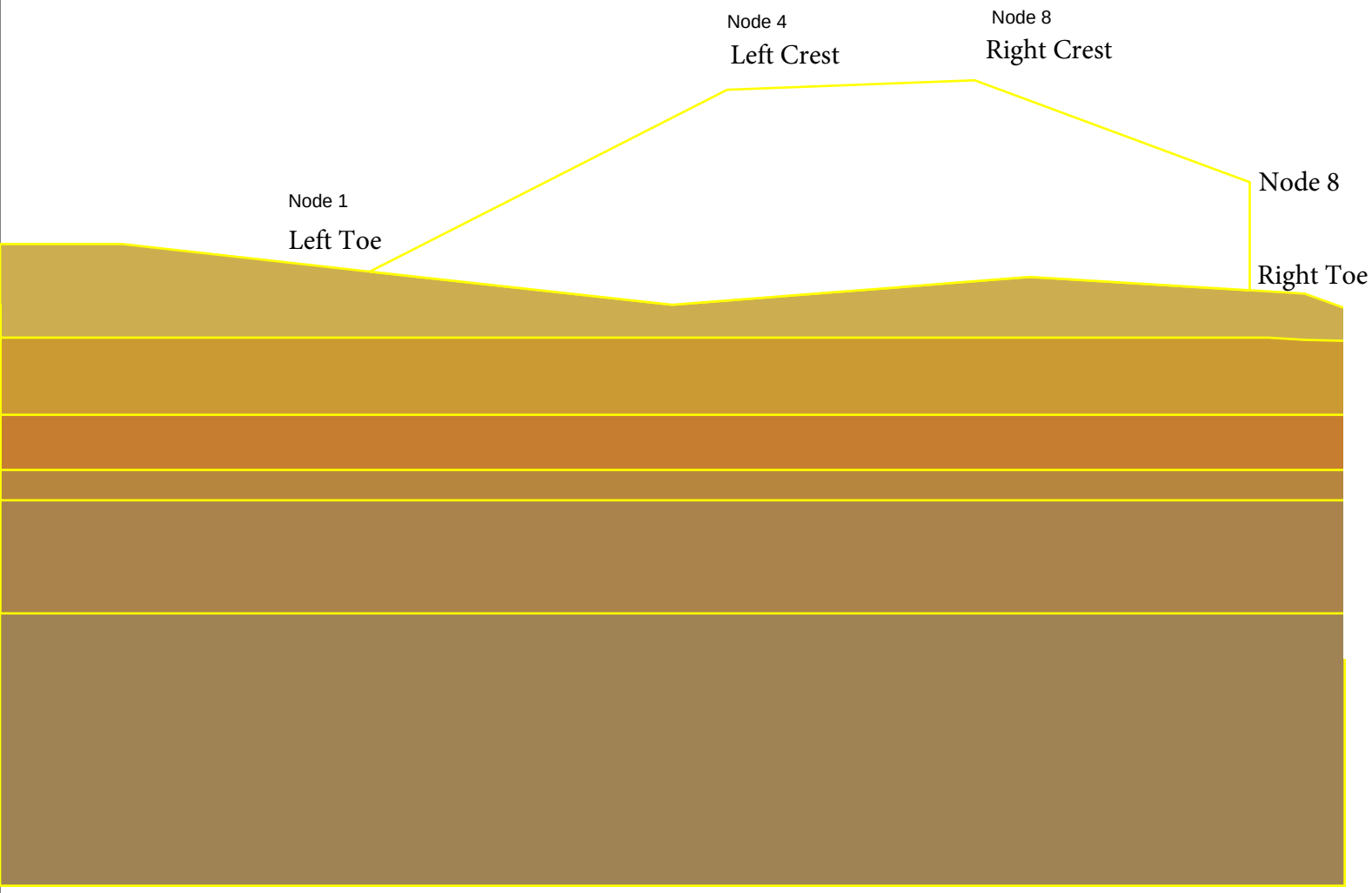
INPUT DATA -- EMBANKMENT LAYERS -- 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	105.00	Embankment Fill

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	-120.00	960.00
2	-10.00	960.00
3	0.00	960.00
4	50.00	960.00
5	103.00	960.00

DRAWING OF SPECIFIED GEOMETRY



IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	-95.00	0.00	1	338914	0.3000	-0.0016	993.00	992.87	0.13
			2	134499	0.3000	-0.0078			
			3	72694	0.3000	0.0057			
			4	55430	0.3000	0.0145			
			5	89223	0.3000	0.0740			
			6	347505	0.3000	0.0434			
2	-72.14	0.00	1	338914	0.3000	0.0234	990.51	989.85	0.66
			2	134499	0.3000	0.0859			
			3	72694	0.3000	0.1243			
			4	55430	0.3000	0.0958			
			5	89223	0.3000	0.2434			
			6	347505	0.3000	0.0881			
3	-49.29	0.00	1	338914	0.3000	0.0360	988.01	986.74	1.27
			2	134499	0.3000	0.1929			
			3	72694	0.3000	0.2700			
			4	55430	0.3000	0.1952			
			5	89223	0.3000	0.4428			
			6	347505	0.3000	0.1365			
4	-26.43	0.00	1	338914	0.3000	0.0490	988.04	986.36	1.69
			2	134499	0.3000	0.2634			
			3	72694	0.3000	0.3639			
			4	55430	0.3000	0.2608			
			5	89223	0.3000	0.5798			
			6	347505	0.3000	0.1711			
5	-3.57	0.00	1	338914	0.3000	0.0579	989.80	988.05	1.75
			2	134499	0.3000	0.2590			
			3	72694	0.3000	0.3722			
			4	55430	0.3000	0.2711			
			5	89223	0.3000	0.6104			
			6	347505	0.3000	0.1807			
6	19.29	0.00	1	338914	0.3000	0.0663	991.56	989.97	1.59
			2	134499	0.3000	0.2376			
			3	72694	0.3000	0.3354			
			4	55430	0.3000	0.2433			
			5	89223	0.3000	0.5482			
			6	347505	0.3000	0.1640			
7	42.14	0.00	1	338914	0.3000	0.0481	990.97	989.78	1.19
			2	134499	0.3000	0.1828			
			3	72694	0.3000	0.2507			
			4	55430	0.3000	0.1789			
			5	89223	0.3000	0.4034			
			6	347505	0.3000	0.1254			
8	65.00	0.00	1	338914	0.3000	0.0146	989.60	989.09	0.51
			2	134499	0.3000	0.0581			
			3	72694	0.3000	0.0914			
			4	55430	0.3000	0.0736			
			5	89223	0.3000	0.1969			
			6	347505	0.3000	0.0756			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

ULTIMATE SETTLEMENT, Sc

Node #	X [ft.]	Y [ft.]	Original Z [ft.]	Settlement Sc [ft.]	Final Z * [ft.]
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00

*Note: Final Z is calculated assuming only 'Ultimate Settlement' exists.

TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	1	-140.00	998.00	Medium Dense SM
	2	-95.00	993.00	
	3	-40.00	987.00	
	4	25.00	992.00	
	5	75.00	989.00	
	6	100.00	980.00	
	7	145.00	979.00	
2	1	-150.00	981.00	Medium Stiff to Stiff CH
	2	68.40	981.00	
	3	75.00	980.60	
	4	100.00	980.00	
	5	145.00	979.00	
3	1	-200.00	967.00	Very Loose SM
	2	-160.00	967.00	
	3	-130.00	967.00	
	4	-110.00	967.00	
	5	131.00	967.00	
	6	150.00	967.00	
4	1	-200.00	957.00	Medium Stiff Sandy ML
	2	-160.00	957.00	
	3	-130.00	957.00	
	4	-110.00	957.00	
	5	-105.00	957.00	
	6	230.00	957.00	
5	1	-120.00	951.50	Loose to Medium Dense SM
	2	-10.00	951.50	
	3	230.00	951.50	
6	1	-120.00	931.00	Medium Dense to Dense SM
	2	10.00	931.00	
	3	230.00	931.00	

TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	D E S C R I P T I O N
1	X1 = -95.00 [ft]	1	-30.00	1026.00	Embankment Fill
	X2 = 65.01 [ft]	2	15.00	1027.70	
		3	65.00	1009.20	

HISTORY OF SETTLEMENT ANALYSES

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	U S E R ' S D E S C R I P T I O N
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
9	---	---	---	---	---	---	
10	---	---	---	---	---	---	
11	---	---	---	---	---	---	
12	---	---	---	---	---	---	
13	---	---	---	---	---	---	
14	---	---	---	---	---	---	
15	---	---	---	---	---	---	

Version 2.0 FoSSA Version 2.0

FoSSA -- Foundation Stress & Settlement Analysis I85/385 Interchange Improvements

Present Date/Time: Fri Oct 30 13:43:06 2015 I:\.....l Reports\Roadway\Settlement MSE Walls\Ramp 4 and 4B\R4B 389+00 Settlement Estimate_2D.2ST

Version 2.0 FoSSA Version 2.0

HISTORY OF STAGED CONSTRUCTION

Case #	Location of 1D Section : (X) [ft.]	(Y) [ft.]	Ultimate Settlement, Sc [ft.]	After... [days]	Actual Settlement, [ft.]	U-ave (min.for all consol.layers) [%]	USER'S DESCRIPTION
1	---	---	---	---	---	---	
2	---	---	---	---	---	---	
3	---	---	---	---	---	---	
4	---	---	---	---	---	---	
5	---	---	---	---	---	---	
6	---	---	---	---	---	---	
7	---	---	---	---	---	---	
8	---	---	---	---	---	---	
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