



N E L L O

211 W. Washington St.
Suite 2000
South Bend, IN 46601

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February 26, 2014

Jerry Gore
American Tower

Re: NTP 195' - Ft White West FL - 282213, Columbia County, FL
Nello Tower Sales Order #20478

Mr. Gore.

This is regarding your inquiry about the expected performance of your NTP 195' tapered pole quoted by Nello Corporation for a site in Columbia County, FL.

Our towers are designed to meet or exceed industry standards defined by TIA/EIA-222-G, "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures" (EIA Standard). It is our opinion that the possibility of a tower collapse is very unlikely. The tower is designed using extreme wind and ice conditions. In fact, wind speeds specified by the EIA Standard are 50-year wind speeds. That is, they have only a 2% statistical chance of occurring in any given year. Furthermore, the tower is designed with extra factors of safety so that it would not be near a failure point even if the wind conditions were at their maximum design level.

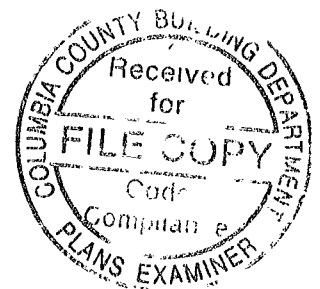
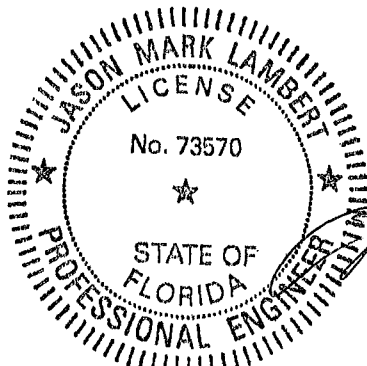
This tower has been designed using the following wind conditions: 1) a 105-mph 3-second-gust wind speed with no ice. The EIA Standard specifies 105 mph as the wind speed required for Columbia County, FL. The "3-second-gust wind speed" refers to a wind measured at 33 feet above the ground. Equations in the EIA Standard take into account that the wind speed escalates with the increasing height of the tower.

Although we cannot guarantee exactly how a tower would fall if it were to fail, the most likely mode of failure will be a buckling failure of one of the tower section due to excessive compression loading. The tower section with the highest compressive stress ratio is located at the 92.3' - 140.8' level. The stress ratio in that section is calculated to be 99.8% of the code-permitted compression loading. Given that the tower section with the highest stress ratio will most likely fail first, the proposed tower would fail at the 92.3' level with the top 102.7' of the tower collapsing. Depending on the conditions at the time of failure and the stress levels in structural members below the 92.3' level, the top 102.7' of the tower would likely fall within a 65' fall radius.

If you have any other questions or concerns regarding our designs, please contact me by phone at 574-288-3632.

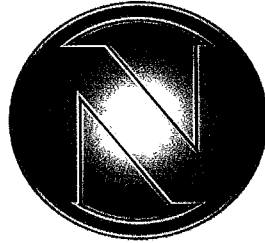
Sincerely,

Jason M. Lambert, PE
Vice President of Engineering



COA # F03000004461

FEB 26 2014



N E L L O

Design Supporting Calculations

Sales Order: 20478

Drawing Number

Tower: 227349

Foundation: 227350

Order Description: NTP 64" x 195'

Site Name: Ft White West FL - 282213

Location: Columbia Co., FL

Prepared For:

Customer: American Tower

Contact: Jerry Gore

Date: March 3, 2014

Included pages: 63

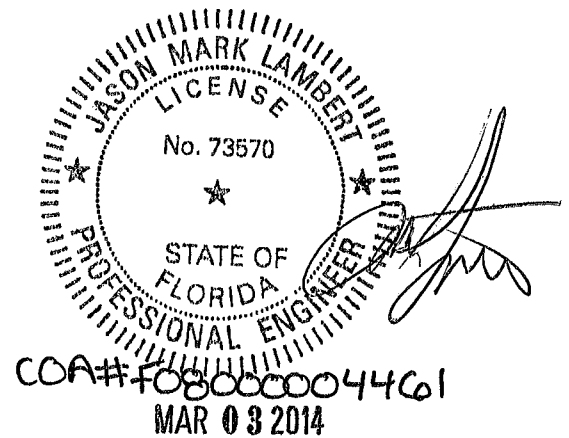


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Tower Analysis - Short form

Tower Analysis - Long form

Foundation Analysis

Section	5	4	3	2	1
Length (ft)	52.75	53.00	53.00	20.00	38.25
Number of Sides	18	18	18	18	18
Thickness (in)	0.4375	0.3750	0.3125	0.2500	0.1875
Socket Length (ft)		7.50	6.00	4.50	4.00
Top Dia (in)	51.6669	41.5682	30.9870	27.7913	20.0000
Bot Dia (in)	64.2441	54.2051	43.6238	32.5599	29.1200
Grade			A572-65		
Weight (lb)	15770.3	11218.7	7279.1	1777.7	2076.7

195.0 ft

168.8 ft

140.8 ft

92.3 ft

45.3 ft

0.0 ft

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
80 sq.ft.	195	80 sq.ft.	175
80 sq.ft.	185	80 sq.ft.	165

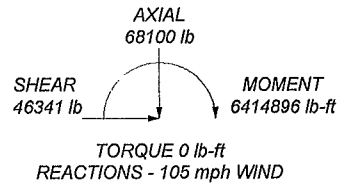
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

- 1 Tower designed for Exposure C to the TIA-222-G Standard
- 2 Tower designed for a 105 mph basic wind in accordance with the TIA-222-G Standard
- 3 Deflections are based upon a 60 mph wind
- 4 Tower Structure Class II
- 5 Topographic Category 1 with Crest Height of 0 00 ft
- 6 TOWER RATING 99.8%

ALL REACTIONS ARE FACTORED



Nello Corporation			Job: SO20478; Tower 227349; Foundation 227350		
211 W Washington, Suite 2000			Project: NP 195' - Ft White West FL - 282213 - Columbia Co., F		
South Bend, IN			Client: American Tower		
Phone 800-806-3556			Drawn by: BL TNX V 6 1 2		
FAX. 574-288-5860			Date: 02/21/14		
			Scale: NTS		
			Path: N:\eri\2273\227349.eri		
			Dwg No: E-1		

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	Client American Tower	Designed by BL TNX V.6.1 2

Tapered Pole Properties

Section	Tip Dia in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L1	20 3085	11 7909	584 7409	7 0334	10 1600	57 5532	1170 2512	5 8966	3 1900	17 013
	29 5692	17 2185	1820 9731	10 2710	14 7930	123 0973	3644 3423	8 6109	4 7951	25 574
L2	29 1884	21 8540	2094 2885	9 7772	14 1180	148 3421	4191 3327	10 9291	4 4513	17 805
	33 0622	25 6379	3381 3592	11 4700	16 5404	204 4299	6767 1676	12 8214	5 2905	21 162
L3	32 5545	30 4252	3616 8060	10 8894	15 7414	229 7643	7238.3711	15.2155	4 9037	15 692
	44 2968	42 9594	10181 1954	15 3755	22 1609	459 4215	20375 7876	21 4838	7 1278	22 809
L4	43 6621	49 0302	10511 2251	14 6236	21 1167	497 7692	21036 2812	24 5198	6 6560	17 749
	55 0413	64 0713	23455 8487	19 1097	27 5362	851 8190	46942 5612	32 0417	8 8801	23 68
L5	54 2797	71 1384	23587 3579	18 1864	26 2468	898 6767	47205 7527	35 5759	8 3234	19 025
	65 2352	88 6035	45574 2581	22 6513	32 6360	1396 4408	91208 4840	44 3102	10 5370	24 084

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
L1 195 00- 156 75				1	1	1 1		
L2 156 75- 140 75				1	1	1 1		
L3 140 75- 92 25				1	1	1 1		
L4 92 25-45 25				1	1	1 1		
L5 45 25-0 00				1	1	1 1		

Monopole Base Plate Data

Base Plate Data	
Base plate is square	
Base plate is grouted	
Anchor bolt grade	A615-75
Anchor bolt size	2 2500 in
Number of bolts	20
Embedment length	60 0000 in
f _c	3 ksi
Grout space	0 5000 in
Base plate grade	A572-50
Base plate thickness	3 0000 in
Bolt circle diameter	71 0000 in
Outer diameter	77 0000 in
Inner diameter	60 5000 in
Base plate type	Plain Plate

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _A A _A	Weight
						ft ² /ft	plf
LDF7-50A (1-5/8)	C	No	Inside Pole	195 00 - 0 00	18	No Ice 0 00	0 82

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Tower Pressures - No Ice

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft ²	F a c e	A_F ft ²	A_R ft ²	A_{leg} ft ²	Leg %	C_{AA} In Face ft ²	C_{AA} Out Face ft ²
L1 195 00-156 75	174 80	1 424	38	79 493	A	0 000	79 493	79 493	100 00	0 000	0 000
					B	0 000	79 493	100 00	0 000	0 000	
					C	0 000	79 493	100 00	0 000	0 000	
L2 156 75-140 75	148 58	1 376	37	41 500	A	0 000	41 500	41 500	100 00	0 000	0 000
					B	0 000	41 500	100 00	0 000	0 000	
					C	0 000	41 500	100 00	0 000	0 000	
L3 140 75-92 25	115 53	1 305	35	155 304	A	0 000	155 304	155 304	100 00	0 000	0 000
					B	0 000	155 304	100 00	0 000	0 000	
					C	0 000	155 304	100 00	0 000	0 000	
L4 92 25-45 25	68 27	1 168	31	193 294	A	0 000	193 294	193 294	100 00	0 000	0 000
					B	0 000	193 294	100 00	0 000	0 000	
					C	0 000	193 294	100 00	0 000	0 000	
L5 45 25-0 00	22 89	0 928	25	225 335	A	0 000	225 335	225 335	100 00	0 000	0 000
					B	0 000	225 335	100 00	0 000	0 000	
					C	0 000	225 335	100 00	0 000	0 000	

Tower Pressure - Service

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft ²	F a c e	A_F ft ²	A_R ft ²	A_{leg} ft ²	Leg %	C_{AA} In Face ft ²	C_{AA} Out Face ft ²
L1 195 00-156 75	174 80	1 424	11	79 493	A	0 000	79 493	79 493	100 00	0 000	0 000
					B	0 000	79 493	100 00	0 000	0 000	
					C	0 000	79 493	100 00	0 000	0 000	
L2 156 75-140 75	148 58	1 376	11	41 500	A	0 000	41 500	41 500	100 00	0 000	0 000
					B	0 000	41 500	100 00	0 000	0 000	
					C	0 000	41 500	100 00	0 000	0 000	
L3 140 75-92 25	115 53	1 305	10	155 304	A	0 000	155 304	155 304	100 00	0 000	0 000
					B	0 000	155 304	100 00	0 000	0 000	
					C	0 000	155 304	100 00	0 000	0 000	
L4 92 25-45 25	68 27	1 168	9	193 294	A	0 000	193 294	193 294	100 00	0 000	0 000
					B	0 000	193 294	100 00	0 000	0 000	
					C	0 000	193 294	100 00	0 000	0 000	
L5 45 25-0 00	22 89	0 928	7	225 335	A	0 000	225 335	225 335	100 00	0 000	0 000
					B	0 000	225 335	100 00	0 000	0 000	
					C	0 000	225 335	100 00	0 000	0 000	

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C_F	q_z psf	D_F	D_R	A_E ft ²	F lb	w plf	Ctrl Face
L1 195 00-156 75	1372 68	2076 67	A	1	0 65	38	1	1	79 493	2168 59	56 70	C
			B	1	0 65	1	1	79 493				

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	Client American Tower	Designed by BL TNX V.6 1.2

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z	D _F	D _R	A _E	F	w	Ctrl Face
ft	lb	lb	e			psf			ft ²	lb	plf	
L2 156 75-140 75	944 64	1777 66	A	1	0 65	37	1	1	41 500	1094 48	68 41	C
			B	1	0 65		1	1	41 500			
			C	1	0 65		1	1	41 500			
L3 140 75-92 25	2863 44	7279 13	A	1	0 65	35	1	1	155 304	3879 07	79 98	C
			B	1	0 65		1	1	155 304			
			C	1	0 65		1	1	155 304			
L4 92.25-45 25	2774 88	11218 70	A	1	0 65	31	1	1	193 294	4311 46	91 73	C
			B	1	0 65		1	1	193 294			
			C	1	0 65		1	1	193 294			
L5 45 25-0 00	2671 56	15770 27	A	1	0 65	25	1	1	225 335	3995 43	88 30	C
			B	1	0 65		1	1	225 335			
			C	1	0 65		1	1	225 335			
Sum Weight	10627 20	38122 42						OTM	1375657 8 9 lb-ft	15449 02		

Tower Forces - Service - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z	D _F	D _R	A _E	F	w	Ctrl Face
ft	lb	lb	e			psf			ft ²	lb	plf	
L1 195 00-156 75	1372 68	2076 67	A	1	0 65	11	1	1	79 493	633 57	16 56	C
			B	1	0 65		1	1	79 493			
			C	1	0 65		1	1	79 493			
L2 156 75-140 75	944 64	1777 66	A	1	0 65	11	1	1	41 500	319 76	19 99	C
			B	1	0 65		1	1	41 500			
			C	1	0 65		1	1	41 500			
L3 140 75-92 25	2863 44	7279 13	A	1	0 65	10	1	1	155 304	1133 31	23 37	C
			B	1	0 65		1	1	155 304			
			C	1	0 65		1	1	155 304			
L4 92.25-45 25	2774 88	11218 70	A	1	0 65	9	1	1	193 294	1259 63	26 80	C
			B	1	0 65		1	1	193.294			
			C	1	0 65		1	1	193.294			
L5 45 25-0 00	2671 56	15770 27	A	1	0 65	7	1	1	225 335	1167 30	25 80	C
			B	1	0 65		1	1	225 335			
			C	1	0 65		1	1	225 335			
Sum Weight	10627 20	38122 42						OTM	401910 79 lb-ft	4513 57		

Tower Forces - Service - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z	D _F	D _R	A _E	F	w	Ctrl Face
ft	lb	lb	e			psf			ft ²	lb	plf	
L1 195 00-156 75	1372 68	2076 67	A	1	0 65	11	1	1	79 493	633 57	16 56	C
			B	1	0 65		1	1	79 493			
			C	1	0 65		1	1	79 493			
L2 156 75-	944 64	1777 66	A	1	0 65	11	1	1	41 500	319 76	19 99	C

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	Client American Tower	Designed by BL TNX V.6.1.2

Section No.	Section Elevation ft	Wind Azimuth °	Directionality	F lb	V _x lb	V _z lb	OTM _x lb-ft	OTM _z lb-ft	Torque lb-ft		
L2	156 75-140 75	180	Wind 60	2168 59	0 00	2168 59	379068 06	0 00	0 00		
		210	Wind 90	2168 59	-1084 29	1878 05	328282 57	189534 03	0 00		
		240	Wind Normal	2168 59	-1878 05	1084 29	189534 03	328282 57	0 00		
		270	Wind 90	2168 59	-2168 59	0 00	0 00	379068 06	0 00		
		300	Wind 60	2168 59	-1878 05	-1084 29	-189534 03	328282 57	0 00		
		330	Wind 90	2168 59	-1084 29	-1878 05	-328282 57	189534 03	0 00		
		0	Wind Normal	1094 48	0 00	-1094 48	-162622 45	0 00	0 00		
		30	Wind 90	1094 48	547 24	-947 85	-140835 17	-81311 22	0 00		
		60	Wind 60	1094 48	947 85	-547 24	-81311 22	-140835 17	0 00		
		90	Wind 90	1094 48	1094 48	0 00	0 00	-162622 45	0 00		
		120	Wind Normal	1094 48	947 85	547 24	81311 22	-140835 17	0 00		
		150	Wind 90	1094 48	547 24	947 85	140835 17	-81311 22	0 00		
		180	Wind 60	1094 48	0 00	1094 48	162622.45	0 00	0 00		
		210	Wind 90	1094 48	-547 24	947 85	140835 17	81311 22	0 00		
		240	Wind Normal	1094 48	-947 85	547 24	81311 22	140835 17	0 00		
L3	140 75-92 25	270	Wind 90	1094 48	-1094 48	0 00	0 00	162622 45	0 00		
		300	Wind 60	1094 48	-947 85	-547 24	-81311 22	140835 17	0 00		
		330	Wind 90	1094 48	-547 24	-947 85	-140835 17	81311 22	0 00		
		0	Wind Normal	3879 07	0 00	-3879 07	-448149 50	0 00	0 00		
		30	Wind 90	3879 07	1939 54	-3359 37	-388108 85	-224074 75	0 00		
		60	Wind 60	3879 07	3359 37	-1939 54	-224074 75	-388108 85	0 00		
		90	Wind 90	3879 07	3879 07	0 00	0 00	-448149 50	0 00		
		120	Wind Normal	3879 07	3359 37	1939 54	224074 75	-388108 85	0 00		
		150	Wind 90	3879 07	1939 54	3359 37	388108 85	-224074 75	0 00		
		180	Wind 60	3879 07	0 00	3879 07	448149 50	0 00	0 00		
		210	Wind 90	3879 07	-1939 54	3359 37	388108 85	224074 75	0 00		
		240	Wind Normal	3879 07	-3359 37	1939 54	224074 75	388108 85	0 00		
		270	Wind 90	3879 07	-3879 07	0 00	0 00	448149 50	0 00		
		300	Wind 60	3879 07	-3359 37	-1939 54	-224074 75	388108 85	0 00		
		330	Wind 90	3879 07	-1939 54	-3359 37	-388108 85	224074 75	0 00		
L4	92.25-45 25	0	Wind Normal	4311 46	0 00	-4311 46	-294359 12	0 00	0 00		
		30	Wind 90	4311 46	2155 73	-3733 83	-254922 48	-147179 56	0 00		
		60	Wind 60	4311 46	3733 83	-2155 73	-147179 56	-254922 48	0 00		
		90	Wind 90	4311 46	4311 46	0 00	0 00	-294359 12	0 00		
		120	Wind Normal	4311 46	3733 83	2155 73	147179 56	-254922 48	0 00		
		150	Wind 90	4311 46	2155 73	3733 83	254922 48	-147179 56	0 00		
		180	Wind 60	4311 46	0 00	4311 46	294359 12	0 00	0 00		
		210	Wind 90	4311 46	-2155 73	3733 83	254922 48	147179 56	0 00		
		240	Wind Normal	4311 46	-3733 83	2155 73	147179 56	254922 48	0 00		
		270	Wind 90	4311 46	-4311 46	0 00	0 00	294359 12	0 00		
		300	Wind 60	4311 46	-3733 83	-2155 73	-147179 56	254922 48	0 00		
		330	Wind 90	4311 46	-2155 73	-3733 83	-254922 48	147179 56	0 00		
		L5	45 25-0 00	0	Wind Normal	3995 43	0 00	-3995 43	-91458 76	0 00	0 00
				30	Wind 90	3995 43	1997 71	-3460 14	-79205 61	-45729 38	0 00
				60	Wind 60	3995 43	3460 14	-1997 71	-45729 38	-79205 61	0 00
90	Wind 90			3995 43	3995 43	0 00	0 00	-91458 76	0 00		
120	Wind Normal			3995 43	3460 14	1997 71	45729.38	-79205 61	0 00		
150	Wind 90			3995 43	1997 71	3460 14	79205 61	-45729 38	0 00		
180	Wind 60			3995 43	0 00	3995 43	91458 76	0 00	0 00		
210	Wind 90			3995 43	-1997 71	3460 14	79205 61	45729 38	0 00		
240	Wind Normal			3995 43	-3460 14	1997 71	45729 38	79205 61	0 00		
270	Wind 90			3995 43	-3995 43	0 00	0 00	91458 76	0 00		
300	Wind 60			3995 43	-3460 14	-1997 71	-45729 38	79205 61	0 00		
330	Wind 90			3995 43	-1997 71	-3460 14	-79205 61	45729 38	0 00		

Mast Totals - No Ice

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	Client American Tower	Designed by BL TNX V.6.1 2

Wind Azimuth °	F _a lb	F _s lb	V _x lb	V _z lb	OTM _x lb-ft	OTM _z lb-ft	Torque lb-ft
0	3318.29	0.00	0.00	-3318.29	-547517.21	0.00	0.00
30	3318.29	0.00	1659.14	-2873.72	-474163.81	-273758.61	0.00
60	3318.29	0.00	2873.72	-1659.14	-273758.61	-474163.81	0.00
90	3318.29	0.00	3318.29	0.00	0.00	-547517.21	0.00
120	3318.29	0.00	2873.72	1659.14	273758.61	-474163.81	0.00
150	3318.29	0.00	1659.14	2873.72	474163.81	-273758.61	0.00
180	3318.29	0.00	0.00	3318.29	547517.21	0.00	0.00
210	3318.29	0.00	-1659.14	2873.72	474163.81	273758.61	0.00
240	3318.29	0.00	-2873.72	1659.14	273758.61	474163.81	0.00
270	3318.29	0.00	-3318.29	0.00	0.00	547517.21	0.00
300	3318.29	0.00	-2873.72	-1659.14	-273758.61	474163.81	0.00
330	3318.29	0.00	-1659.14	-2873.72	-474163.81	273758.61	0.00

Discrete Appurtenance Totals - No Ice

Wind Azimuth °	V _x lb	V _z lb	OTM _x lb-ft	OTM _z lb-ft	Torque lb-ft
0	0.00	-13514.18	-2434531.64	0.00	0.00
30	6757.09	-11703.62	-2108366.24	-1217265.82	0.00
60	11703.62	-6757.09	-1217265.82	-2108366.24	0.00
90	13514.18	0.00	0.00	-2434531.64	0.00
120	11703.62	6757.09	1217265.82	-2108366.24	0.00
150	6757.09	11703.62	2108366.24	-1217265.82	0.00
180	0.00	13514.18	2434531.64	0.00	0.00
210	-6757.09	11703.62	2108366.24	1217265.82	0.00
240	-11703.62	6757.09	1217265.82	2108366.24	0.00
270	-13514.18	0.00	0.00	2434531.64	0.00
300	-11703.62	-6757.09	-1217265.82	2108366.24	0.00
330	-6757.09	-11703.62	-2108366.24	1217265.82	0.00

Discrete Appurtenance Pressures - Service $G_H = 1.100$

Description	Aliming Azimuth °	Weight lb	Offset _x ft	Offset _z ft	z ft	K _z	q _z psf	C _{MAc} Front ft ²	C _{MAc} Side ft ²
80 sq ft	0.0000	2000.00	0.00	0.00	195.00	1.457	11	80.00	80.00
80 sq ft.	0.0000	2000.00	0.00	0.00	185.00	1.441	11	80.00	80.00
80 sq ft.	0.0000	2000.00	0.00	0.00	175.00	1.424	11	80.00	80.00
80 sq ft.	0.0000	2000.00	0.00	0.00	165.00	1.406	11	80.00	80.00
Sum Weight		8000.00							

Discrete Appurtenance Vectors - Service

80 sq.ft. - Elevation 195 - None C							
Wind Azimuth °	F _a lb	F _s lb	V _x lb	V _z lb	OTM _x lb-ft	OTM _z lb-ft	Torque lb-ft
0	1004.17	0.00	0.00	-1004.17	-195812.99	0.00	0.00

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80 sq.ft. - Elevation 165 - None C							
Wind Azimuth °	F _a lb	F _s lb	V _x lb	V _z lb	OTM _x lb-ft	OTM _z lb-ft	Torque lb-ft
120	969 47	0 00	839 58	484 73	79981 03	-138531 21	0 00
150	969 47	0 00	484 73	839 58	138531 21	-79981 03	0 00
180	969 47	0 00	0 00	969 47	159962 06	0 00	0 00
210	969 47	0 00	-484 73	839 58	138531 21	79981 03	0 00
240	969 47	0 00	-839 58	484 73	79981 03	138531 21	0 00
270	969 47	0 00	-969 47	0 00	0 00	159962 06	0 00
300	969 47	0 00	-839 58	-484 73	-79981 03	138531 21	0 00
330	969 47	0 00	-484 73	-839 58	-138531 21	79981 03	0 00

Discrete Appurtenance Totals - Service

Wind Azimuth °	V _x lb	V _z lb	OTM _x lb-ft	OTM _z lb-ft	Torque lb-ft
0	0 00	-3948 29	-711270 25	0 00	0 00
30	1974 14	-3419 32	-615978 11	-355635 13	0 00
60	3419 32	-1974 14	-355635 13	-615978 11	0 00
90	3948 29	0 00	0 00	-711270 25	0 00
120	3419 32	1974 14	355635 13	-615978 11	0 00
150	1974 14	3419 32	615978 11	-355635 13	0 00
180	0 00	3948.29	711270 25	0 00	0 00
210	-1974 14	3419 32	615978 11	355635 13	0 00
240	-3419 32	1974 14	355635 13	615978 11	0 00
270	-3948 29	0 00	0 00	711270 25	0 00
300	-3419 32	-1974 14	-355635 13	615978 11	0 00
330	-1974 14	-3419 32	-615978 11	355635 13	0 00

Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M _x lb-ft	Sum of Overturning Moments, M _z lb-ft	Sum of Torques lb-ft
Leg Weight	38122 42					
Bracing Weight	0 00					
Total Member Self-Weight	38122.42			0 00	0 00	
Total Weight	56749 62			0 00	0 00	
Wind 0 deg - No Ice		0 00	-28963.20	-3810189 52	0 00	0 00
Wind 30 deg - No Ice		14481 60	-25082 87	-3299720 92	-1905094 76	0 00
Wind 60 deg - No Ice		25082 87	-14481 60	-1905094 76	-3299720 92	0 00
Wind 90 deg - No Ice		28963 20	0 00	0 00	-3810189 52	0 00
Wind 120 deg - No Ice		25082 87	14481 60	1905094 76	-3299720 92	0 00
Wind 150 deg - No Ice		14481 60	25082 87	3299720 92	-1905094 76	0 00
Wind 180 deg - No Ice		0 00	28963 20	3810189 52	0 00	0 00
Wind 210 deg - No Ice		-14481 60	25082 87	3299720 92	1905094 76	0 00
Wind 240 deg - No Ice		-25082 87	14481 60	1905094 76	3299720 92	0 00
Wind 270 deg - No Ice		-28963 20	0 00	0 00	3810189 52	0 00
Wind 300 deg - No Ice		-25082 87	-14481 60	-1905094 76	3299720 92	0 00
Wind 330 deg - No Ice		-14481 60	-25082 87	-3299720 92	1905094 76	0 00
Total Weight	56749 62			0 00	0 00	
Wind 0 deg - Service		0 00	-8461 86	-1113181 04	0 00	0 00

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Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov Load Comb	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L1	195 - 156 75	Pole	Max Tension	1	0 00	0 00	0 00
			Max Compression	1	-11052 25	0 00	0 00
			Max Mx	8	-9075 76	-504630 70	0 00
			Max My	2	-9075 76	0 00	504630 70
			Max Vy	8	26502 39	-504630 70	0 00
			Max Vx	2	-26502 39	0 00	504630 70
			Max Torque	6			0 01
L2	156 75 - 140 75	Pole	Max Tension	1	0 00	0 00	0 00
			Max Compression	1	-13481 30	0 00	0 00
			Max Mx	8	-12245 59	-930029 46	0 00
			Max My	2	-12245 59	0 00	930029 46
			Max Vy	8	28372 34	-930029 46	0 00
			Max Vx	2	-28372 34	0 00	930029 46
			Max Torque	6			0 02
L3	140 75 - 92.25	Pole	Max Tension	1	0 00	0 00	0 00
			Max Compression	2	-24805 23	0 00	2405863 93
			Max Mx	8	-24805 23	-	0 00
			Max My	2	-24805 23	0 00	2405863 93
			Max Vy	8	34411 37	-	0 00
			Max Vx	2	-34411 37	0 00	2405863 93
			Max Torque	6			0 04
L4	92 25 - 45 25	Pole	Max Tension	1	0 00	0 00	0 00
			Max Compression	2	-41765 02	0 00	4112096 93
			Max Mx	8	-41765 02	-	0 00
			Max My	2	-41765 02	0 00	4112096 93
			Max Vy	8	40456 03	-	0 00
			Max Vx	2	-40456 03	0 00	4112096 93
			Max Torque	6			0 06
L5	45 25 - 0	Pole	Max Tension	1	0 00	0 00	0 00
			Max Compression	2	-68060 66	0 00	6414892 58
			Max Mx	8	-68060 66	-	0 00
			Max My	2	-68060 66	0 00	6414892 58
			Max Vy	8	46398 22	-	0 00
			Max Vx	2	-46398 22	0 00	6414892 58
			Max Torque	6			0 07

Maximum Reactions

Location	Condition	Gov Load Comb	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	2	68099 55	0 00	46341 13
	Max. H _x	21	51074 66	46341 14	0 00
	Max H _z	3	51074 66	0 00	46341 14
	Max M _x	2	6414892 58	0 00	46341 13
	Max M _z	8	6414892 58	-46341 13	0 00
	Max Torsion	6		-40132 59	23170 56

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Load Combination	Vertical	Shear _x	Shear _y	Overturing Moment, M _x	Overturing Moment, M _y	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
1 2 Dead+1 6 Wind 330 deg - No Ice	68099 55	-23170 56	-40132 59	-5555463 04	3207448 14	-0 07
0 9 Dead+1 6 Wind 330 deg - No Ice	51074 66	-23170 56	-40132 59	-5477963 38	3162703 64	-0 01
Dead+Wind 0 deg - Service	56749 62	0 00	-8461 87	-1165042 14	0 00	0 00
Dead+Wind 30 deg - Service	56749 62	4230 93	-7328 19	-1008964 92	-582526 17	0 00
Dead+Wind 60 deg - Service	56749 62	7328 19	-4230 93	-582526 17	-1008964 92	-0 00
Dead+Wind 90 deg - Service	56749 62	8461 87	0 00	0 00	-1165042 14	0 00
Dead+Wind 120 deg - Service	56749 62	7328 19	4230 93	582526 17	-1008964 92	0 00
Dead+Wind 150 deg - Service	56749 62	4230 93	7328 19	1008964 92	-582526 17	-0 00
Dead+Wind 180 deg - Service	56749 62	0 00	8461 87	1165042 14	0 00	0 00
Dead+Wind 210 deg - Service	56749 62	-4230 93	7328 19	1008964 92	582526 17	0 00
Dead+Wind 240 deg - Service	56749 62	-7328 19	4230 93	582526 17	1008964 92	-0 00
Dead+Wind 270 deg - Service	56749 62	-8461 87	0 00	0 00	1165042 14	0 00
Dead+Wind 300 deg - Service	56749 62	-7328 19	-4230 93	-582526 17	1008964 92	0 00
Dead+Wind 330 deg - Service	56749 62	-4230 93	-7328 19	-1008964 92	582526 17	-0 00

Solution Summary

Load Comb	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
1	0 00	-56749 62	0 00	0 00	56749 62	0 00	0 000%
2	0 00	-68099 55	-46341 13	0 00	68099 55	46341 13	0 000%
3	0 00	-51074 66	-46341 13	0 00	51074 66	46341 14	0 000%
4	23170 56	-68099 55	-40132 59	-23170 56	68099 55	40132 59	0 000%
5	23170 56	-51074 66	-40132 59	-23170 56	51074 66	40132 59	0 000%
6	40132 59	-68099 55	-23170 56	-40132 59	68099 55	23170 56	0 000%
7	40132 59	-51074 66	-23170 56	-40132 59	51074 66	23170 56	0 000%
8	46341 13	-68099 55	0 00	-46341 13	68099 55	0 00	0 000%
9	46341 13	-51074 66	0 00	-46341 14	51074 66	0 00	0 000%
10	40132 59	-68099 55	23170 56	-40132 59	68099 55	-23170 56	0 000%
11	40132 59	-51074 66	23170 56	-40132 59	51074 66	-23170 56	0 000%
12	23170 56	-68099 55	40132 59	-23170 56	68099 55	-40132 59	0 000%
13	23170 56	-51074 66	40132 59	-23170 56	51074 66	-40132 59	0 000%
14	0 00	-68099 55	46341 13	0 00	68099 55	-46341 13	0 000%
15	0 00	-51074 66	46341 13	0 00	51074 66	-46341 14	0 000%
16	-23170 56	-68099 55	40132 59	23170 56	68099 55	-40132 59	0 000%
17	-23170 56	-51074 66	40132 59	23170 56	51074 66	-40132 59	0 000%
18	-40132 59	-68099 55	23170 56	40132 59	68099 55	-23170 56	0 000%
19	-40132 59	-51074 66	23170 56	40132 59	51074 66	-23170 56	0 000%
20	-46341 13	-68099 55	0 00	46341 13	68099 55	0 00	0 000%
21	-46341 13	-51074 66	0 00	46341 14	51074 66	0 00	0 000%
22	-40132 59	-68099 55	-23170 56	40132 59	68099 55	23170 56	0 000%
23	-40132 59	-51074 66	-23170 56	40132 59	51074 66	23170 56	0 000%
24	-23170 56	-68099 55	-40132 59	23170 56	68099 55	40132 59	0 000%
25	-23170 56	-51074 66	-40132 59	23170 56	51074 66	40132 59	0 000%
26	0 00	-56749 62	-8461 86	0 00	56749 62	8461 87	0 000%
27	4230 93	-56749 62	-7328 19	-4230 93	56749 62	7328 19	0 000%
28	7328 19	-56749 62	-4230 93	-7328 19	56749 62	4230 93	0 000%
29	8461 86	-56749 62	0 00	-8461 87	56749 62	0 00	0 000%
30	7328 19	-56749 62	4230 93	-7328 19	56749 62	-4230 93	0 000%
31	4230 93	-56749 62	7328 19	-4230 93	56749 62	-7328 19	0 000%
32	0 00	-56749 62	8461 86	0 00	56749 62	-8461 87	0 000%
33	-4230 93	-56749 62	7328 19	4230 93	56749 62	-7328 19	0 000%
34	-7328 19	-56749 62	4230 93	7328 19	56749 62	-4230 93	0 000%
35	-8461 86	-56749 62	0 00	8461 87	56749 62	0 00	0 000%
36	-7328 19	-56749 62	-4230 93	7328 19	56749 62	4230 93	0 000%

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Section No.	Elevation ft	Horz Deflection in	Gov Load Comb	Tilt °	Twist °
L4	98.25 - 45.25	8.308	29	0.8602	0.0000
L5	52.75 - 0	2.253	29	0.3958	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov Load Comb	Deflection in	Tilt °	Twist °	Radius of Curvature ft
195.00	80 sq ft.	29	38.559	1.9562	0.0000	27951
185.00	80 sq ft.	29	34.495	1.8932	0.0000	13975
175.00	80 sq ft.	29	30.517	1.8213	0.0000	6987
165.00	80 sq ft.	29	26.711	1.7318	0.0000	4658

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov Load Comb	Tilt °	Twist °
L1	195 - 156.75	211.564	2	10.7539	0.0000
L2	160.75 - 140.75	138.303	2	9.2765	0.0000
L3	145.25 - 92.25	109.857	2	8.1776	0.0000
L4	98.25 - 45.25	45.746	2	4.7393	0.0000
L5	52.75 - 0	12.408	2	2.1806	0.0000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov Load Comb	Deflection in	Tilt °	Twist °	Radius of Curvature ft
195.00	80 sq ft.	2	211.564	10.7539	0.0000	5438
185.00	80 sq ft.	2	189.343	10.4092	0.0000	2717
175.00	80 sq ft.	2	167.587	10.0161	0.0000	1354
165.00	80 sq ft.	2	146.760	9.5260	0.0000	899

Base Plate Design Data

Plate Thickness in	Number of Anchor Bolts	Anchor Bolt Size in	Actual Allowable Ratio Bolt Tension lb	Actual Allowable Ratio Bolt Compression lb	Actual Allowable Ratio Plate Stress ksi	Actual Allowable Ratio Stiffener Stress ksi	Controlling Condition	Ratio
3.0000	20	2.2500	213438.53	220244.59	32.766		Bolt T	0.95 ✓
			223654.40	371266.30	45.000			

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Section No	Elevation	Size	L	L _n	Kl/r	A	P _n	φP _n	Ratio P _n φP _n
	ft		ft	ft		in ²	lb	lb	
	155 705								
	155 705 -					23 0064	-10365 20	1641060 00	0 006
	154 659								
	154 659 -					23 2042	-10567 30	1650860 00	0 006
	153 614								
	153 614 -					23 4020	-10771 10	1660580 00	0 006
	152 568								
	152 568 -					23 5998	-10976 70	1670230 00	0 007
	151 523								
	151 523 -					23 7976	-11184 00	1679810 00	0 007
	150 477								
	150 477 -					23 9953	-11393 10	1689310 00	0 007
	149 432								
	149 432 -					24 1931	-11603 70	1698750 00	0 007
	148 386								
	148 386 -					24 3909	-11816 10	1708100 00	0 007
	147 341								
	147 341 -					24 5887	-12030 00	1717390 00	0 007
	146 295								
	146 295 -					24 7865	-12245 60	1726600 00	0 007
	145 25								
	145 25 -					25 6379	-6206 88	1765400 00	0 004
	140 75								
L3	145 25 -	TP43 6238x30 987x0 3125	53 00	0 00	0 0	31 4895	-7472.24	2330530 00	0 003
	140 75								
	140 75 -					32 0478	-14233 30	2361110 00	0 006
	138 389								
	138 389 -					32 6062	-14794 00	2391300 00	0 006
	136 028								
	136 028 -					33 1646	-15362 90	2421120 00	0 006
	133 667								
	133 667 -					33 7230	-15939 80	2450570 00	0 007
	131 306								
	131 306 -					34 2814	-16524 50	2479640 00	0 007
	128 944								
	128 944 -					34 8398	-17117 10	2508340 00	0 007
	126 583								
	126 583 -					35 3982	-17717 20	2536660 00	0 007
	124 222								
	124 222 -					35 9566	-18325 00	2564600 00	0 007
	121 861								
	121 861 -					36 5150	-18940 30	2592180 00	0 007
	119 5								
	119 5 -					37 0733	-19563 00	2619370 00	0 007
	117 139								
	117 139 -					37 6317	-20193 00	2646200 00	0 008
	114 778								
	114 778 -					38 1901	-20830 40	2672640 00	0 008
	112 417								
	112 417 -					38 7485	-21475 00	2698720 00	0 008
	110 056								
	110 056 -					39 3069	-22126 80	2724410 00	0 008
	107 694								
	107 694 -					39 8653	-22785 70	2749740 00	0 008
	105 333								
	105 333 -					40 4237	-23451 80	2774690 00	0 008
	102 972								
	102 972 -					40 9821	-24125 00	2799260 00	0 009
	100 611								
	100 611 -					41 5405	-24805 20	2823460 00	0 009

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Section No	Elevation ft	Size	L ft	L _n ft	KI/r	A in ²	P _n lb	φP _n lb	Ratio $\frac{P_n}{\phi P_n}$
	19 0526								
	19 0526 -					83 0838	-59915 20	5604700 00	0 011
	16 6711								
	16 6711 -					83 8723	-61052 80	5637620 00	0 011
	14 2895								
	14 2895 -					84 6609	-62199 10	5670150 00	0 011
	11 9079								
	11 9079 -					85 4494	-63354 10	5702290 00	0 011
	9 52632								
	9 52632 -					86 2379	-64517 80	5734060 00	0 011
	7 14474								
	7 14474 -					87 0264	-65690 10	5765450 00	0 011
	4 76316								
	4 76316 -					87 8149	-66871 10	5796450 00	0 012
	2 38158								
	2 38158 - 0					88 6035	-68060 70	5827080 00	0 012

Pole Bending Design Data

Section No	Elevation ft	Size	M _{ux} lb-ft	φM _{ux} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M _{uy} lb-ft	φM _{uy} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
L1	195 - 193 197	TP29 12x20x0 1875	10696 92	364660 83	0 029	0 00	364660 83	0 000
	193 197 -		21697 42	378153 33	0 057	0 00	378153 33	0 000
	191 395							
	191 395 -		33006 58	391788 33	0 084	0 00	391788 33	0 000
	189 592							
	189 592 -		44629 08	405561 67	0 110	0 00	405561 67	0 000
	187 789							
	187 789 -		56569 58	419467 50	0 135	0 00	419467 50	0 000
	185 987							
	185 987 -		73558 58	433498 33	0 170	0 00	433498 33	0 000
	184 184							
	184 184 -		96580 83	447650 00	0 216	0 00	447650 00	0 000
	182 382							
	182 382 -		119931 67	461915 83	0 260	0 00	461915 83	0 000
	180 579							
	180 579 -		143614 17	476290 00	0 302	0 00	476290 00	0 000
	178 776							
	178 776 -		167632 50	490766 67	0 342	0 00	490766 67	0 000
	176 974							
	176 974 -		191990 00	505340 83	0 380	0 00	505340 83	0 000
	175 171							
	175 171 -		226005 00	520005 00	0 435	0 00	520005 00	0 000
	173 368							
	173 368 -		261349 17	534755 00	0 489	0 00	534755 00	0 000
	171 566							
	171 566 -		297036 67	549585 00	0 540	0 00	549585 00	0 000
	169 763							
	169 763 -		333068 33	564487 50	0 590	0 00	564487 50	0 000
	167 961							
	167 961 -		369448 33	579458 33	0 638	0 00	579458 33	0 000
	166 158							
	166 158 -		409819 17	594490 00	0 689	0 00	594490 00	0 000
	164 355							
	164 355 -		457052 50	609578 33	0 750	0 00	609578 33	0 000

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Section No	Elevation ft	Size	M_{ix}	ϕM_{ix}	Ratio	M_{iy}	ϕM_{iy}	Ratio
			lb-ft	lb-ft	$\frac{M_{ix}}{\phi M_{ix}}$	lb-ft	lb-ft	$\frac{M_{iy}}{\phi M_{iy}}$
	107 694							
	107 694 - 105 333		2165591 67	2272783 33	0 953	0 00	2272783.33	0 000
	105 333 - 102 972		2244975 00	2325775 00	0 965	0 00	2325775 00	0 000
	102 972 - 100 611		2325066 67	2379033 33	0 977	0 00	2379033 33	0 000
	100 611 - 98 25		2405866 67	2432533 33	0 989	0 00	2432533 33	0 000
	98 25 - 92 25		1220591 67	2569541 67	0 475	0 00	2569541 67	0 000
L4	98 25 - 92 25	TP54 2051x41 5682x0 375	1394475 00	3188008 33	0 437	0 00	3188008 33	0 000
	92 25 - 90 0556		2692975 00	3255266 67	0 827	0 00	3255266 67	0 000
	90 0556 - 87 8611		2771508 33	3322916 67	0 834	0 00	3322916 67	0 000
	87 8611 - 85 6667		2850658 33	3390950 00	0 841	0 00	3390950 00	0 000
	85 6667 - 83 4722		2930441 67	3459341 67	0 847	0 00	3459341 67	0 000
	83 4722 - 81 2778		3010841 67	3528100 00	0 853	0 00	3528100 00	0 000
	81 2778 - 79 0833		3091858 33	3597200 00	0 860	0 00	3597200 00	0 000
	79 0833 - 76 8889		3173500 00	3666633 33	0 866	0 00	3666633 33	0 000
	76 8889 - 74 6944		3255758 33	3736400 00	0 871	0 00	3736400 00	0 000
	74 6944 - 72 5		3338633 33	3806475 00	0 877	0 00	3806475 00	0 000
	72 5 - 70 3056		3422125 00	3876858 33	0 883	0 00	3876858 33	0 000
	70.3056 - 68 1111		3506233 33	3947533 33	0 888	0 00	3947533 33	0 000
	68 1111 - 65 9167		3590950 00	4018500 00	0 894	0 00	4018500 00	0 000
	65 9167 - 63 7222		3676283 33	4089733.33	0 899	0 00	4089733 33	0 000
	63 7222 - 61 5278		3762233 33	4161233.33	0 904	0 00	4161233 33	0 000
	61 5278 - 59 3333		3848783 33	4232983 33	0 909	0 00	4232983 33	0 000
	59 3333 - 57 1389		3935950 00	4304975 00	0 914	0 00	4304975 00	0 000
	57 1389 - 54 9444		4023725 00	4377191 67	0 919	0 00	4377191 67	0 000
	54 9444 - 52 75		4112100 00	4449641 67	0 924	0 00	4449641 67	0 000
	52 75 - 45 25		2091250 00	4698750 00	0 445	0 00	4698750 00	0 000
L5	52 75 - 45 25	TP64 2441x51 6669x0 4375	2328425 00	5645141 33	0 412	0 00	5645141 33	0 000
	45 25 - 42 8684		4519100 00	5747391.33	0 786	0 00	5747391 33	0 000
	42 8684 - 40 4868		4619200 00	5850100 00	0 790	0 00	5850100 00	0 000
	40 4868 - 38 1053		4719966 67	5953258 00	0 793	0 00	5953258 00	0 000
	38 1053 - 35 7237		4821383 33	6056841 33	0 796	0 00	6056841 33	0 000
	35 7237 - 33 3421		4923450 00	6160841 33	0 799	0 00	6160841 33	0 000
	33.3421 - 30 9605		5026150 00	6265250 00	0 802	0 00	6265250 00	0 000
	30 9605 -		5129483 33	6370050 00	0 805	0 00	6370050 00	0 000

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	Project NP 195' - Ft White West FL - 282213 - Columbia Co., FL	Date 13:39.34 02/21/14
	Client American Tower	Designed by BL TNX V.6.1.2

Section No.	Elevation ft	Size	Actual V_u lb	ϕV_n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u lb-ft	ϕT_n lb-ft	Ratio $\frac{T_u}{\phi T_n}$
	169 763							
	169 763 -		20092 50	522317 00	0 038	0 01	1130358 33	0 000
	167 961							
	167 961 -		20286 40	527475 00	0 038	0 01	1160333 33	0 000
	166 158							
	166 158 -		26117 70	532523 00	0 049	0 01	1190433 33	0 000
	164 355							
	164 355 -		26310 10	537462 00	0 049	0 01	1220650 00	0 000
	162 553							
	162 553 -		26503 10	542292 00	0 049	0 01	1250958 33	0 000
	160 75							
	160 75 -		12016 30	552619 00	0 022	0 01	1318525 00	0 000
	156 75							
L2	160 75 -	TP32 5599x27 7913x0.25	15013 90	810620 00	0 019	0 01	1900533 33	0 000
	156 75							
	156 75 -		27146 30	815592 00	0 033	0 02	1929066 67	0 000
	155 705							
	155 705 -		27267 90	820528 00	0 033	0 02	1957716 67	0 000
	154 659							
	154 659 -		27389 70	825428 00	0 033	0 02	1986483 33	0 000
	153 614							
	153 614 -		27511 90	830290 00	0 033	0 02	2015358 33	0 000
	152 568							
	152 568 -		27634 30	835116 00	0 033	0 02	2044350 00	0 000
	151 523							
	151 523 -		27757 10	839905 00	0 033	0 02	2073450 00	0 000
	150 477							
	150 477 -		27880 10	844657 00	0 033	0 02	2102658 33	0 000
	149 432							
	149 432 -		28003 40	849373 00	0 033	0 02	2131966 67	0 000
	148 386							
	148 386 -		28127 00	854052 00	0 033	0 02	2161383 33	0 000
	147 341							
	147 341 -		28250 80	858694 00	0 033	0 02	2190891 67	0 000
	146.295							
	146.295 -		28375 00	863299 00	0 033	0 02	2220500 00	0 000
	145 25							
	145 25 -		13450 40	882702 00	0 015	0 01	2349016 67	0 000
	140 75							
L3	145 25 -	TP43 6238x30 987x0 3125	15607 40	1165270 00	0 013	0 01	3040625 00	0 000
	140 75							
	140 75 -		29349 40	1180550 00	0 025	0 02	3135666 67	0 000
	138 389							
	138 389 -		29642 00	1195650 00	0 025	0 03	3231633 33	0 000
	136 028							
	136 028 -		29935 40	1210560 00	0 025	0 03	3328491 67	0 000
	133 667							
	133 667 -		30229 30	1225280 00	0 025	0 03	3426225 00	0 000
	131 306							
	131 306 -		30524 00	1239820 00	0 025	0 03	3524800 00	0 000
	128 944							
	128 944 -		30819 20	1254170 00	0 025	0 03	3624191 67	0 000
	126 583							
	126 583 -		31115 10	1268330 00	0 025	0 03	3724366 67	0 000
	124.222							
	124.222 -		31411 70	1282300 00	0 024	0 03	3825316 67	0 000
	121 861							
	121 861 -		31708 80	1296090 00	0 024	0 03	3927000 00	0 000
	119 5							
	119 5 -		32006 60	1309690 00	0 024	0 04	4029391 67	0 000

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	Client American Tower	Designed by BL TNX V.6.1.2

Section No.	Elevation ft	Size	Actual V_u lb	ϕV_u lb	Ratio $\frac{V_u}{\phi V_u}$	Actual T_u lb-ft	ϕT_u lb-ft	Ratio $\frac{T_u}{\phi T_u}$
	38 1053							
	38 1053 - 35 7237		42770 60	2663840 00	0 016	0 06	12128500 00	0 000
	35 7237 - 33 3421		43040 50	2681820 00	0 016	0 06	12336749 33	0 000
	33 3421 - 30 9605		43306 40	2699610 00	0 016	0 06	12545833 33	0 000
	30 9605 - 28 5789		43568 30	2717210 00	0 016	0 06	12755666 67	0 000
	28 5789 - 26 1974		43826 20	2734620 00	0 016	0 06	12966249 33	0 000
	26 1974 - 23 8158		44080 10	2751840 00	0 016	0 06	13177582 67	0 000
	23 8158 - 21 4342		44330 00	2768870 00	0 016	0 06	13389666 67	0 000
	21 4342 - 19 0526		44575 90	2785710 00	0 016	0 06	13602333 33	0 000
	19 0526 - 16 6711		44817 80	2802350 00	0 016	0 06	13815749 33	0 000
	16 6711 - 14.2895		45055 60	2818810 00	0 016	0 06	14029666 67	0 000
	14.2895 - 11 9079		45289 40	2835070 00	0 016	0 06	14244249 33	0 000
	11 9079 - 9 52632		45519 20	2851150 00	0 016	0 06	14459416 00	0 000
	9 52632 - 7 14474		45745 00	2867030 00	0 016	0 06	14675082 67	0 000
	7 14474 - 4 76316		45966 80	2882720 00	0 016	0 07	14891249 33	0 000
	4 76316 - 2 38158		46184 50	2898230 00	0 016	0 07	15107916 00	0 000
	2 38158 - 0		46398 20	2913540 00	0 016	0 07	15325082 67	0 000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P_u ϕP_u	Ratio M_{ux} ϕM_{ux}	Ratio M_{uy} ϕM_{uy}	Ratio V_u ϕV_u	Ratio T_u ϕT_u	Comb Stress Ratio	Allow Stress Ratio	Criteria
L1	195 - 193 197	0 002	0 029	0 000	0 014	0 000	0 031 ✓	1 000	4 8 2 ✓
	193 197 - 191 395	0 002	0 057	0 000	0 014	0 000	0 059 ✓	1 000	4 8 2 ✓
	191 395 - 189 592	0 002	0 084	0 000	0 014	0 000	0 086 ✓	1 000	4 8 2 ✓
	189 592 - 187 789	0 002	0 110	0 000	0 014	0 000	0 112 ✓	1 000	4 8 2 ✓
	187 789 - 185 987	0 002	0 135	0 000	0 014	0 000	0 137 ✓	1 000	4 8 2 ✓
	185 987 - 184 184	0 004	0 170	0 000	0 027	0 000	0 174 ✓	1 000	4 8 2 ✓
	184 184 - 182 382	0 004	0 216	0 000	0 027	0 000	0 220 ✓	1 000	4 8 2 ✓
	182 382 - 180 579	0 004	0 260	0 000	0 027	0 000	0 264 ✓	1 000	4 8 2 ✓
	180 579 - 0	0 004	0 302	0 000	0 027	0 000	0 306 ✓	1 000	4 8 2 ✓

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	Client American Tower	Designed by BL TNX V.6 1.2

Section No.	Elevation ft	Ratio	Ratio	Ratio	Ratio	Ratio	Comb Stress Ratio	Allow Stress Ratio	Criteria
		P_u	M_{ux}	M_{uy}	V_u	T_u			
		ϕP_n	ϕM_{ux}	ϕM_{uy}	ϕV_n	ϕT_n			
	128 944								
	128 944 -	0 007	0 819	0 000	0 025	0 000	0 827 ✓	1 000	4 8 2 ✓
	126 583								
	126 583 -	0 007	0 837	0 000	0 025	0 000	0 844 ✓	1 000	4 8 2 ✓
	124 222								
	124 222 -	0 007	0 853	0 000	0 024	0 000	0 861 ✓	1 000	4 8 2 ✓
	121 861								
	121 861 -	0 007	0 869	0 000	0 024	0 000	0 877 ✓	1 000	4 8 2 ✓
	119 5								
	119 5 -	0 007	0 884	0 000	0 024	0 000	0 892 ✓	1 000	4 8 2 ✓
	117 139								
	117 139 -	0 008	0 899	0 000	0 024	0 000	0 907 ✓	1 000	4 8.2 ✓
	114 778								
	114 778 -	0 008	0 913	0 000	0 024	0 000	0 922 ✓	1 000	4 8 2 ✓
	112 417								
	112.417 -	0 008	0 927	0 000	0 024	0 000	0 935 ✓	1 000	4 8 2 ✓
	110 056								
	110 056 -	0 008	0 940	0 000	0 024	0 000	0 949 ✓	1 000	4 8 2 ✓
	107 694								
	107 694 -	0 008	0 953	0 000	0 024	0 000	0 962 ✓	1 000	4 8 2 ✓
	105 333								
	105 333 -	0 008	0 965	0 000	0 024	0 000	0 974 ✓	1 000	4 8.2 ✓
	102 972								
	102 972 -	0 009	0 977	0 000	0 024	0 000	0 987 ✓	1 000	4 8.2 ✓
	100 611								
	100 611 -	0 009	0 989	0 000	0 024	0 000	0 998 ✓	1 000	4 8 2 ✓
	98 25								
	98 25 - 92.25	0 004	0 475	0 000	0 012	0 000	0 480 ✓	1 000	4 8 2 ✓
L4	98.25 - 92 25	0 004	0 437	0 000	0 010	0 000	0 442 ✓	1 000	4 8 2 ✓
	92 25 -	0 008	0 827	0 000	0 019	0 000	0 835 ✓	1 000	4 8.2 ✓
	90 0556								
	90 0556 -	0 008	0 834	0 000	0 019	0 000	0 842 ✓	1 000	4 8.2 ✓
	87 8611								
	87 8611 -	0 008	0 841	0 000	0 019	0 000	0 849 ✓	1 000	4 8 2 ✓
	85 6667								
	85 6667 -	0 008	0 847	0 000	0 019	0 000	0 856 ✓	1 000	4 8 2 ✓
	83 4722								
	83 4722 -	0 008	0 853	0 000	0 019	0 000	0 862 ✓	1 000	4 8.2 ✓
	81 2778								
	81 2778 -	0 008	0 860	0 000	0 019	0 000	0 868 ✓	1 000	4 8.2 ✓
	79 0833								
	79 0833 -	0 009	0 866	0 000	0 019	0 000	0 874 ✓	1 000	4 8 2 ✓
	76 8889								
	76 8889 -	0 009	0 871	0 000	0 019	0 000	0 880 ✓	1 000	4 8 2 ✓
	74 6944								
	74 6944 - 72 5	0 009	0 877	0 000	0 019	0 000	0 886 ✓	1 000	4 8.2 ✓
	72 5 - 70 3056	0 009	0 883	0 000	0 019	0 000	0 892 ✓	1 000	4 8 2 ✓
	70 3056 -	0 009	0 888	0 000	0 019	0 000	0 898 ✓	1 000	4 8 2 ✓
	68 1111								
	68 1111 -	0 009	0 894	0 000	0 019	0 000	0 903 ✓	1 000	4 8.2 ✓
	65 9167								
	65 9167 -	0 009	0 899	0 000	0 019	0 000	0 909 ✓	1 000	4 8.2 ✓
	63 7222								
	63 7222 -	0 009	0 904	0 000	0 019	0 000	0 914 ✓	1 000	4 8 2 ✓
	61 5278								
	61 5278 -	0 010	0 909	0 000	0 019	0 000	0 919 ✓	1 000	4 8 2 ✓
	59 3333								
	59 3333 -	0 010	0 914	0 000	0 019	0 000	0 924 ✓	1 000	4 8.2 ✓

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	Client American Tower	Designed by BL TNX V 6 1.2

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail	
L4	92.25 - 45.25	Pole	TP54 2051x41 5682x0 375	4	-41765 00	4155250 00	93.5	Pass	
L5	45.25 - 0	Pole	TP64.2441x51 6669x0 4375	5	-68060 70	5827080 00	85.0	Pass	
							Summary		
							Pole (L3)	99.8	Pass
							Base Plate	95.4	Pass
							RATING =	99.8	Pass

227350.LPile.lp6o

=====
Pile Plus for windows, Version 2012-06.030
Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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=====

This copy of LPile is licensed to:

Nello Corporation
211 W. Washington St., Suite 2000, South Bend, IN 46601

Serial Number of Security Device: 138583407
Company Name Stored in Security Device: Nello Corp.

Files Used for Analysis

Path to file locations: N:\SO\20478\
Name of input data file: 227350.LPile.lp6d
Name of output report file: 227350.LPile.lp6o
Name of plot output file: 227350.LPile.lp6p
Name of runtime message file: 227350.LPile.lp6r

Date and Time of Analysis

Date: February 28, 2014 Time: 12:22:41

Problem Title

Job Number: SO20478

Client: American Tower

Engineer: CMR

Description: FDN NO: 227350

 Ground Slope and Pile Batter Angles

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

 Soil and Rock Layering Information

The soil profile is modelled using 7 layers

Layer 1 is soft clay, p-y criteria by Matlock, 1970

Distance from top of pile to top of layer	=	0.50000 ft
Distance from top of pile to bottom of layer	=	5.50000 ft
Effective unit weight at top of layer	=	100.00000 pcf
Effective unit weight at bottom of layer	=	100.00000 pcf
Undrained cohesion at top of layer	=	250.00000 psi
Undrained cohesion at bottom of layer	=	250.00000 psi
Epsilon-50 at top of layer	=	0.10000
Epsilon-50 at bottom of layer	=	0.10000

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	5.50000 ft
Distance from top of pile to bottom of layer	=	9.00000 ft
Effective unit weight at top of layer	=	95.00000 pcf
Effective unit weight at bottom of layer	=	95.00000 pcf
Friction angle at top of layer	=	27.00000 deg.
Friction angle at bottom of layer	=	27.00000 deg.
Subgrade k at top of layer	=	25.00000 pci
Subgrade k at bottom of layer	=	25.00000 pci

Layer 3 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	9.00000 ft
Distance from top of pile to bottom of layer	=	29.00000 ft
Effective unit weight at top of layer	=	110.00000 pcf
Effective unit weight at bottom of layer	=	110.00000 pcf
Friction angle at top of layer	=	30.00000 deg.
Friction angle at bottom of layer	=	30.00000 deg.
Subgrade k at top of layer	=	90.00000 pci
Subgrade k at bottom of layer	=	90.00000 pci

Layer 4 is stiff clay without free water

Distance from top of pile to top of layer	=	29.00000 ft
Distance from top of pile to bottom of layer	=	34.00000 ft

227350.LPile.1p6o

1	Soft Clay				0.10000	0.500	100.000	250.000
--	--	--	--	--	--	--	--	--
					0.10000	5.500	100.000	250.000
					--	--	--	--
2	Sand (Reese, et al.)				--	5.500	95.000	--
27.000	--	--	--	--	--	--	25.000	--
					--	9.000	95.000	--
27.000	--	--	--	--	--	--	25.000	--
3	Sand (Reese, et al.)				--	9.000	110.000	--
30.000	--	--	--	--	--	--	90.000	--
					--	29.000	110.000	--
30.000	--	--	--	--	--	--	90.000	--
4	stiff Clay w/o Free water				0.01000	29.000	110.000	1100.000
--	--	--	--	--	--	--	--	--
					0.01000	34.000	110.000	1100.000
--	--	--	--	--	--	--	--	--
5	stiff Clay w/o Free water				0.00850	34.000	110.000	1300.000
--	--	--	--	--	--	--	--	--
					0.00850	39.000	110.000	1300.000
--	--	--	--	--	--	--	--	--
6	stiff Clay with Free water				0.01500	39.000	37.600	700.000
--	--	--	--	--	--	--	70.000	--
					0.01500	44.000	37.600	700.000
--	--	--	--	--	--	--	70.000	--
7	Sand (Reese, et al.)				--	44.000	52.600	--
35.000	--	--	--	--	--	--	125.000	--
					--	50.500	52.600	--
35.000	--	--	--	--	--	--	125.000	--

Loading Type

cyclic loading criteria were used for computation of p-y curves for all analyses.
 Number of cycles of loading = 1000

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

227350.LPile.lp6o

10	1.27000	1.27000	22.18250	38.42122
11	1.27000	1.27000	17.57208	40.73666
12	1.27000	1.27000	12.72403	42.50120
13	1.27000	1.27000	7.70390	43.69100
14	1.27000	1.27000	2.57960	44.28994
15	1.27000	1.27000	-2.57960	44.28994
16	1.27000	1.27000	-7.70390	43.69100
17	1.27000	1.27000	-12.72403	42.50120
18	1.27000	1.27000	-17.57208	40.73666
19	1.27000	1.27000	-22.18250	38.42122
20	1.27000	1.27000	-26.49294	35.58620
21	1.27000	1.27000	-30.44511	32.26993
22	1.27000	1.27000	-33.98556	28.51727
23	1.27000	1.27000	-37.06642	24.37897
24	1.27000	1.27000	-39.64601	19.91098
25	1.27000	1.27000	-41.68946	15.17372
26	1.27000	1.27000	-43.16914	10.23127
27	1.27000	1.27000	-44.06502	5.15046
28	1.27000	1.27000	-44.36500	0.00000
29	1.27000	1.27000	-44.06502	-5.15046
30	1.27000	1.27000	-43.16914	-10.23127
31	1.27000	1.27000	-41.68946	-15.17372
32	1.27000	1.27000	-39.64601	-19.91098
33	1.27000	1.27000	-37.06642	-24.37897
34	1.27000	1.27000	-33.98556	-28.51727
35	1.27000	1.27000	-30.44511	-32.26993
36	1.27000	1.27000	-26.49294	-35.58620
37	1.27000	1.27000	-22.18250	-38.42122
38	1.27000	1.27000	-17.57208	-40.73666
39	1.27000	1.27000	-12.72403	-42.50120
40	1.27000	1.27000	-7.70390	-43.69100
41	1.27000	1.27000	-2.57960	-44.28994
42	1.27000	1.27000	2.57960	-44.28994
43	1.27000	1.27000	7.70390	-43.69100
44	1.27000	1.27000	12.72403	-42.50120
45	1.27000	1.27000	17.57208	-40.73666
46	1.27000	1.27000	22.18250	-38.42122
47	1.27000	1.27000	26.49294	-35.58620
48	1.27000	1.27000	30.44511	-32.26993
49	1.27000	1.27000	33.98556	-28.51727
50	1.27000	1.27000	37.06642	-24.37897
51	1.27000	1.27000	39.64601	-19.91098
52	1.27000	1.27000	41.68946	-15.17372
53	1.27000	1.27000	43.16914	-10.23127
54	1.27000	1.27000	44.06502	-5.15046

Concrete Properties:

Compressive Strength of Concrete	=	4.0000000	ksi
Modulus of Elasticity of Concrete	=	3604.99653259	ksi
Modulus of Rupture of Concrete	=	-0.47434164	ksi
Compression Strain at Peak Stress	=	0.00188627	
Tensile Strain at Fracture of Concrete	=	-0.00011537	
Maximum Coarse Aggregate Size	=	0.75000000	in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number Axial Thrust Force
 kips

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0.4985549	-10.2584070	C				
0.000005313	41622.		7834762684.	24.6710980	0.0001311	-0.0003789
0.5264873	-10.9151590	C				
0.000005625	41622.		7399498091.	24.5818796	0.0001383	-0.0004017
0.5543255	-11.5717809	C				
0.000005938	41622.		7010050823.	24.5028105	0.0001455	-0.0004245
0.5820693	-12.2282723	C				
0.000006250	41622.		6659548281.	24.4302709	0.0001527	-0.0004473
0.6096674	-12.8850134	C				
0.000006563	41622.		6342426935.	24.3644446	0.0001599	-0.0004701
0.6371486	-13.5417916	C				
0.000006875	41622.		6054134801.	24.3052856	0.0001671	-0.0004929
0.6645362	-14.1984337	C				
0.000007188	41622.		5790911549.	24.2519265	0.0001743	-0.0005157
0.6918299	-14.8549390	C				
0.000007500	41622.		5549623568.	24.2036445	0.0001815	-0.0005385
0.7190297	-15.5113073	C				
0.000007813	41622.		5327638625.	24.1598323	0.0001887	-0.0005613
0.7461354	-16.1675380	C				
0.000008125	41622.		5122729447.	24.1199762	0.0001960	-0.0005840
0.7731468	-16.8236306	C				
0.000008438	41622.		4932998727.	24.0836386	0.0002032	-0.0006068
0.8000637	-17.4795846	C				
0.000008750	41622.		4756820201.	24.0504444	0.0002104	-0.0006296
0.8268859	-18.1353997	C				
0.000009063	41622.		4592791918.	24.0200702	0.0002177	-0.0006523
0.8536134	-18.7910753	C				
0.000009375	41622.		4439698854.	23.9922358	0.0002249	-0.0006751
0.8802459	-19.4466109	C				
0.000009688	41622.		4296482762.	23.9666971	0.0002322	-0.0006978
0.9067833	-20.1020060	C				
0.0000100	41622.		4162217676.	23.9432406	0.0002394	-0.0007206
0.9332254	-20.7572602	C				
0.0000103	41712.		4044798040.	23.9216787	0.0002467	-0.0007433
0.9595720	-21.4123732	C				
0.0000106	42909.		4038448211.	23.9018458	0.0002540	-0.0007660
0.9858230	-22.0673440	C				
0.0000109	44104.		4032408164.	23.8835952	0.0002612	-0.0007888
1.0119781	-22.7221724	C				
0.0000113	45300.		4026651928.	23.8667966	0.0002685	-0.0008115
1.0380373	-23.3768578	C				
0.0000116	46495.		4021156337.	23.8513339	0.0002758	-0.0008342
1.0640003	-24.0313998	C				
0.0000119	47689.		4015900664.	23.8371030	0.0002831	-0.0008569
1.0898670	-24.6857978	C				
0.0000122	48882.		4010866309.	23.8240106	0.0002904	-0.0008796
1.1156372	-25.3400514	C				
0.0000128	51268.		4001396270.	23.8009137	0.0003049	-0.0009251
1.1668873	-26.6481230	C				
0.0000134	53651.		3992630593.	23.7814640	0.0003196	-0.0009704
1.2177493	-27.9556107	C				
0.0000141	56032.		3984474245.	23.7651857	0.0003342	-0.0010158
1.2682216	-29.2625105	C				
0.0000147	58410.		3976848734.	23.7516840	0.0003489	-0.0010611
1.3183029	-30.5688173	C				
0.0000153	60786.		3969687905.	23.7406284	0.0003635	-0.0011065
1.3679917	-31.8745273	C				
0.0000159	63159.		3962936133.	23.7317408	0.0003782	-0.0011518
1.4172865	-33.1796361	C				
0.0000166	65530.		3956546178.	23.7247850	0.0003929	-0.0011971
1.4661858	-34.4841392	C				
0.0000172	67899.		3950477660.	23.7195592	0.0004077	-0.0012423
1.5146880	-35.7880322	C				

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2.7896415	-60.0000000	CY				
0.0000397	134819.		3397011912.	23.0390782	0.0009144	-0.0028956
2.8960182	-60.0000000	CY				
0.0000422	137679.		3263494622.	22.7789281	0.0009610	-0.0030890
2.9949053	-60.0000000	CY				
0.0000447	140092.		3134921909.	22.5188875	0.0010063	-0.0032837
3.0865289	-60.0000000	CY				
0.0000472	142154.		3012531766.	22.2527781	0.0010501	-0.0034799
3.1707134	-60.0000000	CY				
0.0000497	144048.		2899072633.	22.0049120	0.0010934	-0.0036766
3.2500503	-60.0000000	CY				
0.0000522	145639.		2790689460.	21.7607284	0.0011356	-0.0038744
3.3235740	-60.0000000	CY				
0.0000547	147128.		2690340824.	21.5306466	0.0011775	-0.0040725
3.3925622	-60.0000000	CY				
0.0000572	148458.		2595980667.	21.3016085	0.0012182	-0.0042718
3.4561363	-60.0000000	CY				
0.0000597	149593.		2506265908.	21.0785003	0.0012581	-0.0044719
3.5150294	-60.0000000	CY				
0.0000622	150721.		2423653333.	20.8757131	0.0012982	-0.0046718
3.5707544	-60.0000000	CY				
0.0000647	151751.		2345909627.	20.6827780	0.0013379	-0.0048721
3.6225891	-60.0000000	CY				
0.0000672	152603.		2271296478.	20.4817790	0.0013761	-0.0050739
3.6692549	-60.0000000	CY				
0.0000697	153434.		2201742072.	20.2932624	0.0014142	-0.0052758
3.7126885	-60.0000000	CY				
0.0000722	154260.		2136929272.	20.1197475	0.0014524	-0.0054776
3.7532140	-60.0000000	CY				
0.0000747	155004.		2075371745.	19.9524595	0.0014902	-0.0056798
3.7902694	-60.0000000	CY				
0.0000772	155632.		2016281605.	19.7870254	0.0015273	-0.0058827
3.8236953	-60.0000000	CY				
0.0000797	156236.		1960612281.	19.6286607	0.0015642	-0.0060858
3.8540077	-60.0000000	CY				
0.0000822	156823.		1908115313.	19.4733850	0.0016005	-0.0062895
3.8810698	-60.0000000	CY				
0.0000847	157406.		1858665292.	19.3288603	0.0016369	-0.0064931
3.9054477	-60.0000000	CY				
0.0000872	157960.		1811726154.	19.1916461	0.0016733	-0.0066967
3.9269839	-60.0000000	CY				
0.0000897	158415.		1766303524.	19.0534471	0.0017089	-0.0069011
3.9453575	-60.0000000	CY				
0.0000922	158836.		1722966262.	18.9209103	0.0017443	-0.0071057
3.9610020	-60.0000000	CY				
0.0000947	159252.		1681872711.	18.7967217	0.0017798	-0.0073102
3.9740580	-60.0000000	CY				
0.0000972	159659.		1642793034.	18.6765433	0.0018151	-0.0075149
3.9844008	-60.0000000	CY				
0.0000997	160051.		1605528022.	18.5568825	0.0018499	-0.0077201
3.9920237	-60.0000000	CY				
0.0001022	160440.		1570050252.	18.4443672	0.0018848	-0.0079252
3.9971287	-60.0000000	CY				
0.0001047	160824.		1536230872.	18.3385024	0.0019198	-0.0081302
3.9996861	-60.0000000	CY				
0.0001072	161145.		1503394561.	18.2317825	0.0019542	-0.0083358
3.9948274	-60.0000000	CY				
0.0001097	161434.		1471767301.	18.1279176	0.0019884	-0.0085416
3.9964977	-60.0000000	CY				
0.0001122	161703.		1441367533.	18.0276121	0.0020225	-0.0087475
3.9992777	-60.0000000	CY				
0.0001147	161968.		1412254554.	17.9327160	0.0020567	-0.0089533
3.9983579	-60.0000000	CY				

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0.3071900	-5.6092618	C				
0.000003125	41622.	C	13318964968.	26.3914247	0.0000825	-0.0002175
0.3360502	-6.2647771	C				
0.000003438	41622.	C	12108149971.	26.0896705	0.0000897	-0.0002403
0.3646516	-6.9213360	C				
0.000003750	41622.	C	11099137473.	25.8393562	0.0000969	-0.0002631
0.3931583	-7.5777700	C				
0.000004063	41622.	C	10245357668.	25.6286142	0.0001041	-0.0002859
0.4215701	-8.2340789	C				
0.000004375	41622.	C	9513546406.	25.4489677	0.0001113	-0.0003087
0.4498868	-8.8902622	C				
0.000004688	41622.	C	8879309979.	25.2879669	0.0001185	-0.0003315
0.4779921	-9.5471670	C				
0.000005000	41622.	C	8324353105.	25.1476490	0.0001257	-0.0003543
0.5059967	-10.2039909	C				
0.000005313	41622.	C	7834685275.	25.0246820	0.0001329	-0.0003771
0.5339072	-10.8606849	C				
0.000005625	41622.	C	7399424982.	24.9161766	0.0001402	-0.0003998
0.5617235	-11.5172487	C				
0.000005938	41622.	C	7009981562.	24.8198520	0.0001474	-0.0004226
0.5894454	-12.1736817	C				
0.000006250	41622.	C	6659482484.	24.7338833	0.0001546	-0.0004454
0.6170726	-12.8299836	C				
0.000006563	41622.	C	6342364271.	24.6567933	0.0001618	-0.0004682
0.6446052	-13.4861540	C				
0.000006875	41622.	C	6054074986.	24.5873734	0.0001690	-0.0004910
0.6720428	-14.1421924	C				
0.000007188	41622.	C	5790854334.	24.5246253	0.0001763	-0.0005137
0.6993854	-14.7980984	C				
0.000007500	41622.	C	5549568737.	24.4671725	0.0001835	-0.0005365
0.7266171	-15.4539900	C				
0.000007813	41622.	C	5327585987.	24.4131075	0.0001907	-0.0005593
0.7537000	-16.1101553	C				
0.000008125	41622.	C	5122678834.	24.3637884	0.0001980	-0.0005820
0.7806885	-16.7661823	C				
0.000008438	41622.	C	4932949988.	24.3186898	0.0002052	-0.0006048
0.8075824	-17.4220706	C				
0.000008750	41622.	C	4756773203.	24.2773614	0.0002124	-0.0006276
0.8343817	-18.0778195	C				
0.000009063	41622.	C	4592746541.	24.2394150	0.0002197	-0.0006503
0.8610861	-18.7334287	C				
0.000009375	41622.	C	4439654989.	24.2045142	0.0002269	-0.0006731
0.8876955	-19.3888977	C				
0.000009688	41622.	C	4296440312.	24.1723660	0.0002342	-0.0006958
0.9142098	-20.0442259	C				
0.0000100	41622.	C	4162176553.	24.1427141	0.0002414	-0.0007186
0.9406286	-20.6994129	C				
0.0000103	42087.	C	4081129737.	24.1153330	0.0002487	-0.0007413
0.9669519	-21.3544582	C				
0.0000106	43283.	C	4073688942.	24.0900242	0.0002560	-0.0007640
0.9931796	-22.0093613	C				
0.0000109	44479.	C	4066620194.	24.0666115	0.0002632	-0.0007868
1.0193113	-22.6641216	C				
0.0000113	45674.	C	4059892333.	24.0449385	0.0002705	-0.0008095
1.0453470	-23.3187388	C				
0.0000116	46868.	C	4053477387.	24.0248656	0.0002778	-0.0008322
1.0712864	-23.9732126	C				
0.0000119	48062.	C	4047350867.	24.0062679	0.0002851	-0.0008549
1.0971295	-24.6275417	C				
0.0000122	49256.	C	4041490252.	23.9890336	0.0002924	-0.0008776
1.1228760	-25.2817262	C				
0.0000128	51641.	C	4030488455.	23.9582612	0.0003070	-0.0009230
1.1740786	-26.5896585	C				

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2.5849388	-60.0000000	CY				
0.0000334	125379.		3749641409.	23.7246800	0.0007933	-0.0024167
2.6172743	-60.0000000	CY				
0.0000341	126636.		3717757053.	23.6724208	0.0008063	-0.0024637
2.6488794	-60.0000000	CY				
0.0000347	127825.		3685040233.	23.6177732	0.0008192	-0.0025108
2.6797581	-60.0000000	CY				
0.0000353	128912.		3650610969.	23.5585106	0.0008319	-0.0025581
2.7097229	-60.0000000	CY				
0.0000359	129981.		3616856482.	23.4995083	0.0008445	-0.0026055
2.7391896	-60.0000000	CY				
0.0000366	131003.		3582997162.	23.4377120	0.0008569	-0.0026531
2.7679018	-60.0000000	CY				
0.0000372	131902.		3546940374.	23.3692955	0.0008690	-0.0027010
2.7955308	-60.0000000	CY				
0.0000397	135262.		3408171112.	23.1040005	0.0009169	-0.0028931
2.9017517	-60.0000000	CY				
0.0000422	138129.		3274174712.	22.8410614	0.0009636	-0.0030864
3.0004703	-60.0000000	CY				
0.0000447	140545.		3145072228.	22.5803720	0.0010091	-0.0032809
3.0920891	-60.0000000	CY				
0.0000472	142618.		3022373752.	22.3133606	0.0010529	-0.0034771
3.1762247	-60.0000000	CY				
0.0000497	144514.		2908461731.	22.0630260	0.0010963	-0.0036737
3.2553437	-60.0000000	CY				
0.0000522	146111.		2799738684.	21.8168822	0.0011386	-0.0038714
3.3286754	-60.0000000	CY				
0.0000547	147604.		2699047813.	21.5881575	0.0011806	-0.0040694
3.3977492	-60.0000000	CY				
0.0000572	148943.		2604462691.	21.3577514	0.0012214	-0.0042686
3.4611458	-60.0000000	CY				
0.0000597	150077.		2514377710.	21.1325497	0.0012613	-0.0044687
3.5197819	-60.0000000	CY				
0.0000622	151204.		2431425197.	20.9278480	0.0013015	-0.0046685
3.5752470	-60.0000000	CY				
0.0000647	152241.		2353482706.	20.7338042	0.0013412	-0.0048688
3.6268770	-60.0000000	CY				
0.0000672	153099.		2278684023.	20.5350075	0.0013797	-0.0050703
3.6736019	-60.0000000	CY				
0.0000697	153929.		2208852585.	20.3448238	0.0014178	-0.0052722
3.7167583	-60.0000000	CY				
0.0000722	154754.		2143781659.	20.1697637	0.0014560	-0.0054740
3.7570029	-60.0000000	CY				
0.0000747	155503.		2082043177.	20.0014584	0.0014939	-0.0056761
3.7938084	-60.0000000	CY				
0.0000772	156134.		2022783438.	19.8350690	0.0015310	-0.0058790
3.8269818	-60.0000000	CY				
0.0000797	156743.		1966974307.	19.6792220	0.0015682	-0.0060818
3.8572541	-60.0000000	CY				
0.0000822	157329.		1914273960.	19.5226406	0.0016045	-0.0062855
3.8840119	-60.0000000	CY				
0.0000847	157911.		1864632460.	19.3768934	0.0016410	-0.0064890
3.9080816	-60.0000000	CY				
0.0000872	158466.		1817529696.	19.2386844	0.0016774	-0.0066926
3.9293150	-60.0000000	CY				
0.0000897	158928.		1772016232.	19.1001493	0.0017130	-0.0068970
3.9474141	-60.0000000	CY				
0.0000922	159348.		1728515930.	18.9665484	0.0017485	-0.0071015
3.9627440	-60.0000000	CY				
0.0000947	159763.		1687267409.	18.8413530	0.0017840	-0.0073060
3.9754813	-60.0000000	CY				
0.0000972	160175.		1648099791.	18.7239695	0.0018197	-0.0075103
3.9855977	-60.0000000	CY				

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In ACI 318-08, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are spirals or tied hoops.

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318-08, Section 9.3.2.2 or the value required by the design standard being followed.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 61788.000 lbs
 Applied moment at pile head = 102638336.000 in-lbs
 Axial thrust load on pile head = 90800.000 lbs

Depth Res. Soil	Deflect. Spr. y	Bending Distrib. Load	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil p
X Es*h inches lb/inch	Lat. Load inches lb/inch	Moment in-lbs	lbs	radians	psi*	lb-in ²	lb/in
0.00	1.6845	1.026E+08	61788.	-0.009736	0.000	3.897E+12	
0.000	0.000	0.000					
5.340	1.6329	1.030E+08	61788.	-0.009595	0.000	3.897E+12	
0.000	0.000	0.000					
10.680	1.5820	1.033E+08	61502.	-0.009454	0.000	3.897E+12	
-107.0605	361.3824	0.000					
16.020	1.5319	1.036E+08	60915.	-0.009312	0.000	3.895E+12	
-112.7724	393.1136	0.000					
21.360	1.4825	1.040E+08	60298.	-0.009170	0.000	3.895E+12	
-118.3281	426.2099	0.000					
26.700	1.4340	1.043E+08	59652.	-0.009027	0.000	3.894E+12	
-123.7262	460.7529	0.000					
32.040	1.3861	1.046E+08	58977.	-0.008884	0.000	3.894E+12	
-128.9648	496.8306	0.000					
37.380	1.3391	1.049E+08	58275.	-0.008740	0.000	3.893E+12	
-134.0424	534.5379	0.000					
42.720	1.2928	1.052E+08	57546.	-0.008596	0.000	3.893E+12	
-138.9572	573.9774	0.000					
48.060	1.2473	1.056E+08	56791.	-0.008451	0.000	3.892E+12	
-143.7073	615.2601	0.000					
53.400	1.2025	1.059E+08	56012.	-0.008306	0.000	3.892E+12	
-148.2910	658.5063	0.000					
58.740	1.1586	1.062E+08	55208.	-0.008161	0.000	3.891E+12	
-152.7062	703.8467	0.000					
64.080	1.1154	1.065E+08	54381.	-0.008015	0.000	3.891E+12	
-156.9509	751.4230	0.000					
69.420	1.0730	1.067E+08	51433.	-0.007868	0.000	3.890E+12	
-947.1493	4713.8294	0.000					
74.760	1.0313	1.070E+08	46114.	-0.007722	0.000	3.890E+12	
-1045.2107	5411.8216	0.000					
80.100	0.9905	1.072E+08	40260.	-0.007575	0.000	3.889E+12	
-1147.3614	6185.6881	0.000					
85.440	0.9504	1.075E+08	33849.	-0.007427	0.000	3.889E+12	

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256.320	0.0724	75445844.	-458194.	-0.003085	0.000	3.953E+12
-1623.2068	119725.	0.000				
261.660	0.0562	72977416.	-465964.	-0.002985	0.000	3.959E+12
-1287.0036	122291.	0.000				
267.000	0.0405	70472241.	-471930.	-0.002888	0.000	3.966E+12
-947.5184	124857.	0.000				
272.340	0.0254	67940001.	-476076.	-0.002795	0.000	3.973E+12
-605.0583	127424.	0.000				
277.680	0.0107	65390462.	-478385.	-0.002705	0.000	3.980E+12
-259.8894	129990.	0.000				
283.020	-0.003535	62833470.	-478845.	-0.002619	0.000	3.988E+12
87.7613	132557.	0.000				
288.360	-0.0173	60278940.	-477442.	-0.002537	0.000	3.997E+12
437.7048	135123.	0.000				
293.700	-0.0306	57736853.	-474164.	-0.002458	0.000	4.006E+12
789.7878	137689.	0.000				
299.040	-0.0436	55217249.	-469001.	-0.002383	0.000	4.016E+12
1143.8912	140256.	0.000				
304.380	-0.0561	52730229.	-461942.	-0.002311	0.000	4.026E+12
1499.9271	142822.	0.000				
309.720	-0.0682	50285946.	-452977.	-0.002243	0.000	4.037E+12
1857.8369	145389.	0.000				
315.060	-0.0800	47894608.	-442096.	-0.002178	0.000	4.048E+12
2217.5884	147955.	0.000				
320.400	-0.0915	45566475.	-429288.	-0.002117	0.000	4.060E+12
2579.1730	150521.	0.000				
325.740	-0.1026	43311860.	-414545.	-0.002058	0.000	4.074E+12
2942.6022	153088.	0.000				
331.080	-0.1135	41141127.	-397856.	-0.002024	0.000	1.903E+13
3307.9045	155654.	0.000				
336.420	-0.1243	39064716.	-379194.	-0.002013	0.000	1.905E+13
3681.7997	158221.	0.000				
341.760	-0.1350	37093288.	-358512.	-0.002002	0.000	1.906E+13
4064.2939	160787.	0.000				
347.100	-0.1456	35237750.	-335764.	-0.001992	0.000	1.908E+13
4455.3945	163353.	0.000				
352.440	-0.1563	33509257.	-320428.	-0.001983	0.000	1.909E+13
1288.6245	44038.	0.000				
357.780	-0.1668	31817504.	-313490.	-0.001973	0.000	1.910E+13
1309.8693	41930.	0.000				
363.120	-0.1773	30163099.	-306441.	-0.001965	0.000	1.912E+13
1330.0388	40051.	0.000				
368.460	-0.1878	28546617.	-299288.	-0.001957	0.000	1.913E+13
1349.2496	38365.	0.000				
373.800	-0.1982	26968606.	-292034.	-0.001949	0.000	1.914E+13
1367.5998	36841.	0.000				
379.140	-0.2086	25429588.	-284684.	-0.001941	0.000	1.915E+13
1385.1731	35457.	0.000				
384.480	-0.2190	23930067.	-277242.	-0.001935	0.000	1.917E+13
1402.0412	34192.	0.000				
389.820	-0.2293	22470522.	-269712.	-0.001928	0.000	1.918E+13
1418.2666	33032.	0.000				
395.160	-0.2396	21051417.	-262096.	-0.001922	0.000	1.919E+13
1433.9034	31963.	0.000				
400.500	-0.2498	19673198.	-254399.	-0.001916	0.000	1.920E+13
1448.9994	30975.	0.000				
405.840	-0.2600	18336295.	-246622.	-0.001911	0.000	1.921E+13
1463.5967	30057.	0.000				
411.180	-0.2702	17041125.	-237858.	-0.001906	0.000	1.922E+13
1818.8288	35944.	0.000				
416.520	-0.2804	15797818.	-228101.	-0.001902	0.000	1.923E+13
1835.7008	34962.	0.000				
421.860	-0.2905	14606854.	-218254.	-0.001897	0.000	1.924E+13

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Depth of maximum shear force = 283.0200000 inches below pile head
 Number of iterations = 37
 Number of zero deflection points = 1

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 11282.000 lbs
 Applied moment at pile head = 18640674.000 in-lbs
 Axial thrust load on pile head = 75666.000 lbs

Depth Res.	Soil X	Deflect. Spr. y	Bending Distrib. Load	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil p
	Es*h inches lb/inch	Lat. inches lb/inch	Moment in-lbs	lbs	radians	psi*	lb-in ²	lb/in
0.000	0.00	0.0960	18640674.000	11282.	-0.000441	0.000	1.921E+13	
0.000	5.340	0.0937	18701097.000	11282.	-0.000435	0.000	1.921E+13	
-41.3885	10.680	0.0914	18761518.000	11171.	-0.000430	0.000	1.921E+13	
-43.6969	2418.3084	0.0891	18820756.000	10944.	-0.000425	0.000	1.921E+13	
-45.9584	2618.5961	0.0869	18878746.000	10705.	-0.000420	0.000	1.921E+13	
-48.1728	21.360	0.0846	18935424.000	10454.	-0.000414	0.000	1.921E+13	
-50.3397	2825.6277	0.0824	18990726.000	10191.	-0.000409	0.000	1.920E+13	
-52.4588	32.040	0.0803	19044590.000	9916.1042	-0.000404	0.000	1.920E+13	
-54.5297	37.380	0.0781	19096956.000	9630.4450	-0.000399	0.000	1.920E+13	
-56.5520	3490.3727	0.0760	19147765.000	9333.8571	-0.000393	0.000	1.920E+13	
-58.5253	3973.4386	0.0739	19196959.000	9026.6007	-0.000388	0.000	1.920E+13	
-60.4494	4228.1147	0.0719	19244483.000	8708.9382	-0.000383	0.000	1.920E+13	
-62.3237	4492.1311	0.0698	19290280.000	8381.1340	-0.000377	0.000	1.920E+13	
-121.5722	64.080	0.0678	19334298.000	7890.1319	-0.000372	0.000	1.920E+13	
-126.8316	69.420	0.0659	19374847.000	7226.8938	-0.000366	0.000	1.920E+13	
-131.6240	74.760	0.0639	19411777.000	6536.8173	-0.000361	0.000	1.920E+13	
-135.9610	80.100	0.0620	19444952.000	5822.3654	-0.000356	0.000	1.920E+13	
-139.8543	85.440	0.0601	19474247.000	5085.9387	-0.000350	0.000	1.920E+13	
-143.3155	90.780	0.0583	19499553.000	4329.8754	-0.000345	0.000	1.920E+13	

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-317.8580	124857.	0.000				
272.340	0.0126	13306811.	-73327.	-0.000183	0.000	1.925E+13
-300.8335	127424.	0.000				
277.680	0.0116	12911029.	-74887.	-0.000179	0.000	1.925E+13
-283.3400	129990.	0.000				
283.020	0.0107	12507166.	-76352.	-0.000176	0.000	1.926E+13
-265.3912	132557.	0.000				
288.360	0.009761	12095733.	-77720.	-0.000172	0.000	1.926E+13
-246.9994	135123.	0.000				
293.700	0.008849	11677256.	-78989.	-0.000169	0.000	1.926E+13
-228.1756	137689.	0.000				
299.040	0.007955	11252271.	-80156.	-0.000166	0.000	1.926E+13
-208.9293	140256.	0.000				
304.380	0.007077	10821327.	-81219.	-0.000163	0.000	1.927E+13
-189.2685	142822.	0.000				
309.720	0.006215	10384985.	-82176.	-0.000160	0.000	1.927E+13
-169.1997	145389.	0.000				
315.060	0.005368	9943816.	-83025.	-0.000157	0.000	1.927E+13
-148.7283	147955.	0.000				
320.400	0.004536	9498406.	-83763.	-0.000154	0.000	1.927E+13
-127.8578	150521.	0.000				
325.740	0.003718	9049348.	-84389.	-0.000152	0.000	1.928E+13
-106.5905	153088.	0.000				
331.080	0.002914	8597250.	-84901.	-0.000149	0.000	1.928E+13
-84.9273	155654.	0.000				
336.420	0.002122	8142729.	-85295.	-0.000147	0.000	1.928E+13
-62.8676	158221.	0.000				
341.760	0.001342	7686415.	-85571.	-0.000145	0.000	1.929E+13
-40.4095	160787.	0.000				
347.100	0.000574	7228948.	-85726.	-0.000143	0.000	1.929E+13
-17.5494	163353.	0.000				
352.440	-0.000184	6770979.	-85631.	-0.000141	0.000	1.930E+13
53.1869	1543570.	0.000				
357.780	-0.000932	6314526.	-84770.	-0.000139	0.000	1.930E+13
269.3109	1543570.	0.000				
363.120	-0.001670	5865752.	-82762.	-0.000137	0.000	1.931E+13
482.7383	1543570.	0.000				
368.460	-0.002400	5430743.	-80260.	-0.000136	0.000	1.931E+13
454.0855	1010454.	0.000				
373.800	-0.003121	5008682.	-77753.	-0.000134	0.000	1.931E+13
484.8422	829454.	0.000				
379.140	-0.003836	4600445.	-75096.	-0.000133	0.000	1.931E+13
510.4128	710594.	0.000				
384.480	-0.004543	4206763.	-72312.	-0.000132	0.000	1.931E+13
532.4333	625820.	0.000				
389.820	-0.005244	3828264.	-69417.	-0.000131	0.000	1.931E+13
551.8548	561913.	0.000				
395.160	-0.005940	3465500.	-66423.	-0.000130	0.000	1.931E+13
569.2832	511778.	0.000				
400.500	-0.006631	3118969.	-63341.	-0.000129	0.000	1.931E+13
585.1310	471246.	0.000				
405.840	-0.007316	2789124.	-60177.	-0.000128	0.000	1.931E+13
599.6924	437696.	0.000				
411.180	-0.007998	2476378.	-56561.	-0.000127	0.000	1.931E+13
754.7233	503894.	0.000				
416.520	-0.008676	2185154.	-52489.	-0.000127	0.000	1.931E+13
770.2206	474050.	0.000				
421.860	-0.009351	1915893.	-48338.	-0.000126	0.000	1.931E+13
784.7676	448144.	0.000				
427.200	-0.0100	1669009.	-44110.	-0.000126	0.000	1.931E+13
798.4915	425408.	0.000				
432.540	-0.0107	1444895.	-39812.	-0.000125	0.000	1.931E+13
811.4955	405263.	0.000				

 Summary of Pile Response(s)

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
 Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
 Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Stiffness, in-lbs/radian
 Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
 Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radians

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches) Shear lbs	Pile-head Condition 2 Pile-head Rotation in-lb, rad., or in-lb/rad. Rotation radians	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in-lbs
1	1	v = 61788.	M = 1.026E+08	90800.	1.68446475	
107870401.		-478845.	-0.00973598			
2	1	v = 11282.	M = 18640674.	75666.	0.09604153	
19550600.		-85726.	-0.00044052			

The analysis ended normally.