



Structural Design Report
170' Monopole
Site: Bridgewater 4, CT
Site Number: CT11934-S

prepared for: SBA NETWORK SERVICES INC
by: Sabre Towers & Poles™

Job Number: 55137

March 8, 2012

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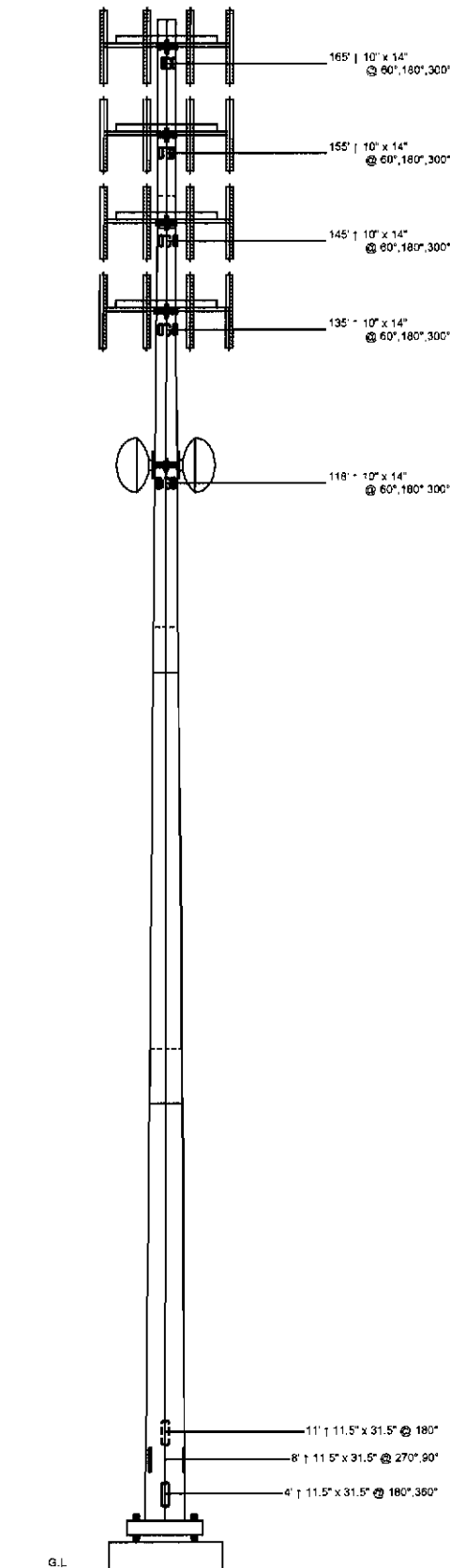
3/8/12

Monopole by JDS

Foundation by RFB

Approved by KJT

Section	1	2	3	4
Length (ft)	23'-6"	53'-8"	53'-6"	53'-3"
Number Of Sides	3/16"	5/16"	3/8"	7/16"
Thickness (in)	A	5'-0"	8'-0"	41 68225"
Lap Splice (ft)	22.25"	25.48825"	33.73675"	51.427"
Top Diameter (in)	26.5505"	35.27875"	43.55025"	
Bottom Diameter (in)				
Taper (in/ft)			0.183	
Grade			A572-65	
Weight (lbs)	1434	8078	8805	14284



Designed Appurtenance Loading

Elev	Description	Tx-Line
167	L.P. Platform (Monopole Only) - 14' w/ Handrail	
167	(6) TMAs	
167	(12) DB848H90E-XY Panel Antennas	(24) 1 5/8"
157	L.P. Platform (Monopole Only) - 14' w/ Handrail	
157	(6) TMAs	
157	(12) DB848H90E-XY Panel Antennas	(18) 1 5/8"
147	L.P. Platform (Monopole Only) - 14' w/ Handrail	
147	(6) TMAs	
147	(9) DB848H90E-XY Panel Antennas	(18) 1 5/8"
137	L.P. Platform (Monopole Only) - 14' w/ Handrail	
137	(6) TMAs	
137	(9) DB848H90E-XY Panel Antennas	(18) 1 5/8"
120	(2) Dish Mount (Monopole Only) - Pipe Mount (up to 6' Dish)	
120	(2) 6' Solid Dishes w/ Radome	(12) 1 5/8"

Load Case Reactions

Description	Axial (kips)	Shear (kips)	Moment (ft-k)	Deflection (ft)	Sway (deg)
3s Gusted Wind	61.6	38.5	5023	17.3	10.59
3s Gusted Wind 0.8 Dead	48.8	38.5	4888	16.6	10.17
3s Gusted Wind&Ice	94.6	6.5	869	3	1.37
Service Loads	50.1	7.8	1003	3.4	2.1

Base Plate Dimensions

Shape	Width	Thickness	Bolt Circle	Bolt Qty	Bolt Diameter
Square	60.25"	2.75"	58"	20	2.25"

Anchor Bolt Dimensions

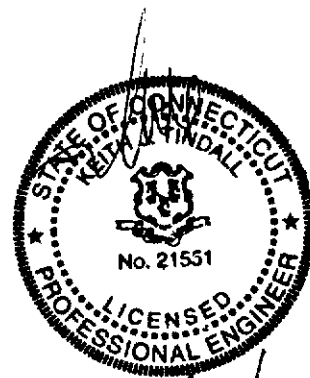
Length	Diameter	Hole Diameter	Weight	Type	Finish
84"	2.25"	2.625"	2737	A815-75	Galv-18"

Material List

Display	Value
A	3' - 9"

Notes

- 1) Full Height Step Bolts
- 2) Antenna Feed Lines Run Inside Pole
- 3) The Monopole was designed for a basic wind speed of 100 mph with 0" of radial ice, and 40 mph with 1" of radial ice, in accordance with ANSI/TIA-222-G, Structure Class II, Exposure Category C, Topographic Category 1
- 4) All dimensions are above ground level, unless otherwise specified.



3/8/12

Sabre Industries
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Job: **55137**

Customer: **SBA NETWORK SERVICES INC**

Site Name: **Bridgewater 4, CT CT11934-S**

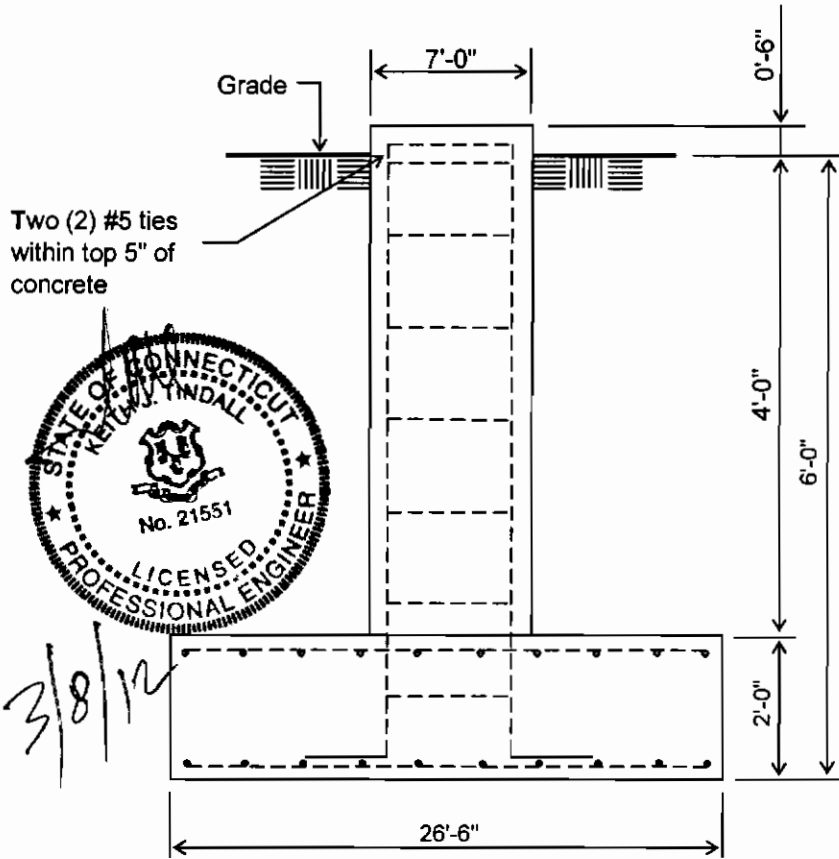
Description: **170' Monopole**

Date: **2/1/2012** By: **JDS** Page: **1**

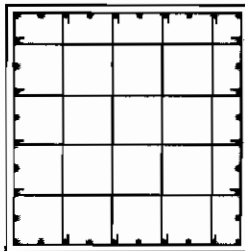
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Customer: SBA NETWORK SERVICES INC
Site: Bridgewater 4, CT CT11934-S

170' Monopole at
100 mph Wind with no ice and 40 mph Wind with 1 in. Ice per ANSI/TIA-222-G.
Antenna Loading per Page 1



ELEVATION VIEW
(60.19 Cu. Yds. each)
(1 REQUIRED; NOT TO SCALE)



Typical pier cross-section

Notes:

- 1). Concrete shall have a minimum 28-day compressive strength of 4000 PSI, in accordance with ACI 318-05
- 2). Rebar to conform to ASTM specification A615 Grade 60.
- 3). All rebar to have a minimum of 3" concrete cover.
- 4). All exposed concrete corners to be chamfered 3/4".
- 5). The foundation design is based on the geotechnical report by TEP project no. 120651.10, dated: 3/2/12
- 6). See the geotechnical report for compaction requirements, if specified.
- 7). The foundation is based on the following factored loads:
Moment (kip-ft) = 5023.33
Axial (kips) = 61.624
Shear (kips) = 38.455

Rebar Schedule per Pad and Pier	
Pier	(36) #9 vertical rebar w/hooks at bottom w/#5 ties, two within top 5" of top of pier then 12" C/C
Pad	(40) #8 horizontal rebar evenly spaced each way top and bottom (160 Total)

8). This is a design drawing only. Please see final construction drawings for all installation details.

9). The foundation is designed for a 15% increase in loads shown in note 7.

TOP	DIAMETER	22.25 in.	[22.59 in. Point-Point]
BOTTOM	DIAMETER	51.43 in.	[52.22 in. Point-Point]
POLE	HEIGHT	169.00 ft.	18 SIDED FLAT ORIENTATION
BASE	HEIGHT	1.00 ft.	ABOVE GROUND
E-MODULUS		29000 ksi	[12000 ksi SHEAR MODULUS]

APPURTENANCES

ATTACH POINTS:	NO.	X,ft	Qty	Description	Status
	1	166.00	1	14' LP Platform with Handrail (R	Future Appurt
	2	156.00	1	14' LP Platform with Handrail (R	Future Appurt
	3	146.00	1	14' LP Platform with Handrail (R	Future Appurt
	4	136.00	1	14' LP Platform with Handrail (R	Future Appurt
	5	119.00	2	Pipe Mount (up to 6' Dish)	Future Appurt

Some wind forces may have been derived from full-scale wind tunnel tests.

Pole Section	Bottom X,ft.	Thick in.	Connect Type	LAP in.	Taper in/ft	Length ft.	Weight lbs	Steel Spec	Pole Finish
1	23.50	.18750	SLIP-JNT	45.	.1830	23.50	1152	A572-65	GALVANIZE
2	73.25	.31250	SLIP-JNT	60.	.1830	53.50	5429	A572-65	GALVANIZE
3	121.75	.37500	SLIP-JNT	72.	.1830	53.50	8289	A572-65	GALVANIZE
4	169.00	.43750	C-WELD		.1830	53.25	11603	A572-65	GALVANIZE

SECTION PROPERTIES

X,ft	UP,ft	D,in	T,in	Area in ²	Iz in ⁴	IxIy in ⁴	SxSy in ³	w/t	d/t	F _y (ksi)	
169.00	.00	22.25	.1875	13.13	1614	807	71.4	19.16	118.7	65.00	TOP
166.00	3.00	22.80	.1875	13.46	1738	869	75.1	19.68	121.6	65.00	P01
161.00	8.00	23.71	.1875	14.00	1958	979	81.3	20.54	126.5	65.00	
156.00	13.00	24.63	.1875	14.55	2196	1098	87.8	21.40	131.4	65.00	P02
151.00	18.00	25.54	.1875	15.09	2450	1225	94.5	22.26	136.2	65.00	
149.25	19.75	25.86	.1875	15.28	2544	1272	96.9	22.56	137.9	65.00	Slip-B01
146.00	23.00	26.08	.3125	25.56	4288	2144	161.9	12.95	83.5	65.00	P03
145.50	23.50	26.18	.3125	25.65	4334	2167	163.1	13.01	83.8	65.00	Slip-T02
140.50	28.50	27.09	.3125	26.56	4812	2406	174.9	13.52	86.7	65.00	
136.00	33.00	27.91	.3125	27.38	5270	2635	185.9	13.99	89.3	65.00	P04
131.00	38.00	28.83	.3125	28.28	5810	2905	198.5	14.50	92.3	65.00	
126.00	43.00	29.74	.3125	29.19	6388	3194	211.5	15.02	95.2	65.00	
121.00	48.00	30.66	.3125	30.10	7002	3501	224.9	15.54	98.1	65.00	
119.00	50.00	31.03	.3125	30.46	7258	3629	230.4	15.74	99.3	65.00	P05
114.00	55.00	31.94	.3125	31.37	7926	3963	244.4	16.26	102.2	65.00	
109.00	60.00	32.86	.3125	32.28	8636	4318	258.9	16.78	105.1	65.00	
104.00	65.00	33.77	.3125	33.18	9384	4692	273.7	17.29	108.1	65.00	
100.75	68.25	34.36	.3125	33.77	9894	4947	283.5	17.63	110.0	65.00	Slip-B02
95.75	73.25	34.65	.3750	40.80	12112	6056	344.2	14.53	92.4	65.00	Slip-T03
90.75	78.25	35.57	.3750	41.89	13106	6553	362.9	14.96	94.9	65.00	
85.75	83.25	36.48	.3750	42.98	14156	7078	382.1	15.39	97.3	65.00	
80.75	88.25	37.40	.3750	44.07	15262	7631	401.9	15.82	99.7	65.00	
75.75	93.25	38.31	.3750	45.16	16420	8210	422.0	16.25	102.2	65.00	
70.75	98.25	39.23	.3750	46.25	17636	8818	442.7	16.68	104.6	65.00	
65.75	103.25	40.14	.3750	47.33	18912	9456	463.9	17.11	107.1	65.00	
60.75	108.25	41.06	.3750	48.42	20248	10124	485.6	17.54	109.5	65.00	
55.75	113.25	41.97	.3750	49.51	21644	10822	507.8	17.97	111.9	65.00	
53.25	115.75	42.43	.3750	50.06	22366	11183	519.1	18.19	113.2	65.00	Slip-B03
48.25	120.75	42.60	.4375	58.54	26288	13144	607.8	15.40	97.4	65.00	
47.25	121.75	42.78	.4375	58.80	26630	13315	613.0	15.48	97.8	65.00	Slip-T04
42.25	126.75	43.70	.4375	60.07	28394	14197	639.9	15.85	99.9	65.00	
37.25	131.75	44.61	.4375	61.34	30234	15117	667.4	16.22	102.0	65.00	
32.25	136.75	45.53	.4375	62.61	32150	16075	695.5	16.58	104.1	65.00	
27.25	141.75	46.44	.4375	63.88	34148	17074	724.1	16.95	106.1	65.00	
22.25	146.75	47.36	.4375	65.15	36228	18114	753.4	17.32	108.2	65.00	
17.25	151.75	48.27	.4375	66.42	38388	19194	783.2	17.69	110.3	65.00	
12.25	156.75	49.19	.4375	67.69	40632	20316	813.6	18.06	112.4	65.00	
7.25	161.75	50.10	.4375	68.96	42966	21483	844.6	18.43	114.5	65.00	
2.25	166.75	51.02	.4375	70.23	45384	22692	876.1	18.80	116.6	65.00	
.00	169.00	51.43	.4375	70.80	46500	23250	890.5	18.96	117.5	65.00	BASE

CASE - 1: 3s Gusted Wind ANSI-TIA-222-G

WIND OLF	1.60	GUSTED WIND (3sec)	100.0 mph	160.9 kph
VERTICAL OLF	1.20	EXP-CAT/STRUC CLASS	C-II	
DESIGN ICE	.00 in	EXP-POWER COEFF.	.2105	
GUST FACTOR (Gh)	1.10	REFERENCE HEIGHT	900.0 ft	
FORCE COEFF (Cf)	.65	PRESSURE @ 32.7 ft	42.8 psf	2048.2 Pa
IMPORTANCE FAC (I)	1.00	BASE ABOVE Grd	1.0	
DIRECTION FAC (Kd)	.95	CREST HEIGHT	.0 ft	
TOPOGRAPHIC CAT	1			

APPURTENANCES Sabre Areas

#	Qty	Description	Center Line Elev-Ft	WEIGHT each Lbs	AREA each Ft^2	Tx-CABLE		WIND Psf	FORCES			MOM. Lg-X Ft-K
						Type	Qty #/Ft		Tra-Y Kips	Ax-Z Kips		
1	1	14' LP Platform with Handrail (R)	166.0	1704	86.5			60.5	5.23	-2.0	-7.8	
	12	DB848H90E-XY.	166.0	28		1 5/8"	24 1.04	60.3			-5.4	
	6	TMA	166.0	8		None	1 .00	60.3			-.1	
2	1	14' LP Platform with Handrail (R)	156.0	1704	86.5			59.7	5.16	-2.0	-7.7	
	12	DB848H90E-XY.	156.0	28		1 5/8"	18 1.04	59.6			-3.9	
	6	TMA	156.0	8		None	1 .00	59.6			-.1	
3	1	14' LP Platform with Handrail (R)	146.0	1704	71.9			58.9	4.24	-2.0	-6.4	
	9	DB848H90E-XY.	146.0	28		1 5/8"	18 1.04	58.7			-3.6	
	6	TMA	146.0	8		None	1 .00	58.7			-.1	
4	1	14' LP Platform with Handrail (R)	136.0	1704	71.9			58.0	4.17	-2.0	-6.3	
	9	DB848H90E-XY.	136.0	28		1 5/8"	18 1.04	57.9			-3.4	
	6	TMA	136.0	8		None	1 .00	57.9			-.1	
5	2	Pipe Mount (up to 6' Dish)	119.0	49	.1			56.3	.01	-.1	.0	
	2	6' SOLID DISH W/ RADOME	119.0	330	24.4	1 5/8"	12 1.04	56.3	2.75	-2.6		

RESULTS

X, ft	Kzt	WIND psf	ICE in	--- FORCES, kips ---			--- MOMENTS, ft-kips ---			F'y ksi	Inter 4.8.2
				ShearX	ShearY	AxiaZ	BendX	BendY	TorqZ		
169.00	1.00	39.37	.00	.0	.01	-.1	.0	.0	.0	78.84	.000
166.00	1.00	39.23	.00	.0	6.86	-6.7	-8.2	.0	.0	78.24	.026
161.00	1.00	38.98	.00	.0	7.40	-7.0	-43.1	.0	.0	77.22	.099
156.00	1.00	38.72	.00	.0	13.99	-12.3	-87.8	.0	.0	76.21	.188
151.00	1.00	38.46	.00	.0	14.27	-12.5	-157.8	.0	.0	75.20	.309
149.25	1.00	38.36	.00	.0	14.51	-12.8	-182.8	.0	.0	74.84	.349
146.00	1.00	38.19	.00	.0	19.85	-17.9	-236.3	.0	.0	82.55	.246
145.50	1.00	38.16	.00	.0	20.13	-18.4	-246.2	.0	.0	82.55	.254
140.50	1.00	37.88	.00	.0	20.57	-19.1	-346.8	.0	.0	82.55	.330
136.00	1.00	37.62	.00	.0	26.02	-24.4	-445.6	.0	.0	82.55	.400
131.00	1.00	37.33	.00	.0	26.44	-25.1	-575.8	.0	.0	82.55	.481
126.00	1.00	37.03	.00	.0	26.85	-25.8	-707.9	.0	.0	82.55	.553
121.00	1.00	36.72	.00	.0	27.13	-26.3	-842.5	.0	.0	82.55	.617
119.00	1.00	36.59	.00	.0	30.54	-29.1	-896.7	.0	.0	82.55	.642
114.00	1.00	36.26	.00	.0	30.92	-30.0	-1049.2	.0	.0	82.26	.709
109.00	1.00	35.93	.00	.0	31.29	-30.8	-1203.3	.0	.0	81.65	.773
104.00	1.00	35.58	.00	.0	31.60	-31.7	-1360.0	.0	.0	81.04	.831
100.75	1.00	35.34	.00	.0	31.97	-33.0	-1462.5	.0	.0	80.65	.867
95.75	1.00	34.97	.00	.0	32.41	-34.6	-1622.5	.0	.0	82.55	.773
90.75	1.00	34.58	.00	.0	32.81	-35.8	-1785.0	.0	.0	82.55	.807
85.75	1.00	34.17	.00	.0	33.18	-36.9	-1949.2	.0	.0	82.55	.836
80.75	1.00	33.75	.00	.0	33.54	-38.1	-2115.0	.0	.0	82.55	.862
75.75	1.00	33.30	.00	.0	33.89	-39.2	-2282.5	.0	.0	82.27	.889
70.75	1.00	32.84	.00	.0	34.24	-40.4	-2451.7	-.1	.0	81.76	.915
65.75	1.00	32.34	.00	.0	34.58	-41.6	-2623.3	-.1	.0	81.25	.940
60.75	1.00	31.81	.00	.0	34.91	-42.8	-2795.8	-.1	.0	80.75	.963
55.75	1.00	31.25	.00	.0	35.16	-43.9	-2970.8	-.1	.0	80.24	.985
53.25	1.00	30.96	.00	.0	35.43	-45.2	-3058.3	-.1	.0	79.99	.995
48.25	1.00	30.33	.00	.0	35.64	-46.4	-3235.8	-.1	.0	82.55	.871
47.25	1.00	30.20	.00	.0	35.85	-47.6	-3270.8	-.1	.0	82.55	.873
42.25	1.00	29.52	.00	.0	36.18	-49.3	-3450.0	-.1	.0	82.55	.882
37.25	1.00	28.76	.00	.0	36.47	-50.8	-3630.8	-.1	.0	82.31	.893
32.25	1.00	27.93	.00	.0	36.76	-52.3	-3813.3	-.1	.0	81.88	.904
27.25	1.00	26.98	.00	.0	37.03	-53.8	-3997.5	-.1	.0	81.44	.916
22.25	1.00	25.90	.00	.0	37.31	-55.3	-4182.5	-.1	.0	81.01	.926
17.25	1.00	24.61	.00	.0	37.59	-56.9	-4369.2	-.1	.0	80.57	.935
12.25	1.00	23.65	.00	.0	37.86	-58.5	-4556.7	-.1	.0	80.14	.944
7.25	1.00	23.65	.00	.0	38.14	-60.1	-4746.7	-.1	.0	79.71	.953
2.25	1.00	23.65	.00	.0	38.34	-61.3	-4936.7	-.1	.0	79.27	.960
.00	1.00	23.65	.00	.0	38.46	-61.6	5023.3	.1	.0	79.08	.964

SABRE COMMUNICATIONS CORP	JOB: 00-55137	01-Feb-12 09:40
2101 Murray Street	SBA NETWORK SERVICES INC	Ph 712.258.6690
Sioux City, IA 51101	Bridgewater 4, CT	Fx 712.258.8250

DISPLACEMENTS

ELEV	DEFLECTION feet				ROTATION, degrees			
X, ft	X	Y	Z	XY-Result	X	Y	Z	XY-Result
169.00	.00	17.28	-1.19	17.28<10.22%>	-10.59	.00	.00	10.59

CASE - 2: 3s Gusted Wind 0.9 Dead ANSI-TIA-222-G

WIND OLF	1.60	GUSTED WIND (3sec)	100.0 mph	160.9 kph
VERTICAL OLF	.90	EXP-CAT/STRUC CLASS	C-II	
DESIGN ICE	.00 in	EXP-POWER COEFF.	.2105	
GUST FACTOR (Gh)	1.10	REFERENCE HEIGHT	900.0 ft	
FORCE COEFF (Cf)	.65	PRESSURE @ 32.7 ft	42.8 psf	2048.2 Pa
IMPORTANCE FAC (I)	1.00	BASE ABOVE Grd	1.0	
DIRECTION FAC (Kd)	.95	CREST HEIGHT	.0 ft	
TOPOGRAPHIC CAT	1			

APPURTENANCES

Sabre Areas

#	Qty	Description	Center Line Elev-Ft	WEIGHT each Lbs	AREA each Ft^2	Tx-CABLE		WIND Psf	FORCES		MOM. Lg-X Ft-K	
						Type	Qty #/Ft		Tra-Y Kips	Ax-Z Kips		
1	12	14' LP Platform with Handrail (R) DB848H90E-XY.	166.0	1704	86.5	1 5/8"	24	1.04	60.5	5.23	-1.5	-7.8
	6	TMA	166.0	28		None	1	.00	60.3		-4.0	
2	12	14' LP Platform with Handrail (R) DB848H90E-XY.	156.0	1704	86.5	1 5/8"	18	1.04	59.7	5.16	-1.5	-7.7
	6	TMA	156.0	28		None	1	.00	59.6		-2.9	
3	9	14' LP Platform with Handrail (R) DB848H90E-XY.	146.0	1704	71.9	1 5/8"	18	1.04	58.9	4.24	-1.5	-6.4
	6	TMA	146.0	28		None	1	.00	58.7		-2.7	
4	9	14' LP Platform with Handrail (R) DB848H90E-XY.	136.0	1704	71.9	1 5/8"	18	1.04	58.0	4.17	-1.5	-6.3
	6	TMA	136.0	28		None	1	.00	57.9		-2.5	
5	2	Pipe Mount (up to 6' Dish)	119.0	49	.1				56.3	.01	-.1	.0
	2	6' SOLID DISH W/ RADOME	119.0	330	24.4	1 5/8"	12	1.04	56.3	2.75	-1.9	

RESULTS

X, ft	Kzt	WIND psf	ICE in	FORCES, kips			MOMENTS, ft-kips			F'y ksi	Inter 4.8.2
				ShearX	ShearY	Axiaz	BendX	BendY	TorqZ		
169.00	1.00	39.37	.00	.0	.01	-.1	.0	.0	.0	78.84	.000
166.00	1.00	39.23	.00	.0	6.47	-4.8	-8.2	.0	.0	78.24	.024
161.00	1.00	38.98	.00	.0	6.99	-5.0	-41.1	.0	.0	77.22	.093
156.00	1.00	38.72	.00	.0	13.28	-8.8	-83.8	.0	.0	76.21	.177
151.00	1.00	38.46	.00	.0	13.56	-9.0	-150.3	.0	.0	75.20	.292
149.25	1.00	38.36	.00	.0	13.79	-9.2	-173.9	.0	.0	74.84	.330
146.00	1.00	38.19	.00	.0	18.85	-12.9	-225.1	.0	.0	82.55	.232
145.50	1.00	38.16	.00	.0	19.12	-13.3	-234.5	.0	.0	82.55	.240
140.50	1.00	37.88	.00	.0	19.55	-13.8	-330.1	.0	.0	82.55	.312
136.00	1.00	37.62	.00	.0	24.75	-17.6	-424.3	.0	.0	82.55	.378
131.00	1.00	37.33	.00	.0	25.18	-18.2	-548.1	.0	.0	82.55	.455
126.00	1.00	37.03	.00	.0	25.61	-18.8	-674.0	.0	.0	82.55	.524
121.00	1.00	36.72	.00	.0	25.90	-19.2	-802.1	.0	.0	82.55	.585
119.00	1.00	36.59	.00	.0	29.22	-21.2	-854.2	.0	.0	82.55	.609
114.00	1.00	36.26	.00	.0	29.64	-21.9	-1000.0	.0	.0	82.26	.673
109.00	1.00	35.93	.00	.0	30.04	-22.6	-1148.3	.0	.0	81.65	.735
104.00	1.00	35.58	.00	.0	30.39	-23.2	-1298.3	.0	.0	81.04	.791
100.75	1.00	35.34	.00	.0	30.77	-24.2	-1397.5	.0	.0	80.65	.825
95.75	1.00	34.97	.00	.0	31.24	-25.5	-1550.8	.0	.0	82.55	.737
90.75	1.00	34.58	.00	.0	31.67	-26.5	-1707.5	.0	.0	82.55	.769
85.75	1.00	34.17	.00	.0	32.09	-27.3	-1865.8	.0	.0	82.55	.798
80.75	1.00	33.75	.00	.0	32.50	-28.2	-2025.8	.0	.0	82.55	.823
75.75	1.00	33.30	.00	.0	32.91	-29.1	-2188.3	.0	.0	82.27	.849
70.75	1.00	32.84	.00	.0	33.31	-30.0	-2353.3	.0	.0	81.76	.876
65.75	1.00	32.34	.00	.0	33.71	-31.0	-2519.2	-.1	.0	81.25	.900
60.75	1.00	31.81	.00	.0	34.10	-31.9	-2688.3	-.1	.0	80.75	.924
55.75	1.00	31.25	.00	.0	34.40	-32.8	-2858.3	-.1	.0	80.24	.945
53.25	1.00	30.96	.00	.0	34.71	-33.8	-2945.0	-.1	.0	79.99	.955
48.25	1.00	30.33	.00	.0	34.95	-34.7	-3118.3	-.1	.0	82.55	.837
47.25	1.00	30.20	.00	.0	35.20	-35.6	-3153.3	-.1	.0	82.55	.839
42.25	1.00	29.52	.00	.0	35.59	-37.0	-3329.2	-.1	.0	82.55	.849
37.25	1.00	28.76	.00	.0	35.95	-38.1	-3506.7	-.1	.0	82.31	.860
32.25	1.00	27.93	.00	.0	36.30	-39.3	-3686.7	-.1	.0	81.88	.872
27.25	1.00	26.98	.00	.0	36.66	-40.5	-3868.3	-.1	.0	81.44	.883
22.25	1.00	25.90	.00	.0	37.01	-41.7	-4051.7	-.1	.0	81.01	.894
17.25	1.00	24.61	.00	.0	37.36	-42.9	-4236.7	-.1	.0	80.57	.904
12.25	1.00	23.65	.00	.0	37.72	-44.1	-4423.3	-.1	.0	80.14	.914
7.25	1.00	23.65	.00	.0	38.08	-45.4	-4611.7	-.1	.0	79.71	.923
2.25	1.00	23.65	.00	.0	38.34	-46.3	-4802.5	-.1	.0	79.27	.931
.00	1.00	23.65	.00	.0	38.46	-46.6	-4888.3	.1	.0	79.08	.935

SABRE COMMUNICATIONS CORP
2101 Murray Street
Sioux City, IA 51101

JOB: 00-55137

SBA NETWORK SERVICES INC
Bridgewater 4, CT

01-Feb-12 09:40
Ph 712.258.6690
Fx 712.258.8250

DISPLACEMENTS

ELEV	DEFLECTION feet				ROTATION, degrees			
X, ft	X	Y	Z	XY-Result	X	Y	Z	XY-Result
169.00	.00	16.64	-1.10	16.64< 9.85%>	-10.17	.00	.00	10.17

CASE - 3: 3s Gusted Wind&Ice ANSI-TIA-222-G

WIND OLF	1.00	GUSTED WIND (3sec)	40.0 mph	64.4 kph
VERTICAL OLF	1.20	EXP-CAT/STRUC CLASS	C-II	
DESIGN ICE	1.00 in	EXP-POWER COEFF.	.2105	
GUST FACTOR (Gh)	1.10	REFERENCE HEIGHT	900.0 ft	
FORCE COEFF (Cf)	1.20	PRESSURE @ 32.7 ft	4.3 psf	204.8 Pa
IMPORTANCE FAC (I)	1.00	BASE ABOVE Grd	1.0	
DIRECTION FAC (Kd)	.95	CREST HEIGHT	.0 ft	
TOPOGRAPHIC CAT	1			

APPURTENANCES

Sabre Areas

# Qty	Description	Center Elev-Ft	WEIGHT each Lbs	AREA each Ft^2	Tx-CABLE		WIND Psf	FORCES			MOM. Lg-X Ft-K
					Type	Qty #/Ft		Tra-Y Kips	Ax-Z Kips		
1	14' LP Platform with Handrail (R)	166.0	1874	122.2			6.0	.74	-9.5	-1.1	
12	DB848H90E-XY.	166.0	55		1 5/8"	24 1.04	6.0		-9.8		
6	TMA	166.0	11		None	1 .00	6.0		-.4		
2	14' LP Platform with Handrail (R)	156.0	1874	122.0			6.0	.73	-9.4	-1.1	
12	DB848H90E-XY.	156.0	55		1 5/8"	18 1.04	6.0		-8.3		
6	TMA	156.0	11		None	1 .00	6.0		-.4		
3	14' LP Platform with Handrail (R)	146.0	1874	99.1			5.9	.58	-9.3	-.9	
9	DB848H90E-XY.	146.0	55		1 5/8"	18 1.04	5.9		-6.8		
6	TMA	146.0	11		None	1 .00	5.9		-.4		
4	14' LP Platform with Handrail (R)	136.0	1874	98.9			5.8	.57	-9.2	-.9	
9	DB848H90E-XY.	136.0	55		1 5/8"	18 1.04	5.8		-6.6		
6	TMA	136.0	11		None	1 .00	5.8		-.4		
5	2 Pipe Mount (up to 6' Dish)	119.0	53	.1			5.6	.00	-.1	.0	
2	6' SOLID DISH W/ RADOME	119.0	838	25.1	1 5/8"	12 1.04	5.6	.28	-2.6		

RESULTS

X, ft	Kzt	WIND psf	ICE in	--- FORCES, kips ---			--- MOMENTS, ft-kips ---			F'y ksi	Inter 4.8.2
				ShearX	ShearY	Axiaz	BendX	BendY	TorqZ		
169.00	1.00	7.27	2.36	.0	.01	-.2	.0	.0	.0	78.84	.000
166.00	1.00	7.24	2.35	.0	1.24	-13.1	-1.2	.0	.0	78.24	.017
161.00	1.00	7.20	2.34	.0	1.36	-13.8	-7.5	.0	.0	77.22	.030
156.00	1.00	7.15	2.34	.0	2.55	-25.4	-15.4	.0	.0	76.21	.056
151.00	1.00	7.10	2.33	.0	2.61	-25.9	-28.1	.0	.0	75.20	.078
149.25	1.00	7.08	2.33	.0	2.67	-26.3	-32.7	.0	.0	74.84	.086
146.00	1.00	7.05	2.32	.0	3.59	-36.2	-42.3	.0	.0	82.55	.061
145.50	1.00	7.04	2.32	.0	3.65	-36.8	-44.0	.0	.0	82.55	.063
140.50	1.00	6.99	2.31	.0	3.75	-37.9	-62.3	.0	.0	82.55	.077
136.00	1.00	6.95	2.31	.0	4.68	-48.0	-80.0	.0	.0	82.55	.093
131.00	1.00	6.89	2.30	.0	4.77	-49.0	-103.4	.0	.0	82.55	.108
126.00	1.00	6.84	2.29	.0	4.85	-50.1	-127.3	.0	.0	82.55	.120
121.00	1.00	6.78	2.28	.0	4.90	-50.8	-151.4	.0	.0	82.55	.131
119.00	1.00	6.76	2.28	.0	5.31	-54.3	-161.3	.0	.0	82.55	.137
114.00	1.00	6.69	2.27	.0	5.37	-55.4	-187.8	.0	.0	82.26	.148
109.00	1.00	6.63	2.26	.0	5.44	-56.6	-214.7	.0	.0	81.65	.159
104.00	1.00	6.57	2.25	.0	5.49	-57.6	-241.8	.0	.0	81.04	.169
100.75	1.00	6.52	2.24	.0	5.55	-59.2	-259.7	.0	.0	80.65	.176
95.75	1.00	6.46	2.23	.0	5.62	-61.1	-287.4	.0	.0	82.55	.155
90.75	1.00	6.38	2.22	.0	5.69	-62.7	-315.5	.0	.0	82.55	.161
85.75	1.00	6.31	2.20	.0	5.75	-64.1	-343.9	.0	.0	82.55	.165
80.75	1.00	6.23	2.19	.0	5.80	-65.5	-372.7	.0	.0	82.55	.170
75.75	1.00	6.15	2.18	.0	5.86	-67.0	-401.7	.0	.0	82.27	.174
70.75	1.00	6.06	2.16	.0	5.91	-68.5	-431.0	.0	.0	81.76	.179
65.75	1.00	5.97	2.15	.0	5.96	-70.0	-460.5	.0	.0	81.25	.183
60.75	1.00	5.87	2.13	.0	6.01	-71.6	-490.3	.0	.0	80.75	.187
55.75	1.00	5.77	2.11	.0	6.04	-72.9	-520.3	.0	.0	80.24	.191
53.25	1.00	5.72	2.10	.0	6.08	-74.5	-535.4	.0	.0	79.99	.193
48.25	1.00	5.60	2.08	.0	6.11	-75.9	-565.8	.0	.0	82.55	.168
47.25	1.00	5.58	2.08	.0	6.14	-77.3	-571.9	.0	.0	82.55	.168
42.25	1.00	5.45	2.05	.0	6.18	-79.4	-602.7	.0	.0	82.55	.170
37.25	1.00	5.31	2.03	.0	6.22	-81.3	-633.6	.0	.0	82.31	.172
32.25	1.00	5.16	2.00	.0	6.26	-83.1	-664.7	.0	.0	81.88	.174
27.25	1.00	4.98	1.97	.0	6.29	-85.0	-695.9	.0	.0	81.44	.176
22.25	1.00	4.78	1.93	.0	6.33	-87.0	-727.4	.0	.0	81.01	.177
17.25	1.00	4.54	1.88	.0	6.36	-88.9	-759.1	.0	.0	80.57	.179
12.25	1.00	4.37	1.83	.0	6.39	-90.9	-790.8	.0	.0	80.14	.180
7.25	1.00	4.37	1.74	.0	6.43	-92.9	-822.8	.0	.0	79.71	.182
2.25	1.00	4.37	1.59	.0	6.45	-94.3	-855.0	.0	.0	79.27	.183
.00	1.00	4.37	1.41	.0	6.47	-94.6	-869.2	.0	.0	79.08	.183

SABRE COMMUNICATIONS CORP

JOB: 00-55137

01-Feb-12 09:40

2101 Murray Street

SBA NETWORK SERVICES INC

Ph 712.258.6690

Sioux City, IA 51101

Bridgewater 4, CT

Fx 712.258.8250

DISPLACEMENTS

ELEV	DEFLECTION feet				ROTATION, degrees			
X, ft	X	Y	Z	XY-Result	X	Y	Z	XY-Result
169.00	.00	3.04	-.05	3.04< 1.80%>	-1.87	.00	.00	1.87

SABRE COMMUNICATIONS CORP
 2101 Murray Street
 Sioux City, IA 51101

JOB: 00-55137
 SBA NETWORK SERVICES INC
 Bridgewater 4, CT

01-Feb-12 09:40
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CASE - 4: Service Loads

ANSI-TIA-222-G

WIND OLF	1.00	GUSTED WIND (3sec)	60.0 mph	96.6 kph
VERTICAL OLF	1.00	EXP-CAT/STRUC CLASS	C-II	
DESIGN ICE	.00 in	EXP-POWER COEFF.	.2105	
GUST FACTOR (Gh)	1.10	REFERENCE HEIGHT	900.0 ft	
FORCE COEFF (Cf)	.65	PRESSURE @ 32.7 ft	8.6 psf	412.3 Pa
IMPORTANCE FAC (I)	1.00	BASE ABOVE Grd	1.0	
DIRECTION FAC (Kd)	.85	CREST HEIGHT	.0 ft	
TOPOGRAPHIC CAT	1			

APPURTENANCES

Sabre Areas

#	Qty	Description	Center Line Elev-Ft	WEIGHT each Lbs	AREA each Ft^2	Tx-CABLE			WIND Psf	FORCES			MOM. Ft-K
						Type	Qty	#/Ft		Tra-Y Kips	Ax-Z Kips	Lg-X Kips	
- 1	1	14' LP Platform with Handrail	(R) 166.0	1704	86.5			12.2	1.05	-1.7	-1.6		
	12	DB848H90E-XY.	166.0	28		1 5/8"	24	1.04	12.1		-4.5		
	6	TMA	166.0	8		None	1	.00	12.1		.0		
- 2	1	14' LP Platform with Handrail	(R) 156.0	1704	86.5			12.0	1.04	-1.7	-1.6		
	12	DB848H90E-XY.	156.0	28		1 5/8"	18	1.04	12.0		-3.3		
	6	TMA	156.0	8		None	1	.00	12.0		.0		
- 3	1	14' LP Platform with Handrail	(R) 146.0	1704	71.9			11.9	.85	-1.7	-1.3		
	9	DB848H90E-XY.	146.0	28		1 5/8"	18	1.04	11.8		-3.0		
	6	TMA	146.0	8		None	1	.00	11.8		.0		
- 4	1	14' LP Platform with Handrail	(R) 136.0	1704	71.9			11.7	.84	-1.7	-1.3		
	9	DB848H90E-XY.	136.0	28		1 5/8"	18	1.04	11.7		-2.8		
	6	TMA	136.0	8		None	1	.00	11.7		.0		
5	2	Pipe Mount (up to 6' Dish)	119.0	49	.1			11.3	.00	-.1	.0		
	2	6' SOLID DISH W/ RADOME	119.0	330	24.4	1 5/8"	12	1.04	11.3	.55	-2.1		

RESULTS

X, ft	Kzt	WIND psf	ICE in	FORCES, kips			MOMENTS, ft-kips			F'y ksi	Inter 4.8.2
				ShearX	ShearY	Axiaz	BendX	BendY	TorqZ		
169.00	1.00	7.93	.00	.0	.00	-.1	.0	.0	.0	78.84	.000
166.00	1.00	7.90	.00	.0	1.35	-6.4	-1.7	.0	.0	78.24	.011
161.00	1.00	7.85	.00	.0	1.46	-6.7	-8.5	.0	.0	77.22	.025
156.00	1.00	7.79	.00	.0	2.77	-11.9	-17.4	.0	.0	76.21	.047
151.00	1.00	7.74	.00	.0	2.82	-12.1	-31.2	.0	.0	75.20	.070
149.25	1.00	7.72	.00	.0	2.87	-12.3	-36.1	.0	.0	74.84	.078
146.00	1.00	7.69	.00	.0	3.92	-17.2	-46.8	.0	.0	82.55	.056
145.50	1.00	7.68	.00	.0	3.98	-17.6	-48.7	.0	.0	82.55	.057
140.50	1.00	7.63	.00	.0	4.07	-18.1	-68.6	.0	.0	82.55	.073
136.00	1.00	7.57	.00	.0	5.15	-23.1	-88.2	.0	.0	82.55	.088
131.00	1.00	7.52	.00	.0	5.23	-23.6	-113.9	.0	.0	82.55	.104
126.00	1.00	7.45	.00	.0	5.31	-24.1	-140.1	.0	.0	82.55	.118
121.00	1.00	7.39	.00	.0	5.37	-24.4	-166.6	.0	.0	82.55	.131
119.00	1.00	7.37	.00	.0	6.05	-27.0	-177.3	.0	.0	82.55	.136
114.00	1.00	7.30	.00	.0	6.13	-27.6	-207.6	.0	.0	82.26	.150
109.00	1.00	7.23	.00	.0	6.21	-28.1	-238.3	.0	.0	81.65	.162
104.00	1.00	7.16	.00	.0	6.27	-28.7	-269.3	.0	.0	81.04	.174
100.75	1.00	7.11	.00	.0	6.35	-29.6	-289.7	.0	.0	80.65	.181
95.75	1.00	7.04	.00	.0	6.44	-30.8	-321.4	.0	.0	82.55	.161
90.75	1.00	6.96	.00	.0	6.52	-31.7	-353.6	.0	.0	82.55	.168
85.75	1.00	6.88	.00	.0	6.60	-32.4	-386.2	.0	.0	82.55	.173
80.75	1.00	6.79	.00	.0	6.68	-33.2	-419.2	.0	.0	82.55	.179
75.75	1.00	6.70	.00	.0	6.75	-33.9	-452.5	.0	.0	82.27	.184
70.75	1.00	6.61	.00	.0	6.83	-34.7	-486.3	.0	.0	81.76	.189
65.75	1.00	6.51	.00	.0	6.90	-35.6	-520.4	.0	.0	81.25	.194
60.75	1.00	6.40	.00	.0	6.98	-36.4	-554.9	.0	.0	80.75	.199
55.75	1.00	6.29	.00	.0	7.03	-37.1	-589.8	.0	.0	80.24	.203
53.25	1.00	6.23	.00	.0	7.09	-38.1	-607.4	.0	.0	79.99	.206
48.25	1.00	6.11	.00	.0	7.14	-39.0	-642.9	.0	.0	82.55	.180
47.25	1.00	6.08	.00	.0	7.19	-39.9	-650.0	.0	.0	82.55	.180
42.25	1.00	5.94	.00	.0	7.26	-41.2	-685.9	.0	.0	82.55	.182
37.25	1.00	5.79	.00	.0	7.33	-42.2	-722.3	.0	.0	82.31	.185
32.25	1.00	5.62	.00	.0	7.40	-43.3	-758.9	.0	.0	81.88	.187
27.25	1.00	5.43	.00	.0	7.46	-44.4	-795.8	.0	.0	81.44	.189
22.25	1.00	5.21	.00	.0	7.53	-45.5	-833.2	.0	.0	81.01	.192
17.25	1.00	4.96	.00	.0	7.59	-46.6	-870.8	.0	.0	80.57	.194
12.25	1.00	4.76	.00	.0	7.66	-47.8	-909.2	.0	.0	80.14	.196
7.25	1.00	4.76	.00	.0	7.73	-49.0	-946.7	.0	.0	79.71	.197
2.25	1.00	4.76	.00	.0	7.78	-49.8	-985.8	.0	.0	79.27	.199
.00	1.00	4.76	.00	.0	7.80	-50.1	-1003.3	.0	.0	79.08	.200

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DISPLACEMENTS

ELEV	DEFLECTION feet				ROTATION, degrees				Micro
X, ft	X	Y	Z	XY-Result	X	Y	Z	XY-Result	Allow
169.00	.00	3.44	-.05	3.44 < 2.04% >	-2.10	.00	.00	2.10	

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 2101 Murray Street
 Sioux City, IA 51101

JOB: 00-55137
 SBA NETWORK SERVICES INC
 Bridgewater 4, CT

01-Feb-12 09:40
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SHAPE: 18 SIDED POLYGON with FLAT-FLAT ORIENTATION
 BOLTS: QUADRANT SPACED BOLTS 6.00 in. ON CENTER
 LOCATE:

POLE DATA

DIAMETER =	51.43 in.	BASE	AXIAL FORCE=	-61.6 kips	Vert
PLATE =	.4375 in.	ACTIONS	SHEAR X =	27.2 kips	Long
TAPER =	.1830 in/ft		SHEAR Y =	27.2 kips	Tran
POLE Fy =	65.00 ksi		X-AXIS MOM =	3551.5 ft-kips	Tran
			Y-Axis MOM =	3551.5 ft-kips	Long
			Z-Axis MOM =	.0 ft-kips	Vert

DESIGN CASE = 1 3s Gusted Wind

Design: ANY Orientation Reactions at 45.00 deg to X-AXIS

BOLT LOADS

AXIAL - COMPRESSION	=	210.94 kips	
AXIAL - TENSION	=	204.78 kips	
SHEAR	=	2.72 kips	
AXIAL STRESS	=	64.91 ksi	
SHEAR STRESS	=	.89 ksi	
YIELD STRENGTH Fy	=	75.00 ksi	
ULT. STRENGTH Fu	=	100.00 ksi	
ALLOW STRESS Fa [.80 x 1.00]	=	80.00 ksi	Interaction .833 TIA-G
SHEAR Fv [.80 x .40]	=	32.00 ksi	
TENSION AREA REQUIRED	=	2.64 in ²	
TENSION AREA FURNISHED	=	3.25 in ²	
ROOT AREA FURNISHED	=	3.07 in ²	

A615 ::: ANCHOR BOLT DESIGN USED

20 Bolts on a 58.000 in. Bolt Circle SHIP
 2.250 in. Diameter 67.13 in. Embedded (lbs)
 12.00 in. Exposed 84.00 in. Total Length 2664

CONCRETE - Fc= 4000 psi

ANCHOR BOLTS are STRAIGHT w\ UPLIFT NUT

BASE PLATE

[Bend Model: 1/4 Circ]
 YIELD STRENGTH = 50.0 ksi
 BEND LINE WIDTH = 40.8 in.
 PLATE MOMENT = 3179.5 in-k
 THICKNESS REQD = 2.632 in.
 BENDING STRESS = 41.2 ksi
 ALLOWABLE STRESS = 45.0 ksi
 [Fy x .90 x 1.00]

BASE PLATE USED

2.75 in.	THICK	SHIP
60.25 in.	SQUARE	(lbs)
39.00 in.	CENTER HOLE	1500
14.00 in.	CORNER CLIP	

LOAD CASE SUMMARY

LC	FORCES- (kips)			MOMENTS- (ft-k)			ABolt-Str		Plate-Str		Design Code
	Axial	ShearX	ShearY	X-axis	Y-axis	TorQ	CSR	Allow ksi	Actual ksi	Allow ksi	
1	61.6	27.2	27.2	3552	3552	0	.833	75.00	41.21	45.00	TIA-G
2	46.6	27.2	27.2	3456	3456	0	.809	75.00	39.97	45.00	TIA-G
3	94.6	4.6	4.6	614	614	0	.160	75.00	7.99	45.00	TIA-G
4	50.1	5.5	5.5	709	709	0	.174	75.00	8.62	45.00	TIA-G

MAT FOUNDATION DESIGN BY SABRE TOWERS & POLES

170' Monopole SBA NETWORK SERVICES INC Bridgewater 4, CT (55137) 3-8-12 REB

Overall Loads:

Factored Moment (ft-kips)	5776.83
Factored Axial (kips)	70.87
Factored Shear (kips)	44.22
Bearing Design Strength (ksf)	22.35
Water Table Below Grade (ft)	4
Width of Mat (ft)	26.5
Thickness of Mat (ft)	2
Depth to Bottom of Slab (ft)	6
Quantity of Bolts in Bolt Circle	20
Bolt Circle Diameter (in)	58
Top of Concrete to Top of Bottom Threads (in)	60
Equivalent Diameter of Pier (ft)	7.9
Ht. of Pier Above Ground (ft)	0.5
Ht. of Pier Below Ground (ft)	4
Quantity of Bars in Mat	40
Bar Diameter in Mat (in)	1
Area of Bars in Mat (in ²)	31.42
Spacing of Bars in Mat (in)	7.97
Quantity of Bars Pier	36
Bar Diameter in Pier (in)	1.128
Tie Bar Diameter in Pier (in)	0.625
Spacing of Ties (in)	12
Area of Bars in Pier (in ²)	35.98
Spacing of Bars in Pier (in)	7.54
f _c (ksi)	4
f _y (ksi)	60
Unit Wt. of Soil (kcf)	0.117
Unit Wt. of Concrete (kcf)	0.15

Volume of Concrete (yd³) 60.19

Two-Way Shear Action:

Average d (in)	20
ϕV_c (kips)	1368.6
$\phi V_c = \phi(2 + 4/\beta_c)f_c^{1/2}b_o d$	2052.9
$\phi V_c = \phi(\alpha_s d/b_o + 2)f_c^{1/2}b_o d$	1443.2
$\phi V_c = \phi 4f_c^{1/2}b_o d$	1368.6
Shear perimeter, b _o (in)	360.65
β_c	1

One-Way Shear:

ϕV_c (kips) **683.8**

Stability:

Overturning Design Strength (ft-k) **6211.6**

Max. Net Bearing Press. (ksf) **3.62**

Ultimate Bearing Pressure (ksf) **29.80**
Bearing Φ_s **0.75**

Minimum Pier Diameter (ft) **6.33**

Equivalent Square b (ft) **7.00**

Recommended Spacing (in) **6 to 12**

Minimum Pier A_s (in²) **35.29**

Recommended Spacing (in) **6 to 12**

V_u (kips) **110.6**

V_u (kips) **381.5**

Total Applied M (ft-k) **6064.3**

MAT FOUNDATION DESIGN BY SABRE TOWERS & POLES (CONTINUED)

170' Monopole SBA NETWORK SERVICES INC Bridgewater 4, CT (55137) 3-8-12 REB

Pier Design:

ϕV_n (kips)	776.9	V_u (kips)	44.2
$\phi V_c = \phi 2(1 + N_u / (2000 A_g)) f_c^{1/2} b_w d$	776.9		
V_s (kips)	0.0	*** $V_s \text{ max} = 4 f_c^{1/2} b_w d$ (kips)	1818.8
Maximum Spacing (in)	7.77	(Only if Shear Ties are Required)	
Actual Hook Development (in)	19.00	Req'd Hook Development l_{dh} (in)	14.98

*** Ref. To Spacing Requirements ACI 11.5.4.3

Flexure in Slab:

ϕM_n (ft-kips)	2704.2	M_u (ft-kips)	2492.9
a (in)	1.74		
Steel Ratio	0.00494		
β_1	0.85		
Maximum Steel Ratio (.75 p_b)	0.0214		
Minimum Steel Ratio	0.0018		
Rebar Development in Pad (in)	156.00	Required Development in Pad (in)	43.57

Condition	1 is OK, 0 Fails
Maximum Soil Bearing Pressure	1
Pier Area of Steel	1
Pier Shear	1
Interaction Diagram Visual Check	1
Two-Way Shear Action	1
One-Way Shear Action	1
Overturning	1
Flexure	1
Steel Ratio	1
Length of Development in Pad	1
Hook Development	1