

June 26, 2018

Susan Masse  
Centerline Communications, LLC  
95 Ryan Drive, Suite 1  
Raynham, MA 02767

Ramaker & Associates, Inc.  
855 Community Drive  
Sauk City, WI 53583

**SUBJECT: STRUCTURAL ASSESSMENT**

**CARRIER: SPRINT**

**SITE: NM03XC065  
131 CHADWICK STREET  
PORTLAND, CUMBERLAND COUNTY, MAINE 04102  
RAMAKER & ASSOCIATES PROJECT NUMBER: 39053**

**RESULTS: MOUNT: PASS WITH REPLACEMENT  
SUPPORTING STRUCTURE: ADEQUATE**

Dear Susan Masse:

Ramaker & Associates, Inc. (RAMAKER) respectfully submits this structural assessment for the above mentioned site. The purpose of this report is to determine the structural integrity of the structure(s) with the proposed loading configurations. Engineering recommendations regarding the analysis results are provided in the following pages.

RAMAKER analyzed the structure(s) using accepted engineering practices. All information contained herein is valid only for the described structure configuration and loading conditions. RAMAKER reserves the right to modify our recommendations should alterations to the structure(s) loading occur.

If you have any questions or comments, please do not hesitate to contact our office.

Sincerely,

RAMAKER & ASSOCIATES, INC.



Tucker Schwab  
Structural Designer



James R. Skowronski, P.E.  
Supervising Engineer





**ANALYSIS CRITERIA**

Adopted Building Code	2015 IBC
Referenced Standard	TIA-222-G
Risk Category	II
Ultimate Design Wind Speed, $V_{ult}$	118 mph (3 sec. gust)
Nominal Design Wind Speed, $V_{asd}$	91 mph (3 sec. gust)
Design Wind Speed w/ Ice	50 mph (3 sec. gust)
Ice Thickness	1 inch
Exposure Category	C
Topographic Feature	None

**SUPPORTING DOCUMENTATION**

- Previous mount analysis by Hudson Design Group, job number NM03XC065, dated 12/31/12
- Construction drawings by RAMAKER, project number 39053
- Other pertinent data procured or assumed by RAMAKER during site due diligence activities

**MOUNT LOADING**

RAMAKER understands that the loading to be used for this analysis will consist of the antennas and equipment configurations as shown in the following chart(s):

Antenna Mount – All Sectors				
Elevation	Position	Appurtenance	Mount Type	Status
64.5	1	(1) RFS APXVSSP18-C-A20	Pipe Mount	Existing
		(1) ALU 1900 MHz 4x45W RRH		
		(1) ALU 800 MHz 2x50W RRH		
	2	(1) RFS APXVTSM18-C-I20	Pipe Mount	Proposed
		(1) ALU TD-RRH-8X20-25		
		(1) ALU 800 MHz 2x50W RRH		

**RESULTS**

By engineering calculation and inspection, the **proposed** antenna and equipment mounting structure(s) are capable of supporting the proposed loading configurations without causing an overstress condition in the antenna and equipment mounting structure(s). **The existing antenna and equipment mounting structure(s) shall be removed and replaced with the proposed antenna and equipment mounting structure(s) prior to antenna and equipment installation. See attached details for the proposed mounting structures.**



**LIMITATIONS**

The recommendations contained within this report were developed using the supporting documentation as previously described. All recommendations pertain only to the proposed antenna installation activities as described in this report. RAMAKER assumes no responsibility for failures caused by factors beyond our control. These include but are not limited to the following:

- Missing, corroding, and/or deteriorating members
- Improper manufacturing and/or construction
- Improper maintenance
- Member grades less than assumed grades show below:

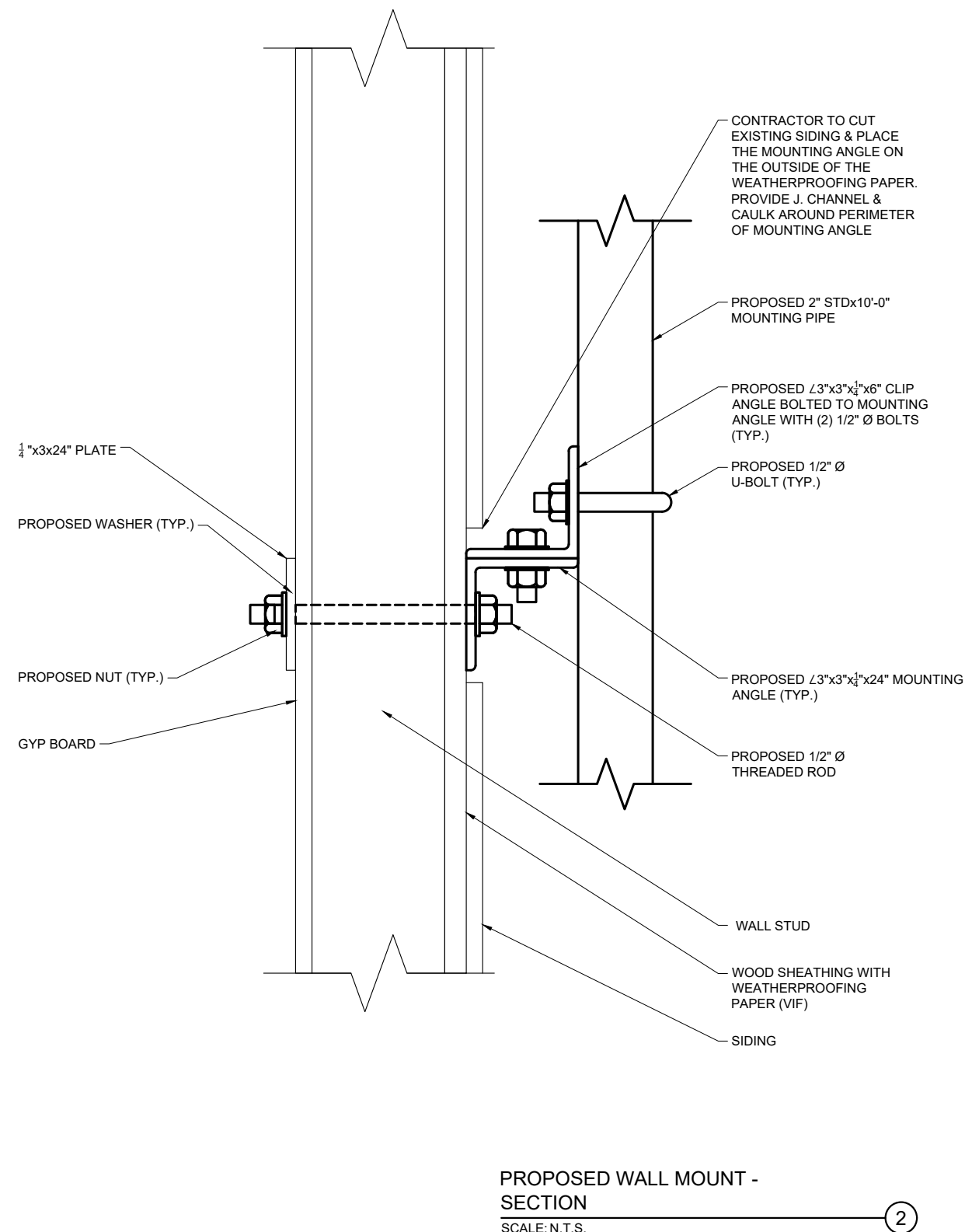
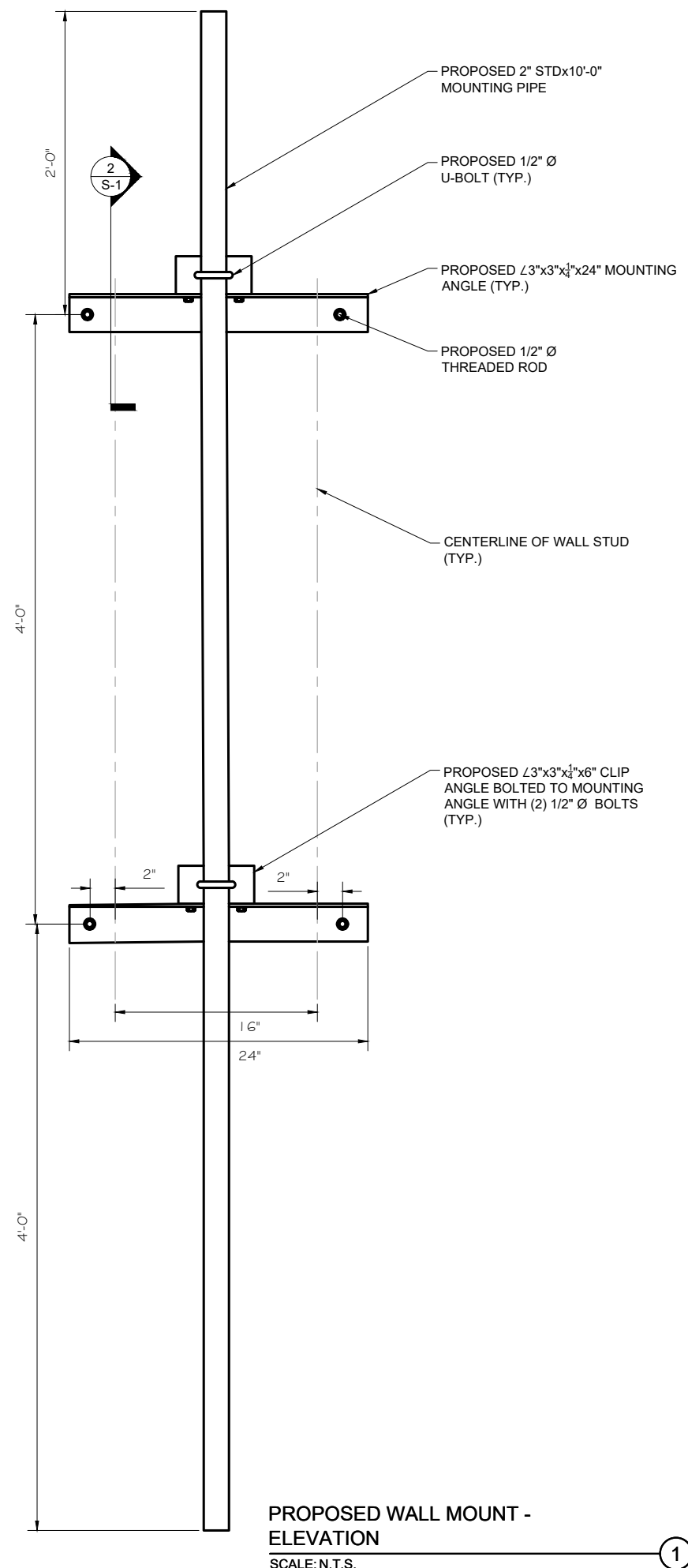
<b>Assumed Steel Member Grades</b>	
Angles/Plates/Channels/Solid Rods	ASTM A36, 36 ksi
Pipes	ASTM A53 Gr. B, 35 ksi

RAMAKER is not responsible for verifying that the loading on the structure is consistent with the loading applied to the structure within this report. If there is any information contrary to that contained herein, or if there are any defects arising from the original design, material, fabrication and erection deficiencies, this report should be disregarded and RAMAKER should be contacted immediately. RAMAKER is not liable for any representation, recommendation, or conclusion not expressly stated herein.



**ATTACHMENTS**

- Modification Details
- Analysis Figures
- Analysis Calculations



**Sprint**

6391 SPRINT PARKWAY  
 OVERLAND PARK, KS 66251

**CENTERLINE COMMUNICATIONS**

95 RYAN DRIVE, SUITE 1  
 RAYNHAM, MA 02767  
 OFFICE: (844) 748-8878

**RAMAKER & ASSOCIATES, INC.**  
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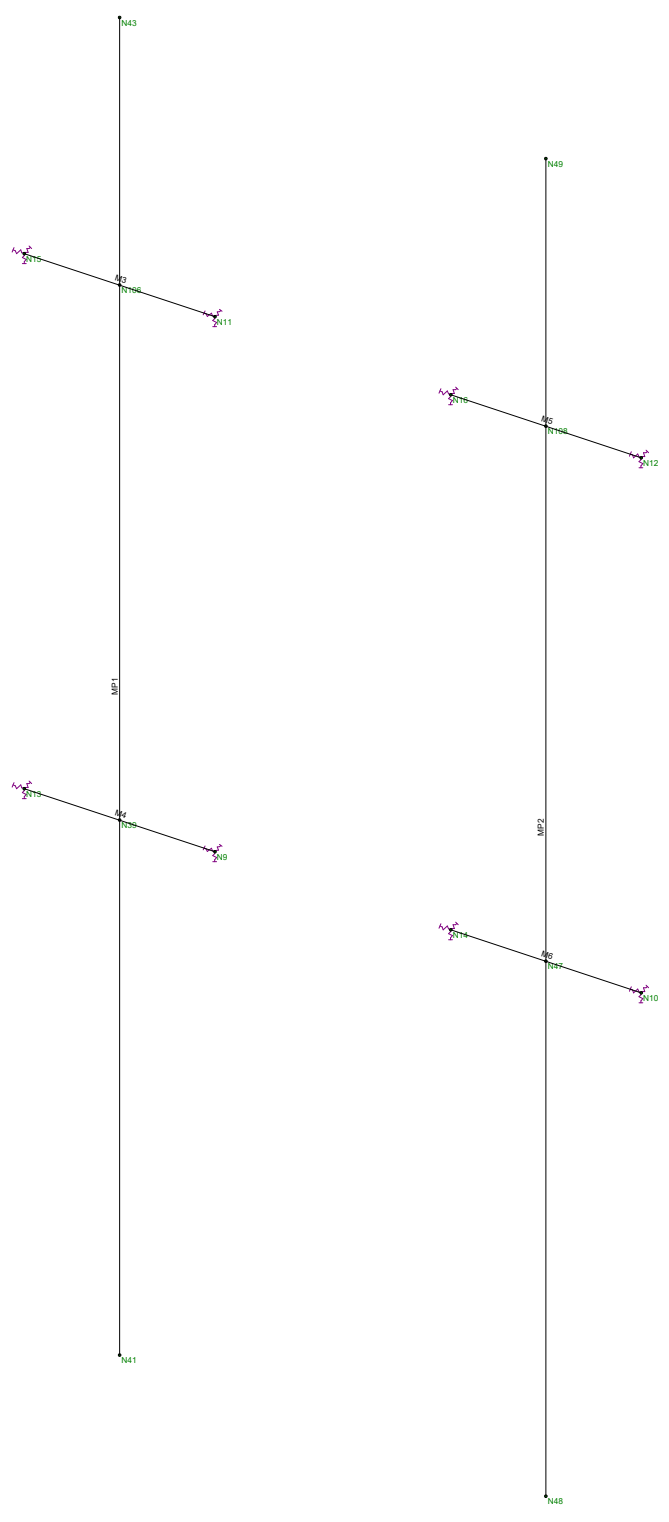
855 Community Dr, Sauk City, WI 53583  
 608-643-4100 www.Ramaker.com

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Certification & Seal:

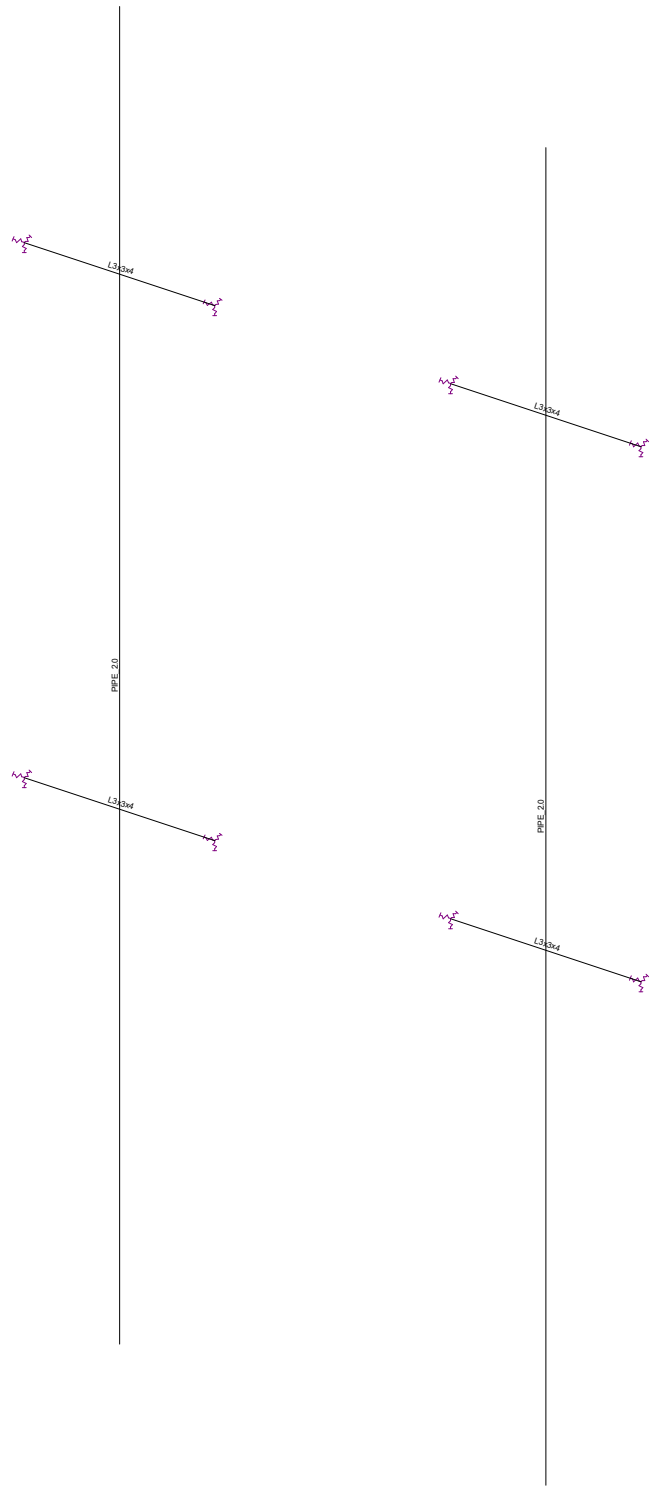

1	06/26/18	MOUNTING DETAILS
MARK	DATE	DESCRIPTION
ISSUE PHASE	FINAL	DATE ISSUED 05/16/2018
PROJECT TITLE: <b>PORTLAND SOUTH CHADWICK NM03XC065</b>		
PROJECT INFORMATION: 131 CHADWICK STREET PORTLAND, ME 04102 CUMBERLAND COUNTY		
SHEET TITLE: GROUNDING DETAILS		
SCALE: AS NOTED		
PROJECT NUMBER	39053	
SHEET NUMBER	5-1	

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Envelope Only Solution

Ramaker & Associates, Inc.	NM03XC065	SK - 1
TJS		June 26, 2018 at 10:20 AM
39053		39053 Rev2 Mount.r3d



Envelope Only Solution

Ramaker & Associates, Inc.		SK - 2
TJS	NM03XC065	June 26, 2018 at 10:20 AM
39053		39053 Rev2 Mount.r3d



### Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (1/E...)	Density[k/ft...]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3

### Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	L3X3X1/4	L3x3x4	Beam	Single Angle	A36 Gr.36	Typical	1.44	1.23	1.23	.031
2	PIPE_2	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25

### Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	MP1	N41	N43			PIPE_2	Beam	Pipe	A53 Gr.B	Typical
2	MP2	N48	N49			PIPE_2	Beam	Pipe	A53 Gr.B	Typical
3	M3	N15	N11		90	L3X3X1/4	Beam	Single Angle	A36 Gr.36	Typical
4	M4	N13	N9		90	L3X3X1/4	Beam	Single Angle	A36 Gr.36	Typical
5	M5	N16	N12		90	L3X3X1/4	Beam	Single Angle	A36 Gr.36	Typical
6	M6	N14	N10		90	L3X3X1/4	Beam	Single Angle	A36 Gr.36	Typical

### Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu..	Area(M...)	Surface...
1	Dead Load	None		-1			8			
2	Antenna Wind 0	None					16			
3	Antenna Wind 30	None					16			
4	Antenna Wind 45	None					16			
5	Antenna Wind 60	None					16			
6	Antenna Wind 90	None					16			
7	Antenna Wind 120	None					16			
8	Antenna Wind 135	None					16			
9	Antenna Wind 150	None					16			
10	Antenna Wind 180	None					16			
11	Antenna Wind 210	None					16			
12	Antenna Wind 225	None					16			
13	Antenna Wind 240	None					16			
14	Antenna Wind 270	None					16			
15	Antenna Wind 300	None					16			
16	Antenna Wind 315	None					16			
17	Antenna Wind 330	None					16			
18	Antenna Ice Dead Load	None					8			
19	Antenna Wind w/Ice 0	None					16			
20	Antenna Wind w/Ice 30	None					16			
21	Antenna Wind w/Ice 45	None					16			
22	Antenna Wind w/Ice 60	None					16			
23	Antenna Wind w/Ice 90	None					16			
24	Antenna Wind w/Ice 120	None					16			
25	Antenna Wind w/Ice 135	None					16			
26	Antenna Wind w/Ice 150	None					16			
27	Antenna Wind w/Ice 180	None					16			





Company : Ramaker & Associates, Inc.  
 Designer : TJS  
 Job Number : 39053  
 Model Name : NM03XC065



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**Basic Load Cases (Continued)**

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu.	Area(M...	Surface...
28	Antenna Wind w/Ice 210	None					16			
29	Antenna Wind w/Ice 225	None					16			
30	Antenna Wind w/Ice 240	None					16			
31	Antenna Wind w/Ice 270	None					16			
32	Antenna Wind w/Ice 300	None					16			
33	Antenna Wind w/Ice 315	None					16			
34	Antenna Wind w/Ice 330	None					16			
35	Member Wind 0	None						4		
36	Member Wind 30	None						4		
37	Member Wind 45	None						4		
38	Member Wind 60	None						4		
39	Member Wind 90	None						4		
40	Member Wind 120	None						4		
41	Member Wind 135	None						4		
42	Member Wind 150	None						4		
43	Member Wind 180	None						4		
44	Member Wind 210	None						4		
45	Member Wind 225	None						4		
46	Member Wind 240	None						4		
47	Member Wind 270	None						4		
48	Member Wind 300	None						4		
49	Member Wind 315	None						4		
50	Member Wind 330	None						4		
51	Member Ice Dead Load	None						2		
52	Member Wind w/Ice 0	None						4		
53	Member Wind w/Ice 30	None						4		
54	Member Wind w/Ice 45	None						4		
55	Member Wind w/Ice 60	None						4		
56	Member Wind w/Ice 90	None						4		
57	Member Wind w/Ice 120	None						4		
58	Member Wind w/Ice 135	None						4		
59	Member Wind w/Ice 150	None						4		
60	Member Wind w/Ice 180	None						4		
61	Member Wind w/Ice 210	None						4		
62	Member Wind w/Ice 225	None						4		
63	Member Wind w/Ice 240	None						4		
64	Member Wind w/Ice 270	None						4		
65	Member Wind w/Ice 300	None						4		
66	Member Wind w/Ice 315	None						4		
67	Member Wind w/Ice 330	None						4		
68	LV-1	None								
69	LV-2	None								
70	LV-3	None								
71	LV-4	None								
72	LV-5	None								
73	LV-6	None								
74	LV-7	None								
75	LV-8	None								
76	LV-9	None								
77	LV-10	None								
78	LV-11	None								
79	LV-12	None								
80	LV-13	None								
81	LV-14	None								
82	LV-15	None								
83	LM-1	None								
84	LM-2	None								



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**Basic Load Cases (Continued)**

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu.	Area(M <sup>2</sup> )	Surface
85	LM-3	None								
86	LM-4	None								
87	LM-5	None								
88	LM-6	None								
89	LM-7	None								
90	LM-8	None								
91	LM-9	None								
92	LM-10	None								
93	LM-11	None								
94	LM-12	None								
95	LM-13	None								
96	LM-14	None								
97	LM-15	None								

**Load Combinations**

	Description	PD	S	B	Fa	B	Fa	B	Fa	B	F	B	F	B	F	B	F	B	F	
1	1.4D	Y		1	1.4															
2	0.9D + 1.6 (0-Wind)	Y		1	.9	2	1.6	35	1.6											
3	0.9D + 1.6 (30-Wind)	Y		1	.9	3	1.6	36	1.6											
4	0.9D + 1.6 (45-Wind)	Y		1	.9	4	1.6	37	1.6											
5	0.9D + 1.6 (60-Wind)	Y		1	.9	5	1.6	38	1.6											
6	0.9D + 1.6 (90-Wind)	Y		1	.9	6	1.6	39	1.6											
7	0.9D + 1.6 (120-Wind)	Y		1	.9	7	1.6	40	1.6											
8	0.9D + 1.6 (135-Wind)	Y		1	.9	8	1.6	41	1.6											
9	0.9D + 1.6 (150-Wind)	Y		1	.9	9	1.6	42	1.6											
10	0.9D + 1.6 (180-Wind)	Y		1	.9	10	1.6	43	1.6											
11	0.9D + 1.6 (210-Wind)	Y		1	.9	11	1.6	44	1.6											
12	0.9D + 1.6 (225-Wind)	Y		1	.9	12	1.6	45	1.6											
13	0.9D + 1.6 (240-Wind)	Y		1	.9	13	1.6	46	1.6											
14	0.9D + 1.6 (270-Wind)	Y		1	.9	14	1.6	47	1.6											
15	0.9D + 1.6 (300-Wind)	Y		1	.9	15	1.6	48	1.6											
16	0.9D + 1.6 (315-Wind)	Y		1	.9	16	1.6	49	1.6											
17	0.9D + 1.6 (330-Wind)	Y		1	.9	17	1.6	50	1.6											
18	1.2D + 1.6 (0-Wind)	Y		1	1.2	2	1.6	35	1.6											
19	1.2D + 1.6 (30-Wind)	Y		1	1.2	3	1.6	36	1.6											
20	1.2D + 1.6 (45-Wind)	Y		1	1.2	4	1.6	37	1.6											
21	1.2D + 1.6 (60-Wind)	Y		1	1.2	5	1.6	38	1.6											
22	1.2D + 1.6 (90-Wind)	Y		1	1.2	6	1.6	39	1.6											
23	1.2D + 1.6 (120-Wind)	Y		1	1.2	7	1.6	40	1.6											
24	1.2D + 1.6 (135-Wind)	Y		1	1.2	8	1.6	41	1.6											
25	1.2D + 1.6 (150-Wind)	Y		1	1.2	9	1.6	42	1.6											
26	1.2D + 1.6 (180-Wind)	Y		1	1.2	10	1.6	43	1.6											
27	1.2D + 1.6 (210-Wind)	Y		1	1.2	11	1.6	44	1.6											
28	1.2D + 1.6 (225-Wind)	Y		1	1.2	12	1.6	45	1.6											
29	1.2D + 1.6 (240-Wind)	Y		1	1.2	13	1.6	46	1.6											
30	1.2D + 1.6 (270-Wind)	Y		1	1.2	14	1.6	47	1.6											
31	1.2D + 1.6 (300-Wind)	Y		1	1.2	15	1.6	48	1.6											
32	1.2D + 1.6 (315-Wind)	Y		1	1.2	16	1.6	49	1.6											
33	1.2D + 1.6 (330-Wind)	Y		1	1.2	17	1.6	50	1.6											
34	1.2D + 1.0Di + 1.0 (0-Wind Ice)	Y		1	1.2	18	1	51	1	19	1	52	1							
35	1.2D + 1.0Di + 1.0 (30-Wind Ice)	Y		1	1.2	18	1	51	1	20	1	53	1							
36	1.2D + 1.0Di + 1.0 (45-Wind Ice)	Y		1	1.2	18	1	51	1	21	1	54	1							
37	1.2D + 1.0Di + 1.0 (60-Wind Ice)	Y		1	1.2	18	1	51	1	22	1	55	1							
38	1.2D + 1.0Di + 1.0 (90-Wind Ice)	Y		1	1.2	18	1	51	1	23	1	56	1							
39	1.2D + 1.0Di + 1.0 (120-Wind Ice)	Y		1	1.2	18	1	51	1	24	1	57	1							



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**Load Combinations (Continued)**

Description	PD	S	B	Fa	B	Fa	B	Fa	B	F	B	F	F	F	F	F	F
40 1.2D + 1.0Di + 1.0 (135-Wind Ice)	...	Y		1	1.2	18	1	51	1	25	1	58	1				
41 1.2D + 1.0Di + 1.0 (150-Wind Ice)	...	Y		1	1.2	18	1	51	1	26	1	59	1				
42 1.2D + 1.0Di + 1.0 (180-Wind Ice)	...	Y		1	1.2	18	1	51	1	27	1	60	1				
43 1.2D + 1.0Di + 1.0 (210-Wind Ice)	...	Y		1	1.2	18	1	51	1	28	1	61	1				
44 1.2D + 1.0Di + 1.0 (225-Wind Ice)	...	Y		1	1.2	18	1	51	1	29	1	62	1				
45 1.2D + 1.0Di + 1.0 (240-Wind Ice)	...	Y		1	1.2	18	1	51	1	30	1	63	1				
46 1.2D + 1.0Di + 1.0 (270-Wind Ice)	...	Y		1	1.2	18	1	51	1	31	1	64	1				
47 1.2D + 1.0Di + 1.0 (300-Wind Ice)	...	Y		1	1.2	18	1	51	1	32	1	65	1				
48 1.2D + 1.0Di + 1.0 (315-Wind Ice)	...	Y		1	1.2	18	1	51	1	33	1	66	1				
49 1.2D + 1.0Di + 1.0 (330-Wind Ice)	...	Y		1	1.2	18	1	51	1	34	1	67	1				
50 1.2D + 1.5LV-1	...	Y		1	1.2	68	1.5										
51 1.2D + 1.5LV-2	...	Y		1	1.2	69	1.5										
52 1.2D + 1.5LV-3	...	Y		1	1.2	70	1.5										
53 1.2D + 1.5LV-4	...	Y		1	1.2	71	1.5										
54 1.2D + 1.5LV-5	...	Y		1	1.2	72	1.5										
55 1.2D + 1.5LV-6	...	Y		1	1.2	73	1.5										
56 1.2D + 1.5LV-7	...	Y		1	1.2	74	1.5										
57 1.2D + 1.5LV-8	...	Y		1	1.2	75	1.5										
58 1.2D + 1.5LV-9	...	Y		1	1.2	76	1.5										
59 1.2D + 1.5LV-10	...	Y		1	1.2	77	1.5										
60 1.2D + 1.5LV-11	...	Y		1	1.2	78	1.5										
61 1.2D + 1.5LV-12	...	Y		1	1.2	79	1.5										
62 1.2D + 1.5LV-13	...	Y		1	1.2	80	1.5										
63 1.2D + 1.5LV-14	...	Y		1	1.2	81	1.5										
64 1.2D + 1.5LV-15	...	Y		1	1.2	82	1.5										
65 1.2D + 1.5LM-1 + Maintenance (0-Wind)	...	Y		1	1.2	83	1.5	2	.108	35	.1...						
66 1.2D + 1.5LM-1 + Maintenance (30-Wind)	...	Y		1	1.2	83	1.5	3	.108	36	.1...						
67 1.2D + 1.5LM-1 + Maintenance (45-Wind)	...	Y		1	1.2	83	1.5	4	.108	37	.1...						
68 1.2D + 1.5LM-1 + Maintenance (60-Wind)	...	Y		1	1.2	83	1.5	5	.108	38	.1...						
69 1.2D + 1.5LM-1 + Maintenance (90-Wind)	...	Y		1	1.2	83	1.5	6	.108	39	.1...						
70 1.2D + 1.5LM-1 + Maintenance (120-Wind)	...	Y		1	1.2	83	1.5	7	.108	40	.1...						
71 1.2D + 1.5LM-1 + Maintenance (135-Wind)	...	Y		1	1.2	83	1.5	8	.108	41	.1...						
72 1.2D + 1.5LM-1 + Maintenance (150-Wind)	...	Y		1	1.2	83	1.5	9	.108	42	.1...						
73 1.2D + 1.5LM-1 + Maintenance (180-Wind)	...	Y		1	1.2	83	1.5	10	.108	43	.1...						
74 1.2D + 1.5LM-1 + Maintenance (210-Wind)	...	Y		1	1.2	83	1.5	11	.108	44	.1...						
75 1.2D + 1.5LM-1 + Maintenance (225-Wind)	...	Y		1	1.2	83	1.5	12	.108	45	.1...						
76 1.2D + 1.5LM-1 + Maintenance (240-Wind)	...	Y		1	1.2	83	1.5	13	.108	46	.1...						
77 1.2D + 1.5LM-1 + Maintenance (270-Wind)	...	Y		1	1.2	83	1.5	14	.108	47	.1...						
78 1.2D + 1.5LM-1 + Maintenance (300-Wind)	...	Y		1	1.2	83	1.5	15	.108	48	.1...						
79 1.2D + 1.5LM-1 + Maintenance (315-Wind)	...	Y		1	1.2	83	1.5	16	.108	49	.1...						
80 1.2D + 1.5LM-1 + Maintenance (330-Wind)	...	Y		1	1.2	83	1.5	17	.108	50	.1...						
81 1.2D + 1.5LM-2 + Maintenance (0-Wind)	...	Y		1	1.2	84	1.5	2	.108	35	.1...						
82 1.2D + 1.5LM-2 + Maintenance (30-Wind)	...	Y		1	1.2	84	1.5	3	.108	36	.1...						
83 1.2D + 1.5LM-2 + Maintenance (45-Wind)	...	Y		1	1.2	84	1.5	4	.108	37	.1...						
84 1.2D + 1.5LM-2 + Maintenance (60-Wind)	...	Y		1	1.2	84	1.5	5	.108	38	.1...						
85 1.2D + 1.5LM-2 + Maintenance (90-Wind)	...	Y		1	1.2	84	1.5	6	.108	39	.1...						
86 1.2D + 1.5LM-2 + Maintenance (120-Wind)	...	Y		1	1.2	84	1.5	7	.108	40	.1...						
87 1.2D + 1.5LM-2 + Maintenance (135-Wind)	...	Y		1	1.2	84	1.5	8	.108	41	.1...						
88 1.2D + 1.5LM-2 + Maintenance (150-Wind)	...	Y		1	1.2	84	1.5	9	.108	42	.1...						
89 1.2D + 1.5LM-2 + Maintenance (180-Wind)	...	Y		1	1.2	84	1.5	10	.108	43	.1...						
90 1.2D + 1.5LM-2 + Maintenance (210-Wind)	...	Y		1	1.2	84	1.5	11	.108	44	.1...						
91 1.2D + 1.5LM-2 + Maintenance (225-Wind)	...	Y		1	1.2	84	1.5	12	.108	45	.1...						
92 1.2D + 1.5LM-2 + Maintenance (240-Wind)	...	Y		1	1.2	84	1.5	13	.108	46	.1...						
93 1.2D + 1.5LM-2 + Maintenance (270-Wind)	...	Y		1	1.2	84	1.5	14	.108	47	.1...						
94 1.2D + 1.5LM-2 + Maintenance (300-Wind)	...	Y		1	1.2	84	1.5	15	.108	48	.1...						
95 1.2D + 1.5LM-2 + Maintenance (315-Wind)	...	Y		1	1.2	84	1.5	16	.108	49	.1...						
96 1.2D + 1.5LM-2 + Maintenance (330-Wind)	...	Y		1	1.2	84	1.5	17	.108	50	.1...						



Company : Ramaker & Associates, Inc.  
 Designer : TJS  
 Job Number : 39053  
 Model Name : NM03XC065



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 07/26/2018

**Load Combinations (Continued)**

	Description	PD	S	B	Fa	B	Fa	B	Fa	B	F	B	F	B	F	B	F	B	
97	1.2D + 1.5LM-3 + Maintenance (0-Wind)	...	Y		1	1.2	85	1.5	2	108	35	.1							
98	1.2D + 1.5LM-3 + Maintenance (30-Wind)	...	Y		1	1.2	85	1.5	3	108	36	.1							
99	1.2D + 1.5LM-3 + Maintenance (45-Wind)	...	Y		1	1.2	85	1.5	4	108	37	.1							
100	1.2D + 1.5LM-3 + Maintenance (60-Wind)	...	Y		1	1.2	85	1.5	5	108	38	.1							
101	1.2D + 1.5LM-3 + Maintenance (90-Wind)	...	Y		1	1.2	85	1.5	6	108	39	.1							
102	1.2D + 1.5LM-3 + Maintenance (120-Wind)	...	Y		1	1.2	85	1.5	7	108	40	.1							
103	1.2D + 1.5LM-3 + Maintenance (135-Wind)	...	Y		1	1.2	85	1.5	8	108	41	.1							
104	1.2D + 1.5LM-3 + Maintenance (150-Wind)	...	Y		1	1.2	85	1.5	9	108	42	.1							
105	1.2D + 1.5LM-3 + Maintenance (180-Wind)	...	Y		1	1.2	85	1.5	10	108	43	.1							
106	1.2D + 1.5LM-3 + Maintenance (210-Wind)	...	Y		1	1.2	85	1.5	11	108	44	.1							
107	1.2D + 1.5LM-3 + Maintenance (225-Wind)	...	Y		1	1.2	85	1.5	12	108	45	.1							
108	1.2D + 1.5LM-3 + Maintenance (240-Wind)	...	Y		1	1.2	85	1.5	13	108	46	.1							
109	1.2D + 1.5LM-3 + Maintenance (270-Wind)	...	Y		1	1.2	85	1.5	14	108	47	.1							
110	1.2D + 1.5LM-3 + Maintenance (300-Wind)	...	Y		1	1.2	85	1.5	15	108	48	.1							
111	1.2D + 1.5LM-3 + Maintenance (315-Wind)	...	Y		1	1.2	85	1.5	16	108	49	.1							
112	1.2D + 1.5LM-3 + Maintenance (330-Wind)	...	Y		1	1.2	85	1.5	17	108	50	.1							
113	1.2D + 1.5LM-4 + Maintenance (0-Wind)	...	Y		1	1.2	86	1.5	2	108	35	.1							
114	1.2D + 1.5LM-4 + Maintenance (30-Wind)	...	Y		1	1.2	86	1.5	3	108	36	.1							
115	1.2D + 1.5LM-4 + Maintenance (45-Wind)	...	Y		1	1.2	86	1.5	4	108	37	.1							
116	1.2D + 1.5LM-4 + Maintenance (60-Wind)	...	Y		1	1.2	86	1.5	5	108	38	.1							
117	1.2D + 1.5LM-4 + Maintenance (90-Wind)	...	Y		1	1.2	86	1.5	6	108	39	.1							
118	1.2D + 1.5LM-4 + Maintenance (120-Wind)	...	Y		1	1.2	86	1.5	7	108	40	.1							
119	1.2D + 1.5LM-4 + Maintenance (135-Wind)	...	Y		1	1.2	86	1.5	8	108	41	.1							
120	1.2D + 1.5LM-4 + Maintenance (150-Wind)	...	Y		1	1.2	86	1.5	9	108	42	.1							
121	1.2D + 1.5LM-4 + Maintenance (180-Wind)	...	Y		1	1.2	86	1.5	10	108	43	.1							
122	1.2D + 1.5LM-4 + Maintenance (210-Wind)	...	Y		1	1.2	86	1.5	11	108	44	.1							
123	1.2D + 1.5LM-4 + Maintenance (225-Wind)	...	Y		1	1.2	86	1.5	12	108	45	.1							
124	1.2D + 1.5LM-4 + Maintenance (240-Wind)	...	Y		1	1.2	86	1.5	13	108	46	.1							
125	1.2D + 1.5LM-4 + Maintenance (270-Wind)	...	Y		1	1.2	86	1.5	14	108	47	.1							
126	1.2D + 1.5LM-4 + Maintenance (300-Wind)	...	Y		1	1.2	86	1.5	15	108	48	.1							
127	1.2D + 1.5LM-4 + Maintenance (315-Wind)	...	Y		1	1.2	86	1.5	16	108	49	.1							
128	1.2D + 1.5LM-4 + Maintenance (330-Wind)	...	Y		1	1.2	86	1.5	17	108	50	.1							
129	1.2D + 1.5LM-5 + Maintenance (0-Wind)	...	Y		1	1.2	87	1.5	2	108	35	.1							
130	1.2D + 1.5LM-5 + Maintenance (30-Wind)	...	Y		1	1.2	87	1.5	3	108	36	.1							
131	1.2D + 1.5LM-5 + Maintenance (45-Wind)	...	Y		1	1.2	87	1.5	4	108	37	.1							
132	1.2D + 1.5LM-5 + Maintenance (60-Wind)	...	Y		1	1.2	87	1.5	5	108	38	.1							
133	1.2D + 1.5LM-5 + Maintenance (90-Wind)	...	Y		1	1.2	87	1.5	6	108	39	.1							
134	1.2D + 1.5LM-5 + Maintenance (120-Wind)	...	Y		1	1.2	87	1.5	7	108	40	.1							
135	1.2D + 1.5LM-5 + Maintenance (135-Wind)	...	Y		1	1.2	87	1.5	8	108	41	.1							
136	1.2D + 1.5LM-5 + Maintenance (150-Wind)	...	Y		1	1.2	87	1.5	9	108	42	.1							
137	1.2D + 1.5LM-5 + Maintenance (180-Wind)	...	Y		1	1.2	87	1.5	10	108	43	.1							
138	1.2D + 1.5LM-5 + Maintenance (210-Wind)	...	Y		1	1.2	87	1.5	11	108	44	.1							
139	1.2D + 1.5LM-5 + Maintenance (225-Wind)	...	Y		1	1.2	87	1.5	12	108	45	.1							
140	1.2D + 1.5LM-5 + Maintenance (240-Wind)	...	Y		1	1.2	87	1.5	13	108	46	.1							
141	1.2D + 1.5LM-5 + Maintenance (270-Wind)	...	Y		1	1.2	87	1.5	14	108	47	.1							
142	1.2D + 1.5LM-5 + Maintenance (300-Wind)	...	Y		1	1.2	87	1.5	15	108	48	.1							
143	1.2D + 1.5LM-5 + Maintenance (315-Wind)	...	Y		1	1.2	87	1.5	16	108	49	.1							
144	1.2D + 1.5LM-5 + Maintenance (330-Wind)	...	Y		1	1.2	87	1.5	17	108	50	.1							
145	1.2D + 1.5LM-6 + Maintenance (0-Wind)	...	Y		1	1.2	88	1.5	2	108	35	.1							
146	1.2D + 1.5LM-6 + Maintenance (30-Wind)	...	Y		1	1.2	88	1.5	3	108	36	.1							
147	1.2D + 1.5LM-6 + Maintenance (45-Wind)	...	Y		1	1.2	88	1.5	4	108	37	.1							
148	1.2D + 1.5LM-6 + Maintenance (60-Wind)	...	Y		1	1.2	88	1.5	5	108	38	.1							
149	1.2D + 1.5LM-6 + Maintenance (90-Wind)	...	Y		1	1.2	88	1.5	6	108	39	.1							
150	1.2D + 1.5LM-6 + Maintenance (120-Wind)	...	Y		1	1.2	88	1.5	7	108	40	.1							
151	1.2D + 1.5LM-6 + Maintenance (135-Wind)	...	Y		1	1.2	88	1.5	8	108	41	.1							
152	1.2D + 1.5LM-6 + Maintenance (150-Wind)	...	Y		1	1.2	88	1.5	9	108	42	.1							
153	1.2D + 1.5LM-6 + Maintenance (180-Wind)	...	Y		1	1.2	88	1.5	10	108	43	.1							





Company : Ramaker & Associates, Inc.  
 Designer : TJS  
 Job Number : 39053  
 Model Name : NM03XC065



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 Building and Inspections Department  
 Approved with Conditions  
 07/26/2018

**Load Combinations (Continued)**

	Description	PD	S	B	Fa	B	Fa	B	Fa	B	F	B	F	B	F	B	F	B	F	B	
154	1.2D + 1.5LM-6 + Maintenance (210-Wind)	...	Y		1	1.2	88	1.5	11	108	44	.1									
155	1.2D + 1.5LM-6 + Maintenance (225-Wind)	...	Y		1	1.2	88	1.5	12	108	45	.1									
156	1.2D + 1.5LM-6 + Maintenance (240-Wind)	...	Y		1	1.2	88	1.5	13	108	46	.1									
157	1.2D + 1.5LM-6 + Maintenance (270-Wind)	...	Y		1	1.2	88	1.5	14	108	47	.1									
158	1.2D + 1.5LM-6 + Maintenance (300-Wind)	...	Y		1	1.2	88	1.5	15	108	48	.1									
159	1.2D + 1.5LM-6 + Maintenance (315-Wind)	...	Y		1	1.2	88	1.5	16	108	49	.1									
160	1.2D + 1.5LM-6 + Maintenance (330-Wind)	...	Y		1	1.2	88	1.5	17	108	50	.1									
161	1.2D + 1.5LM-7 + Maintenance (0-Wind)	...	Y		1	1.2	89	1.5	2	108	35	.1									
162	1.2D + 1.5LM-7 + Maintenance (30-Wind)	...	Y		1	1.2	89	1.5	3	108	36	.1									
163	1.2D + 1.5LM-7 + Maintenance (45-Wind)	...	Y		1	1.2	89	1.5	4	108	37	.1									
164	1.2D + 1.5LM-7 + Maintenance (60-Wind)	...	Y		1	1.2	89	1.5	5	108	38	.1									
165	1.2D + 1.5LM-7 + Maintenance (90-Wind)	...	Y		1	1.2	89	1.5	6	108	39	.1									
166	1.2D + 1.5LM-7 + Maintenance (120-Wind)	...	Y		1	1.2	89	1.5	7	108	40	.1									
167	1.2D + 1.5LM-7 + Maintenance (135-Wind)	...	Y		1	1.2	89	1.5	8	108	41	.1									
168	1.2D + 1.5LM-7 + Maintenance (150-Wind)	...	Y		1	1.2	89	1.5	9	108	42	.1									
169	1.2D + 1.5LM-7 + Maintenance (180-Wind)	...	Y		1	1.2	89	1.5	10	108	43	.1									
170	1.2D + 1.5LM-7 + Maintenance (210-Wind)	...	Y		1	1.2	89	1.5	11	108	44	.1									
171	1.2D + 1.5LM-7 + Maintenance (225-Wind)	...	Y		1	1.2	89	1.5	12	108	45	.1									
172	1.2D + 1.5LM-7 + Maintenance (240-Wind)	...	Y		1	1.2	89	1.5	13	108	46	.1									
173	1.2D + 1.5LM-7 + Maintenance (270-Wind)	...	Y		1	1.2	89	1.5	14	108	47	.1									
174	1.2D + 1.5LM-7 + Maintenance (300-Wind)	...	Y		1	1.2	89	1.5	15	108	48	.1									
175	1.2D + 1.5LM-7 + Maintenance (315-Wind)	...	Y		1	1.2	89	1.5	16	108	49	.1									
176	1.2D + 1.5LM-7 + Maintenance (330-Wind)	...	Y		1	1.2	89	1.5	17	108	50	.1									
177	1.2D + 1.5LM-8 + Maintenance (0-Wind)	...	Y		1	1.2	90	1.5	2	108	35	.1									
178	1.2D + 1.5LM-8 + Maintenance (30-Wind)	...	Y		1	1.2	90	1.5	3	108	36	.1									
179	1.2D + 1.5LM-8 + Maintenance (45-Wind)	...	Y		1	1.2	90	1.5	4	108	37	.1									
180	1.2D + 1.5LM-8 + Maintenance (60-Wind)	...	Y		1	1.2	90	1.5	5	108	38	.1									
181	1.2D + 1.5LM-8 + Maintenance (90-Wind)	...	Y		1	1.2	90	1.5	6	108	39	.1									
182	1.2D + 1.5LM-8 + Maintenance (120-Wind)	...	Y		1	1.2	90	1.5	7	108	40	.1									
183	1.2D + 1.5LM-8 + Maintenance (135-Wind)	...	Y		1	1.2	90	1.5	8	108	41	.1									
184	1.2D + 1.5LM-8 + Maintenance (150-Wind)	...	Y		1	1.2	90	1.5	9	108	42	.1									
185	1.2D + 1.5LM-8 + Maintenance (180-Wind)	...	Y		1	1.2	90	1.5	10	108	43	.1									
186	1.2D + 1.5LM-8 + Maintenance (210-Wind)	...	Y		1	1.2	90	1.5	11	108	44	.1									
187	1.2D + 1.5LM-8 + Maintenance (225-Wind)	...	Y		1	1.2	90	1.5	12	108	45	.1									
188	1.2D + 1.5LM-8 + Maintenance (240-Wind)	...	Y		1	1.2	90	1.5	13	108	46	.1									
189	1.2D + 1.5LM-8 + Maintenance (270-Wind)	...	Y		1	1.2	90	1.5	14	108	47	.1									
190	1.2D + 1.5LM-8 + Maintenance (300-Wind)	...	Y		1	1.2	90	1.5	15	108	48	.1									
191	1.2D + 1.5LM-8 + Maintenance (315-Wind)	...	Y		1	1.2	90	1.5	16	108	49	.1									
192	1.2D + 1.5LM-8 + Maintenance (330-Wind)	...	Y		1	1.2	90	1.5	17	108	50	.1									
193	1.2D + 1.5LM-9 + Maintenance (0-Wind)	...	Y		1	1.2	91	1.5	2	108	35	.1									
194	1.2D + 1.5LM-9 + Maintenance (30-Wind)	...	Y		1	1.2	91	1.5	3	108	36	.1									
195	1.2D + 1.5LM-9 + Maintenance (45-Wind)	...	Y		1	1.2	91	1.5	4	108	37	.1									
196	1.2D + 1.5LM-9 + Maintenance (60-Wind)	...	Y		1	1.2	91	1.5	5	108	38	.1									
197	1.2D + 1.5LM-9 + Maintenance (90-Wind)	...	Y		1	1.2	91	1.5	6	108	39	.1									
198	1.2D + 1.5LM-9 + Maintenance (120-Wind)	...	Y		1	1.2	91	1.5	7	108	40	.1									
199	1.2D + 1.5LM-9 + Maintenance (135-Wind)	...	Y		1	1.2	91	1.5	8	108	41	.1									
200	1.2D + 1.5LM-9 + Maintenance (150-Wind)	...	Y		1	1.2	91	1.5	9	108	42	.1									
201	1.2D + 1.5LM-9 + Maintenance (180-Wind)	...	Y		1	1.2	91	1.5	10	108	43	.1									
202	1.2D + 1.5LM-9 + Maintenance (210-Wind)	...	Y		1	1.2	91	1.5	11	108	44	.1									
203	1.2D + 1.5LM-9 + Maintenance (225-Wind)	...	Y		1	1.2	91	1.5	12	108	45	.1									
204	1.2D + 1.5LM-9 + Maintenance (240-Wind)	...	Y		1	1.2	91	1.5	13	108	46	.1									
205	1.2D + 1.5LM-9 + Maintenance (270-Wind)	...	Y		1	1.2	91	1.5	14	108	47	.1									
206	1.2D + 1.5LM-9 + Maintenance (300-Wind)	...	Y		1	1.2	91	1.5	15	108	48	.1									
207	1.2D + 1.5LM-9 + Maintenance (315-Wind)	...	Y		1	1.2	91	1.5	16	108	49	.1									
208	1.2D + 1.5LM-9 + Maintenance (330-Wind)	...	Y		1	1.2	91	1.5	17	108	50	.1									
209	1.2D + 1.5LM-10 + Maintenance (0-Wind)	...	Y		1	1.2	92	1.5	2	108	35	.1									
210	1.2D + 1.5LM-10 + Maintenance (30-Wind)	...	Y		1	1.2	92	1.5	3	108	36	.1									



Company : Ramaker & Associates, Inc.  
 Designer : TJS  
 Job Number : 39053  
 Model Name : NM03XC065



June 26, 2018  
 12:35 PM  
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 Building and Inspections Department  
 Approved with Conditions  
 07/26/2018

**Load Combinations (Continued)**

	Description	PD	S	B	Fa	B	Fa	B	Fa	B	F	B	F	B	F	B	F	B	
211	1.2D + 1.5LM-10 + Maintenance (45-Wind)	...	Y		1	1.2	92	1.5	4	108	37	.1							
212	1.2D + 1.5LM-10 + Maintenance (60-Wind)	...	Y		1	1.2	92	1.5	5	108	38	.1							
213	1.2D + 1.5LM-10 + Maintenance (90-Wind)	...	Y		1	1.2	92	1.5	6	108	39	.1							
214	1.2D + 1.5LM-10 + Maintenance (120-Wind)	...	Y		1	1.2	92	1.5	7	108	40	.1							
215	1.2D + 1.5LM-10 + Maintenance (135-Wind)	...	Y		1	1.2	92	1.5	8	108	41	.1							
216	1.2D + 1.5LM-10 + Maintenance (150-Wind)	...	Y		1	1.2	92	1.5	9	108	42	.1							
217	1.2D + 1.5LM-10 + Maintenance (180-Wind)	...	Y		1	1.2	92	1.5	10	108	43	.1							
218	1.2D + 1.5LM-10 + Maintenance (210-Wind)	...	Y		1	1.2	92	1.5	11	108	44	.1							
219	1.2D + 1.5LM-10 + Maintenance (225-Wind)	...	Y		1	1.2	92	1.5	12	108	45	.1							
220	1.2D + 1.5LM-10 + Maintenance (240-Wind)	...	Y		1	1.2	92	1.5	13	108	46	.1							
221	1.2D + 1.5LM-10 + Maintenance (270-Wind)	...	Y		1	1.2	92	1.5	14	108	47	.1							
222	1.2D + 1.5LM-10 + Maintenance (300-Wind)	...	Y		1	1.2	92	1.5	15	108	48	.1							
223	1.2D + 1.5LM-10 + Maintenance (315-Wind)	...	Y		1	1.2	92	1.5	16	108	49	.1							
224	1.2D + 1.5LM-10 + Maintenance (330-Wind)	...	Y		1	1.2	92	1.5	17	108	50	.1							
225	1.2D + 1.5LM-11 + Maintenance (0-Wind)	...	Y		1	1.2	93	1.5	2	108	35	.1							
226	1.2D + 1.5LM-11 + Maintenance (30-Wind)	...	Y		1	1.2	93	1.5	3	108	36	.1							
227	1.2D + 1.5LM-11 + Maintenance (45-Wind)	...	Y		1	1.2	93	1.5	4	108	37	.1							
228	1.2D + 1.5LM-11 + Maintenance (60-Wind)	...	Y		1	1.2	93	1.5	5	108	38	.1							
229	1.2D + 1.5LM-11 + Maintenance (90-Wind)	...	Y		1	1.2	93	1.5	6	108	39	.1							
230	1.2D + 1.5LM-11 + Maintenance (120-Wind)	...	Y		1	1.2	93	1.5	7	108	40	.1							
231	1.2D + 1.5LM-11 + Maintenance (135-Wind)	...	Y		1	1.2	93	1.5	8	108	41	.1							
232	1.2D + 1.5LM-11 + Maintenance (150-Wind)	...	Y		1	1.2	93	1.5	9	108	42	.1							
233	1.2D + 1.5LM-11 + Maintenance (180-Wind)	...	Y		1	1.2	93	1.5	10	108	43	.1							
234	1.2D + 1.5LM-11 + Maintenance (210-Wind)	...	Y		1	1.2	93	1.5	11	108	44	.1							
235	1.2D + 1.5LM-11 + Maintenance (225-Wind)	...	Y		1	1.2	93	1.5	12	108	45	.1							
236	1.2D + 1.5LM-11 + Maintenance (240-Wind)	...	Y		1	1.2	93	1.5	13	108	46	.1							
237	1.2D + 1.5LM-11 + Maintenance (270-Wind)	...	Y		1	1.2	93	1.5	14	108	47	.1							
238	1.2D + 1.5LM-11 + Maintenance (300-Wind)	...	Y		1	1.2	93	1.5	15	108	48	.1							
239	1.2D + 1.5LM-11 + Maintenance (315-Wind)	...	Y		1	1.2	93	1.5	16	108	49	.1							
240	1.2D + 1.5LM-11 + Maintenance (330-Wind)	...	Y		1	1.2	93	1.5	17	108	50	.1							
241	1.2D + 1.5LM-12 + Maintenance (0-Wind)	...	Y		1	1.2	94	1.5	2	108	35	.1							
242	1.2D + 1.5LM-12 + Maintenance (30-Wind)	...	Y		1	1.2	94	1.5	3	108	36	.1							
243	1.2D + 1.5LM-12 + Maintenance (45-Wind)	...	Y		1	1.2	94	1.5	4	108	37	.1							
244	1.2D + 1.5LM-12 + Maintenance (60-Wind)	...	Y		1	1.2	94	1.5	5	108	38	.1							
245	1.2D + 1.5LM-12 + Maintenance (90-Wind)	...	Y		1	1.2	94	1.5	6	108	39	.1							
246	1.2D + 1.5LM-12 + Maintenance (120-Wind)	...	Y		1	1.2	94	1.5	7	108	40	.1							
247	1.2D + 1.5LM-12 + Maintenance (135-Wind)	...	Y		1	1.2	94	1.5	8	108	41	.1							
248	1.2D + 1.5LM-12 + Maintenance (150-Wind)	...	Y		1	1.2	94	1.5	9	108	42	.1							
249	1.2D + 1.5LM-12 + Maintenance (180-Wind)	...	Y		1	1.2	94	1.5	10	108	43	.1							
250	1.2D + 1.5LM-12 + Maintenance (210-Wind)	...	Y		1	1.2	94	1.5	11	108	44	.1							
251	1.2D + 1.5LM-12 + Maintenance (225-Wind)	...	Y		1	1.2	94	1.5	12	108	45	.1							
252	1.2D + 1.5LM-12 + Maintenance (240-Wind)	...	Y		1	1.2	94	1.5	13	108	46	.1							
253	1.2D + 1.5LM-12 + Maintenance (270-Wind)	...	Y		1	1.2	94	1.5	14	108	47	.1							
254	1.2D + 1.5LM-12 + Maintenance (300-Wind)	...	Y		1	1.2	94	1.5	15	108	48	.1							
255	1.2D + 1.5LM-12 + Maintenance (315-Wind)	...	Y		1	1.2	94	1.5	16	108	49	.1							
256	1.2D + 1.5LM-12 + Maintenance (330-Wind)	...	Y		1	1.2	94	1.5	17	108	50	.1							
257	1.2D + 1.5LM-13 + Maintenance (0-Wind)	...	Y		1	1.2	95	1.5	2	108	35	.1							
258	1.2D + 1.5LM-13 + Maintenance (30-Wind)	...	Y		1	1.2	95	1.5	3	108	36	.1							
259	1.2D + 1.5LM-13 + Maintenance (45-Wind)	...	Y		1	1.2	95	1.5	4	108	37	.1							
260	1.2D + 1.5LM-13 + Maintenance (60-Wind)	...	Y		1	1.2	95	1.5	5	108	38	.1							
261	1.2D + 1.5LM-13 + Maintenance (90-Wind)	...	Y		1	1.2	95	1.5	6	108	39	.1							
262	1.2D + 1.5LM-13 + Maintenance (120-Wind)	...	Y		1	1.2	95	1.5	7	108	40	.1							
263	1.2D + 1.5LM-13 + Maintenance (135-Wind)	...	Y		1	1.2	95	1.5	8	108	41	.1							
264	1.2D + 1.5LM-13 + Maintenance (150-Wind)	...	Y		1	1.2	95	1.5	9	108	42	.1							
265	1.2D + 1.5LM-13 + Maintenance (180-Wind)	...	Y		1	1.2	95	1.5	10	108	43	.1							
266	1.2D + 1.5LM-13 + Maintenance (210-Wind)	...	Y		1	1.2	95	1.5	11	108	44	.1							
267	1.2D + 1.5LM-13 + Maintenance (225-Wind)	...	Y		1	1.2	95	1.5	12	108	45	.1							



### Load Combinations (Continued)

	Description	PD	S	B	Fa	B	Fa	B	Fa	B	F	B	F	B	F	B	F	B	F	
268	1.2D + 1.5LM-13 + Maintenance (240-Wind)	...	Y		1	1.2	95	1.5	13	108	46	.1								
269	1.2D + 1.5LM-13 + Maintenance (270-Wind)	...	Y		1	1.2	95	1.5	14	108	47	.1								
270	1.2D + 1.5LM-13 + Maintenance (300-Wind)	...	Y		1	1.2	95	1.5	15	108	48	.1								
271	1.2D + 1.5LM-13 + Maintenance (315-Wind)	...	Y		1	1.2	95	1.5	16	108	49	.1								
272	1.2D + 1.5LM-13 + Maintenance (330-Wind)	...	Y		1	1.2	95	1.5	17	108	50	.1								
273	1.2D + 1.5LM-14 + Maintenance (0-Wind)	...	Y		1	1.2	96	1.5	2	108	35	.1								
274	1.2D + 1.5LM-14 + Maintenance (30-Wind)	...	Y		1	1.2	96	1.5	3	108	36	.1								
275	1.2D + 1.5LM-14 + Maintenance (45-Wind)	...	Y		1	1.2	96	1.5	4	108	37	.1								
276	1.2D + 1.5LM-14 + Maintenance (60-Wind)	...	Y		1	1.2	96	1.5	5	108	38	.1								
277	1.2D + 1.5LM-14 + Maintenance (90-Wind)	...	Y		1	1.2	96	1.5	6	108	39	.1								
278	1.2D + 1.5LM-14 + Maintenance (120-Wind)	...	Y		1	1.2	96	1.5	7	108	40	.1								
279	1.2D + 1.5LM-14 + Maintenance (135-Wind)	...	Y		1	1.2	96	1.5	8	108	41	.1								
280	1.2D + 1.5LM-14 + Maintenance (150-Wind)	...	Y		1	1.2	96	1.5	9	108	42	.1								
281	1.2D + 1.5LM-14 + Maintenance (180-Wind)	...	Y		1	1.2	96	1.5	10	108	43	.1								
282	1.2D + 1.5LM-14 + Maintenance (210-Wind)	...	Y		1	1.2	96	1.5	11	108	44	.1								
283	1.2D + 1.5LM-14 + Maintenance (225-Wind)	...	Y		1	1.2	96	1.5	12	108	45	.1								
284	1.2D + 1.5LM-14 + Maintenance (240-Wind)	...	Y		1	1.2	96	1.5	13	108	46	.1								
285	1.2D + 1.5LM-14 + Maintenance (270-Wind)	...	Y		1	1.2	96	1.5	14	108	47	.1								
286	1.2D + 1.5LM-14 + Maintenance (300-Wind)	...	Y		1	1.2	96	1.5	15	108	48	.1								
287	1.2D + 1.5LM-14 + Maintenance (315-Wind)	...	Y		1	1.2	96	1.5	16	108	49	.1								
288	1.2D + 1.5LM-14 + Maintenance (330-Wind)	...	Y		1	1.2	96	1.5	17	108	50	.1								
289	1.2D + 1.5LM-15 + Maintenance (0-Wind)	...	Y		1	1.2	97	1.5	2	108	35	.1								
290	1.2D + 1.5LM-15 + Maintenance (30-Wind)	...	Y		1	1.2	97	1.5	3	108	36	.1								
291	1.2D + 1.5LM-15 + Maintenance (45-Wind)	...	Y		1	1.2	97	1.5	4	108	37	.1								
292	1.2D + 1.5LM-15 + Maintenance (60-Wind)	...	Y		1	1.2	97	1.5	5	108	38	.1								
293	1.2D + 1.5LM-15 + Maintenance (90-Wind)	...	Y		1	1.2	97	1.5	6	108	39	.1								
294	1.2D + 1.5LM-15 + Maintenance (120-Wind)	...	Y		1	1.2	97	1.5	7	108	40	.1								
295	1.2D + 1.5LM-15 + Maintenance (135-Wind)	...	Y		1	1.2	97	1.5	8	108	41	.1								
296	1.2D + 1.5LM-15 + Maintenance (150-Wind)	...	Y		1	1.2	97	1.5	9	108	42	.1								
297	1.2D + 1.5LM-15 + Maintenance (180-Wind)	...	Y		1	1.2	97	1.5	10	108	43	.1								
298	1.2D + 1.5LM-15 + Maintenance (210-Wind)	...	Y		1	1.2	97	1.5	11	108	44	.1								
299	1.2D + 1.5LM-15 + Maintenance (225-Wind)	...	Y		1	1.2	97	1.5	12	108	45	.1								
300	1.2D + 1.5LM-15 + Maintenance (240-Wind)	...	Y		1	1.2	97	1.5	13	108	46	.1								
301	1.2D + 1.5LM-15 + Maintenance (270-Wind)	...	Y		1	1.2	97	1.5	14	108	47	.1								
302	1.2D + 1.5LM-15 + Maintenance (300-Wind)	...	Y		1	1.2	97	1.5	15	108	48	.1								
303	1.2D + 1.5LM-15 + Maintenance (315-Wind)	...	Y		1	1.2	97	1.5	16	108	49	.1								
304	1.2D + 1.5LM-15 + Maintenance (330-Wind)	...	Y		1	1.2	97	1.5	17	108	50	.1								

### Envelope Joint Reactions

Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC	
1	N9	max	177.253	14	254.506	46	205.976	2	0	1	0	1	0	1
2		min	-177.253	6	-88.39	6	-205.974	10	0	1	0	1	0	1
3	N10	max	160.507	14	276.451	46	261.496	2	0	1	0	1	0	1
4		min	-160.507	6	-66.229	6	-261.492	10	0	1	0	1	0	1
5	N11	max	54.485	30	228.829	38	71.377	18	0	1	0	1	0	1
6		min	-54.485	22	-18.776	14	-71.378	26	0	1	0	1	0	1
7	N12	max	60.223	30	254.002	38	76.829	18	0	1	0	1	0	1
8		min	-60.223	22	-11.535	14	-76.832	26	0	1	0	1	0	1
9	N13	max	177.253	14	254.506	38	205.976	2	0	1	0	1	0	1
10		min	-177.253	6	-88.39	14	-205.974	10	0	1	0	1	0	1
11	N14	max	160.507	14	276.451	38	261.496	2	0	1	0	1	0	1
12		min	-160.507	6	-66.229	14	-261.492	10	0	1	0	1	0	1
13	N15	max	54.485	30	228.829	46	71.377	18	0	1	0	1	0	1
14		min	-54.485	22	-18.776	6	-71.378	26	0	1	0	1	0	1
15	N16	max	60.223	30	254.002	46	76.829	18	0	1	0	1	0	1



Company : Ramaker & Associates, Inc.  
 Designer : TJS  
 Job Number : 39053  
 Model Name : NM03XC065

June 26, 2018  
 12:35 PM  
 Checked By  
 Reviewed for Code Compliance  
 Building and Inspections Department  
 Approved with Conditions  
 07/26/2018

**Envelope Joint Reactions (Continued)**

Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
16	min	-60.223	22	-11.535	6	-76.832	26	0	1	0	1	0	1
17	Totals: max	904.691	14	1767.12	34	1230.776	18						
18	min	-904.691	6	445.663	10	-1230.776	10						

**Envelope AISC 14th(360-10): LRFD Steel Code Checks**

Member	Shape	Code Check	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pnc [L]	phi*Pnt [lb]	phi*Mn y-...	phi*Mn z-...	Cb	Eqn	
1	MP1	PIPE 2.0	.261	3.958	18	.022	4.063	2	9836.597	32130	1871.625	1871.625	1	H1-1b	
2	MP2	PIPE 2.0	.329	3.958	18	.027	3.958	2	9836.597	32130	1871.625	1871.625	1	H1-1b	
3	M3	L3x3x4	.093	.67	45	.016	1.34	z	38	44836.668	46656	1688.138	3755.745	1...	H2-1
4	M4	L3x3x4	.113	.67	27	.017	0	z	38	44836.668	46656	1688.138	3755.745	1...	H2-1
5	M5	L3x3x4	.104	.67	45	.017	0	z	46	44836.668	46656	1688.138	3755.745	1...	H2-1
6	M6	L3x3x4	.133	.67	27	.019	0	z	38	44836.668	46656	1688.138	3755.745	1...	H2-1





**Wind Load on Antennas TIA-222-G**

$$q_z = 0.00256 K_z K_{zt} K_d V^2 I$$

$$F = q_z G_h C_a A_a$$

Occupancy :	II	Classification of Structures (Table 2-1)
Exposure :	C	Exposure Category
V :	91 mph	Basic Wind Speed (Annex B)
z :	64.5 ft	Height above ground level to the center of the antenna
I :	1.00	Importance Factor (Table 2-3)
K <sub>z</sub> :	1.15	Velocity Pressure Coefficient (2.6.5.2)
K <sub>zt</sub> :	1.00	Topographic Factor (2.6.6.4)
K <sub>d</sub> :	0.95	Wind Direction Probability Factor (Table 2-2)
q <sub>z</sub> :	23.4 psf	Velocity Pressure at Height z
G <sub>h</sub> :	1.00	Strength Design of Appurtenances and their Connections

**Mount & Antenna Wind Loads**

Appurtenance	Height	Width	h/D	Shape	C <sub>a</sub>	A <sub>a</sub>	Force	Force
	<i>in</i>	<i>in</i>				<i>sq ft</i>	<i>lb</i>	<i>plf</i>
APXVSP18-C-A20	72.0	11.8	6.1	Flat	1.360	5.90	188.1	
APXVTSM18-C-I20	72.0	14.6	4.9	Flat	1.308	7.30	223.9	
1900MHz 4x45W RRH	25.1	11.1	2.3	Flat	1.200	1.93	54.4	
800MHz 2x50W RRH	19.0	13.0	1.5	Flat	1.200	1.72	48.3	
TD-RRH8x20	26.1	18.6	1.4	Flat	1.200	3.37	94.9	
Pipe2STD x 10 ft	120.0	2.4	50.5	Round	1.200	1.98	55.7	5.6



**Wind Load on Antennas TIA-222-G**

$$q_z = 0.00256 K_z K_{zt} K_d V^2 I$$

$$F = q_z G_h C_a A_a$$

Occupancy :	II	Classification of Structures (Table 2-1)
Exposure :	C	Exposure Category
V :	91 mph	Basic Wind Speed (Annex B)
z :	64.5 ft	Height above ground level to the center of the antenna
I :	1.00	Importance Factor (Table 2-3)
K <sub>z</sub> :	1.15	Velocity Pressure Coefficient (2.6.5.2)
K <sub>zt</sub> :	1.00	Topographic Factor (2.6.6.4)
K <sub>d</sub> :	0.95	Wind Direction Probability Factor (Table 2-2)
q <sub>z</sub> :	23.4 psf	Velocity Pressure at Height z
G <sub>h</sub> :	1.00	Strength Design of Appurtenances and their Connections

**Mount & Antenna Wind Loads**

Appurtenance	Height <i>in</i>	Depth <i>in</i>	h/D	Shape	C <sub>a</sub>	A <sub>a</sub> <i>sq ft</i>	Force <i>lb</i>	Force <i>plf</i>
APXVSPP18-C-A20	72.0	7.9	9.1	Flat	1.470	3.95	136.2	
APXVTSM18-C-I20	72.0	8.1	8.9	Flat	1.463	4.05	138.9	
1900MHz 4x45W RRH	25.1	10.7	2.3	Flat	1.200	1.86	52.4	
800MHz 2x50W RRH	19.0	12.2	1.6	Flat	1.200	1.61	45.3	
TD-RRH8x20	26.1	6.7	3.9	Flat	1.262	1.21	35.9	
Pipe2STD x 10 ft	120.0	2.4	50.5	Round	1.200	1.98	55.7	5.6



**Ice Wind Load on Antennas TIA-222-G**

$$q_z = 0.00256 K_z K_{zt} K_d V^2 I$$

$$F = q_z G_h C_a A_a$$

Occupancy :	II	Classification of Structures (Table 2-1)
Exposure :	C	Exposure Category
$V_i$ :	50 mph	Basic Wind Speed (Annex B)
$z$ :	64.5 ft	Height above ground level to the center of the antenna
$I$ :	1.00	Importance Factor (Table 2-3)
$K_z$ :	1.15	Velocity Pressure Coefficient (2.6.5.2)
$K_{zt}$ :	1.00	Topographic Factor (2.6.6.4)
$K_d$ :	0.95	Wind Direction Probability Factor (Table 2-2)
$q_z$ :	7.02 psf	Velocity Pressure at Height $z$
$G_h$ :	1.00	Strength Design of Appurtenances and their Connections
$t_{iz}$ :	2.14 in	Design Thickness of Radial Ice at Height $z$ (2.6.8)

**Mount & Antenna Ice Wind Loads**

Appurtenance	Height <i>in</i>	Width <i>in</i>	h/D	Shape	$C_a$	$A_a$ <i>sq ft</i>	Force <i>lb</i>	Force <i>plf</i>
APXVSP18-C-A20	76.3	16.1	4.7	Flat	1.300	8.52	77.7	
APXVTSM18-C-I20	76.3	18.9	4.0	Flat	1.268	10.00	89.0	
1900MHz 4x45W RRH	29.4	15.4	1.9	Flat	1.200	3.14	26.4	
800MHz 2x50W RRH	23.3	17.3	1.3	Flat	1.200	2.79	23.5	
TD-RRH8x20	30.4	22.9	1.3	Flat	1.200	4.83	40.6	
Pipe2STD x 10 ft	124.3	6.7	18.7	Round	1.060	5.74	42.7	4.1



**Ice Wind Load on Antennas TIA-222-G**

$$q_z = 0.00256 K_z K_{zt} K_d V^2 I$$

$$F = q_z G_h C_a A_a$$

Occupancy :	II	Classification of Structures (Table 2-1)
Exposure :	C	Exposure Category
V <sub>i</sub> :	50 mph	Basic Wind Speed (Annex B)
z :	64.5 ft	Height above ground level to the center of the antenna
I :	1.00	Importance Factor (Table 2-3)
K <sub>z</sub> :	1.15	Velocity Pressure Coefficient (2.6.5.2)
K <sub>zt</sub> :	1.00	Topographic Factor (2.6.6.4)
K <sub>d</sub> :	0.95	Wind Direction Probability Factor (Table 2-2)
q <sub>z</sub> :	7.02 psf	Velocity Pressure at Height z
G <sub>h</sub> :	1.00	Strength Design of Appurtenances and their Connections
t <sub>iz</sub> :	2.14 in	Design Thickness of Radial Ice at Height z (2.6.8)

**Mount & Antenna Ice Wind Loads**

Appurtenance	Height <i>in</i>	Depth <i>in</i>	h/D	Shape	C <sub>a</sub>	A <sub>a</sub> <i>sq ft</i>	Force <i>lb</i>	Force <i>plf</i>
APXVSP18-C-A20	76.3	12.2	6.3	Flat	1.367	6.45	61.9	
APXVTSM18-C-I20	76.3	12.4	6.2	Flat	1.363	6.56	62.7	
1900MHz 4x45W RRH	29.4	15.0	2.0	Flat	1.200	3.05	25.7	
800MHz 2x50W RRH	23.3	16.5	1.4	Flat	1.200	2.66	22.4	
TD-RRH8x20	30.4	11.0	2.8	Flat	1.212	2.32	19.7	
Pipe2STD x 10 ft	124.3	6.7	18.7	Round	1.060	5.74	42.7	4.1



**Ice Load on Antennas TIA-222-G**

Ice Weight :	56	pcf	Ice Density
t <sub>i</sub> :	1.00		Design Ice Thickness
Occupancy :	II		Classification of Structures (Table 2-1)
Exposure :	C		Exposure Category
V <sub>i</sub> :	50	mph	Basic Wind Speed (Annex B)
z :	64.5	ft	Height above ground level to the center of the antenna
I :	1.00		Importance Factor (Table 2-3)
K <sub>iz</sub> :	1.07		Height Escalation Factor for Ice Thickness
K <sub>zt</sub> :	1.00		Topographic Factor (2.6.6.4)
t <sub>iz</sub> :	2.14	in	Design Thickness of Radial Ice at Height z (2.6.8)

Platform Grating : None  
 Ice Load : psf

**Mount & Antenna Ice Wind Loads**

Appurtenance	Height	Width	Depth	Diam.	Area	Perim.	Ice Weight	
	<i>in</i>	<i>in</i>	<i>in</i>	<i>in</i>	<i>sq in</i>	<i>in</i>	<i>lb</i>	<i>plf</i>
APXVSP18-C-A20	76.3	16.1	12.2	14.20	109.78	47.95	256.1	
APXVTSM18-C-I20	76.3	18.9	12.4	16.70	126.55	53.95	295.3	
1900MHz 4x45W RRH	29.4	15.4	15.0	15.41	117.91	52.13	95.9	
800MHz 2x50W RRH	23.3	17.3	16.5	17.83	134.15	58.95	82.6	
TD-RRH8x20	30.4	22.9	11.0	19.77	147.20	59.15	124.5	
Pipe2STD x 10 ft	124.3	6.7	6.7	2.38	30.33	14.18	117.9	11.8