STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
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E-Mail: siting.council@ct.gov
Web Site: portal.ct.gov/csc

VIA ELECTRONIC MAIL

June 3, 2021

Richard Zajac
Site Acquisition Specialist
4545 East River Road, Suite 320
West Henrietta, NY
richard.zajac@crowncastle.com

RE: **EM-T-MOBILE-042-210507** - T-Mobile notice of intent to modify an existing telecommunications facility located at 94 East High Street, East Hampton, Connecticut.

Dear Mr. Zajac:

The Connecticut Siting Council (Council) is in receipt of your correspondence of May 27, 2021 submitted in response to the Council's May 27, 2021 notification of an incomplete request for exempt modification with regard to the above-referenced matter.

The submission renders the request for exempt modification complete and the Council will process the request in accordance with the Federal Communications Commission 60-day timeframe.

Thank you for your attention and cooperation.

Sincerely,

s/Melanie A. Bachman

Melanie A. Bachman
Executive Director

MAB/IN/emr

From: Zajac, Richard <Richard.Zajac@crowncastle.com>
Sent: Thursday, May 27, 2021 9:28 PM
To: Robidoux, Evan <Evan.Robidoux@ct.gov>
Cc: CSC-DL Siting Council <Siting.Council@ct.gov>
Subject: RE: Council Incomplete Letter for EM-T-MOBILE-042-210507 (94 East High Street, East Hampton)

Good evening,

Pursuant to the Council Incomplete Letter for EM-T-MOBILE-042-210507, please see the attached revised Mount Analysis. Should you have any questions/concern or require additional documentation in order to resume the review process, please let me know.

Thank you,

RICH ZAJAC
Site Acquisition Specialist
T: (585) 445-5896 M: (607) 346-7212
F: (724) 416-4461
CROWN CASTLE
4545 East River Road, Suite 320
West Henrietta, NY 14586

Date: **February 2, 2021**

GPD Engineering and Architecture
Professional Corporation
520 South Main Street, Suite 2531
Akron, Ohio 44311
(216) 927-8663
CrownMA@gpdgroup.com

Darcy Tarr
Crown Castle
6325 Ardrey Kell Road, Suite 600
Charlotte, NC 28277
(704) 405-6589

Subject:	**Mount Analysis Report**	
Carrier Designation:	***Sprint PCS* Loading Modification**	
	Carrier Site Number:	CTHA701A
	Carrier Site Name:	CTHA701A
Crown Castle Designation:	**Crown Castle BU Number:**	876352
	Crown Castle Site Name:	RICHARD WALL
	Crown Castle JDE Job Number:	628843
	Crown Castle Order Number:	538770 Rev. 0
Engineering Firm Designation:	**GPD Report Designation:**	2021777.876352.01
Site Data:	**94 East Hight Street, East Hampton, Middlesex County, CT 06424** **Latitude 41° 35' 14.20" Longitude -72° 29' 19.60"**	
Structure Information:	**Tower Height & Type:**	**117.5 ft Monopole Tower**
	Mount Elevation:	**118.0 ft**
	Mount Type:	**10.67 ft Platform Mount**

Dear Darcy Tarr,

GPD is pleased to submit this **"Mount Analysis Report"** to determine the structural integrity of Sprint PCS's antenna mounting system with the proposed appurtenance and equipment addition on the above mentioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

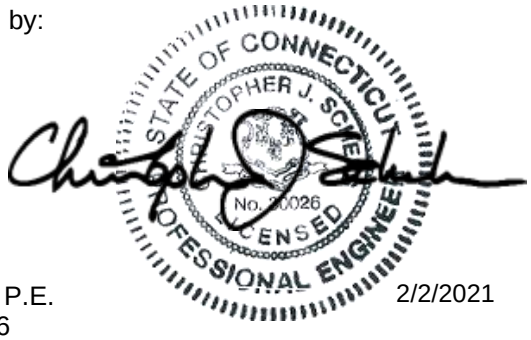
Platform Mount **Sufficient***

***The mount has sufficient capacity once the loading changes, as described in Section 4.1 Recommendations of this report, are completed.**

This analysis utilizes an ultimate 3-second gust wind speed of 130 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: Audra Hoffmeister

Respectfully Submitted by:



Christopher J. Scheks, P.E. 2/2/2021
Connecticut #: 0030026

TABLE OF CONTENTS

1) INTRODUCTION

This is a 10.67 ft. Platform Mount. Mount geometry was obtained from site photos and experience with similar mounts.

A proposed support rail (Site Pro 1 Part #: HRK12-3HD, see Appendix E) has been assumed for the purpose of this analysis. In order for the analysis results to be valid, the support rail shall be installed at 36" above the toe rail.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	130 mph
Exposure Category:	C
Topographic Factor at Base:	1
Topographic Factor at Mount:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Live Loading Wind Speed:	30 mph
Man Live Load at Mid/End-Points:	250 lb
Man Live Load at Mount Pipes:	500 lb

Table 1a - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount Details
118.0	119.0	3	Ericsson	AIR6449 B41_T-MOBILE	10.67 ft. Platform Mount
		3	RFS/Celwave	APX16DWV-16DWV-S-E-A20	
		3	RFS/Celwave	APXVAALL24_43-U-NA20_TMO	
		3	Ericsson	RADIO 4415 B66A_CCIV3	
		3	Ericsson	RADIO 4424 B25_TMO	
		3	Ericsson	RADIO 4449 B71 B85A_T-MOBILE	

Table 1b - Other Considered Equipment

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount Details
118.0	130.0	1	Decibel	DB420-A	10.67 ft. Platform Mount
		1	Decibel	DB264-A	
	126.0	1	Decibel	ASP-2011	
	119.0	1	Gabriel Electronics	GHF3W-23	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
CCI Application	Crown Order Number 538770 Rev. 0	-	CCI
RF Data Sheet	Sprint Retain RFDS Site ID: CTHA701A, dated 1/15/2021	-	CCI
Support Rail Design	Site Pro 1 Drawing #: HRK12-3HD, dated 4/7/2015	-	Site Pro 1

3.1) Analysis Method

RISA-3D Edition (Version 17.0.2), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

A tool internally developed by GPD, using Microsoft Excel, was used to calculate wind loading on all appurtenances, dishes, and mount members for various load cases. Selected output from the analysis is included in Appendix B.

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 *Tower Mount Analysis* (Revision C).

3.2) Assumptions

1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and the referenced drawings.
3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
4) This analysis assumes all information reference in Table 2 is current and correct.
5) The mount was modeled from site photos. Member information and dimensions not provided have been assumed based on previous experience with similar mounts. No guarantee can be made as to the accuracy of these assumptions without a complete mount mapping.
6) Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325

This analysis may be affected if any assumptions are not valid or have been made in error. GPD should be notified to determine the effect on the structural integrity of the antenna mounting system.

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Platform Mount)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1,3	Toe Rail	M6	118.0	79.0	Pass
	Platform Inner Bracing	M7		77.3	Pass
	Pipe Mount	B2		81.0	Pass
	Ladder Support Bracing	M25		41.2	Pass
	Support Rail	M36		84.1	Pass
	Support Rail Corner Connection	M40		19.4	Pass
	Support Rail Inner Brace	M58		9.3	Pass
2,3	Mount to Tower Connection	-		75.2	Pass

Structure Rating (max from all components) =	**84.1%[3]**

Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
2) See additional documentation in "Appendix D - Additional Calculations" for calculations supporting the % capacity consumed.
3) Ratings per TIA-222-H section 15.5.

4.1) Recommendations

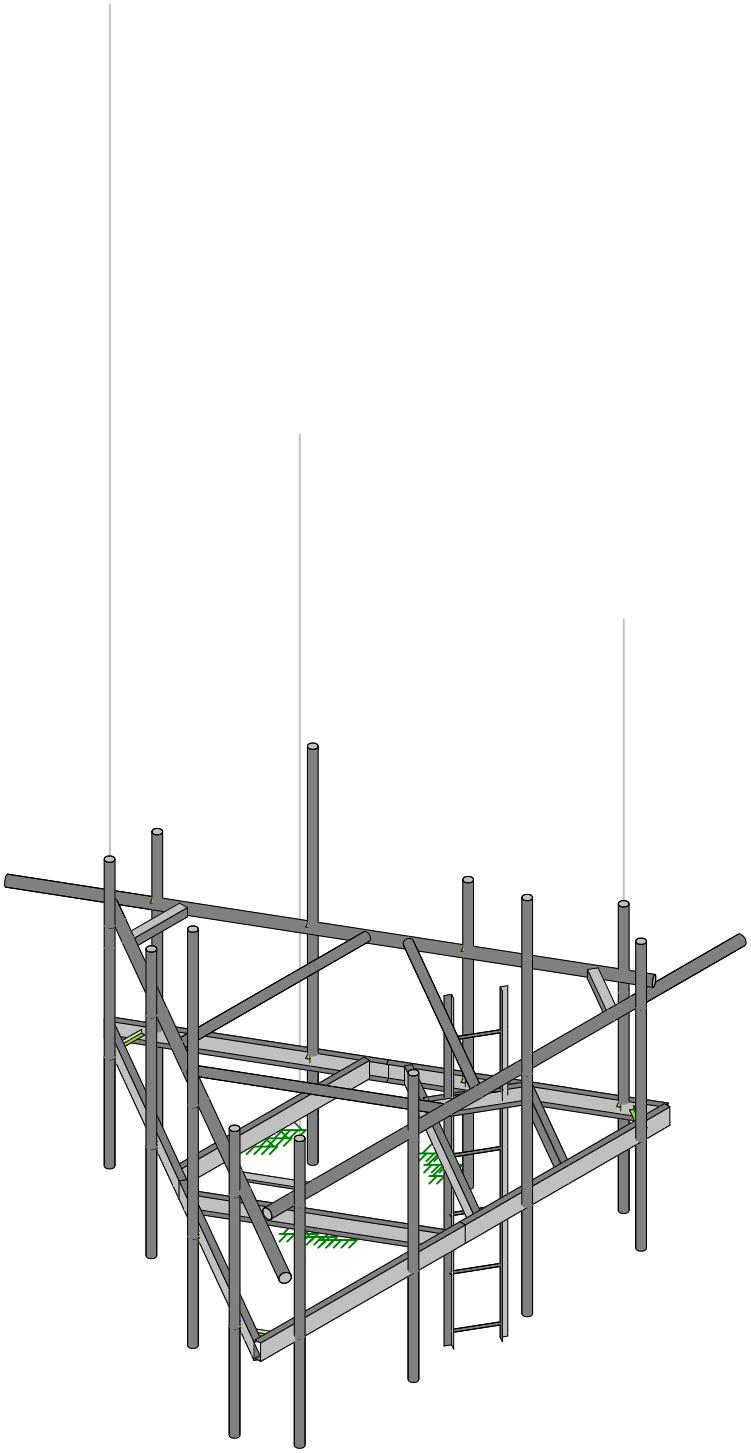
The mount has sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, the loading modification listed below must be completed.

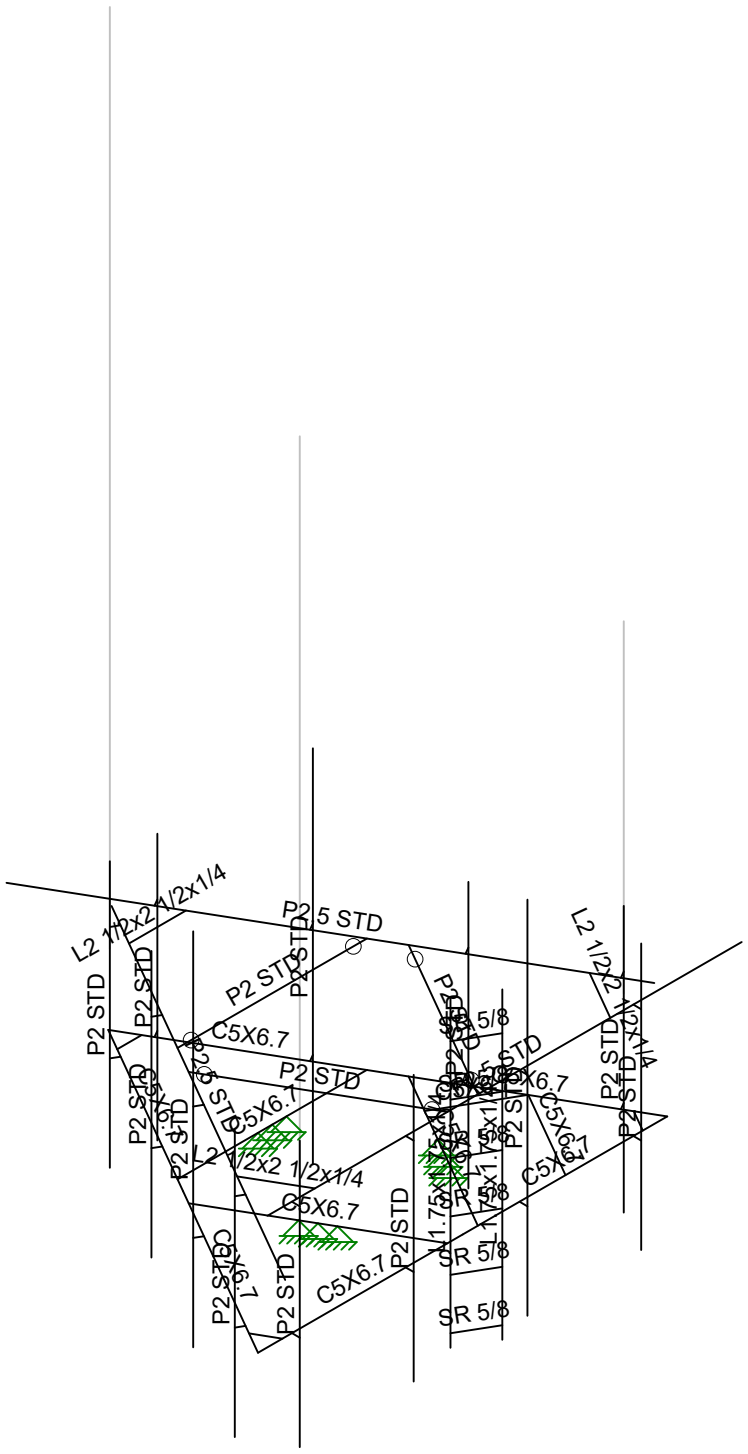
1. Installation of a proposed support rail (Site Pro 1 Part #: HRK12-3HD, dated 4/7/2015) 36" above the toe rail. See Appendix E.

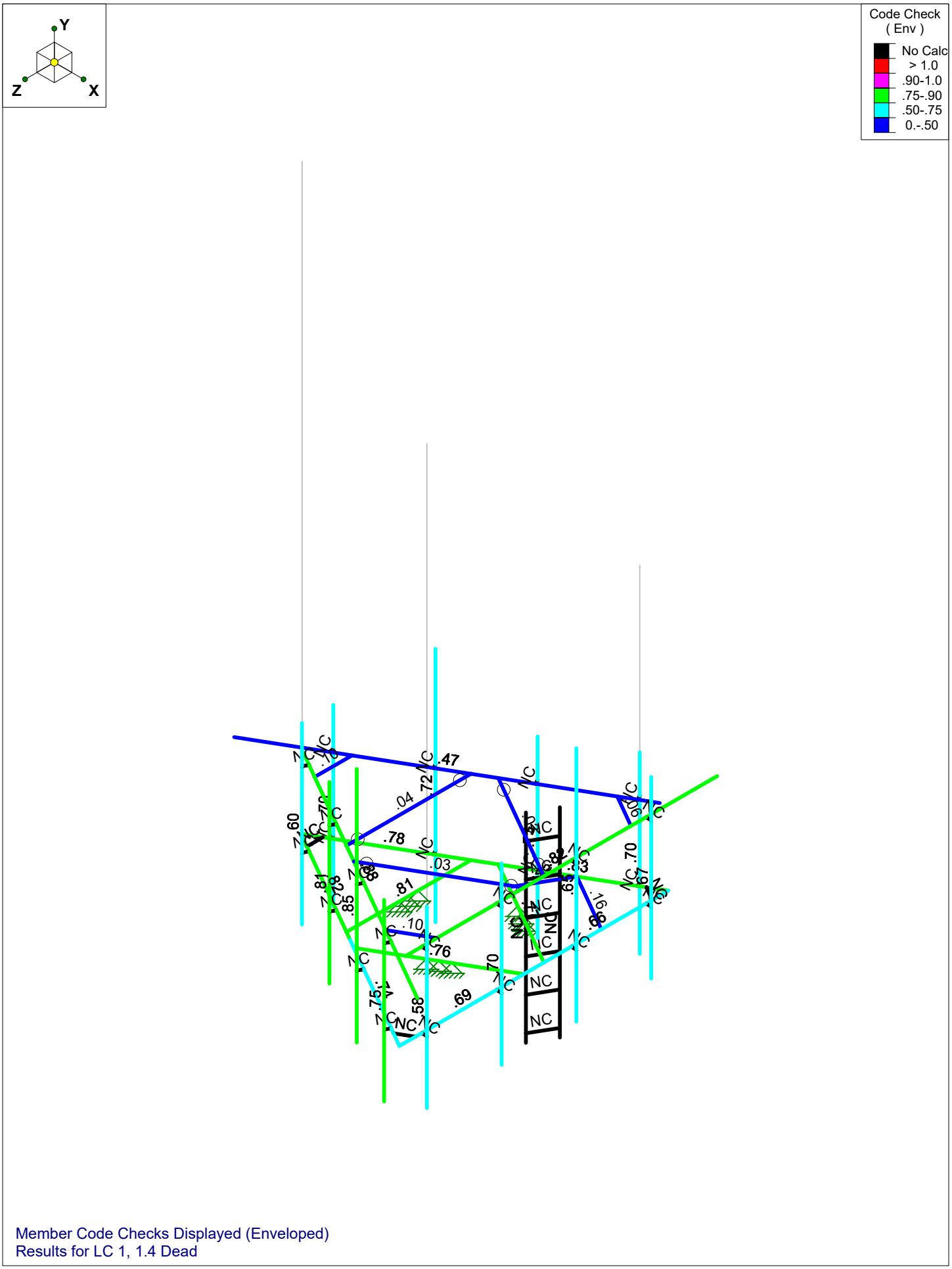
No structural modifications are required at this time, provided that the above-listed changes are implemented.

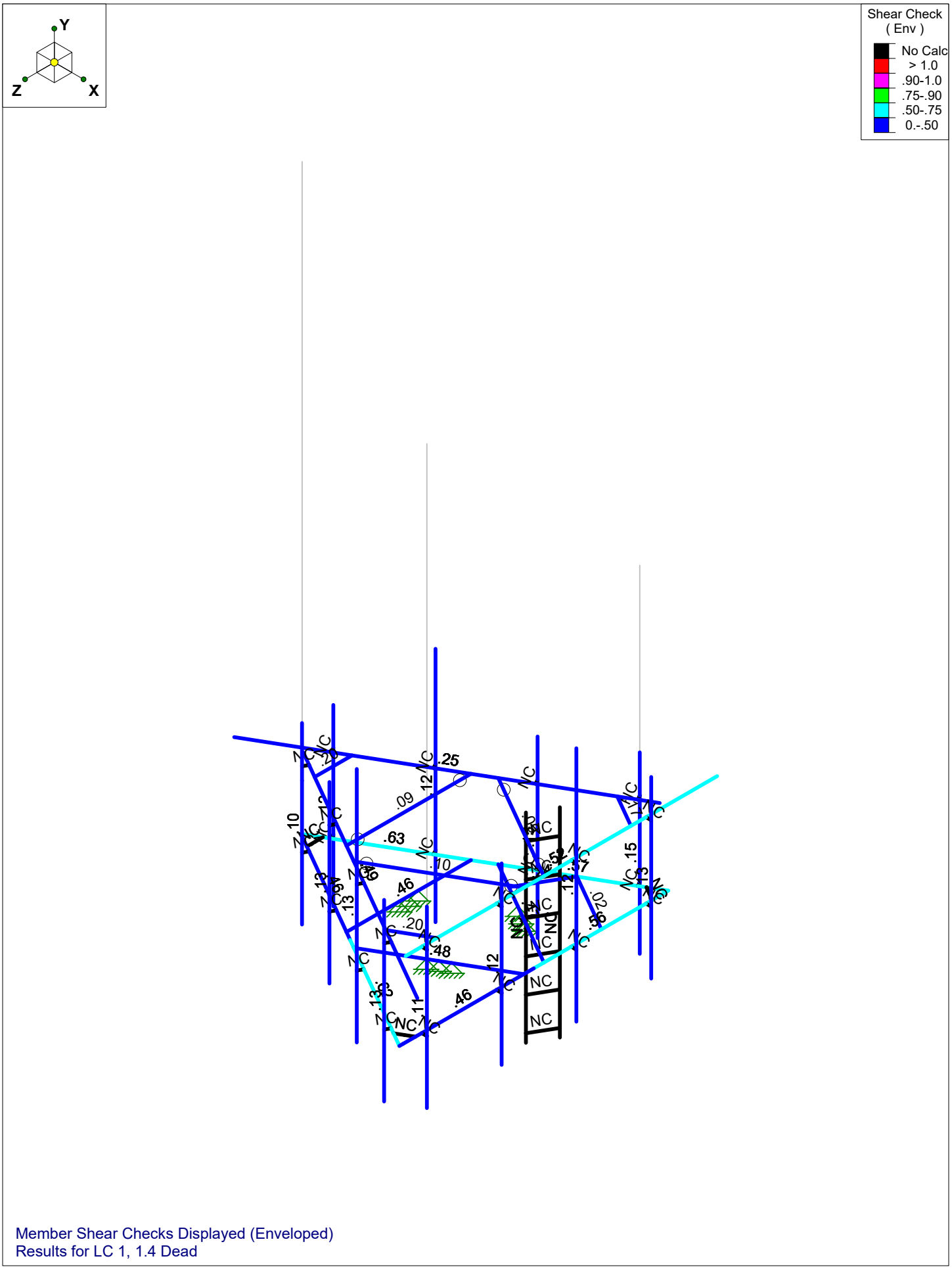
APPENDIX A

WIRE FRAME AND RENDERED MODELS

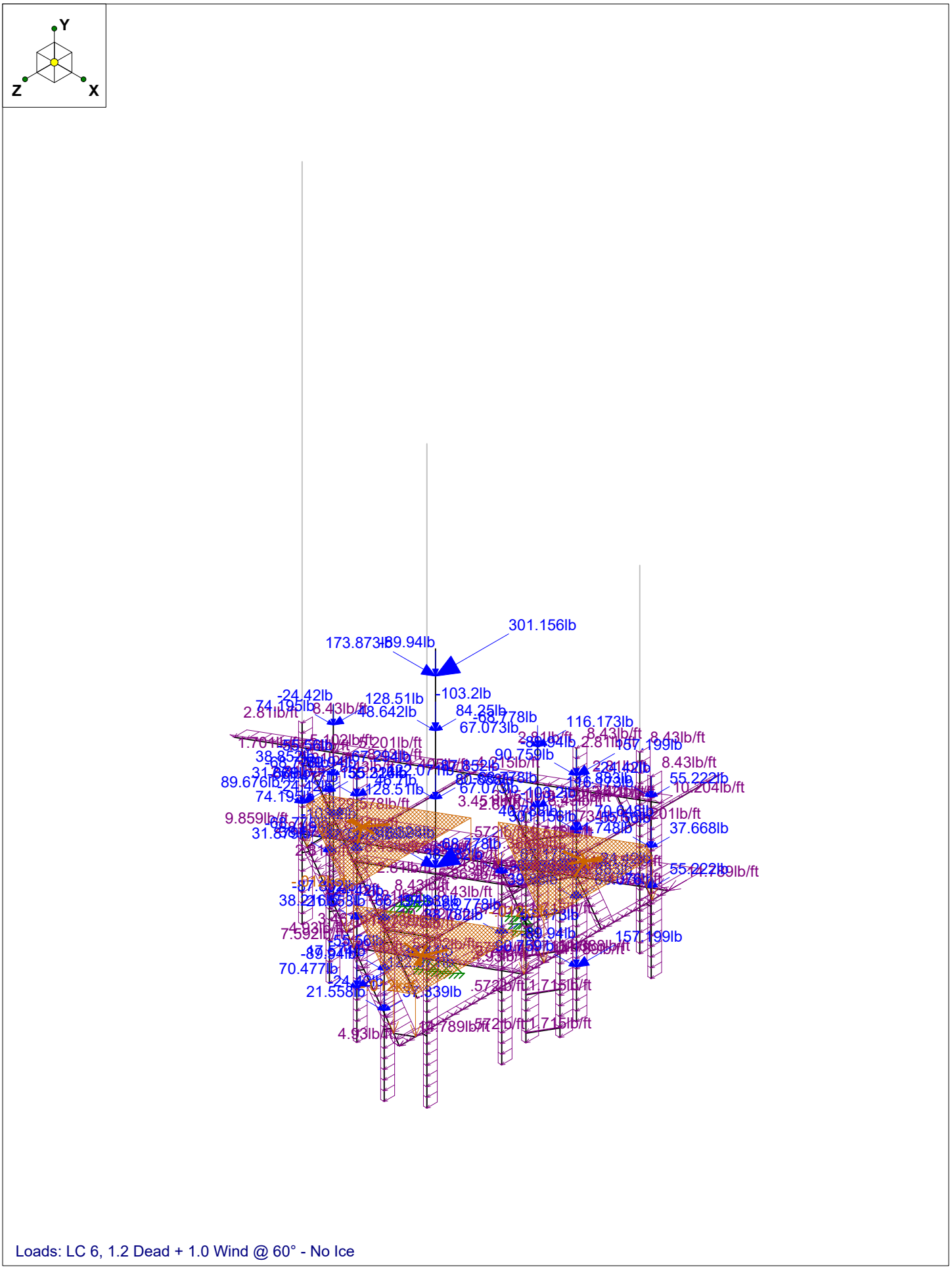

Y
Z
X


Y
Z
X
L2 1 1/2x2 1/2x1/4
P2.5 STD
P2 STD
P4 STD
C5X6.7
L2 1 1/2x2 1/2x1/4
SR 5/8
SR 1.75x1.75x1/8


Y
Z
X
Code Check
(Env)
No Calc
> 1.0
.90-1.0
.75-.90
.50-.75
0.-.50
Member Code Checks Displayed (Enveloped)
Results for LC 1, 1.4 Dead



Member Shear Checks Displayed (Enveloped)
Results for LC 1, 1.4 Dead



Loads: LC 6, 1.2 Dead + 1.0 Wind @ 60° - No Ice

APPENDIX B

SOFTWARE INPUT CALCULATIONS

TIA-222-H: Mount Analysis Wind Loading
876352 - RICHARD WALL
2021777.876352.01

Structure Information		
Structure Type:	Monopole	
Structure Height:	117.5	ft
z (Mount Centerline) =	118	ft
Gh (Mount Gust Effect Factor) =	1.00	
Risk Category:	II	

Code Specifications		
TIA/EIA Code:	H	
Ultimate Wind Speed (No Ice) =	130	mph (3-s gust)
Ultimate Wind Speed (With Ice) =	50	mph (3-s gust)
Ice Thickness	1.5	in
Exposure Category	C	
Tower Base Elevation (AMSL)	664	ft

Topographic Inputs	
Topographic Feature:	N/A

Section Sets										No Ice	Ice Output	
Mount Components	Member Type	Length (in)	Side (Longest seeing wind) (in)	Other Side (in)	Calculated Dc, for ice weight (in)	Dc, for ice weight (in)	Area Type (Round or Flat)	K_a	User's Wind Multiplier	Normal Wind Force (lb/ft)*	Normal Ice Wind Force (lb/ft)*	Ice Weight (lb/ft)*
Toe Rail	Square/Rect.	128.000	5	1.75		5.30	Flat	0.90	1.00	43.82	7.60	14.57
Platform Inner Bracing	Square/Rect.	56.000	5	1.75		5.30	Flat	0.90	1.00	33.74	6.24	14.57
Pipe Mount	Pipe	114.000	2.375	2.375		2.38	Round	0.90	1.00	12.49	4.06	8.49
Ladder Support Bracing	Square/Rect.	32.000	5	1.75		5.30	Flat	0.90	1.00	30.09	5.69	14.57
Ladder Rail	Angle	102.000	1.75	1.75		2.47	Flat	0.90	1.00	15.34	4.47	8.70
Ladder Rung	Pipe	12.000	0.625	0.625		0.63	Round	0.90	1.00	2.93	1.86	4.85
Support Rail	Pipe	150.000	2.875	2.875		2.88	Round	0.90	1.00	15.12	4.79	9.53
Support Rail Corner Connection	Angle	18.000	2.5	2.5		3.54	Flat	0.90	1.00	15.41	3.56	10.91
Support Rail Inner Brace	Pipe	72.000	2.375	2.375		2.38	Round	0.90	1.00	12.49	3.45	8.49

*All forces are unfactored.

Appurtenances							Shielding			No Ice		Ice Output	
Appurtenance Model	Loading Elevation (ft)	Height (in)	Front Width (in)	Side Depth (in)	Wt (lbs)	Type for Area	Front Shielding (%)	Side Shielding (%)	K_a and/or block shielding	Normal Wind Force (lbs)*	Wt (lbs) (no ice)*	Normal Wind Force (lbs) (w/ ice)*	Wt (lbs) (only ice)*
(1) DB420-A	130	216.96	3	3	34	Round	0%	0%	0.90	261.98	34.00	84.52	233.03
(1) DB264-A	130	258	2	3.18	36	Round	0%	0%	0.90	207.69	36.00	84.69	252.03
(1) ASP-2011	126	102	1.25	1.25	4	Round	0%	0%	0.90	50.98	4.00	27.85	69.67
(1) GHF3W-23	119	36	36	15.9	55	Grid Dish	0%	0%	0.90	179.35	55.00	98.87	130.75
(3) AIR6449 B41_T-MOBILE	119	33.11	20.51	8.54	114.63	Flat	0%	0%	0.90	268.29	114.63	46.32	150.39
(3) APX16DWV-16DWV-S-E-A20	119	55.9	13.3	3.15	40.7	CFD	0%	0%	0.90	296.78	40.70	58.54	136.91
(3) APXVAALL24_43-U-NA20_TMO	119	95.9	24	8.5	149.9	CFD	0%	0%	0.90	695.49	149.90	121.58	420.09
(3) RADIO 4415 B66A_CCIV3	119	14.9	13.2	5.4	46.3	Flat	0%	0%	0.90	77.70	46.30	15.16	52.42
(3) RADIO 4424 B25_TMO	119	17.1	14.4	11.3	86	Flat	0%	0%	0.90	97.28	86.00	18.45	83.98
(3) RADIO 4449 B71 B85A_T-MOBILE	119	17.91	13.2	10.63	73.21	Flat	0%	0%	0.90	93.40	73.21	17.83	79.70

*All forces are unfactored.

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E5 F)	Density[k/ft^3]	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 R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Toe Rail	C5X6.7	None	None	A36 Gr.36	Typical	1.97	.47	7.48	.055
2	Platform Inner Bracing	C5X6.7	None	None	A36 Gr.36	Typical	1.97	.47	7.48	.055
3	Pipe Mount	P2 STD	None	None	A53 Gr.B	Typical	1.075	.666	.666	1.331
4	Ladder Support Braci...	C5X6.7	None	None	A36 Gr.36	Typical	1.97	.47	7.48	.055
5	Ladder Rail	L1.75x1.75x1/4	None	None	A36 Gr.36	Typical	.813	.227	.227	.015
6	Ladder Rung	SR 5/8	None	None	A36 Gr.36	Typical	.307	.007	.007	.015
7	Support Rail	P2.5 STD	None	None	A53 Gr.B	Typical	1.704	1.53	1.53	3.059
8	Support Rail Corner ...	L2 1/2x2 1/2x1/4	None	None	A36 Gr.36	Typical	1.19	.703	.703	.025
9	Support Rail Inner Br...	P2 STD	None	None	A53 Gr.B	Typical	1.075	.666	.666	1.331

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Dead	DL		-1			44		3	
2	No Ice Wind 0 deg	None					44	40		
3	No Ice Wind 30 deg	None					88	66		
4	No Ice Wind 60 deg	None					88	80		
5	No Ice Wind 90 deg	None					44	34		
6	No Ice Wind 120 deg	None					88	66		
7	No Ice Wind 150 deg	None					88	68		
8	No Ice Wind 180 deg	None					44	40		
9	No Ice Wind 210 deg	None					88	66		
10	No Ice Wind 240 deg	None					88	80		
11	No Ice Wind 270 deg	None					44	34		
12	No Ice Wind 300 deg	None					88	66		
13	No Ice Wind 330 deg	None					88	68		
14	Ice Weight	None					44	40	3	
15	Ice Wind 0 deg	None					44	40		
16	Ice Wind 30 deg	None					88	66		
17	Ice Wind 60 deg	None					88	80		
18	Ice Wind 90 deg	None					44	34		
19	Ice Wind 120 deg	None					88	66		
20	Ice Wind 150 deg	None					88	68		
21	Ice Wind 180 deg	None					44	40		
22	Ice Wind 210 deg	None					88	66		
23	Ice Wind 240 deg	None					88	80		
24	Ice Wind 270 deg	None					44	34		
25	Ice Wind 300 deg	None					88	66		
26	Ice Wind 330 deg	None					88	68		
27	Live Load - A1	None					1			
28	Live Load - A2	None					1			
29	Live Load - A3	None					1			
30	Live Load - A4	None					1			
31	Live Load - B1	None					1			

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
32	Live Load - B2	None					1			
33	Live Load - B3	None					1			
34	Live Load - B4	None					1			
35	Live Load - C1	None					1			
36	Live Load - C2	None					1			
37	Live Load - C3	None					1			
38	Live Load - C4	None					1			
39	Live Load - M1 (Start)	None					1			
40	Live Load - M1 (Midd...	None					1			
41	Live Load - M1 (End)	None					1			
42	Live Load - M2 (Start)	None					1			
43	Live Load - M2 (Midd...	None					1			
44	Live Load - M2 (End)	None					1			
45	Live Load - M3 (Start)	None					1			
46	Live Load - M3 (Midd...	None					1			
47	Live Load - M3 (End)	None					1			
48	Live Load - M4 (Start)	None					1			
49	Live Load - M4 (Midd...	None					1			
50	Live Load - M4 (End)	None					1			
51	Live Load - M5 (Start)	None					1			
52	Live Load - M5 (Midd...	None					1			
53	Live Load - M5 (End)	None					1			
54	Live Load - M6 (Start)	None					1			
55	Live Load - M6 (Midd...	None					1			
56	Live Load - M6 (End)	None					1			
57	Live Load - M7 (Start)	None					1			
58	Live Load - M7 (Midd...	None					1			
59	Live Load - M7 (End)	None					1			
60	Live Load - M8 (Start)	None					1			
61	Live Load - M8 (Midd...	None					1			
62	Live Load - M8 (End)	None					1			
63	Live Load - M9 (Start)	None					1			
64	Live Load - M9 (Midd...	None					1			
65	Live Load - M9 (End)	None					1			
66	Live Load - M25 (Sta...	None					1			
67	Live Load - M25 (Mid...	None					1			
68	Live Load - M25 (End)	None					1			
69	Live Load - M26 (Sta...	None					1			
70	Live Load - M26 (Mid...	None					1			
71	Live Load - M26 (End)	None					1			
72	BLC 1 Transient Area...	None						43		
73	BLC 14 Transient Are...	None						43		

Load Combinations

	Description	Solve	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4 Dead	Yes	Y		1	1.4	0		0		0		0		0		0		0					
2	1.2 Dead + 1.0 Wind @ 0° -...	Yes	Y		1	1.2	2	1	0		0		0		0		0		0					
3	0.9 Dead + 1.0 Wind @ 0° -...	Yes	Y		1	.9	2	1	0		0		0		0		0		0					
4	1.2 Dead + 1.0 Wind @ 30°...	Yes	Y		1	1.2	3	1	0		0		0		0		0		0					
5	0.9 Dead + 1.0 Wind @ 30°...	Yes	Y		1	.9	3	1	0		0		0		0		0		0					
6	1.2 Dead + 1.0 Wind @ 60°...	Yes	Y		1	1.2	4	1	0		0		0		0		0		0					
7	0.9 Dead + 1.0 Wind @ 60°...	Yes	Y		1	.9	4	1	0		0		0		0		0		0					
8	1.2 Dead + 1.0 Wind @ 90°...	Yes	Y		1	1.2	5	1	0		0		0		0		0		0					
9	0.9 Dead + 1.0 Wind @ 90°...	Yes	Y		1	.9	5	1	0		0		0		0		0		0					
10	1.2 Dead + 1.0 Wind @ 12...	Yes	Y		1	1.2	6	1	0		0		0		0		0		0					

Load Combinations (Continued)

	Description	Solve	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
11	0.9 Dead + 1.0 Wind @ 12...	Yes	Y		1	.9	6	1	0		0		0		0		0		0					
12	1.2 Dead + 1.0 Wind @ 15...	Yes	Y		1	1.2	7	1	0		0		0		0		0		0					
13	0.9 Dead + 1.0 Wind @ 15...	Yes	Y		1	.9	7	1	0		0		0		0		0		0					
14	1.2 Dead + 1.0 Wind @ 18...	Yes	Y		1	1.2	8	1	0		0		0		0		0		0					
15	0.9 Dead + 1.0 Wind @ 18...	Yes	Y		1	.9	8	1	0		0		0		0		0		0					
16	1.2 Dead + 1.0 Wind @ 21...	Yes	Y		1	1.2	9	1	0		0		0		0		0		0					
17	0.9 Dead + 1.0 Wind @ 21...	Yes	Y		1	.9	9	1	0		0		0		0		0		0					
18	1.2 Dead + 1.0 Wind @ 24...	Yes	Y		1	1.2	10	1	0		0		0		0		0		0					
19	0.9 Dead + 1.0 Wind @ 24...	Yes	Y		1	.9	10	1	0		0		0		0		0		0					
20	1.2 Dead + 1.0 Wind @ 27...	Yes	Y		1	1.2	11	1	0		0		0		0		0		0					
21	0.9 Dead + 1.0 Wind @ 27...	Yes	Y		1	.9	11	1	0		0		0		0		0		0					
22	1.2 Dead + 1.0 Wind @ 30...	Yes	Y		1	1.2	12	1	0		0		0		0		0		0					
23	0.9 Dead + 1.0 Wind @ 30...	Yes	Y		1	.9	12	1	0		0		0		0		0		0					
24	1.2 Dead + 1.0 Wind @ 33...	Yes	Y		1	1.2	13	1	0		0		0		0		0		0					
25	0.9 Dead + 1.0 Wind @ 33...	Yes	Y		1	.9	13	1	0		0		0		0		0		0					
26	1.2 Dead + 1.0 Ice Wind @...	Yes	Y		1	1.2	15	1	14	1		1	0		0		0		0					
27	1.2 Dead + 1.0 Ice Wind @...	Yes	Y		1	1.2	16	1	14	1		1	0		0		0		0					
28	1.2 Dead + 1.0 Ice Wind @...	Yes	Y		1	1.2	17	1	14	1		1	0		0		0		0					
29	1.2 Dead + 1.0 Ice Wind @...	Yes	Y		1	1.2	18	1	14	1		1	0		0		0		0					
30	1.2 Dead + 1.0 Ice Wind @...	Yes	Y		1	1.2	19	1	14	1		1	0		0		0		0					
31	1.2 Dead + 1.0 Ice Wind @...	Yes	Y		1	1.2	20	1	14	1		1	0		0		0		0					
32	1.2 Dead + 1.0 Ice Wind @...	Yes	Y		1	1.2	21	1	14	1		1	0		0		0		0					
33	1.2 Dead + 1.0 Ice Wind @...	Yes	Y		1	1.2	22	1	14	1		1	0		0		0		0					
34	1.2 Dead + 1.0 Ice Wind @...	Yes	Y		1	1.2	23	1	14	1		1	0		0		0		0					
35	1.2 Dead + 1.0 Ice Wind @...	Yes	Y		1	1.2	24	1	14	1		1	0		0		0		0					
36	1.2 Dead + 1.0 Ice Wind @...	Yes	Y		1	1.2	25	1	14	1		1	0		0		0		0					
37	1.2 Dead + 1.0 Ice Wind @...	Yes	Y		1	1.2	26	1	14	1		1	0		0		0		0					
38	1.2 Dead + 1.5 Live_M - A1...	Yes	Y		1	1.2	27	1.5	2	.053	0		0		0		0		0					
39	1.2 Dead + 1.5 Live_M - A1...	Yes	Y		1	1.2	27	1.5	3	.053	0		0		0		0		0					
40	1.2 Dead + 1.5 Live_M - A1...	Yes	Y		1	1.2	27	1.5	4	.053	0		0		0		0		0					
41	1.2 Dead + 1.5 Live_M - A1...	Yes	Y		1	1.2	27	1.5	5	.053	0		0		0		0		0					
42	1.2 Dead + 1.5 Live_M - A1...	Yes	Y		1	1.2	27	1.5	6	.053	0		0		0		0		0					
43	1.2 Dead + 1.5 Live_M - A1...	Yes	Y		1	1.2	27	1.5	7	.053	0		0		0		0		0					
44	1.2 Dead + 1.5 Live_M - A1...	Yes	Y		1	1.2	27	1.5	8	.053	0		0		0		0		0					
45	1.2 Dead + 1.5 Live_M - A1...	Yes	Y		1	1.2	27	1.5	9	.053	0		0		0		0		0					
46	1.2 Dead + 1.5 Live_M - A1...	Yes	Y		1	1.2	27	1.5	10	.053	0		0		0		0		0					
47	1.2 Dead + 1.5 Live_M - A1...	Yes	Y		1	1.2	27	1.5	11	.053	0		0		0		0		0					
48	1.2 Dead + 1.5 Live_M - A1...	Yes	Y		1	1.2	27	1.5	12	.053	0		0		0		0		0					
49	1.2 Dead + 1.5 Live_M - A1...	Yes	Y		1	1.2	27	1.5	13	.053	0		0		0		0		0					
50	1.2 Dead + 1.5 Live_M - A2...	Yes	Y		1	1.2	28	1.5	2	.053	0		0		0		0		0					
51	1.2 Dead + 1.5 Live_M - A2...	Yes	Y		1	1.2	28	1.5	3	.053	0		0		0		0		0					
52	1.2 Dead + 1.5 Live_M - A2...	Yes	Y		1	1.2	28	1.5	4	.053	0		0		0		0		0					
53	1.2 Dead + 1.5 Live_M - A2...	Yes	Y		1	1.2	28	1.5	5	.053	0		0		0		0		0					
54	1.2 Dead + 1.5 Live_M - A2...	Yes	Y		1	1.2	28	1.5	6	.053	0		0		0		0		0					
55	1.2 Dead + 1.5 Live_M - A2...	Yes	Y		1	1.2	28	1.5	7	.053	0		0		0		0		0					
56	1.2 Dead + 1.5 Live_M - A2...	Yes	Y		1	1.2	28	1.5	8	.053	0		0		0		0		0					
57	1.2 Dead + 1.5 Live_M - A2...	Yes	Y		1	1.2	28	1.5	9	.053	0		0		0		0		0					
58	1.2 Dead + 1.5 Live_M - A2...	Yes	Y		1	1.2	28	1.5	10	.053	0		0		0		0		0					
59	1.2 Dead + 1.5 Live_M - A2...	Yes	Y		1	1.2	28	1.5	11	.053	0		0		0		0		0					
60	1.2 Dead + 1.5 Live_M - A2...	Yes	Y		1	1.2	28	1.5	12	.053	0		0		0		0		0					
61	1.2 Dead + 1.5 Live_M - A2...	Yes	Y		1	1.2	28	1.5	13	.053	0		0		0		0		0					
62	1.2 Dead + 1.5 Live_M - A3...	Yes	Y		1	1.2	29	1.5	2	.053	0		0		0		0		0					
63	1.2 Dead + 1.5 Live_M - A3...	Yes	Y		1	1.2	29	1.5	3	.053	0		0		0		0		0					
64	1.2 Dead + 1.5 Live_M - A3...	Yes	Y		1	1.2	29	1.5	4	.053	0		0		0		0		0					
65	1.2 Dead + 1.5 Live_M - A3...	Yes	Y		1	1.2	29	1.5	5	.053	0		0		0		0		0					
66	1.2 Dead + 1.5 Live_M - A3...	Yes	Y		1	1.2	29	1.5	6	.053	0		0		0		0		0					
67	1.2 Dead + 1.5 Live_M - A3...	Yes	Y		1	1.2	29	1.5	7	.053	0		0		0		0		0					

Load Combinations (Continued)

	Description	Solve	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
68	1.2 Dead + 1.5 Live_M - A3...	Yes	Y		1	1.2	29	1.5	8	.053	0		0		0		0		0					
69	1.2 Dead + 1.5 Live_M - A3...	Yes	Y		1	1.2	29	1.5	9	.053	0		0		0		0		0					
70	1.2 Dead + 1.5 Live_M - A3...	Yes	Y		1	1.2	29	1.5	10	.053	0		0		0		0		0					
71	1.2 Dead + 1.5 Live_M - A3...	Yes	Y		1	1.2	29	1.5	11	.053	0		0		0		0		0					
72	1.2 Dead + 1.5 Live_M - A3...	Yes	Y		1	1.2	29	1.5	12	.053	0		0		0		0		0					
73	1.2 Dead + 1.5 Live_M - A3...	Yes	Y		1	1.2	29	1.5	13	.053	0		0		0		0		0					
74	1.2 Dead + 1.5 Live_M - A4...	Yes	Y		1	1.2	30	1.5	2	.053	0		0		0		0		0					
75	1.2 Dead + 1.5 Live_M - A4...	Yes	Y		1	1.2	30	1.5	3	.053	0		0		0		0		0					
76	1.2 Dead + 1.5 Live_M - A4...	Yes	Y		1	1.2	30	1.5	4	.053	0		0		0		0		0					
77	1.2 Dead + 1.5 Live_M - A4...	Yes	Y		1	1.2	30	1.5	5	.053	0		0		0		0		0					
78	1.2 Dead + 1.5 Live_M - A4...	Yes	Y		1	1.2	30	1.5	6	.053	0		0		0		0		0					
79	1.2 Dead + 1.5 Live_M - A4...	Yes	Y		1	1.2	30	1.5	7	.053	0		0		0		0		0					
80	1.2 Dead + 1.5 Live_M - A4...	Yes	Y		1	1.2	30	1.5	8	.053	0		0		0		0		0					
81	1.2 Dead + 1.5 Live_M - A4...	Yes	Y		1	1.2	30	1.5	9	.053	0		0		0		0		0					
82	1.2 Dead + 1.5 Live_M - A4...	Yes	Y		1	1.2	30	1.5	10	.053	0		0		0		0		0					
83	1.2 Dead + 1.5 Live_M - A4...	Yes	Y		1	1.2	30	1.5	11	.053	0		0		0		0		0					
84	1.2 Dead + 1.5 Live_M - A4...	Yes	Y		1	1.2	30	1.5	12	.053	0		0		0		0		0					
85	1.2 Dead + 1.5 Live_M - A4...	Yes	Y		1	1.2	30	1.5	13	.053	0		0		0		0		0					
86	1.2 Dead + 1.5 Live_M - B1...	Yes	Y		1	1.2	31	1.5	2	.053	0		0		0		0		0					
87	1.2 Dead + 1.5 Live_M - B1...	Yes	Y		1	1.2	31	1.5	3	.053	0		0		0		0		0					
88	1.2 Dead + 1.5 Live_M - B1...	Yes	Y		1	1.2	31	1.5	4	.053	0		0		0		0		0					
89	1.2 Dead + 1.5 Live_M - B1...	Yes	Y		1	1.2	31	1.5	5	.053	0		0		0		0		0					
90	1.2 Dead + 1.5 Live_M - B1...	Yes	Y		1	1.2	31	1.5	6	.053	0		0		0		0		0					
91	1.2 Dead + 1.5 Live_M - B1...	Yes	Y		1	1.2	31	1.5	7	.053	0		0		0		0		0					
92	1.2 Dead + 1.5 Live_M - B1...	Yes	Y		1	1.2	31	1.5	8	.053	0		0		0		0		0					
93	1.2 Dead + 1.5 Live_M - B1...	Yes	Y		1	1.2	31	1.5	9	.053	0		0		0		0		0					
94	1.2 Dead + 1.5 Live_M - B1...	Yes	Y		1	1.2	31	1.5	10	.053	0		0		0		0		0					
95	1.2 Dead + 1.5 Live_M - B1...	Yes	Y		1	1.2	31	1.5	11	.053	0		0		0		0		0					
96	1.2 Dead + 1.5 Live_M - B1...	Yes	Y		1	1.2	31	1.5	12	.053	0		0		0		0		0					
97	1.2 Dead + 1.5 Live_M - B1...	Yes	Y		1	1.2	31	1.5	13	.053	0		0		0		0		0					
98	1.2 Dead + 1.5 Live_M - B2...	Yes	Y		1	1.2	32	1.5	2	.053	0		0		0		0		0					
99	1.2 Dead + 1.5 Live_M - B2...	Yes	Y		1	1.2	32	1.5	3	.053	0		0		0		0		0					
100	1.2 Dead + 1.5 Live_M - B2...	Yes	Y		1	1.2	32	1.5	4	.053	0		0		0		0		0					
101	1.2 Dead + 1.5 Live_M - B2...	Yes	Y		1	1.2	32	1.5	5	.053	0		0		0		0		0					
102	1.2 Dead + 1.5 Live_M - B2...	Yes	Y		1	1.2	32	1.5	6	.053	0		0		0		0		0					
103	1.2 Dead + 1.5 Live_M - B2...	Yes	Y		1	1.2	32	1.5	7	.053	0		0		0		0		0					
104	1.2 Dead + 1.5 Live_M - B2...	Yes	Y		1	1.2	32	1.5	8	.053	0		0		0		0		0					
105	1.2 Dead + 1.5 Live_M - B2...	Yes	Y		1	1.2	32	1.5	9	.053	0		0		0		0		0					
106	1.2 Dead + 1.5 Live_M - B2...	Yes	Y		1	1.2	32	1.5	10	.053	0		0		0		0		0					
107	1.2 Dead + 1.5 Live_M - B2...	Yes	Y		1	1.2	32	1.5	11	.053	0		0		0		0		0					
108	1.2 Dead + 1.5 Live_M - B2...	Yes	Y		1	1.2	32	1.5	12	.053	0		0		0		0		0					
109	1.2 Dead + 1.5 Live_M - B2...	Yes	Y		1	1.2	32	1.5	13	.053	0		0		0		0		0					
110	1.2 Dead + 1.5 Live_M - B3...	Yes	Y		1	1.2	33	1.5	2	.053	0		0		0		0		0					
111	1.2 Dead + 1.5 Live_M - B3...	Yes	Y		1	1.2	33	1.5	3	.053	0		0		0		0		0					
112	1.2 Dead + 1.5 Live_M - B3...	Yes	Y		1	1.2	33	1.5	4	.053	0		0		0		0		0					
113	1.2 Dead + 1.5 Live_M - B3...	Yes	Y		1	1.2	33	1.5	5	.053	0		0		0		0		0					
114	1.2 Dead + 1.5 Live_M - B3...	Yes	Y		1	1.2	33	1.5	6	.053	0		0		0		0		0					
115	1.2 Dead + 1.5 Live_M - B3...	Yes	Y		1	1.2	33	1.5	7	.053	0		0		0		0		0					
116	1.2 Dead + 1.5 Live_M - B3...	Yes	Y		1	1.2	33	1.5	8	.053	0		0		0		0		0					
117	1.2 Dead + 1.5 Live_M - B3...	Yes	Y		1	1.2	33	1.5	9	.053	0		0		0		0		0					
118	1.2 Dead + 1.5 Live_M - B3...	Yes	Y		1	1.2	33	1.5	10	.053	0		0		0		0		0					
119	1.2 Dead + 1.5 Live_M - B3...	Yes	Y		1	1.2	33	1.5	11	.053	0		0		0		0		0					
120	1.2 Dead + 1.5 Live_M - B3...	Yes	Y		1	1.2	33	1.5	12	.053	0		0		0		0		0					
121	1.2 Dead + 1.5 Live_M - B3...	Yes	Y		1	1.2	33	1.5	13	.053	0		0		0		0		0					
122	1.2 Dead + 1.5 Live_M - B4...	Yes	Y		1	1.2	34	1.5	2	.053	0		0		0		0		0					
123	1.2 Dead + 1.5 Live_M - B4...	Yes	Y		1	1.2	34	1.5	3	.053	0		0		0		0		0					
124	1.2 Dead + 1.5 Live_M - B4...	Yes	Y		1	1.2	34	1.5	4	.053	0		0		0		0		0					

Load Combinations (Continued)

	Description	Solve	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
125	1.2 Dead + 1.5 Live_M - B4...	Yes	Y		1	1.2	34	1.5	5	.053	0		0		0		0		0					
126	1.2 Dead + 1.5 Live_M - B4...	Yes	Y		1	1.2	34	1.5	6	.053	0		0		0		0		0					
127	1.2 Dead + 1.5 Live_M - B4...	Yes	Y		1	1.2	34	1.5	7	.053	0		0		0		0		0					
128	1.2 Dead + 1.5 Live_M - B4...	Yes	Y		1	1.2	34	1.5	8	.053	0		0		0		0		0					
129	1.2 Dead + 1.5 Live_M - B4...	Yes	Y		1	1.2	34	1.5	9	.053	0		0		0		0		0					
130	1.2 Dead + 1.5 Live_M - B4...	Yes	Y		1	1.2	34	1.5	10	.053	0		0		0		0		0					
131	1.2 Dead + 1.5 Live_M - B4...	Yes	Y		1	1.2	34	1.5	11	.053	0		0		0		0		0					
132	1.2 Dead + 1.5 Live_M - B4...	Yes	Y		1	1.2	34	1.5	12	.053	0		0		0		0		0					
133	1.2 Dead + 1.5 Live_M - B4...	Yes	Y		1	1.2	34	1.5	13	.053	0		0		0		0		0					
134	1.2 Dead + 1.5 Live_M - C1...	Yes	Y		1	1.2	35	1.5	2	.053	0		0		0		0		0					
135	1.2 Dead + 1.5 Live_M - C1...	Yes	Y		1	1.2	35	1.5	3	.053	0		0		0		0		0					
136	1.2 Dead + 1.5 Live_M - C1...	Yes	Y		1	1.2	35	1.5	4	.053	0		0		0		0		0					
137	1.2 Dead + 1.5 Live_M - C1...	Yes	Y		1	1.2	35	1.5	5	.053	0		0		0		0		0					
138	1.2 Dead + 1.5 Live_M - C1...	Yes	Y		1	1.2	35	1.5	6	.053	0		0		0		0		0					
139	1.2 Dead + 1.5 Live_M - C1...	Yes	Y		1	1.2	35	1.5	7	.053	0		0		0		0		0					
140	1.2 Dead + 1.5 Live_M - C1...	Yes	Y		1	1.2	35	1.5	8	.053	0		0		0		0		0					
141	1.2 Dead + 1.5 Live_M - C1...	Yes	Y		1	1.2	35	1.5	9	.053	0		0		0		0		0					
142	1.2 Dead + 1.5 Live_M - C1...	Yes	Y		1	1.2	35	1.5	10	.053	0		0		0		0		0					
143	1.2 Dead + 1.5 Live_M - C1...	Yes	Y		1	1.2	35	1.5	11	.053	0		0		0		0		0					
144	1.2 Dead + 1.5 Live_M - C1...	Yes	Y		1	1.2	35	1.5	12	.053	0		0		0		0		0					
145	1.2 Dead + 1.5 Live_M - C1...	Yes	Y		1	1.2	35	1.5	13	.053	0		0		0		0		0					
146	1.2 Dead + 1.5 Live_M - C2...	Yes	Y		1	1.2	36	1.5	2	.053	0		0		0		0		0					
147	1.2 Dead + 1.5 Live_M - C2...	Yes	Y		1	1.2	36	1.5	3	.053	0		0		0		0		0					
148	1.2 Dead + 1.5 Live_M - C2...	Yes	Y		1	1.2	36	1.5	4	.053	0		0		0		0		0					
149	1.2 Dead + 1.5 Live_M - C2...	Yes	Y		1	1.2	36	1.5	5	.053	0		0		0		0		0					
150	1.2 Dead + 1.5 Live_M - C2...	Yes	Y		1	1.2	36	1.5	6	.053	0		0		0		0		0					
151	1.2 Dead + 1.5 Live_M - C2...	Yes	Y		1	1.2	36	1.5	7	.053	0		0		0		0		0					
152	1.2 Dead + 1.5 Live_M - C2...	Yes	Y		1	1.2	36	1.5	8	.053	0		0		0		0		0					
153	1.2 Dead + 1.5 Live_M - C2...	Yes	Y		1	1.2	36	1.5	9	.053	0		0		0		0		0					
154	1.2 Dead + 1.5 Live_M - C2...	Yes	Y		1	1.2	36	1.5	10	.053	0		0		0		0		0					
155	1.2 Dead + 1.5 Live_M - C2...	Yes	Y		1	1.2	36	1.5	11	.053	0		0		0		0		0					
156	1.2 Dead + 1.5 Live_M - C2...	Yes	Y		1	1.2	36	1.5	12	.053	0		0		0		0		0					
157	1.2 Dead + 1.5 Live_M - C2...	Yes	Y		1	1.2	36	1.5	13	.053	0		0		0		0		0					
158	1.2 Dead + 1.5 Live_M - C3...	Yes	Y		1	1.2	37	1.5	2	.053	0		0		0		0		0					
159	1.2 Dead + 1.5 Live_M - C3...	Yes	Y		1	1.2	37	1.5	3	.053	0		0		0		0		0					
160	1.2 Dead + 1.5 Live_M - C3...	Yes	Y		1	1.2	37	1.5	4	.053	0		0		0		0		0					
161	1.2 Dead + 1.5 Live_M - C3...	Yes	Y		1	1.2	37	1.5	5	.053	0		0		0		0		0					
162	1.2 Dead + 1.5 Live_M - C3...	Yes	Y		1	1.2	37	1.5	6	.053	0		0		0		0		0					
163	1.2 Dead + 1.5 Live_M - C3...	Yes	Y		1	1.2	37	1.5	7	.053	0		0		0		0		0					
164	1.2 Dead + 1.5 Live_M - C3...	Yes	Y		1	1.2	37	1.5	8	.053	0		0		0		0		0					
165	1.2 Dead + 1.5 Live_M - C3...	Yes	Y		1	1.2	37	1.5	9	.053	0		0		0		0		0					
166	1.2 Dead + 1.5 Live_M - C3...	Yes	Y		1	1.2	37	1.5	10	.053	0		0		0		0		0					
167	1.2 Dead + 1.5 Live_M - C3...	Yes	Y		1	1.2	37	1.5	11	.053	0		0		0		0		0					
168	1.2 Dead + 1.5 Live_M - C3...	Yes	Y		1	1.2	37	1.5	12	.053	0		0		0		0		0					
169	1.2 Dead + 1.5 Live_M - C3...	Yes	Y		1	1.2	37	1.5	13	.053	0		0		0		0		0					
170	1.2 Dead + 1.5 Live_M - C4...	Yes	Y		1	1.2	38	1.5	2	.053	0		0		0		0		0					
171	1.2 Dead + 1.5 Live_M - C4...	Yes	Y		1	1.2	38	1.5	3	.053	0		0		0		0		0					
172	1.2 Dead + 1.5 Live_M - C4...	Yes	Y		1	1.2	38	1.5	4	.053	0		0		0		0		0					
173	1.2 Dead + 1.5 Live_M - C4...	Yes	Y		1	1.2	38	1.5	5	.053	0		0		0		0		0					
174	1.2 Dead + 1.5 Live_M - C4...	Yes	Y		1	1.2	38	1.5	6	.053	0		0		0		0		0					
175	1.2 Dead + 1.5 Live_M - C4...	Yes	Y		1	1.2	38	1.5	7	.053	0		0		0		0		0					
176	1.2 Dead + 1.5 Live_M - C4...	Yes	Y		1	1.2	38	1.5	8	.053	0		0		0		0		0					
177	1.2 Dead + 1.5 Live_M - C4...	Yes	Y		1	1.2	38	1.5	9	.053	0		0		0		0		0					
178	1.2 Dead + 1.5 Live_M - C4...	Yes	Y		1	1.2	38	1.5	10	.053	0		0		0		0		0					
179	1.2 Dead + 1.5 Live_M - C4...	Yes	Y		1	1.2	38	1.5	11	.053	0		0		0		0		0					
180	1.2 Dead + 1.5 Live_M - C4...	Yes	Y		1	1.2	38	1.5	12	.053	0		0		0		0		0					
181	1.2 Dead + 1.5 Live_M - C4...	Yes	Y		1	1.2	38	1.5	13	.053	0		0		0		0		0					

Load Combinations (Continued)

	Description	Solve	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
182	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	39	1.5	0		0		0		0		0					
183	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	40	1.5	0		0		0		0		0					
184	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	41	1.5	0		0		0		0		0					
185	1.2 Dead + 1.5 Live_V - M2...	Yes	Y		1	1.2	42	1.5	0		0		0		0		0					
186	1.2 Dead + 1.5 Live_V - M2...	Yes	Y		1	1.2	43	1.5	0		0		0		0		0					
187	1.2 Dead + 1.5 Live_V - M2...	Yes	Y		1	1.2	44	1.5	0		0		0		0		0					
188	1.2 Dead + 1.5 Live_V - M3...	Yes	Y		1	1.2	45	1.5	0		0		0		0		0					
189	1.2 Dead + 1.5 Live_V - M3...	Yes	Y		1	1.2	46	1.5	0		0		0		0		0					
190	1.2 Dead + 1.5 Live_V - M3...	Yes	Y		1	1.2	47	1.5	0		0		0		0		0					
191	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	48	1.5	0		0		0		0		0					
192	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	49	1.5	0		0		0		0		0					
193	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	50	1.5	0		0		0		0		0					
194	1.2 Dead + 1.5 Live_V - M5...	Yes	Y		1	1.2	51	1.5	0		0		0		0		0					
195	1.2 Dead + 1.5 Live_V - M5...	Yes	Y		1	1.2	52	1.5	0		0		0		0		0					
196	1.2 Dead + 1.5 Live_V - M5...	Yes	Y		1	1.2	53	1.5	0		0		0		0		0					
197	1.2 Dead + 1.5 Live_V - M6...	Yes	Y		1	1.2	54	1.5	0		0		0		0		0					
198	1.2 Dead + 1.5 Live_V - M6...	Yes	Y		1	1.2	55	1.5	0		0		0		0		0					
199	1.2 Dead + 1.5 Live_V - M6...	Yes	Y		1	1.2	56	1.5	0		0		0		0		0					
200	1.2 Dead + 1.5 Live_V - M7...	Yes	Y		1	1.2	57	1.5	0		0		0		0		0					
201	1.2 Dead + 1.5 Live_V - M7...	Yes	Y		1	1.2	58	1.5	0		0		0		0		0					
202	1.2 Dead + 1.5 Live_V - M7...	Yes	Y		1	1.2	59	1.5	0		0		0		0		0					
203	1.2 Dead + 1.5 Live_V - M8...	Yes	Y		1	1.2	60	1.5	0		0		0		0		0					
204	1.2 Dead + 1.5 Live_V - M8...	Yes	Y		1	1.2	61	1.5	0		0		0		0		0					
205	1.2 Dead + 1.5 Live_V - M8...	Yes	Y		1	1.2	62	1.5	0		0		0		0		0					
206	1.2 Dead + 1.5 Live_V - M9...	Yes	Y		1	1.2	63	1.5	0		0		0		0		0					
207	1.2 Dead + 1.5 Live_V - M9...	Yes	Y		1	1.2	64	1.5	0		0		0		0		0					
208	1.2 Dead + 1.5 Live_V - M9...	Yes	Y		1	1.2	65	1.5	0		0		0		0		0					
209	1.2 Dead + 1.5 Live_V - M2...	Yes	Y		1	1.2	66	1.5	0		0		0		0		0					
210	1.2 Dead + 1.5 Live_V - M2...	Yes	Y		1	1.2	67	1.5	0		0		0		0		0					
211	1.2 Dead + 1.5 Live_V - M2...	Yes	Y		1	1.2	68	1.5	0		0		0		0		0					
212	1.2 Dead + 1.5 Live_V - M2...	Yes	Y		1	1.2	69	1.5	0		0		0		0		0					
213	1.2 Dead + 1.5 Live_V - M2...	Yes	Y		1	1.2	70	1.5	0		0		0		0		0					
214	1.2 Dead + 1.5 Live_V - M2...	Yes	Y		1	1.2	71	1.5	0		0		0		0		0					

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N7	max	1243.02	18	10783.695	2	2510.204	22	0	214	0	214	0	214
2		min	-1185.258	7	-8057.389	15	-2534.814	10	0	1	0	1	0	1
3	N6	max	1301.759	22	4733.391	11	2263.758	10	0	214	0	214	0	214
4		min	-1309.065	10	-8749.747	22	-2251.104	22	0	1	0	1	0	1
5	N5	max	3254.15	15	10303.149	18	1278.027	20	0	214	0	214	0	214
6		min	-3309.284	2	-6986.603	7	-1288.425	9	0	1	0	1	0	1
7	N18	max	1395.275	10	10897.082	2	2344.352	23	0	214	0	214	0	214
8		min	-1320.156	23	-8340.35	15	-2371.428	10	0	1	0	1	0	1
9	N19	max	1070.08	7	5517.491	19	1849.823	7	0	214	0	214	0	214
10		min	-1091.042	18	-9674.554	6	-1886.13	18	0	1	0	1	0	1
11	N20	max	3040.811	15	10333.362	10	729.054	22	0	214	0	214	0	214
12		min	-3090.411	2	-6881.743	23	-650.453	11	0	1	0	1	0	1
13	N47	max	1703.932	15	9976.673	10	2540	16	0	214	0	214	0	214
14		min	-1732.18	2	-6597.137	23	-2492.684	3	0	1	0	1	0	1
15	N48	max	2657.326	2	6045.125	3	4.271	23	0	214	0	214	0	214
16		min	-2610.16	15	-10596.651	14	-4.271	6	0	1	0	1	0	1
17	N49	max	1879.123	15	10673.861	16	2493.52	3	0	214	0	214	0	214
18		min	-1932.227	2	-7462.151	5	-2550.23	14	0	1	0	1	0	1
19	Totals:	max	7070.302	14	9804.047	26	6509.105	20						

Envelope Joint Reactions (Continued)

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
20		min	-7070.299	3	2703.398	15	-6509.105	9						

Envelope AISC 15th(360-16): LRFD Steel Code Checks

	Memb...	Shape	Code Ch...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt...	phi*Mn...	phi*Mn z...	Cb	Eqn
1	M36	P2.5 ...	.883	14.063	6	.493	14.063		20	15362.035	53676	3.812	3.812	2.629	H3-6
2	B2	P2 STD	.850	83.125	14	.133	83.125		14	11572.824	33847....	1.997	1.997	2.193	H1-1b
3	M6	C5X6.7	.830	4.72	16	.571	54.618	y	4	25319.628	63828	1.604	9.585	2.387	H1-1b
4	M4	C5X6.7	.824	4.72	14	.460	54.618	z	20	25319.627	63828	1.604	9.585	2.119	H1-1b
5	M35	P2.5 ...	.815	14.063	24	.518	14.063		14	15362.035	53676	3.812	3.812	2.296	H3-6
6	B3	P2 STD	.813	53.375	6	.128	53.375		6	18896.611	33847....	1.997	1.997	1.999	H1-1b
7	M7	C5X6.7	.812	24.963	14	.459	25.587	y	18	28909.906	63828	1.604	9.585	1.475	H1-1b
8	M5	C5X6.7	.781	60.012	14	.633	10.114	z	8	25319.627	63828	1.604	9.585	2.004	H1-1b
9	M8	C5X6.7	.770	34.948	20	.474	26.211	y	2	28909.907	63828	1.604	9.585	1.779	H1-1b
10	M9	C5X6.7	.759	24.963	8	.475	34.324	y	2	28909.907	63828	1.604	9.585	1.734	H1-1b
11	B1	P2 STD	.752	53.375	14	.131	53.375		14	18896.611	33847....	1.997	1.997	1.987	H1-1b
12	M3	C5X6.7	.745	60.012	14	.618	10.114	z	24	25319.628	63828	1.604	9.585	3.166	H1-1b
13	C3	P2 STD	.727	53.375	14	.155	53.375		14	18896.611	33847....	1.997	1.997	1.994	H1-1b
14	C2	P2 STD	.723	83.125	20	.122	83.125		20	11572.824	33847....	1.997	1.997	2.995	H1-1b
15	C1	P2 STD	.705	53.375	20	.116	53.375		22	18896.611	33847....	1.997	1.997	2.097	H1-1b
16	C4	P2 STD	.703	53.375	14	.153	53.375		16	18896.611	33847....	1.997	1.997	3.357	H1-1b
17	A3	P2 STD	.697	53.375	22	.120	53.375		22	18896.611	33847....	1.997	1.997	1.406	H1-1b
18	M2	C5X6.7	.686	4.72	24	.458	54.618	z	12	25319.627	63828	1.604	9.585	2.585	H1-1b
19	A1	P2 STD	.669	53.375	4	.128	53.375		4	18896.611	33847....	1.997	1.997	1.982	H1-1b
20	M1	C5X6.7	.664	60.012	4	.560	10.114	y	16	25319.627	63828	1.604	9.585	2.558	H1-1b
21	A2	P2 STD	.648	83.125	6	.125	83.125		6	11572.824	33847....	1.997	1.997	2.389	H1-1b
22	B4	P2 STD	.600	53.375	8	.104	24.5		12	18896.611	33847....	1.997	1.997	3.171	H1-1b
23	A4	P2 STD	.582	53.375	2	.112	24.5		2	18896.611	33847....	1.997	1.997	3.091	H1-1b
24	M37	P2.5 ...	.472	14.063	14	.247	107.813		8	15362.035	53676	3.812	3.812	2.102	H1-1b
25	M25	C5X6.7	.433	24	2	.238	6	z	14	56209.885	63828	1.604	9.585	1.745	H1-1b
26	M26	C5X6.7	.156	0	2	.020	8.385	y	213	50776.547	63828	1.604	9.585	1.57	H1-1b
27	M38	L2 1/2...	.104	7.313	23	.201	18	z	8	35922.376	38556	.46	2.564	2.156	H2-1
28	M40	L2 1/2...	.103	7.688	3	.204	0	z	12	35922.376	38556	.46	2.564	2.17	H2-1
29	M39	L2 1/2...	.063	3.188	10	.167	18	z	16	35922.376	38556	.46	2.564	1.049	H2-1
30	M56	P2 STD	.035	29.955	2	.094	0		20	25162.746	33847....	1.997	1.997	1.136	H1-1b
31	M57	P2 STD	.034	0	11	.090	0		4	25162.746	33847....	1.997	1.997	1.136	H1-1b*
32	M58	P2 STD	.030	29.955	18	.098	59.911		12	25162.746	33847....	1.997	1.997	1.136	H1-1b

Envelope AISC 15th(360-16): LRFD Steel Code Checks

	Member	Shape	Code Check Actual	Code Check Allowable	Ratio (Act./Allow.)	Loc[in]	LC	Shear Check	Shear Check Allowable	Ratio (Act./Allow.)	Loc[in]	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	M36	P2.5 STD	0.883	1.05	0.841*	14.06	6	0.493	1.05	0.47*	14.06	15362.035	53676	3.812	3.812	2.629	H3-6
2	B2	P2 STD	0.85	1.05	0.81*	83.13	14	0.133	1.05	0.127*	83.13	11572.824	33847.758	1.997	1.997	2.193	H1-1b
3	M6	C5X6.7	0.83	1.05	0.79*	4.72	16	0.571	1.05	0.544*	54.62	25319.628	63828	1.604	9.585	2.387	H1-1b
4	M4	C5X6.7	0.824	1.05	0.785*	4.72	14	0.46	1.05	0.438*	54.62	25319.627	63828	1.604	9.585	2.119	H1-1b
5	M35	P2.5 STD	0.815	1.05	0.776*	14.06	24	0.518	1.05	0.493*	14.06	15362.035	53676	3.812	3.812	2.296	H3-6
6	B3	P2 STD	0.813	1.05	0.774*	53.38	6	0.128	1.05	0.122*	53.38	18896.611	33847.758	1.997	1.997	1.999	H1-1b
7	M7	C5X6.7	0.812	1.05	0.773*	24.96	14	0.459	1.05	0.437*	25.59	28909.906	63828	1.604	9.585	1.475	H1-1b
8	M5	C5X6.7	0.781	1.05	0.744*	60.01	14	0.633	1.05	0.603*	10.11	25319.627	63828	1.604	9.585	2.004	H1-1b
9	M8	C5X6.7	0.77	1.05	0.733*	34.95	20	0.474	1.05	0.451*	26.21	28909.907	63828	1.604	9.585	1.779	H1-1b
10	M9	C5X6.7	0.759	1.05	0.723*	24.96	8	0.475	1.05	0.452*	34.32	28909.907	63828	1.604	9.585	1.734	H1-1b
11	B1	P2 STD	0.752	1.05	0.716*	53.38	14	0.131	1.05	0.125*	53.38	18896.611	33847.758	1.997	1.997	1.987	H1-1b
12	M3	C5X6.7	0.745	1.05	0.71*	60.01	14	0.618	1.05	0.589*	10.11	25319.628	63828	1.604	9.585	3.166	H1-1b
13	C3	P2 STD	0.727	1.05	0.692*	53.38	14	0.155	1.05	0.148*	53.38	18896.611	33847.758	1.997	1.997	1.994	H1-1b
14	C2	P2 STD	0.723	1.05	0.689*	83.13	20	0.122	1.05	0.116*	83.13	11572.824	33847.758	1.997	1.997	2.995	H1-1b
15	C1	P2 STD	0.705	1.05	0.671*	53.38	20	0.116	1.05	0.11*	53.38	18896.611	33847.758	1.997	1.997	2.097	H1-1b
16	C4	P2 STD	0.703	1.05	0.67*	53.38	14	0.153	1.05	0.146*	53.38	18896.611	33847.758	1.997	1.997	3.357	H1-1b
17	A3	P2 STD	0.697	1.05	0.664*	53.38	22	0.12	1.05	0.114*	53.38	18896.611	33847.758	1.997	1.997	1.406	H1-1b
18	M2	C5X6.7	0.686	1.05	0.653*	4.72	24	0.458	1.05	0.436*	54.62	25319.627	63828	1.604	9.585	2.585	H1-1b
19	A1	P2 STD	0.669	1.05	0.637*	53.38	4	0.128	1.05	0.122*	53.38	18896.611	33847.758	1.997	1.997	1.982	H1-1b
20	M1	C5X6.7	0.664	1.05	0.632*	60.01	4	0.56	1.05	0.533*	10.11	25319.627	63828	1.604	9.585	2.558	H1-1b
21	A2	P2 STD	0.648	1.05	0.617*	83.13	6	0.125	1.05	0.119*	83.13	11572.824	33847.758	1.997	1.997	2.389	H1-1b
22	B4	P2 STD	0.6	1.05	0.571*	53.38	8	0.104	1.05	0.099*	24.5	18896.611	33847.758	1.997	1.997	3.171	H1-1b
23	A4	P2 STD	0.582	1.05	0.554*	53.38	2	0.112	1.05	0.107*	24.5	18896.611	33847.758	1.997	1.997	3.091	H1-1b
24	M37	P2.5 STD	0.472	1.05	0.45*	14.06	14	0.247	1.05	0.235*	107.8	15362.035	53676	3.812	3.812	2.102	H1-1b
25	M25	C5X6.7	0.433	1.05	0.412*	24	2	0.238	1.05	0.227*	6	56209.885	63828	1.604	9.585	1.745	H1-1b
26	M26	C5X6.7	0.156	1.05	0.149*	0	2	0.02	1.05	0.019*	8.385	50776.547	63828	1.604	9.585	1.57	H1-1b
27	M38	L2 1/2x2 1/2x1/4	0.104	1.05	0.099*	7.313	23	0.201	1.05	0.191*	18	35922.376	38556	0.46	2.564	2.156	H2-1
28	M40	L2 1/2x2 1/2x1/4	0.103	1.05	0.098*	7.688	3	0.204	1.05	0.194*	0	35922.376	38556	0.46	2.564	2.17	H2-1
29	M39	L2 1/2x2 1/2x1/4	0.063	1.05	0.06*	3.188	10	0.167	1.05	0.159*	18	35922.376	38556	0.46	2.564	1.049	H2-1
30	M56	P2 STD	0.035	1.05	0.033*	29.96	2	0.094	1.05	0.09*	0	25162.746	33847.758	1.997	1.997	1.136	H1-1b
31	M57	P2 STD	0.034	1.05	0.032*	0	11	0.09	1.05	0.086*	0	25162.746	33847.758	1.997	1.997	1.136	H1-1b*
32	M58	P2 STD	0.03	1.05	0.029*	29.96	18	0.098	1.05	0.093*	59.91	25162.746	33847.758	1.997	1.997	1.136	H1-1b

*Rating per TIA-222-H, Section 15.5

APPENDIX D

ADDITIONAL CALCULATIONS

TIA-222-H CONNECTION CHECK
Mount to Tower Connection - Typ. All Sectors
2021777.876352.01

Bolt Information		
Bolt Diameter (d)	0.625	in
Net Tensile Area (An)	0.226	in^2
# of Bolts Total (n)	1	
Bolt Grade	A325N	
Bolt Tensile Strength (F_{ub})	120	ksi

RISA 3D Reactions		
Moment (M)	0.00	k-ft
Axial (T)	0.03	kips
Shear (V)	10.91	kips

Bolt Capacity		
Nominal Tensile Strength (R_{nt})	27.120	kips
Nominal Shear Strength (R_{nv})	18.41	kips
Bolt Tensile Force (T_{ub})	0.03	kips
Bolt Shear Force (V_{ub})	10.905	kips
$T_{ub}/\phi R_{nt}$	0.00131	
$V_{ub}/\phi R_{nv}$	0.75227	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.59421	
Bolt Capacity =	75.2%	OK

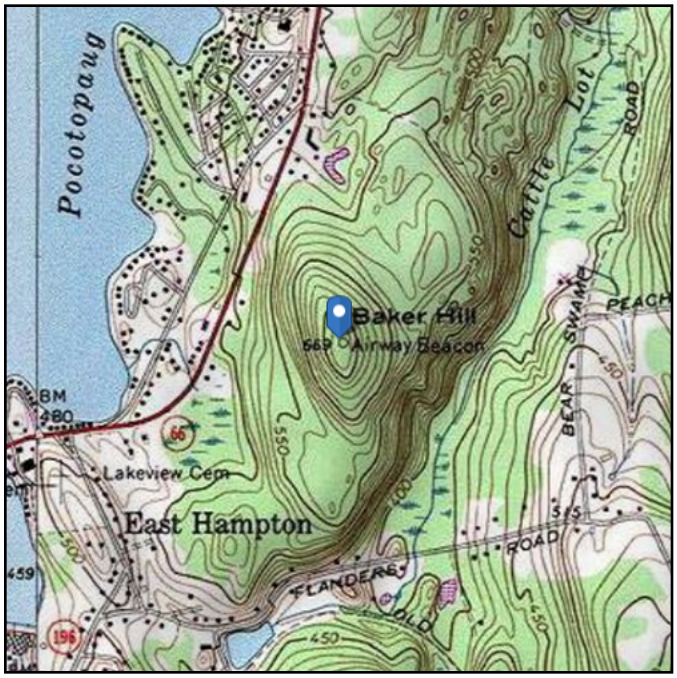
*Rating per TIA-222-H, Section 15.5

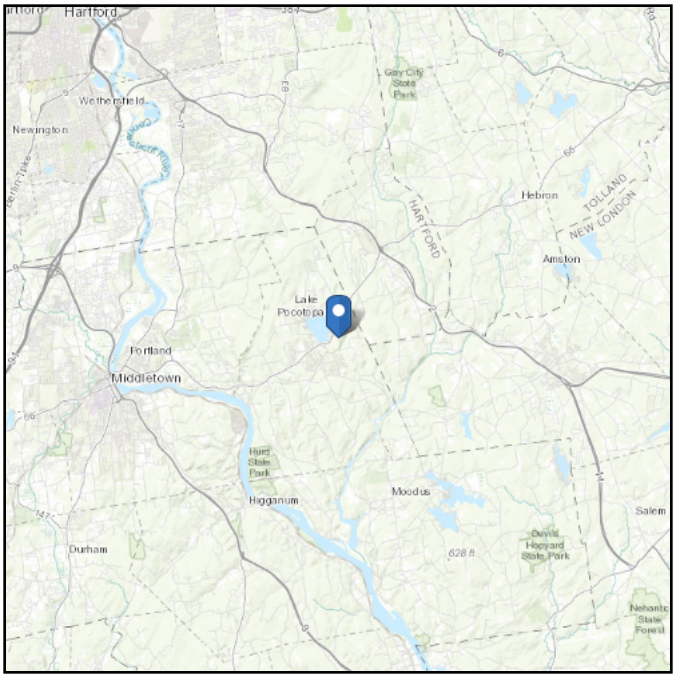
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 664.58 ft (NAVD 88)
Latitude: 41.587278
Longitude: -72.488778





Wind

Results:

Wind Speed:	127 Vmph
10-year MRI	78 Vmph
25-year MRI	87 Vmph
50-year MRI	95 Vmph
100-year MRI	103 Vmph

Data Source: ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014

Date Accessed: Mon Feb 01 2021

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

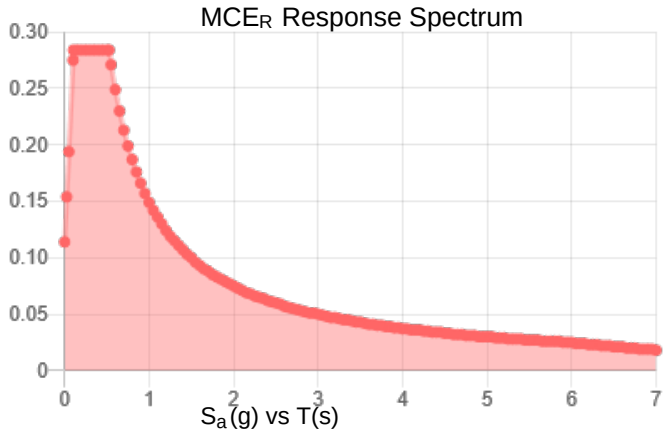
Seismic

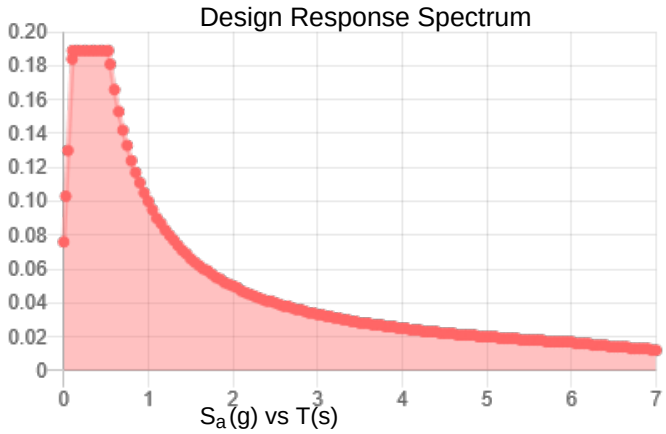
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.177	S_{DS} :	0.189
S_1 :	0.062	S_{D1} :	0.1
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.09
S_{MS} :	0.284	PGA_M :	0.144
S_{M1} :	0.149	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Mon Feb 01 2021

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Mon Feb 01 2021

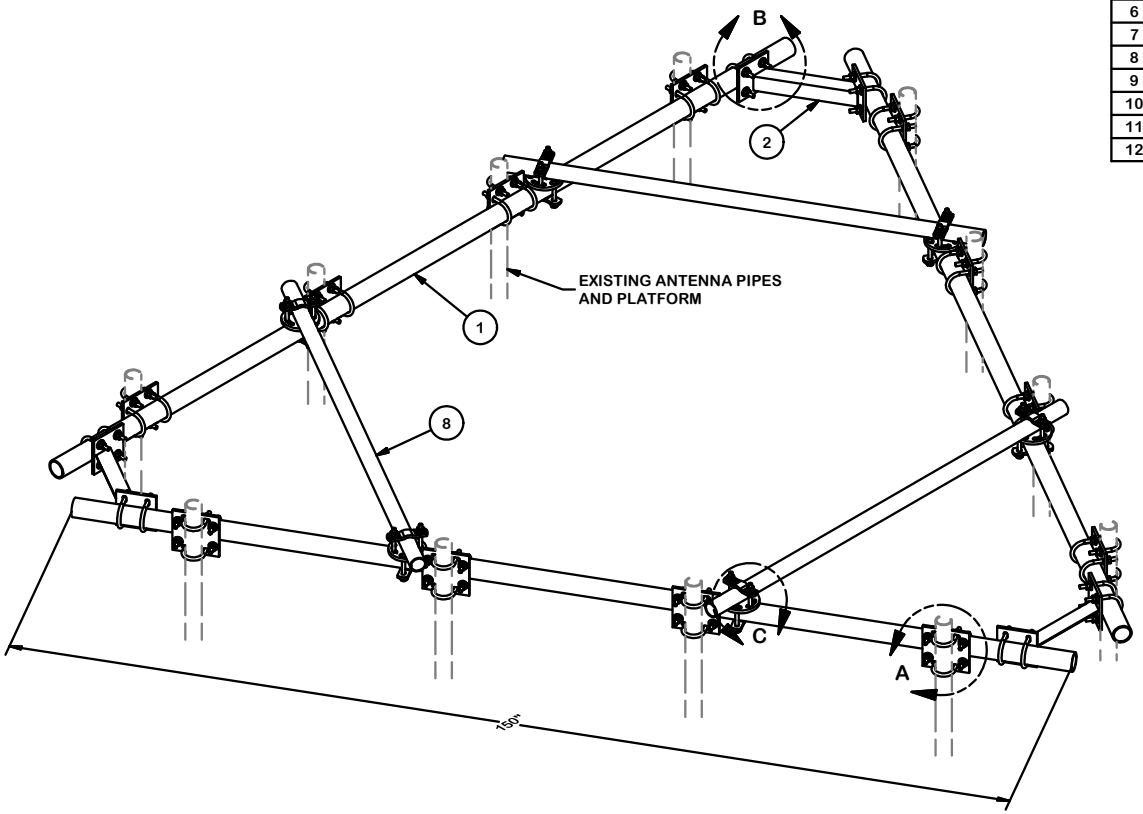
Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

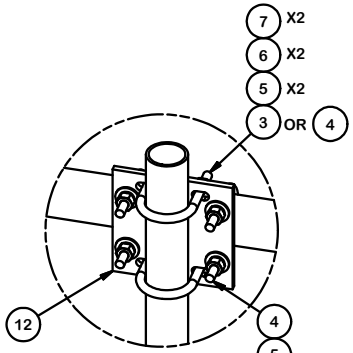
Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

APPENDIX E

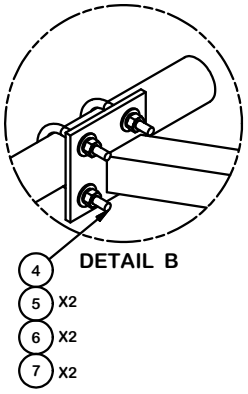
SUPPLEMENTAL DRAWINGS

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	3	P30150	2-7/8" O.D. X 150" SCH. 40 PIPE	150 in	76.94	230.81
2	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
3	24	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.73	17.56
4	60	X-UB1300	1/2" X 3" X 5" X 2" U-BOLT (HDG.)		0.73	43.90
5	144	G12FW	1/2" HDG USS FLATWASHER		0.03	4.91
6	144	G12LW	1/2" HDG LOCKWASHER		0.01	2.00
7	144	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	10.31
8	3	P272	2-3/8" X 72" SCH 40 GALVANIZED PIPE	72 in	23.07	69.20
9	6	X-127594	FLAT DISK CLAMP PLATE 4" CENTERS (GALVANIZED)		2.48	14.90
10	12	X-100064	CLAMP (S) (4" V-CLAMP) GALVANIZED		0.91	10.95
11	24	G1204	1/2" x 4" HDG HEX BOLT GR5 FULL THREAD	4 in	0.27	6.48
12	12	SCX2	CROSSOVER PLATE	7 in	4.80	57.56
					TOTAL WT. #	502.34

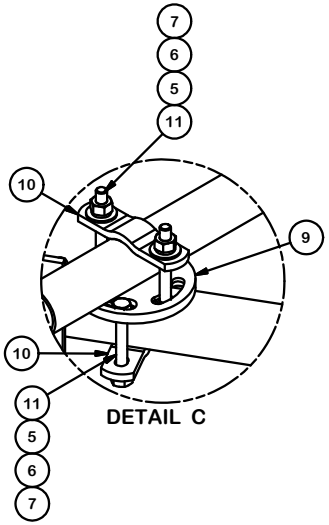




DETAIL A



DETAIL B



DETAIL C

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION
HEAY DUTY HANDRAIL KIT
FOR 12' PLATFORMS WITH
2-7/8" HANDRAIL PIPES

SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
	CEK 4/6/2015		HRK12-3HD

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	BMC 4/7/2015	HRK12-3HD