STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
Web Site: portal.ct.gov/csc

VIA ELECTRONIC MAIL

April 6, 2022

Kenneth C. Baldwin, Esq.
Robinson & Cole, LLP
280 Trumbull Street
Hartford, CT 06103
kbaldwin@rc.com

RE: **TS-VER-076-220317** – Cellco Partnership d/b/a Verizon Wireless request for an order to approve tower sharing at an existing telecommunications facility located at 6-9 Campus Drive, Madison, Connecticut.

Dear Attorney Baldwin:

The Connecticut Siting Council (Council) is in receipt of your correspondence of April 6, 2022 submitted in response to the Council's April 5, 2022 notification of an incomplete request for tower sharing with regard to the above-referenced matter.

The submission renders the request for tower sharing 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,

Melanie A. Bachman
Executive Director

MAB/CMW/emr

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

Proposed Verizon Wireless
Antenna Installation

Site Ref: Madison 6

9 Campus Drive
Madison, CT

Centek Project No. 20083.14

Date: May 28, 2021

Max Stress Ratio = 41.0%

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

Prepared for:

Verizon Wireless
20 Alexander Drive
Wallingford, CT 06492

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CENTEK engineering
Centered on Solutions℠

May 28, 2021

Mr. Andrew Leone
Verizon Wireless
20 Alexander Drive
Wallingford, CT 06492

Re: Structural Letter ~ Antenna Mounts
Verizon – Site Ref: Madison 6
9 Campus Drive
Madison, CT 06443

Centek Project No. 200083.14

Dear Mr. Leone,

Centek Engineering, Inc. has reviewed the Verizon antenna installation at the above-referenced site. The purpose of the review is to determine the structural adequacy of the proposed antenna mounts to support the proposed/existing equipment configuration. The review considered the effects of wind load, dead load and ice load in accordance with the 2015 International Building Code as modified by the 2018 Connecticut State Building Code (CTBC) including ASCE 7-10 and ANSI/TIA-222-G *Structural Standards for Steel Antenna Towers and Supporting Structures*.

The loads considered in this analysis consist of the following:

- Verizon (Proposed Final Configuration):
  V-Frames: Six (6) JMA MX06FRO660 panel antennas, three (3) Samsung CBRS panel antennas/RRHs, three (3) Samsung MT6407-77A (AKA VZS01) panel antennas, three (3) B2/B66A remote radio heads, three (3) B5/B13 remote radio heads and one (1) OVP box mounted on three (3) V-Frames (SitePro VFA12-HD) with a RAD center elevation of 120-ft above the existing tower base.

The antenna mount was analyzed per the requirements of the 2015 International Building Code as modified by the 2018 Connecticut State Building Code considering a nominal design wind speed of 101 mph for Madison as required in Appendix N of the 2018 Connecticut State Building Code.

Based on our review of the installation, it is our opinion that the subject antenna mount has sufficient capacity to support the aforementioned antenna configuration.

If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

Prepared by:

Fernando J. Palacios
Engineer

Section 2 - Calculations

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA-222-G

Wind Speeds

Basic Wind Speed	$V := 101$	mph	(User Input - 2018 CSBC Appendix N)
Basic Wind Speed with Ice	$V_i := 50$	mph	(User Input per Annex B of TIA-222-G)

Input

Structure Type =	Structure_Type := Lattice		(User Input)
Structure Category =	SC := II		(User Input)
Exposure Category =	Exp := C		(User Input)
Structure Height =	$h := 150$	ft	(User Input)
Height to Center of Antennas =	$z := 120$	ft	(User Input)
Radial Ice Thickness =	$t_i := 0.75$	in	(User Input per Annex B of TIA-222-G)
Radial Ice Density =	$Id := 56.00$	pcf	(User Input)
Topographic Factor =	$K_{zt} := 1.0$		(User Input)
	$K_a := 1.0$		(User Input)
Gust Response Factor =	$G_H = 1.15$		(User Input)

Output

Wind Direction Probability Factor =

$K_d :=$ if Structure_Type = Pole → 0.95; if Structure_Type = Lattice → 0.85; $= 0.85$

(Per Table 2-2 of TIA-222-G)

(Per Table 2-3 of TIA-222-G)

Importance Factors =

$I_{Wind} :=$ if SC = 1 → 0.87; if SC = 2 → 1.00; if SC = 3 → 1.15; $= 1$

$I_{Wind\_w\_Ice} :=$ if SC = 1 → 0; if SC = 2 → 1.00; if SC = 3 → 1.00; $= 1$

$I_{ice} :=$ if SC = 1 → 0; if SC = 2 → 1.00; if SC = 3 → 1.25; $= 1$

$$K_{iz} := \left(\frac{z}{33}\right)^{0.1} = 1.138$$

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.707$$

Velocity Pressure Coefficient Antennas =

$$Kz := 2.01 \cdot \left(\left(\frac{z}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.315$$

Velocity Pressure w/o Ice Antennas = $qz := 0.00256 \cdot K_d \cdot Kz \cdot V^2 \cdot I_{Wind} = 29$ psf

Velocity Pressure with Ice Antennas = $qz_{ice} := 0.00256 \cdot K_d \cdot Kz \cdot V_i^2 \cdot I_{Wind} = 7$ psf

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	JMA MX06FRO660		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 71.3$	in	(User Input)
Antenna Width =	$W_{ant} := 15.4$	in	(User Input)
Antenna Thickness =	$T_{ant} := 10.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 75$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.6$		
Antenna Force Coefficient =	$Ca_{ant} = 1.29$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 7.6$	sf
Total Antenna Wind Force Front =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 331$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.3$	sf
Total Antenna Wind Force Side =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 230$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 9.8$	sf
Total Antenna Wind Force w/ Ice Front =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 104$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 7.3$	sf
Total Antenna Wind Force w/ Ice Side =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 78$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 75$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1 \cdot 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 8089$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 262$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 262$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Samsung MT6407-774 (**AKA** VZS01)		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 35.1$	in	(User Input)
Antenna Width =	$W_{ant} := 16.1$	in	(User Input)
Antenna Thickness =	$T_{ant} := 5.5$	in	(User Input)
Antenna Weight =	$WT_{ant} := 87$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 2.2$		
Antenna Force Coefficient =	$Ca_{ant} = 1.2$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 3.9$	sf
Total Antenna Wind Force Front =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 158$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.3$	sf
Total Antenna Wind Force Side =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 54$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 5.2$	sf
Total Antenna Wind Force w/ Ice Front =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 52$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 2.4$	sf
Total Antenna Wind Force w/ Ice Side =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 24$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 87$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 3108$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 3591$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 116$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 116$	lbs

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Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Samsung CBRS		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 35.1$	in	(User Input)
Antenna Width =	$W_{ant} := 16.1$	in	(User Input)
Antenna Thickness =	$T_{ant} := 5.5$	in	(User Input)
Antenna Weight =	$WT_{ant} := 87.0$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 2.2$		
Antenna Force Coefficient =	$Ca_{ant} = 1.2$		

Wind Load (without ice)

Surface Area for One Antenna = $SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 3.9$ sf

Total Antenna Wind Force Front = $F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 158$ lbs

Surface Area for One Antenna = $SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.3$ sf

Total Antenna Wind Force Side = $F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 54$ lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 5.2$ sf

Total Antenna Wind Force w/ Ice Front = $Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 52$ lbs

Surface Area for One Antenna w/ Ice = $SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 2.4$ sf

Total Antenna Wind Force w/ Ice Side = $Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 24$ lbs

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 87$ lbs

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 3108$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 3591$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 116$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 116$ lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model = Samsung B2/B66A RRH - BR049

RRUS Shape = Flat (User Input)

RRUS Height = $L_{RRUS} := 15.0$ in (User Input)

RRUS Width = $W_{RRUS} := 15.0$ in (User Input)

RRUS Thickness = $T_{RRUS} := 10.0$ in (User Input)

RRUS Weight = $WT_{RRUS} := 84.4$ lbs (User Input)

Number of RRUS's = $N_{RRUS} := 1$

RRUS Aspect Ratio = $Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1$

RRUS Force Coefficient = $Ca_{RRUS} = 1.2$

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.6$ sf

Total RRUS Wind Force = $F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 63$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1$ sf

Total RRUS Wind Force = $F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 42$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.4$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 23$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.7$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 17$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 84$ lbs

Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2250$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2298$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 74$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 74$ lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model = CBRS RRH - RT4401-48A

RRUS Shape = Flat (User Input)

RRUS Height = $L_{RRUS} := 12.1$ in (User Input)

RRUS Width = $W_{RRUS} := 8.5$ in (User Input)

RRUS Thickness = $T_{RRUS} := 4.1$ in (User Input)

RRUS Weight = $WT_{RRUS} := 18.6$ lbs (User Input)

Number of RRUS's = $N_{RRUS} := 1$

RRUS Aspect Ratio = $Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.4$

RRUS Force Coefficient = $Ca_{RRUS} = 1.2$

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 0.7$ sf

Total RRUS Wind Force = $F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 29$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 0.3$ sf

Total RRUS Wind Force = $F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 14$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 1.3$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 13$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 0.8$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 8$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 19$ lbs

Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 422$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 967$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 31$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 31$ lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model =	Samsung B5/B13 RRH - BR04C		
RRUS Shape =	Flat		(User Input)
RRUS Height =	$L_{RRUS} := 15.0$	in	(User Input)
RRUS Width =	$W_{RRUS} := 15.0$	in	(User Input)
RRUS Thickness =	$T_{RRUS} := 8.1$	in	(User Input)
RRUS Weight =	$WT_{RRUS} := 70.3$	lbs	(User Input)
Number of RRUS's =	$N_{RRUS} := 1$		
RRUS Aspect Ratio =	$Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1$		
RRUS Force Coefficient =	$Ca_{RRUS} = 1.2$		

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.6$ sf

Total RRUS Wind Force = $F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 63$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 0.8$ sf

Total RRUS Wind Force = $F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 34$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.4$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 23$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.5$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 15$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 70$ lbs

Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 1823$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2081$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 67$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 67$ lbs

Development of Wind & Ice Load on SA's

SA Data:

Appurtenance Model =	RayCap RCMDC-6600-PF-48		
Appurtenance Shape =	Flat	in	(User Input)
Appurtenance Height =	$L_{SA} := 12.6$	in	(User Input)
Appurtenance Width =	$W_{SA} := 16.5$	in	(User Input)
Appurtenance Thickness =	$T_{SA} := 29.5$	lbs	(User Input)
Appurtenance Weight =	$WT_{SA} := 31.5$		(User Input)
Number of Appurtenance =	$N_{SA} := 1$		(User Input)

Appurtenance Aspect Ratio = $Ar_{SA} := \frac{L_{SA}}{W_{SA}} = 0.8$

Appurtenance Force Coefficient = $Ca_{SA} = 1.2$

Wind Load (without ice)

SA Surface Area Front = $SA_{SAF} := \frac{L_{SA} \cdot W_{SA}}{144} = 1.4$ sf

Total SA Wind Front= $F_{SAF} := qz \cdot G_H \cdot Ca_{SA} \cdot K_a \cdot SA_{SAF} = 58$ lbs

SA Surface Area Side = $SA_{SAS} := \frac{L_{SA} \cdot T_{SA}}{144} = 2.6$ sf

Total SA Wind Side= $F_{SAS} := qz \cdot G_H \cdot Ca_{SA} \cdot K_a \cdot SA_{SAS} = 104$ lbs

Wind Load (with ice)

SA Projected Surface Area for w/ Ice Front = $SA_{ICESAF} := \frac{(L_{SA} + 2 \cdot t_{iz}) \cdot (W_{SA} + 2 \cdot t_{iz})}{144} = 2.2$ sf

Total SA Wind Force w/ Ice Front = $Fi_{SAF} := qz_{ice} \cdot G_H \cdot Ca_{SA} \cdot K_a \cdot SA_{ICESAF} = 22$ lbs

SA Projected Surface Area for w/ Ice Side = $SA_{ICESAS} := \frac{(L_{SA} + 2 \cdot t_{iz}) \cdot (T_{SA} + 2 \cdot t_{iz})}{144} = 3.7$ sf

Total SA Wind Force w/ Ice Side = $Fi_{SAS} := qz_{ice} \cdot G_H \cdot Ca_{SA} \cdot K_a \cdot SA_{ICESAS} = 36$ lbs

Gravity Load (without ice)

Weight of All SA's = $WT_{SA} \cdot N_{SA} = 32$ lbs

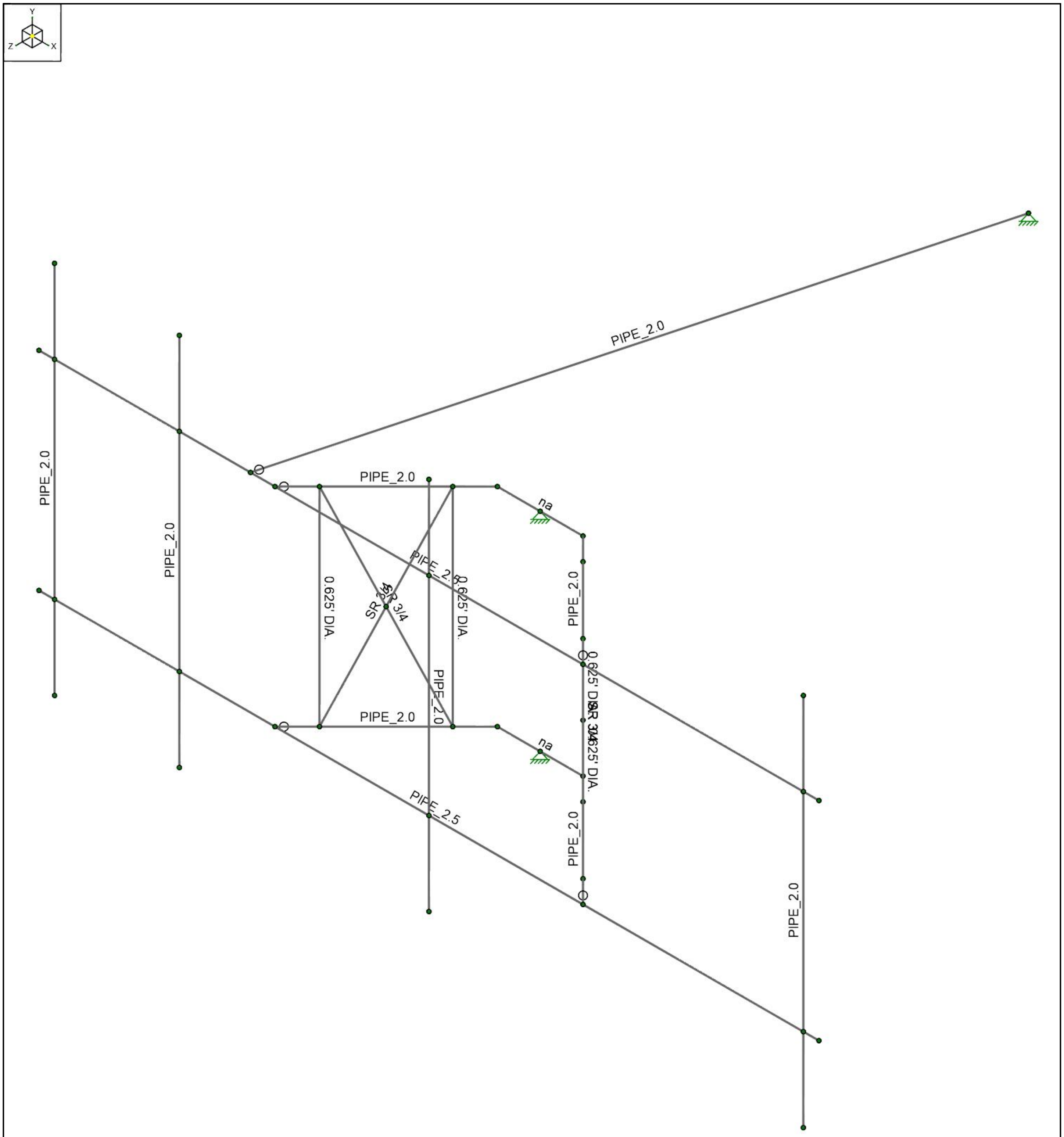
Gravity Loads (ice only)

Volume of Each SA = $V_{SA} := L_{SA} \cdot W_{SA} \cdot T_{SA} = 6133$ cu in

Volume of Ice on Each SA = $V_{iceSA} := (L_{SA} + 2 \cdot t_{iz}) \cdot (W_{SA} + 2 \cdot t_{iz}) \cdot (T_{SA} + 2 \cdot t_{iz}) - V_{SA} = 4362$ cu in

Weight of Ice on Each SA = $W_{ICESA} := \frac{V_{iceSA}}{1728} \cdot Id = 141$ lbs

Weight of Ice on All SA's = $W_{ICESA} \cdot N_{SA} = 141$ lbs



Envelope Only Solution

Centek Engineering	Madison 6 - Mount	SK-1
FJP		May 29, 2021 at 02:35 PM
20083.14	Member Framing	Madison 6 CT_AMA.R3D

Model Settings

Number of Reported Sections	5
Number of Internal Sections	97
Member Area Load Mesh Size (in^2)	144
Consider Shear Deformation	Yes
Consider Torsional Warping	Yes

Approximate Mesh Size (in)	12
Transfer Forces Between Intersecting Wood Walls	Yes
Increase Wood Wall Nailing Capacity for Wind Loads	Yes
Include P-Delta for Walls	Yes
Optimize Masonry and Wood Walls	Yes
Maximum Number of Iterations	3

Single	No
Multiple (Optimum)	Yes
Maximum	No

Global Axis corresponding to vertical direction	Y
Convert Existing Data	Yes

Default Global Plane for z-axis	XZ

Plate Local Axis Orientation	Nodal

Hot Rolled Steel	AISC 15th (360-16): LRFD
Stiffness Adjustment	Yes (Iterative)
Notional Annex	None
Connections	AISC 15th (360-16): LRFD
Cold Formed Steel	AISI S100-10: ASD
Stiffness Adjustment	Yes (Iterative)
Wood	AWC NDS-12: ASD
Temperature	< 100F
Concrete	ACI 318-11
Masonry	ACI 530-11: ASD
Aluminum	AA ADM1-10: ASD
Structure Type	Building
Stiffness Adjustment	Yes (Iterative)
Stainless	AISC 14th (360-10): ASD
Stiffness Adjustment	Yes (Iterative)

Analysis Methodology	Exact Integration Method
Parme Beta Factor	0.65
Compression Stress Block	Rectangular Stress Block
Analyze using Cracked Sections	Yes
Leave room for horizontal rebar splices (2*d bar spacing)	No
List forces which were ignored for design in the Detail Report	Yes

Column Min Steel	1
Column Max Steel	8
Rebar Material Spec	ASTM A615
Warn if beam-column framing arrangement is not understood	No
Number of Shear Regions	4
Region 2 & 3 Spacing Increase Increment (in)	4

Code	ASCE 7-10

Model Settings (Continued)

Risk Category	I
Drift Cat	Other
Base Elevation (ft)	-999999
Include the weight of the structure in base shear calcs	Yes

S_1(g)	1
SD_1(g)	1
SD_S(g)	1
T_L(sec)	5

T (sec)	
T (sec)	
C_t	0.02
C_t	0.02
C_tExp.	0.75
C_tExp.	0.75
R	3
R	3
Ω_0	1
Ω_0	1
C_d	1
C_d	1
ρ	1
ρ	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. C…	Density [k…	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	58	1.2
3	A992	29000	11154	0.3	0.65	0.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	0.3	0.65	0.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	0.3	0.65	0.49	46	1.2	58	1.1
6	A53 Grad…	29000	11154	0.3	0.65	0.49	35	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	Antenna…	PIPE_2.0	Column	Pipe	A53 Grad…	Typical	1.02	0.627	0.627	1.25
2	Horizontal…	PIPE_2.5	Beam	Pipe	A53 Grad…	Typical	1.61	1.45	1.45	2.89
3	Outrigger…	PIPE_2.0	Beam	Pipe	A53 Grad…	Typical	1.02	0.627	0.627	1.25
4	Stabilizer…	PIPE_2.0	Beam	Pipe	A53 Grad…	Typical	1.02	0.627	0.627	1.25
5	0.625" Di…	0.625' DIA.	Column	BAR	A36 Gr.36	Typical	0.307	0.007	0.007	0.015
6	0.75"Dia.…	SR 3/4	Column	BAR	A36 Gr.36	Typical	0.442	0.016	0.016	0.031

Hot Rolled Member Properties

	Label	Shape	Length [in]	Lb y-y [in]	Lb z-z [in]	Lcomp t…	Lcomp…	L-Torqu…	K y-y	K z-z	Cb	Function
1	H1	Horizon…	150	Segment		Lbyy						Lateral
2	H2	Horizon…	150	Segment		Lbyy						Lateral
3	M3	Stabiliz…	122.16			Lbyy						Lateral
4	M4	Outrigg…	30.249	Segment	Segment	Lbyy						Lateral
5	M5	Outrigg…	30.249	Segment	Segment	Lbyy						Lateral
6	M6	Outrigg…	30.249	Segment	Segment	Lbyy						Lateral
7	M7	Outrigg…	30.249	Segment	Segment	Lbyy						Lateral
8	M8	0.625"…	40									Lateral
9	M9	0.625"…	40									Lateral
10	M10	0.75"Di…	43.913	21.956	21.956	Lbyy						Lateral
11	M11	0.625"…	40									Lateral
12	M12	0.75"Di…	43.913	21.956	21.956	Lbyy						Lateral
13	M13	0.625"…	40									Lateral
14	M14	0.75"Di…	43.913	21.956	21.956	Lbyy						Lateral
15	M15	0.75"Di…	43.913	21.956	21.956	Lbyy						Lateral
16	PS.1	Antenn…	72			Lbyy						Lateral
17	PS.2	Antenn…	72			Lbyy						Lateral
18	PS.3	Antenn…	72			Lbyy						Lateral
19	M21	Antenn…	72			Lbyy						Lateral

Primary Member Properties

	Label	I Node	J Node	K Node	Rotate(deg)	Section/S…	Type	Design List	Material	Design Rule
1	H1	N2	N34			Horizontal…	Beam	Pipe	A53 Grad…	Typical
2	H2	N1	N33			Horizontal…	Beam	Pipe	A53 Grad…	Typical
3	M3	N7	N8			Stabilizer…	Beam	Pipe	A53 Grad…	Typical
4	M4	N10	N20			Outrigger…	Beam	Pipe	A53 Grad…	Typical
5	M5	N9	N19			Outrigger…	Beam	Pipe	A53 Grad…	Typical
6	M6	N28	N22			Outrigger…	Beam	Pipe	A53 Grad…	Typical
7	M7	N27	N21			Outrigger…	Beam	Pipe	A53 Grad…	Typical
8	M8	N12	N11			0.625" Di…	Column	BAR	A36 Gr.36	Typical
9	M9	N18	N17			0.625" Di…	Column	BAR	A36 Gr.36	Typical
10	M10	N12	N17			0.75"Dia.…	Column	BAR	A36 Gr.36	Typical
11	M11	N26	N25			0.625" Di…	Column	BAR	A36 Gr.36	Typical
12	M12	N18	N11			0.75"Dia.…	Column	BAR	A36 Gr.36	Typical
13	M13	N24	N23			0.625" Di…	Column	BAR	A36 Gr.36	Typical
14	M14	N26	N23			0.75"Dia.…	Column	BAR	A36 Gr.36	Typical
15	M15	N24	N25			0.75"Dia.…	Column	BAR	A36 Gr.36	Typical
16	PS.1	N5	N6			Antenna…	Column	Pipe	A53 Grad…	Typical
17	PS.2	N16	N15			Antenna…	Column	Pipe	A53 Grad…	Typical

Primary Member Properties (Continued)

	Label	I Node	J Node	K Node	Rotate(deg)	Section/S…	Type	Design List	Material	Design Rule
18	PS.3	N31	N32			Antenna…	Column	Pipe	A53 Grad…	Typical
19	M19	N20	N22			RIGID	None	None	RIGID	Typical
20	M20	N19	N21			RIGID	None	None	RIGID	Typical
21	M21	N37	N38			Antenna…	Column	Pipe	A53 Grad…	Typical

Nodes

	Label	X [in]	Y [in]	Z [in]	Temp [deg F]	Detach From Dia…
1	N1	0	1	0.		
2	N2	0	41	0.		
3	N3	3	1	0.		
4	N4	3	41	0.		
5	N5	3	-15	0.		
6	N6	3	57	0.		
7	N7	40.6875	41	0.		
8	N8	72.304835	41	-117.997499		
9	N9	45.375	1	0.		
10	N10	45.375	41	0.		
11	N11	49.663532	1	-4.288532		
12	N12	49.663532	41	-4.288532		
13	N13	75	1	0.		
14	N14	75	41	0.		
15	N15	75	-15	0.		
16	N16	75	57	0.		
17	N17	62.476024	1	-17.101024		
18	N18	62.476024	41	-17.101024		
19	N19	66.764556	1	-21.389556		
20	N20	66.764556	41	-21.389556		
21	N21	83.235444	1	-21.389556		
22	N22	83.235444	41	-21.389556		
23	N23	87.523976	1	-17.101024		
24	N24	87.523976	41	-17.101024		
25	N25	100.336468	1	-4.288532		
26	N26	100.336468	41	-4.288532		
27	N27	104.625	1	0.		
28	N28	104.625	41	0.		
29	N29	147	1	0.		
30	N30	147	41	0.		
31	N31	147	-15	0.		
32	N32	147	57	0.		
33	N33	150	1	0.		
34	N34	150	41	0.		
35	N35	75	41	-21.389556		
36	N36	75	1	-21.389556		
37	N37	27	-15	0.		
38	N38	27	57	0.		
39	N39	27	41	0.		
40	N40	27	1	0.		
41	N41	56.069778	21	-10.694778		
42	N42	93.930222	21	-10.694778		

Basic Load Cases

	BLC Desc…	Category	X Gravity	Y Gravity	Z Gravity	Nodal	Point	Distributed	Area(Me…	Surface(P…
1	Self Weight	None		-1						
2	Equipmen…	None					12			
3	Ice Weight	None					12			
4	Wind w/ I…	None					12	13		
5	Wind X(2…	None					12	13		

Basic Load Cases (Continued)

	BLC Desc…	Category	X Gravity	Y Gravity	Z Gravity	Nodal	Point	Distributed	Area(Me…	Surface(P…
6	Wind w/ I…	None					12	12		
7	Wind Z (2…	None					12	12		

Load Combinations

	De…	So…	PD…	SR…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…
1	1.2…	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9…	Yes	Y		1	0.9	2	0.9	5	1.6														
3	1.2…	Yes	Y		1	1.2	2	1.2	3	1	4	1												
4	1.2…	Yes	Y		1	1.2	2	1.2	7	1.6														
5	0.9…	Yes	Y		1	0.9	2	0.9	7	1.6														
6	1.2…	Yes	Y		1	1.2	2	1.2	3	1	6	1												

Node Reactions

	Node…		X [lbs]	LC	Y [lbs]	LC	Z [lbs]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N8	max	345.411	4	21.335	4	-225.195	6	0	6	0	6	0	6
2		min	59.425	3	15.995	2	-1288.…	4	0	1	0	1	0	1
3	N35	max	228.686	6	1042.7…	3	734.898	2	0	6	0	6	0	6
4		min	-1055.…	2	303.374	5	-1083.…	6	0	1	0	1	0	1
5	N36	max	-16.153	5	1050.7…	6	1089.3…	3	0	6	0	6	0	6
6		min	-805.803	1	373.595	2	-713.313	5	0	1	0	1	0	1
7	Totals:	max	0	6	2100.4…	6	0	3						
8		min	-1594.…	2	773.564	2	-2208.…	4						

Node Displacements

	Node…		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rota…	LC	Y Rota…	LC	Z Rota…	LC
1	N1	max	0.085	1	-0.07	5	0.792	4	-8.751…	3	1.84e-02	5	2.284e…	3
2		min	0.018	6	-0.159	3	0.05	3	-6.258…	5	2.083e…	3	1.63e-03	5
3	N2	max	0.028	2	-0.069	2	0.643	4	-2.093…	6	1.806e…	4	2.179e…	3
4		min	-0.025	4	-0.159	3	0.009	2	-3.051…	2	2.215e…	2	1.34e-03	2
5	N3	max	0.085	1	-0.065	2	0.737	4	-8.751…	3	1.84e-02	5	2.284e…	3
6		min	0.018	6	-0.152	3	0.049	3	-6.258…	5	2.083e…	3	1.63e-03	5
7	N4	max	0.028	2	-0.065	2	0.589	4	-2.093…	6	1.806e…	4	2.179e…	3
8		min	-0.025	4	-0.152	3	0.009	2	-3.051…	2	2.215e…	2	1.34e-03	2
9	N5	max	0.126	1	-0.065	2	0.849	4	-8.744…	3	1.84e-02	5	2.656e…	1
10		min	0.052	6	-0.152	3	0.063	3	-7.206…	5	2.083e…	3	1.629e…	5
11	N6	max	0.015	2	-0.065	2	0.596	4	6.025e…	4	1.806e…	4	2.177e…	6
12		min	-0.053	4	-0.152	3	-0.04	2	-3.051…	2	2.215e…	2	6.773e…	2
13	N7	max	0.028	2	-0.009	5	0.014	2	1.756e…	6	9.961e…	4	2.742e…	3
14		min	-0.025	4	-0.044	3	-0.002	6	-1.728…	2	-9.62e…	2	9.012e…	2
15	N8	max	0	3	0	2	0	4	1.587e…	4	3.479e…	2	3.184e…	3
16		min	0	4	0	4	0	6	1.052e…	2	-1.969…	4	1.213e…	5
17	N9	max	0.085	1	-0.005	2	0.103	1	-1.001…	3	1.123e…	4	2.219e…	3
18		min	0.017	6	-0.032	6	0.019	6	-3.144…	5	7.375e…	3	5.19e-04	5
19	N10	max	0.028	2	-0.006	5	0.019	2	2.716e…	6	7.706e…	4	2.224e…	3
20		min	-0.025	4	-0.032	3	-0.041	4	-1.457…	2	-9.888…	2	5.863e…	2
21	N11	max	0.065	1	-0.005	2	0.083	1	-2.098…	3	4.596e…	1	1.699e…	6
22		min	0.013	6	-0.022	3	0.014	6	-1.652…	5	1.036e…	6	6.966e…	2
23	N12	max	0.018	2	-0.005	2	0.01	2	-1.503…	6	2.082e…	2	1.636e…	3
24		min	-0.021	4	-0.022	3	-0.037	4	-9.315…	2	-9.097…	4	1.404e…	5
25	N13	max	0.085	1	0	3	0.012	2	2.723e…	3	3.687e…	1	5.274e…	6
26		min	0.017	6	-0.005	4	-0.126	4	-4.444…	5	5.955e…	6	1.9e-04	2
27	N14	max	0.028	2	-0.001	3	0.02	1	6.962e…	4	8.806e…	2	5.426e…	3
28		min	-0.025	4	-0.005	4	-0.111	5	-2.716…	2	-1.757…	4	2.417e…	5
29	N15	max	0.088	1	0	3	0.013	2	2.723e…	3	3.687e…	1	5.274e…	6
30		min	0.026	6	-0.005	4	-0.119	4	-4.807…	5	5.955e…	6	2.2e-04	2
31	N16	max	0.025	2	-0.001	3	0.02	1	7.883e…	4	8.806e…	2	5.283e…	6
32		min	-0.029	4	-0.005	4	-0.099	5	-2.717…	2	-1.757…	4	1.86e-04	2

Node Displacements (Continued)

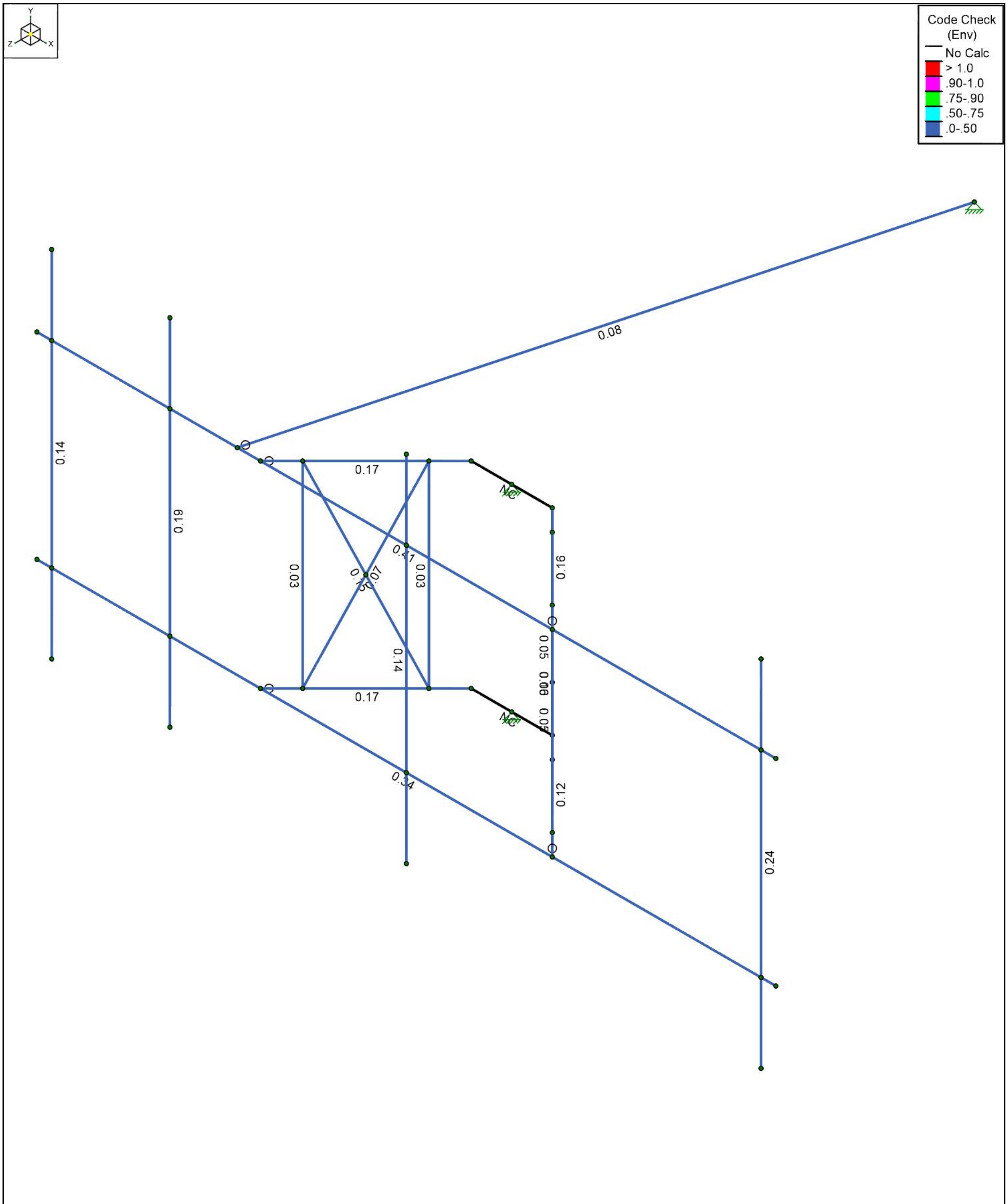
	Node…		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rota…	LC	Y Rota…	LC	Z Rota…	LC
33	N17	max	0.012	1	-0.011	2	0.032	1	5.332e…	3	3.234e…	1	8.608e…	6
34		min	0.002	6	-0.018	3	0.003	6	-4.405…	5	5.36e-04	6	6.063e…	2
35	N18	max	0	3	-0.011	2	0.002	3	5.812e…	6	3.417e…	2	8.515e…	3
36		min	-0.007	4	-0.018	3	-0.022	5	-2.343…	2	-1.471…	4	4.59e-04	4
37	N19	max	0	3	-0.007	2	0.02	1	1.248e…	3	2.379e…	1	1.077e…	3
38		min	0	5	-0.009	3	0.002	6	2.772e…	5	2.233e…	6	8.642e…	2
39	N20	max	0	2	-0.007	2	0.001	3	1.259e…	6	1.535e…	3	1.075e…	3
40		min	0	6	-0.009	3	-0.015	5	3.588e…	2	-1.836…	5	8.543e…	2
41	N21	max	0	5	0.009	3	-0.002	6	1.248e…	3	2.379e…	1	1.077e…	3
42		min	0	3	0.007	2	-0.02	1	2.772e…	5	2.233e…	6	8.642e…	2
43	N22	max	0	6	0.009	3	0.015	5	1.259e…	6	1.535e…	3	1.075e…	3
44		min	0	2	0.007	2	-0.001	3	3.588e…	2	-1.836…	5	8.543e…	2
45	N23	max	0.012	1	0.008	5	-0.004	6	1.013e…	3	3.234e…	1	6.925e…	3
46		min	0.002	6	0.006	6	-0.032	1	5.733e…	5	5.312e…	6	4.542e…	5
47	N24	max	0	3	0.008	5	0.022	5	1.005e…	3	3.863e…	2	6.925e…	3
48		min	-0.007	5	0.006	6	-0.002	3	5.989e…	2	-1.472…	4	4.789e…	2
49	N25	max	0.064	1	0.002	3	-0.014	6	9.697e…	1	4.604e…	1	-2.473…	2
50		min	0.012	6	-0.002	1	-0.084	1	7.316e…	6	1.033e…	6	-7.855…	6
51	N26	max	0.019	2	0.002	3	0.037	4	1.048e…	4	2.182e…	2	-2.575…	5
52		min	-0.021	4	-0.003	1	-0.012	2	7.419e…	6	-9.222…	4	-7.797…	3
53	N27	max	0.085	1	-0.007	2	-0.019	6	1.048e…	3	3.667e…	1	-4.831…	2
54		min	0.017	6	-0.009	4	-0.104	1	7.052e…	5	-7.214…	5	-1.64e…	6
55	N28	max	0.028	2	-0.007	5	0.041	4	1.072e…	4	2.035e…	2	-5.074…	5
56		min	-0.025	4	-0.01	1	-0.022	2	9.58e-04	2	-8.368…	4	-1.659…	3
57	N29	max	0.085	1	-0.026	5	0.458	5	2.047e…	1	2.716e…	1	3.354e…	5
58		min	0.016	6	-0.128	6	-0.231	1	1.154e…	6	-1.398…	5	-1.792…	3
59	N30	max	0.029	2	-0.026	5	0.526	4	2.062e…	1	2.966e…	2	4.238e…	2
60		min	-0.025	4	-0.128	6	-0.135	2	9.161e…	6	-1.304…	4	-1.757…	6
61	N31	max	0.084	2	-0.026	5	0.427	5	2.047e…	1	2.716e…	1	3.354e…	5
62		min	-0.012	6	-0.128	6	-0.264	1	1.148e…	6	-1.398…	5	-1.786…	3
63	N32	max	0.028	3	-0.026	5	0.545	4	2.062e…	1	2.966e…	2	3.938e…	2
64		min	-0.03	5	-0.128	6	-0.103	2	9.216e…	6	-1.304…	4	-1.757…	6
65	N33	max	0.085	1	-0.025	5	0.5	5	2.047e…	1	2.716e…	1	3.354e…	5
66		min	0.016	6	-0.133	6	-0.24	1	1.154e…	6	-1.398…	5	-1.792…	3
67	N34	max	0.029	2	-0.025	5	0.565	4	2.062e…	1	2.966e…	2	4.238e…	2
68		min	-0.025	4	-0.133	6	-0.144	2	9.161e…	6	-1.304…	4	-1.757…	6
69	N35	max	0	2	0	5	0	6	1.259e…	6	1.535e…	3	1.075e…	3
70		min	0	6	0	3	0	2	3.588e…	2	-1.836…	5	8.543e…	2
71	N36	max	0	1	0	2	0	5	1.248e…	3	2.379e…	1	1.077e…	3
72		min	0	5	0	6	0	3	2.772e…	5	2.233e…	6	8.642e…	2
73	N37	max	0.122	1	-0.026	2	0.405	4	-6.733…	3	1.644e…	5	2.943e…	3
74		min	0.057	5	-0.085	3	0.054	3	-6.15e…	5	3.037e…	3	1.494e…	5
75	N38	max	0.015	2	-0.026	2	0.188	4	7.67e-04	4	1.522e…	4	2.72e-03	6
76		min	-0.054	6	-0.085	3	-0.034	2	-2.518…	2	-1.598…	2	6.754e…	2
77	N39	max	0.028	2	-0.026	2	0.178	4	-1.049…	6	1.522e…	4	2.741e…	3
78		min	-0.025	4	-0.085	3	0.003	3	-2.518…	2	-1.598…	2	1.338e…	2
79	N40	max	0.085	1	-0.026	2	0.31	4	-6.738…	3	1.644e…	5	2.806e…	3
80		min	0.018	6	-0.085	3	0.043	3	-5.202…	5	3.037e…	3	1.495e…	5
81	N41	max	0.025	1	-0.008	2	0.03	1	-4.953…	6	2.682e…	1	8.116e…	5
82		min	-0.003	5	-0.02	3	-0.004	5	-1.909…	4	-5.4e-06	5	-1.523…	6
83	N42	max	0.024	1	0.005	3	0	5	1.764e…	5	2.718e…	1	1.096e…	4
84		min	0.001	5	0.002	1	-0.03	1	6.833e…	6	1.489e…	6	3.562e…	6

LRFD

	Member	Shape	Code…	Loc [in]	LC	Shear…	Loc [in]	Dir	LC	phi*P…	phi*P…	phi*M…	phi*M…	Cb	Eqn
1	H1	PIPE…	0.410	40.625	4	0.119	45.313		1	14558…	50715	3.596	3.596	1.609	H1-1b
2	H2	PIPE…	0.344	46.875	4	0.129	45.313		4	14558…	50715	3.596	3.596	1.729	H1-1b
3	M3	PIPE…	0.077	61.08	1	0.004	122.16		1	9491.…	32130	1.872	1.872	1.136	H1-1b

LRFD (Continued)

	Member	Shape	Code…	Loc [in]	LC	Shear…	Loc [in]	Dir	LC	phi*P…	phi*P…	phi*M…	phi*M…	Cb	Eqn
4	M4	PIPE…	0.169	24.263	1	0.102	5.987		3	32031…	32130	1.872	1.872	1.424	H1-1b
5	M5	PIPE…	0.172	24.263	3	0.105	30.249		6	32031…	32130	1.872	1.872	1.668	H1-1b
6	M6	PIPE…	0.157	30.249	1	0.097	30.249		3	32031…	32130	1.872	1.872	1.776	H1-1b
7	M7	PIPE…	0.124	30.249	1	0.099	30.249		6	32031…	32130	1.872	1.872	1.913	H1-1b
8	M8	0.625'…	0.028	40	6	0.012	40		4	1057.…	9940.19	0.104	0.104	2.259	H1-1b
9	M9	0.625'…	0.031	40	4	0.014	40		4	1057.…	9940.19	0.104	0.104	2.205	H1-1b
10	M10	SR 3/4	0.152	43.913	3	0.015	0		4	6954.33	14313…	0.179	0.179	1	H1-1b*
11	M11	0.625'…	0.047	40	1	0.012	40		4	1057.…	9940.19	0.104	0.104	2.269	H1-1b
12	M12	SR 3/4	0.067	43.913	6	0.020	21.956		1	6954.33	14313…	0.179	0.179	2.267	H1-1b
13	M13	0.625'…	0.049	40	4	0.013	40		4	1057.…	9940.19	0.104	0.104	2.237	H1-1b*
14	M14	SR 3/4	0.102	43.913	6	0.017	0		4	6954.33	14313…	0.179	0.179	2.643	H1-1b*
15	M15	SR 3/4	0.056	43.913	6	0.024	21.956		1	6954.33	14313…	0.179	0.179	2.654	H1-1b
16	PS.1	PIPE…	0.139	55.5	6	0.029	56.25		4	20866…	32130	1.872	1.872	1.555	H1-1b
17	PS.2	PIPE…	0.136	55.5	5	0.080	55.5		4	20866…	32130	1.872	1.872	1.556	H1-1b
18	PS.3	PIPE…	0.236	55.5	3	0.046	16.5		4	20866…	32130	1.872	1.872	1.562	H1-1b
19	M21	PIPE…	0.193	55.5	6	0.029	56.25		4	20866…	32130	1.872	1.872	1.555	H1-1b



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek Engineering	Madison 6 - Mount	SK-3
FJP		May 29, 2021 at 02:43 PM
20083.14	Member Unity Check	Madison 6 CT_AMA.R3D