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March 31, 2023

Via Electronic Mail

Melanie A. Bachman, Esq.
Executive Director/Staff Attorney
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Petition No. 1543 – Petition for a Declaratory Ruling on the Need to Obtain a Siting Council Certificate for the Installation of a Telecommunications Facility at 19 Kenosia Avenue, Danbury, Connecticut**

Dear Attorney Bachman:

As you are aware, the Council approved Petition No. 1543 on December 23, 2022, subject to conditions including, but not limited to, the delegation of "any project changes" to Council staff.

After receiving the approval, it was discovered that the Structural Analysis ("SA") submitted with Petition No. 1543 did not specify the correct remote radio head ("RRH") model that Cellco intends to install at the 19 Kenosia Avenue facility. Cellco did however provide the Council with the correct RRH specification sheets in the Petition No. 1543 filing. Attached to this letter is an updated SA referencing the correct RRH model.

If you have any questions or need any additional information about this change, please contact me.

Sincerely,

Kenneth C. Baldwin

Attachments

Copy to:
- Tim Parks
- Karla Hanna
- Christina Glass, SAI Communications

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Screen Wall/Platform

Proposed Verizon Wireless
Rooftop Site Build

Site Ref: Ridgefield-Boehringer

19 Kenosia Ave
Danbury, CT

CENTEK Project No. 21058.02

Date: ~~October 21, 2022~~

Rev 2: March 24, 2023

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

Prepared for:

Verizon Wireless
20 Alexander Drive
Wallingford, CT 06492

Table of Contents

Introduction

The purpose of this structural analysis report (SAR) is to summarize the results, of the impacted structural components, by the proposed equipment site build proposed by Verizon Wireless on the existing host building located in Danbury, CT.

The antennas are mounted within (2) proposed screen wall enclosures on roof of the host building. The Verizon equipment cabinets and other components are mounted on a proposed steel dunnage platform on roof of the host building. The screen wall enclosures and platform are anchored to the existing wide flange beams.

Primary Assumptions Used in the Analysis

- The host structure's theoretical capacity not including any assessment of the condition of the host structure.
- The proposed elevated steel antenna frames carry the horizontal and vertical loads due to the weight of equipment, and wind and transfers into host structure.
- Proposed reinforcement and support steel will be properly installed and maintained.
- Structure is in plumb condition.
- Loading for equipment and enclosure as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as observed during roof framing mapping.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.

Antenna and Equipment Summary

Location	Appurtenance / Equipment	Rad Center Elevation (AGL)	Mount Type
Alpha Sector	**(1) JMA MX08FIT265-01 Antenna** **(2) JMA MX10FR0640 Antenna** **(1) Samsung B5/B13 RRH–RF4440d-13A** **(1) Samsung B2/B66A RRH–RF4439d-25A** **(1) Commscope CBC78T-DS-43 Diplexer** **(1) RT-8808-77A**	58-ft	Screen Wall Enclosure on host building roof
Beta Sector	**(2) JMA MX10FR0640 Antenna** **(1) Samsung B5/B13 RRH–RF4440d-13A** **(1) Samsung B2/B66A RRH–RF4439d-25A** **(1) Commscope CBC78T-DS-43 Diplexer** **(1) RT-8808-77A**	58-ft	Screen Wall Enclosure on host building roof
Gamma Sector	**(1) JMA MX08FIT265-01 Antenna** **(2) JMA MX10FR0640 Antenna** **(1) Samsung B5/B13 RRH–RF4440d-13A** **(1) Samsung B2/B66A RRH–RF4439d-25A** **(1) Commscope CBC78T-DS-43 Diplexer** **(1) RT-8808-77A**	58-ft	Screen Wall Enclosure on host building roof

Equipment – Indicates equipment to be installed.

Analysis

The roof framing were analyzed using a comprehensive computer program titled Risa3D. The program analyzes the equipment platform and antenna mounts considering the worst case code prescribed loading condition. The structures were considered to be loaded by concentric forces, and the model assumes that the members are subjected to bending, axial, and shear forces.

Design Loading

Loading was determined per the requirements of the 2021 International Building Code amended by the 2022 CSBC and ASCE 7-16 “Minimum Design Loads for Buildings and Other Structures”.

Wind Speed:	V_{ult} = 120 mph	*Appendix P of the 2022 CT State Building Code*
Risk Category:	II	*2021 IBC; Table 1604.05*
Exposure Category:	Surface Roughness B	*ASCE 7-16; Section 26.7.2*
Ground Snow Load	30 psf	*Appendix P of the 2022 CT State Building Code*
Dead Load	Equipment and framing self-weight	*Identified within SAR design calculations*
Live Load	20 psf	*ASCE 7-16; Table 4-1 “Roofs – All Other Construction”*

Reference Standards

2021 International Building Code:

1. ACI 318-14, *Building Code Requirements for Structural Concrete*.
2. ACI 530-13, *Building Code Requirements for Masonry Structures*.
3. AISC 360-10, *Specification for Structural Steel Buildings*

Results

Structure stresses were calculated utilizing the structural analysis software RISA 3D. The stresses were determined based on the AISC standard.

- Calculated stresses for the antenna screenwalls, platforms, and host building were found to **be within allowable** limits.

Sector	Component	Stress Ratio (percentage of capacity)	Result
Equipment Platform	W12X35 Platform Beam	15%	**PASS**
	W12X26 Platform Beam	32%	**PASS**
	W8X24 Platform Beam	21%	**PASS**
	HSS4x4x1/4 Platform Post	68%	**PASS**
	Connection to Existing Member(s)	39%	**PASS**
	Existing W18 Roof Member	89%	**PASS**
Alpha/Beta/Gamma	HSS2-1/2x2-1/2x5/16 Screen Wall Vertical Member	85%	**PASS**
	HSS2-1/2x2-1/2x1/4 Screen Wall Horizontal Member	65%	**PASS**
	L2x2x1/4 Screen Wall Bracing Member	92%	**PASS**
	Connection to Existing Member(s)	13%	**PASS**
	Existing W18 Roof Member	81%	**PASS**

Conclusion

This analysis shows that the subject antenna frames, platform & host roof **HAVE SUFFICIENT CAPACITY** to support the proposed antenna configuration.

The analysis is based, in part, on the information provided to this office by Verizon Wireless. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

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

Timothy J. Lynn, PE
Structural Engineer

Luke A. Amiot
Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

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Branford, CT 06405 F: (203) 488-8587

Design Wind Load on Other Structures:

(Based on IBC 2021, CSBC 2022 and ASCE 7-16)

Wind Speed =	$V := 120$	mph	(User Input)	(CSBC Appendix-P)
Risk Category =	$BC := II$		(User Input)	(IBC Table 1604.5)
Exposure Category =	$Exp := C$		(User Input)	
Height Above Grade =	$Z := 60$	ft	(User Input)	
Structure Type =	$Structuretype := Square\_Chimney$			
			(User Input)	
Structure Height =	$Height := 8.0$	ft	(User Input)	
Horizontal Dimension of Structure =	$Width := 12$	ft	(User Input)	

Terrain Exposure Constants:

Nominal Height of the Atmospheric Boundary Layer = $zg := \text{if } Exp = B \;\; 1200;\; \text{if } Exp = C \;\; 900;\; \text{if } Exp = D \;\; 700 \;\; = 900$ (Table 26.9-1)

3-Sec Gust Speed Power Law Exponent = $\alpha := \text{if } Exp = B \;\; 7;\; \text{if } Exp = C \;\; 9.5;\; \text{if } Exp = D \;\; 11.5 \;\; = 9.5$ (Table 26.9-1)

Integral Length Scale Factor = $l := \text{if } Exp = B \;\; 320;\; \text{if } Exp = C \;\; 500;\; \text{if } Exp = D \;\; 650 \;\; = 500$ (Table 26.9-1)

Integral Length Scale Power Law Exponent = $E := \text{if } Exp = B \;\; \frac{1}{3};\; \text{if } Exp = C \;\; \frac{1}{5};\; \text{if } Exp = D \;\; \frac{1}{8} \;\; = 0.2$ (Table 26.9-1)

Turbulence Intensity Factor = $c := \text{if } Exp = B \;\; 0.3;\; \text{if } Exp = C \;\; 0.2;\; \text{if } Exp = D \;\; 0.15 \;\; = 0.2$ (Table 26.9-1)

Exposure Constant = $Z_{min} := \begin{cases} 30 & \text{if } Exp = B \\ 15 & \text{if } Exp = C \\ 7 & \text{if } Exp = D \end{cases} = 15$ (Table 26.9-1)

Exposure Coefficient = $K_z := \begin{cases} 2.01 \cdot \left(\frac{Z}{zg}\right)^{\left(\frac{2}{\alpha}\right)} & \text{if } 15 \le Z \le zg \\ 2.01 \cdot \left(\frac{15}{zg}\right)^{\left(\frac{2}{\alpha}\right)} & \text{if } Z < 15 \end{cases} = 1.14$ (Table 29.3-1)

Topographic Factor = $K_{zt} := 1$ (Eq. 26.8-2)

Wind Directionality Factor = $K_d = 0.9$ (Table 26.6-1)

Velocity Pressure = $q_z := 0.00256 \cdot K_z \cdot K_{zt} \cdot K_d \cdot V^2 = 37.71$ (Eq. 29.3-1)

Peak Factor for Background Response = $g_Q := 3.4$ (Sec 26.9.4)

Peak Factor for Wind Response = $g_v := 3.4$ (Sec 26.9.4)

Equivalent Height of Structure = $z := \begin{cases} Z_{min} & \text{if } Z_{min} > 0.6 \cdot Height \\ 0.6 \cdot Height & \text{else} \end{cases} = 15$ (Sec 26.9.4)

Intensity of Turbulence = $I_z := c \cdot \left(\frac{33}{z}\right)^{\left(\frac{1}{6}\right)} = 0.228$ (Eq. 26.9-7)

Integral Length Scale of Turbulence = $L_Z := l \cdot \left(\frac{z}{33}\right)^{E} = 427.057$ (Eq. 26.9-9)

Background Response Factor = $Q := \sqrt{\frac{1}{1 + 0.63 \cdot \left(\frac{Width + Height}{L_Z}\right)^{0.63}}} = 0.957$ (Eq. 26.9-8)

Gust Response Factor = $G := 0.925 \cdot \left(\frac{(1 + 1.7 \cdot g_Q \cdot I_z \cdot Q)}{1 + 1.7 \cdot g_v \cdot I_z}\right) = 0.902$ (Eq. 26.9-6)

Force Coefficient = $C_f = 1.3$ (Fig 29.5-1 - 29.5-3)

Wind Force = $F := q_z \cdot G \cdot C_f = 44$ psf

Development of Wind on Equipment Cabinets

Cabinet Data:

Cabinet Model =	Commscope RBA84-32 Cabinet (w/ Equip/Batteries)		
Cabinet Shape =	Flat		(User Input)
Cabinet Height =	$L_{Eq} := 85.5$	in	(User Input)
Cabinet Width =	$W_{Eq} := 45.4$	in	(User Input)
Cabinet Thickness =	$T_{Eq} := 44.6$	in	(User Input)
Cabinet Weight =	$WT_{Eq} := 3900$	lbs	(User Input)
Equipment Bearing Points =	$N_{Bp} := 4$		(User Input)
Number of Equipment =	$N_{Eq} := 1$		(User Input)

Wind Load (Front)

Surface Area for One Equipment = $SA_{Eq} := \frac{L_{Eq} \cdot W_{Eq}}{144} = 27$ sf

Equipment Projected Surface Area = $A_{Eq} := SA_{Eq} \cdot N_{Eq} = 27$ sf

Total Equipment Wind Force = $F_{Eq} := \frac{F \cdot A_{Eq} \cdot \frac{\left(\frac{L_{Eq}}{12}\right)}{2}}{\frac{T_{Eq}}{12}} = 1143$ lbs

Total Equipment Shear Wind Force = $F_{Eq} := \frac{F \cdot A_{Eq}}{N_{Bp}} = 298$ lbs

Wind Load (Side)

Surface Area for One Equipment = $SA_{Eq} := \frac{L_{Eq} \cdot T_{Eq}}{144} = 26.5$ sf

Equipment Projected Surface Area = $A_{Eq} := SA_{Eq} \cdot N_{Eq} = 26.5$ sf

Total Equipment Wind Force = $F_{Eq} := \frac{F \cdot A_{Eq} \cdot \frac{\left(\frac{L_{Eq}}{12}\right)}{2}}{\frac{W_{Eq}}{12}} = 1103$ lbs

Total Equipment Shear Wind Force = $F_{Eq} := \frac{F \cdot A_{Eq}}{N_{Bp}} = 293$ lbs

Gravity Load (without ice)

Weight of All Equipments = $\frac{WT_{Eq}}{N_{Bp}} = 975$ lbs

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Development of Wind on Equipment Cabinets

Cabinet Data:

Cabinet Model = Square D EXN30T3HC 45VA Transformer

Cabinet Shape = Flat (User Input)

Cabinet Height = $L_{Eq} := 28.3$ in (User Input)

Cabinet Width = $W_{Eq} := 25.5$ in (User Input)

Cabinet Thickness = $T_{Eq} := 24.1$ in (User Input)

Cabinet Weight = $WT_{Eq} := 356$ lbs (User Input)

Equipment Bearing Points = $N_{Bp} := 4$ (User Input)

Number of Equipment = $N_{Eq} := 1$ (User Input)

Wind Load (Front)

Surface Area for One Equipment = $SA_{Eq} := \dfrac{L_{Eq} \cdot W_{Eq}}{144} = 5$ sf

Equipment Projected Surface Area = $A_{Eq} := SA_{Eq} \cdot N_{Eq} = 5$ sf

Total Equipment Wind Force = $F_{Eq} := \dfrac{F \cdot A_{Eq} \cdot \dfrac{\left(\dfrac{L_{Eq}}{12}\right)}{2}}{\dfrac{T_{Eq}}{12}} = 130$ lbs

Total Equipment Shear Wind Force = $F_{Eq} := \dfrac{F \cdot A_{Eq}}{N_{Bp}} = 55$ lbs

Wind Load (Side)

Surface Area for One Equipment = $SA_{Eq} := \dfrac{L_{Eq} \cdot T_{Eq}}{144} = 4.7$ sf

Equipment Projected Surface Area = $A_{Eq} := SA_{Eq} \cdot N_{Eq} = 4.7$ sf

Total Equipment Wind Force = $F_{Eq} := \dfrac{F \cdot A_{Eq} \cdot \dfrac{\left(\dfrac{L_{Eq}}{12}\right)}{2}}{\dfrac{W_{Eq}}{12}} = 116$ lbs

Total Equipment Shear Wind Force = $F_{Eq} := \dfrac{F \cdot A_{Eq}}{N_{Bp}} = 52$ lbs

Gravity Load (without ice)

Weight of All Equipments = $\dfrac{WT_{Eq}}{N_{Bp}} = 89$ lbs

Development of Wind on Antennas

Antenna Data:

Antenna Model = JMA MX10FR0640

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 71.6$ in (User Input)

Antenna Width = $W_{ant} := 19.8$ in (User Input)

Antenna Thickness = $T_{ant} := 7.4$ in (User Input)

Antenna Weight = $WT_{ant} := 76.3$ lbs (User Input)

Number of Antennas = $N_{ant} := 1$ (User Input)

Wind Load (Front)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 9.8$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 9.8$ sf

Total Antenna Wind Force = $F_{ant} := F \cdot A_{ant} = 436$ lbs

Wind Load (Side)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot T_{ant}}{144} = 3.7$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 3.7$ sf

Total Antenna Wind Force = $F_{ant} := F \cdot A_{ant} = 163$ lbs

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 76$ lbs

Development of Wind on Antennas

Antenna Data:

Antenna Model =	JMA MX08FIT265-01		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 24$	in	(User Input)
Antenna Width =	$W_{ant} := 11.6$	in	(User Input)
Antenna Thickness =	$T_{ant} := 4.53$	in	(User Input)
Antenna Weight =	$WT_{ant} := 21.5$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)

Wind Load (Front)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 1.9$	sf
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 1.9$	sf
Total Antenna Wind Force =	$F_{ant} := F \cdot A_{ant} = 86$	lbs

Wind Load (Side)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot T_{ant}}{144} = 0.8$	sf
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 0.8$	sf
Total Antenna Wind Force =	$F_{ant} := F \cdot A_{ant} = 33$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 22$	lbs

Development of Wind on RRU

RRU Data:

RRU Model =	Samsung B2/B66A RRH-BR049		
RRU Shape =	Flat		(User Input)
RRU Height =	$L_{ant} := 15$	in	(User Input)
RRU Width =	$W_{ant} := 15$	in	(User Input)
RRU Thickness =	$T_{ant} := 10$	in	(User Input)
RRU Weight =	$WT_{ant} := 84.4$	lbs	(User Input)
Number of RRU =	$N_{ant} := 1$		(User Input)

Wind Load (Front)

Surface Area for One RRU =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 1.6$	sf
RRU Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 1.6$	sf
Total RRU Wind Force =	$F_{ant} := F \cdot A_{ant} = 69$	lbs

Wind Load (Side)

Surface Area for One RRU =	$SA_{ant} := \frac{L_{ant} \cdot T_{ant}}{144} = 1$	sf
RRU Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 1$	sf
Total RRU Wind Force =	$F_{ant} := F \cdot A_{ant} = 46$	lbs

Gravity Load (without ice)

Weight of All RRU=	$WT_{ant} \cdot N_{ant} = 84$	lbs

Development of Wind on RRU

RRU Data:

RRU Model =	Samsung B5/B13 RRH-BR04C		
RRU Shape =	Flat		(User Input)
RRU Height =	$L_{ant} := 15$	in	(User Input)
RRU Width =	$W_{ant} := 15$	in	(User Input)
RRU Thickness =	$T_{ant} := 8.1$	in	(User Input)
RRU Weight =	$WT_{ant} := 70.3$	lbs	(User Input)
Number of RRU =	$N_{ant} := 1$		(User Input)

Wind Load (Front)

Surface Area for One RRU =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 1.6$	sf
RRU Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 1.6$	sf
Total RRU Wind Force =	$F_{ant} := F \cdot A_{ant} = 69$	lbs

Wind Load (Side)

Surface Area for One RRU =	$SA_{ant} := \frac{L_{ant} \cdot T_{ant}}{144} = 0.8$	sf
RRU Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 0.8$	sf
Total RRU Wind Force =	$F_{ant} := F \cdot A_{ant} = 37$	lbs

Gravity Load (without ice)

Weight of All RRU=	$WT_{ant} \cdot N_{ant} = 70$	lbs

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Development of Wind on RRU

RRU Data:

RRU Model =	Samsung RT-8808-77A		
RRU Shape =	Flat		(User Input)
RRU Height =	$L_{ant} := 15$	in	(User Input)
RRU Width =	$W_{ant} := 15$	in	(User Input)
RRU Thickness =	$T_{ant} := 6.8$	in	(User Input)
RRU Weight =	$WT_{ant} := 59.5$	lbs	(User Input)
Number of RRU =	$N_{ant} := 1$		(User Input)

Wind Load (Front)

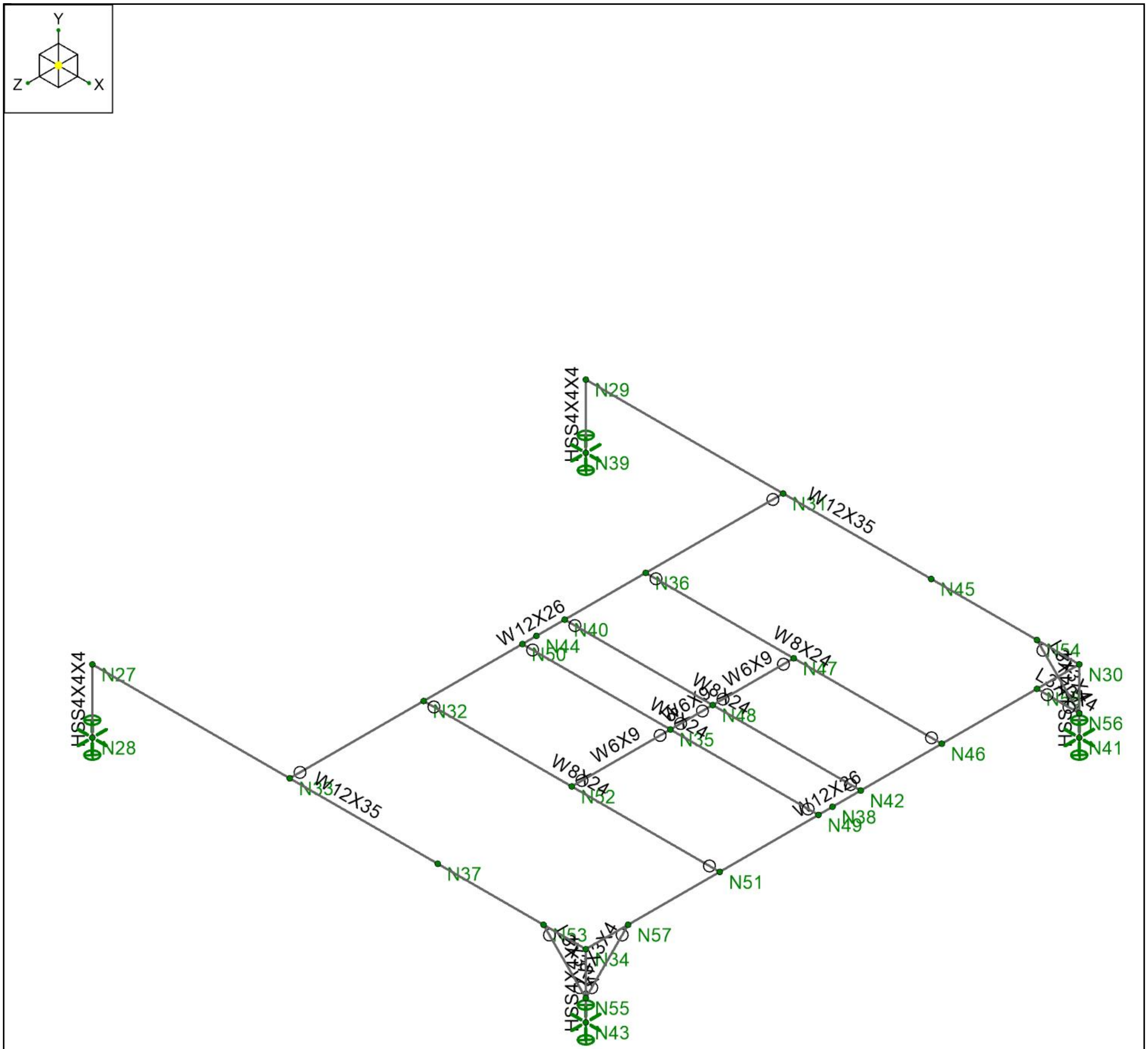
Surface Area for One RRU =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 1.6$	sf
RRU Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 1.6$	sf
Total RRU Wind Force =	$F_{ant} := F \cdot A_{ant} = 69$	lbs

Wind Load (Side)

Surface Area for One RRU =	$SA_{ant} := \frac{L_{ant} \cdot T_{ant}}{144} = 0.7$	sf
RRU Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 0.7$	sf
Total RRU Wind Force =	$F_{ant} := F \cdot A_{ant} = 31$	lbs

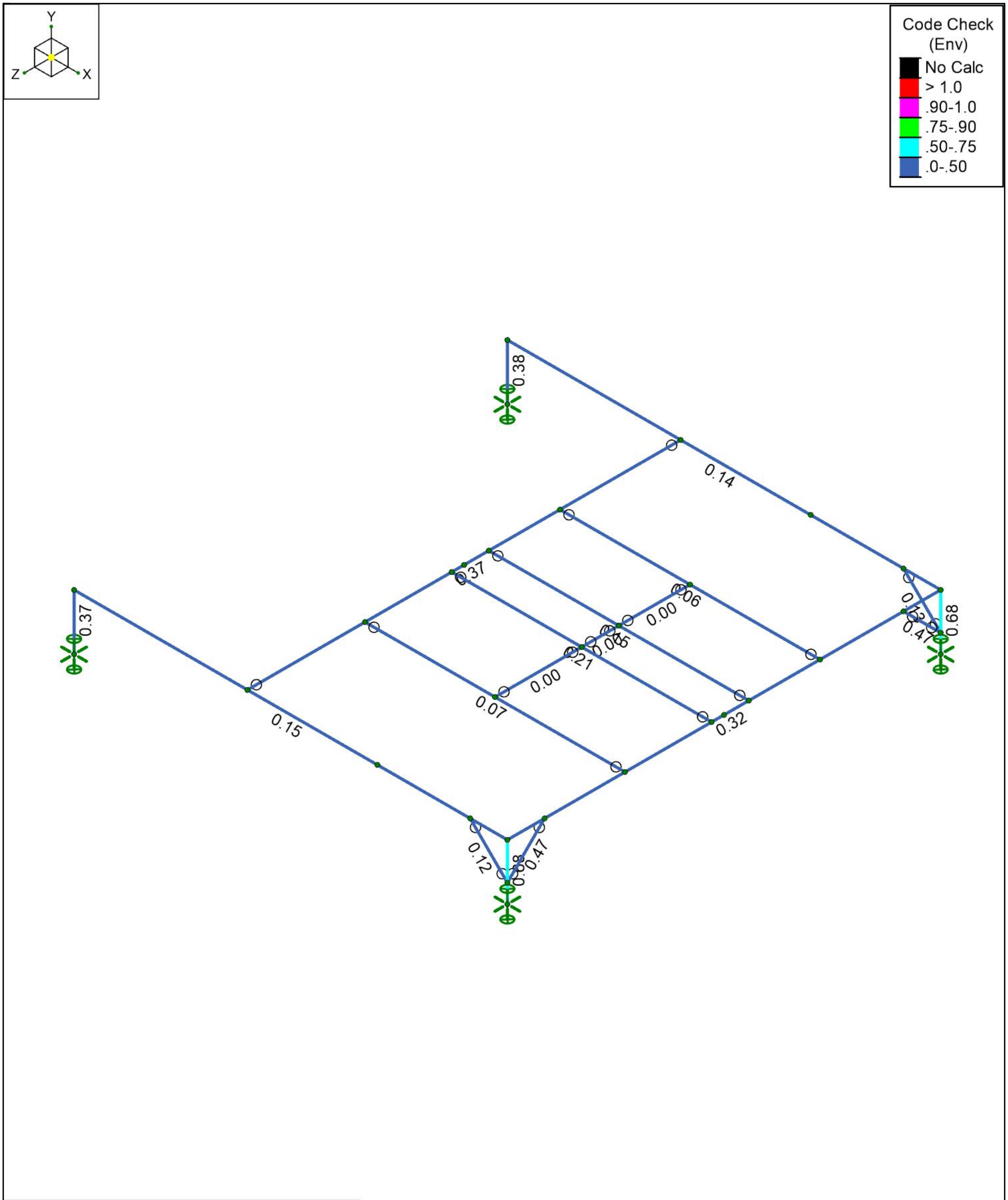
Gravity Load (without ice)

Weight of All RRU=	$WT_{ant} \cdot N_{ant} = 60$	lbs



Envelope Only Solution

Centek Engineering	Proposed Equipment Platform	SK-1
LAA		Oct 20, 2022
21058.02		21058.02 Proposed Equipment Pl…



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek Engineering	Proposed Equipment Platform	SK-2
LAA		Oct 20, 2022
21058.02		21058.02 Proposed Equipment Pl...

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N27	35	0	23.333	
2	N28	35	-3	23.333	
3	N29	35	0	0	
4	N30	58.333	0	0	
5	N31	44.333	0	0	
6	N32	44.333	0	17	
7	N33	44.333	0	23.333	
8	N34	58.333	0	23.333	
9	N35	51.333	0	12.333	
10	N36	44.333	0	6.5	
11	N37	51.333	0	23.333	
12	N38	58.333	0	11.6665	
13	N39	35	-3	0	
14	N40	44.333	0	10.333	
15	N41	58.333	-3	0	
16	N42	58.333	0	10.333	
17	N43	58.333	-3	23.333	
18	N44	44.333	0	11.6665	
19	N45	51.333	0	0	
20	N46	58.333	0	6.5	
21	N47	51.333	0	6.5	
22	N48	51.333	0	10.333	
23	N49	58.333	0	12.333	
24	N50	44.333	0	12.333	
25	N51	58.333	0	17	
26	N52	51.333	0	17	
27	N53	56.333	0	23.333	
28	N54	56.333	0	0	
29	N55	58.333	-2	23.333	
30	N56	58.333	-2	0	
31	N57	58.333	0	21.333	
32	N58	58.333	0	2	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]	Y Rot [k-ft/rad]
1	N28	Reaction	Reaction	Reaction	Reaction
2	N39	Reaction	Reaction	Reaction	Reaction
3	N41	Reaction	Reaction	Reaction	Reaction
4	N43	Reaction	Reaction	Reaction	Reaction

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	0.3	0.65	0.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	0.3	0.65	0.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2
7	A1085	29000	11154	0.3	0.65	0.49	50	1.4	65	1.3

Hot Rolled Steel Design Parameters

	Label	Shape	Length [ft]	Lb y-y [ft]	Lcomp top [ft]	Function
1	M18	W12X35	23.333	Segment	Lbyy	Lateral
2	M19	W8X24	14	Segment	Lbyy	Lateral
3	M20	W6X9	3.833		Lbyy	Lateral
4	M21	W6X9	2		Lbyy	Lateral
5	M22	W6X9	4.667		Lbyy	Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length [ft]	Lb y-y [ft]	Lcomp top [ft]	Function
6	M23	HSS4X4X4	3		Lbyy	Lateral
7	M24	HSS4X4X4	3		Lbyy	Lateral
8	M25	HSS4X4X4	3		Lbyy	Lateral
9	M26	HSS4X4X4	3		Lbyy	Lateral
10	M27	W8X24	14	Segment	Lbyy	Lateral
11	M28	W12X26	23.333	Segment	Lbyy	Lateral
12	M29	W12X35	23.333	Segment	Lbyy	Lateral
13	M30	W12X26	23.333	Segment	Lbyy	Lateral
14	M31	W8X24	14	Segment	Lbyy	Lateral
15	M32	W8X24	14	Segment	Lbyy	Lateral
16	M33	L3X3X4	2.828		Lbyy	Lateral
17	M34	L3X3X4	2.828		Lbyy	Lateral
18	M35	L3X3X4	2.828		Lbyy	Lateral
19	M36	L3X3X4	2.828		Lbyy	Lateral

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	M27	Y	-0.975	11.5	Active
2	M27	Y	-0.09	2.5	Active
3	M27	Y	-0.975	8	Active
4	M27	Y	-0.09	0.5	Active
5	M31	Y	-0.09	2.5	Active
6	M31	Y	-0.09	0.5	Active
7	M31	Y	-0.975	8	Active
8	M31	Y	-0.975	11.5	Active

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	M27	X	0.293	11.5	Active
2	M27	X	0.055	2.5	Active
3	M27	X	0.293	8	Active
4	M27	Y	-1.103	11.5	Active
5	M27	X	0.055	0.5	Active
6	M27	Y	-0.116	2.5	Active
7	M27	Y	0.116	0.5	Active
8	M27	Y	1.103	8	Active
9	M31	X	0.293	8	Active
10	M31	X	0.055	0.5	Active
11	M31	Y	-0.116	2.5	Active
12	M31	X	0.293	11.5	Active
13	M31	X	0.055	2.5	Active
14	M31	Y	1.103	8	Active
15	M31	Y	0.116	0.5	Active
16	M31	Y	-1.103	11.5	Active

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	M27	Y	-1.143	8	Active
2	M27	Y	-0.116	2.5	Active
3	M27	Y	-0.116	0.5	Active
4	M27	Z	0.052	2.5	Active
5	M27	Y	-1.143	11.5	Active
6	M27	Z	0.052	0.5	Active
7	M31	Y	0.116	2.5	Active
8	M31	Y	0.116	0.5	Active
9	M31	Z	0.052	0.5	Active
10	M31	Z	0.052	2.5	Active

Member Point Loads (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
11	M31	Y	1.143	11.5	Active
12	M31	Y	1.143	8	Active

Member Distributed Loads

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	M19	Y	-0.015	-0.015	0	%100	Active
2	M28	Y	-0.015	-0.015	6.5	17	Active
3	M30	Y	-0.015	-0.015	6.5	17	Active
4	M32	Y	-0.015	-0.015	0	%100	Active

Member Distributed Loads

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	M27	Y	-0.023	-0.023	0	14	Active
2	M27	Y	-0.023	-0.023	0	14	Active
3	M32	Y	-0.023	-0.023	0	14	Active
4	M32	Y	-0.023	-0.023	0	14	Active
5	M27	Y	-0.01	-0.01	0	14	Active
6	M27	Y	-0.01	-0.01	0	14	Active
7	M31	Y	-0.01	-0.01	0	14	Active
8	M31	Y	-0.01	-0.01	0	14	Active
9	M19	Y	-0.019	-0.019	0	14	Active
10	M19	Y	-0.019	-0.019	0	14	Active
11	M31	Y	-0.019	-0.019	0	14	Active
12	M31	Y	-0.019	-0.019	0	14	Active

Member Distributed Loads

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	M19	Y	-0.038	-0.038	0	14	Active
2	M19	Y	-0.038	-0.038	0	14	Active
3	M31	Y	-0.038	-0.038	0	14	Active
4	M31	Y	-0.038	-0.038	0	14	Active
5	M27	Y	-0.02	-0.02	0	14	Active
6	M27	Y	-0.02	-0.02	0	14	Active
7	M31	Y	-0.02	-0.02	0	14	Active
8	M31	Y	-0.02	-0.02	0	14	Active
9	M27	Y	-0.047	-0.047	0	14	Active
10	M27	Y	-0.047	-0.047	0	14	Active
11	M32	Y	-0.047	-0.047	0	14	Active
12	M32	Y	-0.047	-0.047	0	14	Active

Member Distributed Loads

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	M27	Y	-0.07	-0.07	0	14	Active
2	M27	Y	-0.07	-0.07	0	14	Active
3	M32	Y	-0.07	-0.07	0	14	Active
4	M32	Y	-0.07	-0.07	0	14	Active
5	M27	Y	-0.03	-0.03	0	14	Active
6	M27	Y	-0.03	-0.03	0	14	Active
7	M31	Y	-0.03	-0.03	0	14	Active
8	M31	Y	-0.03	-0.03	0	14	Active
9	M19	Y	-0.057	-0.057	0	14	Active
10	M19	Y	-0.057	-0.057	0	14	Active
11	M31	Y	-0.057	-0.057	0	14	Active
12	M31	Y	-0.057	-0.057	0	14	Active

Member Area Loads

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [ksf]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	N32	N50	N49	N51	Y	A-B	-0.01	Active
2	N50	N40	N42	N49	Y	A-B	-0.01	Active
3	N40	N36	N46	N42	Y	A-B	-0.01	Active

Member Area Loads

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [ksf]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	N40	N36	N46	N42	Y	A-B	-0.02	Active
2	N50	N40	N42	N49	Y	A-B	-0.02	Active
3	N32	N50	N49	N51	Y	A-B	-0.02	Active

Member Area Loads

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [ksf]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	N32	N50	N49	N51	Y	A-B	-0.03	Active
2	N50	N40	N42	N49	Y	A-B	-0.03	Active
3	N40	N36	N46	N42	Y	A-B	-0.03	Active

Member Area Loads

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [ksf]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	N33	N32	N51	N34	Y	A-B	-0.02	Active
2	N32	N50	N49	N51	Y	A-B	-0.02	Active
3	N50	N40	N42	N49	Y	A-B	-0.02	Active
4	N40	N36	N46	N42	Y	A-B	-0.02	Active
5	N36	N31	N30	N46	Y	A-B	-0.02	Active

Load Combinations

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	IBC 16-8	Yes	Y	DL	1										
2	IBC 16-9	Yes	Y	DL	1	LL	1	LLS	1						
3	IBC 16-10 (b)	Yes	Y	DL	1	SL	1	SLN	1						
4	IBC 16-11 (b)	Yes	Y	DL	1	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75		
5	IBC 16-12 (a) (a)	Yes	Y	DL	1	WLX	0.6								
6	IBC 16-12 (a) (b)	Yes	Y	DL	1	WLZ	0.6								
7	IBC 16-13 (a) (a)	Yes	Y	DL	1	WLX	0.45	LL	0.75	LLS	0.75				
8	IBC 16-13 (a) (b)	Yes	Y	DL	1	WLZ	0.45	LL	0.75	LLS	0.75				
9	IBC 16-13 (b) (a)	Yes	Y	DL	1	WLX	0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
10	IBC 16-13 (b) (b)	Yes	Y	DL	1	WLZ	0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
11	IBC 16-15 (a)	Yes	Y	DL	0.6	WLX	0.6								
12	IBC 16-15 (b)	Yes	Y	DL	0.6	WLZ	0.6								

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N28	max	1.265	4	2.462	10	0.041	10	0	12	0.006	4	0	12
2		min	0.325	11	0.814	11	-0.003	4	0	1	-0.581	10	0	1
3	N39	max	1.279	10	2.463	4	0.047	10	0	12	0.1	5	0	12
4		min	0.323	11	0.82	11	0.001	5	0	1	-0.598	10	0	1
5	N41	max	-0.453	12	5.939	9	5.488	9	0	12	0.01	4	0	12
6		min	-1.463	9	2.215	12	2.019	12	0	1	-0.444	5	0	1
7	N43	max	-0.533	12	5.866	9	-2.147	12	0	12	0.422	5	0	12
8		min	-1.445	9	2.41	12	-5.49	9	0	1	-0.301	10	0	1
9	Totals:	max	0	3	16.476	9	0	7						
10		min	-0.835	5	6.578	12	-0.125	12						

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Pnc/om [k]	Pnt/om [k]	Mnyy/om [k-ft]	Mnzz/om [k-ft]	Cb	Eqn
1	M18	W12X35	0.146	9.236	10	0.055	9.236	y	10	175.362	308.383	28.693	127.745	1.928	H1-1b
2	M19	W8X24	0.058	7	9	0.026	0	y	10	153.022	211.976	21.382	57.635	1.304	H1-1b
3	M20	W6X9	0.001	1.917	6	0.001	3.833	y	10	66.458	80.24	4.29	15.54	1.136	H1-1b
4	M21	W6X9	0	1	9	0.002	2	y	6	76.227	80.24	4.29	15.54	1.136	H1-1b
5	M22	W6X9	0.002	2.333	6	0.001	4.667	y	6	60.682	80.24	4.29	15.54	1.136	H1-1b
6	M23	HSS4X4X4	0.681	1	9	0.254	1	z	9	89.395	92.826	10.765	10.765	1.453	H1-1b
7	M24	HSS4X4X4	0.377	3	10	0.116	3	y	10	89.395	92.826	10.765	10.765	1.667	H1-1b
8	M25	HSS4X4X4	0.373	3	10	0.113	3	y	10	89.395	92.826	10.765	10.765	1.667	H1-1b
9	M26	HSS4X4X4	0.679	1	9	0.251	1	z	9	89.395	92.826	10.765	10.765	1.453	H1-1b
10	M27	W8X24	0.207	8.021	10	0.088	14	y	10	153.022	211.976	21.382	57.635	1.263	H1-1b
11	M28	W12X26	0.366	12.153	9	0.06	23.333	y	10	98.585	229.042	20.384	92.814	1.001	H1-1b
12	M29	W12X35	0.142	9.236	10	0.048	9.236	y	10	175.362	308.383	28.693	127.745	1.936	H1-1b
13	M30	W12X26	0.315	12.153	9	0.081	21.389	y	9	98.585	229.042	20.384	92.814	1.001	H1-1b
14	M31	W8X24	0.153	8.021	4	0.069	14	y	9	153.022	211.976	21.382	57.635	1.265	H1-1b
15	M32	W8X24	0.067	7	10	0.029	0	y	4	153.022	211.976	21.382	57.635	1.304	H1-1b
16	M33	L3X3X4	0.471	1.385	9	0.01	2.828	y	5	26.001	31.042	1.123	2.488	1.136	H2-1
17	M34	L3X3X4	0.125	1.385	9	0.013	2.828	y	4	26.001	31.042	1.123	2.488	1.136	H2-1
18	M35	L3X3X4	0.471	1.385	9	0.01	2.828	y	5	26.001	31.042	1.123	2.488	1.136	H2-1
19	M36	L3X3X4	0.127	1.385	9	0.015	2.828	y	10	26.001	31.042	1.123	2.488	1.136	H2-1

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Platform Connection to Building

Number of Thru Bolts =	$n_b := 4$	(User Input)
Bolt Diameter =	$d\phi := 0.625\ in$	(User Input)
Allowable Tensile Strength =	$r_{nt} := 13.8\ kip$	(User Input)
Allowable Shear Strength =	$r_{nv} := 8.25 \cdot kip$	(User Input)
Spacing Between Bolts =	$S := 2\ in$	(User Input - Assumed)

ASD Reactions at Connection Node :

Tension X =	$Tension_x := 2.147 \cdot kip$	(User Input)
Shear Y =	$Shear_y := 1.463\ kip$	(User Input)
Shear Z =	$Shear_z := 5.488 \cdot kip$	(User Input)
Moment X =	$M_X := 0.598 \cdot kip \cdot ft$	(User Input)
Moment Y =	$M_Y := 0 \cdot kip \cdot ft$	(User Input)
Moment Z =	$M_Z := 0 \cdot kip \cdot ft$	(User Input)

Anchor Check:

Shear Force per Bolt (ASD) =

$$V_{all} := \frac{\sqrt{Shear_z^2 + Shear_y^2}}{n_b} + \frac{M_X}{S \cdot \frac{n_b}{2}} = 3.214\ kip$$

$$\frac{V_{all}}{r_{nv}} = 39\%$$

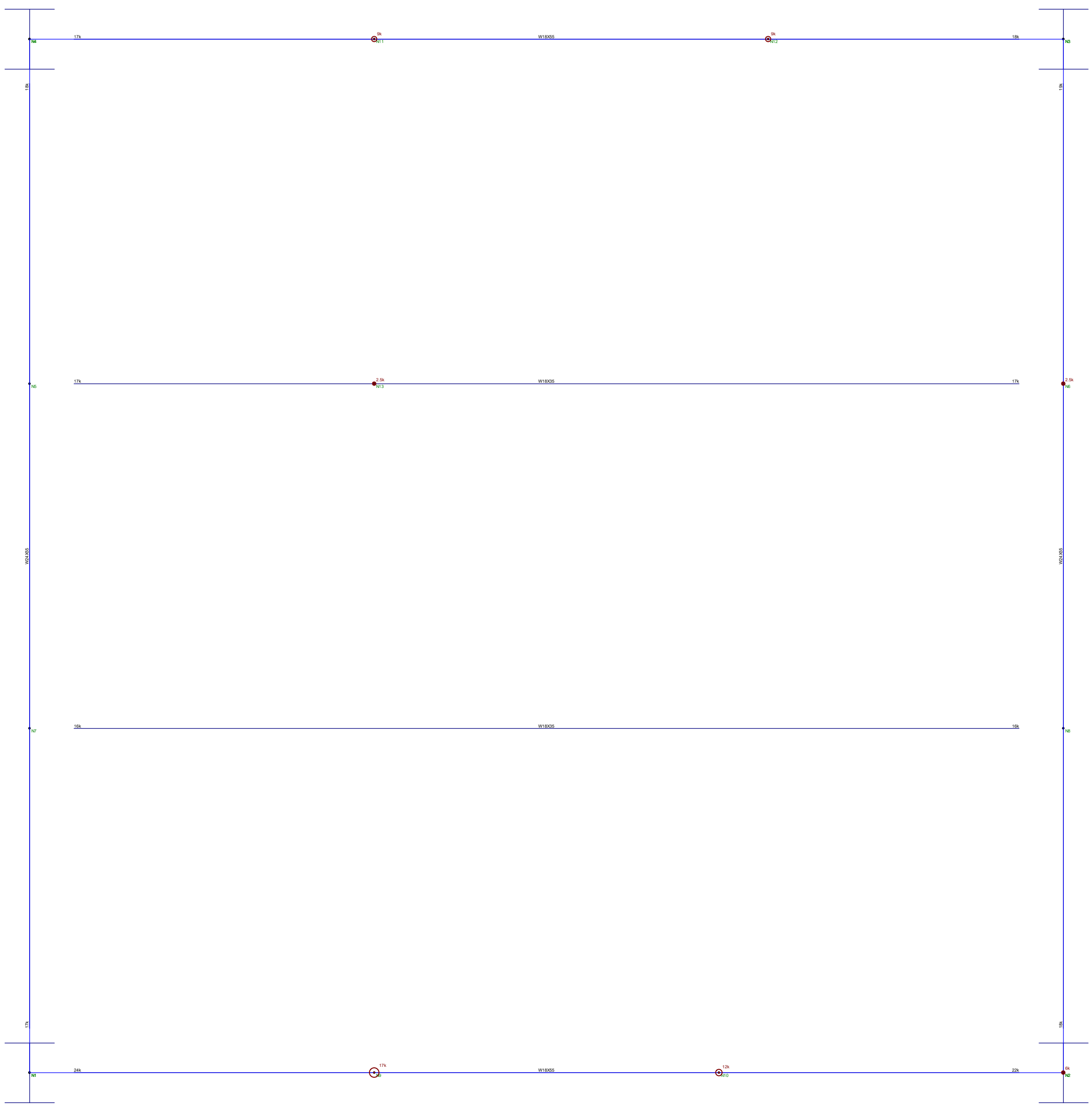
Tension Force per Bolt (ASD) =

$$T_{all} := \frac{Tension_x}{n_b} + \frac{M_Y + M_Z}{S \cdot \frac{n_b}{2}} = 0.537\ kip$$

$$\frac{T_{all}}{r_{nt}} = 3.9\%$$

Combined Shear and Tension Ultimate Limit State =

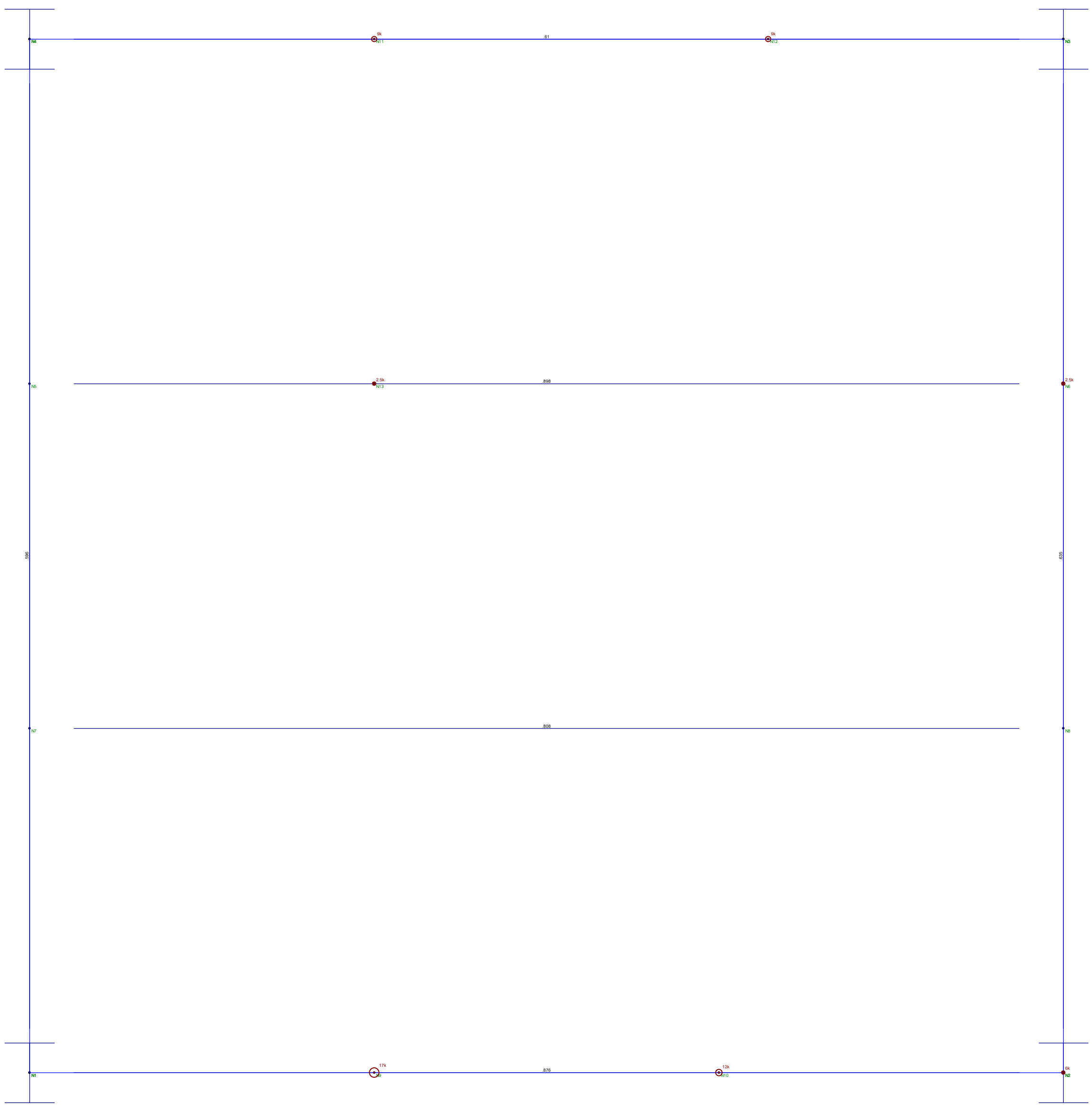
$$Condition1 := \text{if}\left(\left(\frac{T_{all}}{r_{nt}}\right)^2 + \left(\frac{T_{all}}{r_{nt}}\right)^2 \le 1.0, \text{"OK"}, \text{"Overstressed"}\right) = \text{"OK"}$$



Member Camber and Reactions
Loads: Envelop Results

Centek Engineering	Roof Framing	SK - 1
Luke Amit		Oct 20, 2022 at 10:26 AM
	EXISTING ROOF FRAMING AT PLATFORM	Existing Framing Calculation.rfl

Lateral
Gravity



Member Bending Check
Loads: Envelop Results

Centek Engineering	Roof Framing	SK - 2
Luke Amit		Oct 20, 2022 at 10:27 AM
	EXISTING ROOF UNITY CHECK AT PLATFORM	Existing Framing Calculation.rfl

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E..	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	1.25	65	1.15
8	A913 Gr.65	29000	11154	.3	.65	.49	65	1.1	80	1.1

Deck General Properties

	Label	Material Type	Deck	Unbraced[ft]	Max Spa...
1	Concrete Deck	Conc3000NW	1 in	3	10
2	Composite Deck	Vulcraft 3 VLI	7.5"NW 3VLI20, Conc3000NW, 3in, .75in, 65ksi	2	10
3	Metal Deck	Verco Steel Roof Deck	22ga PLB-36	2	4
4	Wood	Wood Deck	1 in	1	4

Deck Loads

	Label	Two Way	Self Wt [ksf]	Super DL [ksf]	Const DL [ksf]	Const LL [ksf]
1	Concrete Deck		.012	0	0	.02
2	Composite Deck		.075	0	0	.02
3	Metal Deck		.002	0	0	.02
4	Wood		.003	0	0	.02

Uniform Area Loads

	Label	Additive	PreDL[ksf]	PostDL[ksf]	LL[ksf]	LL Type	VL[ksf]	Dyn Load[...
1	Snow Load			.01	.03	SL	.004	.01
2	Add Piping	Yes		.02		LL-Non	.011	.02
3	Roof			.01	.02	RLL-Non	.011	.01

Point Locations : Roof Framing

	Label	Z [ft]	X [ft]	Elev Offset [ft]
1	N1	0	0	0
2	N2	35	0	0
3	N3	35	35	0
4	N4	0	35	0
5	N5	0	23.333333	0
6	N6	35	23.333333	0
7	N7	0	11.666667	0
8	N8	35	11.666667	0
9	N9	11.666667	0	0
10	N10	23.333333	0	0
11	N11	11.667	35	0
12	N12	25	35	0
13	N13	11.666667	23.333333	0

Beam Primary Data : Roof Framing

	Label	Start Point	End Point	Shape	Material	Design Rules	Function	Orientation	Start Rel...	End Rele...	Outrigger?
1	M1	N1	N2	W18X55	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
2	M2	N4	N3	W18X55	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	

Beam Primary Data : Roof Framing (Continued)

	Label	Start Point	End Point	Shape	Material	Design Rules	Function	Orientation	Start Rel...	End Rele...	Outrigger?
3	M3	N1	N4	W24X55	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
4	M4	N2	N3	W24X55	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
5	M5	N5	N6	W18X35	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
6	M6	N7	N8	W18X35	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	

Hot Rolled : Roof Framing

	Label	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp To...	Lcomp Bot...	L-torqu...	Cb	Composite	Camber[in]	B-eff Left[...	B-eff Righ...
1	M1	35	1		Framing				Yes			
2	M2	35	1		Framing				Yes			
3	M3	35	Segment		Framing				Yes			
4	M4	35	Segment		Framing				Yes			
5	M5	35	1		Framing				Yes			
6	M6	35	1		Framing				Yes			

Point Loads : Roof Framing

	Point Label	PreDL[k]	PostDL[k]	LL[k]	LL Type	Dyn Load[k]
1	N9		11		LL-Non	
2	N10		12		LL-Non	
3	N11		9		LL-Non	
4	N12		9		LL-Non	
5	N13		2.5		LL-Non	
6	N6		2.5		LL-Non	
7	N9		6		LL-Non	
8	N2		6		LL-Non	

Combinations

	Label	Sol...	Cat...	Fac..	Cat...	Fac..	Cat...	Fac..	Cat...	Fac..	Cat...	Fact...	Cat...	Fact...	Cat...	Fact...	Cat...	Fact...	Cat...	Fact...	Cat...	Fact...
1	Service ...	Yes	DL	1																		
2	Service ...	Yes	DL	1	LL	1	LLS	1														
3	IBC 16-8...	Yes	DLP...	1																		
4	IBC 16-9...	Yes	DLP...	1	LLC...	1																
5	IBC 16-1...	Yes	DL	1	RLL	1																
6	IBC 16-1...	Yes	DL	1	SL	1	SLN	1														
7	IBC 16-1...	Yes	DL	1	LL	.75	LLS	.75	RLL	.75												
8	IBC 16-1...	Yes	DL	1	LL	.75	LLS	.75	SL	.75	SLN	.75										
9	IBC 16-1...	Yes	DL	1	LL	.75	LLS	.75														

Floors

	Label	Elevation[ft]	Floor Type	Area Load Default	Inactive	Splice Dis...	Splice Type	No Wind/...	Parapet Hei...
1	Roof Framing	12	Floor Beam	Roof		12	Moment		0

Beam Floors

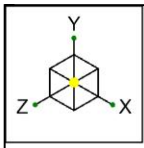
	Label	Deck Default	Deck Angle Default (deg)	Parent
1	Roof Framing	Concrete Deck	90	None

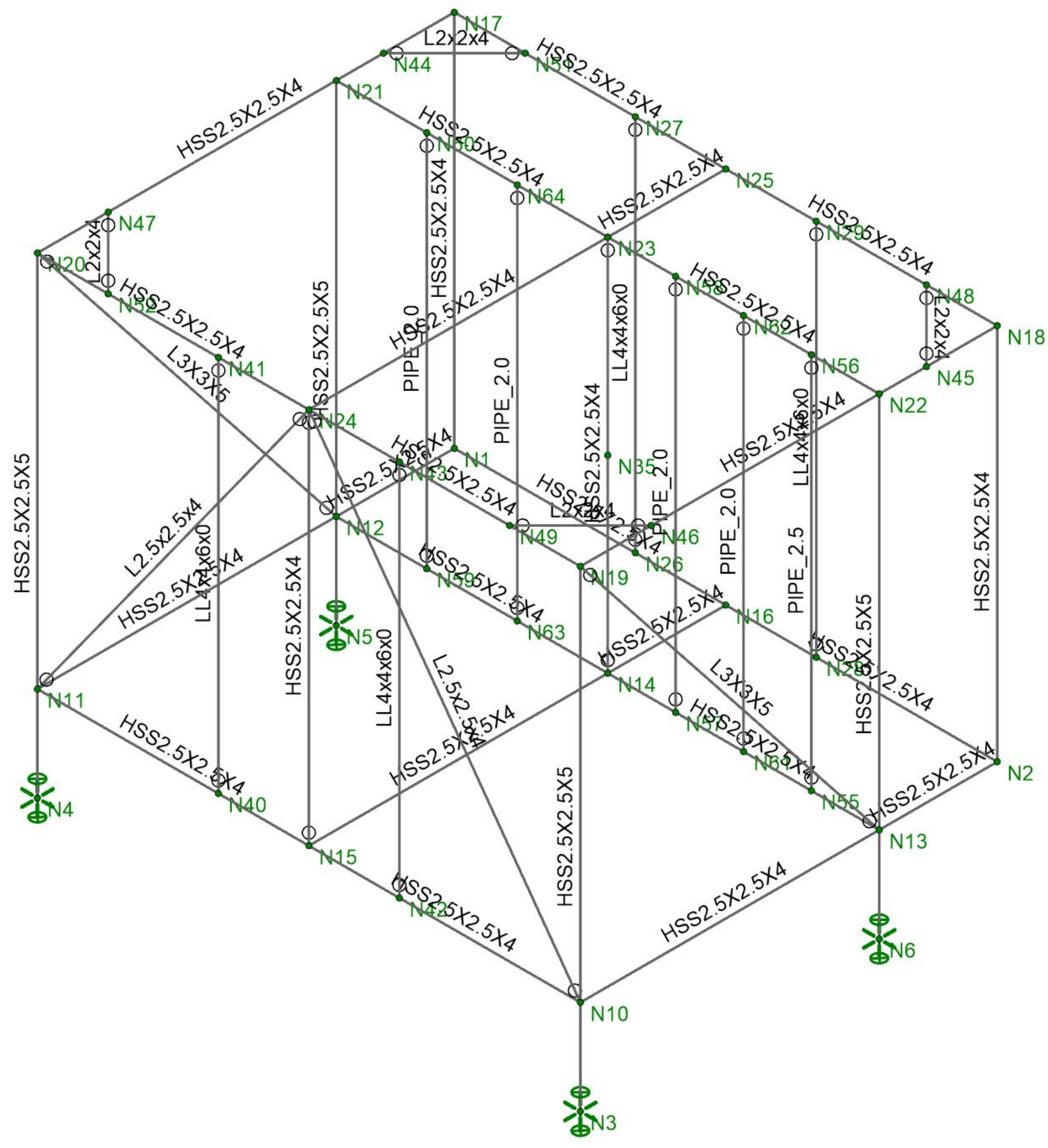
Beam Code Summary for Hot Rolled : Roof Framing

	Label	Size	Explicit	Studs	Camb...	Material	Bending...	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear C..	Loc[ft]	LC
1	M1	W18X55	Yes		0	A992	.876	13.854	6	1.218	17.5	DL+...	.168	0	6
2	M2	W18X55	Yes		0	A992	.61	16.771	6	.864	17.5	DL+...	.126	35	6
3	M3	W24X55	Yes		0	A992	.596	23.333	6	.661	17.5	DL+...	.104	35	6
4	M4	W24X55	Yes		0	A992	.635	23.333	6	.694	17.5	DL+...	.111	35	6
5	M5	W18X35	Yes		0	A992	.898	16.406	6	1.277	17.5	DL+...	.16	0	6
6	M6	W18X35	Yes		0	A992	.808	17.5	6	1.143	17.5	DL+...	.144	35	6

Beam End Reactions : Roof Framing

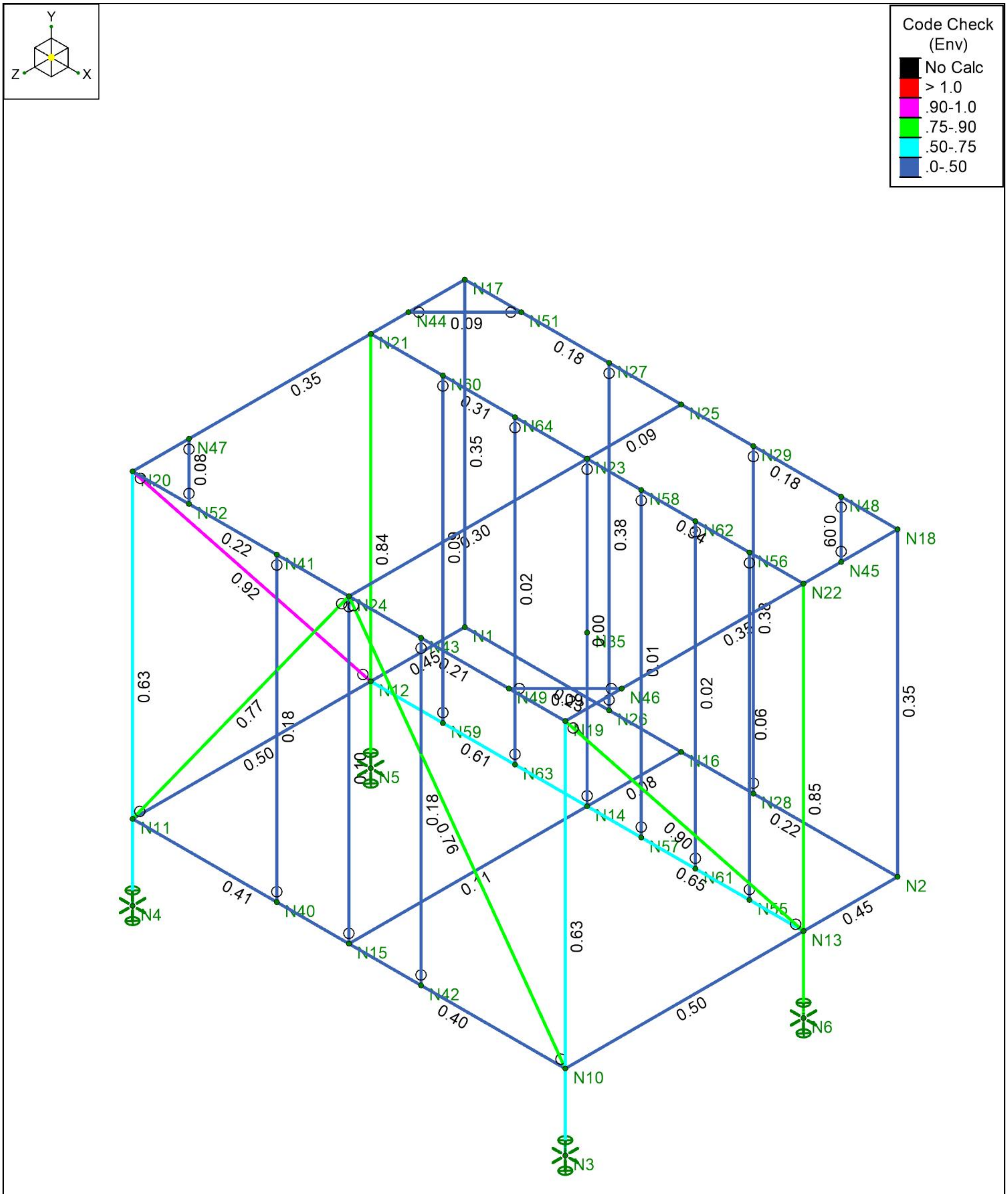
	Beam	End	PreDL[k]	DL[k]	LL[k]	LLS[k]	Roof[k]	Roof Cat	Max[k]	LC	Min[k]	LC
1	M1	Start	2.198	20.594	0	0	3.063	SL	23.657	6	2.198	3
2		End	2.198	18.927	0	0	3.063	SL	21.99	6	2.198	3
3	M2	Start	2.198	13.832	0	0	3.063	SL	16.895	6	2.198	3
4		End	2.198	14.689	0	0	3.063	SL	17.752	6	2.198	3
5	M3	Start	4.045	10.726	0	0	6.125	SL	16.851	6	4.045	3
6		End	4.045	11.281	0	0	6.125	SL	17.406	6	4.045	3
7	M4	Start	4.045	11.281	0	0	6.125	SL	17.406	6	4.045	3
8		End	4.045	12.392	0	0	6.125	SL	18.517	6	4.045	3
9	M5	Start	3.08	10.872	0	0	6.125	SL	16.997	6	3.08	3
10		End	3.08	10.039	0	0	6.125	SL	16.164	6	3.08	3
11	M6	Start	3.08	9.205	0	0	6.125	SL	15.33	6	3.08	3
12		End	3.08	9.205	0	0	6.125	SL	15.33	6	3.08	3





Envelope Only Solution

Centek Engineering Inc.	Westville CT	SK-1
LAA		Oct 21, 2022
21007.02		Antenna FRP Screenwall-Rev.r3d



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek Engineering Inc.	Westville CT	SK-2
LAA		Oct 21, 2022
21007.02		Antenna FRP Screenwall-Rev.r3d

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0.5	0	
2	N2	11.5	0.5	0	
3	N3	11.5	-1.5	8.83	
4	N4	0	-1.5	8.83	
5	N5	0	-1.5	2.5	
6	N6	11.5	-1.5	2.5	
7	N10	11.5	0.5	8.83	
8	N11	0	0.5	8.83	
9	N12	0	0.5	2.5	
10	N13	11.5	0.5	2.5	
11	N14	5.75	0.5	2.5	
12	N15	5.75	0.5	8.83	
13	N16	5.75	0.5	0	
14	N17	0	8.5	0	
15	N18	11.5	8.5	0	
16	N19	11.5	8.5	8.83	
17	N20	0	8.5	8.83	
18	N21	0	8.5	2.5	
19	N22	11.5	8.5	2.5	
20	N23	5.75	8.5	2.5	
21	N24	5.75	8.5	8.83	
22	N25	5.75	8.5	0	
23	N26	3.833333	0.5	0	
24	N27	3.833333	8.5	0	
25	N28	7.666667	0.5	0	
26	N29	7.666667	8.5	0	
27	N35	5.75	4.5	2.5	
28	N55	10.0625	0.5	2.5	
29	N56	10.0625	8.5	2.5	
30	N57	7.1875	0.5	2.5	
31	N58	7.1875	8.5	2.5	
32	N59	1.916667	0.5	2.5	
33	N60	1.916667	8.5	2.5	
34	N61	8.625	0.5	2.5	
35	N62	8.625	8.5	2.5	
36	N63	3.833333	0.5	2.5	
37	N64	3.833333	8.5	2.5	
38	N40	3.833333	0.5	8.83	
39	N41	3.833333	8.5	8.83	
40	N42	7.666667	0.5	8.83	
41	N43	7.666667	8.5	8.83	
42	N44	0	8.5	1.5	
43	N45	11.5	8.5	1.5	
44	N46	11.5	8.5	7.33	
45	N47	0	8.5	7.33	
46	N48	10	8.5	0	
47	N49	10	8.5	8.83	
48	N51	1.5	8.5	0	
49	N52	1.5	8.5	8.83	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]	Y Rot [k-ft/rad]
1	N6	Reaction	Reaction	Reaction	Reaction
2	N3	Reaction	Reaction	Reaction	Reaction
3	N5	Reaction	Reaction	Reaction	Reaction
4	N4	Reaction	Reaction	Reaction	Reaction

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	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	65	1.1
3	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	0.3	0.65	0.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	0.3	0.65	0.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2
7	A1085	29000	11154	0.3	0.65	0.49	50	1.4	65	1.3
8	FRP	2800	420	0.35	0.44	0.07	16.67	1.5	50	1.2

Hot Rolled Steel Design Parameters

	Label	Shape	Length [ft]	Lcomp top [ft]	Function
1	M1	HSS2.5X2.5X5	10	Lbyy	Lateral
2	M2	HSS2.5X2.5X4	8	Lbyy	Lateral
3	M3	HSS2.5X2.5X5	10	Lbyy	Lateral
4	M4	HSS2.5X2.5X4	8	Lbyy	Lateral
5	M5	HSS2.5X2.5X5	10	Lbyy	Lateral
6	M6	HSS2.5X2.5X5	10	Lbyy	Lateral
7	M7	HSS2.5X2.5X4	5.75	Lbyy	Lateral
8	M8	HSS2.5X2.5X4	5.75	Lbyy	Lateral
9	M9	HSS2.5X2.5X4	5.75	Lbyy	Lateral
10	M10	HSS2.5X2.5X4	5.75	Lbyy	Lateral
11	M11	HSS2.5X2.5X4	6.33	Lbyy	Lateral
12	M12	HSS2.5X2.5X4	2.5	Lbyy	Lateral
13	M13	HSS2.5X2.5X4	6.33	Lbyy	Lateral
14	M14	HSS2.5X2.5X4	2.5	Lbyy	Lateral
15	M15	HSS2.5X2.5X4	6.33	Lbyy	Lateral
16	M16	HSS2.5X2.5X4	2.5	Lbyy	Lateral
17	M17	HSS2.5X2.5X4	5.75	Lbyy	Lateral
18	M18	HSS2.5X2.5X4	5.75	Lbyy	Lateral
19	M19	HSS2.5X2.5X4	8.83	Lbyy	Lateral
20	M20	HSS2.5X2.5X4	8.83	Lbyy	Lateral
21	M21	HSS2.5X2.5X4	5.75	Lbyy	Lateral
22	M22	HSS2.5X2.5X4	5.75	Lbyy	Lateral
23	M23	HSS2.5X2.5X4	5.75	Lbyy	Lateral
24	M24	HSS2.5X2.5X4	5.75	Lbyy	Lateral
25	M25	HSS2.5X2.5X4	6.33	Lbyy	Lateral
26	M26	HSS2.5X2.5X4	2.5	Lbyy	Lateral
27	M27	HSS2.5X2.5X4	5.75	Lbyy	Lateral
28	M28	HSS2.5X2.5X4	5.75	Lbyy	Lateral
29	M29	HSS2.5X2.5X4	8	Lbyy	Lateral
30	M30	LL4x4x6x0	8	Lbyy	Lateral
31	M31	HSS2.5X2.5X4	8	Lbyy	Lateral
32	M32	LL4x4x6x0	8	Lbyy	Lateral
33	M38	PIPE_2.5	8	Lbyy	Lateral
34	M39	PIPE_2.0	8	Lbyy	Lateral
35	M40	PIPE_2.0	8	Lbyy	Lateral
36	M41	PIPE_2.0	8	Lbyy	Lateral
37	M42	PIPE_2.0	8	Lbyy	Lateral
38	M43	LL4x4x6x0	8	Lbyy	Lateral
39	M44	LL4x4x6x0	8	Lbyy	Lateral
40	M45	L3X3X5	10.201	Lbyy	Lateral
41	M46	L3X3X5	10.201	Lbyy	Lateral
42	M47	L2.5x2.5x4	9.852	Lbyy	Lateral
43	M48	L2.5x2.5x4	9.852	Lbyy	Lateral
44	M49	L2x2x4	2.121	Lbyy	Lateral
45	M50	L2x2x4	2.121	Lbyy	Lateral
46	M51	L2x2x4	2.121	Lbyy	Lateral
47	M52	L2x2x4	2.121	Lbyy	Lateral

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	M5	Y	-0.2	%50	Active
2	M6	Y	-0.2	%50	Active
3	M31	Y	-0.2	%50	Active
4	M32	Y	-0.2	%50	Active
5	M30	Y	-0.2	%50	Active
6	M29	Y	-0.2	%50	Active
7	M3	Y	-0.2	%50	Active
8	M1	Y	-0.2	%50	Active
9	M2	Y	-0.2	%50	Active

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	M38	Y	-0.076	%50	Active
2	M39	Y	-0.084	%50	Active
3	M40	Y	-0.07	%50	Active
4	M41	Y	-0.076	%50	Active
5	M42	Y	-0.041	%50	Active
6	M42	Y	-0.041	%50	Active

Member Distributed Loads

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	M5	X	-0.208	-0.095	2	3.6	Active
2	M5	X	-0.208	-0.095	2	3.6	Active
3	M5	X	-0.095	-0.064	3.6	5.2	Active
4	M5	X	-0.095	-0.064	3.6	5.2	Active
5	M5	X	-0.064	-0.053	5.2	6.8	Active
6	M5	X	-0.064	-0.053	5.2	6.8	Active
7	M5	X	-0.053	-0.017	6.8	8.4	Active
8	M5	X	-0.053	-0.017	6.8	8.4	Active
9	M5	X	-0.017	-0.019	8.4	10	Active
10	M5	X	-0.017	-0.019	8.4	10	Active
11	M6	X	-0.101	-0.065	2	3.6	Active
12	M6	X	-0.101	-0.065	2	3.6	Active
13	M6	X	-0.065	-0.101	3.6	5.2	Active
14	M6	X	-0.065	-0.101	3.6	5.2	Active
15	M6	X	-0.101	-0.112	5.2	6.8	Active
16	M6	X	-0.101	-0.112	5.2	6.8	Active
17	M6	X	-0.112	-0.143	6.8	8.4	Active
18	M6	X	-0.112	-0.143	6.8	8.4	Active
19	M6	X	-0.143	-0.291	8.4	10	Active
20	M6	X	-0.143	-0.291	8.4	10	Active
21	M31	X	-0.055	-0.055	0	8	Active
22	M31	X	-0.055	-0.055	0	8	Active
23	M46	X	-0.097	-0.114	0	2.04	Active
24	M46	X	-0.097	-0.114	0	2.04	Active
25	M46	X	-0.114	-0.115	2.04	4.081	Active
26	M46	X	-0.114	-0.115	2.04	4.081	Active
27	M46	X	-0.115	-0.115	4.081	6.121	Active
28	M46	X	-0.115	-0.115	4.081	6.121	Active
29	M46	X	-0.115	-0.114	6.121	8.161	Active
30	M46	X	-0.115	-0.114	6.121	8.161	Active
31	M46	X	-0.114	-0.097	8.161	10.201	Active
32	M46	X	-0.114	-0.097	8.161	10.201	Active
33	M1	X	-0.208	-0.095	2	3.6	Active
34	M1	X	-0.208	-0.095	2	3.6	Active
35	M1	X	-0.095	-0.064	3.6	5.2	Active
36	M1	X	-0.095	-0.064	3.6	5.2	Active
37	M1	X	-0.064	-0.053	5.2	6.8	Active

Member Distributed Loads (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
37	M1	X	-0.064	-0.053	5.2	6.8	Active
38	M1	X	-0.064	-0.053	5.2	6.8	Active
39	M1	X	-0.053	-0.017	6.8	8.4	Active
40	M1	X	-0.053	-0.017	6.8	8.4	Active
41	M1	X	-0.017	-0.019	8.4	10	Active
42	M1	X	-0.017	-0.019	8.4	10	Active
43	M3	X	-0.101	-0.065	2	3.6	Active
44	M3	X	-0.101	-0.065	2	3.6	Active
45	M3	X	-0.065	-0.101	3.6	5.2	Active
46	M3	X	-0.065	-0.101	3.6	5.2	Active
47	M3	X	-0.101	-0.112	5.2	6.8	Active
48	M3	X	-0.101	-0.112	5.2	6.8	Active
49	M3	X	-0.112	-0.143	6.8	8.4	Active
50	M3	X	-0.112	-0.143	6.8	8.4	Active
51	M3	X	-0.143	-0.291	8.4	10	Active
52	M3	X	-0.143	-0.291	8.4	10	Active
53	M29	X	-0.055	-0.055	0	8	Active
54	M29	X	-0.055	-0.055	0	8	Active
55	M45	X	-0.097	-0.114	0	2.04	Active
56	M45	X	-0.097	-0.114	0	2.04	Active
57	M45	X	-0.114	-0.115	2.04	4.081	Active
58	M45	X	-0.114	-0.115	2.04	4.081	Active
59	M45	X	-0.115	-0.115	4.081	6.121	Active
60	M45	X	-0.115	-0.115	4.081	6.121	Active
61	M45	X	-0.115	-0.114	6.121	8.161	Active
62	M45	X	-0.115	-0.114	6.121	8.161	Active
63	M45	X	-0.114	-0.097	8.161	10.201	Active
64	M45	X	-0.114	-0.097	8.161	10.201	Active

Member Distributed Loads

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	M1	Z	-0.023	-0.021	2	3.6	Active
2	M1	Z	-0.023	-0.021	2	3.6	Active
3	M1	Z	-0.021	-0.044	3.6	5.2	Active
4	M1	Z	-0.021	-0.044	3.6	5.2	Active
5	M1	Z	-0.044	-0.065	5.2	6.8	Active
6	M1	Z	-0.044	-0.065	5.2	6.8	Active
7	M1	Z	-0.065	-0.087	6.8	8.4	Active
8	M1	Z	-0.065	-0.087	6.8	8.4	Active
9	M1	Z	-0.087	-0.139	8.4	10	Active
10	M1	Z	-0.087	-0.139	8.4	10	Active
11	M2	Z	-0.088	-0.089	0	2	Active
12	M2	Z	-0.088	-0.089	0	2	Active
13	M2	Z	-0.089	-0.088	2	4	Active
14	M2	Z	-0.089	-0.088	2	4	Active
15	M2	Z	-0.088	-0.059	4	6	Active
16	M2	Z	-0.088	-0.059	4	6	Active
17	M2	Z	-0.059	-0.003	6	8	Active
18	M2	Z	-0.059	-0.003	6	8	Active
19	M5	Z	-0.023	-0.021	2	3.6	Active
20	M5	Z	-0.023	-0.021	2	3.6	Active
21	M5	Z	-0.021	-0.044	3.6	5.2	Active
22	M5	Z	-0.021	-0.044	3.6	5.2	Active
23	M5	Z	-0.044	-0.065	5.2	6.8	Active
24	M5	Z	-0.044	-0.065	5.2	6.8	Active
25	M5	Z	-0.065	-0.087	6.8	8.4	Active
26	M5	Z	-0.065	-0.087	6.8	8.4	Active
27	M5	Z	-0.087	-0.139	8.4	10	Active

Member Distributed Loads (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
28	M5	Z	-0.087	-0.139	8.4	10	Active
29	M43	Z	-0.147	-0.092	0	1.6	Active
30	M43	Z	-0.147	-0.092	0	1.6	Active
31	M43	Z	-0.092	-0.067	1.6	3.2	Active
32	M43	Z	-0.092	-0.067	1.6	3.2	Active
33	M43	Z	-0.067	-0.077	3.2	4.8	Active
34	M43	Z	-0.067	-0.077	3.2	4.8	Active
35	M43	Z	-0.077	-0.091	4.8	6.4	Active
36	M43	Z	-0.077	-0.091	4.8	6.4	Active
37	M43	Z	-0.091	-0.103	6.4	8	Active
38	M43	Z	-0.091	-0.103	6.4	8	Active
39	M44	Z	-0.147	-0.092	0	1.6	Active
40	M44	Z	-0.147	-0.092	0	1.6	Active
41	M44	Z	-0.092	-0.067	1.6	3.2	Active
42	M44	Z	-0.092	-0.067	1.6	3.2	Active
43	M44	Z	-0.067	-0.077	3.2	4.8	Active
44	M44	Z	-0.067	-0.077	3.2	4.8	Active
45	M44	Z	-0.077	-0.091	4.8	6.4	Active
46	M44	Z	-0.077	-0.091	4.8	6.4	Active
47	M44	Z	-0.091	-0.103	6.4	8	Active
48	M44	Z	-0.091	-0.103	6.4	8	Active
49	M47	Z	-0.089	-0.069	0	1.97	Active
50	M47	Z	-0.089	-0.069	0	1.97	Active
51	M47	Z	-0.069	-0.063	1.97	3.941	Active
52	M47	Z	-0.069	-0.063	1.97	3.941	Active
53	M47	Z	-0.063	-0.053	3.941	5.911	Active
54	M47	Z	-0.063	-0.053	3.941	5.911	Active
55	M47	Z	-0.053	-0.034	5.911	7.882	Active
56	M47	Z	-0.053	-0.034	5.911	7.882	Active
57	M47	Z	-0.034	-0.022	7.882	9.852	Active
58	M47	Z	-0.034	-0.022	7.882	9.852	Active
59	M48	Z	-0.089	-0.069	0	1.97	Active
60	M48	Z	-0.089	-0.069	0	1.97	Active
61	M48	Z	-0.069	-0.063	1.97	3.941	Active
62	M48	Z	-0.069	-0.063	1.97	3.941	Active
63	M48	Z	-0.063	-0.053	3.941	5.911	Active
64	M48	Z	-0.063	-0.053	3.941	5.911	Active
65	M48	Z	-0.053	-0.034	5.911	7.882	Active
66	M48	Z	-0.053	-0.034	5.911	7.882	Active
67	M48	Z	-0.034	-0.023	7.882	9.852	Active
68	M48	Z	-0.034	-0.023	7.882	9.852	Active
69	M29	Z	-0.084	-0.084	8.4e-05	8	Active
70	M29	Z	-0.084	-0.084	8.4e-05	8	Active
71	M30	Z	-0.169	-0.169	4.2e-05	8	Active
72	M30	Z	-0.169	-0.169	4.2e-05	8	Active
73	M31	Z	-0.084	-0.084	0.000251	8	Active
74	M31	Z	-0.084	-0.084	0.000251	8	Active
75	M32	Z	-0.169	-0.169	0.000293	8	Active
76	M32	Z	-0.169	-0.169	0.000293	8	Active

Member Area Loads

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [ksf]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	N19	N18	N2	N10	X	A-B	-0.044	Active
2	N20	N17	N1	N11	X	A-B	-0.044	Active

Member Area Loads

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [ksf]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	N19	N20	N11	N10	Z	A-B	-0.044	Active
2	N18	N17	N1	N2	Z	A-B	-0.044	Active

Load Combinations

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	Deflection 1	Yes	Y	DL	1										
2	Deflection 2	Yes	Y	LL	1										
3	Deflection 3	Yes	Y	DL	1	LL	1								
4	IBC 16-8	Yes	Y	DL	1										
5	IBC 16-9	Yes	Y	DL	1	LL	1	LLS	1						
6	IBC 16-10 (b)	Yes	Y	DL	1	SL	1	SLN	1						
7	IBC 16-11 (b)	Yes	Y	DL	1	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75		
8	IBC 16-12 (a) (a)	Yes	Y	DL	1	WLX	0.6								
9	IBC 16-12 (a) (b)	Yes	Y	DL	1	WLZ	0.6								
10	IBC 16-12 (a) (c)	Yes	Y	DL	1	WLX	-0.6								
11	IBC 16-12 (a) (d)	Yes	Y	DL	1	WLZ	-0.6								
12	IBC 16-13 (a) (a)	Yes	Y	DL	1	WLX	0.45	LL	0.75	LLS	0.75				
13	IBC 16-13 (a) (b)	Yes	Y	DL	1	WLZ	0.45	LL	0.75	LLS	0.75				
14	IBC 16-13 (a) (c)	Yes	Y	DL	1	WLX	-0.45	LL	0.75	LLS	0.75				
15	IBC 16-13 (a) (d)	Yes	Y	DL	1	WLZ	-0.45	LL	0.75	LLS	0.75				
16	IBC 16-13 (b) (a)	Yes	Y	DL	1	WLX	0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
17	IBC 16-13 (b) (b)	Yes	Y	DL	1	WLZ	0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
18	IBC 16-13 (b) (c)	Yes	Y	DL	1	WLX	-0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
19	IBC 16-13 (b) (d)	Yes	Y	DL	1	WLZ	-0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75
20	IBC 16-15 (a)	Yes	Y	DL	0.6	WLX	0.6								
21	IBC 16-15 (b)	Yes	Y	DL	0.6	WLZ	0.6								
22	IBC 16-15 (c)	Yes	Y	DL	0.6	WLX	-0.6								
23	IBC 16-15 (d)	Yes	Y	DL	0.6	WLZ	-0.6								

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N6	max	0.703	20	3.898	9	1.294	21	0	23	0.07	10	0	23
2		min	-1.084	10	-1.336	23	-1.484	11	0	1	-0.071	8	0	1
3	N3	max	1.074	20	2.885	10	1.171	9	0	23	0.201	21	0	23
4		min	-1.007	10	-2.169	20	-0.968	23	0	1	-0.202	11	0	1
5	N5	max	1.04	8	3.818	9	1.293	21	0	23	0.069	10	0	23
6		min	-0.668	22	-1.391	23	-1.488	11	0	1	-0.072	8	0	1
7	N4	max	1.01	8	2.902	8	1.167	9	0	23	0.201	23	0	23
8		min	-1.069	22	-2.159	22	-0.969	23	0	1	-0.202	9	0	1
9	Totals:	max	3.73	8	4.017	10	4.858	21						
10		min	-3.73	10	0	2	-4.858	11						

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Pnc/om [k]	Pnt/om [k]	Mnyy/om [k-ft]	Mnzz/om [k-ft]	Cb	Eqn
1	M1	HSS2.5X2.5X5	0.633	1.979	20	0.124	1.979	z	9	18.997	64.731	4.315	4.315	2.672	H1-1b
2	M2	HSS2.5X2.5X4	0.104	4	11	0.014	0	z	9	25.651	54.263	3.742	3.742	1	H1-1b
3	M3	HSS2.5X2.5X5	0.843	1.979	9	0.104	1.979	z	11	18.997	64.731	4.315	4.315	2.293	H1-1a
4	M4	HSS2.5X2.5X4	0.003	0	11	0.013	8	y	8	25.651	54.263	3.742	3.742	1	H1-1b*
5	M5	HSS2.5X2.5X5	0.632	1.979	22	0.124	1.979	z	9	18.997	64.731	4.315	4.315	2.678	H1-1b
6	M6	HSS2.5X2.5X5	0.851	1.979	9	0.104	1.979	z	11	18.997	64.731	4.315	4.315	2.227	H1-1a
7	M7	HSS2.5X2.5X4	0.406	0	8	0.077	3.833	z	11	36.847	54.263	3.742	3.742	2.454	H1-1b
8	M8	HSS2.5X2.5X4	0.403	5.75	10	0.077	5.75	z	11	36.847	54.263	3.742	3.742	2.454	H1-1b
9	M9	HSS2.5X2.5X4	0.605	0	8	0.101	0	y	8	36.847	54.263	3.742	3.742	3	H1-1b
10	M10	HSS2.5X2.5X4	0.645	5.75	10	0.125	5.75	y	10	36.847	54.263	3.742	3.742	3	H1-1b
11	M11	HSS2.5X2.5X4	0.109	0	11	0.013	6.33	z	8	33.946	54.263	3.742	3.742	2.335	H1-1b
12	M12	HSS2.5X2.5X4	0.083	0	10	0.031	2.5	z	8	50.435	54.263	3.742	3.742	1.604	H1-1b
13	M13	HSS2.5X2.5X4	0.497	0	9	0.049	6.33	y	9	33.946	54.263	3.742	3.742	2.231	H1-1b

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Pnc/om [k]	Pnt/om [k]	Mnyy/om [k-ft]	Mnzz/om [k-ft]	Cb	Eqn
14	M14	HSS2.5X2.5X4	0.447	0	11	0.158	0	y	10	50.435	54.263	3.742	3.742	1.967	H1-1b
15	M15	HSS2.5X2.5X4	0.496	0	9	0.047	6.33	y	9	33.946	54.263	3.742	3.742	2.231	H1-1b
16	M16	HSS2.5X2.5X4	0.448	0	11	0.166	0	y	8	50.435	54.263	3.742	3.742	1.967	H1-1b
17	M17	HSS2.5X2.5X4	0.227	0	11	0.03	3.833	z	9	36.847	54.263	3.742	3.742	1.567	H1-1b
18	M18	HSS2.5X2.5X4	0.224	5.75	11	0.03	5.75	z	9	36.847	54.263	3.742	3.742	1.573	H1-1b
19	M19	HSS2.5X2.5X4	0.349	6.347	9	0.086	1.472	z	10	21.782	54.263	3.742	3.742	1.932	H1-1b
20	M20	HSS2.5X2.5X4	0.349	6.347	9	0.091	1.472	z	8	21.782	54.263	3.742	3.742	1.932	H1-1b
21	M21	HSS2.5X2.5X4	0.215	1.557	8	0.065	1.497	z	10	36.847	54.263	3.742	3.742	1.761	H1-1b
22	M22	HSS2.5X2.5X4	0.212	4.193	10	0.066	5.75	z	8	36.847	54.263	3.742	3.742	1.754	H1-1b
23	M23	HSS2.5X2.5X4	0.183	5.75	11	0.046	1.497	z	9	36.847	54.263	3.742	3.742	1.531	H1-1b
24	M24	HSS2.5X2.5X4	0.184	0	11	0.046	5.75	z	9	36.847	54.263	3.742	3.742	1.521	H1-1b
25	M25	HSS2.5X2.5X4	0.304	0	8	0.024	6.33	z	8	33.946	54.263	3.742	3.742	1.801	H1-1b
26	M26	HSS2.5X2.5X4	0.094	2.5	8	0.032	2.5	z	8	50.435	54.263	3.742	3.742	1.647	H1-1b
27	M27	HSS2.5X2.5X4	0.308	0	10	0.056	0	y	10	36.847	54.263	3.742	3.742	1.449	H1-1b
28	M28	HSS2.5X2.5X4	0.336	5.75	8	0.074	5.75	y	8	36.847	54.263	3.742	3.742	1.41	H1-1b
29	M29	HSS2.5X2.5X4	0.347	0	11	0.046	8	y	9	2.567	19.665	1.356	1.356	2.491	H1-1b
30	M30	LL4x4x6x0	0.378	3.917	9	0.023	0	y	11	10.637	57.097	5.324	2.168	1	H1-1b
31	M31	HSS2.5X2.5X4	0.347	0	11	0.046	8	z	9	2.567	19.665	1.356	1.356	2.273	H1-1b
32	M32	LL4x4x6x0	0.378	3.917	9	0.023	8	y	11	10.637	57.097	5.324	2.168	1	H1-1b
33	M38	PIPE_2.5	0.063	0	10	0.011	8		21	19.986	33.743	2.393	2.393	1	H1-1b*
34	M39	PIPE_2.0	0.006	0	10	0.007	8		21	9.924	21.377	1.245	1.245	1	H1-1b*
35	M40	PIPE_2.0	0.093	0	8	0.011	8		21	9.924	21.377	1.245	1.245	1	H1-1b*
36	M41	PIPE_2.0	0.017	0	8	0.01	8		21	9.924	21.377	1.245	1.245	1	H1-1b*
37	M42	PIPE_2.0	0.017	0	10	0.009	8		21	9.924	21.377	1.245	1.245	1	H1-1b*
38	M43	LL4x4x6x0	0.18	4	9	0.013	0	y	9	10.637	57.097	5.324	2.168	1	H1-1b
39	M44	LL4x4x6x0	0.18	4	9	0.013	0	y	11	10.637	57.097	5.324	2.168	1	H1-1b
40	M45	L3X3X5	0.922	5.101	10	0.033	10.201	z	10	6.068	38.371	1.34	2.37	1.138	H2-1
41	M46	L3X3X5	0.901	5.101	8	0.033	10.201	z	8	6.068	38.371	1.34	2.37	1.138	H2-1
42	M47	L2.5x2.5x4	0.767	4.618	8	0.029	0	z	11	2.973	25.653	0.741	1.228	1.136	H2-1
43	M48	L2.5x2.5x4	0.762	4.618	10	0.029	0	z	11	2.973	25.653	0.741	1.228	1.136	H2-1
44	M49	L2x2x4	0.088	1.061	11	0.01	2.121	y	10	16.205	20.35	0.46	1.049	1.136	H2-1
45	M50	L2x2x4	0.085	1.061	8	0.006	2.121	y	11	16.205	20.35	0.46	1.049	1.136	H2-1
46	M51	L2x2x4	0.084	1.061	10	0.006	2.121	y	11	16.205	20.35	0.46	1.049	1.136	H2-1
47	M52	L2x2x4	0.088	1.061	11	0.008	2.121	y	8	16.205	20.35	0.46	1.049	1.136	H2-1

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Screenwall Connection to Building

Number of Thru Bolts =	$n_b := 4$	(User Input)
Bolt Diameter =	$d\phi := 0.625\ in$	(User Input)
Allowable Tensile Strength =	$r_{nt} := 13.8\ kip$	(User Input)
Allowable Shear Strength =	$r_{nv} := 8.25 \cdot kip$	(User Input)
Spacing Between Bolts =	$S := 2\ in$	(User Input - Assumed)

ASD Reactions at Connection Node :

Tension X =	$Tension_x := 2.169 \cdot kip$	(User Input)
Shear Y =	$Shear_y := 1.488\ kip$	(User Input)
Shear Z =	$Shear_z := 1.084 \cdot kip$	(User Input)
Moment X =	$M_X := .202 \cdot kip \cdot ft$	(User Input)
Moment Y =	$M_Y := 0 \cdot kip \cdot ft$	(User Input)
Moment Z =	$M_Z := 0 \cdot kip \cdot ft$	(User Input)

Anchor Check:

Shear Force per Bolt (ASD) =

$$V_{all} := \frac{\sqrt{Shear_z^{\,2} + Shear_y^{\,2}}}{n_b} + \frac{M_X}{S \cdot \frac{n_b}{2}} = 1.066\ kip$$

$$\frac{V_{all}}{r_{nv}} = 12.9\%$$

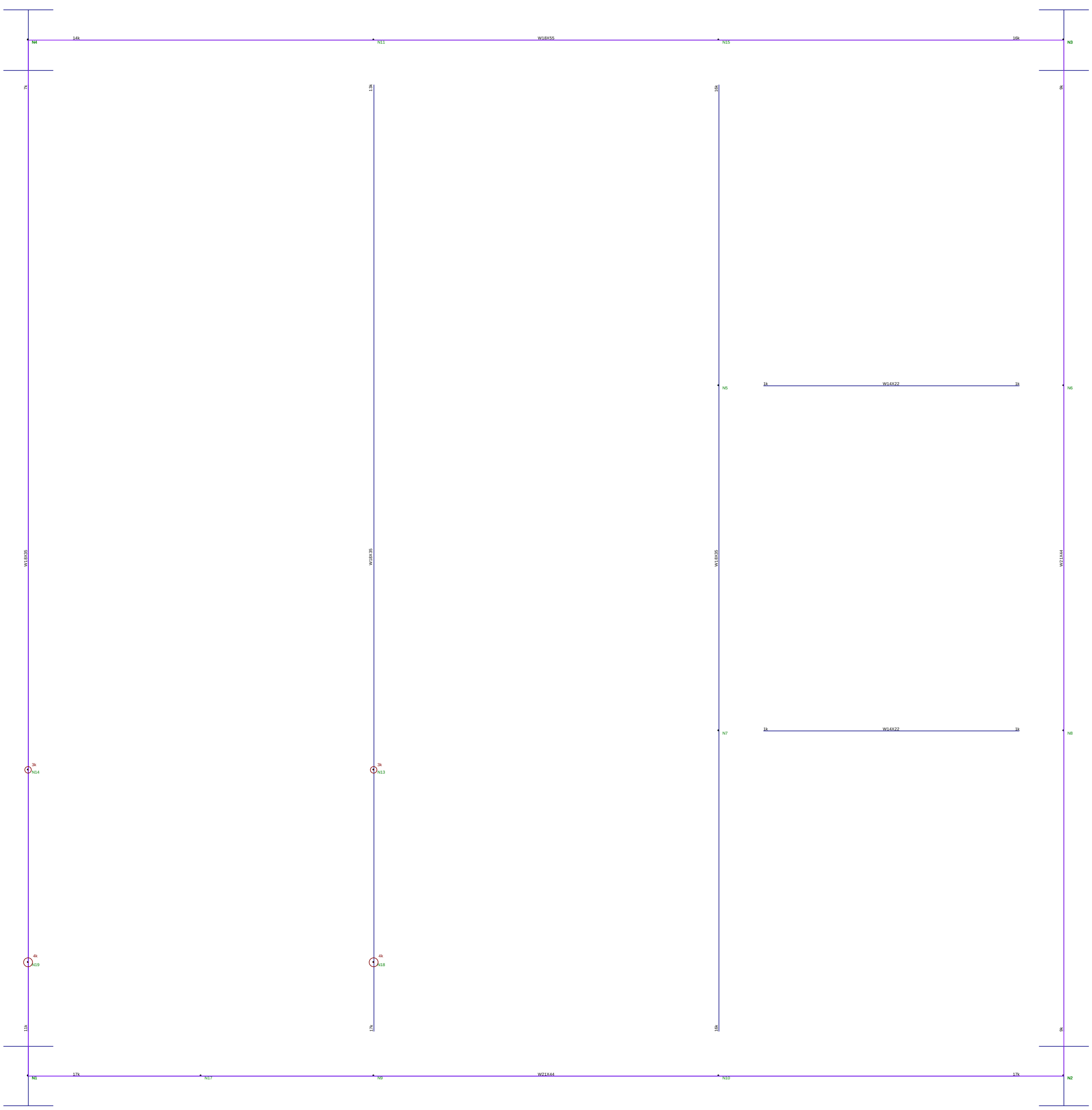
Tension Force per Bolt (ASD) =

$$T_{all} := \frac{Tension_x}{n_b} + \frac{M_Y + M_Z}{S \cdot \frac{n_b}{2}} = 0.542\ kip$$

$$\frac{T_{all}}{r_{nt}} = 3.9\%$$

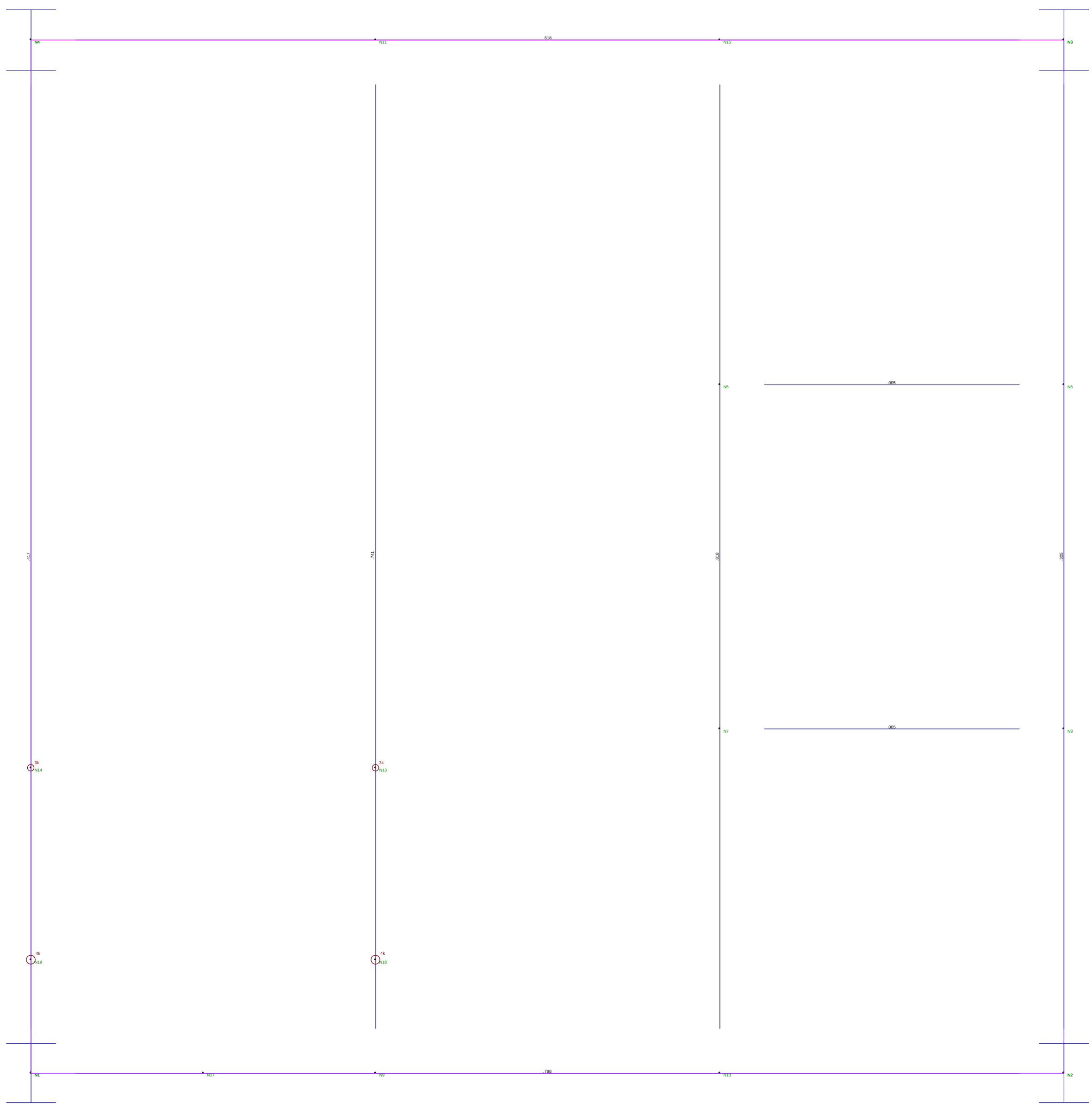
Combined Shear and Tension Ultimate Limit State =

$$Condition1 := \text{if}\left(\left(\frac{T_{all}}{r_{nt}}\right)^2 + \left(\frac{T_{all}}{r_{nt}}\right)^2 \le 1.0, \text{“OK”}, \text{“Overstressed”}\right) = \text{“OK”}$$



Member Camber and Reactions
Loads: Envelop Results

Centek Engineering	Roof Framing	SK - 1
Luke Amiot		Oct 21, 2022 at 8:49 AM
	EXISTING ROOF FRAMING AT ALPHA/BETA	Existing Framing Calculation-Screen...



Member Bending Check
Loads: Envelop Results

Centek Engineering	Roof Framing	SK - 2
Luke Amiot		Oct 21, 2022 at 8:50 AM
	EXISTING ROOF UNIT CHECK ALPHA/BETA	Existing Framing Calculation-Screen...

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E..	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	1.25	65	1.15
8	A913 Gr.65	29000	11154	.3	.65	.49	65	1.1	80	1.1

Deck General Properties

	Label	Material Type	Deck	Unbraced[ft]	Max Spa...
1	Concrete Deck	Conc3000NW	1 in	3	10
2	Composite Deck	Vulcraft 3 VLI	7.5"NW 3VLI20, Conc3000NW, 3in, .75in, 65ksi	2	10
3	Metal Deck	Verco Steel Roof Deck	22ga PLB-36	2	4
4	Wood	Wood Deck	1 in	1	4

Deck Loads

	Label	Two Way	Self Wt [ksf]	Super DL [ksf]	Const DL [ksf]	Const LL [ksf]
1	Concrete Deck		.012	0	0	.02
2	Composite Deck		.075	0	0	.02
3	Metal Deck		.002	0	0	.02
4	Wood		.003	0	0	.02

Uniform Area Loads

	Label	Additive	PreDL[ksf]	PostDL[ksf]	LL[ksf]	LL Type	VL[ksf]	Dyn Load[...
1	Snow Load	Yes			.03	SL	.004	.01
2	Add Piping	Yes		.02		LL-Non	.011	.02
3	Roof			.01	.02	RLL-Non	.011	.01

Point Locations : Roof Framing

	Label	Z [ft]	X [ft]	Elev Offset [ft]
1	N1	0	0	0
2	N2	35	0	0
3	N3	35	35	0
4	N4	0	35	0
5	N5	23.333333	23.333333	0
6	N6	35	23.333333	0
7	N7	23.333333	11.666667	0
8	N8	35	11.666667	0
9	N9	11.666667	0	0
10	N10	23.333333	0	0
11	N11	11.667	35	0
12	N15	23.333333	35	0
13	N13	11.666765	10.333	0
14	N14	0	10.333	0
15	N17	5.833332	0	0
16	N18	11.666703	3.833	0
17	N19	0	3.833	0

Beam Primary Data : Roof Framing

	Label	Start Point	End Point	Shape	Material	Design Rules	Function	Orientation	Start Rel...	End Rele...	Outrigger?
1	M1	N1	N2	W21X44	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
2	M2	N4	N3	W18X55	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
3	M3	N1	N4	W18X35	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
4	M4	N2	N3	W21X44	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
5	M5	N11	N9	W18X35	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
6	M6	N15	N10	W18X35	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
7	M7	N6	N5	W14X22	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
8	M8	N7	N8	W14X22	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	

Hot Rolled : Roof Framing

	Label	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp To...	Lcomp Bot...	L-torqu...	Cb	Composite	Camber[in]	B-eff Left[...	B-eff Righ...
1	M1	35	Segment		Framing				Yes			
2	M2	35	Segment		Framing				Yes			
3	M3	35	1		Framing				Yes			
4	M4	35	1		Framing				Yes			
5	M5	35	1		Framing				Yes			
6	M6	35	1		Framing				Yes			
7	M7	11.667	Segment		Framing				Yes			
8	M8	11.667	Segment		Framing				Yes			

Point Loads : Roof Framing

	Point Label	PreDL[k]	PostDL[k]	LL[k]	LL Type	Dyn Load[k]
1	N19		4		LL-Non	
2	N18		4		LL-Non	
3	N14		3		LL-Non	
4	N13		3		LL-Non	

Combinations

	Label	Sol...	Cat...	Fac...	Cat...	Fac...	Cat...	Fac...	Cat...	Fac...	Cat...	Fact...	Cat...	Fact...	Cat...	Fact...	Cat...	Fact...	Cat...	Fact...	Cat...	Fact...
1	Service ...	Yes	DL	1																		
2	Service ...	Yes	DL	1	LL	1	LLS	1														
3	IBC 16-8...	Yes	DLP...	1																		
4	IBC 16-9...	Yes	DLP...	1	LLC...	1																
5	IBC 16-1...	Yes	DL	1	RLL	1																
6	IBC 16-1...	Yes	DL	1	SL	1	SLN	1														
7	IBC 16-1...	Yes	DL	1	LL	.75	LLS	.75	RLL	.75												
8	IBC 16-1...	Yes	DL	1	LL	.75	LLS	.75	SL	.75	SLN	.75										
9	IBC 16-1...	Yes	DL	1	LL	.75	LLS	.75														

Floors

	Label	Elevation[ft]	Floor Type	Area Load Default	Inactive	Splice Dis...	Splice Type	No Wind/...	Parapet Hei...
1	Roof Framing	12	Floor Beam	Roof		12	Moment		0

Beam Floors

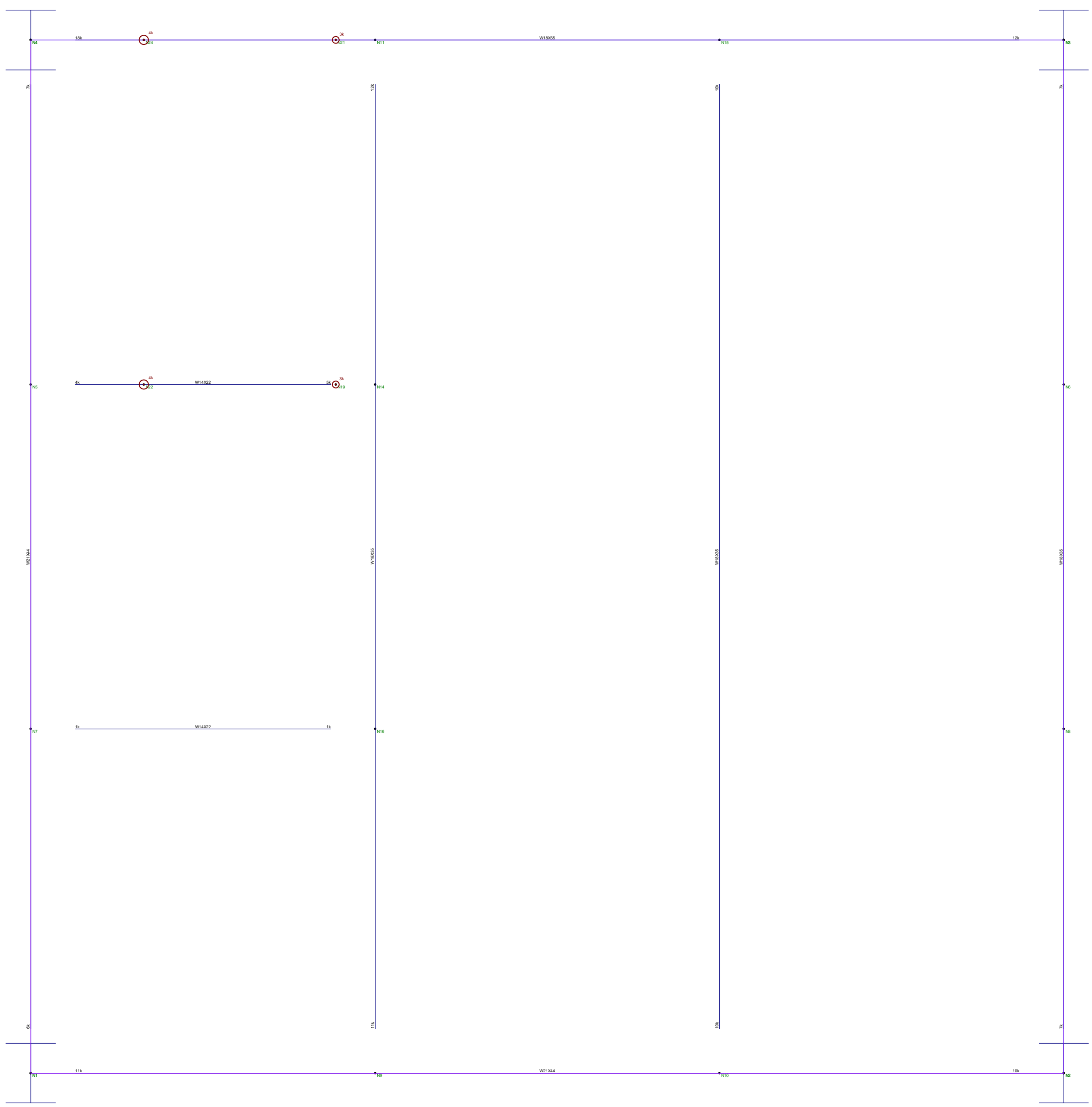
	Label	Deck Default	Deck Angle Default (deg)	Parent
1	Roof Framing	Concrete Deck	0	None

Beam Code Summary for Hot Rolled : Roof Framing

	Label	Size	Explicit	Studs	Camb...	Material	Bending...	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear C..	Loc[ft]	LC
1	M1	W21X44	Yes		0	A992	.798	13.854	6	1.015	17.5	DL+...	.114	0	5
2	M2	W18X55	Yes		0	A992	.618	23.333	6	.843	17.5	DL+...	.107	35	6
3	M3	W18X35	Yes		0	A992	.417	12.76	5	.588	16.406	DL+...	.1	0	5
4	M4	W21X44	Yes		0	A992	.305	17.5	6	.381	17.5	DL+...	.057	35	6
5	M5	W18X35	Yes		0	A992	.741	19.688	5	1.061	18.229	DL+...	.159	35	5
6	M6	W18X35	Yes		0	A992	.818	17.5	6	1.172	17.5	DL+...	.146	35	6
7	M7	W14X22	Yes		0	A992	.005	5.833	1	.036	0	LL	.002	11.6...	1
8	M8	W14X22	Yes		0	A992	.005	5.833	1	.036	0	LL	.002	11.6...	1

Beam End Reactions : Roof Framing

	Beam	End	PreDL[k]	DL[k]	LL[k]	LLS[k]	Roof[k]	Roof Cat	Max[k]	LC	Min[k]	LC
1	M1	Start	3.897	12.445	0	0	4.083	RLL	16.529	5	3.897	3
2		End	3.94	11.277	0	0	5.104	SL	16.381	6	3.94	3
3	M2	Start	4.088	9.734	0	0	4.083	RLL	13.818	5	4.088	3
4		End	4.131	10.017	0	0	5.104	SL	15.121	6	4.131	3
5	M3	Start	1.847	8.544	0	0	2.042	RLL	10.586	5	1.847	3
6		End	1.847	4.191	0	0	2.042	RLL	6.233	5	1.847	3
7	M4	Start	2.136	5.199	0	0	3.063	SL	8.261	6	2.136	3
8		End	2.136	5.199	0	0	3.062	SL	8.261	6	2.136	3
9	M5	Start	3.08	8.487	0	0	4.083	RLL	12.571	5	3.08	3
10		End	3.08	12.84	0	0	4.083	RLL	16.923	5	3.08	3
11	M6	Start	3.209	9.334	0	0	6.125	SL	15.459	6	3.209	3
12		End	3.209	9.334	0	0	6.125	SL	15.459	6	3.209	3
13	M7	Start	.129	.129	0	0	0	RLL	.129	9	.129	9
14		End	.129	.129	0	0	0	RLL	.129	9	.129	9
15	M8	Start	.129	.129	0	0	0	RLL	.129	9	.129	9
16		End	.129	.129	0	0	0	RLL	.129	9	.129	9



Member Camber and Reactions
Loads: Envelop Results

Centek Engineering	Roof Framing	SK - 1
Luke Amiot		Oct 21, 2022 at 8:58 AM
	EXISTING ROOF FRAMING AT GAMMA	Existing Framing Calculation-Scree...

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E..	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	1.25	65	1.15
8	A913 Gr.65	29000	11154	.3	.65	.49	65	1.1	80	1.1

Deck General Properties

	Label	Material Type	Deck	Unbraced[ft]	Max Spa...
1	Concrete Deck	Conc3000NW	1 in	3	10
2	Composite Deck	Vulcraft 3 VLI	7.5"NW 3VLI20, Conc3000NW, 3in, .75in, 65ksi	2	10
3	Metal Deck	Verco Steel Roof Deck	22ga PLB-36	2	4
4	Wood	Wood Deck	1 in	1	4

Deck Loads

	Label	Two Way	Self Wt [ksf]	Super DL [ksf]	Const DL [ksf]	Const LL [ksf]
1	Concrete Deck		.012	0	0	.02
2	Composite Deck		.075	0	0	.02
3	Metal Deck		.002	0	0	.02
4	Wood		.003	0	0	.02

Uniform Area Loads

	Label	Additive	PreDL[ksf]	PostDL[ksf]	LL[ksf]	LL Type	VL[ksf]	Dyn Load[...
1	Snow Load			.01	.03	SL	.004	.01
2	Add Piping	Yes		.01		LL-Non	.011	.02
3	Roof			.01	.02	RLL-Non	.011	.01

Point Locations : Roof Framing

	Label	Z [ft]	X [ft]	Elev Offset [ft]
1	N1	0	0	0
2	N2	35	0	0
3	N3	35	35	0
4	N4	0	35	0
5	N5	0	23.333333	0
6	N6	35	23.333333	0
7	N7	0	11.666667	0
8	N8	35	11.666667	0
9	N9	11.666667	0	0
10	N10	23.333333	0	0
11	N11	11.667	35	0
12	N14	11.666889	23.333333	0
13	N15	23.333333	35	0
14	N16	11.666778	11.666667	0
15	N19	10.333667	23.333333	0
16	N21	10.334	35	0
17	N22	3.833667	23.333333	0
18	N24	3.834	35	0

Beam Primary Data : Roof Framing

	Label	Start Point	End Point	Shape	Material	Design Rules	Function	Orientation	Start Rel...	End Rele...	Outrigger?
1	M1	N1	N2	W21X44	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
2	M2	N4	N3	W18X55	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
3	M3	N1	N4	W21X44	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
4	M4	N2	N3	W18X35	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
5	M5	N11	N9	W18X35	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
6	M6	N15	N10	W18X35	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
7	M7	N14	N5	W14X22	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
8	M8	N7	N16	W14X22	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	

Hot Rolled : Roof Framing

	Label	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp To...	Lcomp Bot...	L-torqu...	Cb	Composite	Camber[in]	B-eff Left[...	B-eff Righ...
1	M1	35	1		1				Yes			
2	M2	35	1		1				Yes			
3	M3	35	Segment		Framing				Yes			
4	M4	35	Segment		Framing				Yes			
5	M5	35	1		1				Yes			
6	M6	35	1		1				Yes			
7	M7	11.667	Segment		Framing				Yes			
8	M8	11.667	Segment		Framing				Yes			

Point Loads : Roof Framing

	Point Label	PreDL[k]	PostDL[k]	LL[k]	LL Type	Dyn Load[k]
1	N22		4		LL-Non	
2	N19		3		LL-Non	
3	N24		4		LL-Non	
4	N21		3		LL-Non	
5	N1				LL-Non	

Combinations

	Label	Sol...	Cat...	Fac...	Cat...	Fac...	Cat...	Fac...	Cat...	Fac...	Cat...	Fact...	Cat...	Fact...	Cat...	Fact...	Cat...	Fact...	Cat...	Fact...	Cat...	Fact...
1	IBC 16-8...	Yes	DLP...	1																		
2	IBC 16-9...	Yes	DLP...	1	LLC...	1																
3	IBC 16-8...	Yes	DL	1																		
4	IBC 16-9...	Yes	DL	1	LL	1	LLS	1														
5	IBC 16-1...	Yes	DL	1	RLL	1																
6	IBC 16-1...	Yes	DL	1	SL	1	SLN	1														
7	IBC 16-1...	Yes	DL	1	LL	.75	LLS	.75	RLL	.75												
8	IBC 16-1...	Yes	DL	1	LL	.75	LLS	.75	SL	.75	SLN	.75										
9	IBC 16-1...	Yes	DL	1	LL	.75	LLS	.75														

Floors

	Label	Elevation[ft]	Floor Type	Area Load Default	Inactive	Splice Dis...	Splice Type	No Wind/...	Parapet Hei...
1	Roof Framing	12	Floor Beam	Roof		12	Moment		0

Beam Floors

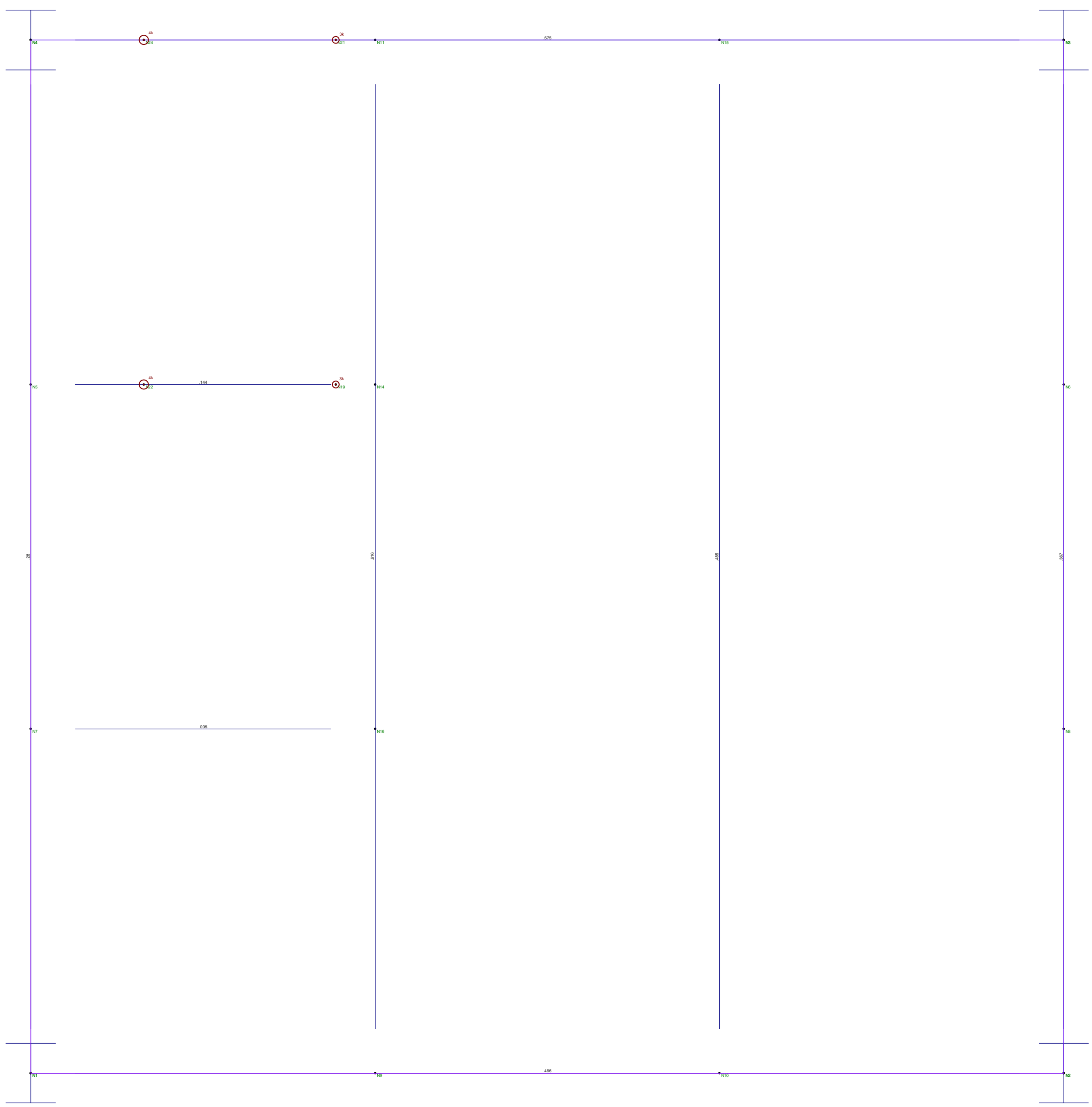
	Label	Deck Default	Deck Angle Default (deg)	Parent
1	Roof Framing	Concrete Deck	0	None

Beam Code Summary for Hot Rolled : Roof Framing

	Label	Size	Explicit	Studs	Camb...	Material	Bending...	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear C...	Loc[ft]	LC
1	M1	W21X44	Yes		0	A992	.496	11.667	5	.614	17.5	DL+...	.072	0	5
2	M2	W18X55	Yes		0	A992	.575	11.667	5	.757	16.771	DL+...	.121	0	5
3	M3	W21X44	Yes		0	A992	.28	19.688	6	.336	18.229	DL+...	.047	35	5
4	M4	W18X35	Yes		0	A992	.367	17.5	6	.518	17.5	DL+...	.065	35	6
5	M5	W18X35	Yes		0	A992	.616	14.583	5	.875	16.771	DL+...	.11	0	5
6	M6	W18X35	Yes		0	A992	.485	17.5	6	.686	17.5	DL+...	.087	35	6
7	M7	W14X22	Yes		0	A992	.144	7.778	3	.083	6.198	DL+...	.065	0	3
8	M8	W14X22	Yes		0	A992	.005	5.833	1	.036	0	LL	.002	11.6...	1

Beam End Reactions : Roof Framing

	Beam	End	PreDL[k]	DL[k]	LL[k]	LLS[k]	Roof[k]	Roof Cat	Max[k]	LC	Min[k]	LC
1	M1	Start	3.94	7.432	0	0	2.949	RLL	10.381	5	3.94	1
2		End	3.897	7.174	0	0	2.495	RLL	9.67	5	3.897	1
3	M2	Start	4.131	14.181	0	0	2.949	RLL	17.13	5	4.131	1
4		End	4.088	9.13	0	0	2.495	RLL	11.626	5	4.088	1
5	M3	Start	2.136	4.507	0	0	1.361	RLL	5.868	5	2.136	1
6		End	2.136	5.517	0	0	1.361	RLL	6.878	5	2.136	1
7	M4	Start	1.847	3.889	0	0	3.063	SL	6.951	6	1.847	1
8		End	1.847	3.889	0	0	3.063	SL	6.951	6	1.847	1
9	M5	Start	3.209	8.239	0	0	3.403	RLL	11.642	5	3.209	1
10		End	3.209	6.915	0	0	3.403	RLL	10.318	5	3.209	1
11	M6	Start	3.08	6.143	0	0	3.063	SL	9.205	6	3.08	1
12		End	3.08	6.143	0	0	3.063	SL	9.205	6	3.08	1
13	M7	Start	.129	4.1	0	0	0	RLL	4.1	9	.129	2
14		End	.129	3.157	0	0	0	RLL	3.157	9	.129	2
15	M8	Start	.129	.129	0	0	0	RLL	.129	9	.129	9
16		End	.129	.129	0	0	0	RLL	.129	9	.129	9



Member Bending Check
Loads: Envelop Results

Centek Engineering	Roof Framing	SK - 2
Luke Amiot		Oct 21, 2022 at 8:59 AM
	EXISTING ROOF UNITY CHECK AT GAMMA	Existing Framing Calculation-Scree...