



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

December 15, 2020

Victoria Masse
Northeast Site Solutions
42 Main Street, Unit 2
Sturbridge, MA 01566

RE: **TS-T-MOBILE-062-201117** – T-Mobile request for an order to approve tower sharing at an existing telecommunications facility located at 796 Woodin Street, Hamden, Connecticut.

Dear Ms. Masse:

The Connecticut Siting Council (Council) is in receipt of your correspondence of December 15, 2020 submitted in response to the Council's December 7, 2020 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,

s/ Melanie A. Bachman

Melanie A. Bachman
Executive Director

MAB/IN/emr

From: Deborah Chase <deborah@northeastsitesolutions.com>
Sent: Tuesday, December 15, 2020 8:35 AM
To: CSC-DL Siting Council <Siting.Council@ct.gov>; Bachman, Melanie <Melanie.Bachman@ct.gov>; Mathews, Lisa A <Lisa.A.Mathews@ct.gov>
Cc: Sheldon Freinle <sheldon@northeastsitesolutions.com>; victoria@northeastsitesolutions.com; tmo-ct@northeastsitesolutions.com
Subject: 796 WOODIN STREET HAMDEN CT 065 T-MOBILE TOWER SHARE (CTNH400A-NSD)

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Siting Council

Please find attached revised cover letter and requested Mount Analysis per the incomplete letter TS-T-MOBILE-062-201117.

Thank you very much

Deborah Chase

Senior Project Coordinator & Analyst

Mobile: 860-490-8839





NSS **NORTHEAST**
SITE SOLUTIONS
Turnkey Wireless Development

Northeast Site Solutions
Victoria Masse
420 Main Street, Sturbridge CT 01566
860-306-2326
victoria@northeastsitesolutions.com

December 4, 2020

Members of the Siting Council
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Tower Share Application
796 Woodin Street, Hamden CT 06514
Latitude: 41.351214
Longitude: -72.962575
T-Mobile Site#: CTNH400A-NSD
TS-T-Mobile-062-201117

Dear Ms. Bachman:

Please accept this revised letter for 796 Woodin Street, Hamden. TS-T-Mobile-062-201117 (attached).
The mount analysis (attached) and 5G antenna statements have been updated as requested.

This letter and attachments are submitted on behalf of T-Mobile Northeast LLC ("T-Mobile"). T-Mobile plans to install antennas and related equipment at the tower site located at 796 Woodin Street, Hamden, Connecticut.

T-Mobile will install three (3) 600/700/1900 MHz 5G antenna, three (3) 2100 MHz antenna, three (3) 2500 MHz 5G antenna, and nine (9) RRUs at the 110-foot level of the existing 120 foot tower. Three (3) hybrid lines will also be installed. T-Mobile's equipment cabinets will be placed within T-Mobile's 200 sq ft lease area. Included are plans by Hudson Design Group dated October 27, 2020.. Also included is a structural analysis prepared by Hudson Design Group, dated October 9, 2020, confirming that the existing tower is structurally capable of supporting the proposed equipment. Attached as, and a mount analysis prepared by Hudson Design Group, dated October 23, 2020, confirming that the proposed tower mounts are structurally capable of supporting the proposed equipment. Attached as **Exhibit A**.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies 16-50aa, of T-Mobile's intent to share a telecommunications facility pursuant to R.C.S.A. 16-50j-88. In accordance with R.C.S.A., a copy of this letter is being sent to Mayor Curt Balzano Leng and Daniel Kops, Town Planner of the Town of Hamden, as well as the tower owner (Tarpon Tower) and property owner (Gabrielle Scirocco).

The planned modifications of the facility fall squarely within those activities explicitly provided for in R.C.S.A. 16-50j-89.

1. The proposed modification will not result in an increase in the height of the existing structure. The top of the support tower is 120-feet; T-Mobile's proposed antennas will be located at a center line height of 110-feet.
2. The proposed modifications will not result in the increase of the site boundary as depicted on the attached site plan.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed local and state criteria. The incremental effect of the proposed changes will be negligible.



4. The operation of the proposed antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard. As indicated in the attached power density calculations, the combined site operations will result in a total power density of 5.17%.

Connecticut General Statutes 16-50aa indicates that the Council must approve the shared use of a telecommunications facility provided it finds the shared use is technically, legally, environmentally, and economically feasible and meets public safety concerns. As demonstrated in this letter, T-Mobile respectfully indicates that the shared use of this facility satisfies these criteria.

A. Technical Feasibility. The existing monopole has been deemed structurally capable of supporting T-Mobile's proposed loading. The structural analysis.

B. Legal Feasibility. As referenced above, C.G.S. 16-50aa has been authorized to issue orders approving the shared use of an existing tower such as this support tower in Hamden. Under the authority granted to the Council, an order of the Council approving the requested shared use would permit T-Mobile to obtain a building permit for the proposed installation. Further, a letter of authorization was included as Exhibit F, authorizing T-Mobile to file this application for shared use.

C. Environmental Feasibility. The proposed shared use of this facility would have a minimal environmental impact. The installation of T-Mobile equipment at the 110-foot level of the existing 120-foot tower would have an insignificant visual impact on the area around the tower. T-Mobile's ground equipment would be installed within the existing facility compound. T-Mobile's shared use would therefore not cause any significant alteration in the physical or environmental characteristics of the existing site. Additionally, as evidenced by Exhibit E, the proposed antennas would not increase radio frequency emissions to a level at or above the Federal Communications Commission safety standard.

D. Economic Feasibility. T-Mobile will be entering into an agreement with the owner of this facility to mutually agreeable terms. As previously mentioned, the lease has been provided by the owner to assist T-Mobile with this tower sharing application.

E. Public Safety Concerns. As discussed above, the guyed tower is structurally capable of supporting T-Mobile's proposed loading. T-Mobile is not aware of any public safety concerns relative to the proposed sharing of the existing guyed tower. T-Mobile's intentions of providing new and improved wireless service through the shared use of this facility is expected to enhance the safety and welfare of local residents and individuals traveling through Hamden.

Sincerely,

Victoria Masse
Mobile: 860-306-2326
Fax: 413-521-0558
Office: 420 Main Street, Unit 2, Sturbridge MA 01566
Email: Victoria@northeastsitesolutions.com

Attachments

cc: Mayor Curt Balzano Leng, as elected official
Daniel Kops, Hamden Town Planner
Tarpon Tower - as tower owner
Gabrielle Scirocco - property owner

October 23, 2020



Northeast Site Solutions
420 Main Street, Building 4
Sturbridge, CT 01566

RE: Site Number: CTNH400A (ANCHOR 2020)
 Site Name: CTNH400A
 Site Address: 796 Woodin Street
 Hamden, CT 06514

To Whom It May Concern:

Hudson Design Group LLC (HDG) has been authorized by Northeast Site Solutions to perform a mount analysis on the new T-Mobile antenna/RRH mount to determine their capability of supporting the following additional loading:

- **(3) APX16DWV-16DWV-S-E-A20 Antennas (55.9"x13.0"x3.2" – Wt. = 41 lbs. /each)**
- **(3) APXVAALL24_43-U-NA20 Antennas (95.9"x24.0"x8.7" – Wt. = 128 lbs. /each)**
- **(3) AIR6449 B41 Antennas (33.1"x20.6"x8.6" – Wt. = 104 lbs. /each)**
- **(3) 4415 B25 RRH's (16.6"x13.5"x6.3" – Wt. = 50 lbs. /each)**
- **(3) 4449 B71+B85 RRH's (17.9"x13.2"x9.5" – Wt. = 71 lbs. /each)**
- **(3) 4424 B25 RRH's (16.5"x13.5"x9.6" – Wt. = 88 lbs. /each)**

**Proposed equipment shown in bold*

Mount fabrication drawings prepared by SitePro1, P/N RMQP-NP, dated July 8, 2015 and fabrication drawings prepared by SitePro1, P/N HRK-12, dated July 13, 2014 were used to perform this analysis.

Mount Analysis Methods:

- This analysis was conducted in accordance with EIA/TIA-222-H, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, the International Building Code 2015 with 2018 Connecticut State Building Code.
- HDG considers this mount to be asymmetrical and has applied wind loads in 30-degree increments all around the mount. Per TIA-222-H and Appendix N of the Connecticut State Building Code, the max basic wind speed for this site is equal to 125 mph with a max basic wind speed with ice of 50 mph and a max ice thickness of 1.0 in. An escalated ice thickness of 1.13 in was used for this analysis.
- HDG considers this site to be exposure category C; tower is located near large, flat, open, terrain/grasslands.
- HDG considers this site to be topographic category 1; tower is located on flat terrain or the bottom of a hill or ridge.
- HDG considers this site to have a spectral response acceleration parameter at short periods, S_s , of 0.185 and a spectral response acceleration parameter at a period of 1 second, S_1 , of 0.063.
- The mount has been analyzed with load combinations consisting of 250 lbs live load using a service wind speed of 30 mph wind on the worst case antenna. Analysis performed on each antenna pipe to determine worst case location; worst case location was antenna position 2.
- The mount has been analyzed with load combinations consisting of a 250 lbs live load in a worst case location on the mount.

Based on our evaluation, we have determined that the New SitePro1 RMQP-NP & HRK-12 mount **IS CAPABLE** of supporting the proposed installation.

	Component	Controlling Load Case	Stress Ratio	Pass/Fail
New (ANCHOR 2020) Mount Rating	54	LC3	82%	PASS

Reference Documents:

- Fabrication drawings prepared by SitePro1, P/N RMQP- NP, dated July 8, 2015.
- Fabrication drawings prepared by SitePro1, P/N HRK-12, dated July 13, 2014.

This determination was based on the following limitations and assumptions:

1. HDG is not responsible for any modifications completed prior to and hereafter which HDG was not directly involved.
2. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.
3. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer's requirements.
4. The proposed mount will be adequately secured to the tower structure per the mount manufacturer's specifications
5. All components pertaining to T-Mobile's mounts must be tightened and re-plumbed prior to the installation of new appurtenances.
6. HDG performed a localized analysis on the mount itself and not on the supporting tower structure.

Please feel free to contact our office should you have any questions.

Respectfully Submitted,
Hudson Design Group LLC



Michael Cabral
Vice President



Daniel P. Hamm, PE
Principal



HUDSON
Design Group LLC

Wind & Ice Calculations

Date: 10/22/2020
 Project Name: CTNH400A
 Project No.: CTNH400A
 Designed By: KM Checked By: MSC



2.6.5.2 Velocity Pressure Coeff:

$K_z = 2.01 (z/z_g)^{2/\alpha}$

$K_z =$ **1.291**

$z =$ 110 (ft)
 $z_g =$ 900 (ft)
 $\alpha =$ 9.5

$K_{zmin} \leq K_z \leq 2.01$

Table 2-4

Exposure	Z_g	α	K_{zmin}	K_c
B	1200 ft	7.0	0.70	0.9
C	900 ft	9.5	0.85	1.0
D	700 ft	11.5	1.03	1.1

2.6.6.2 Topographic Factor:

Table 2-5

Topo. Category	K_t	f
2	0.43	1.25
3	0.53	2.0
4	0.72	1.5

$K_{zt} = [1 + (K_c K_t / K_h)]^2$

$K_h = e^{(fz/H)}$

$K_{zt} =$ #DIV/0!

(If Category 1 then $K_{zt} = 1.0$)

Category = **1**

$K_h =$ #DIV/0!
 $K_c =$ 1 (from Table 2-4)
 $K_t =$ (from Table 2-5)
 $f =$ (from Table 2-5)
 $z =$ 110
 $z_g =$ 130 (Mean elevation of base of structure above sea level)
 $H =$ (Ht. of the crest above surrounding terrain)
 $K_{zt} =$ 1.00 (from 2.6.6.2.1)
 $K_e =$ 1.00 (from 2.6.8)

2.6.10 Design Ice Thickness

Max Ice Thickness = $t_i =$ 1.00 in
 Importance Factor = $I =$ 1.0 (from Table 2-3)
 $K_{iz} =$ 1.13 (from Sec. 2.6.10)

$t_{iz} = t_i * I * K_{iz} * (K_{zt})^{0.35}$

$t_{iz} =$ 1.13 in

Date: 10/22/2020
 Project Name: CTNH400A
 Project No.: CTNH400A
 Designed By: KM Checked By: MSC



2.6.9 Gust Effect Factor

2.6.9.1 Self Supporting Lattice Structures

$G_h = 1.0$ Latticed Structures > 600 ft

$G_h = 0.85$ Latticed Structures 450 ft or less

$G_h = 0.85 + 0.15 [h/150 - 3.0]$

$h =$ ht. of structure

$h =$ 120

$G_h =$ 0.85

2.6.9.2 Guyed Masts

$G_h =$ 0.85

2.6.9.3 Pole Structures

$G_h =$ 1.1

2.6.9 Appurtenances

$G_h =$ 1.0

2.6.9.4 Structures Supported on Other Structures

(Cantilevered tubular or latticed spines, pole, structures on buildings ($ht. : width$ ratio > 5))

$G_h =$ 1.35

$G_h =$ 1.00

2.6.11.2 Design Wind Force on Appurtenances

$F = q_z * G_h * (EPA)_A$

$q_z = 0.00256 * K_z * K_{zt} * K_s * K_e * K_d * V_{max}^2$

$q_z =$	48.84
q_z (ice) =	7.81
q_z (30) =	2.81

$K_z =$	1.291 (from 2.6.5.2)
$K_{zt} =$	1.0 (from 2.6.6.2.1)
$K_s =$	1.0 (from 2.6.7)
$K_e =$	1.00 (from 2.6.8)
$K_d =$	0.95 (from Table 2-2)
$V_{max} =$	125 mph (Ultimate Wind Speed)
V_{max} (ice) =	50 mph
$V_{30} =$	30 mph

Table 2-2

Structure Type	Wind Direction Probability Factor, K_d
Latticed structures with triangular, square or rectangular cross sections	0.85
Tubular pole structures, latticed structures with other cross sections, appurtenances	0.95
Tubular pole structures supporting antennas enclosed within a cylindrical shroud	1.00

Date: 10/22/2020
 Project Name: CTNH400A
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Determine Ca:

Table 2-9

Force Coefficients (Ca) for Appurtenances				
Member Type		Aspect Ratio ≤ 2.5	Aspect Ratio = 7	Aspect Ratio ≥ 25
		Ca	Ca	Ca
Flat		1.2	1.4	2.0
Square/Rectangular HSS		1.2 - 2.8(r _s) ≥ 0.85	1.4 - 4.0(r _s) ≥ 0.90	2.0 - 6.0(r _s) ≥ 1.25
Round	C < 39 (Subcritical)	0.7	0.8	1.2
	39 ≤ C ≤ 78 (Transitional)	4.14/(C ^{0.485})	3.66/(C ^{0.415})	46.8/(C ^{1.0})
	C > 78 (Supercritical)	0.5	0.6	0.6

Aspect Ratio is the overall length/width ratio in the plane normal to the wind direction.
 (Aspect ratio is independent of the spacing between support points of a linear appurtenance.)

Note: Linear interpolation may be used for aspect ratios other than those shown.

Ice Thickness = **1.13 in** Angle = **0 (deg)** Equivalent Angle = **180 (deg)**

Appurtenances	Height	Width	Depth	Flat Area	Aspect Ratio	Ca	Force (lbs)	Force (lbs) (w/ Ice)	Force (lbs) (30 mph)
APX16DWV-16DWV-S-E-A20 Antenna	55.9	13.0	3.2	5.05	4.30	1.28	315	62	18
APXVAALL24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	4.00	1.27	989	177	57
AIR 6449 B41 Antenna	33.1	20.6	8.6	4.74	1.61	1.20	278	53	16
4415 B25 RRH	16.6	13.5	6.3	1.56	1.23	1.20	91	19	5
4415 B25 RRH (Shielded)	16.6	0.5	6.3	0.06	0.00	1.20	3	3	0
4449 B71+B85 RRH	17.9	9.5	13.2	1.18	1.88	1.20	69	15	4
4449 B71+B85 RRH (Shielded)	17.9	4.8	13.2	0.59	3.77	1.26	36	10	2
4424 B25 RRH	16.5	9.6	13.5	1.10	1.72	1.20	64	14	4
4424 B25 RRH (Shielded)	16.5	4.8	13.5	0.55	3.44	1.24	33	9	2
HSS 4x4	4.0	12.0		0.33	0.33	2.00	33		
L 2-1/2x2-1/2 Angle	2.5	12.0		0.21	0.21	2.00	20		
L 2x2 Angle	2.0	12.0		0.17	0.17	2.00	16		
PL 6x1/2	6.0	12.0		0.50	0.50	2.00	49		
3" Pipe	3.5	12.0		0.29	0.29	1.20	17		
2-1/2" Pipe	2.9	12.0		0.24	0.24	1.20	14		
2" Pipe	2.4	12.0		0.20	0.20	1.20	12		

Date: 10/22/2020
 Project Name: CTNH400A
 Project No.: CTNH400A
 Designed By: KM Checked By: MSC



WIND LOADS

Angle = **30** (deg)

Ice Thickness = **1.13** in.

Equivalent Angle = **210** (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Aspect Ratio	Aspect Ratio	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
APX16DWV-16DWV-S-E-A20 Antenn	55.9	13.0	3.2	5.05	1.24	4.30	17.47	1.28	1.75	315	106	263
APXVAALL24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	5.79	4.00	11.02	1.27	1.53	989	434	850
AIR 6449 B41 Antenna	33.1	20.6	8.6	4.74	1.98	1.61	3.85	1.20	1.26	278	122	239
4415 B25 RRH	16.6	13.5	6.3	1.56	0.73	1.23	2.63	1.20	1.21	91	43	79
4415 B25 RRH (Shielded)	16.6	0.5	6.3	0.06	0.73	0.00	2.63	1.20	1.21	3	43	13
4449 B71+B85 RRH	17.9	9.5	13.2	1.18	1.64	1.88	1.36	1.20	1.20	69	96	76
4449 B71+B85 RRH (Shielded)	17.9	4.8	13.2	0.59	1.64	3.77	1.36	1.26	1.20	36	96	51
4424 B25 RRH	16.5	9.6	13.5	1.10	1.55	1.72	1.22	1.20	1.20	64	91	71
4424 B25 RRH (Shielded)	16.5	4.8	13.5	0.55	1.55	0.00	1.22	1.20	1.20	32	91	47

WIND LOADS WITH ICE:

APX16DWV-16DWV-S-E-A20 Antenn	58.2	15.3	5.5	6.16	2.20	3.81	10.66	1.26	1.52	61	26	52
APXVAALL24_43-U-NA20 Antenna	98.2	26.3	11.0	17.90	7.47	3.74	8.96	1.26	1.47	176	86	153
AIR 6449 B41 Antenna	35.4	22.9	10.9	5.61	2.67	1.55	3.26	1.20	1.23	53	26	46
4415 B25 RRH	18.9	15.8	8.6	2.06	1.12	1.20	2.20	1.20	1.20	19	11	17
4415 B25 RRH (Shielded)	18.9	2.8	8.6	0.36	1.12	6.84	2.20	1.39	1.20	4	11	6
4449 B71+B85 RRH	20.2	11.8	15.5	1.65	2.16	1.71	1.30	1.20	1.20	15	20	17
4449 B71+B85 RRH (Shielded)	20.2	7.0	15.5	0.98	2.16	2.88	1.30	1.22	1.20	9	20	12
4424 B25 RRH	18.8	11.9	15.8	1.54	2.05	1.58	1.19	1.20	1.20	14	19	16
4424 B25 RRH (Shielded)	18.8	7.1	15.8	0.92	2.05	2.66	1.19	1.21	1.20	9	19	11

WIND LOADS AT 30 MPH:

APX16DWV-16DWV-S-E-A20 Antenn	55.9	13.0	3.2	5.05	1.24	4.30	17.47	1.28	1.75	18	6	15
APXVAALL24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	5.79	4.00	11.02	1.27	1.53	57	25	49
AIR 6449 B41 Antenna	33.1	20.6	8.6	4.74	1.98	1.61	3.85	1.20	1.26	16	7	14
4415 B25 RRH	16.6	13.5	6.3	1.56	0.73	1.23	2.63	1.20	1.21	5	2	5
4415 B25 RRH (Shielded)	16.6	0.5	6.3	0.06	0.73	0.00	2.63	1.20	1.21	0	2	1
4449 B71+B85 RRH	17.9	9.5	13.2	1.18	1.64	1.88	1.36	1.20	1.20	4	6	4
4449 B71+B85 RRH (Shielded)	17.9	4.8	13.2	0.59	1.64	3.77	1.36	1.26	1.20	2	6	3
4424 B25 RRH	16.5	9.6	13.5	1.10	1.55	1.72	1.22	1.20	1.20	4	5	4
4424 B25 RRH (Shielded)	16.5	4.8	13.5	0.55	1.55	0.00	1.22	1.20	1.20	2	5	3

Date: 10/22/2020
 Project Name: CTNH400A
 Project No.: CTNH400A
 Designed By: KM Checked By: MSC



WIND LOADS

Angle = 60 (deg)

Ice Thickness = 1.13 in.

Equivalent Angle = 240 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
APX16DWV-16DWV-S-E-A20 Antenn	55.9	13.0	3.2	5.05	1.24	4.30	17.47	1.28	1.75	315	106	158
APXVAALL24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	5.79	4.00	11.02	1.27	1.53	989	434	573
AIR 6449 B41 Antenna	33.1	20.6	8.6	4.74	1.98	1.61	3.85	1.20	1.26	278	122	161
4415 B25 RRH	16.6	13.5	6.3	1.56	0.73	1.23	2.63	1.20	1.21	91	43	55
4415 B25 RRH (Shielded)	16.6	0.5	6.3	0.06	0.73	0.00	2.63	1.20	1.21	3	43	33
4449 B71+B85 RRH	17.9	9.5	13.2	1.18	1.64	1.88	1.36	1.20	1.20	69	96	89
4449 B71+B85 RRH (Shielded)	17.9	4.8	13.2	0.59	1.64	3.77	1.36	1.26	1.20	36	96	81
4424 B25 RRH	16.5	9.6	13.5	1.10	1.55	1.72	1.22	1.20	1.20	64	91	84
4424 B25 RRH (Shielded)	16.5	4.8	13.5	0.55	1.55	0.00	1.22	1.20	1.20	32	91	76

WIND LOADS WITH ICE:

APX16DWV-16DWV-S-E-A20 Antenn	58.2	15.3	5.5	6.16	2.20	3.81	10.66	1.26	1.52	61	26	35
APXVAALL24_43-U-NA20 Antenna	98.2	26.3	11.0	17.90	7.47	3.74	8.96	1.26	1.47	176	86	108
AIR 6449 B41 Antenna	35.4	22.9	10.9	5.61	2.67	1.55	3.26	1.20	1.23	53	26	32
4415 B25 RRH	18.9	15.8	8.6	2.06	1.12	1.20	2.20	1.20	1.20	19	11	13
4415 B25 RRH (Shielded)	18.9	2.8	8.6	0.36	1.12	6.84	2.20	1.39	1.20	4	11	9
4449 B71+B85 RRH	20.2	11.8	15.5	1.65	2.16	1.71	1.30	1.20	1.20	15	20	19
4449 B71+B85 RRH (Shielded)	20.2	7.0	15.5	0.98	2.16	2.88	1.30	1.22	1.20	9	20	18
4424 B25 RRH	18.8	11.9	15.8	1.54	2.05	1.58	1.19	1.20	1.20	14	19	18
4424 B25 RRH (Shielded)	18.8	7.1	15.8	0.92	2.05	2.66	1.19	1.21	1.20	9	19	17

WIND LOADS AT 30 MPH:

APX16DWV-16DWV-S-E-A20 Antenn	55.9	13.0	3.2	5.05	1.24	4.30	17.47	1.28	1.75	18	6	9
APXVAALL24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	5.79	4.00	11.02	1.27	1.53	57	25	33
AIR 6449 B41 Antenna	33.1	20.6	8.6	4.74	1.98	1.61	3.85	1.20	1.26	16	7	9
4415 B25 RRH	16.6	13.5	6.3	1.56	0.73	1.23	2.63	1.20	1.21	5	2	3
4415 B25 RRH (Shielded)	16.6	0.5	6.3	0.06	0.73	0.00	2.63	1.20	1.21	0	2	2
4449 B71+B85 RRH	17.9	9.5	13.2	1.18	1.64	1.88	1.36	1.20	1.20	4	6	5
4449 B71+B85 RRH (Shielded)	17.9	4.8	13.2	0.59	1.64	3.77	1.36	1.26	1.20	2	6	5
4424 B25 RRH	16.5	9.6	13.5	1.10	1.55	1.72	1.22	1.20	1.20	4	5	5
4424 B25 RRH (Shielded)	16.5	4.8	13.5	0.55	1.55	0.00	1.22	1.20	1.20	2	5	4

Date: 10/22/2020
 Project Name: CTNH400A
 Project No.: CTNH400A
 Designed By: KM Checked By: MSC



WIND LOADS

Angle = 90 (deg) Ice Thickness = 1.13 in. Equivalent Angle = 270 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
APX16DWV-16DWV-S-E-A20 Antenn	55.9	13.0	3.2	5.05	1.24	4.30	17.47	1.28	1.75	315	106	106
APXVAALL24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	5.79	4.00	11.02	1.27	1.53	989	434	434
AIR 6449 B41 Antenna	33.1	20.6	8.6	4.74	1.98	1.61	3.85	1.20	1.26	278	122	122
4415 B25 RRH	16.6	13.5	6.3	1.56	0.73	1.23	2.63	1.20	1.21	91	43	43
4415 B25 RRH (Shielded)	16.6	0.5	6.3	0.06	0.73	0.00	2.63	1.20	1.21	3	43	43
4449 B71+B85 RRH	17.9	9.5	13.2	1.18	1.64	1.88	1.36	1.20	1.20	69	96	96
4449 B71+B85 RRH (Shielded)	17.9	4.8	13.2	0.59	1.64	3.77	1.36	1.26	1.20	36	96	96
4424 B25 RRH	16.5	9.6	13.5	1.10	1.55	1.72	1.22	1.20	1.20	64	91	91
4424 B25 RRH (Shielded)	16.5	4.8	13.5	0.55	1.55	0.00	1.22	1.20	1.20	32	91	91

WIND LOADS WITH ICE:

APX16DWV-16DWV-S-E-A20 Antenn	58.2	15.3	5.5	6.16	2.20	3.81	10.66	1.26	1.52	61	26	26
APXVAALL24_43-U-NA20 Antenna	98.2	26.3	11.0	17.90	7.47	3.74	8.96	1.26	1.47	176	86	86
AIR 6449 B41 Antenna	35.4	22.9	10.9	5.61	2.67	1.55	3.26	1.20	1.23	53	26	26
4415 B25 RRH	18.9	15.8	8.6	2.06	1.12	1.20	2.20	1.20	1.20	19	11	11
4415 B25 RRH (Shielded)	18.9	2.8	8.6	0.36	1.12	6.84	2.20	1.39	1.20	4	11	11
4449 B71+B85 RRH	20.2	11.8	15.5	1.65	2.16	1.71	1.30	1.20	1.20	15	20	20
4449 B71+B85 RRH (Shielded)	20.2	7.0	15.5	0.98	2.16	2.88	1.30	1.22	1.20	9	20	20
4424 B25 RRH	18.8	11.9	15.8	1.54	2.05	1.58	1.19	1.20	1.20	14	19	19
4424 B25 RRH (Shielded)	18.8	7.1	15.8	0.92	2.05	2.66	1.19	1.21	1.20	9	19	19

WIND LOADS AT 30 MPH:

APX16DWV-16DWV-S-E-A20 Antenn	55.9	13.0	3.2	5.05	1.24	4.30	17.47	1.28	1.75	18	6	6
APXVAALL24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	5.79	4.00	11.02	1.27	1.53	57	25	25
AIR 6449 B41 Antenna	33.1	20.6	8.6	4.74	1.98	1.61	3.85	1.20	1.26	16	7	7
4415 B25 RRH	16.6	13.5	6.3	1.56	0.73	1.23	2.63	1.20	1.21	5	2	2
4415 B25 RRH (Shielded)	16.6	0.5	6.3	0.06	0.73	0.00	2.63	1.20	1.21	0	2	2
4449 B71+B85 RRH	17.9	9.5	13.2	1.18	1.64	1.88	1.36	1.20	1.20	4	6	6
4449 B71+B85 RRH (Shielded)	17.9	4.8	13.2	0.59	1.64	3.77	1.36	1.26	1.20	2	6	6
4424 B25 RRH	16.5	9.6	13.5	1.10	1.55	1.72	1.22	1.20	1.20	4	5	5
4424 B25 RRH (Shielded)	16.5	4.8	13.5	0.55	1.55	0.00	1.22	1.20	1.20	2	5	5

Date: 10/22/2020
 Project Name: CTNH400A
 Project No.: CTNH400A
 Designed By: KM Checked By: MSC



WIND LOADS

Angle = 120 (deg) Ice Thickness = 1.13 in. Equivalent Angle = 300 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
APX16DWV-16DWV-S-E-A20 Antenn	55.9	13.0	3.2	5.05	1.24	4.30	17.47	1.28	1.75	315	106	158
APXVAALL24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	5.79	4.00	11.02	1.27	1.53	989	434	573
AIR 6449 B41 Antenna	33.1	20.6	8.6	4.74	1.98	1.61	3.85	1.20	1.26	278	122	161
4415 B25 RRH	16.6	13.5	6.3	1.56	0.73	1.23	2.63	1.20	1.21	91	43	55
4415 B25 RRH (Shielded)	16.6	0.5	6.3	0.06	0.73	0.00	2.63	1.20	1.21	3	43	33
4449 B71+B85 RRH	17.9	9.5	13.2	1.18	1.64	1.88	1.36	1.20	1.20	69	96	89
4449 B71+B85 RRH (Shielded)	17.9	4.8	13.2	0.59	1.64	3.77	1.36	1.26	1.20	36	96	81
4424 B25 RRH	16.5	9.6	13.5	1.10	1.55	1.72	1.22	1.20	1.20	64	91	84
4424 B25 RRH (Shielded)	16.5	4.8	13.5	0.55	1.55	0.00	1.22	1.20	1.20	32	91	76

WIND LOADS WITH ICE:

APX16DWV-16DWV-S-E-A20 Antenn	58.2	15.3	5.5	6.16	2.20	3.81	10.66	1.26	1.52	61	26	35
APXVAALL24_43-U-NA20 Antenna	98.2	26.3	11.0	17.90	7.47	3.74	8.96	1.26	1.47	176	86	108
AIR 6449 B41 Antenna	35.4	22.9	10.9	5.61	2.67	1.55	3.26	1.20	1.23	53	26	32
4415 B25 RRH	18.9	15.8	8.6	2.06	1.12	1.20	2.20	1.20	1.20	19	11	13
4415 B25 RRH (Shielded)	18.9	2.8	8.6	0.36	1.12	6.84	2.20	1.39	1.20	4	11	9
4449 B71+B85 RRH	20.2	11.8	15.5	1.65	2.16	1.71	1.30	1.20	1.20	15	20	19
4449 B71+B85 RRH (Shielded)	20.2	7.0	15.5	0.98	2.16	2.88	1.30	1.22	1.20	9	20	18
4424 B25 RRH	18.8	11.9	15.8	1.54	2.05	1.58	1.19	1.20	1.20	14	19	18
4424 B25 RRH (Shielded)	18.8	7.1	15.8	0.92	2.05	2.66	1.19	1.21	1.20	9	19	17

WIND LOADS AT 30 MPH:

APX16DWV-16DWV-S-E-A20 Antenn	55.9	13.0	3.2	5.05	1.24	4.30	17.47	1.28	1.75	18	6	9
APXVAALL24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	5.79	4.00	11.02	1.27	1.53	57	25	33
AIR 6449 B41 Antenna	33.1	20.6	8.6	4.74	1.98	1.61	3.85	1.20	1.26	16	7	9
4415 B25 RRH	16.6	13.5	6.3	1.56	0.73	1.23	2.63	1.20	1.21	5	2	3
4415 B25 RRH (Shielded)	16.6	0.5	6.3	0.06	0.73	0.00	2.63	1.20	1.21	0	2	2
4449 B71+B85 RRH	17.9	9.5	13.2	1.18	1.64	1.88	1.36	1.20	1.20	4	6	5
4449 B71+B85 RRH (Shielded)	17.9	4.8	13.2	0.59	1.64	3.77	1.36	1.26	1.20	2	6	5
4424 B25 RRH	16.5	9.6	13.5	1.10	1.55	1.72	1.22	1.20	1.20	4	5	5
4424 B25 RRH (Shielded)	16.5	4.8	13.5	0.55	1.55	0.00	1.22	1.20	1.20	2	5	4

Date: 10/22/2020
 Project Name: CTNH400A
 Project No.: CTNH400A
 Designed By: KM Checked By: MSC



WIND LOADS

Angle = 150 (deg) Ice Thickness = 1.13 in. Equivalent Angle = 330 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
APX16DWV-16DWV-S-E-A20 Antenn	55.9	13.0	3.2	5.05	1.24	4.30	17.47	1.28	1.75	315	106	263
APXVAALL24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	5.79	4.00	11.02	1.27	1.53	989	434	850
AIR 6449 B41 Antenna	33.1	20.6	8.6	4.74	1.98	1.61	3.85	1.20	1.26	278	122	239
4415 B25 RRH	16.6	13.5	6.3	1.56	0.73	1.23	2.63	1.20	1.21	91	43	79
4415 B25 RRH (Shielded)	16.6	0.5	6.3	0.06	0.73	0.00	2.63	1.20	1.21	3	43	13
4449 B71+B85 RRH	17.9	9.5	13.2	1.18	1.64	1.88	1.36	1.20	1.20	69	96	76
4449 B71+B85 RRH (Shielded)	17.9	4.8	13.2	0.59	1.64	3.77	1.36	1.26	1.20	36	96	51
4424 B25 RRH	16.5	9.6	13.5	1.10	1.55	1.72	1.22	1.20	1.20	64	91	71
4424 B25 RRH (Shielded)	16.5	4.8	13.5	0.55	1.55	0.00	1.22	1.20	1.20	32	91	47

WIND LOADS WITH ICE:

APX16DWV-16DWV-S-E-A20 Antenn	58.2	15.3	5.5	6.16	2.20	3.81	10.66	1.26	1.52	61	26	52
APXVAALL24_43-U-NA20 Antenna	98.2	26.3	11.0	17.90	7.47	3.74	8.96	1.26	1.47	176	86	153
AIR 6449 B41 Antenna	35.4	22.9	10.9	5.61	2.67	1.55	3.26	1.20	1.23	53	26	46
4415 B25 RRH	18.9	15.8	8.6	2.06	1.12	1.20	2.20	1.20	1.20	19	11	17
4415 B25 RRH (Shielded)	18.9	2.8	8.6	0.36	1.12	6.84	2.20	1.39	1.20	4	11	6
4449 B71+B85 RRH	20.2	11.8	15.5	1.65	2.16	1.71	1.30	1.20	1.20	15	20	17
4449 B71+B85 RRH (Shielded)	20.2	7.0	15.5	0.98	2.16	2.88	1.30	1.22	1.20	9	20	12
4424 B25 RRH	18.8	11.9	15.8	1.54	2.05	1.58	1.19	1.20	1.20	14	19	16
4424 B25 RRH (Shielded)	18.8	7.1	15.8	0.92	2.05	2.66	1.19	1.21	1.20	9	19	11

WIND LOADS AT 30 MPH:

APX16DWV-16DWV-S-E-A20 Antenn	55.9	13.0	3.2	5.05	1.24	4.30	17.47	1.28	1.75	18	6	15
APXVAALL24_43-U-NA20 Antenna	95.9	24.0	8.7	15.98	5.79	4.00	11.02	1.27	1.53	57	25	49
AIR 6449 B41 Antenna	33.1	20.6	8.6	4.74	1.98	1.61	3.85	1.20	1.26	16	7	14
4415 B25 RRH	16.6	13.5	6.3	1.56	0.73	1.23	2.63	1.20	1.21	5	2	5
4415 B25 RRH (Shielded)	16.6	0.5	6.3	0.06	0.73	0.00	2.63	1.20	1.21	0	2	1
4449 B71+B85 RRH	17.9	9.5	13.2	1.18	1.64	1.88	1.36	1.20	1.20	4	6	4
4449 B71+B85 RRH (Shielded)	17.9	4.8	13.2	0.59	1.64	3.77	1.36	1.26	1.20	2	6	3
4424 B25 RRH	16.5	9.6	13.5	1.10	1.55	1.72	1.22	1.20	1.20	4	5	4
4424 B25 RRH (Shielded)	16.5	4.8	13.5	0.55	1.55	0.00	1.22	1.20	1.20	2	5	3

Date: 10/22/2020

Project Name: CTNH400A

Project No.: CTNH400A

Designed By: KM Checked By: MSC



HUDSON
Design Group LLC

ICE WEIGHT CALCULATIONS

Thickness of ice: 1.13 in.
Density of ice: 56 pcf

APX16DWV-16DWV-S-E-A20 Antenna

Weight of ice based on total radial SF area:
Height (in): 55.9
Width (in): 13.0
Depth (in): 3.2
Total weight of ice on object: 93 lbs
Weight of object: 41.0 lbs
Combined weight of ice and object: 134 lbs

APXVAALL24_43-U-NA20 Antenna

Weight of ice based on total radial SF area:
Height (in): 95.9
Width (in): 24.0
Depth (in): 8.7
Total weight of ice on object: 294 lbs
Weight of object: 128.0 lbs
Combined weight of ice and object: 422 lbs

AIR 6449 B41 Antenna

Weight of ice based on total radial SF area:
Height (in): 33.1
Width (in): 20.6
Depth (in): 8.6
Total weight of ice on object: 89 lbs
Weight of object: 104.0 lbs
Combined weight of ice and object: 193 lbs

4415 B25 RRH

Weight of ice based on total radial SF area:
Height (in): 16.6
Width (in): 13.5
Depth (in): 6.3
Total weight of ice on object: 31 lbs
Weight of object: 50.0 lbs
Combined weight of ice and object: 81 lbs

4449 B71+B85 RRH

Weight of ice based on total radial SF area:
Height (in): 17.9
Width (in): 13.2
Depth (in): 9.5
Total weight of ice on object: 36 lbs
Weight of object: 71.0 lbs
Combined weight of ice and object: 107 lbs

4424 B25 RRH

Weight of ice based on total radial SF area:
Height (in): 16.5
Width (in): 13.5
Depth (in): 9.6
Total weight of ice on object: 34 lbs
Weight of object: 88.0 lbs
Combined weight of ice and object: 122 lbs

HSS 4x4

Weight of ice based on total radial SF area:
Height (in): 4
Width (in): 4
Per foot weight of ice on object: 9 plf

L 2-1/2x2-1/2 Angles

Weight of ice based on total radial SF area:
Height (in): 2.5
Width (in): 2.5
Per foot weight of ice on object: 6 plf

L 2x2 Angles

Weight of ice based on total radial SF area:
Height (in): 2
Width (in): 2
Per foot weight of ice on object: 5 plf

PL 6x1/2

Weight of ice based on total radial SF area:
Height (in): 6
Width (in): 0.5
Per foot weight of ice on object: 10 plf

3" Pipe

Per foot weight of ice:
diameter (in): 3.5
Per foot weight of ice on object: 6 plf

2-1/2" pipe

Per foot weight of ice:
diameter (in): 2.88
Per foot weight of ice on object: 6 plf

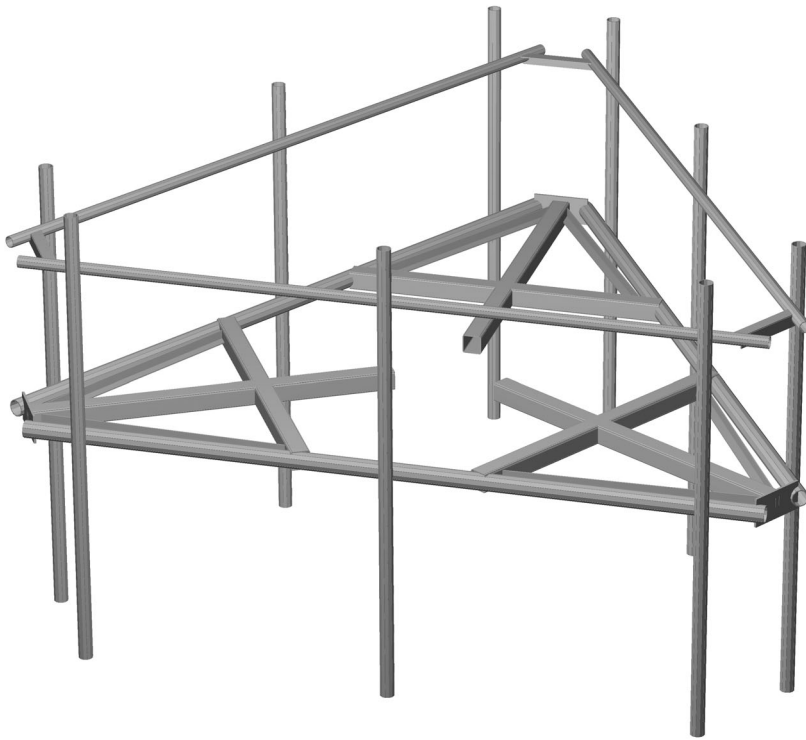
2" pipe

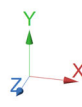
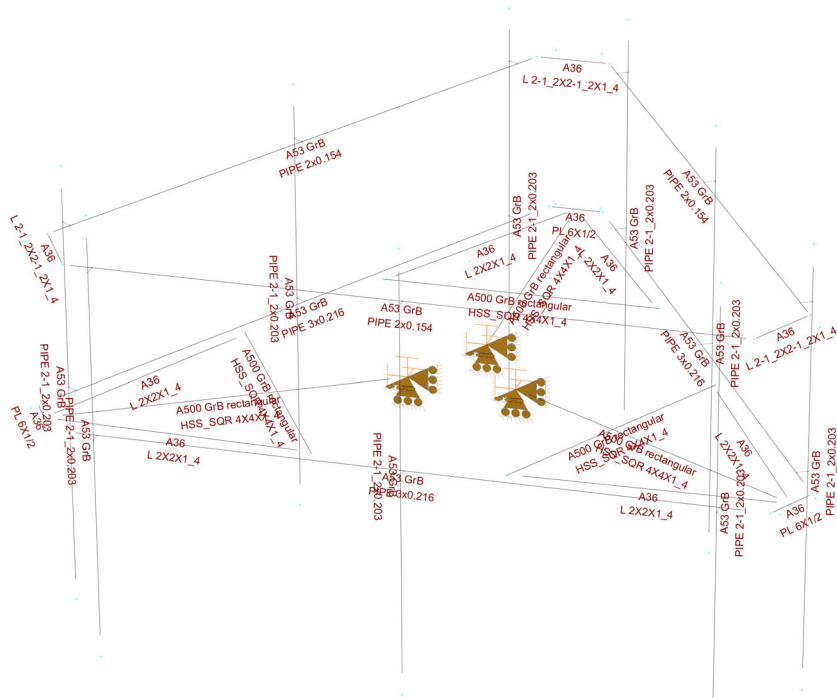
Per foot weight of ice:
diameter (in): 2.38
Per foot weight of ice on object: 5 plf

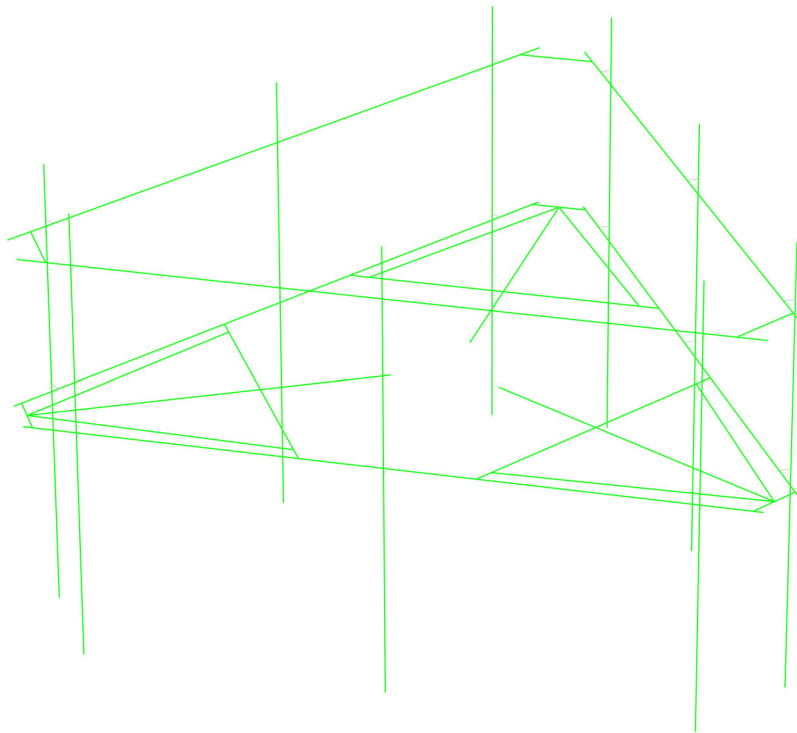


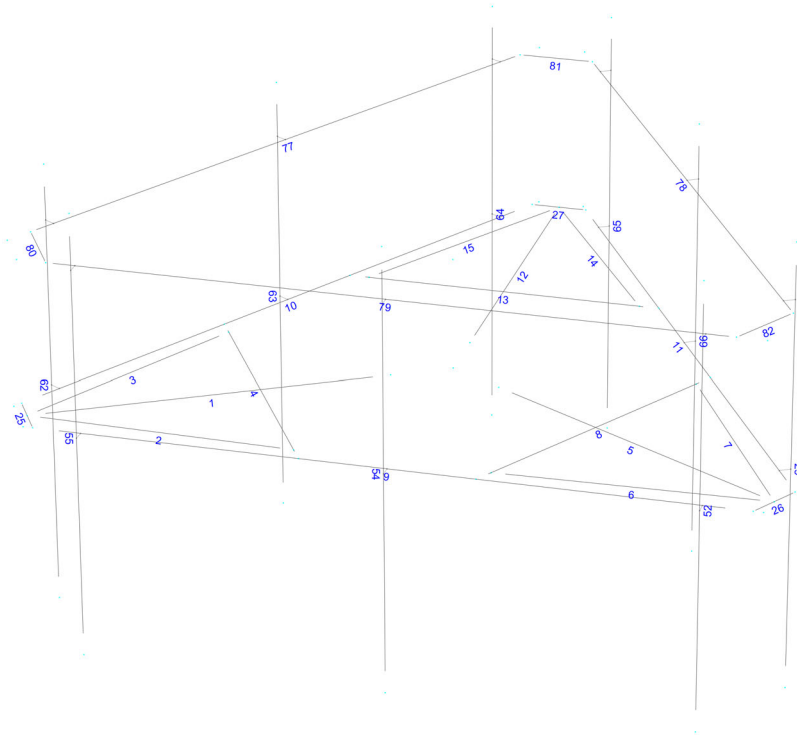
HUDSON
Design Group LLC

**Mount Calculations
(Proposed Conditions)**









Current Date: 10/22/2020 1:32 PM

Units system: English

File name: W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\T-MOBILE\CT\CTNH400A\ANCHOR 2020\CTNH400A.retx

Load data

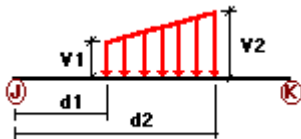
GLOSSARY

Comb : Indicates if load condition is a load combination

Load Conditions

Condition	Description	Comb.	Category
DL	Dead Load	No	DL
W0	Wind Load 0/60/120 deg	No	WIND
W30	Wind Load 30/90/150 deg	No	WIND
Di	Ice Load	No	LL
Wi0	Ice Wind Load 0/60/120 deg	No	WIND
Wi30	Ice Wind Load 30/90/150 deg	No	WIND
WL0	WL 30 mph 0/60/120 deg	No	WIND
WL30	WL 30 mph 30/90/150 deg	No	WIND
LL1	250 lb Live Load Center of Mount	No	LL
LL2	250 lb Live Load End of Mount	No	LL
LLa1	250 lb Live Load Antenna 1	No	LL
LLa2	250 lb Live Load Antenna 2	No	LL
LLa3	250 lb Live Load Antenna 3	No	LL

Distributed force on members



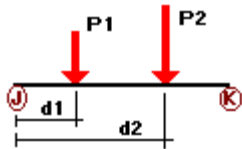
Condition	Member	Dir1	Val1 [Kip/ft]	Val2 [Kip/ft]	Dist1 [ft]	%	Dist2 [ft]	%	
DL	2	y	-0.01	0.00	0.00	No	0.00	No	
	3	y	-0.01	0.00	0.00	No	0.00	No	
	4	y	-0.01	0.00	0.00	No	0.00	No	
	6	y	-0.01	0.00	0.00	No	0.00	No	
	7	y	-0.01	0.00	0.00	No	0.00	No	
	8	y	-0.01	0.00	0.00	No	0.00	No	
	13	y	-0.01	0.00	0.00	No	0.00	No	
	14	y	-0.01	0.00	0.00	No	0.00	No	
	15	y	-0.01	0.00	0.00	No	0.00	No	
	W0	1	z	-0.033	0.00	0.00	No	0.00	No
		2	z	-0.016	0.00	0.00	No	0.00	No
		3	z	-0.016	0.00	0.00	No	0.00	No
		4	z	-0.033	0.00	0.00	No	0.00	No
		5	z	-0.033	0.00	0.00	No	0.00	No
		6	z	-0.016	0.00	0.00	No	0.00	No

W30

7	z	-0.016	0.00	0.00	No	0.00	No
8	z	-0.033	0.00	0.00	No	0.00	No
9	z	-0.017	0.00	0.00	No	0.00	No
10	z	-0.017	0.00	0.00	No	0.00	No
11	z	-0.017	0.00	0.00	No	0.00	No
12	z	-0.033	0.00	0.00	No	0.00	No
13	z	-0.033	0.00	0.00	No	0.00	No
14	z	-0.016	0.00	0.00	No	0.00	No
15	z	-0.016	0.00	0.00	No	0.00	No
25	z	-0.049	0.00	0.00	No	0.00	No
26	z	-0.049	0.00	0.00	No	0.00	No
27	z	-0.049	0.00	0.00	No	0.00	No
52	z	-0.014	0.00	0.00	No	0.00	No
54	z	-0.014	0.00	0.00	No	0.00	No
55	z	-0.014	0.00	0.00	No	0.00	No
62	z	-0.014	0.00	0.00	No	0.00	No
63	z	-0.014	0.00	0.00	No	0.00	No
64	z	-0.014	0.00	0.00	No	0.00	No
65	z	-0.014	0.00	0.00	No	0.00	No
66	z	-0.014	0.00	0.00	No	0.00	No
67	z	-0.014	0.00	0.00	No	0.00	No
77	z	-0.012	0.00	0.00	No	0.00	No
78	z	-0.012	0.00	0.00	No	0.00	No
79	z	-0.012	0.00	0.00	No	0.00	No
80	z	-0.02	0.00	0.00	No	0.00	No
81	z	-0.02	0.00	0.00	No	0.00	No
82	z	-0.02	0.00	0.00	No	0.00	No
1	x	-0.033	0.00	0.00	No	0.00	No
2	x	-0.016	0.00	0.00	No	0.00	No
3	x	-0.016	0.00	0.00	No	0.00	No
4	x	-0.033	0.00	0.00	No	0.00	No
5	x	-0.033	0.00	0.00	No	0.00	No
6	x	-0.016	0.00	0.00	No	0.00	No
7	x	-0.016	0.00	0.00	No	0.00	No
8	x	-0.033	0.00	0.00	No	0.00	No
9	x	-0.017	0.00	0.00	No	0.00	No
10	x	-0.017	0.00	0.00	No	0.00	No
11	x	-0.017	0.00	0.00	No	0.00	No
12	x	-0.033	0.00	0.00	No	0.00	No
13	x	-0.033	0.00	0.00	No	0.00	No
14	x	-0.016	0.00	0.00	No	0.00	No
15	x	-0.016	0.00	0.00	No	0.00	No
25	x	-0.049	0.00	0.00	No	0.00	No
26	x	-0.049	0.00	0.00	No	0.00	No
27	x	-0.049	0.00	0.00	No	0.00	No
52	x	-0.014	0.00	0.00	No	0.00	No
54	x	-0.014	0.00	0.00	No	0.00	No
55	x	-0.014	0.00	0.00	No	0.00	No
62	x	-0.014	0.00	0.00	No	0.00	No
63	x	-0.014	0.00	0.00	No	0.00	No
64	x	-0.014	0.00	0.00	No	0.00	No
65	x	-0.014	0.00	0.00	No	0.00	No
66	x	-0.014	0.00	0.00	No	0.00	No
67	x	-0.014	0.00	0.00	No	0.00	No
77	x	-0.012	0.00	0.00	No	0.00	No
78	x	-0.012	0.00	0.00	No	0.00	No
79	x	-0.012	0.00	0.00	No	0.00	No
80	x	-0.02	0.00	0.00	No	0.00	No
81	x	-0.02	0.00	0.00	No	0.00	No
82	x	-0.02	0.00	0.00	No	0.00	No

Di	1	y	-0.009	0.00	0.00	No	0.00	No
	2	y	-0.005	0.00	0.00	No	0.00	No
	3	y	-0.005	0.00	0.00	No	0.00	No
	4	y	-0.009	0.00	0.00	No	0.00	No
	5	y	-0.009	0.00	0.00	No	0.00	No
	6	y	-0.005	0.00	0.00	No	0.00	No
	7	y	-0.005	0.00	0.00	No	0.00	No
	8	y	-0.009	0.00	0.00	No	0.00	No
	9	y	-0.006	0.00	0.00	No	0.00	No
	10	y	-0.006	0.00	0.00	No	0.00	No
	11	y	-0.006	0.00	0.00	No	0.00	No
	12	y	-0.009	0.00	0.00	No	0.00	No
	13	y	-0.009	0.00	0.00	No	0.00	No
	14	y	-0.005	0.00	0.00	No	0.00	No
	15	y	-0.005	0.00	0.00	No	0.00	No
	25	y	-0.01	0.00	0.00	No	0.00	No
	26	y	-0.01	0.00	0.00	No	0.00	No
	27	y	-0.01	0.00	0.00	No	0.00	No
	52	y	-0.006	0.00	0.00	No	0.00	No
	54	y	-0.006	0.00	0.00	No	0.00	No
	55	y	-0.006	0.00	0.00	No	0.00	No
	62	y	-0.006	0.00	0.00	No	0.00	No
	63	y	-0.006	0.00	0.00	No	0.00	No
	64	y	-0.006	0.00	0.00	No	0.00	No
	65	y	-0.006	0.00	0.00	No	0.00	No
	66	y	-0.006	0.00	0.00	No	0.00	No
	67	y	-0.006	0.00	0.00	No	0.00	No
	77	y	-0.005	0.00	0.00	No	0.00	No
	78	y	-0.005	0.00	0.00	No	0.00	No
	79	y	-0.005	0.00	0.00	No	0.00	No
	80	y	-0.006	0.00	0.00	No	0.00	No
	81	y	-0.006	0.00	0.00	No	0.00	No
	82	y	-0.006	0.00	0.00	No	0.00	No

Concentrated forces on members



Condition	Member	Dir1	Value1 [Kip]	Dist1 [ft]	%
DL	52	y	-0.021	1.50	No
		y	-0.021	6.00	No
		y	-0.05	5.00	No
	54	y	-0.064	1.50	No
		y	-0.064	7.50	No
		y	-0.071	5.50	No
		y	-0.088	5.50	No
	55	y	-0.052	3.00	No
		y	-0.052	5.50	No
	62	y	-0.021	1.50	No
		y	-0.021	6.00	No
		y	-0.05	5.00	No

	63	y	-0.064	1.50	No
		y	-0.064	7.50	No
		y	-0.071	5.50	No
		y	-0.088	5.50	No
	64	y	-0.052	3.00	No
		y	-0.052	5.50	No
	65	y	-0.021	1.50	No
		y	-0.021	6.00	No
		y	-0.05	5.00	No
	66	y	-0.064	1.50	No
		y	-0.064	7.50	No
		y	-0.071	5.50	No
		y	-0.088	5.50	No
	67	y	-0.052	3.00	No
		y	-0.052	5.50	No
W0	52	z	-0.158	1.50	No
		z	-0.158	6.00	No
		z	-0.003	5.00	No
	54	z	-0.495	1.50	No
		z	-0.495	7.50	No
		z	-0.036	5.50	No
		z	-0.033	5.50	No
	55	z	-0.139	3.00	No
		z	-0.139	5.50	No
	62	z	-0.079	1.50	No
		z	-0.079	6.00	No
		z	-0.033	5.00	No
	63	z	-0.287	1.50	No
		z	-0.287	7.50	No
		z	-0.081	5.50	No
	64	z	-0.081	3.00	No
		z	-0.081	5.50	No
	65	z	-0.079	1.50	No
		z	-0.079	6.00	No
		z	-0.033	5.00	No
	66	z	-0.287	1.50	No
		z	-0.287	7.50	No
		z	-0.081	5.50	No
	67	z	-0.081	3.00	No
		z	-0.081	5.50	No
W30	52	x	-0.053	1.50	No
		x	-0.053	6.00	No
		x	-0.043	5.00	No
	54	x	-0.217	1.50	No
		x	-0.217	7.50	No
		x	-0.096	5.50	No
	55	x	-0.061	3.00	No
		x	-0.061	5.50	No
	62	x	-0.132	1.50	No
		x	-0.132	6.00	No
		x	-0.013	5.00	No
	63	x	-0.425	1.50	No
		x	-0.425	7.50	No
		x	-0.051	5.50	No
	64	x	-0.12	3.00	No
		x	-0.12	5.50	No
	65	x	-0.132	1.50	No
		x	-0.132	6.00	No
		x	-0.013	5.00	No
	66	x	-0.425	1.50	No

		x	-0.425	7.50	No
		x	-0.051	5.50	No
	67	x	-0.12	3.00	No
		x	-0.12	5.50	No
Di	52	y	-0.047	1.50	No
		y	-0.047	6.00	No
		y	-0.031	5.00	No
	54	y	-0.147	1.50	No
		y	-0.147	7.50	No
		y	-0.036	5.50	No
		y	-0.034	5.50	No
	55	y	-0.045	3.00	No
		y	-0.045	5.50	No
	62	y	-0.047	1.50	No
		y	-0.047	6.00	No
		y	-0.031	5.00	No
	63	y	-0.147	1.50	No
		y	-0.147	7.50	No
		y	-0.036	5.50	No
		y	-0.034	5.50	No
	64	y	-0.045	3.00	No
		y	-0.045	5.50	No
	65	y	-0.047	1.50	No
		y	-0.047	6.00	No
		y	-0.031	5.00	No
	66	y	-0.147	1.50	No
		y	-0.147	7.50	No
		y	-0.036	5.50	No
		y	-0.034	5.50	No
	67	y	-0.045	3.00	No
		y	-0.045	5.50	No
Wi0	52	z	-0.031	1.50	No
		z	-0.031	6.00	No
		z	-0.003	5.00	No
	54	z	-0.089	1.50	No
		z	-0.089	7.50	No
		z	-0.01	5.50	No
		z	-0.009	5.50	No
	55	z	-0.027	3.00	No
		z	-0.027	5.50	No
	62	z	-0.018	1.50	No
		z	-0.018	6.00	No
		z	-0.009	5.00	No
	63	z	-0.054	1.50	No
		z	-0.054	7.50	No
		z	-0.018	5.50	No
	64	z	-0.016	3.00	No
		z	-0.016	5.50	No
	65	z	-0.018	1.50	No
		z	-0.018	6.00	No
		z	-0.009	5.00	No
	66	z	-0.054	1.50	No
		z	-0.054	7.50	No
		z	-0.018	5.50	No
	67	z	-0.016	3.00	No
		z	-0.016	5.50	No
Wi30	52	x	-0.013	1.50	No
		x	-0.013	6.00	No
		x	-0.011	5.00	No
	54	x	-0.043	1.50	No

		x	-0.043	7.50	No
		x	-0.02	5.50	No
	55	x	-0.013	3.00	No
		x	-0.013	5.50	No
	62	x	-0.026	1.50	No
		x	-0.026	6.00	No
		x	-0.006	5.00	No
	63	x	-0.077	1.50	No
		x	-0.077	7.50	No
		x	-0.012	5.50	No
	64	x	-0.023	3.00	No
		x	-0.023	5.50	No
	65	x	-0.026	1.50	No
		x	-0.026	6.00	No
		x	-0.006	5.00	No
	66	x	-0.077	1.50	No
		x	-0.077	7.50	No
		x	-0.012	5.50	No
	67	x	-0.023	3.00	No
		x	-0.023	5.50	No
WLO	52	z	-0.009	1.50	No
		z	-0.009	6.00	No
	54	z	-0.029	1.50	No
		z	-0.029	7.50	No
		z	-0.002	5.50	No
		z	-0.002	5.50	No
	55	z	-0.008	3.00	No
		z	-0.008	5.50	No
	62	z	-0.005	1.50	No
		z	-0.005	6.00	No
		z	-0.002	5.00	No
	63	z	-0.017	1.50	No
		z	-0.017	7.50	No
		z	-0.005	5.50	No
	64	z	-0.005	3.00	No
		z	-0.005	5.50	No
	65	z	-0.005	1.50	No
		z	-0.005	6.00	No
		z	-0.002	5.00	No
	66	z	-0.017	1.50	No
		z	-0.017	7.50	No
		z	-0.005	5.50	No
	67	z	-0.005	3.00	No
		z	-0.005	5.50	No
WL30	52	x	-0.003	1.50	No
		x	-0.003	6.00	No
		x	-0.002	5.00	No
	54	x	-0.013	1.50	No
		x	-0.013	7.50	No
		x	-0.006	5.50	No
	55	x	-0.004	3.00	No
		x	-0.004	5.50	No
	62	x	-0.008	1.50	No
		x	-0.008	6.00	No
		x	-0.001	5.00	No
	63	x	-0.025	1.50	No
		x	-0.025	7.50	No
		x	-0.003	5.50	No
	64	x	-0.007	3.00	No
		x	-0.007	5.50	No

	65	x	-0.008	1.50	No
		x	-0.008	6.00	No
		x	-0.001	5.00	No
	66	x	-0.025	1.50	No
		x	-0.025	7.50	No
		x	-0.003	5.50	No
	67	x	-0.007	3.00	No
		x	-0.007	5.50	No
LL1	9	y	-0.25	50.00	Yes
LL2	9	y	-0.25	100.00	Yes
LLa1	52	y	-0.25	50.00	Yes
LLa2	54	y	-0.25	50.00	Yes
LLa3	55	y	-0.25	50.00	Yes

Self weight multipliers for load conditions

Condition	Description	Self weight multiplier			
		Comb.	MultX	MultY	MultZ
DL	Dead Load	No	0.00	-1.00	0.00
W0	Wind Load 0/60/120 deg	No	0.00	0.00	0.00
W30	Wind Load 30/90/150 deg	No	0.00	0.00	0.00
Di	Ice Load	No	0.00	0.00	0.00
Wi0	Ice Wind Load 0/60/120 deg	No	0.00	0.00	0.00
Wi30	Ice Wind Load 30/90/150 deg	No	0.00	0.00	0.00
WL0	WL 30 mph 0/60/120 deg	No	0.00	0.00	0.00
WL30	WL 30 mph 30/90/150 deg	No	0.00	0.00	0.00
LL1	250 lb Live Load Center of Mount	No	0.00	0.00	0.00
LL2	250 lb Live Load End of Mount	No	0.00	0.00	0.00
LLa1	250 lb Live Load Antenna 1	No	0.00	0.00	0.00
LLa2	250 lb Live Load Antenna 2	No	0.00	0.00	0.00
LLa3	250 lb Live Load Antenna 3	No	0.00	0.00	0.00

Earthquake (Dynamic analysis only)

Condition	a/g	Ang. [Deg]	Damp. [%]
DL	0.00	0.00	0.00
W0	0.00	0.00	0.00
W30	0.00	0.00	0.00
Di	0.00	0.00	0.00
Wi0	0.00	0.00	0.00
Wi30	0.00	0.00	0.00
WL0	0.00	0.00	0.00
WL30	0.00	0.00	0.00
LL1	0.00	0.00	0.00
LL2	0.00	0.00	0.00
LLa1	0.00	0.00	0.00
LLa2	0.00	0.00	0.00
LLa3	0.00	0.00	0.00



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Steel Code Check

Report: Summary - Group by member

Load conditions to be included in design :

- LC1=1.2DL+W0
- LC2=1.2DL+W30
- LC3=1.2DL-W0
- LC4=1.2DL-W30
- LC5=0.9DL+W0
- LC6=0.9DL+W30
- LC7=0.9DL-W0
- LC8=0.9DL-W30
- LC9=1.2DL+Di+Wi0
- LC10=1.2DL+Di+Wi30
- LC11=1.2DL+Di-Wi0
- LC12=1.2DL+Di-Wi30
- LC13=1.2DL
- LC15=1.2DL+1.5LL1
- LC16=1.2DL+1.5LL2
- LC17=1.2DL+W0+1.5LLa1
- LC18=1.2DL+W30+1.5LLa1
- LC19=1.2DL-W0+1.5LLa1
- LC20=1.2DL-W30+1.5LLa1
- LC21=1.2DL+W0+1.5LLa2
- LC22=1.2DL+W30+1.5LLa2
- LC23=1.2DL-W0+1.5LLa2
- LC24=1.2DL-W30+1.5LLa2
- LC25=1.2DL+W0+1.5LLa3
- LC26=1.2DL+W30+1.5LLa3
- LC27=1.2DL-W0+1.5LLa3
- LC28=1.2DL-W30+1.5LLa3

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	HSS_SQR 4X4X1_4	1	LC9 at 100.00%	0.48	OK	Eq. H1-1b
		4	LC9 at 50.00%	0.24	OK	Eq. H1-1b
		5	LC9 at 100.00%	0.48	OK	Eq. H1-1b
		8	LC9 at 50.00%	0.24	OK	Eq. H1-1b
		12	LC4 at 0.00%	0.51	OK	Eq. H1-1b
		13	LC10 at 50.00%	0.23	OK	Eq. H1-1b
	L 2-1_2X2-1_2X1_4	80	LC2 at 100.00%	0.15	OK	Eq. H2-1
		81	LC4 at 0.00%	0.12	OK	Eq. H2-1
		82	LC3 at 100.00%	0.16	OK	Eq. H2-1
	L 2X2X1_4	2	LC3 at 100.00%	0.27	OK	Eq. H2-1
		3	LC2 at 100.00%	0.30	OK	Eq. H2-1
		6	LC3 at 100.00%	0.27	OK	Eq. H2-1
		7	LC4 at 100.00%	0.30	OK	Eq. H2-1
		14	LC1 at 0.00%	0.27	OK	Eq. H2-1
		15	LC1 at 0.00%	0.27	OK	Eq. H2-1
	PIPE 2-1_2x0.203	52	LC1 at 47.92%	0.29	OK	Eq. H1-1b
		54	LC1 at 50.00%	0.82	OK	Eq. H1-1b
		55	LC1 at 47.92%	0.25	OK	Eq. H1-1b

	62	LC4 at 47.92%	0.27	OK	Eq. H1-1b
	63	LC4 at 50.00%	0.70	OK	Eq. H1-1b
	64	LC4 at 47.92%	0.22	OK	Eq. H1-1b
	65	LC2 at 47.92%	0.24	OK	Eq. H1-1b
	66	LC2 at 50.00%	0.70	OK	Eq. H1-1b
	67	LC2 at 47.92%	0.24	OK	Eq. H1-1b
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PIPE 2x0.154	77	LC9 at 50.00%	0.29	OK	Eq. H1-1b
	78	LC9 at 50.00%	0.29	OK	Eq. H1-1b
	79	LC10 at 50.00%	0.29	OK	Eq. H1-1b
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PIPE 3x0.216	9	LC9 at 38.28%	0.26	OK	Eq. H1-1b
	10	LC12 at 61.72%	0.27	OK	Eq. H1-1b
	11	LC10 at 38.28%	0.27	OK	Eq. H1-1b
<hr/>					
PL 6X1/2	25	LC4 at 46.88%	0.12	OK	Eq. H1-1b
	26	LC2 at 50.00%	0.14	OK	Eq. H1-1b
	27	LC3 at 50.00%	0.15	OK	Eq. H1-1b



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Geometry data

GLOSSARY

- Cb22, Cb33 : Moment gradient coefficients
- Cm22, Cm33 : Coefficients applied to bending term in interaction formula
- d0 : Tapered member section depth at J end of member
- DJX : Rigid end offset distance measured from J node in axis X
- DJY : Rigid end offset distance measured from J node in axis Y
- DJZ : Rigid end offset distance measured from J node in axis Z
- DKX : Rigid end offset distance measured from K node in axis X
- DKY : Rigid end offset distance measured from K node in axis Y
- DKZ : Rigid end offset distance measured from K node in axis Z
- dL : Tapered member section depth at K end of member
- Ig factor : Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members
- K22 : Effective length factor about axis 2
- K33 : Effective length factor about axis 3
- L22 : Member length for calculation of axial capacity
- L33 : Member length for calculation of axial capacity
- LB pos : Lateral unbraced length of the compression flange in the positive side of local axis 2
- LB neg : Lateral unbraced length of the compression flange in the negative side of local axis 2
- RX : Rotation about X
- RY : Rotation about Y
- RZ : Rotation about Z
- TO : 1 = Tension only member 0 = Normal member
- TX : Translation in X
- TY : Translation in Y
- TZ : Translation in Z

Nodes

Node	X [ft]	Y [ft]	Z [ft]	Rigid Floor
2	-1.50	0.00	4.0896	0
3	-6.0833	0.00	4.0896	0
4	-6.25	0.00	4.0896	0
5	-6.3333	0.00	3.6566	0
6	-6.5833	0.00	3.2236	0
7	-4.1172	0.00	-0.4435	0
8	-4.2917	0.00	-0.7457	0
9	-1.6745	0.00	3.7874	0
10	-6.6667	0.00	3.3679	0
11	-2.7917	0.00	-3.3438	0
12	-2.4427	0.00	-3.3438	0
13	-0.50	0.00	-7.3131	0
14	-0.4167	0.00	-7.4574	0
17	1.50	0.00	4.0896	0
18	6.0833	0.00	4.0896	0
19	6.25	0.00	4.0896	0
20	6.3333	0.00	3.6566	0
21	6.5833	0.00	3.2236	0
22	4.1172	0.00	-0.4435	0
23	4.2917	0.00	-0.7457	0
24	1.6745	0.00	3.7874	0

25	6.6667	0.00	3.3679	0
26	2.7917	0.00	-3.3438	0
27	2.4427	0.00	-3.3438	0
28	0.50	0.00	-7.3131	0
29	0.4167	0.00	-7.4574	0
32	0.00	0.00	-7.3131	0
69	0.9427	0.00	0.5443	0
70	0.00	0.00	-1.0885	0
71	-0.9427	0.00	0.5443	0
108	5.25	4.00	4.2896	0
109	-5.25	4.00	4.2896	0
110	5.25	-4.00	4.2896	0
111	-5.25	-4.00	4.2896	0
113	0.00	4.00	4.2896	0
115	0.00	-4.00	4.2896	0
124	0.00	0.00	0.00	0
125	0.00	2.00	0.00	0
130	6.3399	-4.00	2.4018	0
131	-1.0899	-4.00	-6.6914	0
132	6.3399	4.00	2.4018	0
133	-1.0899	4.00	-6.6914	0
138	3.7149	-4.00	-2.1448	0
139	-3.7149	-4.00	-2.1448	0
140	3.7149	4.00	-2.1448	0
141	-3.7149	4.00	-2.1448	0
146	1.0899	-4.00	-6.6914	0
147	-6.3399	-4.00	2.4018	0
148	1.0899	4.00	-6.6914	0
149	-6.3399	4.00	2.4018	0
168	-6.6667	3.00	3.3679	0
169	-0.4167	3.00	-7.4574	0
170	0.4167	3.00	-7.4574	0
171	6.6667	3.00	3.3679	0
172	-6.25	3.00	4.0896	0
173	6.25	3.00	4.0896	0
174	-5.75	3.00	4.0896	0
175	5.75	3.00	4.0896	0
176	6.4167	3.00	2.9349	0
177	-0.6667	3.00	-7.0244	0
178	0.6667	3.00	-7.0244	0
179	-6.4167	3.00	2.9349	0

Restraints

Node	TX	TY	TZ	RX	RY	RZ
69	1	1	1	1	1	1
70	1	1	1	1	1	1
71	1	1	1	1	1	1

Members

Member	NJ	NK	Description	Section	Material	d0 [in]	dL [in]	Ig factor
1	5	71		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
2	5	9		L 2X2X1_4	A36	0.00	0.00	0.00
3	5	7		L 2X2X1_4	A36	0.00	0.00	0.00
4	8	2		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
5	20	69		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
6	20	24		L 2X2X1_4	A36	0.00	0.00	0.00
7	20	22		L 2X2X1_4	A36	0.00	0.00	0.00
8	23	17		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
9	4	19		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
10	10	14		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
11	29	25		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
12	70	32		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
13	11	26		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
14	27	32		L 2X2X1_4	A36	0.00	0.00	0.00
15	12	32		L 2X2X1_4	A36	0.00	0.00	0.00
25	6	3		PL 6X1/2	A36	0.00	0.00	0.00
26	18	21		PL 6X1/2	A36	0.00	0.00	0.00
27	28	13		PL 6X1/2	A36	0.00	0.00	0.00
52	108	110		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
54	113	115		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
55	109	111		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
62	149	147		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
63	141	139		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
64	133	131		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
65	148	146		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
66	140	138		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
67	132	130		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
77	168	169		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
78	170	171		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
79	172	173		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
80	179	174		L 2-1_2X2-1_2X1_4	A36	0.00	0.00	0.00
81	177	178		L 2-1_2X2-1_2X1_4	A36	0.00	0.00	0.00
82	175	176		L 2-1_2X2-1_2X1_4	A36	0.00	0.00	0.00

Orientation of local axes

Member	Rotation [Deg]	Axes23	NX	NY	NZ
2	270.00	0	0.00	0.00	0.00
4	180.00	0	0.00	0.00	0.00
7	270.00	0	0.00	0.00	0.00
8	90.00	0	0.00	0.00	0.00
13	90.00	0	0.00	0.00	0.00
14	270.00	0	0.00	0.00	0.00
80	180.00	0	0.00	0.00	0.00
81	90.00	0	0.00	0.00	0.00
82	180.00	0	0.00	0.00	0.00