



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 28, 2020

G. Scott Shepherd
Site Development Specialist II
SBA Communications Corporation
134 Flanders Rd., Suite 125
Westborough, MA 01581

RE: **EM-T-MOBILE-003-201118** – T-Mobile notice of intent to modify an existing telecommunications facility located at 92 (a/k/a 99) Knowlton Hill Road, Ashford, Connecticut.

Dear Mr. Shepherd:

The Connecticut Siting Council (Council) is in receipt of your correspondence of December 23, 2020 submitted in response to the Council's December 2, 2020 notification of an incomplete request for exempt modification with regard to the above-referenced matter.

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

Thank you for your attention and cooperation.

Sincerely,

s/Melanie A. Bachman

Melanie A. Bachman
Executive Director

MAB/IN/laf

From: Glenn Shepherd <GShepherd@sbsite.com>
Sent: Wednesday, December 23, 2020 2:07 PM
To: Robidoux, Evan <Evan.Robidoux@ct.gov>
Cc: CSC-DL Siting Council <Siting.Council@ct.gov>; Rick Woods <RWoods@sbsite.com>; Kri Pelletier <KPelletier@sbsite.com>
Subject: RE: [External] Council Incomplete Letter for EM-T-MOBILE-003-201118 (92/99 Knowlton Hill Road, Ashford)

EXTERNAL EMAIL: This email originated from outside of the organization. Do not click any links or open any attachments unless you trust the sender and know the content is safe.

Evan,

Based upon your letter of incomplete, it is my understanding that an electronic copy of a Mount analysis and 5G statement is all that required at this time, if said documents are provided by January 8, 2021.

As requested, please see the attached Mount Analysis for the above referenced site located at 99 Knowlton Rd., Ashford, CT.

Also attached, is a revised letter describing the wireless services frequencies, including any frequency associated with 5G services.

Please let me know if there's anything else you may require to complete your review and approval.

Thank You,

G. Scott Shepherd

Site Development Specialist II

508.251.0720 Ext.3807 + **T**

508.366.2610 + F + **F**

508.868.6000 + C + **C**



Filed by:

G. Scott Shepherd, Site Development Specialist II - SBA Communications
134 Flanders Rd., Suite 125, Westborough, MA 01581
508.251.0720 x 3807 - gshepherd@sbsite.com

December 23, 2020

Melanie A. Bachman
Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Notice of Exempt Modification
99 Knowlton Hill Rd., Ashford, CT 06278
Latitude: 41 50 26.8
Longitude: 41 50 26.8
T-Mobile Site #: CT11519D_L600

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 147-foot level of the existing 149-foot Monopole Tower at 99 Knowlton Hill Rd., CT. The 147-foot tower is owned by SBA Towers V, LLC. The property is owned by Thomas E. Knowlton. T-Mobile now intends to remove three (3) new L700/L600 MHz antennas and replace with three (3) new L700/L600 MHz antennas.

The new antennas support 5g services and would be installed at the 147-foot level of the tower.

Please note: Per the Connecticut Siting Council Website: CSC COVID 19 Guidelines. *In order to prevent the spread of Coronavirus and protect the health and safety of our members and staff, as of March 18, 2020, the Connecticut Siting Council shall convert to full remote operations until March 30, 2020. Please be advised that during this time period, all hard copy filing requirements will be waived in lieu of an electronic filing. Please also be advised that the March 26, 2020 regular meeting shall be held via teleconference. The Council's website is not equipped with an on-line filing fee receipt service. Therefore, filing fees and/or direct cost charges associated with matters received electronically during the above-mentioned time period will be directly invoiced at a later date.*

Planned Modifications:

TOWER

Remove:

- N/A



Remove and Replace:

- (3) RFS LNX-6515DS antennas (remove) – (3) RFS APXVAARR24_43-U-NA20 antennas (replace)

Install New:

- (3) Ericsson Radio 4449 B71+B12 RRU
- (1) Sitepro PRK-1245L (Platform kit)
- (1) Sitepro HRK12-U (Platform Kit)
- (1) 1-5/8" fiber

Existing Equipment to Remain:

- (3) Ericsson KRY 112 489/2 TMA
- 12' Low Profile Platform
- (6) 1-5/8" coax

Entitlements:

- (3) Ericsson KRY 112 489/2 TMA
- (12) 1-5/8" coax
- (2) 1-5/8" fiber

GROUND

Install New:

- Equipment inside existing RBS 6201 Equipment cabinet

This facility was approved by the Council on October 26, 2004 under Docket 291. Approval was given for a monopole no taller than necessary to provide the proposed telecommunications services, sufficient to accommodate the antennas of the carrier and other entities, both public and private, but not to exceed 150-feet above ground level, including appurtenances. The tower and foundation were to be designed and constructed with the ability to be extended to 180-feet above ground level. A recalculated radio frequency report was to be provided when a change in operation caused a change in power density levels. Upon the establishment of any new State or federal radio frequency standards applicable to the facility, it was to be brought into compliance. The Certificate Holder was to permit public or private entities to share space on the proposed tower for fair consideration or to provide legal, technical, environmental, or economic reasons precluding such sharing. There was to be space provided on the tower for no compensation for any municipal antennas, provide they were compatible with the structural integrity of the tower. And any obsolete antennas were to be removed within 60 days. There were no further post construction stipulations set. Please see attached.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. §16.50j-72(b)(2). In accordance with R.C.S.A. § 16.50j-73, a copy of this letter is being sent to the Town of Ashford's First Selectman, Cathryn E. Silver-Smith, and Building Official James Rupert, as well as to the property owner. (Separate notice is not being sent to tower owner, as it belongs to SBA.)

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. §16.50j-72(b)(2).



1. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modification will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.
5. The proposed modification will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above-referenced telecommunication facility constitute an exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

G. Scott Shepherd
Site Development Specialist II
SBA COMMUNICATIONS CORPORATION
134 Flanders Rd., Suite 125
Westborough, MA 01581
508.251.0720 x3807 + T
508.366.2610 + F
508.868.6000 + C
gshepherd@sbsite.com

Attachments

- cc: Cathryn E. Silver-Smith, First Selectman / with attachments
Town of Ashford, Town Hall, 5 Town Hall Road, Ashford, CT 06278
James Rupert, Building Official / with attachments
Town of Ashford, Town Hall, 5 Town Hall Road, Ashford, CT 06278
Thomas E. Knowlton / with attachments
317 Squaw Hollow Road, Ashford CT 06278 (SBA address on file)
99 Knowlton Hill Rd., Ashford, CT 06278 (Town address on file)



EXHIBIT LIST

Exhibit 1	Check Copy	x To be invoiced at a later date per Covid guidelines.
Exhibit 2	Notification Receipts	x
Exhibit 3	Property Card	x
Exhibit 4	Property Map	x
Exhibit 5	Original Zoning Approval	CSC 10/26/04
Exhibit 6	Construction Drawings	Chappell Engineering 11/9/20
Exhibit 7	Modification Drawings	Geo Structural 6/19/19
Exhibit 8	Structural Analysis	TES 9/6/19
Exhibit 9	Mount Analysis	GeoStructural 6/12/19
Exhibit 9	EME Report	Transcom Engineering 6/10/19

Antenna Mount Structural Analysis



Source: SBA Date: 4.23.2019

SBA Site: CT13614-A Knowlton
T-Mobile Site Number: CT11519D
Project: L600 Project

Prepared For: T-Mobile

Mount Description: (1) Platform
w/ Handrail and Kicker Augments
Site Location: 99 Knowlton Hill Rd, Ashford, CT
Windham County
41.84077291°, -72.207521°

Design Codes: ANSI/TIA-222-G
IBC 2015 w/ 2018 CT Building Code

Analysis Load Case: T-Mobile Final Configuration
Analysis Result: Adequate @ 66% - **Once Augmented**
See Conclusion



Revision 0
June 12, 2019

CT11519D_A and E_Structural_L600 06.12.19 - Pass with Augments

1.0 Introduction

An antenna mount structural analysis has been performed on T-Mobile's existing mount assembly **with augments** located at the CT13614-A Knowlton communications site in Windham County, CT considering the final equipment loading configuration listed in Section 3.0.

2.0 Analysis Criteria

An elastic three-dimensional model of the mount structure has been analyzed pursuant to the following criteria considering wind forces in 30° increments:

- 2018 Connecticut State Building Code.
- IBC 2015 - International Building Code.
- ANSI/TIA-222-G - Structural Standard for Antenna Supporting Structures and Antennas.
- AISC - Steel Construction Manual.
- ANSI/AWS D1.1 - Structural Welding Code.

Wind w/o ice = 130 mph (3-sec gust Ultimate Wind Speed)
Wind w/o ice = 101 mph (3-sec gust Basic Wind Speed)
Wind w/ ice = 50 mph (3-sec gust Basic) with 1" Design Ice, Escalated with Height
Topographic Category 1; Exposure Category C; Structure Class (Risk Category) II
Gust Effect Factor = 1.0; Directionality Factor = 0.95
Site Class D "Stiff Soil"; $F_a = 1.6$; $F_v = 2.4$; $S_{DS} = 0.185$
Maintenance Loads**:
$L_m = 500$ lb @ Worst Case Mount Pipe (Concurrent with 30 mph Wind Speed)
$L_v = 250$ lb @ Worst Case Member Location (Center Span or Cantilever)
** The mount face horizontal boom rails of T-Arm mount assemblies are not rated for rigging, hoisting or maintenance loading.

The following documents were provided:

- Mount and Tower Record Documents
SBA
- Tower Structural Analysis
FDH, 3/4/15.
- Colo Application
SBA 600 MHz, App # 117023 v1.
- RFDS
T-Mobile L600 Project, V3.1, CT11519D, 5/14/19.

The results of the analysis are illustrated in Section 4.0. If any of the existing or proposed conditions reported in this analysis are not properly represented, please contact our office immediately to request an amended report.

3.0 Appurtenance Information

Table 3.1 – T-Mobile Final Configuration^{1,2,3}

COR	(Quantity) Appurtenance Make/Model	Mount Description
147.0'±	(6) RFS APXV18-209014-C-A20	(1) Platform w/ Handrail and Kicker Augments
	(3) RFS APXVAARR24_43-U-NA20	
	(3) ERICSSON 4449 B71+B12 RRH	
	(3) Twin Style 1A PCS TMA	

1. Refer to antenna installation Construction Drawings (by others, when applicable) for additional information regarding final antenna and equipment orientations.
2. Panel antennas to be installed as follows:
 - 2.1. APXV18 panels to be installed on mount pipes in Positions 1 and 4 similar to existing.
 - 2.2. AARR panels to be installed on mount pipes in Positions 2 similar to existing.
3. RRH/TMA units to be installed as follows:
 - 3.1. TMAs to be installed on mount pipes behind panels in Position 1 similar to existing.
 - 3.2. 4449 RRHs to be installed on mount pipe behind panels in Position 2.

4.0 Analysis Results

Table 4.1 – Augmented Mount Capacity

Load Case	Governing Mount Component ¹	% Capacity ²	Result
Final T-Mobile Configuration	New Handrail Assembly	66%	Adequate Once Augmented ³
	Bracing	31%	
	Standoff	23%	
	Bottom Rail	11%	
	Mount Pipe	65%	
	New PRK Double Angles	43%	
	Connection Plates	54%	

1. Refer to the Calculations & Software Output portion of this report for mount component and structural information.
2. Listed results are expressed as a percentage of available mount member capacity based upon the assumed material strengths listed in Table 4.2. 105% is an acceptable allowable stress percentage for mount components.
3. Refer to Section 5.0 for information regarding required mount augments.

Table 4.2 – Structural Component Material Strengths

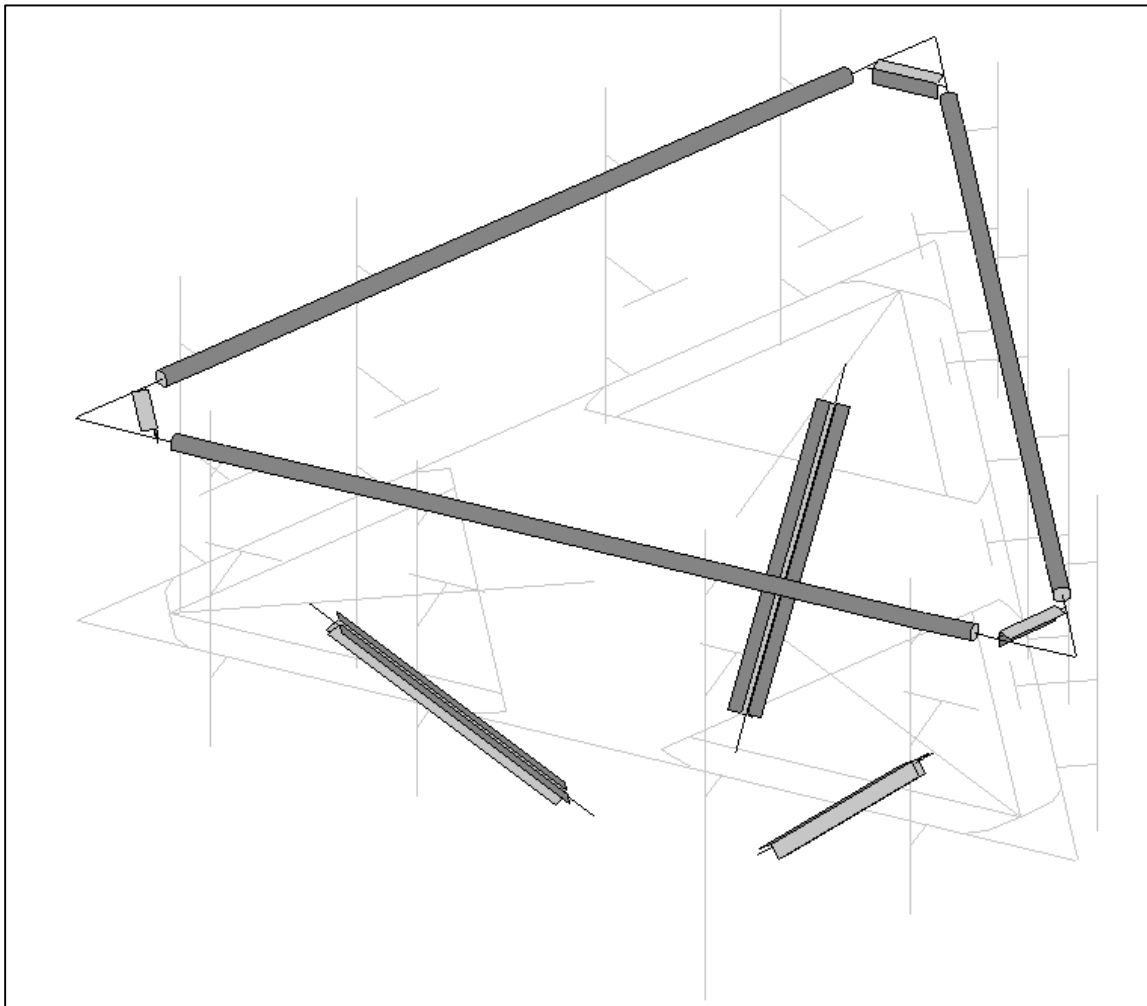
Structural Component	Nominal Strength/Material ¹
Pipe	$F_y = 35$ ksi (A53, Gr. B)
Tube	$F_y = 46$ ksi (A500, Gr. B)
Structural Shapes (L, C, W, etc.), Plate / Bar	$F_y = 36$ ksi (A36)
Uni-Strut	$F_y = 33$ ksi (A570, Gr. 33)
Connection Bolts	A325
Stainless Steel Bolts	18-8 Stainless, Grade 316/304 $F_y = 74$ ksi (Yield) & $F_u = 29$ ksi (Tension)
U-Bolts / Threaded Rod	SAE J429 Grade 2 (Substitution: ASTM A449) $F_y = 57$ ksi (Yield) & $F_u = 74$ ksi (Tension)
Welds	E70XX Electrodes

1. Strengths listed were assumed for this analysis and are based upon ASTM, AISC, RCSC, AWS and ACI preferred specification values. Values and materials are consistent with industry standards. Material strengths were taken from original design documents when available.

5.0 Conclusion & Recommendations

Based on T-Mobile's final equipment loading configuration, the mount assemblies do not have sufficient capacity to support the loading considered in this analysis pursuant to the listed standards. Structural modifications (augment) will be required and are briefly summarized below:

- Install Platform Reinforcement Kit; located 3.5' below the existing standoff centerline to monopole shaft and attaching to the existing standoff member approximately 3.5' out from the collar attachment.
 - Sitepro1 PRK-1245L, (1) total.
- Install Handrail Kit; located 3.0' above the existing platform rail and attaching to the mount pipes.
 - Sitepro1 HRK12-U or 14-U, (1) total. Verify required size in field. Attach all mount pipes to new handrail with kit-provided cross-over plates.



Once the recommended augments are successfully implemented, the **augmented** mount assembly has sufficient capacity to support the loading considered in this analysis pursuant to the listed standards.

Augmentation Requirements:

- Antennas and equipment shall be installed centered vertically on the mount front face rails (limit vertical installation eccentricity) same as existing. This analysis accounts for vertical eccentricities necessary to install all panel antennas at the same relative top tip elevation.
- Panel antennas to be installed as follows:
 - APXV18 panels to be installed on mount pipes in Positions 1 and 4 similar to existing.
 - AARR panels to be installed on mount pipes in Positions 2 similar to existing.
- RRH/TMA units to be installed as follows:
 - TMAs to be installed on mount pipes behind panels in Position 1 similar to existing.
 - 4449 RRHs to be installed on mount pipe behind panels in Position 2.
- In order to obtain a mount structure capable of supporting the currently proposed final loading configuration, upgrade augments must be installed in accordance with GeoStructural's mount augment *recommendations*.

All data required to complete our structural analysis was furnished by our client and provided record data. GeoStructural has not conducted a site visit or independent study, nor have they been provided a mount mapping to verify existing conditions and the results of this analysis are based solely on the information provided.

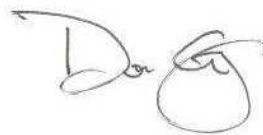
This analysis only encompasses the antenna mount assembly. The tower, overall mount support structure, foundation, etc. are beyond the scope of this analysis. If any of the existing or proposed conditions (appurtenance loading, member sizes, etc.) reported in this analysis are not properly represented, please contact our office immediately to request an amended report.

Prepared by:



Jesse Drennen, PE, MLE
208.761.7986
jesse.drennen@geostructural.com

Reviewed and Approved by:



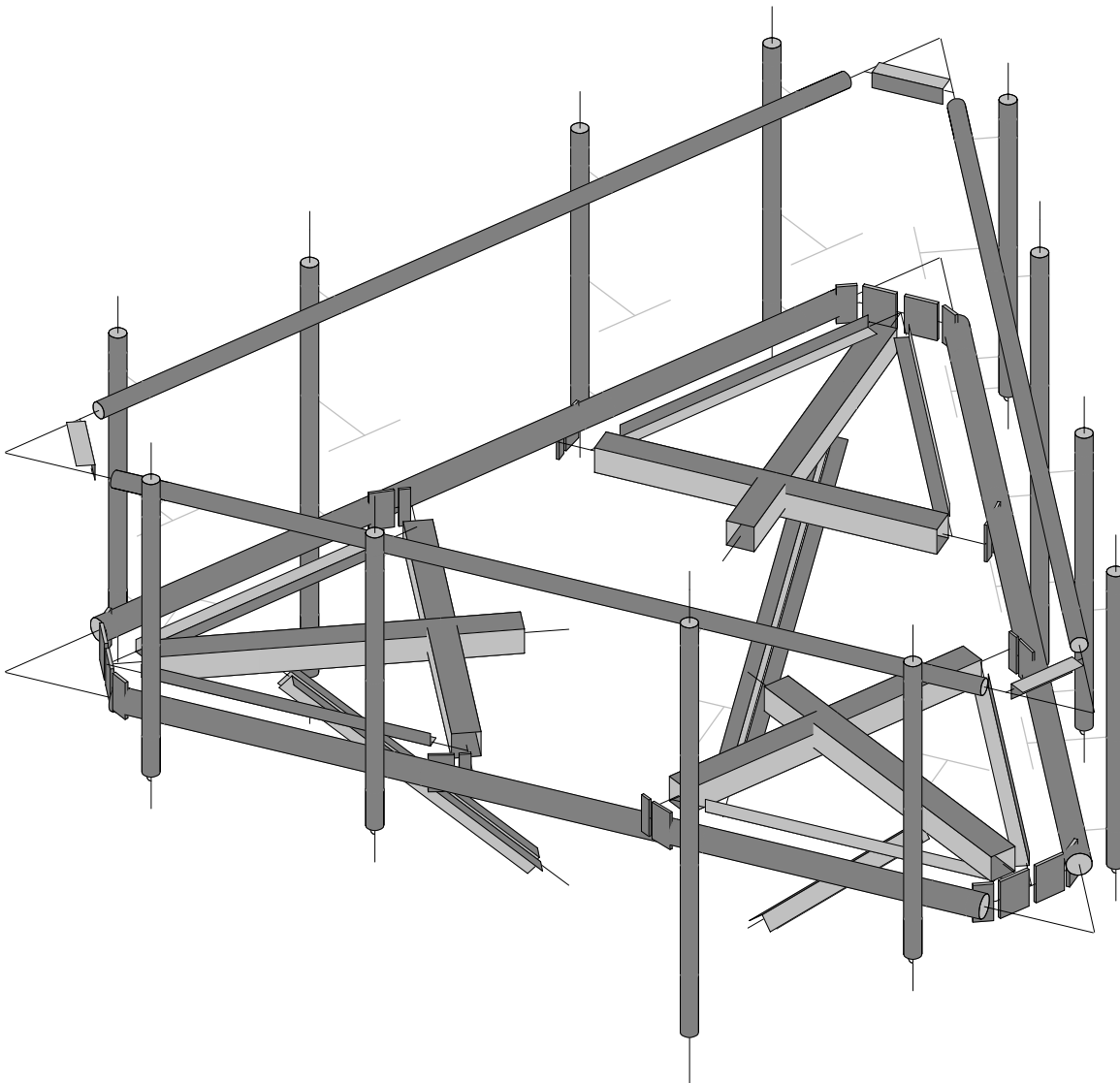
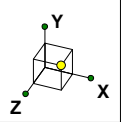
Don George, PE, SE, MLSE
208.602.6569
don.george@geostructural.com

6.0 Standard Conditions

- All data required to complete our structural analysis was furnished by our client and provided record data. GeoStructural has not conducted a site visit or independent study to verify existing conditions and the results of this analysis are based solely on the information provided. It has been assumed that the tower, antenna support structure and foundation have been constructed according to the provided existing drawings, previous structural analysis reports, mapping documents, etc.
- The default Structure Classification is Class II in accordance with ANSI/TIA-222-G §A.2.2 & §A.15.3 and has been assumed for this analysis. The owner shall verify this classification conforms with original or desired reliability criteria.
- This analysis assumes that the structure has been properly installed and maintained in accordance with ANSI/TIA-222-G §15.5 and that no physical deterioration has occurred in any of the components of the structure. Damaged, missing, or rusted members were not considered.
- This analysis verifies the adequacy of the main components of the structure. Not all connections, welds, bolts, plates, etc. were individually detailed and analyzed. Where not specifically analyzed, the existing connection plates, welds, bolts, etc. were assumed adequate to develop the full capacity of the main structural members.
- No consideration has been made for unusual or extreme wind events, rime/in-cloud ice loadings, harmonic or nodal vibration, vortex shedding or other similar conditions.
- It is the owner's responsibility to determine the appropriate design wind speed and amount of ice accumulation beyond code minimum values that should be considered in the analysis.
- This analysis report does not constitute a maintenance and condition assessment. No certifications regarding maintenance and condition are expressed or implied. If desired, GeoStructural can provide these services under a subsequent contract.
- This analysis only encompasses the antenna mount assembly. The tower, overall mount support structure, foundation, etc. are beyond the scope of this analysis. If desired, GeoStructural can provide these services under a subsequent contract.

7.0 Calculations & Software Output

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Envelope Only Solution

GeoStructural, LLC

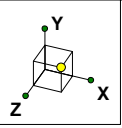
Jesse Drennen, PE

CT11519D

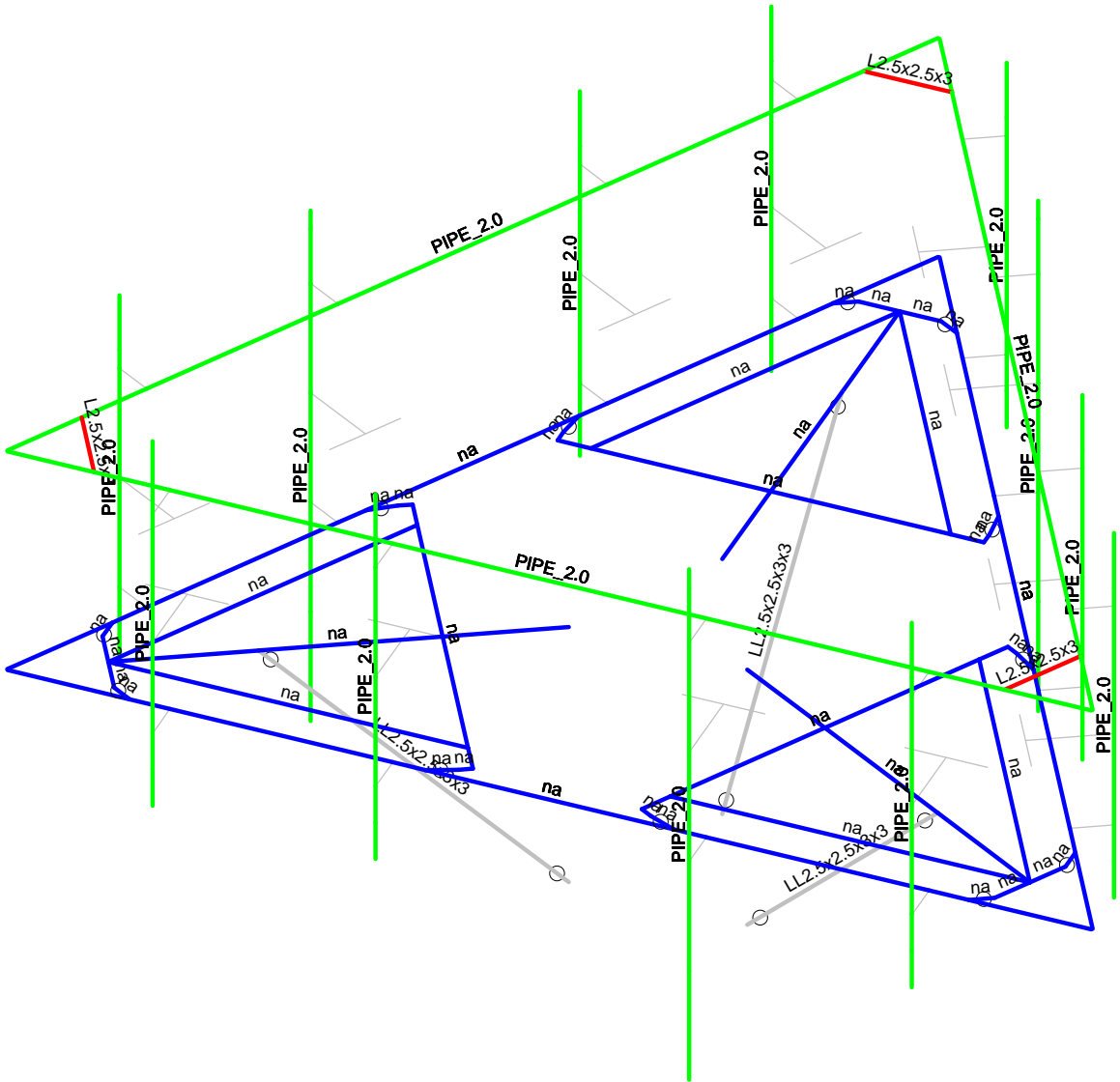
SK - 2

June 12, 2019 at 1:33 PM

CT11519D_Mount Analysis_R0 19...



Section Sets	
na	na
PIPE_2.0	PIPE_2.0
L2.5x2.5x3	L2.5x2.5x3
LL2.5x2.5x3x3	LL2.5x2.5x3x3
RIGID	RIGID



Envelope Only Solution

GeoStructural, LLC

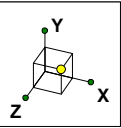
Jesse Drennen, PE

CT11519D

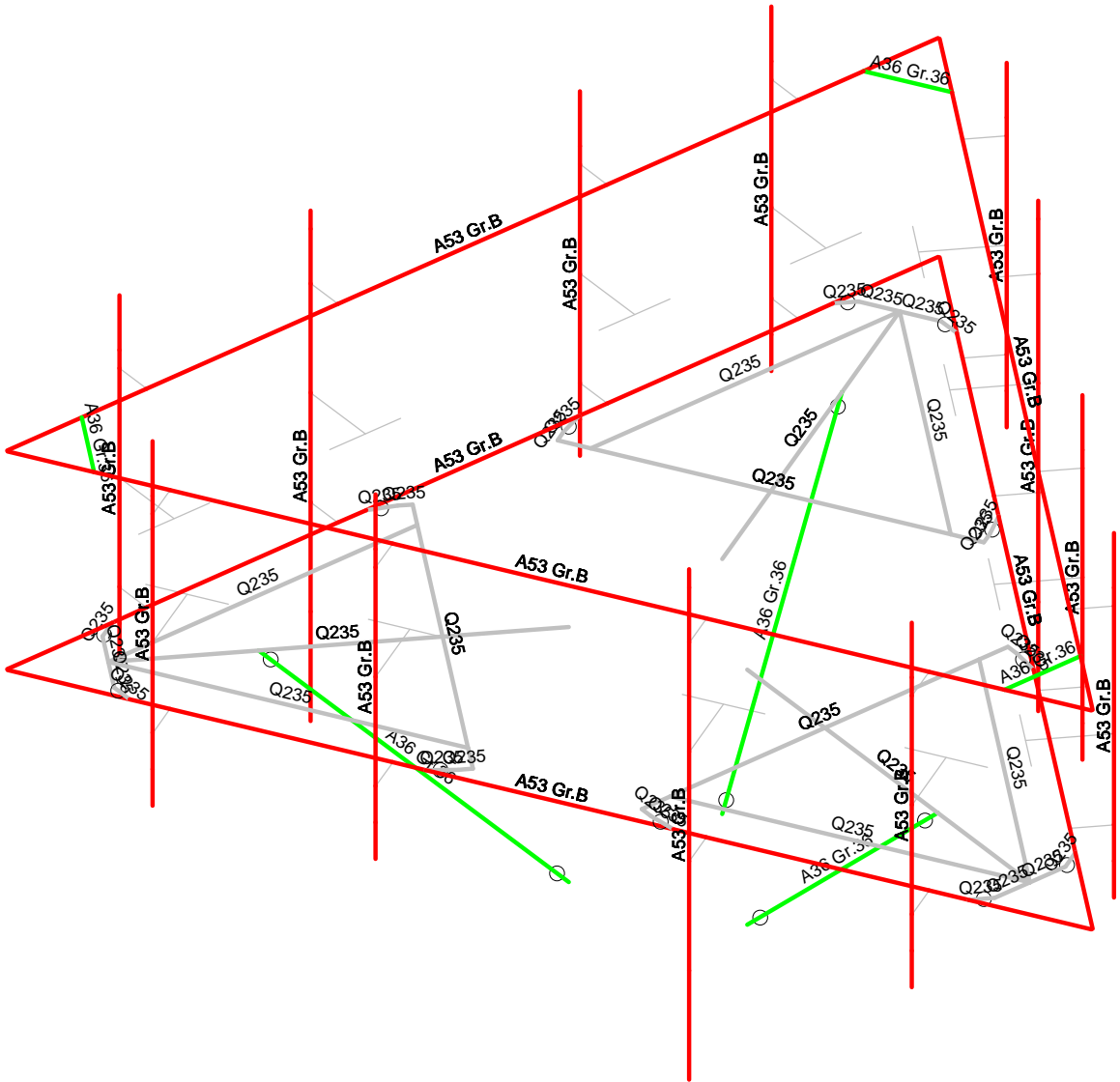
SK - 5

June 12, 2019 at 1:33 PM

CT11519D_Mount Analysis_R0 19...



Material Sets	
■	RIGID
■	A36 Gr.36
■	A53 Gr.B
■	Q235

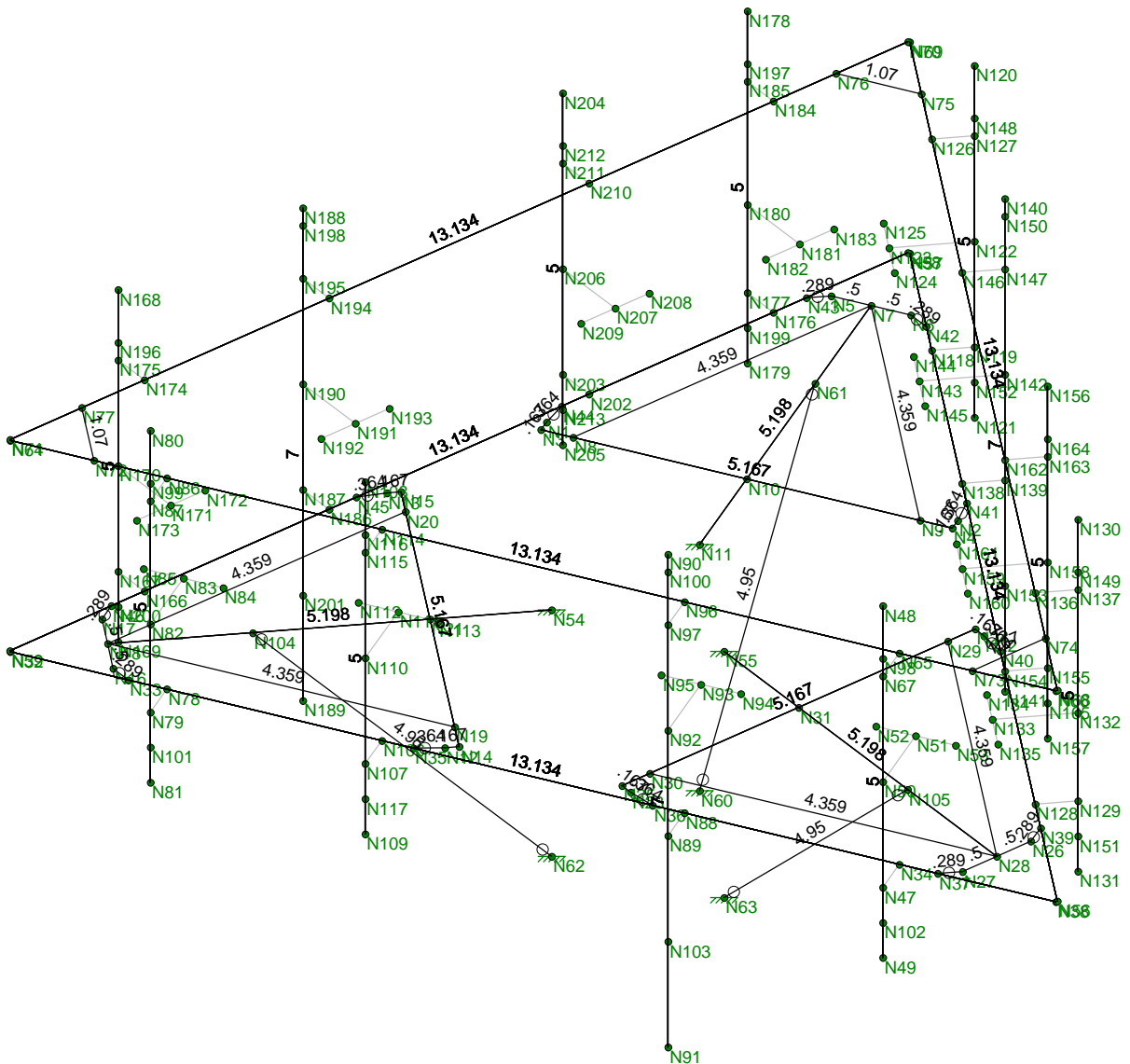
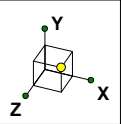


Envelope Only Solution

GeoStructural, LLC
Jesse Drennen, PE

CT11519D

SK - 6
June 12, 2019 at 1:33 PM
CT11519D_Mount Analysis_R0 19...



Member Length (ft) Displayed
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GeoStructural, LLC

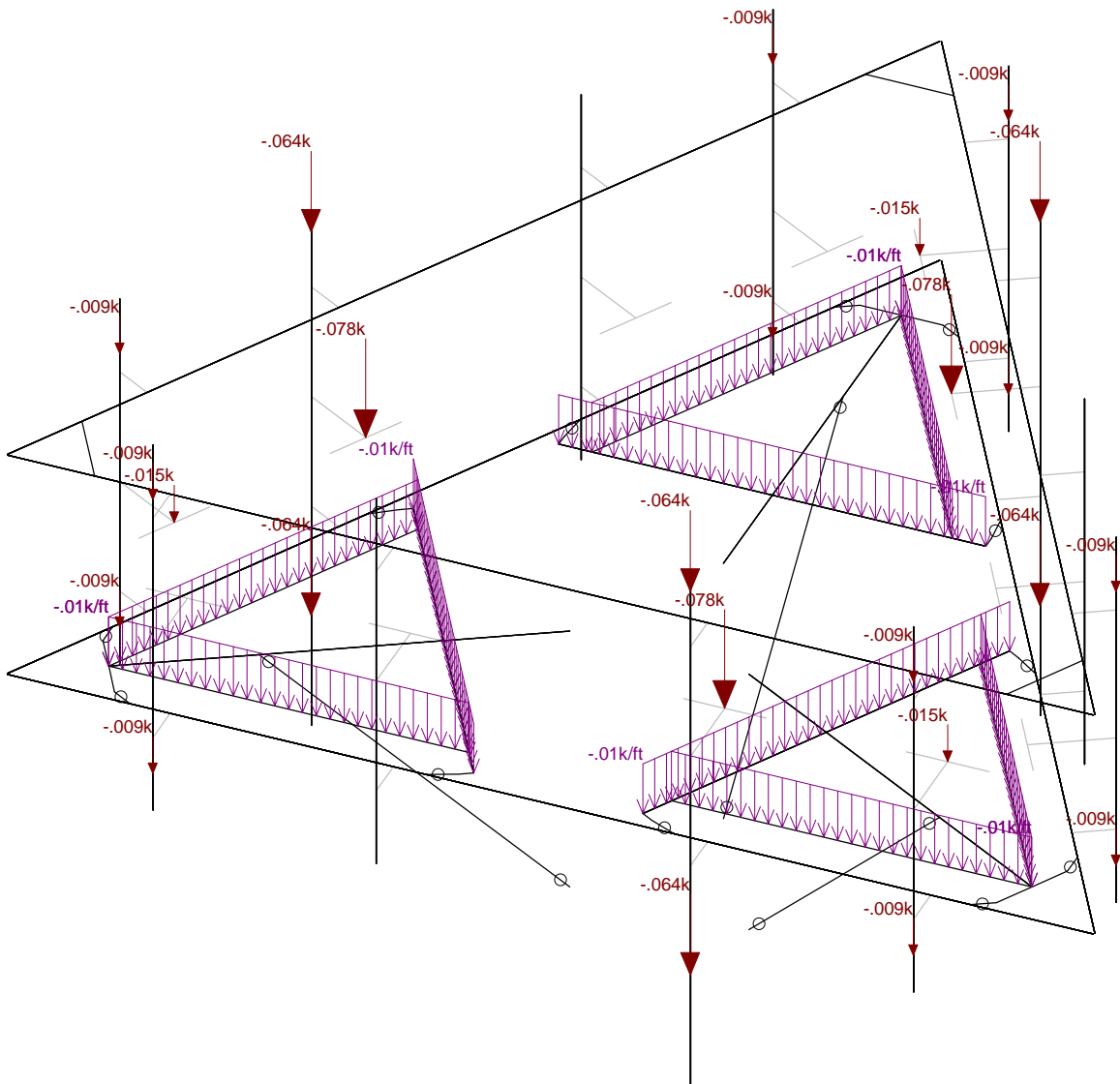
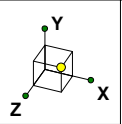
Jesse Drennen, PE

CT11519D

SK - 7

June 12, 2019 at 1:33 PM

CT11519D_Mount Analysis_R0 19...



Loads: BLC 1, D
Envelope Only Solution

GeoStructural, LLC

Jesse Drennen, PE

CT11519D

SK - 8

June 12, 2019 at 1:33 PM

CT11519D_Mount Analysis_R0 19...



Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	D	DL		-1		25		9		
2	Di	SL				25		63		
3	Lm [500]	LL				1				
4	Lv [250]	LL				2				
5	Woz	WL				25		60		
6	Wox	WL				25		60		
7	Wiz	WL				25		60		
8	Wix	WL				25		60		
9	Ez	EL				25				
10	Ex	EL				25				

Load Combination Design

	Description	ASIF	CD	Service	Hot Rol...	Cold Form...	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
1	1) 1.4D				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
15	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
18	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
19	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
21	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
22	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
23	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
24	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
25	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
26	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
27	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
28	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
29	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
30	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
31	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
32	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
33	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
34	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
35	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
36	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
37	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
38	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
39	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
40	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
41	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes



Load Combination Design (Continued)

	Description	ASIF	CD	Service	Hot Rol...	Cold Form...	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
42	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
43	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
44	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
45	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
46	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
47	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
48	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
49	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
50	6) 1.2D+1.5Lv				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
51	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
52	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
53	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
54	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
55	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
56	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
57	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
58	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
59	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
60	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
61	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
62	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
63	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
64	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
65	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
66	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
67	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
68	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
69	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
70	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
71	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
72	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
73	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
74	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
75	Dead Only				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
3	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.49	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.49	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A500 Gr.B RND_1	29000	11154	.3	.65	.527	42	1.4	58	1.3
8	A500 Gr.B Rect 1	29000	11154	.3	.65	.527	46	1.4	58	1.3
9	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3
10	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
11	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
12	Q235	29000	11154	.3	.65	.49	34	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in ²]	Iyy [in ⁴]	Izz [in ⁴]	J [in ⁴]
1	PIPE 1.5	PIPE 1.5	Beam	None	A53 Gr.B	Typical	.749	.293	.293	.586
2	PIPE 2.0	PIPE 2.0	Beam	None	A53 Gr.B	Typical	1.02	.627	.627	1.25
3	PIPE 2.5	PIPE 2.5	Beam	None	A53 Gr.B	Typical	1.61	1.45	1.45	2.89
4	PIPE 3.0	PIPE 3.0	Beam	None	A53 Gr.B	Typical	2.07	2.85	2.85	5.69
5	PIPE 3.5	PIPE 3.5	Beam	None	A53 Gr.B	Typical	2.5	4.52	4.52	9.04
6	PIPE 4.0	PIPE 4.0	Beam	None	A53 Gr.B	Typical	2.96	6.82	6.82	13.6
7	PIPE 5.0	PIPE 5.0	Beam	None	A53 Gr.B	Typical	4.01	14.3	14.3	28.6
8	HSS2x2x3	HSS2x2x3	Beam	None	A500 Gr.B Rect	Typical	1.19	.641	.641	1.09
9	HSS3x3x3	HSS3x3x3	Beam	None	A500 Gr.B Rect	Typical	1.89	2.46	2.46	4.03
10	HSS4x4x3	HSS4x4x3	Beam	None	A500 Gr.B Rect	Typical	2.58	6.21	6.21	10
11	HSS4x4x4	HSS4x4x4	Beam	None	A500 Gr.B Rect	Typical	3.37	7.8	7.8	12.8
12	HSS5x5x4	HSS5x5x4	Beam	None	A500 Gr.B Rect	Typical	4.3	16	16	25.8
13	C3x3.5	C3x3.5	Beam	None	A36 Gr.36	Typical	1.09	.169	1.57	.023
14	C4x4.5	C4x4.5	Beam	None	A36 Gr.36	Typical	1.38	.289	3.65	.032
15	C5x6.7	C5x6.7	Beam	None	A36 Gr.36	Typical	1.97	.47	7.48	.055
16	L2.5x2.5x3	L2.5x2.5x3	Beam	None	A36 Gr.36	Typical	.901	.535	.535	.011
17	L2.5x2.5x4	L2.5x2.5x4	Beam	None	A36 Gr.36	Typical	1.19	.692	.692	.026
18	L3x3x3	L3x3x3	Beam	None	A36 Gr.36	Typical	1.09	.948	.948	.014
19	L3x3x4	L3x3x4	Beam	None	A36 Gr.36	Typical	1.44	1.23	1.23	.031
20	L3x3x6	L3x3x6	Beam	None	A36 Gr.36	Typical	2.11	1.75	1.75	.101
21	L3.5x3.5x4	L3.5x3.5x4	Beam	None	A36 Gr.36	Typical	1.7	2	2	.039
22	L4x4x4	L4x4x4	Beam	None	A36 Gr.36	Typical	1.93	3	3	.044
23	LL2.5x2.5x3x3	LL2.5x2.5x3x3	Beam	None	A36 Gr.36	Typical	1.8	2.46	1.07	.023

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N11	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N54	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N55	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4	N60	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
5	N61						
6	N62	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
7	N63	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
8	N104						
9	N105						

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N7	N5		90	1/2 x 6	Beam	None	Q235	Typical_APP
2	M2	N7	N6		90	1/2 x 6	Beam	None	Q235	Typical_APP
3	M3	N3	N1		90	3/8x6 HRA	Beam	None	Q235	Typical_APP
4	M4	N1	N44		90	3/8x6 HRA	Beam	None	Q235	Typical_APP
5	M5	N4	N2		90	3/8x6 HRA	Beam	None	Q235	Typical_APP
6	M6	N2	N41		90	3/8x6 HRA	Beam	None	Q235	Typical_APP
7	M7	N7	N9			L2x2x4	Beam	None	Q235	Typical_APP
8	M8	N7	N8		270	L2x2x4	Beam	None	Q235	Typical_APP
9	M9	N5	N43		90	1/2 x 6	Beam	None	Q235	Typical_APP
10	M10	N6	N42		90	1/2 x 6	Beam	None	Q235	Typical_APP
11	M11	N18	N16		90	1/2 x 6	Beam	None	Q235	Typical_APP
12	M12	N18	N17		90	1/2 x 6	Beam	None	Q235	Typical_APP
13	M13	N14	N12		90	3/8x6 HRA	Beam	None	Q235	Typical_APP
14	M14	N12	N35		90	3/8x6 HRA	Beam	None	Q235	Typical_APP
15	M15	N15	N13		90	3/8x6 HRA	Beam	None	Q235	Typical_APP
16	M16	N13	N45		90	3/8x6 HRA	Beam	None	Q235	Typical_APP

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
17	M17	N18	N20			L2x2x4	Beam	None	Q235	Typical_APP
18	M18	N18	N19		270	L2x2x4	Beam	None	Q235	Typical_APP
19	M19	N15	N14			HSS4x4x4	Beam	None	Q235	Typical_APP
20	M20	N16	N33		90	1/2 x 6	Beam	None	Q235	Typical_APP
21	M21	N17	N46		90	1/2 x 6	Beam	None	Q235	Typical_APP
22	M22	N28	N26		90	1/2 x 6	Beam	None	Q235	Typical_APP
23	M23	N28	N27		90	1/2 x 6	Beam	None	Q235	Typical_APP
24	M24	N24	N22		90	3/8x6 HRA	Beam	None	Q235	Typical_APP
25	M25	N22	N40		90	3/8x6 HRA	Beam	None	Q235	Typical_APP
26	M26	N25	N23		90	3/8x6 HRA	Beam	None	Q235	Typical_APP
27	M27	N23	N36		90	3/8x6 HRA	Beam	None	Q235	Typical_APP
28	M28	N28	N30			L2x2x4	Beam	None	Q235	Typical_APP
29	M29	N28	N29		270	L2x2x4	Beam	None	Q235	Typical_APP
30	M30	N26	N39		90	1/2 x 6	Beam	None	Q235	Typical_APP
31	M31	N27	N37		90	1/2 x 6	Beam	None	Q235	Typical_APP
32	M32	N32	N38			PIPE 3.0	Beam	None	A53 Gr.B	Typical_APP
33	M33	N34	N47			RIGID	None	None	RIGID	Typical
34	M34	N50	N51			RIGID	None	None	RIGID	Typical
35	M35	N52	N53			RIGID	None	None	RIGID	Typical
36	M36	N49	N48			PIPE 2.0	Beam	None	A53 Gr.B	Typical
37	M37	N18	N54			HSS4x4x4	Beam	None	Q235	Typical_APP
38	M38	N56	N57			PIPE 3.0	Beam	None	A53 Gr.B	Typical_APP
39	M39	N58	N59			PIPE 3.0	Beam	None	A53 Gr.B	Typical_APP
40	M40	N25	N24			HSS4x4x4	Beam	None	Q235	Typical_APP
41	M41	N4	N3			HSS4x4x4	Beam	None	Q235	Typical_APP
42	M42	N28	N55			HSS4x4x4	Beam	None	Q235	Typical_APP
43	M43	N7	N11			HSS4x4x4	Beam	None	Q235	Typical_APP
44	M44	N61	N60			LL2.5x2.5x3x3	Beam	None	A36 Gr.36	Typical
45	M45	N64	N66			PIPE 2.0	Beam	None	A53 Gr.B	Typical
46	M46	N65	N67			RIGID	None	None	RIGID	Typical
47	M47	N68	N69			PIPE 2.0	Beam	None	A53 Gr.B	Typical
48	M48	N70	N71			PIPE 2.0	Beam	None	A53 Gr.B	Typical
49	M49	N73	N74		90	L2.5x2.5x3	Beam	None	A36 Gr.36	Typical
50	M50	N75	N76		90	L2.5x2.5x3	Beam	None	A36 Gr.36	Typical
51	M51	N77	N72		90	L2.5x2.5x3	Beam	None	A36 Gr.36	Typical
52	M52	N78	N79			RIGID	None	None	RIGID	Typical
53	M53	N82	N83			RIGID	None	None	RIGID	Typical
54	M54	N84	N85			RIGID	None	None	RIGID	Typical
55	M55	N81	N80			PIPE 2.0	Beam	None	A53 Gr.B	Typical
56	M56	N86	N87			RIGID	None	None	RIGID	Typical
57	M57	N88	N89			RIGID	None	None	RIGID	Typical
58	M58	N92	N93			RIGID	None	None	RIGID	Typical
59	M59	N94	N95			RIGID	None	None	RIGID	Typical
60	M60	N91	N90			PIPE 2.0	Beam	None	A53 Gr.B	Typical
61	M61	N96	N97			RIGID	None	None	RIGID	Typical
62	M62	N104	N62			LL2.5x2.5x3x3	Beam	None	A36 Gr.36	Typical
63	M63	N105	N63			LL2.5x2.5x3x3	Beam	None	A36 Gr.36	Typical
64	M64	N106	N107			RIGID	None	None	RIGID	Typical
65	M65	N110	N111			RIGID	None	None	RIGID	Typical
66	M66	N112	N113			RIGID	None	None	RIGID	Typical
67	M67	N109	N108			PIPE 2.0	Beam	None	A53 Gr.B	Typical
68	M68	N114	N115			RIGID	None	None	RIGID	Typical
69	M69	N118	N119			RIGID	None	None	RIGID	Typical
70	M70	N122	N123			RIGID	None	None	RIGID	Typical
71	M71	N124	N125			RIGID	None	None	RIGID	Typical
72	M72	N121	N120			PIPE 2.0	Beam	None	A53 Gr.B	Typical
73	M73	N126	N127			RIGID	None	None	RIGID	Typical



Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
74	M74	N128	N129			RIGID	None	None	RIGID	Typical
75	M75	N132	N133			RIGID	None	None	RIGID	Typical
76	M76	N134	N135			RIGID	None	None	RIGID	Typical
77	M77	N131	N130			PIPE 2.0	Beam	None	A53 Gr.B	Typical
78	M78	N136	N137			RIGID	None	None	RIGID	Typical
79	M79	N138	N139			RIGID	None	None	RIGID	Typical
80	M80	N142	N143			RIGID	None	None	RIGID	Typical
81	M81	N144	N145			RIGID	None	None	RIGID	Typical
82	M82	N141	N140			PIPE 2.0	Beam	None	A53 Gr.B	Typical
83	M83	N146	N147			RIGID	None	None	RIGID	Typical
84	M84	N154	N155			RIGID	None	None	RIGID	Typical
85	M85	N158	N159			RIGID	None	None	RIGID	Typical
86	M86	N160	N161			RIGID	None	None	RIGID	Typical
87	M87	N157	N156			PIPE 2.0	Beam	None	A53 Gr.B	Typical
88	M88	N162	N163			RIGID	None	None	RIGID	Typical
89	M89	N166	N167			RIGID	None	None	RIGID	Typical
90	M90	N170	N171			RIGID	None	None	RIGID	Typical
91	M91	N172	N173			RIGID	None	None	RIGID	Typical
92	M92	N169	N168			PIPE 2.0	Beam	None	A53 Gr.B	Typical
93	M93	N174	N175			RIGID	None	None	RIGID	Typical
94	M94	N176	N177			RIGID	None	None	RIGID	Typical
95	M95	N180	N181			RIGID	None	None	RIGID	Typical
96	M96	N182	N183			RIGID	None	None	RIGID	Typical
97	M97	N179	N178			PIPE 2.0	Beam	None	A53 Gr.B	Typical
98	M98	N184	N185			RIGID	None	None	RIGID	Typical
99	M99	N186	N187			RIGID	None	None	RIGID	Typical
100	M100	N190	N191			RIGID	None	None	RIGID	Typical
101	M101	N192	N193			RIGID	None	None	RIGID	Typical
102	M102	N189	N188			PIPE 2.0	Beam	None	A53 Gr.B	Typical
103	M103	N194	N195			RIGID	None	None	RIGID	Typical
104	M104	N202	N203			RIGID	None	None	RIGID	Typical
105	M105	N206	N207			RIGID	None	None	RIGID	Typical
106	M106	N208	N209			RIGID	None	None	RIGID	Typical
107	M107	N205	N204			PIPE 2.0	Beam	None	A53 Gr.B	Typical
108	M108	N210	N211			RIGID	None	None	RIGID	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
1	M1						Yes				None
2	M2						Yes				None
3	M3						Yes				None
4	M4		BenPIN				Yes				None
5	M5						Yes				None
6	M6		BenPIN				Yes				None
7	M7						Yes				None
8	M8						Yes				None
9	M9		BenPIN				Yes				None
10	M10		BenPIN				Yes				None
11	M11						Yes				None
12	M12						Yes				None
13	M13						Yes				None
14	M14		BenPIN				Yes				None
15	M15						Yes				None
16	M16		BenPIN				Yes				None
17	M17						Yes				None



Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
18	M18						Yes				None
19	M19						Yes				None
20	M20		BenPIN				Yes				None
21	M21		BenPIN				Yes				None
22	M22						Yes				None
23	M23						Yes				None
24	M24						Yes				None
25	M25		BenPIN				Yes				None
26	M26						Yes				None
27	M27		BenPIN				Yes				None
28	M28						Yes				None
29	M29						Yes				None
30	M30		BenPIN				Yes				None
31	M31		BenPIN				Yes				None
32	M32						Yes				None
33	M33						Yes	** NA **			None
34	M34						Yes	** NA **			None
35	M35						Yes	** NA **			None
36	M36						Yes				None
37	M37						Yes				None
38	M38						Yes				None
39	M39						Yes				None
40	M40						Yes				None
41	M41						Yes				None
42	M42						Yes				None
43	M43						Yes				None
44	M44	BenPIN	BenPIN				Yes				None
45	M45						Yes				None
46	M46		BenPIN				Yes	** NA **			None
47	M47						Yes				None
48	M48						Yes				None
49	M49						Yes				None
50	M50						Yes				None
51	M51						Yes				None
52	M52						Yes	** NA **			None
53	M53						Yes	** NA **			None
54	M54						Yes	** NA **			None
55	M55						Yes				None
56	M56		BenPIN				Yes	** NA **			None
57	M57						Yes	** NA **			None
58	M58						Yes	** NA **			None
59	M59						Yes	** NA **			None
60	M60						Yes				None
61	M61		BenPIN				Yes	** NA **			None
62	M62	BenPIN	BenPIN				Yes				None
63	M63	BenPIN	BenPIN				Yes				None
64	M64						Yes	** NA **			None
65	M65						Yes	** NA **			None
66	M66						Yes	** NA **			None
67	M67						Yes				None
68	M68		BenPIN				Yes	** NA **			None
69	M69						Yes	** NA **			None
70	M70						Yes	** NA **			None
71	M71						Yes	** NA **			None
72	M72						Yes				None
73	M73		BenPIN				Yes	** NA **			None
74	M74						Yes	** NA **			None



Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
75	M75						Yes	** NA **			None
76	M76						Yes	** NA **			None
77	M77						Yes				None
78	M78		BenPIN				Yes	** NA **			None
79	M79						Yes	** NA **			None
80	M80						Yes	** NA **			None
81	M81						Yes	** NA **			None
82	M82						Yes				None
83	M83		BenPIN				Yes	** NA **			None
84	M84						Yes	** NA **			None
85	M85						Yes	** NA **			None
86	M86						Yes	** NA **			None
87	M87						Yes				None
88	M88		BenPIN				Yes	** NA **			None
89	M89						Yes	** NA **			None
90	M90						Yes	** NA **			None
91	M91						Yes	** NA **			None
92	M92						Yes				None
93	M93		BenPIN				Yes	** NA **			None
94	M94						Yes	** NA **			None
95	M95						Yes	** NA **			None
96	M96						Yes	** NA **			None
97	M97						Yes				None
98	M98		BenPIN				Yes	** NA **			None
99	M99						Yes	** NA **			None
100	M100						Yes	** NA **			None
101	M101						Yes	** NA **			None
102	M102						Yes				None
103	M103		BenPIN				Yes	** NA **			None
104	M104						Yes	** NA **			None
105	M105						Yes	** NA **			None
106	M106						Yes	** NA **			None
107	M107						Yes				None
108	M108		BenPIN				Yes	** NA **			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	1/2 x 6	.5			Lbyy						Lateral
2	M2	1/2 x 6	.5			Lbyy						Lateral
3	M3	3/8x6_HRA	.167			Lbyy						Lateral
4	M4	3/8x6_HRA	.364			Lbyy						Lateral
5	M5	3/8x6_HRA	.167			Lbyy						Lateral
6	M6	3/8x6_HRA	.364			Lbyy						Lateral
7	M7	L2x2x4	4.359			Lbyy						Lateral
8	M8	L2x2x4	4.359			Lbyy						Lateral
9	M9	1/2 x 6	.289			Lbyy						Lateral
10	M10	1/2 x 6	.289			Lbyy						Lateral
11	M11	1/2 x 6	.5			Lbyy						Lateral
12	M12	1/2 x 6	.5			Lbyy						Lateral
13	M13	3/8x6_HRA	.167			Lbyy						Lateral
14	M14	3/8x6_HRA	.364			Lbyy						Lateral
15	M15	3/8x6_HRA	.167			Lbyy						Lateral
16	M16	3/8x6_HRA	.364			Lbyy						Lateral
17	M17	L2x2x4	4.359			Lbyy						Lateral
18	M18	L2x2x4	4.359			Lbyy						Lateral



Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
19	M19	HSS4x4x4	5.167			Lbyy						Lateral
20	M20	1/2 x 6	.289			Lbyy						Lateral
21	M21	1/2 x 6	.289			Lbyy						Lateral
22	M22	1/2 x 6	.5			Lbyy						Lateral
23	M23	1/2 x 6	.5			Lbyy						Lateral
24	M24	3/8x6_HRA	.167			Lbyy						Lateral
25	M25	3/8x6_HRA	.364			Lbyy						Lateral
26	M26	3/8x6_HRA	.167			Lbyy						Lateral
27	M27	3/8x6_HRA	.364			Lbyy						Lateral
28	M28	L2x2x4	4.359			Lbyy						Lateral
29	M29	L2x2x4	4.359			Lbyy						Lateral
30	M30	1/2 x 6	.289			Lbyy						Lateral
31	M31	1/2 x 6	.289			Lbyy						Lateral
32	M32	PIPE 3.0	13.134	3.6	3.6	Lbyy						Lateral
33	M36	PIPE 2.0	5			Lbyy						Lateral
34	M37	HSS4x4x4	5.198			Lbyy						Lateral
35	M38	PIPE 3.0	13.134	3.6	3.6	Lbyy						Lateral
36	M39	PIPE 3.0	13.134	3.6	3.6	Lbyy						Lateral
37	M40	HSS4x4x4	5.167			Lbyy						Lateral
38	M41	HSS4x4x4	5.167			Lbyy						Lateral
39	M42	HSS4x4x4	5.198			Lbyy						Lateral
40	M43	HSS4x4x4	5.198			Lbyy						Lateral
41	M44	LL2.5x2.5x3...	4.95			Lbyy						Lateral
42	M45	PIPE 2.0	13.134			Lbyy						Lateral
43	M47	PIPE 2.0	13.134			Lbyy						Lateral
44	M48	PIPE 2.0	13.134			Lbyy						Lateral
45	M49	L2.5x2.5x3	1.07			Lbyy						Lateral
46	M50	L2.5x2.5x3	1.07			Lbyy						Lateral
47	M51	L2.5x2.5x3	1.07			Lbyy						Lateral
48	M55	PIPE 2.0	5			Lbyy						Lateral
49	M60	PIPE 2.0	7			Lbyy						Lateral
50	M62	LL2.5x2.5x3...	4.95			Lbyy						Lateral
51	M63	LL2.5x2.5x3...	4.95			Lbyy						Lateral
52	M67	PIPE 2.0	5			Lbyy						Lateral
53	M72	PIPE 2.0	5			Lbyy						Lateral
54	M77	PIPE 2.0	5			Lbyy						Lateral
55	M82	PIPE 2.0	7			Lbyy						Lateral
56	M87	PIPE 2.0	5			Lbyy						Lateral
57	M92	PIPE 2.0	5			Lbyy						Lateral
58	M97	PIPE 2.0	5			Lbyy						Lateral
59	M102	PIPE 2.0	7			Lbyy						Lateral
60	M107	PIPE 2.0	5			Lbyy						Lateral

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N11	max	1.623	17	.683	8	4.657	2	.656	32	2.43	23	.396	28
2		min	-1.638	11	-.322	14	-3.368	20	-.269	14	-2.429	5	.012	22
3	N54	max	4.926	6	.801	12	2.246	25	.283	18	.827	25	.273	18
4		min	-3.811	24	-.438	18	-2.882	7	-.299	12	-.831	7	-.77	36
5	N55	max	3.485	16	.812	4	2.794	15	.095	21	1.54	21	.632	4
6		min	-4.585	10	-.45	22	-3.455	9	-.661	27	-1.545	3	-.401	22
7	N60	max	.058	17	2.87	26	.433	20	0	74	0	22	0	4
8		min	-.057	23	-.502	20	-2.746	26	0	1	0	4	0	22
9	N62	max	.513	24	2.894	30	1.385	30	0	5	0	23	0	23
10		min	-2.397	30	-.679	24	-.3	24	0	23	0	5	0	5



Envelope Joint Reactions (Continued)

Joint	X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
11	N63	max	2.398	34	2.896	34	1.386	34	0	23	0	23
12		min	-5.23	16	-6.91	16	-3.06	16	0	41	0	41
13	Totals:	max	7.585	17	9.382	27	6.922	2				
14		min	-7.585	11	1.764	70	-6.922	20				

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

Member	Shape	Code ...	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y...	phi*Mn z...	Cb	Eqn
1	M49	L2.5x2.5x3	.655	1.07	9	.094	0	y	7	27.66	29.192	.873	1.972	1... H2-1
2	M51	L2.5x2.5x3	.652	1.07	5	.092	1.07	y	3	27.66	29.192	.873	1.972	1... H2-1
3	M60	PIPE 2.0	.650	3.063	2	.086	3.063		5	17.855	32.13	1.872	1.872	1... H1-1b
4	M102	PIPE 2.0	.640	3.063	11	.094	3.063		12	17.855	32.13	1.872	1.872	1... H1-1b
5	M82	PIPE 2.0	.616	3.063	5	.092	3.063		9	17.855	32.13	1.872	1.872	1... H1-1b
6	M107	PIPE 2.0	.458	1.042	11	.042	1.042		13	23.809	32.13	1.872	1.872	1... H1-1b
7	M45	PIPE 2.0	.455	8.482	20	.092	12.04		9	5.702	32.13	1.872	1.872	1... H1-1b
8	M50	L2.5x2.5x3	.450	1.07	13	.097	1.07	y	11	27.66	29.192	.873	1.972	1... H2-1
9	M47	PIPE 2.0	.430	8.482	23	.084	1.095		10	5.702	32.13	1.872	1.872	3... H1-1b
10	M48	PIPE 2.0	.423	8.482	5	.101	12.04		6	5.702	32.13	1.872	1.872	3... H1-1b
11	M67	PIPE 2.0	.412	1.042	2	.043	1.042		6	23.809	32.13	1.872	1.872	1... H1-1b
12	M87	PIPE 2.0	.401	1.042	5	.049	1.042		10	23.809	32.13	1.872	1.872	1... H1-1b
13	M92	PIPE 2.0	.387	1.042	6	.059	1.042		6	23.809	32.13	1.872	1.872	1... H1-1b
14	M77	PIPE 2.0	.337	1.042	10	.036	1.042		10	23.809	32.13	1.872	1.872	1... H1-1b
15	M36	PIPE 2.0	.331	1.042	10	.049	1.042		10	23.809	32.13	1.872	1.872	1... H1-1b
16	M72	PIPE 2.0	.324	1.042	3	.049	1.042		3	23.809	32.13	1.872	1.872	1... H1-1b
17	M17	L2x2x4	.306	4.359	5	.012	0	y	35	11.646	28.886	.653	1.489	1... H2-1
18	M28	L2x2x4	.306	4.359	9	.012	0	y	26	11.646	28.886	.653	1.476	1... H2-1
19	M5	3/8x6 HRA	.286	0	5	.516	0	y	6	67.691	68.85	8.606	.538	1... H1-1b
20	M55	PIPE 2.0	.282	1.042	6	.030	1.042		6	23.809	32.13	1.872	1.872	1... H1-1b
21	M18	L2x2x4	.268	0	7	.015	0	z	26	11.646	28.886	.653	1.489	1... H2-1
22	M29	L2x2x4	.258	0	10	.015	0	z	30	11.646	28.886	.653	1.489	2.1 H2-1
23	M97	PIPE 2.0	.250	1.042	2	.027	1.042		2	23.809	32.13	1.872	1.872	1... H1-1b
24	M7	L2x2x4	.244	4.359	13	.012	0	y	30	11.646	28.886	.653	1.489	1... H2-1
25	M8	L2x2x4	.235	0	3	.015	0	z	34	11.646	28.886	.653	1.489	1... H2-1
26	M43	HSS4x4x4	.226	5.198	5	.076	5.198	z	5	94.854	103.122	11.96	11.96	2... H1-1b
27	M6	3/8x6 HRA	.221	0	5	.493	0	y	6	63.5	68.85	8.606	.538	1... H1-1b
28	M24	3/8x6 HRA	.215	0	4	.518	.167	y	6	67.691	68.85	8.606	.538	1... H1-1b
29	M42	HSS4x4x4	.207	5.198	3	.087	1.678	y	45	94.854	103.122	11.96	11.96	1... H1-1b
30	M3	3/8x6 HRA	.198	0	12	.541	0	y	11	67.691	68.85	8.606	.538	1... H1-1b
31	M37	HSS4x4x4	.187	1.733	6	.069	1.733	y	29	94.854	103.122	11.96	11.96	1... H1-1b
32	M22	1/2 x 6	.183	0	10	.343	.5	y	7	84.3	91.8	11.475	.956	1... H1-1b
33	M40	HSS4x4x4	.177	2.583	36	.079	.377	z	3	94.949	103.122	11.96	11.96	1... H1-1b
34	M19	HSS4x4x4	.177	2.583	29	.082	.377	z	11	94.949	103.122	11.96	11.96	1... H1-1b
35	M41	HSS4x4x4	.173	2.583	27	.068	2.583	y	29	94.949	103.122	11.96	11.96	1... H1-1b
36	M26	3/8x6 HRA	.167	0	2	.495	0	y	2	67.691	68.85	8.606	.538	1... H1-1b
37	M2	1/2 x 6	.162	0	3	.386	0	y	5	84.3	91.8	11.475	.956	1... H1-1b
38	M27	3/8x6 HRA	.160	0	2	.472	0	y	2	63.501	68.85	8.606	.538	1... H1-1b
39	M12	1/2 x 6	.144	0	6	.364	.5	y	10	84.3	91.8	11.475	.956	1... H1-1b
40	M4	3/8x6 HRA	.143	0	11	.539	0	y	4	63.5	68.85	8.606	.538	1... H1-1b
41	M1	1/2 x 6	.133	0	13	.408	0	y	11	84.3	91.8	11.475	.956	1... H1-1b
42	M25	3/8x6 HRA	.122	0	4	.510	.364	y	12	63.501	68.85	8.606	.538	1... H1-1b
43	M63	LL2.5x2.5x3x3	.116	2.475	11	.008	4.95	z	6	42.167	58.32	3.954	2.55	1... H1-1b
44	M62	LL2.5x2.5x3x3	.115	2.475	5	.009	4.95	y	5	42.167	58.32	3.954	2.55	1... H1-1b
45	M11	1/2 x 6	.113	0	6	.344	0	y	3	84.3	91.8	11.475	.956	1... H1-1b
46	M32	PIPE 3.0	.107	5.062	6	.093	5.062		3	60.835	65.205	5.749	5.749	2... H1-1b
47	M38	PIPE 3.0	.106	8.482	10	.087	4.652		11	60.835	65.205	5.749	5.749	1 H1-1b
48	M15	3/8x6 HRA	.100	0	13	.525	.167	y	10	67.691	68.85	8.606	.538	1... H1-1b



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

Member	Shape	Code ...	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y...	phi*Mn z...	Cb	Eqn
49	M44	LL2.5x2.5x3x3	.094	4.95	26	.006	0	y	27	42.167	58.32	3.954	2.55	1 H1-1b*
50	M39	PIPE 3.0	.090	5.062	2	.115	5.062		11	60.835	65.205	5.749	5.749	2... H1-1b
51	M23	1/2 x 6	.088	0	11	.361	.5	y	2	84.3	91.8	11.475	.956	1... H1-1b
52	M16	3/8x6 HRA	.060	0	9	.493	0	y	10	63.501	68.85	8.606	.538	1... H1-1b
53	M13	3/8x6 HRA	.056	0	37	.502	.167	y	2	67.691	68.85	8.606	.538	1... H1-1b
54	M31	1/2 x 6	.049	0	12	.430	0	y	8	89.215	91.8	11.475	.956	1... H1-1b
55	M21	1/2 x 6	.046	0	4	.446	0	y	4	89.215	91.8	11.475	.956	1... H1-1b
56	M20	1/2 x 6	.036	0	4	.410	0	y	8	89.215	91.8	11.475	.956	1... H1-1b
57	M10	1/2 x 6	.035	0	5	.452	0	y	12	89.215	91.8	11.475	.956	1... H1-1b
58	M14	3/8x6 HRA	.035	0	13	.492	0	y	8	63.501	68.85	8.606	.538	1... H1-1b
59	M30	1/2 x 6	.033	0	11	.428	0	y	12	89.215	91.8	11.475	.956	1... H1-1b
60	M9	1/2 x 6	.019	0	36	.465	0	y	5	89.215	91.8	11.475	.956	1... H1-1b

Envelope Plate/Shell Principal Stresses

Plate	Surf...Sigma1 [ksi]	LC	Sigma2 [ksi]	LC	Tau Max [ksi]	LC	Angle [rad]	LC	Von Mises [ksi]	LC
No Data to Print ...										