



Crown Castle  
3 Corporate Park Drive, Suite 101  
Clifton Park, NY 12065

December 06, 2018

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

**RE: Notice of Exempt Modification for Verizon Macro: 803843**  
**Verizon Site ID: New Britain 4**  
**200 Stanley St. New Britain, CT 06053**  
**Latitude: 41° 39' 16.40"/ Longitude: 72° 46' 9.59"**

Dear Ms. Bachman:

Verizon currently maintains twelve (12) antennas at the 103-foot level of the existing 192-foot monopole tower at 200 Stanley St. New Britain, CT 06053. The tower is owned by Crown Castle. The property is owned by Downes Investments LLC. Verizon now intends to replace six (6) RRHs, and one (1) hybrid cable.

The Town of New Britain Planning and Zoning Board approved this facility on June 7<sup>th</sup> 2001. This approval was given without conditions.

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.S.C.A. § 16-50j-73, a copy of this letter is being sent to mayor Erin E. Steward, Town of New Britain, Scott Wadowski, Zoning Officer, Town of New Britain, as well as the property owner, and Crown Castle is the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modification 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 Communication Commission safety standard.

**The Foundation for a Wireless World.**

CrownCastle.com

Melanie A. Bachman

September 21, 2018

Page 2

5. The proposed modifications 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, Verizon respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Jeffrey Barbadora.

Sincerely,

Jeffrey Barbadora  
Real Estate Specialist  
12 Gill Street, Suite 5800, Woburn, MA 01801  
781-729-0053  
[Jeff.Barbadora@crowncastle.com](mailto:Jeff.Barbadora@crowncastle.com)

Attachments:

- Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
- Tab 2: Exhibit-2: Structural Modification Report
- Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc: The Honorable Erin E. Steward  
27 West Main St.  
New Britain, CT 06051

Scott Wadowski: Building Official  
27 West Main Street  
New Britain, CT 06051

Downes Investments  
PO Box 1508  
New Britain, CT  
06050-1508



## 200 STANLEY ST

**Location** 200 STANLEY ST

**Mblu** B10B/ 11/ / /

**Acct#** 81300200

**Owner** DOWNES INVESTMENTS LLC

**Assessment** \$556,500

**Appraisal** \$795,000

**PID** 1486

**Building Count** 1

### Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2017	\$626,600	\$168,400	\$795,000
Assessment			
Valuation Year	Improvements	Land	Total
2017	\$438,620	\$117,880	\$556,500

### Owner of Record

**Owner** DOWNES INVESTMENTS LLC  
**Co-Owner**  
**Address** PO BOX 1508  
 NEW BRITAIN, CT 06050-1508

**Sale Price** \$327,818  
**Certificate** 1  
**Book & Page** 1827/ 193  
**Sale Date** 10/17/2011  
**Instrument** 19

### Ownership History

Ownership History					
Owner	Sale Price	Certificate	Book & Page	Instrument	Sale Date
DOWNES INVESTMENTS LLC	\$327,818	1	1827/ 193	19	10/17/2011
DOWNES INVESTMENTS LLC	\$0		1386/ 135		10/16/2001
DOWNES INVESTMENTS LLC	\$0		1351/ 908		11/03/2000
JOHN E DOWNES TRUSTEE	\$0		1104/ 267		07/03/1991
DOWNES JOHN E	\$0		1105/ 413		06/24/1991

### Building Information

#### Building 1 : Section 1

**Year Built:** 1954  
**Living Area:** 11,912  
**Replacement Cost:** \$1,230,749  
**Building Percent** 44  
**Good:**  
**Replacement Cost**  
**Less Depreciation:** \$541,500

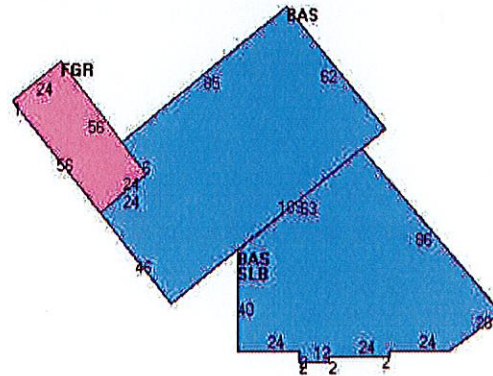
#### Building Photo

Building Attributes	
Field	Description
STYLE	Office
MODEL	Comm/Ind
Grade	C
Stories:	1
Occupancy	1
Exterior Wall 1	Block/Concrete
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	T&G/Rubber
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	
Central Heat	Yes
AC Type	Central
Bldg Use	Office Bld MDL-94
Apt Units	
Total Bedrms	00
Total Baths	0
Comm Units	1
Ind Units	
1st Floor Use:	3400
Heat/AC	Heat/AC Pkgs
Frame Type	Masonry
Baths/Plumbing	Average
Ceiling/Wall	Sus-Ceil & WL
Rooms/Prtns	Average
Wall Height	12
% Corn Wall	



(<http://images.vgsi.com/photos/NewBritainCTPhotos/\00\02\11\63.JPG>)

**Building Layout**



Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	11,912	11,912
FGR	Garage	1,371	0
SLB	Slab	0	0
		13,283	11,912

**Extra Features**

Extra Features	Legend
No Data for Extra Features	

**Land**

**Land Use**

<b>Use Code</b>	3400
<b>Description</b>	Office Bld MDL-94
<b>Zone</b>	I2
<b>Neighborhood</b>	107H

**Land Line Valuation**

<b>Size (Acres)</b>	2.18
<b>Depth</b>	
<b>Assessed Value</b>	\$117,880
<b>Appraised Value</b>	\$168,400

Alt Land Appr No  
 Category

**Outbuildings**

Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
FN1	Fence - Chain			2520 L.F.	\$18,000	1
PAV1	Paving Asphalt			10000 S.F.	\$9,600	1
CB3	PreCastConcCel			240 S.F.	\$55,400	1
FN4	Fence-8' Chain			168 L.F.	\$2,100	1

**Valuation History**

Appraisal			
Valuation Year	Improvements	Land	Total
2017	\$626,600	\$168,400	\$795,000
2016	\$645,500	\$165,400	\$810,900
2015	\$645,500	\$165,400	\$810,900

Assessment			
Valuation Year	Improvements	Land	Total
2017	\$438,620	\$117,880	\$556,500
2016	\$451,850	\$115,780	\$567,630
2015	\$451,850	\$115,780	\$567,630

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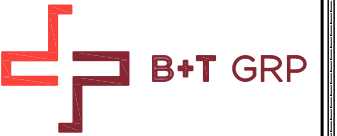
200 Stanley Street

Stanley Street Auto Body

Chinese Kitchen

Everything 2  
Wheels LLC (E2W)

Google



verizon

400 FRIBERG PARKWAY  
WESTBOROUGH, MA 01581  
PH: (508) 330-3300

NEW BRITAIN 4 CT

200 STANLEY ST  
NEW BRITAIN, CT 06051  
EXISTING MONOPOLE

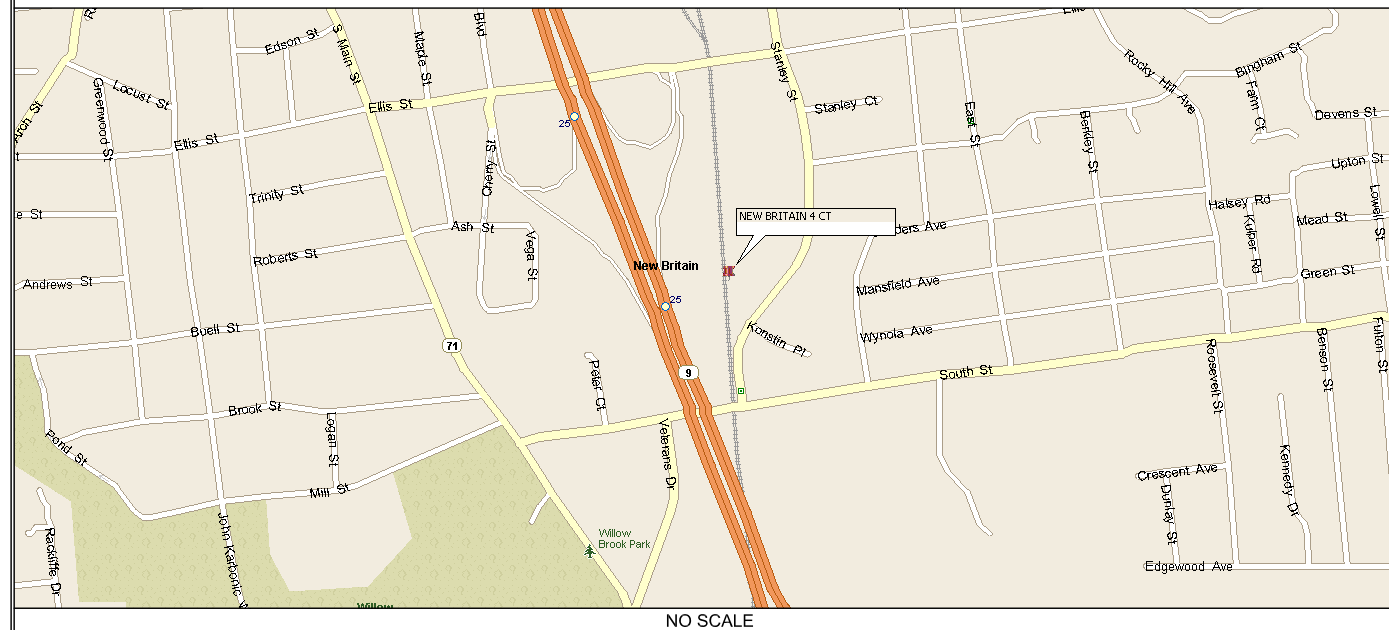
# verizon

## NEW BRITAIN 4 CT 200 STANLEY ST NEW BRITAIN, CT 06051

### PROJECT SUMMARY

SITE NAME: NEW BRITAIN 4 CT  
 SITE ADDRESS: 200 STANLEY ST  
 NEW BRITAIN, CT 06051  
 TOWER OWNER: CROWN CASTLE  
 2000 CORPORATE DR  
 CANONSBURG, PA 15317  
 803843  
 BU NUMBER:  
 MAP NUMBER: B10B  
 LOT NUMBER: 11  
 CUSTOMER/APPLICANT: VERIZON WIRELESS  
 20 ALEXANDER DRIVE, 2ND FLOOR  
 WALLINGFORD, CT 06492  
 CONTACT: JIM O'DONNELL  
 (617) 945-7288  
 NAD83  
 LATITUDE: 41° 39' 16.40" N  
 LONGITUDE: 72° 46' 9.59" W  
 ELEVATION: 111'  
 CURRENT ZONING: I2: LIGHT INDUSTRIAL  
 A&E FIRM: B+T GROUP  
 1717 S. BOULDER, SUITE 300  
 TULSA, OK 74119  
 STEVE THORNHILL  
 (918) 587-4630  
 OCCUPANCY TYPE: UNMANNED  
 A.D.A. COMPLIANCE: FACILITY IS UNMANNED AND NOT  
 FOR HUMAN HABITATION.

### LOCATION MAP



### DRIVING DIRECTIONS

DEPART FROM BRADLEY INTERNATIONAL AIRPORT: HEAD NORTHWEST ON SCHOEPHOESTER RD TOWARD AIRPORT SERVICE RD. CONTINUE ONTO BRADLEY INTERNATIONAL AIRPORT CON. CONTINUE ONTO CT-20 E/BRADLEY INTERNATIONAL AIRPORT CON. TAKE THE EXIT ONTO I-91 S TOWARD HARTFORD. TAKE EXIT 32A-32B FOR I-84 W TOWARD WATERBURY. MERGE ONTO I-84. KEEP LEFT TO STAY ON I-84. TAKE EXIT 39A FOR CT-9 S TOWARD NEWINGTON/NEW BRITAIN. CONTINUE ONTO CT-9 S. TAKE EXIT 25 FOR ELLIS ST TOWARD CT-71/KENSINGTON. TURN RIGHT ONTO ELLIS ST. TURN RIGHT ONTO STANLEY ST. DESTINATION WILL BE ON THE RIGHT. ARRIVE AT NEW BRITAIN 4 CT.

### DRAWING INDEX

SHEET #	SHEET DESCRIPTION	REV. #
T-1	TITLE SHEET	0
A-1	COMPOUND PLAN AND TOWER ELEVATION	0
A-2	EQUIPMENT DETAILS	0
A-3	EQUIPMENT DETAILS	0

### A/E DOCUMENT REVIEW STATUS

TITLE	SIGNATURE	DATE
OWNER:		
R.F. ENGINEER:		
CONSTRUCTION MGR.:		
LEASING & ZONING:		
VERIZON WIRELESS:		

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR MODIFICATIONS.

### DO NOT SCALE DRAWINGS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11x17. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.



CALL CONNECTICUT ONE CALL  
(800) 922-4455  
CALL 3 WORKING DAYS  
BEFORE YOU DIG!

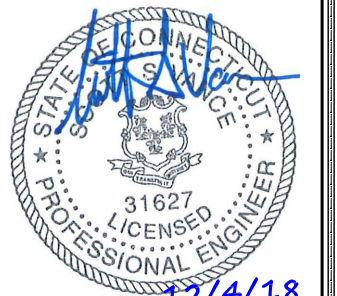


PROJECT NO: 127879.001.01  
 CHECKED BY: RPS

### ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
A	8/23/18	RMC	PRELIMINARY REVIEW
B	11/5/18	JDP	ANTENNA LAYOUT
C	11/16/18	JJD	CLIENT REDLINES
0	12/4/18	MLC	CONSTRUCTION

B&T ENGINEERING, INC.  
 PEC.0001564  
 Expires 2/10/19



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: T-1  
 REVISION: 0



# NEW BRITAIN 4 CT

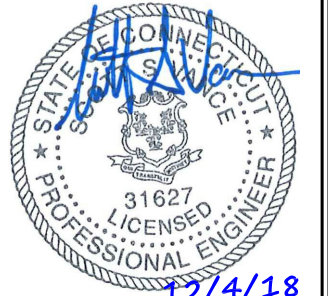
200 STANLEY ST  
NEW BRITAIN, CT 06051  
EXISTING MONOPOLE

PROJECT NO: 127879.001.01  
CHECKED BY: RPS

ISSUED FOR:

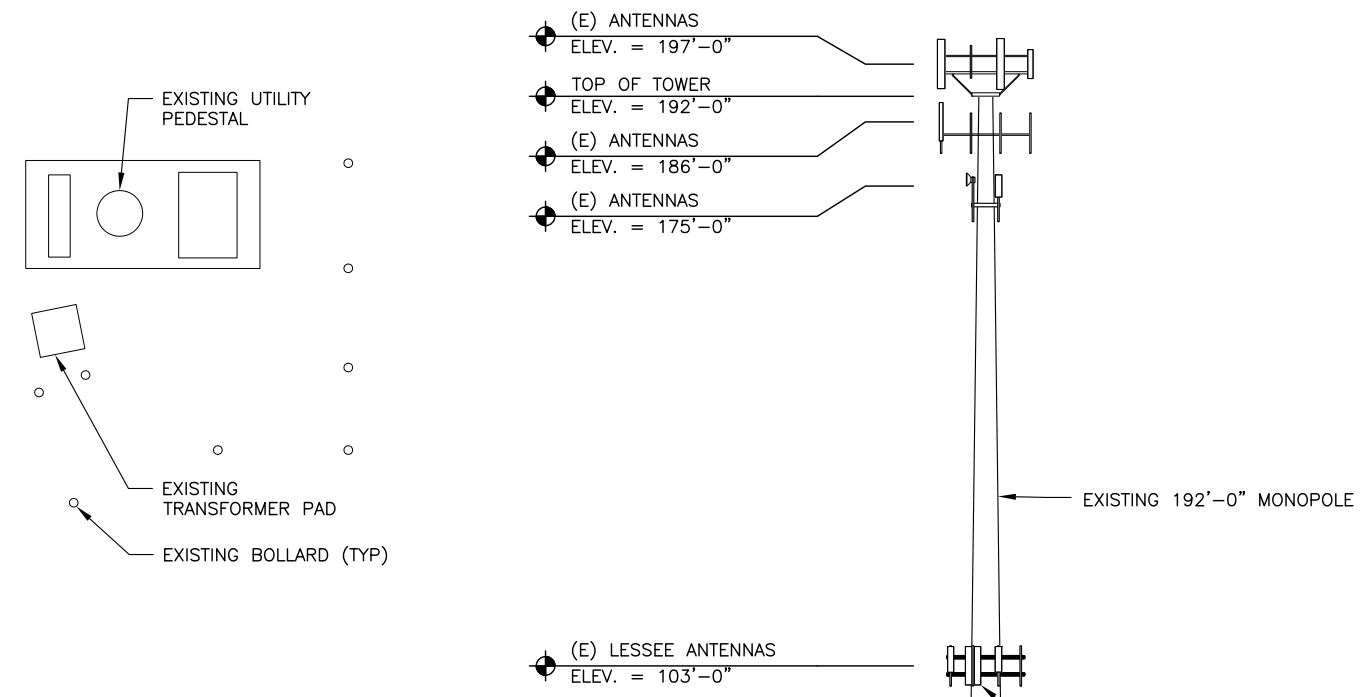
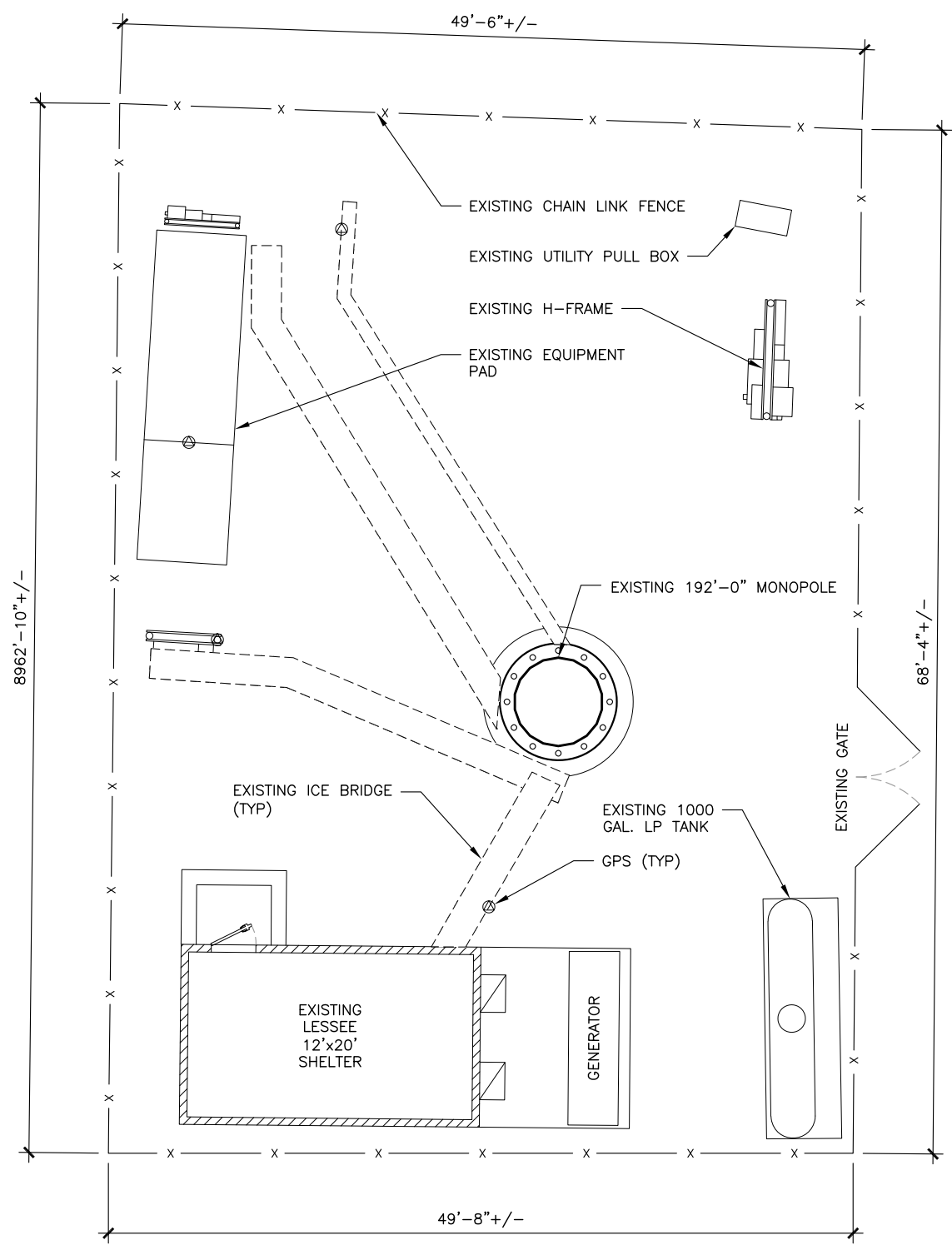
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SHEET NUMBER: **A-1** REVISION: **0**



- NOTES:
- CONTRACTOR TO VERIFY EXACT COAX AND ANTENNA INSTALLATION AND ANTENNA HEIGHT WITH LATEST RF DATA SHEETS PRIOR TO INSTALLATION.
  - STRUCTURAL ANALYSIS DONE BY OTHERS.
  - VERIZON SHALL PROVIDE A STRUCTURAL ANALYSIS OF THE TOWER PREPARED BY A LICENSED STATE STRUCTURAL ENGINEER CERTIFYING THAT THE EXISTING TOWER AND PROPOSED IMPROVEMENTS HAVE SUFFICIENT CAPACITY TO SUPPORT ALL NEW WORK THAT WILL BE DONE IN COMPLIANCE WITH THE CURRENT EDITION OF BUILDING CODES AND EIA/TIA CRITERIA. THE CONTRACTOR IS RESPONSIBLE TO CONFIRM THAT ANY AND ALL IMPROVEMENTS REQUIRED BY THE STRUCTURAL ANALYSIS CERTIFICATION ARE PROPERLY INSTALLED PRIOR TO THE ADDITION OF ANTENNAS, SUPPORTS AND APPURTENANCES PROPOSED ON THESE DRAWING OTHERWISE NOTED IN THE STRUCTURAL ANALYSIS.CAP AND WEATHERPROFF UNUSED ANTENNA PORTS.
  - ESTIMATED HYBRIFLEX CABLE LENGTH: 133' (EACH RUN)

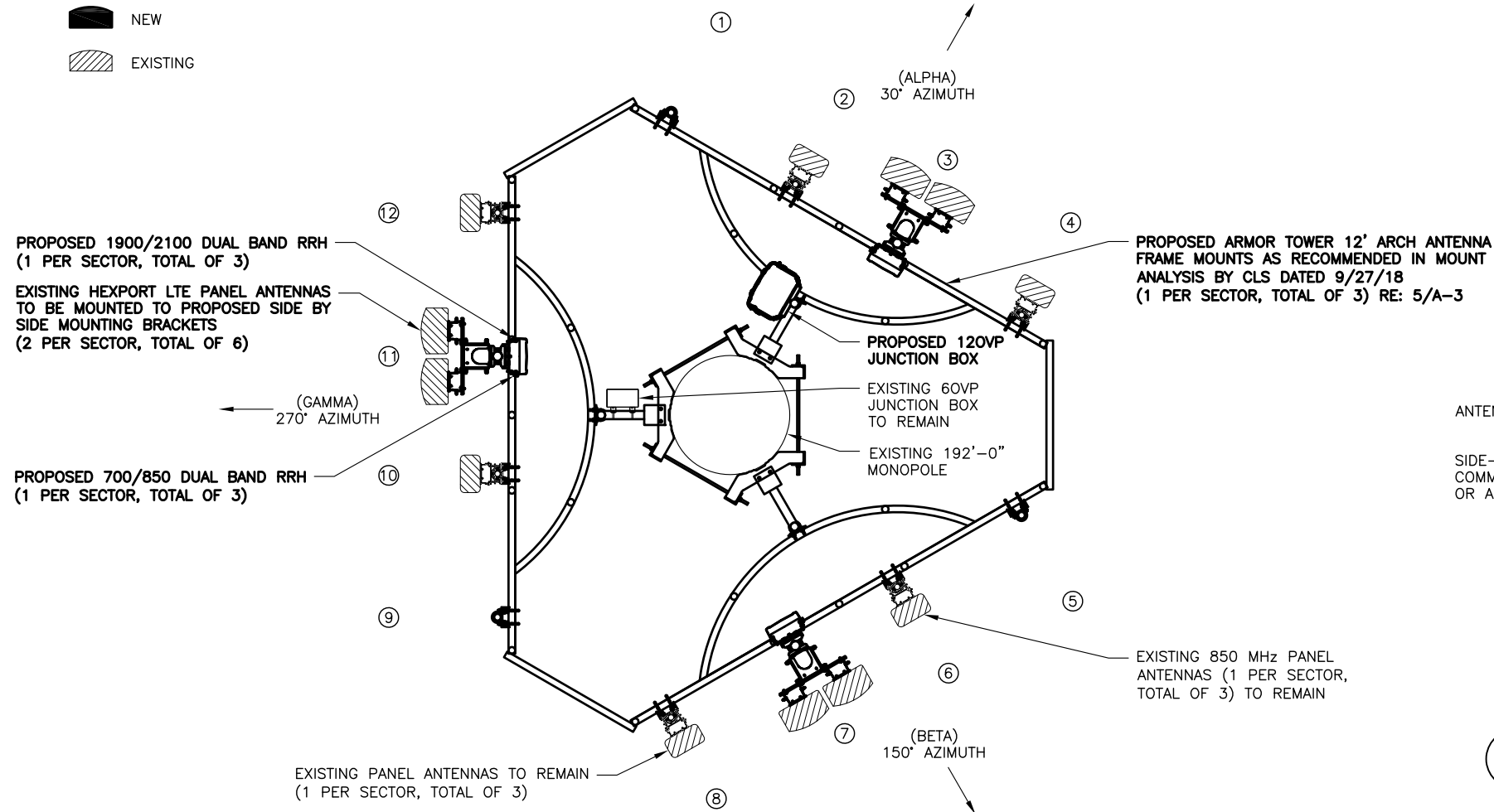
**1** COMPOUND PLAN  
SCALE: 0' 8' 16' 32' 48'



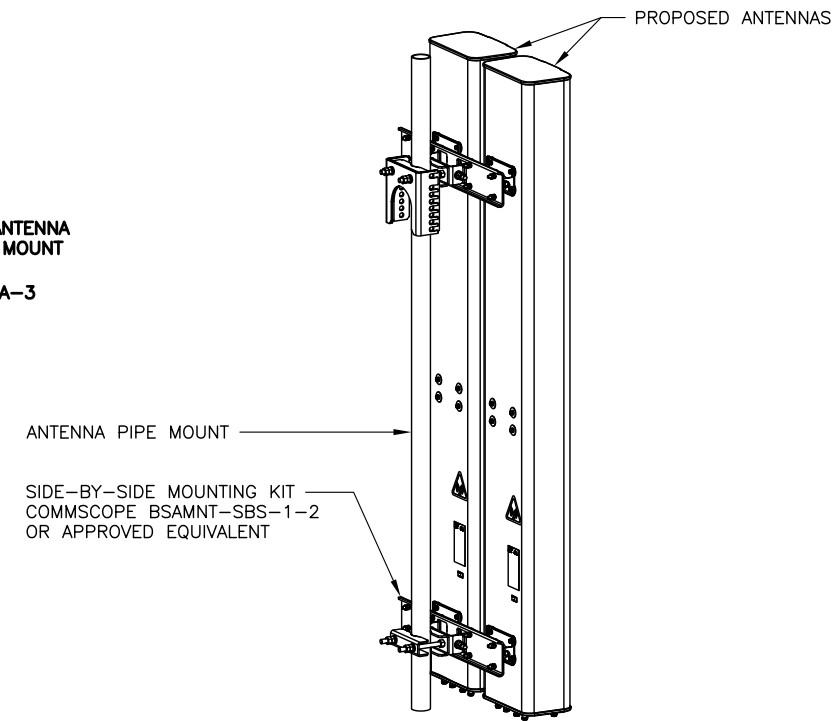
**2** FINAL TOWER ELEVATION  
SCALE: 0' 15' 30' 45' 60' 1"=30'

**LEGEND:**

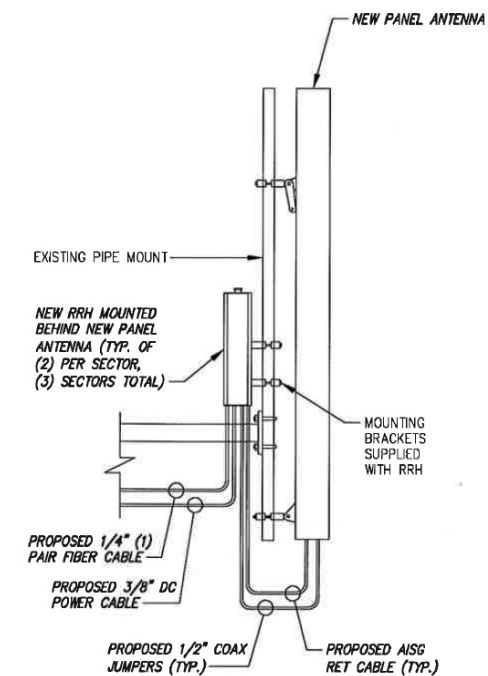
-  NEW
-  EXISTING



**1 FINAL ANTENNA ORIENTATION**  
SCALE: 0' 1' 2' 4' 10'



**2 ANTENNA MOUNTING DETAIL**  
SCALE: N.T.S.



**1 ANTENNA MOUNTING DETAIL**  
SCALE: N.T.S.



**verizon**

400 FRIBERG PARKWAY  
WESTBOROUGH, MA 01581  
PH: (508) 330-3300

**NEW BRITAIN 4 CT**

200 STANLEY ST  
NEW BRITAIN, CT 06051  
EXISTING MONOPOLE

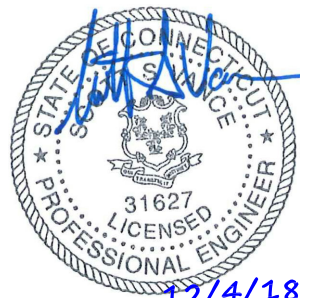
PROJECT NO: 127879.001.01

CHECKED BY: RPS

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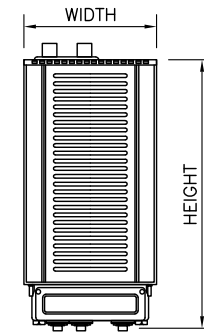
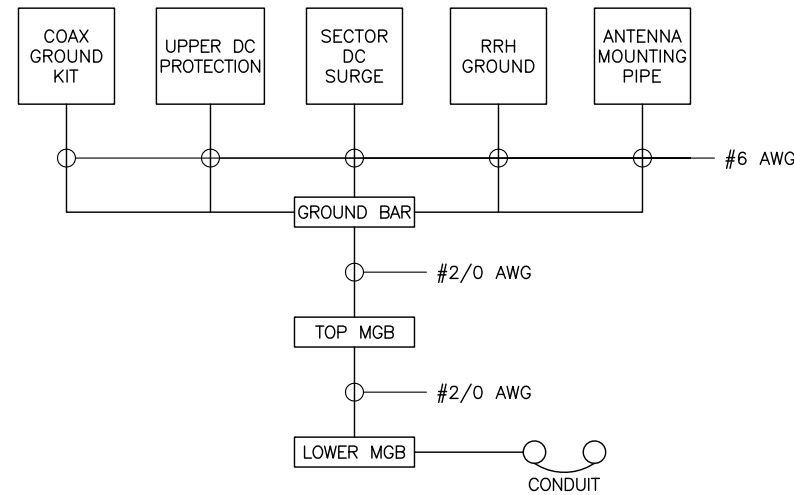
SHEET NUMBER: REVISION:

**A-2** **0**

NOT  
AVAILABLE  
AT TIME  
OF ISSUE

- NOTE:
1. INSTALL ALL EQUIPMENT, MOUNTING BRACKETS AND HARDWARE ACCORDING WITH MANUFACTURE'S RECOMMENDATIONS.
  2. GROUND DISTRIBUTION BOXES, MOUNTING PIPES AND RRHs IN ACCORDANCE WITH MANUFACTURE'S RECOMMENDATIONS.
  3. INSTALLED EQUIPMENT AND MOUNTING BRACKETS SHALL NOT INTERFERE WITH CLIMBING ACCESS NOR ANT INSTALLED SAFETY DEVICES.
  4. EQUIPMENT TO BE INSTALLED AT VERIZON'S RAD. CENTER IN ACCORDANCE WITH TOWER STRUCTURAL ANALYSIS (ANALYSIS BY OTHERS).

REMOTE RADIO HEAD DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
RFV01U-D1A	15"	15"	10"	84.4 LBS
RFV01U-D2A	15"	15"	8.10"	70.3 LBS



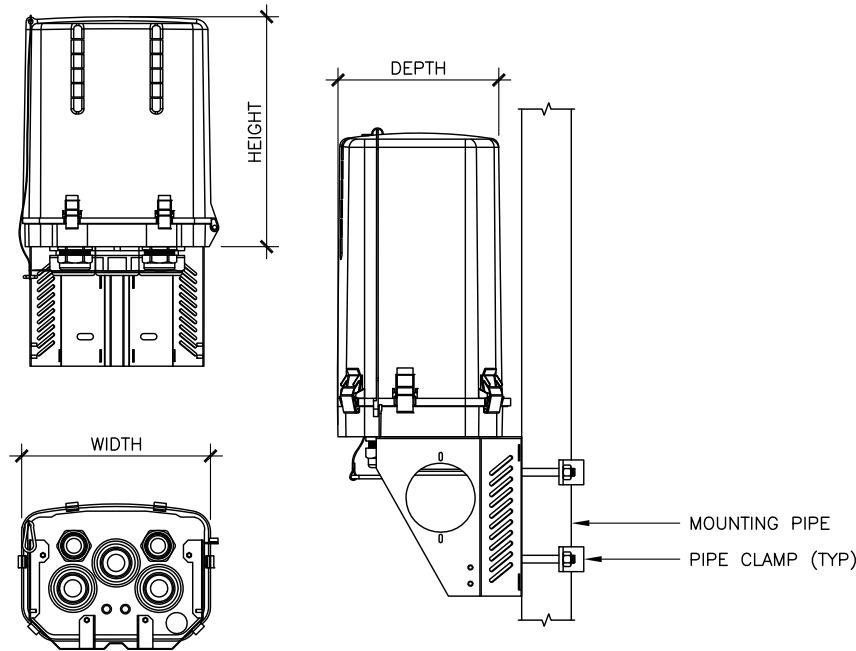
- NOTE:
1. BOND ANTENNA GROUNDING KIT CABLES TO TOP CIBE.
  2. BOND ANTENNA GROUNDING KIT CABLE TO BOTTOM CIBE.
  3. TYPICAL FOR ALL SECTORS.

**1** ANTENNA SYSTEM LAYOUT  
SCALE: N.T.S.

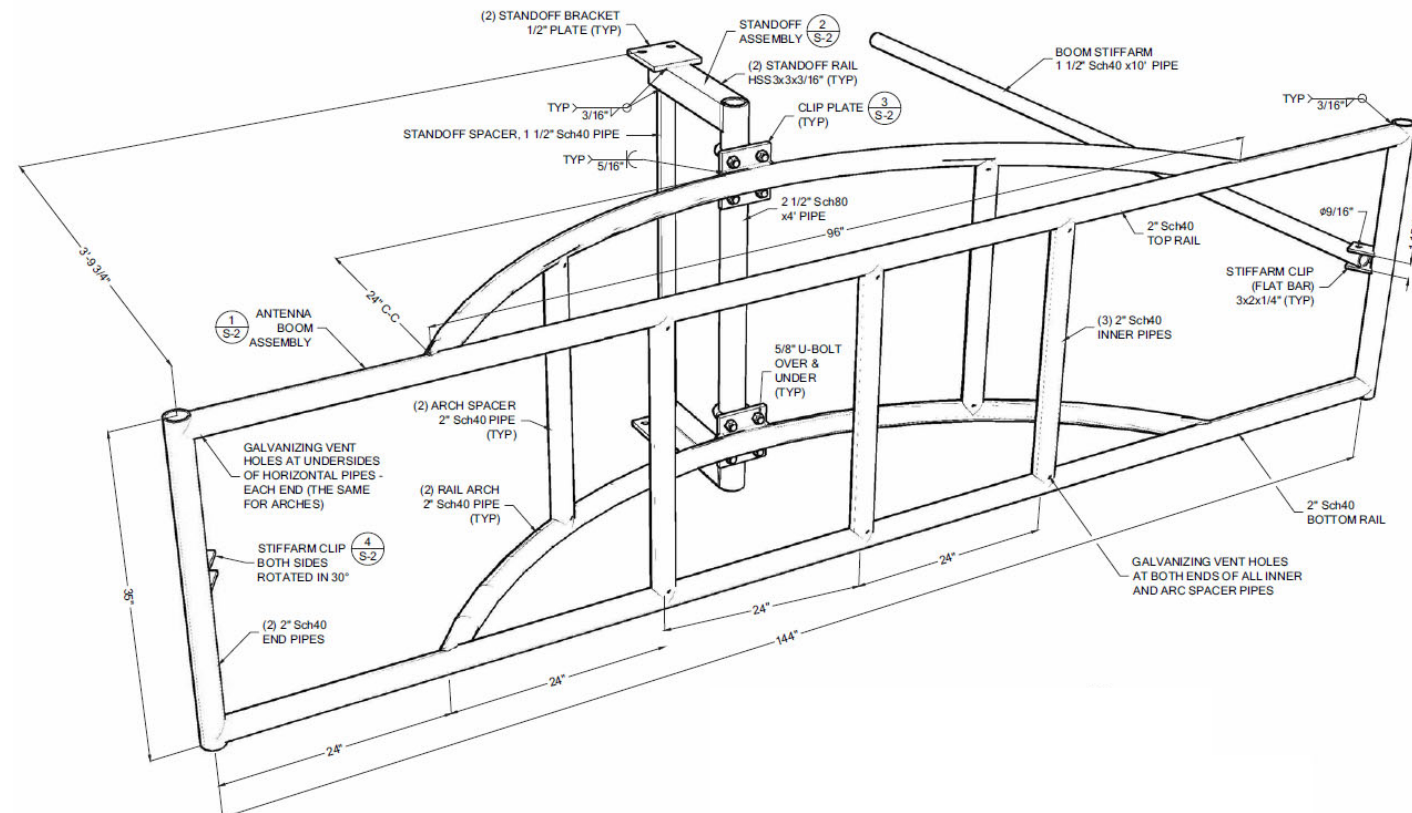
**2** GROUNDING SCHEMATIC DIAGRAM  
SCALE: N.T.S.

**3** RRH SPECIFICATIONS  
SCALE: N.T.S.

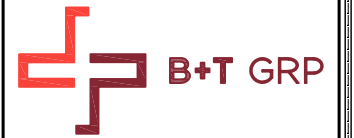
DC SURGE SUPPRESSION DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
RVZDC-6627-PF-48	28.93"	15.73"	10.31"	32 LBS



**4** RAYCAP SPECIFICATIONS  
SCALE: N.T.S.



**5** SECTOR MOUNT DETAIL  
SCALE: N.T.S.



400 FRIBERG PARKWAY  
WESTBOROUGH, MA 01581  
PH: (508) 330-3300

NEW BRITAIN 4 CT

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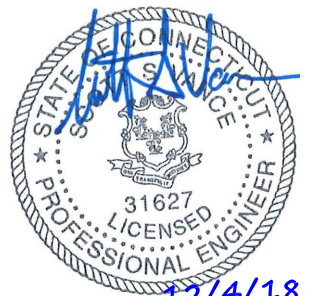
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SHEET NUMBER: REVISION:

A-3 0

**WIRELESS PLANNING SERVICES, LLC**  
 PLANNING & ZONING SERVICES FOR THE WIRELESS INDUSTRY  
 306 East Main Street, Suite 202, Lakeland, FL 33801  
 PHONE 863-838-9686  
 E-MAIL jim@wiley-malless.com

Site Name / #:	CT New Britain 4 CAC 803843	
Site Address:	200 Stanley Street, New Britain, CT 06053	Structure Type: Term Easement
Jurisdiction:	New Britain, CT	Website Address: www.new-britain.net
Contact Person/Title:	Steve Schiller, Dept of Municipal Development	Phone No.: 860-826-3432

Is the Zoning Code available online?  Yes  No

Notes from Contact: 7/21/08 No Issues. The city does not regulate lease extensions or easement agreements between private parties. **Address revision. Tower received approval with site plan review, received by WPS. Per Mr. Schiller, there is no specific zoning in their ordinance that regulates telecommunication towers. This tower is zoned I-2 and is permitted. Co-locations require site plan review if "footprint" of site is changed. Dave Zajac in Building Department states there is an annual inspection and fee of \$100 (initiated by city) that is not current, however this is because the city has not enforced it and no towers have been inspected - City Code, Section 7-14 (E).**

**DOCUMENTS PROVIDED BY CLIENT**

<input type="checkbox"/> Zoning Approval	<input type="checkbox"/> Planning Commission Meeting Minutes
<input type="checkbox"/> Zoning Ordinance	<input type="checkbox"/> Board of Adjustment Meeting Minutes
<input checked="" type="checkbox"/> Other:	<input type="checkbox"/> Other Minutes

Specify:  Specify:

**ANALYSIS OF TOWER ZONING APPROVAL**

Date tower received zoning approval:

Date current tower zoning ordinance adopted:

Did the tower receive zoning approval under the current or a previous zoning code?  Current  Previous

Current status of tower:

Conforming Use  Legal Non-Conforming Use

Illegal Non-Conforming Use

Does the zoning approval expire?  Yes  No

Was the tower approved consistent with the zoning code in place at the time of approval?

Yes

No

Are there any non-compliance or notice of violations (NOVs) pending against this site?

Yes

No

If yes, explain:

Are there any annual reports, renewals, updates or other filings required for this site? **Annual inspection**

Yes

No

If yes, are all filings current as of the date of this report?


Yes

No

---

**CERTIFICATION**

This report was prepared for and may be relied upon by Morgan Stanley, Crown Castle International, Global Signal Inc., Pinnacle Towers, LCC, their respective Subsidiaries, and their respective successors and assigns. Any rating agency or issuer or purchaser of any security collateralized or otherwise backed by the property or any loans placed upon the property may further rely upon the report. We also consent to the inclusion of this report in any form, whether in paper or digital format, including any electronic media such as CD-ROM or the internet, in the Prospectus Supplement relating to any Pinnacle securitization, and we consent to the reference to our firm under the caption "Experts" in such Prospectus Supplement.

  
Wireless Planning Services, LLC BY James B. Malless, AICP  
Signature/Date

CT New Britain 803843

Date: 10/12/01

A request has been made for a Certificate of Occupancy :

**Project Location:** 200 STANLEY STREET (TOWER/PLATFORM)

The final inspection by the Building Department is scheduled on 10/17/01 at 10:00  
Please adjust your inspections accordingly.

Any comments regarding corrections please forward directly to the applicant.

**Applicant:** CROWN CASTLE INTERNATIONAL, LLC **Tel:** 1 860 558-3178

**Applicant address:** 703 HEBRON AVENUE, GLASTONBURY, CT

Prompt return of this form with your recommendation is greatly appreciated.  
Thank you for your attention and consideration in this matter.

Recommended

CO TCO Denied

<input type="checkbox"/>	James Delidonna	Acting Fire Marshal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Joseph F. Carilli	Director of Public Works (PW)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Kenneth A. Malinowski	Director of Department of Municipal Development (SS)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Hudson Hurdus, Jr.	Director of Health Department	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





TO: Frank M. Wiatt, Director, IPEI  
FROM: Clarence Corbin, City Engineer *Clarence*  
DATE: 7 Jun 01  
RE: Site Plan Review - 200 Stanley Street - Tower

This site plan is approved as submitted.

cc: S. Schiller



Date: **October 04, 2018**

Alicia Hansbrough  
Crown Castle  
8000 Avalon Blvd Suite 700  
Alpharetta, GA 30009



Crown Castle  
2000 Corporate Drive  
Canonsburg, PA 15317  
(724) 416-2000

**Subject:**

**Structural Analysis Report**

**Carrier Designation:**

**Verizon Wireless Co-Locate**

**Carrier Site Number:**

33591

**Carrier Site Name:**

New Britain 4 CT

**Crown Castle Designation:**

**Crown Castle BU Number:**

803843

**Crown Castle Site Name:**

CT NEW BRITAIN 4 CAC 803843

**Crown Castle JDE Job Number:**

518914

**Crown Castle Work Order Number:**

1606097

**Crown Castle Order Number:**

450302 Rev. 0

**Engineering Firm Designation:**

**Crown Castle Project Number:**

1606097

**Site Data:**

**200 Stanley Street, New Britain, Hartford County, CT**

**Latitude 41° 39' 16.4", Longitude -72° 46' 9.59"**

**192 Foot - Monopole Tower**

Dear Alicia Hansbrough,

Crown Castle is pleased to submit this "**Structural Analysis Report**" to determine the structural integrity of the above mentioned tower.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Proposed Equipment Configuration

**Sufficient Capacity**

The analysis has been performed in accordance with the TIA-222-H Standard. This analysis utilizes an ultimate 3-second gust wind speed of 125 mph as required by 2016 Connecticut State Building Code. Exposure Category B and Risk Category II were used in this analysis.

Structural analysis prepared by: Luis Zarate/ KB

Respectfully submitted by:

Terry P. Styran, P.E.  
Senior Project Engineer



10/5/2018

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## 1) INTRODUCTION

This tower is a 192 ft Monopole tower designed by Summit Manufacture, LLC.

## 2) ANALYSIS CRITERIA

<b>Building Code:</b>	2016 Connecticut State Building Code
<b>TIA-222 Revision:</b>	TIA-222-H
<b>Risk Category:</b>	II
<b>Wind Speed:</b>	125 mph
<b>Exposure Category:</b>	B
<b>Topographic Factor:</b>	1
<b>Ice Thickness:</b>	2 in
<b>Wind Speed with Ice:</b>	50 mph
<b>Service Wind Speed:</b>	60 mph

**Table 1 - Proposed Equipment Configuration**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
103.0	104.0	3	antel	BXA-70063-6CF-EDIN-6	7 1	1-5/8 1-14
		2	antel	BXA-80080/4CF		
		1	antel	BXA-80090/4CF		
	103.0	6	andrew	SBNHH-1D65B		
		3	samsung telecommunications	RFV01U-D1A		
		3	samsung telecommunications	RFV01U-D2A		
		1	raycap	RVZDC-6627-PF-48		
		3	Site pro	P272 BRACING PIPES		
		12	Site pro	P2120 MOUNT PIPES		
		3	armor tower	12' ARCH ANTENNA FRAME MOUNT		
100.0	1	raycap	RRFDC-3315-PF-48			

**Table 2 – Other Considered Equipment**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
197.0	197.0	1	tower mounts	Miscellaneous [NA 509-3]	8 6 4 2	3/4 1-5/8 Conduit 3/8
		1	tower mounts	Miscellaneous [NA 510-1]		
		1	tower mounts	Platform Mount [LP 1201-1]		
	195.0	6	kathrein	860 10025		
		3	cci antennas	OPA-65R-LCUU-H8 w/ Mount Pipe		
		3	ericsson	RRUS 12		
		3	ericsson	RRUS 32		
		3	ericsson	RRUS 32 B2		
		3	ericsson	RRUS 32 B66		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		3	ericsson	RRUS 4478 B14		
		3	ericsson	RRUS E2 B29		
		3	kathrein	800 10121 w/ Mount Pipe		
		2	kathrein	80010966 w/ Mount Pipe		
		2	raycap	DC6-48-60-0-8F		
		2	cci antennas	TPA-65R-LCUUUU-H8 w/ Mount Pipe		
		1	kathrein	80010965 w/ Mount Pipe		
		1	quintel technology	QS66512-2 w/ Mount Pipe		
		1	ericsson	RRUS-11		
		1	raycap	DC6-48-60-18-8F		
	193.0	2	ericsson	RRUS-11		
		6	powerwave technologies	LGP21401		
		1	raycap	DC6-48-60-18-8F		
186.0	188.0	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	6	1-5/8
	186.0	1	tower mounts	Platform Mount [LP 1201-1]		
175.0	179.0	2	dragonwave	HORIZON COMPACT	3 3 2 1	1-5/8 5/8 Conduit 5/16
	175.0	6	alcatel lucent	800MHZ 2X50W RRH		
		3	alcatel lucent	PCS 1900MHZ 4X45W-65MHZ		
		3	commscope	NNVV-65B-R4 w/ Mount Pipe		
		3	nokia	AAHC w/ Mount Pipe		
		2	andrew	VHLP2-23		
		1	andrew	PX2F-52		
		1	motorola	TIMING 2000		
1	tower mounts	Side Arm Mount [SO 101-3]				
161.0	164.0	1	sigfox	CXL 900-3LW	1	1/2
	161.0	1	sigfox	CAVITY FILTER		
		1	sigfox	LNA		
		1	tower mounts	Side Arm Mount [SO 306-1]		

### 3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, P.E., P.C.	2384583	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Summit	1118798	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Summit	925033	CCISITES

### 3.1) Analysis Method

tnxTower (version 8.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

### 3.2) Assumptions

- 1) Tower and structures were built and maintained in accordance with the manufacturer's specifications
- 2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

## 4) ANALYSIS RESULTS

**Table 4 - Section Capacity (Summary)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	192 - 151.25	Pole	TP39.245x26x0.3125	1	-16.4028	2710.6379	29.1	Pass
L2	151.25 - 111.25	Pole	TP51.621x36.9948x0.4375	2	-28.3911	5087.7223	28.1	Pass
L3	111.25 - 72.75	Pole	TP63.259x48.6333x0.5	3	-47.8919	6976.0842	29.4	Pass
L4	72.75 - 35.75	Pole	TP74.285x59.6589x0.5625	4	-70.1930	9091.9811	29.0	Pass
L5	35.75 - 0	Pole	TP84.78x70.1535x0.5625	5	-103.1430	10121.8840	32.7	Pass
							Summary	
						Pole (L5)	32.7	Pass
						Rating =	32.7	Pass

**Table 5 - Tower Component Stresses vs. Capacity – LC7**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	48.4	Pass
1	Base Plate	0	36.1	Pass
1,2	Drilled Pier Base Foundation (Structural)	0	38.0	Pass
1,2	Drilled Pier Base Foundation (Soil Interaction)	0	39.3	Pass
1,2	Pier and Pad Base Foundation (Structural)	0	28.5	Pass
1,2	Pier and Pad Base Foundation (Soil Interaction)	0	45.6	Pass

<b>Structure Rating (max from all components) =</b>	<b>48.4%</b>
---	--------------

Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) It is unknown whether the foundation is a drilled shaft or pier and pad. Both designs were analyzed and determined to be sufficient.



#### **4.1) Recommendations**

The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

## Mount Analysis of Proposed 12' Arch Antenna Frames for Crown Castle BU #803843 - CT NEW BRITAIN 4 CAC 803843

CLS Engineering PLLC Project #42284-33591-01-MR  
September 27, 2018

PROPOSED CARRIER	Verizon
CARRIER SITE	33591 - New Britain 4 CT
CCI ORDER #	450302 Rev. 0
MOUNT DESCRIPTION	Proposed 12' Arch Antenna Frames at 103 ft AGL
ANTENNA ELEVATION	Nominal Rad. Elevation of 104 ft AGL (Eccentricity of -1 ft)
SITE DESCRIPTION	192 ft Monopole
SITE ADDRESS	200 Stanley Street, New Britain, CT 06053, Hartford County
GPS COORDINATES	41.654556, -72.769331
ANALYSIS STANDARD	2012 IBC / 2016 Connecticut State Building Code / TIA-222-H
LOADING CRITERIA	125 mph, $V_{ult}$ (3-Second Gust) w/o ice & 50 mph (3-Second Gust) w/ 1.5" Ice

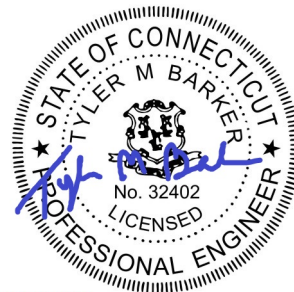
■ ANALYSIS RESULT: Pass (Replacement)

MEMBER USAGE	47%	Pass
CONNECTION USAGE	34%	Pass

Existing mounts to be replaced; see conclusion for details.

Prepared by:  
Sajeeb Thakur, E.I.

Reviewed and Approved by:  
Tyler M. Barker, P.E.



Tyler M. Barker  
CLS Engineering, PLLC  
Director of Engineering  
PE # 32402 Exp. 11/31/2019  
COA # PEC.001833 Exp. 8/14/2019

■ INTRODUCTION

The proposed equipment is to be mounted to the proposed 12' Arch Antenna Frames. This proposed mounting configuration was analyzed using RISA-3D, a commercially available finite element analysis software package. A selection of input and output from our analysis is attached to the end of this report.

■ STRUCTURAL DOCUMENTS PROVIDED

STRUCTURAL DATA	Mount Assembly drawings by Armor Tower, File Name#14078, dated May 07, 2014 Site Photos, dated March 31, 2018
PREVIOUS ANALYSES	Tower SA by Crown Castle, Project #1397541, dated April 26, 2017
LOADING DATA	Crown Order #450302, Rev. 0, dated July 05, 2018

■ ANALYSIS CRITERIA

STANDARD	2012 IBC / 2016 Connecticut State Building Code / TIA-222-H
BASIC WIND SPEED	125 mph, $V_{ult}$ (3-Second Gust)
BASIC WIND SPEED W/ ICE	50 mph (3-Second Gust) w/ 1.5" Radial Ice (Escalating)
EXPOSURE CATEGORY	B
MAX. TOPOGRAPHIC FACTOR, $K_{zt}$	1.00
RISK CATEGORY	II
MAINTENANCE LIVE LOAD	$L_M$ : 500 lb

■ REMAINING EQUIPMENT

ELEVATION (ft)		ANTENNAS	
MOUNT	RAD.	#	NAME
103.0	104.0	1	Antel BXA-70063-6CF-EDIN-6
		2	Antel BXA-80080/4CF
		1	Antel BXA-80090/4CF
	103.0	6	Andrew SBNHH-1D65B
	100.0	1	Raycap RRFDC-3315-PF-48

■ PROPOSED EQUIPMENT

ELEVATION (ft)		ANTENNAS	
MOUNT	RAD.	#	NAME
103.0	104.0	2	Antel BXA-70063-6CF-EDIN-6
	103.0	1	Raycap RVZDC-6627-PF-48
		3	Samsung RFV01U-D1A
		3	Samsung RFV01U-D2A

■ RESULTS SUMMARY

COMPONENT	PEAK USAGE	RESULT
Rail Arch	47%	Pass
Arch Space Pipe	45%	Pass
Connections	34%	Pass
Mount Pipes	28%	Pass
Face Horizontals	23%	Pass
Standoff end Pipe	23%	Pass
Stand-Off Horizontals	23%	Pass
Corner Plates	18%	Pass

■ CONCLUSION AND RECOMMENDATIONS

According to our structural analysis, the mounts have been found to PASS PENDING REPLACEMENT. The mounting configuration considered in this analysis will be capable of supporting the referenced loading pursuant to referenced standards once the following scope is executed:

- Replace existing T-arm mount assembly with (3) new Armor Tower 12' Arch Antenna Frame mounts.
- Attach proposed mounts to the monopole using a new Collar by D&D that fits up to 52" OD monopole in lieu LMONO collars that comes with arch boom set.
- Install (4) Site Pro 1 P2120 mount pipes at each sector (12 total). Connect to face horizontal members using Site Pro 1 SCX1-K crossover plate kits (24 total).
- Install (3) Site Pro 1 P272 bracing pipes as shown. Connect bracing pipes to outer boom end pipes of adjacent sectors with Site Pro 1 SCX1-K crossover plate kits (6 total).
- All mount pipes should be equidistant from each other.
- All the bolts shall be tightened with turn of the nut as per following table.

**BOLT TIGHTENING PROCEDURE**

1. TIGHTEN BOLTS BY AISC "TURN OF THE NUT" METHOD USING THE CHART BELOW:

BOLT LENGTHS UP TO AND INCLUDING FOUR DIAMETERS:  
+1/3 TURN BEYOND SNUG TIGHT

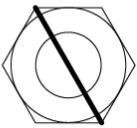
BOLT LENGTHS OVER FOUR AND UP TO EIGHT DIAMETERS:  
+1/2 TURN BEYOND SNUG TIGHT

BOLT LENGTHS OVER EIGHT AND UP TO TWELVE DIAMETERS:  
+2/3 TURN BEYOND SNUG TIGHT

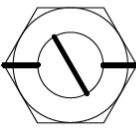
2. SPLICE BOLTS SUBJECT TO DIRECT TENSION SHALL BE INSTALLED AND TIGHTENED AS PER SECTION 8(d)(1) OF THE AISC MANUAL OF STEEL CONSTRUCTION. THE INSTALLATION PROCEDURE IS AS FOLLOWS:

\*FASTENERS SHALL BE INSTALLED IN PROPERLY ALIGNED HOLES AND BE TIGHTENED BY ONE OF THE METHODS DESCRIBED IN SUBSECTION 8(d)(1) THROUGH 8(d)(4).

8(d)(1) TURN-OF-THE-NUT TIGHTENING.  
 BOLTS SHALL BE INSTALLED IN ALL HOLES OF THE CONNECTION AND BROUGHT TO A SNUG TIGHT CONDITION. SNUG TIGHT IS DEFINED AS THE TIGHTNESS THAT EXISTS WHEN THE PLIES OF A JOINT ARE IN FIRM CONTACT. THIS MAY BE OBTAINED BY A FEW IMPACTS OF AN IMPACT WRENCH OR THE FULL EFFORT OF A MAN USING AN ORDINARY SPUD WRENCH. SNUG TIGHTENING SHALL PROGRESS SYSTEMATICALLY...UNTIL ALL THE BOLTS ARE SIMULTANEOUSLY SNUG TIGHT AND THE CONNECTION IS FULLY COMPACTED. FOLLOWING THIS INITIAL OPERATION, ALL BOLTS IN THE CONNECTION SHALL BE TIGHTENED FURTHER BY THE APPLICABLE AMOUNT OF ROTATION SPECIFIED ABOVE. DURING THE TIGHTENING OPERATION, THERE SHALL BE NO ROTATION OF THE PART NOT TURNED BY THE WRENCH. TIGHTENING SHALL PROGRESS SYSTEMATICALLY.



BEFORE 1/3 TURN



AFTER 1/3 TURN

See following Sketches, Armor Tower mount assembly drawing and Site Pro 1 assembly drawings for further details.

## ■ ASSUMPTIONS AND CONDITIONS

This analysis is inclusive of the antenna supporting frames/mounts and all recorded connections that will support the equipment listed in this report. It considers only the theoretical capacity of structural components and it is not a condition assessment. The validity of the analysis may be dependent on the accuracy of structural information supplied by others. The client is responsible for verifying this information. If any provided information is revised after completion of this analysis, CLS Engineering PLLC should be notified immediately to revise results.

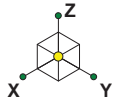
This analysis assumes the following:

1. The tower or other superstructure and mounts (if existing) were properly constructed as per the original design and have been properly maintained in accordance with applicable code standards.
2. Member sizes and strengths are accurate as supplied or are assumed as stated in the calculations.
3. In the absence of sufficient design information, all welds and connections are assumed to develop at least the capacity of the connected member, unless otherwise stated in this analysis.
4. All prior structural modifications, if any, are assumed to be correctly installed and fully effective.
5. The loading configuration is complete and accurate as supplied and/or as modeled in the previous analysis. All appurtenances are assumed to be properly installed and supported as per manufacturer requirements.
6. Some conservative assumptions may be used regarding appurtenances and their projected areas based on careful interpretation of data supplied, previous experience and standard industry practice.

All opinions and conclusions are considered accurate to a reasonable degree of engineering certainty based upon the evidence available at the time of the report. All opinions and conclusions contained herein are subject to revision based upon receipt of new or updated information. All services are provided exercising a level of care and diligence equivalent to the standard of our profession. No warranty or guarantee, either expressed or implied, is offered. All services are confidential in nature and this report will not be released to any other party without the client's consent. The use of this analysis is limited to the expressed purpose for which it was commissioned and it may not be reused, copied or disseminated for any other purpose without consent from CLS Engineering PLLC.

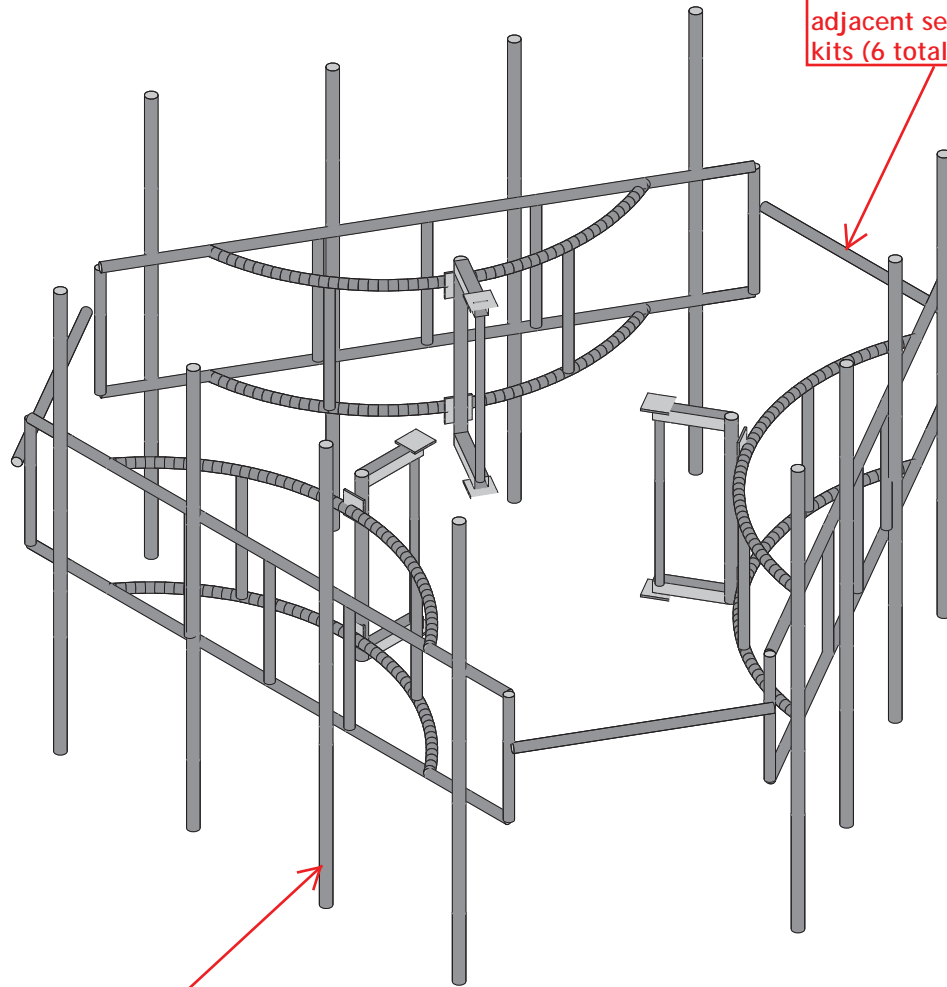
All services were performed, results obtained and recommendations made in accordance with generally accepted engineering principles and practices. CLS Engineering PLLC is not responsible for the conclusions, opinions or recommendations made by others based on the information supplied in this analysis.

It is not possible to have the fully detailed information necessary to perform a complete and thorough analysis of every structural sub-component of an existing structure. The structural analysis by CLS Engineering PLLC verifies the adequacy of the primary members of the structure. CLS Engineering PLLC provides a limited scope of service in that we cannot verify the adequacy of every weld, bolt, gusset, etc.



Replace existing T-arm mount assembly with (3) new Armor Tower 12' Arch Antenna Frame mounts.

Install (3) Site Pro 1 P272 bracing pipes as shown. Connect bracing pipes to outer boom end pipes of adjacent sectors with Site Pro 1 SCX1-K crossover plate kits (6 total).



Install (4) Site Pro 1 P2120 mount pipes at each sector (12 total). Connect to face horizontal members using Site Pro 1 SCX1-K crossover plate kits or equal (24 total).

Envelope Only Solution

CLS
ST
42284-33591-01-MR

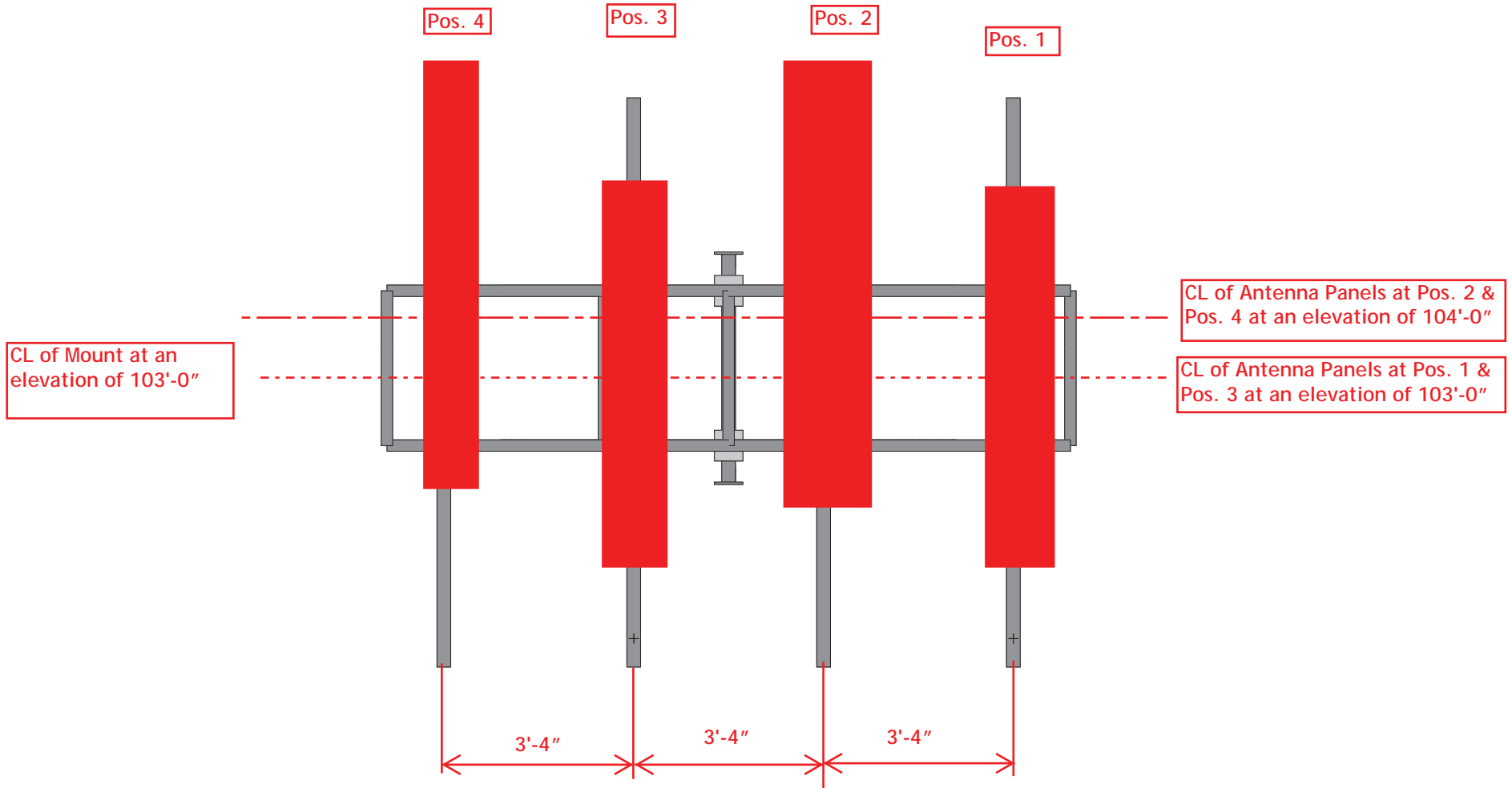
42284-33591-NEW BRITIAN 4 CT
Installation Sketch - Isometric View

IN - 1
Sept 27, 2018 at 12:53 PM
42284-33591-01-MR.r3d





Only one sector shown for clarity



All mount pipes should be equidistant from each other as shown.

CLS  
ST  
42284-33591-01-MR

42284-33591-NEW BRITIAN 4 CT  
Installation Sketch - Front Elevation

IN - 2  
Sept 27, 2018 at 12:43 PM  
42284-33591-01-MR images.r3d

**GENERAL NOTES:**

01. ALL WELDS SHALL BE 3/16" FILLET WELDS UNLESS OTHERWISE NOTED.
02. ALL WELDING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS AND ALL ELECTRODES SHALL BE E70XX LOW HYDROGEN AND MATCHING FILLER METAL, UNLESS OTHERWISE NOTED.
03. FABRICATOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES, APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE IN ACCORDANCE WITH THE AMERICAN WELDING SOCIETY STANDARDS AND SPECIFICATIONS ANSI/AWS D1.1 LATEST EDITION.
04. BASE MATERIAL SHALL BE CORRECTLY PREHEATED BEFORE WELDING AND POSTHEATED AFTER WELDING IN ACCORDANCE WITH AWS SPECIFICATIONS. ALL WELDS SHALL BE CHECKED WITH MAGNETIC PARTICLE PROCESS (MAGNAFLUX) AND ALL SUSPICIOUS MATERIAL SHALL BE CHECKED WITH ULTRASONIC.
05. MATERIAL MAY BE CUT BY SHEARING, SAWING, OR WITH ROUTER OR GAS CUTTER. MATERIAL THICKER THAN 1/2" SHALL NOT BE SHEARED.
06. CUT EDGES SHALL BE TRUE AND SMOOTH AND FREE FROM BURRS AND RAGGED BREAKS. SHEARED EDGES OF THICK PLATES SHALL BE PLANED TO A DEPTH OF 1/4". RE-ENTRANT CUTS SHALL BE AVOIDED.
07. ALL PARTS SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION TO ASTM A123 SPECIFICATIONS.
08. ALL HOLLOW PARTS SHALL HAVE GALVANIZING DRAIN HOLES PROVIDED.
09. PRIOR TO GALVANIZING, ALL FABRICATED STEEL SHALL BE THOROUGHLY INSPECTED AND COUNTED ACCORDING TO THE BEST QUALITY CONTROL AND INSPECTION METHODS
10. ALL BOLT HOLES SHALL BE 1/16" OVERSIZED, UNLESS SPECIFIED OTHERWISE.
11. ALL BOLTS, WASHERS AND LOCKNUTS SHALL BE NEW DOMESTIC HIGH STRENGTH HOT-DIP GALVANIZED TYPE "X" (THREAD EXCLUDED) AND CONFORM TO ASTM A325 SPECIFICATIONS, UNLESS OTHERWISE NOTED. FOR  $\phi 1/2"$ , USE OF BOLTS CONFORMING TO SAE 1429 GRADE 5 IS ACCEPTABLE.
12. ALL U-BOLTS SHALL BE A572 GRADE 50 MATERIAL EQUIVALENT.
13. ALL BOLTS SHALL BE TIGHTENED USING TURN-OF-THE-NUT METHOD.

QTY	DESCRIPTION	MATERIAL	GRADE	LENGTH (in)	WEIGHT (lb)
<b>BOOM COMPONENT LIST</b>					
2	BOOM RAILS	2" Sch40 PIPE	A500 GRADE 50	141.62	86.2
2	BOOM END PIPES	2" Sch40 PIPE	A500 GRADE 50	35	21.3
3	BOOM INNER PIPES	2" Sch40 PIPE	A500 GRADE 50	32.62	29.8
2	RAIL ARCHES (ROLLED PIPES)	2" Sch40 PIPE	A500 GRADE 50	111.28	67.8
2	ARCH SPACER PIPES	2" Sch40 PIPE	A500 GRADE 50	32.62	19.9
2	CLIP PLATES	PL 1/2" (x6")	A572 GRADE 50	6.5	11.1
2	BACK CLAMPS	C3x4.1	A572 GRADE 50	2.75	1.9
1	STIFFARM PIPE	1 1/2" Sch40 PIPE	A500 GRADE 50	120	27
<b>STANDOFF COMPONENT LIST</b>					
2	STANDOFF RAILS	HSS3x3x3/16"	A500 GRADE C	17	19.4
1	STANDOFF END PIPE	2 1/2" Sch80 PIPE	A500 GRADE 50	48	30.6
1	STANDOFF SPACER PIPE	1 1/2" Sch40 PIPE	A500 GRADE 50	42	9.5
2	STANDOFF BRACKETS	PL 1/2" (x6")	A572 GRADE 50	6.25	10.6
<b>TOTAL BOOM COMPONENTS</b>					<b>265</b>
<b>TOTAL STANDOFF COMPONENTS</b>					<b>70.1</b>
<b>TOTAL BOOM &amp; STANDOFF WEIGHT</b>					<b>335.1</b>

\*THESE WEIGHTS EXCLUDE DISH MOUNT ANGLES, STIFFARM ANGLES ON THE TOWER, FASTENER WEIGHTS AND ZINC GALVANIZING WEIGHTS.

PREPARED FOR:



175 Calkins Road  
Rochester, NY 14623

ENGINEER'S APPROVAL:

**ARMOR  
TOWER  
ENGINEERING**

9 NORTH MAIN STREET  
SECOND FLOOR  
CORTLAND, NY 13045  
PHONE: (704) 516-0262 FAX:  
(866) 870-0840

NO.	DATE	ISSUE DESCRIPTION	JJ	AB
1	05/07/14	SUBMITTAL	JJ	AB

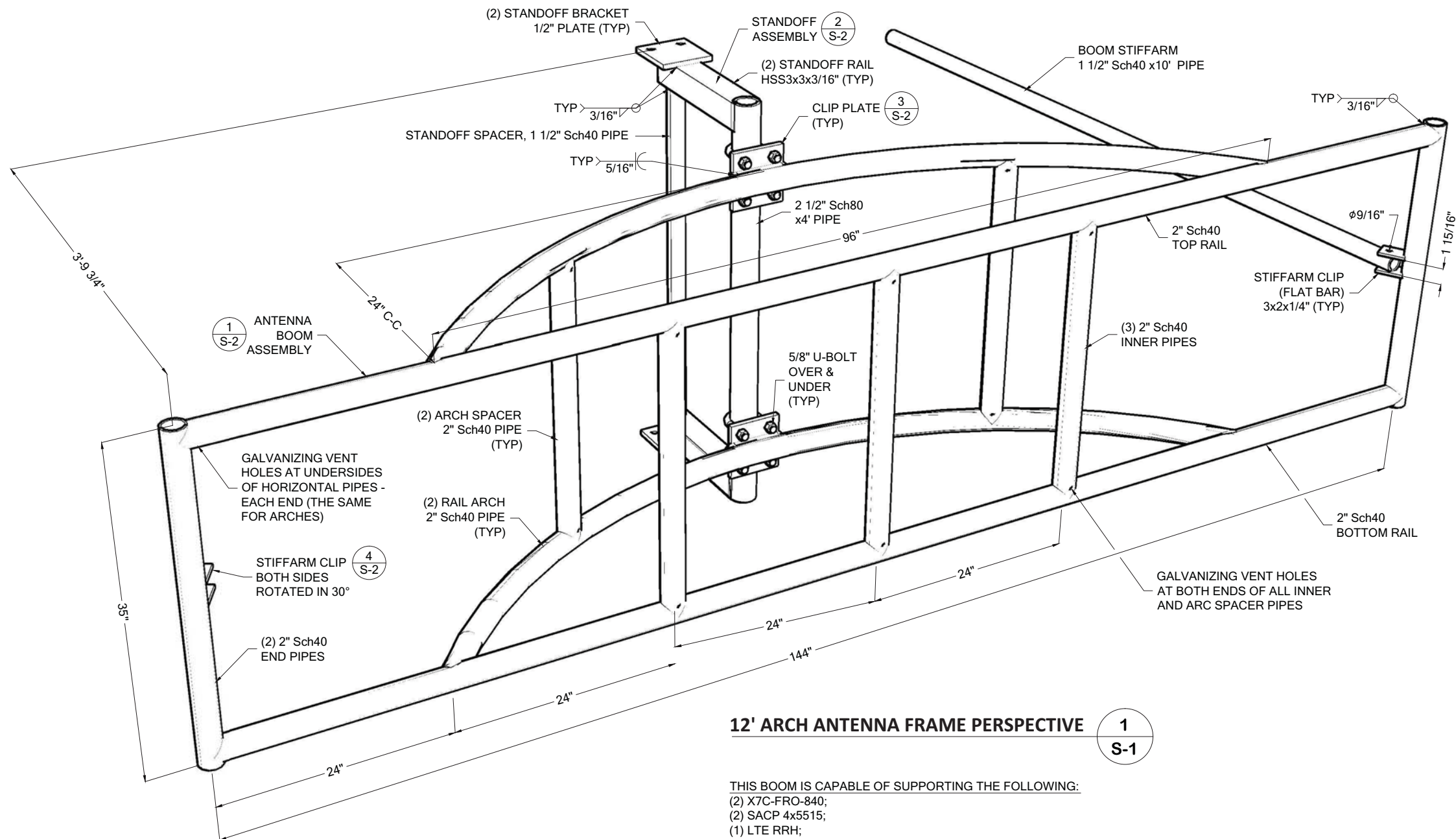
SITE INFO

SHEET SCALE / UNITS  
NTS ALL DIMENSIONS IN INCHES  
UNLESS NOTED OTHERWISE

SHEET TITLE  
**ANTENNA FRAME**

SHEET NUMBER  
**S-1**

FILE NAME  
**14078**



**12' ARCH ANTENNA FRAME PERSPECTIVE** 1 S-1

THIS BOOM IS CAPABLE OF SUPPORTING THE FOLLOWING:  
 (2) X7C-FRO-840;  
 (2) SACP 4x5515;  
 (1) LTE RRH;  
 (1) AWS RRH;  
 (1) PCS RRH;  
 (1) RAYCAP RRDC-1064-PF-48;

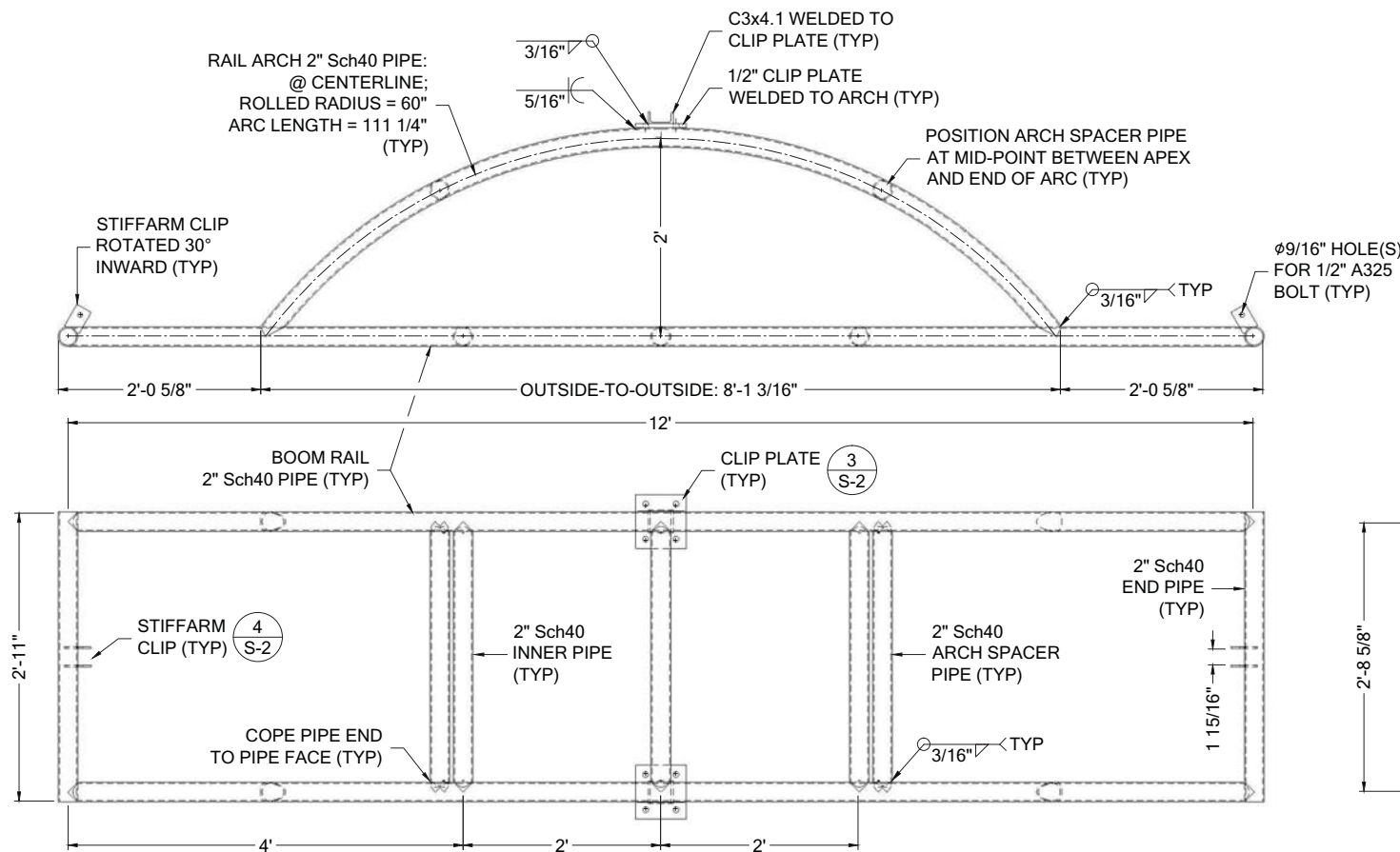


175 Calkins Road  
Rochester, NY 14623

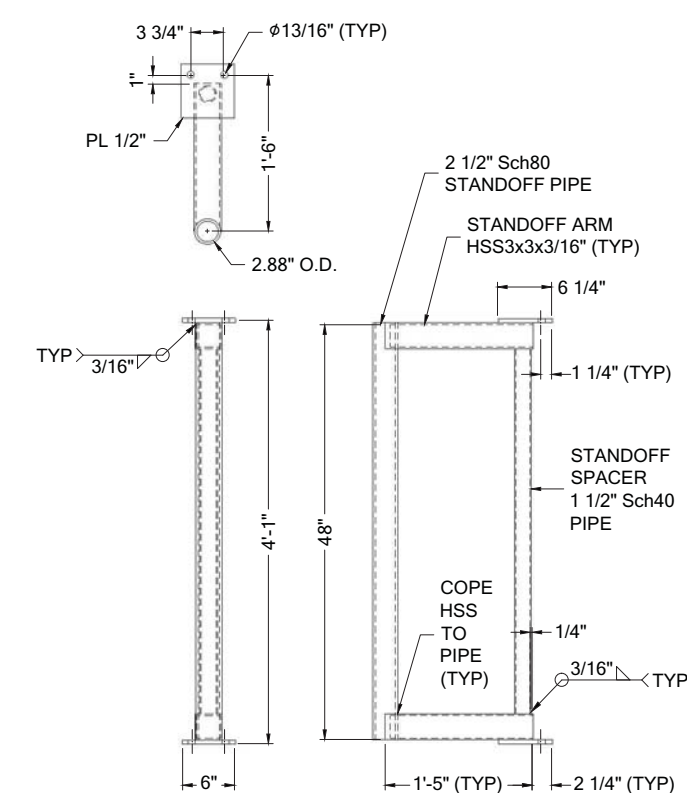
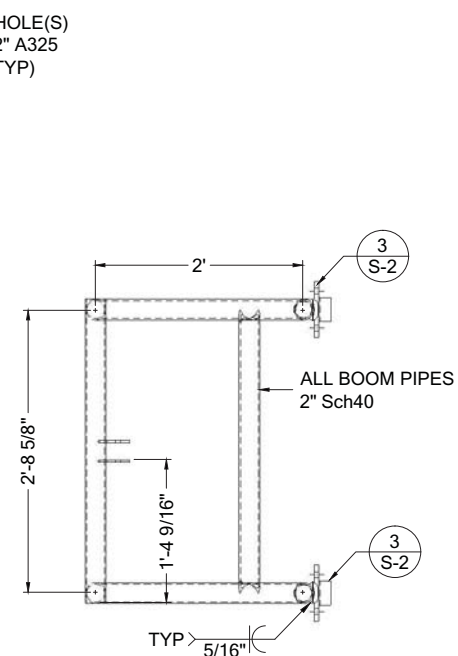
ENGINEER'S APPROVAL:



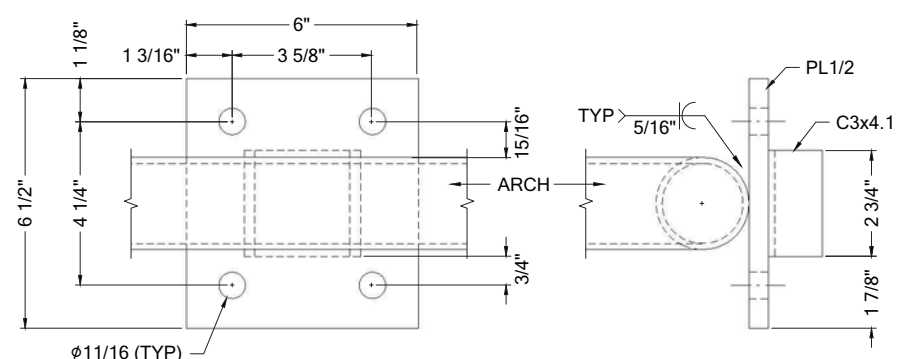
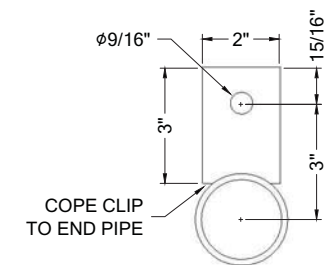
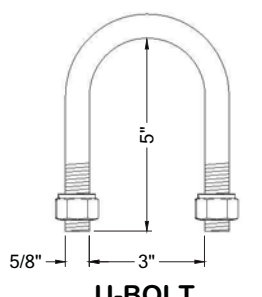
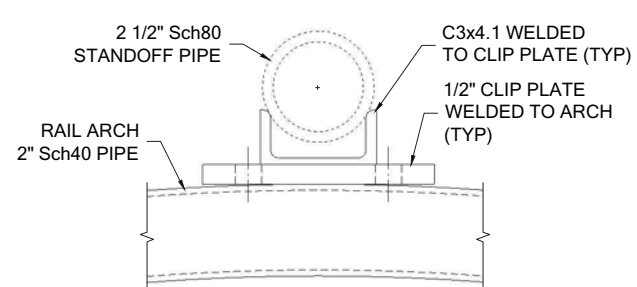
9 NORTH MAIN STREET  
SECOND FLOOR  
CORTLAND, NY 13045  
PHONE: (704) 516-0262 FAX:  
(866) 870-0840



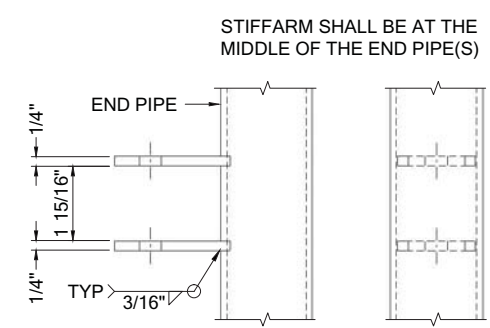
**12' ANTENNA BOOM** 1 S-2



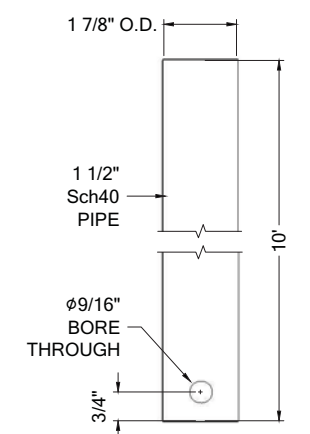
**BOOM STANDOFF** 2 S-2



**CLIP PLATE** 3 S-2



**STIFFARM CLIP** 4 S-2



**STIFFARM** 5 S-2

NO.	DATE	ISSUE DESCRIPTION	INITIALS
1	05/07/14	SUBMITTAL	JJ AB

SITE INFO

SHEET SCALE / UNITS  
NTS ALL DIMENSIONS IN INCHES UNLESS NOTED OTHERWISE

SHEET TITLE  
**FRAME COMPONENTS**

SHEET NUMBER  
**S-2**

FILE NAME  
**14078**



175 Calkins Road  
Rochester, NY 14623

ENGINEER'S APPROVAL:



9 NORTH MAIN STREET  
SECOND FLOOR  
CORTLAND, NY 13045  
PHONE: (704) 516-0262 FAX:  
(866) 870-0840

NO.	DATE	ISSUE DESCRIPTION	JJ	AB
1	05/07/14	SUBMITTAL		

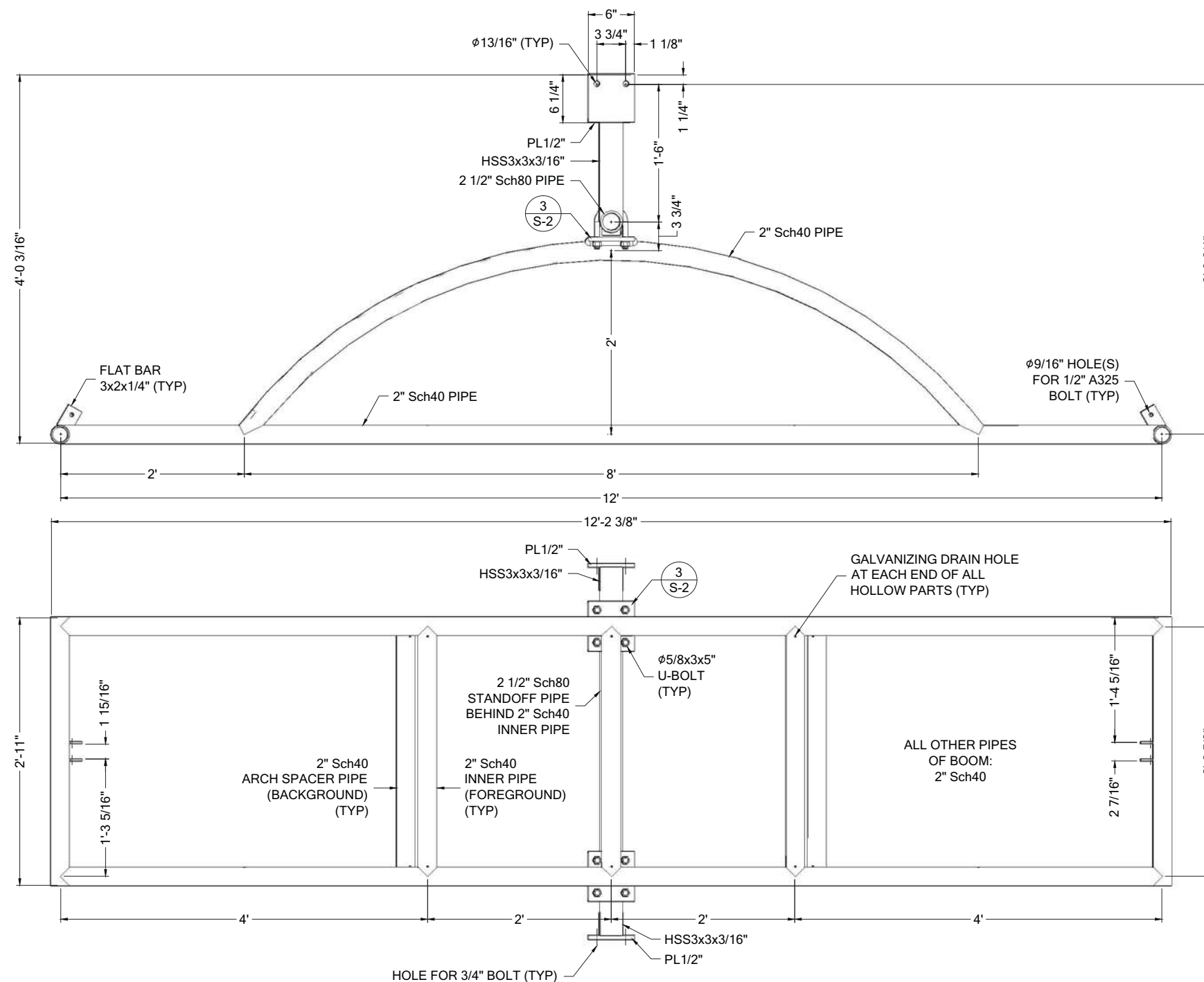
SITE INFO

SHEET SCALE / UNITS  
NTS ALL DIMENSIONS IN INCHES  
UNLESS NOTED OTHERWISE

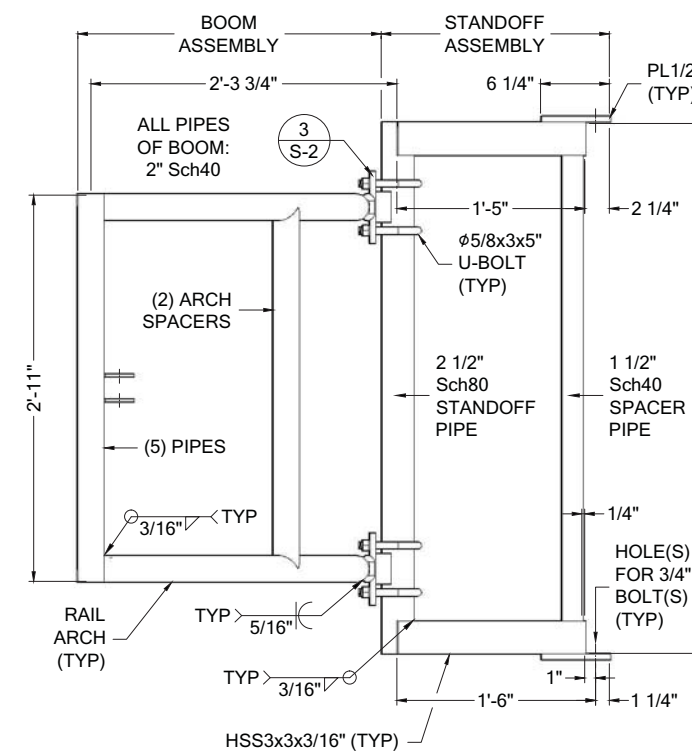
SHEET TITLE  
3rd ANGLE PROJECTION

SHEET NUMBER  
S-3

FILE NAME  
14078



**12' ARCH ANTENNA FRAME ASSEMBLY** 1  
S-3



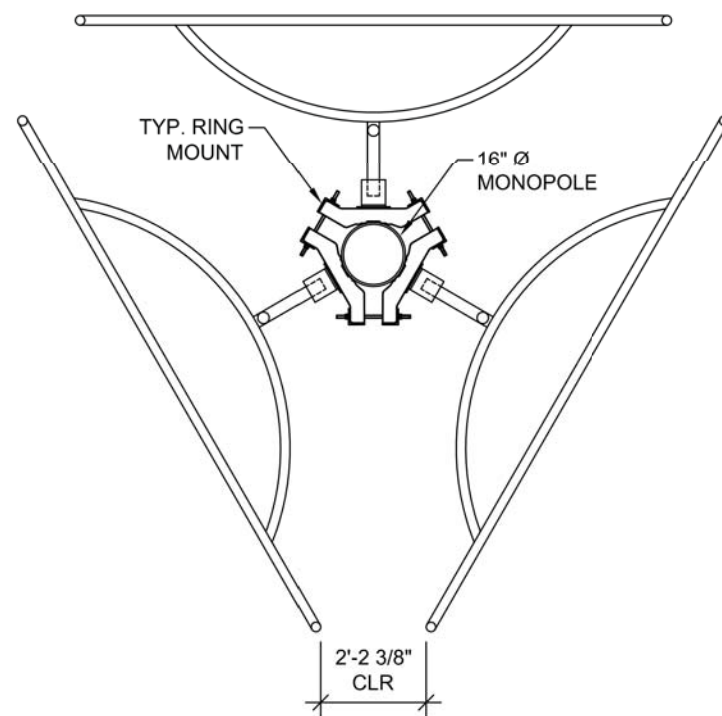


PREPARED FOR:



175 Calkins Road  
Rochester, NY 14623

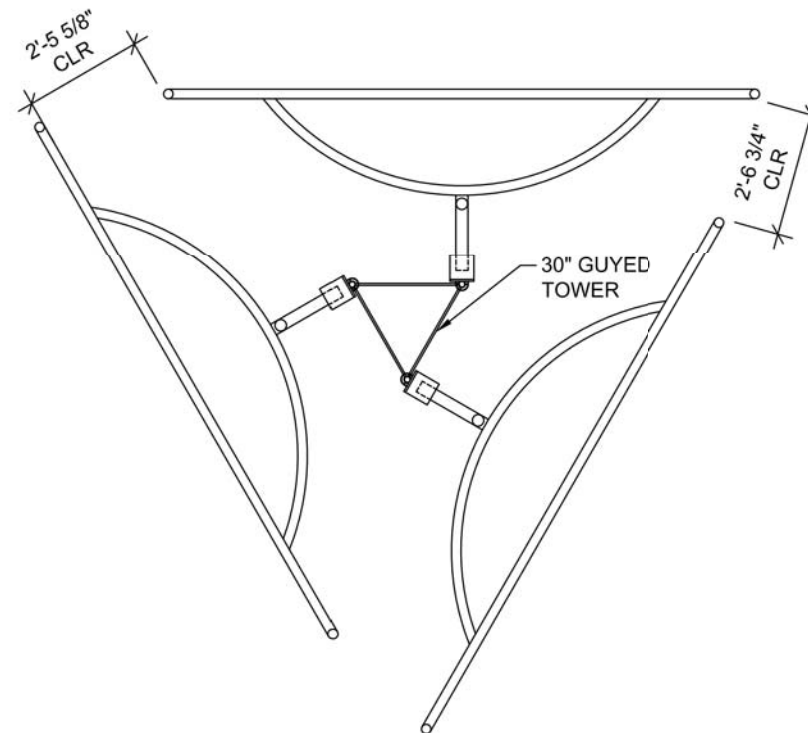
ENGINEER'S APPROVAL:



**FRAME LAYOUT - 16" MONOPOLE**

1/4" = 1'-0"

NOTE: STIFF ARM BRACES  
NOT SHOWN FOR CLARITY



**FRAME LAYOUT - 30" GUYED TOWER**

1/4" = 1'-0"

THIS LAYOUT INDICATES THE GEOMETRIC  
SEPARATION POSSIBLE. SMALLER GUYED TOWERS  
MAY REQUIRE FRAMES TO SPREAD LOAD BETWEEN  
LEGS.

**FRAME LAYOUT / CLEARANCE PLANS**

1  
S-4

**ARMOR  
TOWER  
ENGINEERING**

9 NORTH MAIN STREET  
SECOND FLOOR  
CORTLAND, NY 13045  
PHONE: (704) 516-0262 FAX:  
(866) 870-0840

NO.	DATE	ISSUE DESCRIPTION	AB	DH
1	05/07/14	SUBMITTAL	AB	DH

SITE INFO

SHEET SCALE / UNITS  
NTS ALL DIMENSIONS IN INCHES  
UNLESS NOTED OTHERWISE

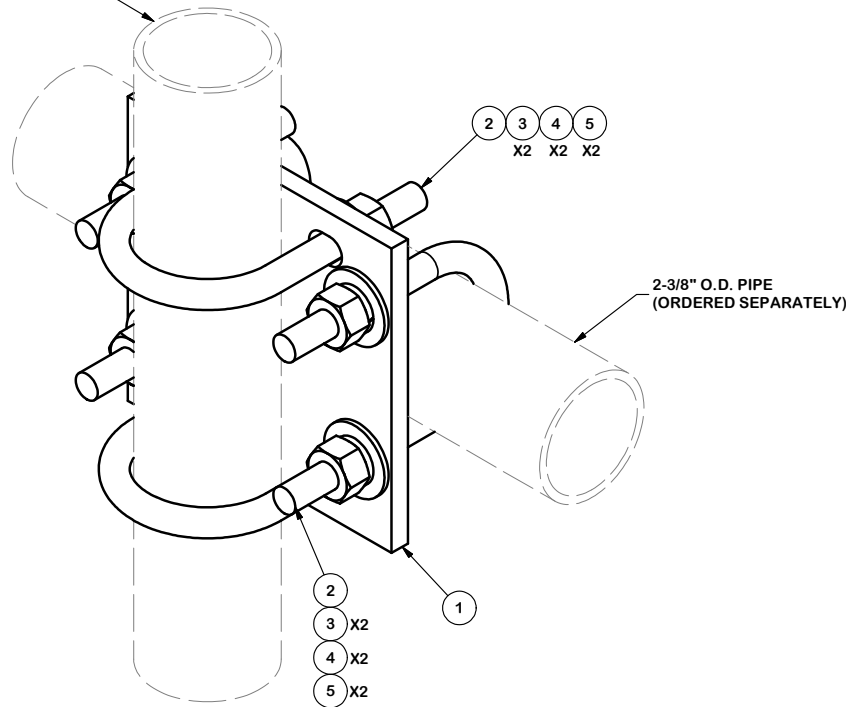
SHEET TITLE  
**FRAME LAYOUT**

SHEET NUMBER  
**S-4**

FILE NAME  
**14078**

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	SCX1	CROSSOVER PLATE 2-3/8" X 2-3/8"		3.71	3.71
2	4	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.63	2.50
3	8	G12FW	1/2" HDG USS FLATWASHER		0.03	0.27
4	8	G12LW	1/2" HDG LOCKWASHER		0.01	0.11
5	8	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	0.57
					<b>TOTAL WT. #</b>	<b>7.16</b>

2-3/8" O.D. ANTENNA PIPE  
(ORDERED SEPARATELY)



**TOLERANCE NOTES**

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

PROPRIETARY NOTE:  
 THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION  
**CROSSOVER PLATE**

**SITE PRO 1**  
 A valmont COMPANY

Locations:  
 New York, NY  
 Atlanta, GA  
 Los Angeles, CA  
 Plymouth, IN  
 Salem, OR  
 Dallas, TX

Engineering  
 Support Team:  
 1-888-753-7446

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	ADDED MISSING U-BOLT AND HRDWE		KC8	7/5/2012
REVISION HISTORY				

CPD NO.	DRAWN BY	ENG. APPROVAL
	CEK 6/30/2011	
CLASS	DRAWING USAGE	CHECKED BY
81	CUSTOMER	CEK 8/23/2012

PART NO.	SCX1-K
DWG. NO.	SCX1-K

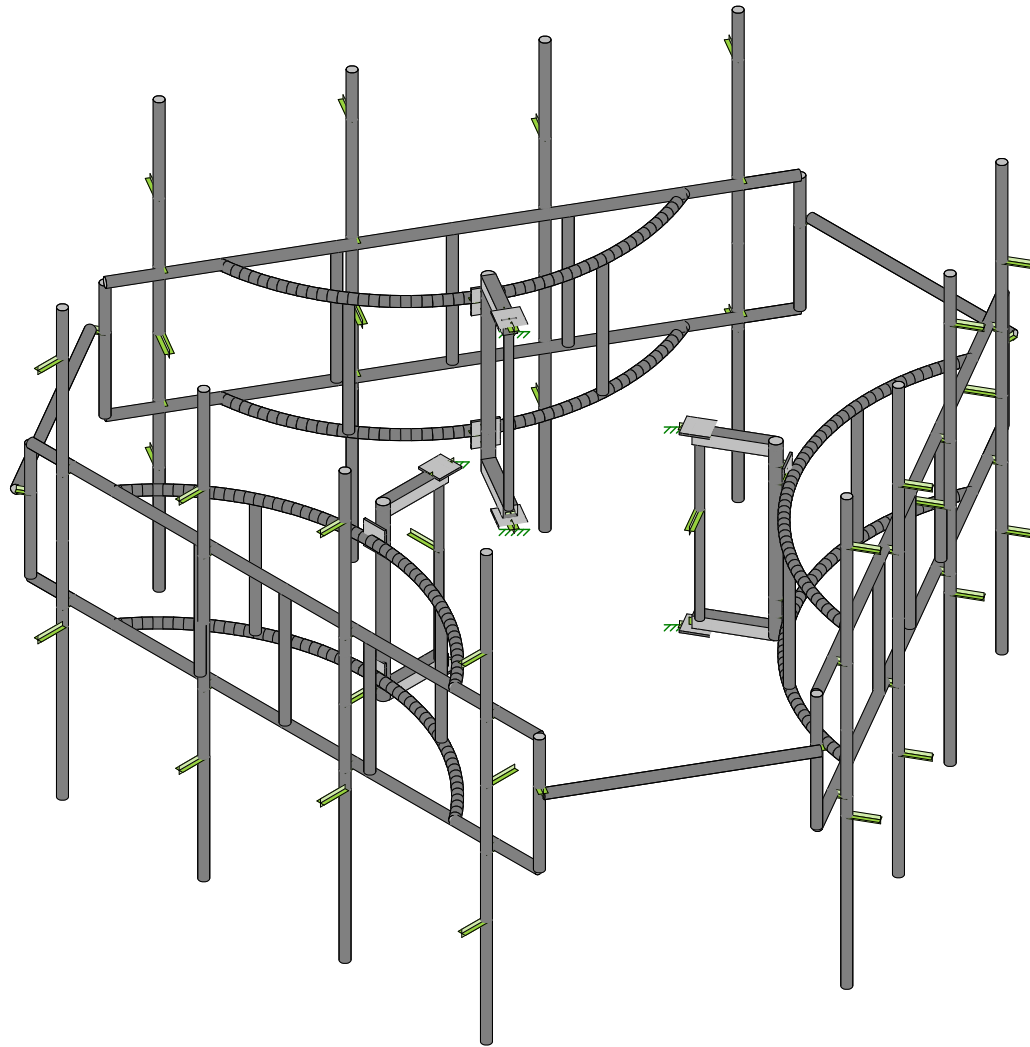
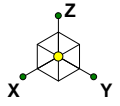


Wind & Ice Loading			
Nominal Mount Elevation (AGL), $z_{mount}$	103 ft	$K_a$	0.90
Nominal Rad Elevation (AGL), $z_{rad}$	104 ft	$K_d$	0.95
TIA Standard	H	$K_z$	1.00
Basic Wind Speed, $V_{ult}$ (bare)	125 mph	$K_{zt}$	1.00
Basic Wind Speed, $V$ (ice)	50 mph	$K_s$	1.00
Design Ice Thickness, $t_i$	1 1/2 in	$t_{iz}$	1.68 in
Exposure Category	B	$G_h$	1.00
Risk Category	II	$q_z$ (bare)	37.7 psf
Seismic Response Coeff., $C_s$	-	$q_z$ (ice)	6.0 psf

Live Loading	
At Mount Pipes, $L_M$	500 lb
Joint Labels Considered	M1
	M2
	M3
	M4

Section Set Label	Shape Label	$F_A$ (lb/ft)		Ice Wt. (lb/ft)
		Bare	Ice	
Rail Arch	PIPE_2.0	8.96	3.46	8.33
Boom Rail	PIPE_2.0	8.96	3.46	8.33
Boom Inner Pipes	PIPE_2.0	8.96	3.46	8.33
Boom End Pipe	PIPE_2.0	8.96	3.46	8.33
Arch Space Pipes	PIPE_2.0	8.96	3.46	8.33
Clip Plate	PL6x0.5	37.72	5.66	11.95
Standoff End Pipe	PIPE_2.5X	10.84	3.76	9.36
Standoff Rail	HSS3X3X3	18.86	2.28	11.30
Standoff Spacer	PIPE_1.5	7.17	3.18	7.35
Standoff Bracket	PL6x0.5	37.72	5.66	11.95
Mount Pipe	PIPE_2.0	8.96	3.46	8.33
MOD-Bracing Pipe	PIPE_2.0	8.96	3.46	8.33

Appurtenances																														
Appurtenance Model	Status	Azimuth Offset (°, °)	Rad Elev. Override (ft)	Swap Width & Depth	Area Factor		Qty. per Azimuth			Total Qty. Override	0° Joints		120° Joints		240° Joints		Height (in)	Width (in)	Depth (in)	Weight (Bare) (lb)	Shape	Weight of Ice (lb)	EPA <sub>A</sub> (Bare) (ft²)		EPA <sub>A</sub> (Ice) (ft²)		F <sub>A</sub> (Bare) (lb)		F <sub>A</sub> (Ice) (lb)	
					Front	Side	0°	120°	240°		1	2	1	2	1	2							N	T	N	T	N	T	N	T
					Andrew SBNHH-1D65B	Remaining		103	<input type="checkbox"/>				1	1	1								A1	A2	B1	B2	C1	C2	72	11.9
BXA-70063-6CF-EDIN-6	Remaining			<input type="checkbox"/>			1				A3	A4					71	11.2	5.2	17	Flat	166.63	7.57	4.16	9.90	6.44	257.65	141.54	53.90	35.08
Andrew SBNHH-1D65B	Remaining		103	<input type="checkbox"/>			1	1	1		A5	A6	B5	B6	C5	C6	72	11.9	7.1	40.6	Flat	192.80	8.08	5.34	10.45	7.70	274.25	181.33	56.76	41.83
BXA-70063-6CF-EDIN-6	Proposed			<input type="checkbox"/>				1	1				B3	B4	C3	C4	71	11.2	5.2	17	Flat	166.63	7.57	4.16	9.90	6.44	257.65	141.54	53.90	35.08
BXA-80080/4CF	Remaining			<input type="checkbox"/>			1	1			A7	A8	B7	B8			48.2	11.2	5.9	14.3	Flat	122.28	4.80	2.84	6.50	4.43	163.37	96.74	35.40	24.15
BXA-80090/4CF	Remaining			<input type="checkbox"/>					1						C7	C8	47.4	8.1	5.7	12	Flat	100.06	3.60	2.71	5.20	4.28	122.43	92.22	28.30	23.28
RRFDC-3315-PF-48	Remaining		100	<input type="checkbox"/>			1				RC1A						25.66	15.73	10.25	32	Flat	109.95	3.36	2.19	4.61	3.29	113.22	73.79	24.85	17.71
RVZDC-6627-PF-48	Proposed		103	<input type="checkbox"/>					1						RC1C		28.93	15.73	10.31	32	Flat	105.84	3.79	2.51	5.14	3.68	128.73	85.33	27.90	19.98
RFV01U-D1A	Proposed		103	<input type="checkbox"/>	0.5		1	1	1		R1A		R1B		R1C		15	15	10	84.4	Flat	61.66	0.94	1.25	1.40	2.04	31.82	42.43	7.63	11.10
RFV01U-D2A	Proposed		103	<input type="checkbox"/>	0.5		1	1	1		R2A		R2B		R2C		15	15	8.1	70.3	Flat	55.24	0.94	1.01	1.40	1.75	31.82	34.37	7.63	9.53

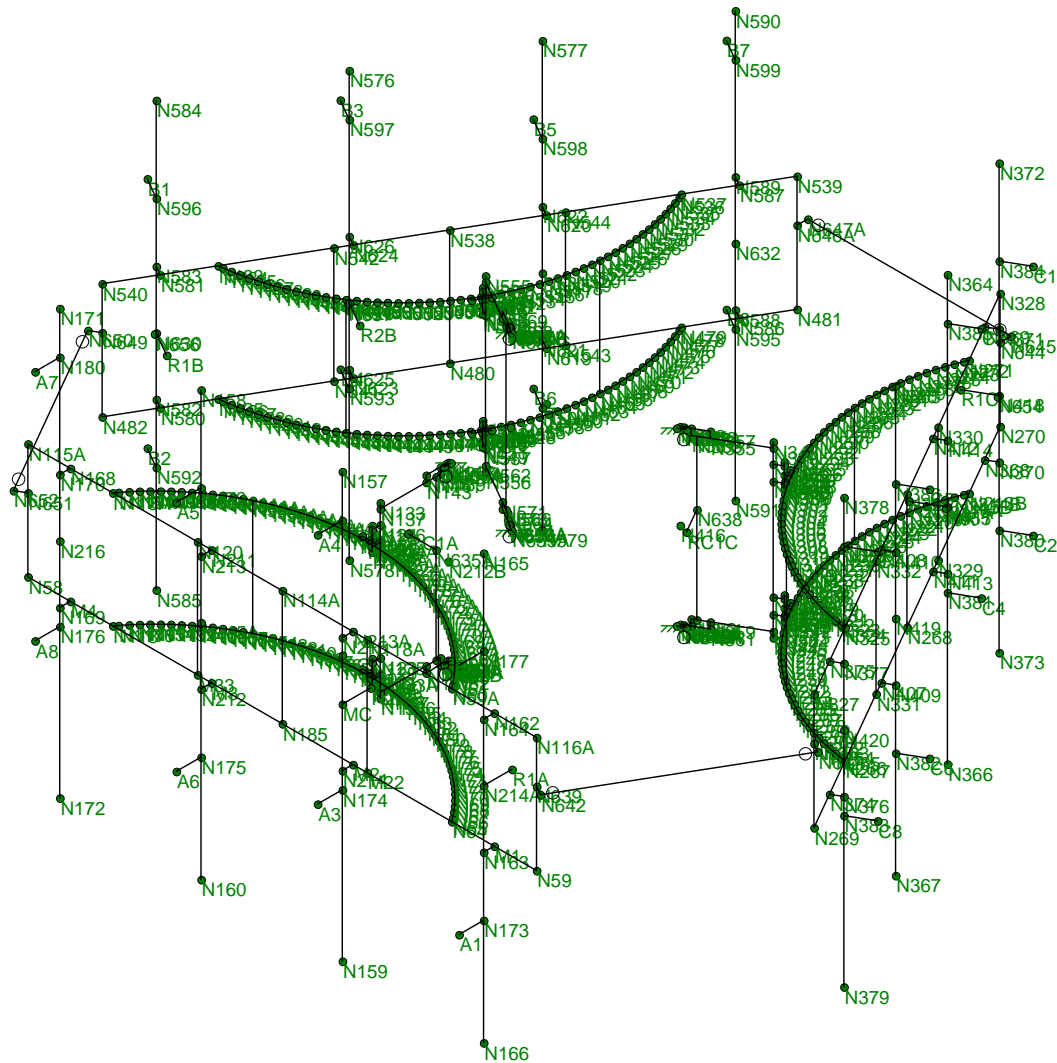
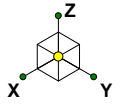


Envelope Only Solution

CLS
ST
42284-33591-01-MR

42284-33591-NEW BRITIAN 4 CT
Rendered

SK - 1
Sept 27, 2018 at 5:40 PM
42284-33591-01-MR.r3d

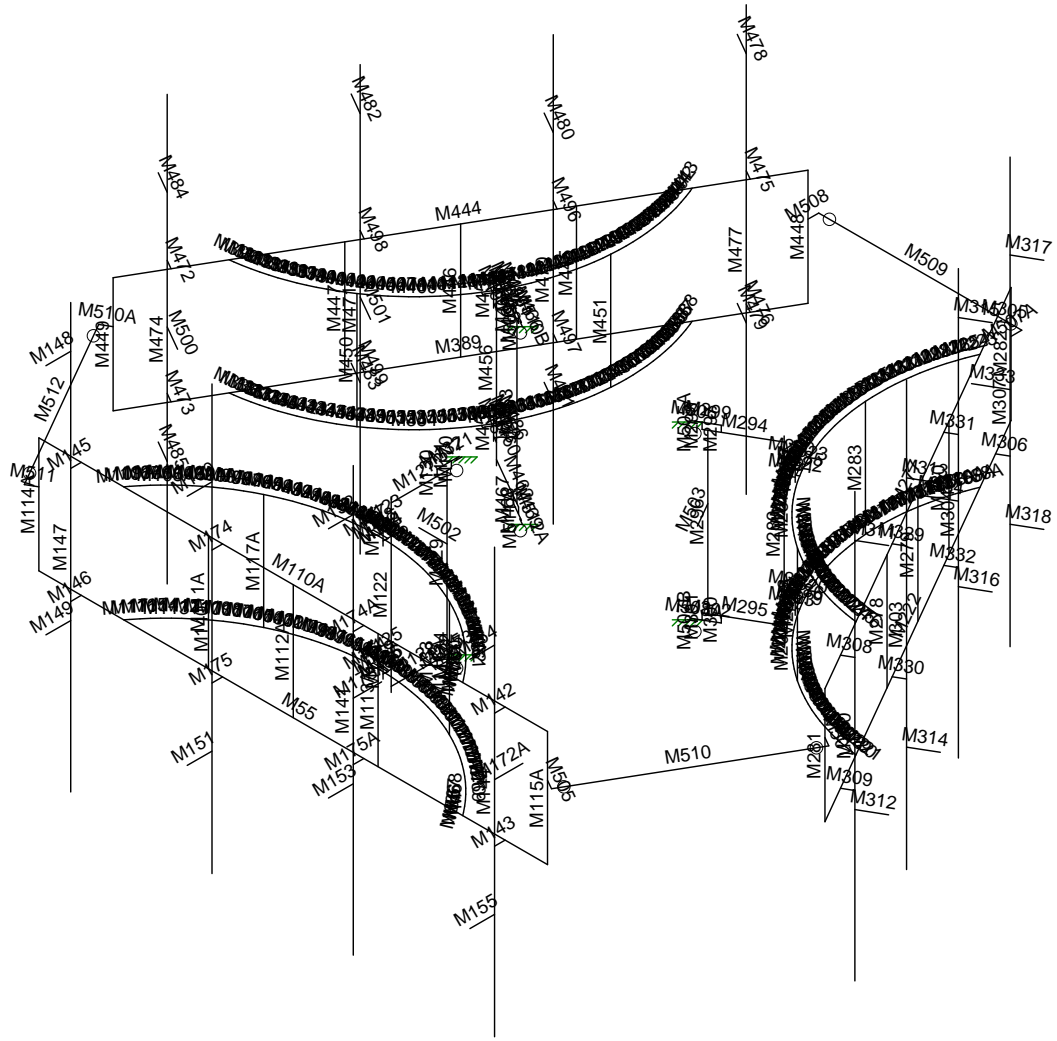
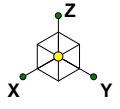


Envelope Only Solution

CLS
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42284-33591-01-MR

42284-33591-NEW BRITIAN 4 CT  
Joint Labels

SK - 2
Sept 27, 2018 at 5:40 PM
42284-33591-01-MR.r3d



Envelope Only Solution

CLS  
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42284-33591-01-MR

42284-33591-NEW BRITIAN 4 CT  
Member Labels

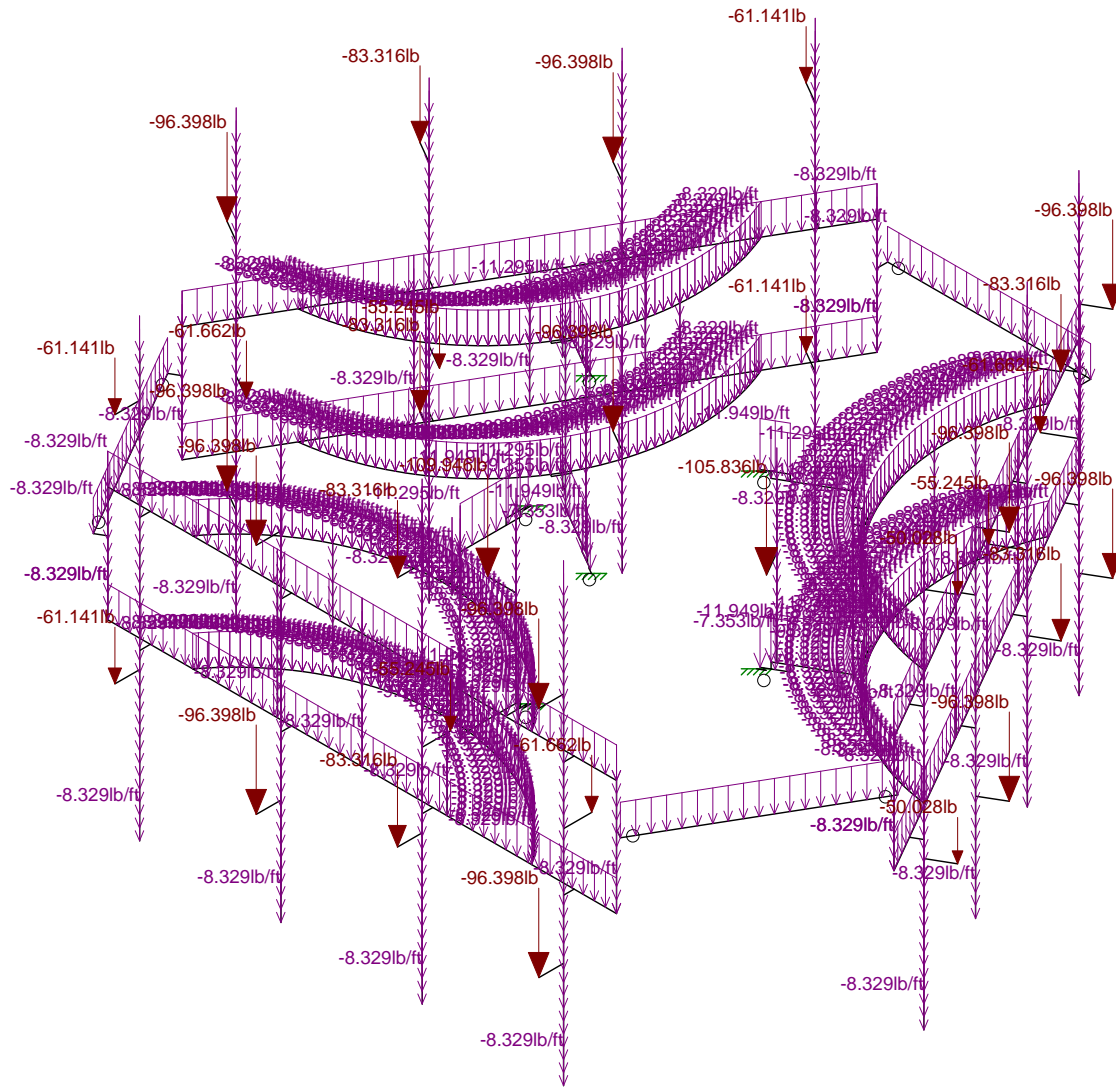
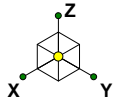
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42284-33591-01-MR.r3d











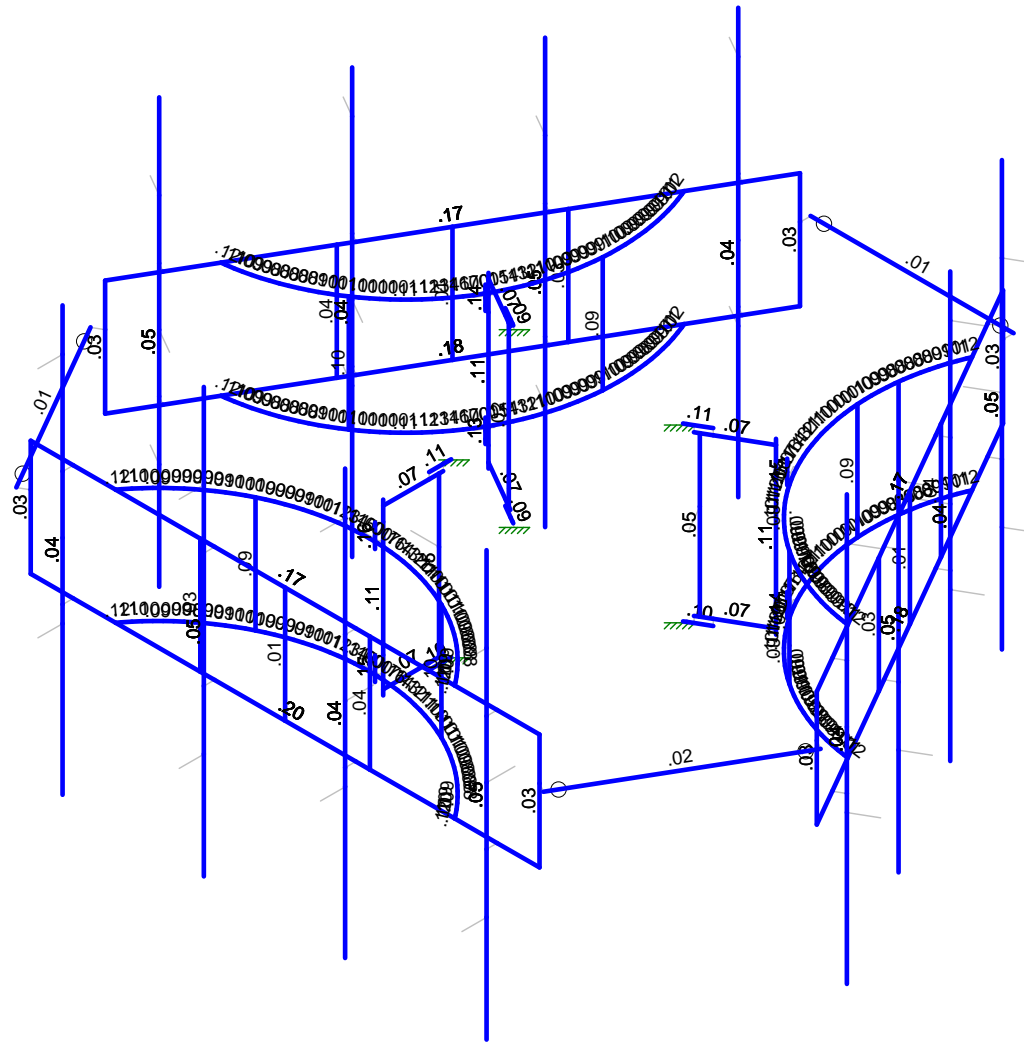
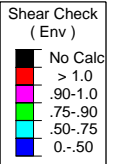
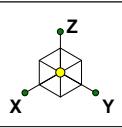
Loads: BLC 2, Ice Dead  
Envelope Only Solution

CLS  
ST  
42284-33591-01-MR

42284-33591-NEW BRITIAN 4 CT  
Ice Dead Loads

SK - 7  
Sept 27, 2018 at 5:42 PM  
42284-33591-01-MR.r3d





Member Shear Checks Displayed (Enveloped)  
Envelope Only Solution

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ST
42284-33591-01-MR

42284-33591-NEW BRITIAN 4 CT
Envelope Member Check Results - Shear

SK - 9
Sept 27, 2018 at 5:42 PM
42284-33591-01-MR.r3d

**Basic Load Cases**

	BLC Description	Category	X Gravi...	Y Gravi...	Z Gravity	Joint	Point	Distrib...	Area(M...	Surfac...
1	Dead	DL			-1	32				
2	Ice Dead	RL				32		390		
4	Structure Wind 0°	None						386		
5	Structure Wind 30°	None						774		
6	Structure Wind 45°	None						772		
7	Structure Wind 60°	None						772		
8	Structure Wind 90°	None						387		
9	Structure Wind 120°	None						772		
10	Structure Wind 135°	None						772		
11	Structure Wind 150°	None						774		
12	Structure Wind w/ Ice 0°	None						386		
13	Structure Wind w/ Ice 30°	None						774		
14	Structure Wind w/ Ice 45°	None						772		
15	Structure Wind w/ Ice 60°	None						772		
16	Structure Wind w/ Ice 90°	None						387		
17	Structure Wind w/ Ice 120°	None						772		
18	Structure Wind w/ Ice 135°	None						772		
19	Structure Wind w/ Ice 150°	None						774		
20	Antenna Wind 0°	None				32				
21	Antenna Wind 30°	None				64				
22	Antenna Wind 45°	None				64				
23	Antenna Wind 60°	None				64				
24	Antenna Wind 90°	None				32				
25	Antenna Wind 120°	None				64				
26	Antenna Wind 135°	None				64				
27	Antenna Wind 150°	None				64				
28	Antenna Wind w/ Ice 0°	None				32				
29	Antenna Wind w/ Ice 30°	None				64				
30	Antenna Wind w/ Ice 45°	None				64				
31	Antenna Wind w/ Ice 60°	None				64				
32	Antenna Wind w/ Ice 90°	None				32				
33	Antenna Wind w/ Ice 120°	None				64				
34	Antenna Wind w/ Ice 135°	None				64				
35	Antenna Wind w/ Ice 150°	None				64				
39	Maintenance Live 500 (1)	OL1				1				
40	Maintenance Live 500 (2)	OL2				1				
41	Maintenance Live 500 (3)	OL3				1				
42	Maintenance Live 500 (4)	OL4				1				

**Load Combinations**

	Description	Solve	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	DISPLAY (1.0D + 1.0W_0°)	Yes	Y	DL	1	20	1											
2	1.4D	Yes	Y	DL	1.4													
3	1.2D + 1.0W 0°	Yes	Y	DL	1.2	4	1	20	1									
4	1.2D + 1.0W 30°	Yes	Y	DL	1.2	5	1	21	1									
5	1.2D + 1.0W 45°	Yes	Y	DL	1.2	6	1	22	1									
6	1.2D + 1.0W 60°	Yes	Y	DL	1.2	7	1	23	1									
7	1.2D + 1.0W 90°	Yes	Y	DL	1.2	8	1	24	1									
8	1.2D + 1.0W 120°	Yes	Y	DL	1.2	9	1	25	1									
9	1.2D + 1.0W 135°	Yes	Y	DL	1.2	10	1	26	1									
10	1.2D + 1.0W 150°	Yes	Y	DL	1.2	11	1	27	1									
11	1.2D + 1.0W 180°	Yes	Y	DL	1.2	4	-1	20	-1									
12	1.2D + 1.0W 210°	Yes	Y	DL	1.2	5	-1	21	-1									
13	1.2D + 1.0W 225°	Yes	Y	DL	1.2	6	-1	22	-1									

**Load Combinations (Continued)**

	Description	Solve	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
14	1.2D + 1.0W 240°	Yes	Y		DL	1.2	7	-1	23	-1												
15	1.2D + 1.0W 270°	Yes	Y		DL	1.2	8	-1	24	-1												
16	1.2D + 1.0W 300°	Yes	Y		DL	1.2	9	-1	25	-1												
17	1.2D + 1.0W 315°	Yes	Y		DL	1.2	10	-1	26	-1												
18	1.2D + 1.0W 330°	Yes	Y		DL	1.2	11	-1	27	-1												
19	1.2D + 1.0Di + 1.0Wi_0°	Yes	Y		DL	1.2	12	1	28	1	RL	1										
20	1.2D + 1.0Di + 1.0Wi_30°	Yes	Y		DL	1.2	13	1	29	1	RL	1										
21	1.2D + 1.0Di + 1.0Wi_45°	Yes	Y		DL	1.2	14	1	30	1	RL	1										
22	1.2D + 1.0Di + 1.0Wi_60°	Yes	Y		DL	1.2	15	1	31	1	RL	1										
23	1.2D + 1.0Di + 1.0Wi_90°	Yes	Y		DL	1.2	16	1	32	1	RL	1										
24	1.2D + 1.0Di + 1.0Wi_120°	Yes	Y		DL	1.2	17	1	33	1	RL	1										
25	1.2D + 1.0Di + 1.0Wi_135°	Yes	Y		DL	1.2	18	1	34	1	RL	1										
26	1.2D + 1.0Di + 1.0Wi_150°	Yes	Y		DL	1.2	19	1	35	1	RL	1										
27	1.2D + 1.0Di + 1.0Wi_180°	Yes	Y		DL	1.2	12	-1	28	-1	RL	1										
28	1.2D + 1.0Di + 1.0Wi_210°	Yes	Y		DL	1.2	13	-1	29	-1	RL	1										
29	1.2D + 1.0Di + 1.0Wi_225°	Yes	Y		DL	1.2	14	-1	30	-1	RL	1										
30	1.2D + 1.0Di + 1.0Wi_240°	Yes	Y		DL	1.2	15	-1	31	-1	RL	1										
31	1.2D + 1.0Di + 1.0Wi_270°	Yes	Y		DL	1.2	16	-1	32	-1	RL	1										
32	1.2D + 1.0Di + 1.0Wi_300°	Yes	Y		DL	1.2	17	-1	33	-1	RL	1										
33	1.2D + 1.0Di + 1.0Wi_315°	Yes	Y		DL	1.2	18	-1	34	-1	RL	1										
34	1.2D + 1.0Di + 1.0Wi_330°	Yes	Y		DL	1.2	19	-1	35	-1	RL	1										
35	1.2D + 1.5Lm_1 + 1.0Wm_...	Yes	Y		DL	1.2	4	.061	20	.061	O...	1.5										
36	1.2D + 1.5Lm_1 + 1.0Wm_...	Yes	Y		DL	1.2	5	.061	21	.061	O...	1.5										
37	1.2D + 1.5Lm_1 + 1.0Wm_...	Yes	Y		DL	1.2	6	.061	22	.061	O...	1.5										
38	1.2D + 1.5Lm_1 + 1.0Wm_...	Yes	Y		DL	1.2	7	.061	23	.061	O...	1.5										
39	1.2D + 1.5Lm_1 + 1.0Wm_...	Yes	Y		DL	1.2	8	.061	24	.061	O...	1.5										
40	1.2D + 1.5Lm_1 + 1.0Wm_...	Yes	Y		DL	1.2	9	.061	25	.061	O...	1.5										
41	1.2D + 1.5Lm_1 + 1.0Wm_...	Yes	Y		DL	1.2	10	.061	26	.061	O...	1.5										
42	1.2D + 1.5Lm_1 + 1.0Wm_...	Yes	Y		DL	1.2	11	.061	27	.061	O...	1.5										
43	1.2D + 1.5Lm_1 + 1.0Wm_...	Yes	Y		DL	1.2	4	-0...	20	-0...	O...	1.5										
44	1.2D + 1.5Lm_1 + 1.0Wm_...	Yes	Y		DL	1.2	5	-0...	21	-0...	O...	1.5										
45	1.2D + 1.5Lm_1 + 1.0Wm_...	Yes	Y		DL	1.2	6	-0...	22	-0...	O...	1.5										
46	1.2D + 1.5Lm_1 + 1.0Wm_...	Yes	Y		DL	1.2	7	-0...	23	-0...	O...	1.5										
47	1.2D + 1.5Lm_1 + 1.0Wm_...	Yes	Y		DL	1.2	8	-0...	24	-0...	O...	1.5										
48	1.2D + 1.5Lm_1 + 1.0Wm_...	Yes	Y		DL	1.2	9	-0...	25	-0...	O...	1.5										
49	1.2D + 1.5Lm_1 + 1.0Wm_...	Yes	Y		DL	1.2	10	-0...	26	-0...	O...	1.5										
50	1.2D + 1.5Lm_1 + 1.0Wm_...	Yes	Y		DL	1.2	11	-0...	27	-0...	O...	1.5										
51	1.2D + 1.5Lm_2 + 1.0Wm_...	Yes	Y		DL	1.2	4	.061	20	.061	O...	1.5										
52	1.2D + 1.5Lm_2 + 1.0Wm_...	Yes	Y		DL	1.2	5	.061	21	.061	O...	1.5										
53	1.2D + 1.5Lm_2 + 1.0Wm_...	Yes	Y		DL	1.2	6	.061	22	.061	O...	1.5										
54	1.2D + 1.5Lm_2 + 1.0Wm_...	Yes	Y		DL	1.2	7	.061	23	.061	O...	1.5										
55	1.2D + 1.5Lm_2 + 1.0Wm_...	Yes	Y		DL	1.2	8	.061	24	.061	O...	1.5										
56	1.2D + 1.5Lm_2 + 1.0Wm_...	Yes	Y		DL	1.2	9	.061	25	.061	O...	1.5										
57	1.2D + 1.5Lm_2 + 1.0Wm_...	Yes	Y		DL	1.2	10	.061	26	.061	O...	1.5										
58	1.2D + 1.5Lm_2 + 1.0Wm_...	Yes	Y		DL	1.2	11	.061	27	.061	O...	1.5										
59	1.2D + 1.5Lm_2 + 1.0Wm_...	Yes	Y		DL	1.2	4	-0...	20	-0...	O...	1.5										
60	1.2D + 1.5Lm_2 + 1.0Wm_...	Yes	Y		DL	1.2	5	-0...	21	-0...	O...	1.5										
61	1.2D + 1.5Lm_2 + 1.0Wm_...	Yes	Y		DL	1.2	6	-0...	22	-0...	O...	1.5										
62	1.2D + 1.5Lm_2 + 1.0Wm_...	Yes	Y		DL	1.2	7	-0...	23	-0...	O...	1.5										
63	1.2D + 1.5Lm_2 + 1.0Wm_...	Yes	Y		DL	1.2	8	-0...	24	-0...	O...	1.5										
64	1.2D + 1.5Lm_2 + 1.0Wm_...	Yes	Y		DL	1.2	9	-0...	25	-0...	O...	1.5										
65	1.2D + 1.5Lm_2 + 1.0Wm_...	Yes	Y		DL	1.2	10	-0...	26	-0...	O...	1.5										
66	1.2D + 1.5Lm_2 + 1.0Wm_...	Yes	Y		DL	1.2	11	-0...	27	-0...	O...	1.5										
67	1.2D + 1.5Lm_3 + 1.0Wm_...	Yes	Y		DL	1.2	4	.061	20	.061	O...	1.5										
68	1.2D + 1.5Lm_3 + 1.0Wm_...	Yes	Y		DL	1.2	5	.061	21	.061	O...	1.5										
69	1.2D + 1.5Lm_3 + 1.0Wm_...	Yes	Y		DL	1.2	6	.061	22	.061	O...	1.5										
70	1.2D + 1.5Lm_3 + 1.0Wm_...	Yes	Y		DL	1.2	7	.061	23	.061	O...	1.5										

**Load Combinations (Continued)**

Description	Solve	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
71	1.2D + 1.5Lm_3 + 1.0Wm_...	Yes	Y		DL 1.2	8	.061	24	.061	O...	1.5												
72	1.2D + 1.5Lm_3 + 1.0Wm_...	Yes	Y		DL 1.2	9	.061	25	.061	O...	1.5												
73	1.2D + 1.5Lm_3 + 1.0Wm_...	Yes	Y		DL 1.2	10	.061	26	.061	O...	1.5												
74	1.2D + 1.5Lm_3 + 1.0Wm_...	Yes	Y		DL 1.2	11	.061	27	.061	O...	1.5												
75	1.2D + 1.5Lm_3 + 1.0Wm_...	Yes	Y		DL 1.2	4	-0...	20	-0...	O...	1.5												
76	1.2D + 1.5Lm_3 + 1.0Wm_...	Yes	Y		DL 1.2	5	-0...	21	-0...	O...	1.5												
77	1.2D + 1.5Lm_3 + 1.0Wm_...	Yes	Y		DL 1.2	6	-0...	22	-0...	O...	1.5												
78	1.2D + 1.5Lm_3 + 1.0Wm_...	Yes	Y		DL 1.2	7	-0...	23	-0...	O...	1.5												
79	1.2D + 1.5Lm_3 + 1.0Wm_...	Yes	Y		DL 1.2	8	-0...	24	-0...	O...	1.5												
80	1.2D + 1.5Lm_3 + 1.0Wm_...	Yes	Y		DL 1.2	9	-0...	25	-0...	O...	1.5												
81	1.2D + 1.5Lm_3 + 1.0Wm_...	Yes	Y		DL 1.2	10	-0...	26	-0...	O...	1.5												
82	1.2D + 1.5Lm_3 + 1.0Wm_...	Yes	Y		DL 1.2	11	-0...	27	-0...	O...	1.5												
83	1.2D + 1.5Lm_4 + 1.0Wm_...	Yes	Y		DL 1.2	4	.061	20	.061	O...	1.5												
84	1.2D + 1.5Lm_4 + 1.0Wm_...	Yes	Y		DL 1.2	5	.061	21	.061	O...	1.5												
85	1.2D + 1.5Lm_4 + 1.0Wm_...	Yes	Y		DL 1.2	6	.061	22	.061	O...	1.5												
86	1.2D + 1.5Lm_4 + 1.0Wm_...	Yes	Y		DL 1.2	7	.061	23	.061	O...	1.5												
87	1.2D + 1.5Lm_4 + 1.0Wm_...	Yes	Y		DL 1.2	8	.061	24	.061	O...	1.5												
88	1.2D + 1.5Lm_4 + 1.0Wm_...	Yes	Y		DL 1.2	9	.061	25	.061	O...	1.5												
89	1.2D + 1.5Lm_4 + 1.0Wm_...	Yes	Y		DL 1.2	10	.061	26	.061	O...	1.5												
90	1.2D + 1.5Lm_4 + 1.0Wm_...	Yes	Y		DL 1.2	11	.061	27	.061	O...	1.5												
91	1.2D + 1.5Lm_4 + 1.0Wm_...	Yes	Y		DL 1.2	4	-0...	20	-0...	O...	1.5												
92	1.2D + 1.5Lm_4 + 1.0Wm_...	Yes	Y		DL 1.2	5	-0...	21	-0...	O...	1.5												
93	1.2D + 1.5Lm_4 + 1.0Wm_...	Yes	Y		DL 1.2	6	-0...	22	-0...	O...	1.5												
94	1.2D + 1.5Lm_4 + 1.0Wm_...	Yes	Y		DL 1.2	7	-0...	23	-0...	O...	1.5												
95	1.2D + 1.5Lm_4 + 1.0Wm_...	Yes	Y		DL 1.2	8	-0...	24	-0...	O...	1.5												
96	1.2D + 1.5Lm_4 + 1.0Wm_...	Yes	Y		DL 1.2	9	-0...	25	-0...	O...	1.5												
97	1.2D + 1.5Lm_4 + 1.0Wm_...	Yes	Y		DL 1.2	10	-0...	26	-0...	O...	1.5												
98	1.2D + 1.5Lm_4 + 1.0Wm_...	Yes	Y		DL 1.2	11	-0...	27	-0...	O...	1.5												

**Hot Rolled Steel Properties**

Label	E [ksi]	G [ksi]	Nu	Therm (1E...	Density[lb/f...	Yield[ksi]	Ry	Fu[ksi]	Rt	
1	A992	29000	11154	.3	.65	490	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	490	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	490	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	490	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	490	50	1.4	65	1.3
8	A500 Gr. 50	29000	11154	.3	.65	490	50	1.5	62	1.2
9	A500 Gr. C	29000	11154	.3	.65	490	50	1.5	62	1.2

**Hot Rolled Steel Section Sets**

Label	Shape	Type	Design List	Material	Design Rul...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]	
1	MOD-Bracing Pipe	PIPE 2.0	Beam	None	A53 Gr.B	Typical	1.02	.627	.627	1.25
2	Rail Arch	PIPE 2.0	Beam	None	A500 Gr. 50	Typical	1.02	.627	.627	1.25
3	Standoff End Pipe	PIPE_2.5X	Beam	None	A500 Gr. 50	Typical	2.1	1.83	1.83	3.66
4	Boom Rail	PIPE 2.0	Beam	None	A500 Gr. 50	Typical	1.02	.627	.627	1.25
5	Boom Inner Pipes	PIPE 2.0	Beam	None	A500 Gr. 50	Typical	1.02	.627	.627	1.25
6	Boom End Pipe	PIPE 2.0	Beam	None	A500 Gr. 50	Typical	1.02	.627	.627	1.25
7	Arch Space Pipes	PIPE 2.0	Beam	None	A500 Gr. 50	Typical	1.02	.627	.627	1.25
8	Clip Plate	PL6x0.5	Beam	None	A572 Gr.50	Typical	3	.063	9	.237
9	Standoff Rail	HSS3X3X3	Beam	None	A500 Gr. C	Typical	1.89	2.46	2.46	4.03
10	Standoff Spacer	PIPE 1.5	Beam	None	A500 Gr. 50	Typical	.749	.293	.293	.586
11	Standoff Bracket	PL6x0.5	Beam	None	A572 Gr.50	Typical	3	.063	9	.237



**Hot Rolled Steel Section Sets (Continued)**

	Label	Shape	Type	Design List	Material	Design Rul...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
12	Mount Pipe	PIPE 2.0	Beam	None	A53 Gr.B	Typical	1.02	.627	.627	1.25

**Hot Rolled Steel Design Parameters**

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torq...	Kyy	Kzz	Cb	Function
1	M64	Rail Arch	1.177			Lbyy						Lateral
2	M65	Rail Arch	2.094			Lbyy						Lateral
3	M66	Rail Arch	2.094			Lbyy						Lateral
4	M67	Rail Arch	2.094			Lbyy						Lateral
5	M68	Rail Arch	2.094			Lbyy						Lateral
6	M69	Rail Arch	2.094			Lbyy						Lateral
7	M70	Rail Arch	2.094			Lbyy						Lateral
8	M71	Rail Arch	2.094			Lbyy						Lateral
9	M72	Rail Arch	2.094			Lbyy						Lateral
10	M73	Rail Arch	2.094			Lbyy						Lateral
11	M74	Rail Arch	2.094			Lbyy						Lateral
12	M75	Rail Arch	2.094			Lbyy						Lateral
13	M76	Rail Arch	2.094			Lbyy						Lateral
14	M77	Rail Arch	2.094			Lbyy						Lateral
15	M78	Rail Arch	2.094			Lbyy						Lateral
16	M79	Rail Arch	2.094			Lbyy						Lateral
17	M80	Rail Arch	2.094			Lbyy						Lateral
18	M81	Rail Arch	2.094			Lbyy						Lateral
19	M82	Rail Arch	2.094			Lbyy						Lateral
20	M83	Rail Arch	2.094			Lbyy						Lateral
21	M84	Rail Arch	2.094			Lbyy						Lateral
22	M85	Rail Arch	2.094			Lbyy						Lateral
23	M86	Rail Arch	2.094			Lbyy						Lateral
24	M87	Rail Arch	2.094			Lbyy						Lateral
25	M88	Rail Arch	2.094			Lbyy						Lateral
26	M89	Rail Arch	2.094			Lbyy						Lateral
27	M90	Rail Arch	2.094			Lbyy						Lateral
28	M91	Rail Arch	2.094			Lbyy						Lateral
29	M92	Rail Arch	2.094			Lbyy						Lateral
30	M93	Rail Arch	2.094			Lbyy						Lateral
31	M94	Rail Arch	2.094			Lbyy						Lateral
32	M95	Rail Arch	2.094			Lbyy						Lateral
33	M96	Rail Arch	2.094			Lbyy						Lateral
34	M97	Rail Arch	2.094			Lbyy						Lateral
35	M98	Rail Arch	2.094			Lbyy						Lateral
36	M99	Rail Arch	2.094			Lbyy						Lateral
37	M100	Rail Arch	2.094			Lbyy						Lateral
38	M101	Rail Arch	2.094			Lbyy						Lateral
39	M102	Rail Arch	2.094			Lbyy						Lateral
40	M103	Rail Arch	2.094			Lbyy						Lateral
41	M104	Rail Arch	2.094			Lbyy						Lateral
42	M105	Rail Arch	2.094			Lbyy						Lateral
43	M106	Rail Arch	2.094			Lbyy						Lateral
44	M107	Rail Arch	2.094			Lbyy						Lateral
45	M108	Rail Arch	2.094			Lbyy						Lateral
46	M109	Rail Arch	2.094			Lbyy						Lateral
47	M110	Rail Arch	2.094			Lbyy						Lateral
48	M111	Rail Arch	2.094			Lbyy						Lateral
49	M112	Rail Arch	2.094			Lbyy						Lateral
50	M113	Rail Arch	2.094			Lbyy						Lateral
51	M114	Rail Arch	2.094			Lbyy						Lateral

**Hot Rolled Steel Design Parameters (Continued)**

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torg...	Kyy	Kzz	Cb	Function
52	M115	Rail Arch	2.094			Lbyy						Lateral
53	M116	Rail Arch	2.094			Lbyy						Lateral
54	M117	Rail Arch	1.177			Lbyy						Lateral
55	M55	Boom Rail	144	96	48	Lbyy						Lateral
56	M56	Rail Arch	1.177			Lbyy						Lateral
57	M57	Rail Arch	2.094			Lbyy						Lateral
58	M58	Rail Arch	2.094			Lbyy						Lateral
59	M59	Rail Arch	2.094			Lbyy						Lateral
60	M60	Rail Arch	2.094			Lbyy						Lateral
61	M61	Rail Arch	2.094			Lbyy						Lateral
62	M62	Rail Arch	2.094			Lbyy						Lateral
63	M63	Rail Arch	2.094			Lbyy						Lateral
64	M64A	Rail Arch	2.094			Lbyy						Lateral
65	M65A	Rail Arch	2.094			Lbyy						Lateral
66	M66A	Rail Arch	2.094			Lbyy						Lateral
67	M67A	Rail Arch	2.094			Lbyy						Lateral
68	M68A	Rail Arch	2.094			Lbyy						Lateral
69	M69A	Rail Arch	2.094			Lbyy						Lateral
70	M70A	Rail Arch	2.094			Lbyy						Lateral
71	M71A	Rail Arch	2.094			Lbyy						Lateral
72	M72A	Rail Arch	2.094			Lbyy						Lateral
73	M73A	Rail Arch	2.094			Lbyy						Lateral
74	M74A	Rail Arch	2.094			Lbyy						Lateral
75	M75A	Rail Arch	2.094			Lbyy						Lateral
76	M76A	Rail Arch	2.094			Lbyy						Lateral
77	M77A	Rail Arch	2.094			Lbyy						Lateral
78	M78A	Rail Arch	2.094			Lbyy						Lateral
79	M79A	Rail Arch	2.094			Lbyy						Lateral
80	M80A	Rail Arch	2.094			Lbyy						Lateral
81	M81A	Rail Arch	2.094			Lbyy						Lateral
82	M82A	Rail Arch	2.094			Lbyy						Lateral
83	M83A	Rail Arch	2.094			Lbyy						Lateral
84	M84A	Rail Arch	2.094			Lbyy						Lateral
85	M85A	Rail Arch	2.094			Lbyy						Lateral
86	M86A	Rail Arch	2.094			Lbyy						Lateral
87	M87A	Rail Arch	2.094			Lbyy						Lateral
88	M88A	Rail Arch	2.094			Lbyy						Lateral
89	M89A	Rail Arch	2.094			Lbyy						Lateral
90	M90A	Rail Arch	2.094			Lbyy						Lateral
91	M91A	Rail Arch	2.094			Lbyy						Lateral
92	M92A	Rail Arch	2.094			Lbyy						Lateral
93	M93A	Rail Arch	2.094			Lbyy						Lateral
94	M94A	Rail Arch	2.094			Lbyy						Lateral
95	M95A	Rail Arch	2.094			Lbyy						Lateral
96	M96A	Rail Arch	2.094			Lbyy						Lateral
97	M97A	Rail Arch	2.094			Lbyy						Lateral
98	M98A	Rail Arch	2.094			Lbyy						Lateral
99	M99A	Rail Arch	2.094			Lbyy						Lateral
100	M100A	Rail Arch	2.094			Lbyy						Lateral
101	M101A	Rail Arch	2.094			Lbyy						Lateral
102	M102A	Rail Arch	2.094			Lbyy						Lateral
103	M103A	Rail Arch	2.094			Lbyy						Lateral
104	M104A	Rail Arch	2.094			Lbyy						Lateral
105	M105A	Rail Arch	2.094			Lbyy						Lateral
106	M106A	Rail Arch	2.094			Lbyy						Lateral
107	M107A	Rail Arch	2.094			Lbyy						Lateral
108	M108A	Rail Arch	2.094			Lbyy						Lateral



**Hot Rolled Steel Design Parameters (Continued)**

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torq...	Kyy	Kzz	Cb	Function
109	M109A	Rail Arch	1.177			Lbyy						Lateral
110	M110A	Boom Rail	144	96	48	Lbyy						Lateral
111	M111A	Boom Inner ...	32.625			Lbyy			.65	.65		Lateral
112	M112A	Boom Inner ...	32.625			Lbyy			.65	.65		Lateral
113	M113A	Boom Inner ...	32.625			Lbyy			.65	.65		Lateral
114	M114A	Boom End ...	32.625			Lbyy			.65	.65		Lateral
115	M115A	Boom End ...	32.625			Lbyy			.65	.65		Lateral
116	M116A	Arch Space ...	32.625			Lbyy			.65	.65		Lateral
117	M117A	Arch Space ...	32.625			Lbyy			.65	.65		Lateral
118	M120	Clip Plate	6.5			Lbyy						Lateral
119	M121	Clip Plate	6.5			Lbyy						Lateral
120	M122	Standoff En...	48			Lbyy			.65	.65		Lateral
121	M127	Standoff Rail	17			Lbyy						Lateral
122	M128	Standoff Rail	17			Lbyy						Lateral
123	M129	Standoff Sp...	45			Lbyy			.65	.65		Lateral
124	M132	Standoff Br...	6.25			Lbyy			.65	.65		Lateral
125	M135	Standoff Br...	6.25			Lbyy			.65	.65		Lateral
126	M140	Mount Pipe	120			Lbyy						Lateral
127	M141	Mount Pipe	120			Lbyy						Lateral
128	M144	Mount Pipe	120			Lbyy						Lateral
129	M147	Mount Pipe	120			Lbyy						Lateral
130	M168A	Rail Arch	1.177			Lbyy						Lateral
131	M169A	Rail Arch	2.094			Lbyy						Lateral
132	M170A	Rail Arch	2.094			Lbyy						Lateral
133	M171A	Rail Arch	2.094			Lbyy						Lateral
134	M172B	Rail Arch	2.094			Lbyy						Lateral
135	M173B	Rail Arch	2.094			Lbyy						Lateral
136	M174B	Rail Arch	2.094			Lbyy						Lateral
137	M175B	Rail Arch	2.094			Lbyy						Lateral
138	M176	Rail Arch	2.094			Lbyy						Lateral
139	M177	Rail Arch	2.094			Lbyy						Lateral
140	M178	Rail Arch	2.094			Lbyy						Lateral
141	M179	Rail Arch	2.094			Lbyy						Lateral
142	M180	Rail Arch	2.094			Lbyy						Lateral
143	M181	Rail Arch	2.094			Lbyy						Lateral
144	M182	Rail Arch	2.094			Lbyy						Lateral
145	M183	Rail Arch	2.094			Lbyy						Lateral
146	M184	Rail Arch	2.094			Lbyy						Lateral
147	M185	Rail Arch	2.094			Lbyy						Lateral
148	M186	Rail Arch	2.094			Lbyy						Lateral
149	M187	Rail Arch	2.094			Lbyy						Lateral
150	M188	Rail Arch	2.094			Lbyy						Lateral
151	M189	Rail Arch	2.094			Lbyy						Lateral
152	M190	Rail Arch	2.094			Lbyy						Lateral
153	M191	Rail Arch	2.094			Lbyy						Lateral
154	M192	Rail Arch	2.094			Lbyy						Lateral
155	M193	Rail Arch	2.094			Lbyy						Lateral
156	M194	Rail Arch	2.094			Lbyy						Lateral
157	M195	Rail Arch	2.094			Lbyy						Lateral
158	M196	Rail Arch	2.094			Lbyy						Lateral
159	M197	Rail Arch	2.094			Lbyy						Lateral
160	M198	Rail Arch	2.094			Lbyy						Lateral
161	M199	Rail Arch	2.094			Lbyy						Lateral
162	M200	Rail Arch	2.094			Lbyy						Lateral
163	M201	Rail Arch	2.094			Lbyy						Lateral
164	M202	Rail Arch	2.094			Lbyy						Lateral
165	M203	Rail Arch	2.094			Lbyy						Lateral

**Hot Rolled Steel Design Parameters (Continued)**

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torg...	Kyy	Kzz	Cb	Function
166	M204	Rail Arch	2.094			Lbyy						Lateral
167	M205	Rail Arch	2.094			Lbyy						Lateral
168	M206	Rail Arch	2.094			Lbyy						Lateral
169	M207	Rail Arch	2.094			Lbyy						Lateral
170	M208	Rail Arch	2.094			Lbyy						Lateral
171	M209	Rail Arch	2.094			Lbyy						Lateral
172	M210	Rail Arch	2.094			Lbyy						Lateral
173	M211	Rail Arch	2.094			Lbyy						Lateral
174	M212	Rail Arch	2.094			Lbyy						Lateral
175	M213	Rail Arch	2.094			Lbyy						Lateral
176	M214	Rail Arch	2.094			Lbyy						Lateral
177	M215	Rail Arch	2.094			Lbyy						Lateral
178	M216	Rail Arch	2.094			Lbyy						Lateral
179	M217	Rail Arch	2.094			Lbyy						Lateral
180	M218	Rail Arch	2.094			Lbyy						Lateral
181	M219	Rail Arch	2.094			Lbyy						Lateral
182	M220	Rail Arch	2.094			Lbyy						Lateral
183	M221	Rail Arch	1.177			Lbyy						Lateral
184	M222	Boom Rail	144	96	48	Lbyy						Lateral
185	M223	Rail Arch	1.177			Lbyy						Lateral
186	M224	Rail Arch	2.094			Lbyy						Lateral
187	M225	Rail Arch	2.094			Lbyy						Lateral
188	M226	Rail Arch	2.094			Lbyy						Lateral
189	M227	Rail Arch	2.094			Lbyy						Lateral
190	M228	Rail Arch	2.094			Lbyy						Lateral
191	M229	Rail Arch	2.094			Lbyy						Lateral
192	M230	Rail Arch	2.094			Lbyy						Lateral
193	M231	Rail Arch	2.094			Lbyy						Lateral
194	M232	Rail Arch	2.094			Lbyy						Lateral
195	M233	Rail Arch	2.094			Lbyy						Lateral
196	M234	Rail Arch	2.094			Lbyy						Lateral
197	M235	Rail Arch	2.094			Lbyy						Lateral
198	M236	Rail Arch	2.094			Lbyy						Lateral
199	M237	Rail Arch	2.094			Lbyy						Lateral
200	M238	Rail Arch	2.094			Lbyy						Lateral
201	M239	Rail Arch	2.094			Lbyy						Lateral
202	M240	Rail Arch	2.094			Lbyy						Lateral
203	M241	Rail Arch	2.094			Lbyy						Lateral
204	M242	Rail Arch	2.094			Lbyy						Lateral
205	M243	Rail Arch	2.094			Lbyy						Lateral
206	M244	Rail Arch	2.094			Lbyy						Lateral
207	M245	Rail Arch	2.094			Lbyy						Lateral
208	M246	Rail Arch	2.094			Lbyy						Lateral
209	M247	Rail Arch	2.094			Lbyy						Lateral
210	M248	Rail Arch	2.094			Lbyy						Lateral
211	M249	Rail Arch	2.094			Lbyy						Lateral
212	M250	Rail Arch	2.094			Lbyy						Lateral
213	M251	Rail Arch	2.094			Lbyy						Lateral
214	M252	Rail Arch	2.094			Lbyy						Lateral
215	M253	Rail Arch	2.094			Lbyy						Lateral
216	M254	Rail Arch	2.094			Lbyy						Lateral
217	M255	Rail Arch	2.094			Lbyy						Lateral
218	M256	Rail Arch	2.094			Lbyy						Lateral
219	M257	Rail Arch	2.094			Lbyy						Lateral
220	M258	Rail Arch	2.094			Lbyy						Lateral
221	M259	Rail Arch	2.094			Lbyy						Lateral
222	M260	Rail Arch	2.094			Lbyy						Lateral

**Hot Rolled Steel Design Parameters (Continued)**

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torg...	Kyy	Kzz	Cb	Function
223	M261	Rail Arch	2.094			Lbyy						Lateral
224	M262	Rail Arch	2.094			Lbyy						Lateral
225	M263	Rail Arch	2.094			Lbyy						Lateral
226	M264	Rail Arch	2.094			Lbyy						Lateral
227	M265	Rail Arch	2.094			Lbyy						Lateral
228	M266	Rail Arch	2.094			Lbyy						Lateral
229	M267	Rail Arch	2.094			Lbyy						Lateral
230	M268	Rail Arch	2.094			Lbyy						Lateral
231	M269	Rail Arch	2.094			Lbyy						Lateral
232	M270	Rail Arch	2.094			Lbyy						Lateral
233	M271	Rail Arch	2.094			Lbyy						Lateral
234	M272	Rail Arch	2.094			Lbyy						Lateral
235	M273	Rail Arch	2.094			Lbyy						Lateral
236	M274	Rail Arch	2.094			Lbyy						Lateral
237	M275	Rail Arch	2.094			Lbyy						Lateral
238	M276	Rail Arch	1.177			Lbyy						Lateral
239	M277	Boom Rail	144	96	48	Lbyy						Lateral
240	M278	Boom Inner ...	32.625			Lbyy			.65	.65		Lateral
241	M279	Boom Inner ...	32.625			Lbyy			.65	.65		Lateral
242	M280	Boom Inner ...	32.625			Lbyy			.65	.65		Lateral
243	M281	Boom End ...	32.625			Lbyy			.65	.65		Lateral
244	M282	Boom End ...	32.625			Lbyy			.65	.65		Lateral
245	M283	Arch Space ...	32.625			Lbyy			.65	.65		Lateral
246	M284	Arch Space ...	32.625			Lbyy			.65	.65		Lateral
247	M287	Clip Plate	6.5			Lbyy						Lateral
248	M288	Clip Plate	6.5			Lbyy						Lateral
249	M289	Standoff En...	48			Lbyy			.65	.65		Lateral
250	M294	Standoff Rail	17			Lbyy						Lateral
251	M295	Standoff Rail	17			Lbyy						Lateral
252	M296	Standoff Sp...	45			Lbyy			.65	.65		Lateral
253	M299	Standoff Br...	6.25			Lbyy			.65	.65		Lateral
254	M302	Standoff Br...	6.25			Lbyy			.65	.65		Lateral
255	M303	Mount Pipe	120			Lbyy						Lateral
256	M304	Mount Pipe	120			Lbyy						Lateral
257	M307	Mount Pipe	120			Lbyy						Lateral
258	M310	Mount Pipe	120			Lbyy						Lateral
259	M335	Rail Arch	1.177			Lbyy						Lateral
260	M336	Rail Arch	2.094			Lbyy						Lateral
261	M337	Rail Arch	2.094			Lbyy						Lateral
262	M338	Rail Arch	2.094			Lbyy						Lateral
263	M339	Rail Arch	2.094			Lbyy						Lateral
264	M340	Rail Arch	2.094			Lbyy						Lateral
265	M341	Rail Arch	2.094			Lbyy						Lateral
266	M342	Rail Arch	2.094			Lbyy						Lateral
267	M343	Rail Arch	2.094			Lbyy						Lateral
268	M344	Rail Arch	2.094			Lbyy						Lateral
269	M345	Rail Arch	2.094			Lbyy						Lateral
270	M346	Rail Arch	2.094			Lbyy						Lateral
271	M347	Rail Arch	2.094			Lbyy						Lateral
272	M348	Rail Arch	2.094			Lbyy						Lateral
273	M349	Rail Arch	2.094			Lbyy						Lateral
274	M350	Rail Arch	2.094			Lbyy						Lateral
275	M351	Rail Arch	2.094			Lbyy						Lateral
276	M352	Rail Arch	2.094			Lbyy						Lateral
277	M353	Rail Arch	2.094			Lbyy						Lateral
278	M354	Rail Arch	2.094			Lbyy						Lateral
279	M355	Rail Arch	2.094			Lbyy						Lateral

**Hot Rolled Steel Design Parameters (Continued)**

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torg...	Kyy	Kzz	Cb	Function
280	M356	Rail Arch	2.094			Lbyy						Lateral
281	M357	Rail Arch	2.094			Lbyy						Lateral
282	M358	Rail Arch	2.094			Lbyy						Lateral
283	M359	Rail Arch	2.094			Lbyy						Lateral
284	M360	Rail Arch	2.094			Lbyy						Lateral
285	M361	Rail Arch	2.094			Lbyy						Lateral
286	M362	Rail Arch	2.094			Lbyy						Lateral
287	M363	Rail Arch	2.094			Lbyy						Lateral
288	M364	Rail Arch	2.094			Lbyy						Lateral
289	M365	Rail Arch	2.094			Lbyy						Lateral
290	M366	Rail Arch	2.094			Lbyy						Lateral
291	M367	Rail Arch	2.094			Lbyy						Lateral
292	M368	Rail Arch	2.094			Lbyy						Lateral
293	M369	Rail Arch	2.094			Lbyy						Lateral
294	M370	Rail Arch	2.094			Lbyy						Lateral
295	M371	Rail Arch	2.094			Lbyy						Lateral
296	M372	Rail Arch	2.094			Lbyy						Lateral
297	M373	Rail Arch	2.094			Lbyy						Lateral
298	M374	Rail Arch	2.094			Lbyy						Lateral
299	M375	Rail Arch	2.094			Lbyy						Lateral
300	M376	Rail Arch	2.094			Lbyy						Lateral
301	M377	Rail Arch	2.094			Lbyy						Lateral
302	M378	Rail Arch	2.094			Lbyy						Lateral
303	M379	Rail Arch	2.094			Lbyy						Lateral
304	M380	Rail Arch	2.094			Lbyy						Lateral
305	M381	Rail Arch	2.094			Lbyy						Lateral
306	M382	Rail Arch	2.094			Lbyy						Lateral
307	M383	Rail Arch	2.094			Lbyy						Lateral
308	M384	Rail Arch	2.094			Lbyy						Lateral
309	M385	Rail Arch	2.094			Lbyy						Lateral
310	M386	Rail Arch	2.094			Lbyy						Lateral
311	M387	Rail Arch	2.094			Lbyy						Lateral
312	M388	Rail Arch	1.177			Lbyy						Lateral
313	M389	Boom Rail	144	96	48	Lbyy						Lateral
314	M390	Rail Arch	1.177			Lbyy						Lateral
315	M391	Rail Arch	2.094			Lbyy						Lateral
316	M392	Rail Arch	2.094			Lbyy						Lateral
317	M393	Rail Arch	2.094			Lbyy						Lateral
318	M394	Rail Arch	2.094			Lbyy						Lateral
319	M395	Rail Arch	2.094			Lbyy						Lateral
320	M396	Rail Arch	2.094			Lbyy						Lateral
321	M397	Rail Arch	2.094			Lbyy						Lateral
322	M398	Rail Arch	2.094			Lbyy						Lateral
323	M399	Rail Arch	2.094			Lbyy						Lateral
324	M400	Rail Arch	2.094			Lbyy						Lateral
325	M401	Rail Arch	2.094			Lbyy						Lateral
326	M402	Rail Arch	2.094			Lbyy						Lateral
327	M403	Rail Arch	2.094			Lbyy						Lateral
328	M404	Rail Arch	2.094			Lbyy						Lateral
329	M405	Rail Arch	2.094			Lbyy						Lateral
330	M406	Rail Arch	2.094			Lbyy						Lateral
331	M407	Rail Arch	2.094			Lbyy						Lateral
332	M408	Rail Arch	2.094			Lbyy						Lateral
333	M409	Rail Arch	2.094			Lbyy						Lateral
334	M410	Rail Arch	2.094			Lbyy						Lateral
335	M411	Rail Arch	2.094			Lbyy						Lateral
336	M412	Rail Arch	2.094			Lbyy						Lateral

**Hot Rolled Steel Design Parameters (Continued)**

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torq...	Kyy	Kzz	Cb	Function
337	M413	Rail Arch	2.094			Lbyy						Lateral
338	M414	Rail Arch	2.094			Lbyy						Lateral
339	M415	Rail Arch	2.094			Lbyy						Lateral
340	M416	Rail Arch	2.094			Lbyy						Lateral
341	M417	Rail Arch	2.094			Lbyy						Lateral
342	M418	Rail Arch	2.094			Lbyy						Lateral
343	M419	Rail Arch	2.094			Lbyy						Lateral
344	M420	Rail Arch	2.094			Lbyy						Lateral
345	M421	Rail Arch	2.094			Lbyy						Lateral
346	M422	Rail Arch	2.094			Lbyy						Lateral
347	M423	Rail Arch	2.094			Lbyy						Lateral
348	M424	Rail Arch	2.094			Lbyy						Lateral
349	M425	Rail Arch	2.094			Lbyy						Lateral
350	M426	Rail Arch	2.094			Lbyy						Lateral
351	M427	Rail Arch	2.094			Lbyy						Lateral
352	M428	Rail Arch	2.094			Lbyy						Lateral
353	M429	Rail Arch	2.094			Lbyy						Lateral
354	M430	Rail Arch	2.094			Lbyy						Lateral
355	M431	Rail Arch	2.094			Lbyy						Lateral
356	M432	Rail Arch	2.094			Lbyy						Lateral
357	M433	Rail Arch	2.094			Lbyy						Lateral
358	M434	Rail Arch	2.094			Lbyy						Lateral
359	M435	Rail Arch	2.094			Lbyy						Lateral
360	M436	Rail Arch	2.094			Lbyy						Lateral
361	M437	Rail Arch	2.094			Lbyy						Lateral
362	M438	Rail Arch	2.094			Lbyy						Lateral
363	M439	Rail Arch	2.094			Lbyy						Lateral
364	M440	Rail Arch	2.094			Lbyy						Lateral
365	M441	Rail Arch	2.094			Lbyy						Lateral
366	M442	Rail Arch	2.094			Lbyy						Lateral
367	M443	Rail Arch	1.177			Lbyy						Lateral
368	M444	Boom Rail	144	96	48	Lbyy						Lateral
369	M445	Boom Inner ...	32.625			Lbyy			.65	.65		Lateral
370	M446	Boom Inner ...	32.625			Lbyy			.65	.65		Lateral
371	M447	Boom Inner ...	32.625			Lbyy			.65	.65		Lateral
372	M448	Boom End ...	32.625			Lbyy			.65	.65		Lateral
373	M449	Boom End ...	32.625			Lbyy			.65	.65		Lateral
374	M450	Arch Space ...	32.625			Lbyy			.65	.65		Lateral
375	M451	Arch Space ...	32.625			Lbyy			.65	.65		Lateral
376	M454	Clip Plate	6.5			Lbyy						Lateral
377	M455	Clip Plate	6.5			Lbyy						Lateral
378	M456	Standoff En...	48			Lbyy			.65	.65		Lateral
379	M461	Standoff Rail	17			Lbyy						Lateral
380	M462	Standoff Rail	17			Lbyy						Lateral
381	M463	Standoff Sp...	45			Lbyy			.65	.65		Lateral
382	M466	Standoff Br...	6.25			Lbyy			.65	.65		Lateral
383	M469	Standoff Br...	6.25			Lbyy			.65	.65		Lateral
384	M470	Mount Pipe	120			Lbyy						Lateral
385	M471	Mount Pipe	120			Lbyy						Lateral
386	M474	Mount Pipe	120			Lbyy						Lateral
387	M477	Mount Pipe	120			Lbyy						Lateral
388	M510	MOD-Braci...	57.471			Lbyy						Lateral
389	M509	MOD-Braci...	57.471			Lbyy						Lateral
390	M512	MOD-Braci...	57.471			Lbyy						Lateral



**Envelope Joint Reactions**

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N209	max	2814.419	19	1142.272	47	1457.751	19	110.234	7	-9.008	3	1728.948	49
2		min	-354.929	11	-785.896	87	204.67	11	-122.633	15	-76.094	27	-1174.932	89
3	N207	max	588.715	3	787.881	95	1484.073	27	79.495	15	-1.59	3	1164.34	97
4		min	-2808.33	27	-1144.407	40	208.957	3	-66.035	7	-302.523	27	-1717.724	41
5	N652C	max	1150.536	34	2605.291	31	1388.876	32	-4.903	9	144.899	30	786.28	6
6		min	-641.069	10	-396.638	7	251.69	8	-258.723	34	-27.056	7	-1342.686	14
7	N643	max	1789.854	20	571.689	14	1470.433	22	256.034	20	174.918	24	757.356	11
8		min	-431.981	12	-2225.128	23	201.079	14	-15.588	12	-30.476	16	-1321.503	3
9	N655A	max	527.415	18	219.488	15	1376.604	24	43.941	6	107.194	4	1272.969	6
10		min	-1159.7	26	-2617.606	23	251.074	16	-73.085	14	-67.313	12	-717.056	14
11	N646B	max	289.068	4	2239.461	31	1444.913	30	86.253	8	111.85	3	1253.876	11
12		min	-1791.258	28	-404.264	7	196.766	6	-37.175	16	-98.332	11	-689.206	3
13	Totals:	max	5457.017	3	5420.969	15	8238.376	33						
14		min	-5457.031	11	-5420.966	7	2204.928	1						

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

Member	Shape	Code	Loc[in]	LC	Shear	Loc[in]	Dir	LC	phi*Pnc	phi*Pnt [lb]	phi*Mn y	phi*Mn z	Cb	Eqn
1	M360	PIPE 2.0	.471	2.094	24	.174	2.094	24	45876.06	45900	2673.75	2673.75	1...	H1-1b
2	M81A	PIPE 2.0	.470	2.094	27	.174	2.094	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
3	M415	PIPE 2.0	.470	2.094	32	.174	2.094	32	45876.06	45900	2673.75	2673.75	1...	H1-1b
4	M89	PIPE 2.0	.470	2.094	19	.174	2.094	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
5	M193	PIPE 2.0	.469	2.094	30	.173	2.094	29	45876.06	45900	2673.75	2673.75	1...	H1-1b
6	M248	PIPE 2.0	.469	2.094	22	.174	2.094	21	45876.06	45900	2673.75	2673.75	1...	H1-1b
7	M450	PIPE 2.0	.445	0	21	.095	32.625	30	43509.276	45900	2673.75	2673.75	2...	H1-1b
8	M116A	PIPE 2.0	.445	0	32	.095	32.625	25	43509.276	45900	2673.75	2673.75	2...	H1-1b
9	M283	PIPE 2.0	.444	0	27	.094	32.625	19	43509.276	45900	2673.75	2673.75	2...	H1-1b
10	M359	PIPE 2.0	.401	2.094	24	.159	2.094	24	45876.06	45900	2673.75	2673.75	1...	H1-1b
11	M88	PIPE 2.0	.400	2.094	19	.158	2.094	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
12	M192	PIPE 2.0	.400	2.094	30	.158	2.094	29	45876.06	45900	2673.75	2673.75	1...	H1-1b
13	M80A	PIPE 2.0	.400	2.094	27	.158	2.094	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
14	M414	PIPE 2.0	.400	2.094	32	.158	2.094	32	45876.06	45900	2673.75	2673.75	1...	H1-1b
15	M247	PIPE 2.0	.399	2.094	22	.158	2.094	21	45876.06	45900	2673.75	2673.75	1...	H1-1b
16	M92	PIPE 2.0	.394	0	19	.149	0	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
17	M363	PIPE 2.0	.394	0	24	.149	0	25	45876.06	45900	2673.75	2673.75	1...	H1-1b
18	M418	PIPE 2.0	.391	0	32	.150	0	33	45876.06	45900	2673.75	2673.75	1...	H1-1b
19	M84A	PIPE 2.0	.391	0	27	.149	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
20	M196	PIPE 2.0	.385	0	30	.146	0	30	45876.06	45900	2673.75	2673.75	1...	H1-1b
21	M251	PIPE 2.0	.382	0	22	.146	0	22	45876.06	45900	2673.75	2673.75	1...	H1-1b
22	M117A	PIPE 2.0	.356	0	86	.095	32.625	29	43509.276	45900	2673.75	2673.75	2...	H1-1b
23	M451	PIPE 2.0	.352	0	27	.095	32.625	34	43509.276	45900	2673.75	2673.75	2...	H1-1b
24	M284	PIPE 2.0	.344	0	32	.093	32.625	24	43509.276	45900	2673.75	2673.75	2...	H1-1b
25	M93	PIPE 2.0	.335	0	19	.137	0	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
26	M358	PIPE 2.0	.335	2.094	24	.145	2.094	24	45876.06	45900	2673.75	2673.75	1...	H1-1b
27	M364	PIPE 2.0	.334	0	24	.137	0	25	45876.06	45900	2673.75	2673.75	1...	H1-1b
28	M87	PIPE 2.0	.334	2.094	19	.145	2.094	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
29	M191	PIPE 2.0	.334	2.094	30	.144	2.094	29	45876.06	45900	2673.75	2673.75	1...	H1-1b
30	M79A	PIPE 2.0	.333	2.094	27	.144	2.094	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
31	M413	PIPE 2.0	.333	2.094	32	.144	2.094	32	45876.06	45900	2673.75	2673.75	1...	H1-1b
32	M246	PIPE 2.0	.332	2.094	22	.144	2.094	21	45876.06	45900	2673.75	2673.75	1...	H1-1b
33	M419	PIPE 2.0	.332	0	32	.137	0	33	45876.06	45900	2673.75	2673.75	1...	H1-1b
34	M85A	PIPE 2.0	.332	0	27	.137	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
35	M197	PIPE 2.0	.327	0	30	.134	0	30	45876.06	45900	2673.75	2673.75	1...	H1-1b
36	M252	PIPE 2.0	.324	0	22	.134	0	22	45876.06	45900	2673.75	2673.75	1...	H1-1b
37	M348	PIPE 2.0	.308	2.094	23	.113	2.094	26	45876.06	45900	2673.75	2673.75	1...	H1-1b

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

Member	Shape	Code	Loc[in]	LC	Shear	Loc[in]	Dir	LC	phi*Pnc [k]	phi*Pnt [lb]	phi*Mn y	phi*Mn z	Cb	Eqn	
38	M77	PIPE 2.0	.308	2.094	34	.113	2.094	20	45876.06	45900	2673.75	2673.75	1...	H1-1b	
39	M181	PIPE 2.0	.307	2.094	29	.112	2.094	31	45876.06	45900	2673.75	2673.75	1...	H1-1b	
40	M403	PIPE 2.0	.306	2.094	32	.113	2.094	33	45876.06	45900	2673.75	2673.75	1...	H1-1b	
41	M69A	PIPE 2.0	.306	2.094	27	.113	2.094	27	45876.06	45900	2673.75	2673.75	1...	H1-1b	
42	M236	PIPE 2.0	.305	2.094	22	.112	2.094	22	45876.06	45900	2673.75	2673.75	1...	H1-1b	
43	M454	PL6x0.5	.302	3.284	31	.135	1.3	y	12	116395....	135000	1406.25	16875	2...	H1-1b
44	M120	PL6x0.5	.302	3.284	26	.156	1.3	y	7	116395....	135000	1406.25	16875	2...	H1-1b
45	M287	PL6x0.5	.300	3.284	21	.151	1.3	y	18	116395....	135000	1406.25	16875	2...	H1-1b
46	M455	PL6x0.5	.291	3.216	23	.130	1.3	y	10	116395....	135000	1406.25	16875	1...	H1-1b
47	M121	PL6x0.5	.290	3.216	34	.149	1.3	y	15	116395....	135000	1406.25	16875	1...	H1-1b
48	M288	PL6x0.5	.288	3.216	29	.145	1.3	y	10	116395....	135000	1406.25	16875	1...	H1-1b
49	M144	PIPE 2.0	.281	78.316	42	.051	46.737	47	9836.597	32130	1871.625	1871.625	3...	H1-1b	
50	M94	PIPE 2.0	.278	0	19	.126	0	19	45876.06	45900	2673.75	2673.75	1...	H1-1b	
51	M365	PIPE 2.0	.278	0	24	.126	0	24	45876.06	45900	2673.75	2673.75	1...	H1-1b	
52	M335	PIPE 2.0	.275	0	22	.120	1.177	23	45892.442	45900	2673.75	2673.75	1...	H1-1b	
53	M64	PIPE 2.0	.275	0	32	.120	1.177	34	45892.442	45900	2673.75	2673.75	1...	H1-1b	
54	M420	PIPE 2.0	.275	0	32	.126	0	33	45876.06	45900	2673.75	2673.75	1...	H1-1b	
55	M86A	PIPE 2.0	.275	0	27	.126	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b	
56	M168A	PIPE 2.0	.274	0	27	.119	1.177	29	45892.442	45900	2673.75	2673.75	1...	H1-1b	
57	M76	PIPE 2.0	.273	2.094	19	.104	2.094	20	45876.06	45900	2673.75	2673.75	1...	H1-1b	
58	M347	PIPE 2.0	.273	2.094	24	.104	2.094	26	45876.06	45900	2673.75	2673.75	1...	H1-1b	
59	M180	PIPE 2.0	.273	2.094	29	.103	2.094	31	45876.06	45900	2673.75	2673.75	1...	H1-1b	
60	M198	PIPE 2.0	.272	0	30	.124	0	30	45876.06	45900	2673.75	2673.75	1...	H1-1b	
61	M402	PIPE 2.0	.272	2.094	32	.103	2.094	33	45876.06	45900	2673.75	2673.75	1...	H1-1b	
62	M357	PIPE 2.0	.272	2.094	24	.133	2.094	24	45876.06	45900	2673.75	2673.75	1...	H1-1b	
63	M68A	PIPE 2.0	.272	2.094	27	.103	2.094	27	45876.06	45900	2673.75	2673.75	1...	H1-1b	
64	M86	PIPE 2.0	.271	2.094	19	.133	2.094	19	45876.06	45900	2673.75	2673.75	1...	H1-1b	
65	M190	PIPE 2.0	.271	2.094	30	.132	2.094	30	45876.06	45900	2673.75	2673.75	1...	H1-1b	
66	M235	PIPE 2.0	.271	2.094	22	.102	2.094	22	45876.06	45900	2673.75	2673.75	1...	H1-1b	
67	M412	PIPE 2.0	.269	2.094	32	.132	2.094	32	45876.06	45900	2673.75	2673.75	1...	H1-1b	
68	M78A	PIPE 2.0	.269	2.094	27	.132	2.094	27	45876.06	45900	2673.75	2673.75	1...	H1-1b	
69	M245	PIPE 2.0	.269	2.094	22	.132	2.094	21	45876.06	45900	2673.75	2673.75	1...	H1-1b	
70	M253	PIPE 2.0	.268	0	22	.123	0	22	45876.06	45900	2673.75	2673.75	1...	H1-1b	
71	M474	PIPE 2.0	.267	46.737	23	.045	45.474	11	9836.597	32130	1871.625	1871.625	3...	H1-1b	
72	M307	PIPE 2.0	.267	46.737	28	.045	45.474	3	9836.597	32130	1871.625	1871.625	3...	H1-1b	
73	M390	PIPE 2.0	.265	0	30	.118	1.177	31	45892.442	45900	2673.75	2673.75	1...	H1-1b	
74	M56	PIPE 2.0	.265	0	24	.118	1.177	26	45892.442	45900	2673.75	2673.75	1...	H1-1b	
75	M223	PIPE 2.0	.264	0	19	.117	1.177	21	45892.442	45900	2673.75	2673.75	1...	H1-1b	
76	M104	PIPE 2.0	.262	0	83	.109	0	34	45876.06	45900	2673.75	2673.75	1...	H1-1b	
77	M96A	PIPE 2.0	.252	0	91	.110	0	26	45876.06	45900	2673.75	2673.75	1...	H1-1b	
78	M336	PIPE 2.0	.251	0	22	.110	2.094	23	45876.06	45900	2673.75	2673.75	1...	H1-1b	
79	M65	PIPE 2.0	.251	0	32	.110	2.094	19	45876.06	45900	2673.75	2673.75	1...	H1-1b	
80	M169A	PIPE 2.0	.250	0	27	.109	2.094	29	45876.06	45900	2673.75	2673.75	1...	H1-1b	
81	M147	PIPE 2.0	.242	78.316	92	.042	46.737	84	9836.597	32130	1871.625	1871.625	3...	H1-1b	
82	M391	PIPE 2.0	.242	0	30	.108	2.094	31	45876.06	45900	2673.75	2673.75	1...	H1-1b	
83	M57	PIPE 2.0	.242	0	24	.108	2.094	26	45876.06	45900	2673.75	2673.75	1...	H1-1b	
84	M224	PIPE 2.0	.241	0	19	.107	2.094	21	45876.06	45900	2673.75	2673.75	1...	H1-1b	
85	M75	PIPE 2.0	.239	2.094	19	.096	2.094	20	45876.06	45900	2673.75	2673.75	1...	H1-1b	
86	M346	PIPE 2.0	.239	2.094	24	.096	2.094	25	45876.06	45900	2673.75	2673.75	1...	H1-1b	
87	M179	PIPE 2.0	.239	2.094	29	.095	2.094	31	45876.06	45900	2673.75	2673.75	1...	H1-1b	
88	M401	PIPE 2.0	.238	2.094	32	.095	2.094	32	45876.06	45900	2673.75	2673.75	1...	H1-1b	
89	M67A	PIPE 2.0	.238	2.094	27	.095	2.094	27	45876.06	45900	2673.75	2673.75	1...	H1-1b	
90	M234	PIPE 2.0	.237	2.094	22	.094	2.094	22	45876.06	45900	2673.75	2673.75	1...	H1-1b	
91	M349	PIPE 2.0	.235	0	23	.103	2.094	24	45876.06	45900	2673.75	2673.75	1...	H1-1b	
92	M78	PIPE 2.0	.235	0	34	.103	2.094	19	45876.06	45900	2673.75	2673.75	1...	H1-1b	
93	M182	PIPE 2.0	.234	0	28	.103	2.094	30	45876.06	45900	2673.75	2673.75	1...	H1-1b	
94	M70A	PIPE 2.0	.233	0	26	.103	2.094	27	45876.06	45900	2673.75	2673.75	1...	H1-1b	



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

Member	Shape	Code	Loc[in]	LC	Shear	Loc[in]	Dir	LC	phi*Pnc	phi*Pnt [lb]	phi*Mn y	phi*Mn z	Cb	Eqn	
95	M404	PIPE 2.0	.233	0	31	.103	2.094	32	45876.06	45900	2673.75	2673.75	1...	H1-1b	
96	M375	PIPE 2.0	.232	0	25	.109	0	23	45876.06	45900	2673.75	2673.75	1...	H1-1b	
97	M237	PIPE 2.0	.232	0	21	.102	2.094	21	45876.06	45900	2673.75	2673.75	1...	H1-1b	
98	M105	PIPE 2.0	.231	0	83	.102	0	34	45876.06	45900	2673.75	2673.75	1...	H1-1b	
99	M122	PIPE 2.5X	.231	1.516	19	.113	1.516	20	87088.365	94500	6637.5	6637.5	4...	H1-1b	
100	M55	PIPE 2.0	.230	131.8...	42	.199	121.2...	43	15369.683	45900	2673.75	2673.75	1	H1-1b	
101	M128	HSS3X3X3	.230	0	20	.071	12.884	z	47	83680.386	85050	7387.5	7387.5	2...	H1-1b
102	M295	HSS3X3X3	.230	0	31	.066	12.884	y	29	83680.386	85050	7387.5	7387.5	2...	H1-1b
103	M289	PIPE 2.5X	.229	1.516	30	.114	1.516	31	87088.365	94500	6637.5	6637.5	4...	H1-1b	
104	M456	PIPE 2.5X	.229	1.516	24	.113	1.516	26	87088.365	94500	6637.5	6637.5	3...	H1-1b	
105	M462	HSS3X3X3	.228	0	26	.068	12.884	y	24	83680.386	85050	7387.5	7387.5	2...	H1-1b
106	M430	PIPE 2.0	.228	0	32	.110	0	31	45876.06	45900	2673.75	2673.75	1...	H1-1b	
107	M208	PIPE 2.0	.226	0	30	.108	0	28	45876.06	45900	2673.75	2673.75	1...	H1-1b	
108	M294	HSS3X3X3	.225	0	23	.067	12.884	y	21	83680.386	85050	7387.5	7387.5	2...	H1-1b
109	M127	HSS3X3X3	.225	0	28	.072	12.884	z	40	83680.386	85050	7387.5	7387.5	2...	H1-1b
110	M461	HSS3X3X3	.225	0	34	.067	12.884	y	32	83680.386	85050	7387.5	7387.5	2...	H1-1b
111	M95	PIPE 2.0	.224	0	19	.117	0	19	45876.06	45900	2673.75	2673.75	1...	H1-1b	
112	M366	PIPE 2.0	.224	0	24	.117	0	24	45876.06	45900	2673.75	2673.75	1...	H1-1b	
113	M97A	PIPE 2.0	.224	0	91	.102	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b	
114	M263	PIPE 2.0	.222	0	22	.108	0	21	45876.06	45900	2673.75	2673.75	1...	H1-1b	
115	M421	PIPE 2.0	.221	0	32	.117	0	33	45876.06	45900	2673.75	2673.75	1...	H1-1b	
116	M87A	PIPE 2.0	.221	0	27	.116	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b	
117	M388	PIPE 2.0	.219	1.177	27	.118	0	25	45892.442	45900	2673.75	2673.75	1...	H1-1b	
118	M117	PIPE 2.0	.219	1.177	22	.118	0	20	45892.442	45900	2673.75	2673.75	1...	H1-1b	
119	M199	PIPE 2.0	.219	0	30	.114	0	30	45876.06	45900	2673.75	2673.75	1...	H1-1b	
120	M254	PIPE 2.0	.216	0	22	.114	0	22	45876.06	45900	2673.75	2673.75	1...	H1-1b	
121	M221	PIPE 2.0	.215	1.177	32	.117	0	31	45892.442	45900	2673.75	2673.75	1...	H1-1b	
122	M356	PIPE 2.0	.212	2.094	24	.123	2.094	24	45876.06	45900	2673.75	2673.75	1...	H1-1b	
123	M85	PIPE 2.0	.212	2.094	19	.122	2.094	19	45876.06	45900	2673.75	2673.75	1...	H1-1b	
124	M444	PIPE 2.0	.212	119.7...	32	.174	121.2...	23	15369.683	45900	2673.75	2673.75	2...	H1-1b	
125	M189	PIPE 2.0	.212	2.094	30	.122	2.094	30	45876.06	45900	2673.75	2673.75	1...	H1-1b	
126	M110A	PIPE 2.0	.212	119.7...	27	.174	121.2...	34	15369.683	45900	2673.75	2673.75	2...	H1-1b	
127	M277	PIPE 2.0	.210	119.7...	22	.174	121.2...	28	15369.683	45900	2673.75	2673.75	2...	H1-1b	
128	M411	PIPE 2.0	.210	2.094	32	.122	2.094	32	45876.06	45900	2673.75	2673.75	1...	H1-1b	
129	M77A	PIPE 2.0	.210	2.094	27	.122	2.094	27	45876.06	45900	2673.75	2673.75	1...	H1-1b	
130	M244	PIPE 2.0	.210	2.094	22	.121	2.094	21	45876.06	45900	2673.75	2673.75	1...	H1-1b	
131	M109A	PIPE 2.0	.210	1.177	34	.116	0	27	45892.442	45900	2673.75	2673.75	1...	H1-1b	
132	M443	PIPE 2.0	.210	1.177	23	.117	0	33	45892.442	45900	2673.75	2673.75	1...	H1-1b	
133	M337	PIPE 2.0	.207	0	21	.101	2.094	24	45876.06	45900	2673.75	2673.75	1...	H1-1b	
134	M66	PIPE 2.0	.207	0	31	.101	2.094	19	45876.06	45900	2673.75	2673.75	1...	H1-1b	
135	M170A	PIPE 2.0	.206	0	25	.100	2.094	29	45876.06	45900	2673.75	2673.75	1...	H1-1b	
136	M376	PIPE 2.0	.206	0	25	.102	0	23	45876.06	45900	2673.75	2673.75	1...	H1-1b	
137	M276	PIPE 2.0	.205	1.177	31	.115	0	22	45892.442	45900	2673.75	2673.75	1...	H1-1b	
138	M74	PIPE 2.0	.205	2.094	19	.089	2.094	20	45876.06	45900	2673.75	2673.75	1...	H1-1b	
139	M345	PIPE 2.0	.205	2.094	24	.090	2.094	25	45876.06	45900	2673.75	2673.75	1...	H1-1b	
140	M178	PIPE 2.0	.204	2.094	29	.088	2.094	31	45876.06	45900	2673.75	2673.75	1...	H1-1b	
141	M400	PIPE 2.0	.204	2.094	32	.089	2.094	32	45876.06	45900	2673.75	2673.75	1...	H1-1b	
142	M66A	PIPE 2.0	.204	2.094	27	.089	2.094	27	45876.06	45900	2673.75	2673.75	1...	H1-1b	
143	M233	PIPE 2.0	.203	2.094	22	.088	2.094	22	45876.06	45900	2673.75	2673.75	1...	H1-1b	
144	M431	PIPE 2.0	.202	0	33	.102	0	32	45876.06	45900	2673.75	2673.75	1...	H1-1b	
145	M387	PIPE 2.0	.202	2.094	27	.109	0	25	45876.06	45900	2673.75	2673.75	1...	H1-1b	
146	M116	PIPE 2.0	.201	2.094	22	.109	0	20	45876.06	45900	2673.75	2673.75	1...	H1-1b	
147	M374	PIPE 2.0	.201	2.094	26	.094	0	24	45876.06	45900	2673.75	2673.75	1...	H1-1b	
148	M103	PIPE 2.0	.201	2.094	20	.094	0	19	45876.06	45900	2673.75	2673.75	1...	H1-1b	
149	M106	PIPE 2.0	.201	0	83	.096	0	34	45876.06	45900	2673.75	2673.75	1...	H1-1b	
150	M58	PIPE 2.0	.201	0	20	.099	2.094	26	45876.06	45900	2673.75	2673.75	1...	H1-1b	
151	M392	PIPE 2.0	.200	0	26	.099	2.094	31	45876.06	45900	2673.75	2673.75	1...	H1-1b	

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

Member	Shape	Code	Loc[In]	LC	Shear	Loc[In]	Dir	LC	phi*Pnc [k]	phi*Pnt [lb]	phi*Mn v	phi*Mn z	Cb	Eqn	
152	M209	PIPE 2.0	.200	0	30	.101	0	28	45876.06	45900	2673.75	2673.75	1...	H1-1b	
153	M225	PIPE 2.0	.200	0	31	.099	2.094	21	45876.06	45900	2673.75	2673.75	1...	H1-1b	
154	M429	PIPE 2.0	.198	2.094	33	.094	0	33	45876.06	45900	2673.75	2673.75	1...	H1-1b	
155	M220	PIPE 2.0	.198	2.094	32	.108	0	31	45876.06	45900	2673.75	2673.75	1...	H1-1b	
156	M207	PIPE 2.0	.198	2.094	31	.092	0	30	45876.06	45900	2673.75	2673.75	1...	H1-1b	
157	M350	PIPE 2.0	.198	0	23	.100	2.094	24	45876.06	45900	2673.75	2673.75	1...	H1-1b	
158	M79	PIPE 2.0	.197	0	34	.100	2.094	19	45876.06	45900	2673.75	2673.75	1...	H1-1b	
159	M95A	PIPE 2.0	.197	2.094	28	.093	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b	
160	M264	PIPE 2.0	.197	0	22	.101	0	21	45876.06	45900	2673.75	2673.75	1...	H1-1b	
161	M183	PIPE 2.0	.196	0	28	.099	2.094	30	45876.06	45900	2673.75	2673.75	1...	H1-1b	
162	M98A	PIPE 2.0	.195	0	91	.096	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b	
163	M71A	PIPE 2.0	.195	0	26	.100	2.094	27	45876.06	45900	2673.75	2673.75	1...	H1-1b	
164	M405	PIPE 2.0	.195	0	31	.100	2.094	32	45876.06	45900	2673.75	2673.75	1...	H1-1b	
165	M141	PIPE 2.0	.194	79.579	11	.041	61.895	30	9836.597	32130	1871.625	1871.625	2...	H1-1b	
166	M471	PIPE 2.0	.194	79.579	16	.041	61.895	19	9836.597	32130	1871.625	1871.625	2...	H1-1b	
167	M304	PIPE 2.0	.194	79.579	6	.040	61.895	25	9836.597	32130	1871.625	1871.625	2...	H1-1b	
168	M262	PIPE 2.0	.194	2.094	23	.092	0	22	45876.06	45900	2673.75	2673.75	1...	H1-1b	
169	M108A	PIPE 2.0	.194	2.094	20	.108	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b	
170	M442	PIPE 2.0	.194	2.094	26	.108	0	33	45876.06	45900	2673.75	2673.75	1...	H1-1b	
171	M238	PIPE 2.0	.194	0	21	.099	2.094	21	45876.06	45900	2673.75	2673.75	1...	H1-1b	
172	M389	PIPE 2.0	.192	119.7...	24	.180	121.2...	34	15369.683	45900	2673.75	2673.75	2...	H1-1b	
173	M129	PIPE 1.5	.192	0	19	.045	45	11	28723.983	33705	1578.75	1578.75	1...	H1-1b	
174	M222	PIPE 2.0	.192	119.7...	29	.180	121.2...	23	15369.683	45900	2673.75	2673.75	2...	H1-1b	
175	M296	PIPE 1.5	.191	45	22	.050	45	6	28723.983	33705	1578.75	1578.75	1...	H1-1b	
176	M275	PIPE 2.0	.190	2.094	31	.107	0	22	45876.06	45900	2673.75	2673.75	1...	H1-1b	
177	M463	PIPE 1.5	.183	0	24	.017	0	24	28723.983	33705	1578.75	1578.75	2...	H1-1b	
178	M135	PL6x0.5	.181	4.013	33	.099	5.461	y	15	127402....	135000	1406.25	16875	1...	H1-1b
179	M132	PL6x0.5	.180	4.013	25	.110	5.461	y	7	127402....	135000	1406.25	16875	1...	H1-1b
180	M302	PL6x0.5	.180	4.013	28	.101	5.461	y	10	127402....	135000	1406.25	16875	1...	H1-1b
181	M299	PL6x0.5	.180	4.013	20	.113	5.461	y	18	127402....	135000	1406.25	16875	1...	H1-1b
182	M377	PIPE 2.0	.180	0	25	.096	0	23	45876.06	45900	2673.75	2673.75	1...	H1-1b	
183	M432	PIPE 2.0	.177	0	32	.096	0	32	45876.06	45900	2673.75	2673.75	1...	H1-1b	
184	M210	PIPE 2.0	.174	0	30	.095	0	28	45876.06	45900	2673.75	2673.75	1...	H1-1b	
185	M477	PIPE 2.0	.173	78.316	33	.040	78.316	34	9836.597	32130	1871.625	1871.625	3...	H1-1b	
186	M96	PIPE 2.0	.173	0	19	.109	0	19	45876.06	45900	2673.75	2673.75	1...	H1-1b	
187	M367	PIPE 2.0	.173	0	24	.109	0	24	45876.06	45900	2673.75	2673.75	1...	H1-1b	
188	M469	PL6x0.5	.172	4.013	22	.089	5.461	y	5	127402....	135000	1406.25	16875	1...	H1-1b
189	M265	PIPE 2.0	.172	0	22	.095	0	21	45876.06	45900	2673.75	2673.75	1...	H1-1b	
190	M399	PIPE 2.0	.171	2.094	32	.084	2.094	32	45876.06	45900	2673.75	2673.75	1...	H1-1b	
191	M65A	PIPE 2.0	.171	2.094	27	.084	2.094	27	45876.06	45900	2673.75	2673.75	1...	H1-1b	
192	M466	PL6x0.5	.171	4.013	30	.093	5.461	y	13	127402....	135000	1406.25	16875	1...	H1-1b
193	M73	PIPE 2.0	.171	2.094	19	.085	2.094	19	45876.06	45900	2673.75	2673.75	1...	H1-1b	
194	M344	PIPE 2.0	.171	2.094	24	.085	2.094	25	45876.06	45900	2673.75	2673.75	1...	H1-1b	
195	M232	PIPE 2.0	.171	2.094	22	.083	2.094	22	45876.06	45900	2673.75	2673.75	1...	H1-1b	
196	M177	PIPE 2.0	.170	2.094	30	.084	2.094	30	45876.06	45900	2673.75	2673.75	1...	H1-1b	
197	M422	PIPE 2.0	.170	0	32	.109	0	32	45876.06	45900	2673.75	2673.75	1...	H1-1b	
198	M88A	PIPE 2.0	.170	0	27	.108	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b	
199	M107	PIPE 2.0	.170	0	83	.091	0	34	45876.06	45900	2673.75	2673.75	1...	H1-1b	
200	M386	PIPE 2.0	.169	2.094	27	.102	0	25	45876.06	45900	2673.75	2673.75	1...	H1-1b	
201	M115	PIPE 2.0	.169	2.094	22	.102	0	20	45876.06	45900	2673.75	2673.75	1...	H1-1b	
202	M200	PIPE 2.0	.169	0	30	.106	0	30	45876.06	45900	2673.75	2673.75	1...	H1-1b	
203	M373	PIPE 2.0	.168	2.094	26	.091	0	24	45876.06	45900	2673.75	2673.75	1...	H1-1b	
204	M102	PIPE 2.0	.168	2.094	20	.091	0	19	45876.06	45900	2673.75	2673.75	1...	H1-1b	
205	M219	PIPE 2.0	.166	2.094	32	.101	0	31	45876.06	45900	2673.75	2673.75	1...	H1-1b	
206	M99A	PIPE 2.0	.166	0	91	.091	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b	
207	M255	PIPE 2.0	.166	0	22	.106	0	22	45876.06	45900	2673.75	2673.75	1...	H1-1b	
208	M428	PIPE 2.0	.166	2.094	33	.091	0	32	45876.06	45900	2673.75	2673.75	1...	H1-1b	

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

Member	Shape	Code ...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc [...]	phi*Pnt [lb]	phi*Mn y...	phi*Mn z...	Cb	Eqn
209	M206	PIPE 2.0	.166	2.094	31	.089	0	30	45876.06	45900	2673.75	2673.75	1...	H1-1b
210	M67	PIPE 2.0	.165	0	30	.094	2.094	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
211	M338	PIPE 2.0	.165	0	19	.094	2.094	24	45876.06	45900	2673.75	2673.75	1...	H1-1b
212	M94A	PIPE 2.0	.165	2.094	28	.091	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
213	M310	PIPE 2.0	.165	46.737	31	.038	78.316	23	9836.597	32130	1871.625	1871.625	3...	H1-1b
214	M171A	PIPE 2.0	.165	0	25	.093	2.094	29	45876.06	45900	2673.75	2673.75	1...	H1-1b
215	M107A	PIPE 2.0	.164	2.094	21	.101	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
216	M441	PIPE 2.0	.164	2.094	27	.101	0	33	45876.06	45900	2673.75	2673.75	1...	H1-1b
217	M261	PIPE 2.0	.162	2.094	23	.089	0	22	45876.06	45900	2673.75	2673.75	1...	H1-1b
218	M274	PIPE 2.0	.162	2.094	32	.100	0	22	45876.06	45900	2673.75	2673.75	1...	H1-1b
219	M59	PIPE 2.0	.160	0	20	.092	2.094	26	45876.06	45900	2673.75	2673.75	1...	H1-1b
220	M393	PIPE 2.0	.160	0	26	.092	2.094	31	45876.06	45900	2673.75	2673.75	1...	H1-1b
221	M226	PIPE 2.0	.160	0	31	.091	2.094	21	45876.06	45900	2673.75	2673.75	1...	H1-1b
222	M351	PIPE 2.0	.159	0	23	.099	2.094	24	45876.06	45900	2673.75	2673.75	1...	H1-1b
223	M80	PIPE 2.0	.159	0	34	.099	2.094	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
224	M355	PIPE 2.0	.158	2.094	22	.114	2.094	24	45876.06	45900	2673.75	2673.75	1...	H1-1b
225	M84	PIPE 2.0	.158	2.094	32	.114	2.094	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
226	M184	PIPE 2.0	.158	0	28	.098	2.094	30	45876.06	45900	2673.75	2673.75	1...	H1-1b
227	M188	PIPE 2.0	.158	2.094	27	.114	2.094	30	45876.06	45900	2673.75	2673.75	1...	H1-1b
228	M406	PIPE 2.0	.156	0	31	.098	2.094	32	45876.06	45900	2673.75	2673.75	1...	H1-1b
229	M72A	PIPE 2.0	.156	0	26	.098	2.094	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
230	M410	PIPE 2.0	.155	2.094	32	.113	2.094	32	45876.06	45900	2673.75	2673.75	1...	H1-1b
231	M76A	PIPE 2.0	.155	2.094	27	.113	2.094	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
232	M239	PIPE 2.0	.155	0	20	.098	2.094	21	45876.06	45900	2673.75	2673.75	1...	H1-1b
233	M243	PIPE 2.0	.155	2.094	21	.113	2.094	21	45876.06	45900	2673.75	2673.75	1...	H1-1b
234	M378	PIPE 2.0	.154	0	25	.091	0	23	45876.06	45900	2673.75	2673.75	1...	H1-1b
235	M433	PIPE 2.0	.153	0	32	.091	0	32	45876.06	45900	2673.75	2673.75	1...	H1-1b
236	M211	PIPE 2.0	.149	0	30	.090	0	29	45876.06	45900	2673.75	2673.75	1...	H1-1b
237	M266	PIPE 2.0	.148	0	22	.090	0	21	45876.06	45900	2673.75	2673.75	1...	H1-1b
238	M64A	PIPE 2.0	.139	2.094	27	.081	2.094	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
239	M398	PIPE 2.0	.139	2.094	32	.081	2.094	32	45876.06	45900	2673.75	2673.75	1...	H1-1b
240	M108	PIPE 2.0	.139	0	83	.087	0	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
241	M231	PIPE 2.0	.139	2.094	22	.080	2.094	21	45876.06	45900	2673.75	2673.75	1...	H1-1b
242	M114	PIPE 2.0	.138	2.094	22	.096	0	20	45876.06	45900	2673.75	2673.75	1...	H1-1b
243	M385	PIPE 2.0	.138	2.094	27	.096	0	25	45876.06	45900	2673.75	2673.75	1...	H1-1b
244	M72	PIPE 2.0	.138	2.094	19	.082	2.094	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
245	M343	PIPE 2.0	.137	2.094	24	.082	2.094	24	45876.06	45900	2673.75	2673.75	1...	H1-1b
246	M176	PIPE 2.0	.137	2.094	30	.081	2.094	30	45876.06	45900	2673.75	2673.75	1...	H1-1b
247	M140	PIPE 2.0	.137	45.474	3	.045	45.474	6	9836.597	32130	1871.625	1871.625	4...	H1-1b
248	M303	PIPE 2.0	.137	45.474	14	.045	45.474	16	9836.597	32130	1871.625	1871.625	4...	H1-1b
249	M470	PIPE 2.0	.137	45.474	8	.045	45.474	11	9836.597	32130	1871.625	1871.625	4...	H1-1b
250	M100A	PIPE 2.0	.137	0	91	.088	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
251	M218	PIPE 2.0	.136	2.094	32	.095	0	31	45876.06	45900	2673.75	2673.75	1...	H1-1b
252	M440	PIPE 2.0	.136	2.094	27	.096	0	33	45876.06	45900	2673.75	2673.75	1...	H1-1b
253	M106A	PIPE 2.0	.136	2.094	22	.095	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
254	M372	PIPE 2.0	.135	2.094	26	.090	0	24	45876.06	45900	2673.75	2673.75	1...	H1-1b
255	M101	PIPE 2.0	.134	2.094	20	.090	0	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
256	M273	PIPE 2.0	.134	2.094	33	.095	0	22	45876.06	45900	2673.75	2673.75	1...	H1-1b
257	M205	PIPE 2.0	.132	2.094	31	.088	0	30	45876.06	45900	2673.75	2673.75	1...	H1-1b
258	M427	PIPE 2.0	.132	2.094	33	.090	0	32	45876.06	45900	2673.75	2673.75	1...	H1-1b
259	M93A	PIPE 2.0	.132	2.094	28	.090	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
260	M260	PIPE 2.0	.129	2.094	23	.088	0	22	45876.06	45900	2673.75	2673.75	1...	H1-1b
261	M379	PIPE 2.0	.129	0	24	.087	0	24	45876.06	45900	2673.75	2673.75	1...	H1-1b
262	M434	PIPE 2.0	.129	0	32	.088	0	32	45876.06	45900	2673.75	2673.75	1...	H1-1b
263	M63	PIPE 2.0	.128	2.094	11	.080	2.094	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
264	M397	PIPE 2.0	.127	2.094	16	.080	2.094	32	45876.06	45900	2673.75	2673.75	1...	H1-1b
265	M230	PIPE 2.0	.126	2.094	6	.079	2.094	21	45876.06	45900	2673.75	2673.75	1...	H1-1b



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

Member	Shape	Code	Loc[in]	LC	Shear	Loc[in]	Dir	LC	phi*Pnc	phi*Pnt	phi*Mn	phi*Mn	Cb	Eqn
266	M212	PIPE 2.0	.125	0	30	.087	0	29	45876.06	45900	2673.75	2673.75	1...	H1-1b
267	M267	PIPE 2.0	.125	0	22	.087	0	22	45876.06	45900	2673.75	2673.75	1...	H1-1b
268	M97	PIPE 2.0	.125	0	19	.102	0	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
269	M60	PIPE 2.0	.125	0	28	.087	2.094	26	45876.06	45900	2673.75	2673.75	1...	H1-1b
270	M394	PIPE 2.0	.125	0	34	.087	2.094	31	45876.06	45900	2673.75	2673.75	1...	H1-1b
271	M339	PIPE 2.0	.125	0	21	.088	2.094	24	45876.06	45900	2673.75	2673.75	1...	H1-1b
272	M68	PIPE 2.0	.125	0	32	.088	2.094	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
273	M368	PIPE 2.0	.125	0	24	.102	0	24	45876.06	45900	2673.75	2673.75	1...	H1-1b
274	M172B	PIPE 2.0	.124	0	27	.087	2.094	29	45876.06	45900	2673.75	2673.75	1...	H1-1b
275	M227	PIPE 2.0	.124	0	23	.086	2.094	21	45876.06	45900	2673.75	2673.75	1...	H1-1b
276	M423	PIPE 2.0	.123	0	32	.102	0	32	45876.06	45900	2673.75	2673.75	1...	H1-1b
277	M89A	PIPE 2.0	.123	0	27	.102	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
278	M201	PIPE 2.0	.122	0	30	.100	0	30	45876.06	45900	2673.75	2673.75	1...	H1-1b
279	M352	PIPE 2.0	.120	0	23	.100	2.094	24	45876.06	45900	2673.75	2673.75	1...	H1-1b
280	M81	PIPE 2.0	.120	0	34	.100	2.094	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
281	M185	PIPE 2.0	.120	0	28	.099	2.094	30	45876.06	45900	2673.75	2673.75	1...	H1-1b
282	M256	PIPE 2.0	.119	0	22	.099	0	22	45876.06	45900	2673.75	2673.75	1...	H1-1b
283	M407	PIPE 2.0	.118	0	31	.099	2.094	32	45876.06	45900	2673.75	2673.75	1...	H1-1b
284	M73A	PIPE 2.0	.118	0	26	.099	2.094	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
285	M62	PIPE 2.0	.117	2.094	11	.081	2.094	27	45876.06	45900	2673.75	2673.75	2...	H1-1b
286	M240	PIPE 2.0	.117	0	20	.099	2.094	21	45876.06	45900	2673.75	2673.75	1...	H1-1b
287	M396	PIPE 2.0	.117	2.094	16	.081	2.094	32	45876.06	45900	2673.75	2673.75	2...	H1-1b
288	M229	PIPE 2.0	.116	2.094	6	.080	2.094	21	45876.06	45900	2673.75	2673.75	2...	H1-1b
289	M435	PIPE 2.0	.116	0	16	.086	0	32	45876.06	45900	2673.75	2673.75	1...	H1-1b
290	M101A	PIPE 2.0	.115	0	11	.086	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
291	M268	PIPE 2.0	.114	0	6	.085	0	22	45876.06	45900	2673.75	2673.75	1...	H1-1b
292	M83	PIPE 2.0	.111	2.094	33	.107	2.094	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
293	M354	PIPE 2.0	.111	2.094	22	.108	2.094	24	45876.06	45900	2673.75	2673.75	1...	H1-1b
294	M187	PIPE 2.0	.111	2.094	27	.107	2.094	30	45876.06	45900	2673.75	2673.75	1...	H1-1b
295	M113	PIPE 2.0	.111	2.094	19	.091	0	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
296	M384	PIPE 2.0	.111	2.094	24	.091	0	25	45876.06	45900	2673.75	2673.75	1...	H1-1b
297	M105A	PIPE 2.0	.111	2.094	26	.091	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
298	M439	PIPE 2.0	.111	2.094	31	.091	0	33	45876.06	45900	2673.75	2673.75	1...	H1-1b
299	M272	PIPE 2.0	.110	2.094	20	.090	0	22	45876.06	45900	2673.75	2673.75	1...	H1-1b
300	M436	PIPE 2.0	.110	0	16	.085	0	32	45876.06	45900	2673.75	2673.75	1...	H1-1b
301	M217	PIPE 2.0	.110	2.094	30	.091	0	30	45876.06	45900	2673.75	2673.75	1...	H1-1b
302	M102A	PIPE 2.0	.110	0	11	.085	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
303	M75A	PIPE 2.0	.109	2.094	25	.107	2.094	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
304	M409	PIPE 2.0	.109	2.094	31	.107	2.094	32	45876.06	45900	2673.75	2673.75	1...	H1-1b
305	M269	PIPE 2.0	.109	0	6	.084	0	22	45876.06	45900	2673.75	2673.75	1...	H1-1b
306	M242	PIPE 2.0	.109	2.094	20	.106	2.094	21	45876.06	45900	2673.75	2673.75	1...	H1-1b
307	M109	PIPE 2.0	.108	0	83	.085	0	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
308	M71	PIPE 2.0	.107	2.094	19	.081	2.094	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
309	M342	PIPE 2.0	.107	2.094	24	.081	2.094	24	45876.06	45900	2673.75	2673.75	1...	H1-1b
310	M175B	PIPE 2.0	.107	2.094	30	.080	2.094	30	45876.06	45900	2673.75	2673.75	1...	H1-1b
311	M380	PIPE 2.0	.106	0	24	.085	0	24	45876.06	45900	2673.75	2673.75	1...	H1-1b
312	M61	PIPE 2.0	.105	2.094	11	.083	2.094	26	45876.06	45900	2673.75	2673.75	1...	H1-1b
313	M228	PIPE 2.0	.105	2.094	6	.082	2.094	21	45876.06	45900	2673.75	2673.75	1...	H1-1b
314	M395	PIPE 2.0	.105	2.094	16	.083	2.094	31	45876.06	45900	2673.75	2673.75	1...	H1-1b
315	M213	PIPE 2.0	.103	0	30	.085	0	30	45876.06	45900	2673.75	2673.75	1...	H1-1b
316	M437	PIPE 2.0	.102	0	16	.086	0	33	45876.06	45900	2673.75	2673.75	2...	H1-1b
317	M103A	PIPE 2.0	.102	0	11	.086	0	27	45876.06	45900	2673.75	2673.75	2...	H1-1b
318	M270	PIPE 2.0	.101	0	6	.085	0	22	45876.06	45900	2673.75	2673.75	2...	H1-1b
319	M371	PIPE 2.0	.100	2.094	26	.091	0	24	45876.06	45900	2673.75	2673.75	1...	H1-1b
320	M100	PIPE 2.0	.099	2.094	20	.091	0	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
321	M204	PIPE 2.0	.098	2.094	31	.089	0	30	45876.06	45900	2673.75	2673.75	1...	H1-1b
322	M426	PIPE 2.0	.098	2.094	34	.091	0	32	45876.06	45900	2673.75	2673.75	1...	H1-1b

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

Member	Shape	Code	Loc[in]	LC	Shear	Loc[in]	Dir	LC	phi*Pnc	phi*Pnt [lb]	phi*Mn y	phi*Mn z	Cb	Eqn
323	M92A	PIPE 2.0	.097	2.094	28	.091	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
324	M70	PIPE 2.0	.096	2.094	3	.082	2.094	19	45876.06	45900	2673.75	2673.75	2...	H1-1b
325	M214	PIPE 2.0	.096	0	14	.084	0	30	45876.06	45900	2673.75	2673.75	2...	H1-1b
326	M381	PIPE 2.0	.096	0	8	.085	0	24	45876.06	45900	2673.75	2673.75	2...	H1-1b
327	M174B	PIPE 2.0	.096	2.094	14	.081	2.094	30	45876.06	45900	2673.75	2673.75	2...	H1-1b
328	M110	PIPE 2.0	.096	0	3	.085	0	19	45876.06	45900	2673.75	2673.75	2...	H1-1b
329	M341	PIPE 2.0	.096	2.094	8	.082	2.094	24	45876.06	45900	2673.75	2673.75	2...	H1-1b
330	M259	PIPE 2.0	.096	2.094	23	.089	0	22	45876.06	45900	2673.75	2673.75	1...	H1-1b
331	M340	PIPE 2.0	.094	0	25	.084	2.094	24	45876.06	45900	2673.75	2673.75	1...	H1-1b
332	M69	PIPE 2.0	.094	0	19	.084	2.094	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
333	M173B	PIPE 2.0	.093	0	30	.083	2.094	29	45876.06	45900	2673.75	2673.75	1...	H1-1b
334	M98	PIPE 2.0	.092	0	84	.097	0	19	45876.06	45900	2673.75	2673.75	1.2	H1-1b
335	M104A	PIPE 2.0	.091	0	11	.088	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
336	M438	PIPE 2.0	.091	0	16	.088	0	33	45876.06	45900	2673.75	2673.75	1...	H1-1b
337	M271	PIPE 2.0	.091	0	6	.087	0	22	45876.06	45900	2673.75	2673.75	1...	H1-1b
338	M382	PIPE 2.0	.090	0	8	.086	0	25	45876.06	45900	2673.75	2673.75	1...	H1-1b
339	M111	PIPE 2.0	.090	0	3	.086	0	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
340	M215	PIPE 2.0	.090	0	14	.085	0	30	45876.06	45900	2673.75	2673.75	1...	H1-1b
341	M112	PIPE 2.0	.089	2.094	19	.088	0	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
342	M383	PIPE 2.0	.089	2.094	24	.088	0	25	45876.06	45900	2673.75	2673.75	1...	H1-1b
343	M90A	PIPE 2.0	.089	0	92	.097	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
344	M216	PIPE 2.0	.088	2.094	29	.087	0	30	45876.06	45900	2673.75	2673.75	1...	H1-1b
345	M353	PIPE 2.0	.088	0	23	.103	2.094	24	45876.06	45900	2673.75	2673.75	1...	H1-1b
346	M82	PIPE 2.0	.088	0	34	.103	2.094	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
347	M186	PIPE 2.0	.087	0	28	.102	2.094	30	45876.06	45900	2673.75	2673.75	1...	H1-1b
348	M408	PIPE 2.0	.086	0	31	.102	2.094	32	45876.06	45900	2673.75	2673.75	1...	H1-1b
349	M74A	PIPE 2.0	.085	0	26	.102	2.094	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
350	M241	PIPE 2.0	.085	0	20	.101	2.094	21	45876.06	45900	2673.75	2673.75	1...	H1-1b
351	M369	PIPE 2.0	.083	0	27	.097	0	24	45876.06	45900	2673.75	2673.75	1...	H1-1b
352	M202	PIPE 2.0	.081	0	32	.095	0	30	45876.06	45900	2673.75	2673.75	1...	H1-1b
353	M424	PIPE 2.0	.080	0	34	.097	0	32	45876.06	45900	2673.75	2673.75	1...	H1-1b
354	M257	PIPE 2.0	.078	0	24	.094	0	22	45876.06	45900	2673.75	2673.75	1...	H1-1b
355	M115A	PIPE 2.0	.074	32.625	44	.031	20.605	8	43509.276	45900	2673.75	2673.75	2.3	H1-1b
356	M99	PIPE 2.0	.070	0	84	.093	0	19	45876.06	45900	2673.75	2673.75	1...	H1-1b
357	M111A	PIPE 2.0	.069	0	75	.031	32.625	25	43509.276	45900	2673.75	2673.75	2...	H1-1b
358	M425	PIPE 2.0	.069	2.094	18	.093	0	32	45876.06	45900	2673.75	2673.75	1...	H1-1b
359	M258	PIPE 2.0	.069	2.094	7	.091	0	22	45876.06	45900	2673.75	2673.75	1...	H1-1b
360	M112A	PIPE 2.0	.068	0	54	.014	0	50	43509.276	45900	2673.75	2673.75	2...	H1-1b
361	M370	PIPE 2.0	.068	2.094	26	.093	0	24	45876.06	45900	2673.75	2673.75	1...	H1-1b
362	M203	PIPE 2.0	.066	2.094	31	.091	0	30	45876.06	45900	2673.75	2673.75	1...	H1-1b
363	M91A	PIPE 2.0	.065	2.094	28	.093	0	27	45876.06	45900	2673.75	2673.75	1...	H1-1b
364	M278	PIPE 2.0	.063	32.625	20	.031	32.625	20	43509.276	45900	2673.75	2673.75	2...	H1-1b
365	M114A	PIPE 2.0	.063	32.625	91	.035	0	13	43509.276	45900	2673.75	2673.75	2...	H1-1b
366	M113A	PIPE 2.0	.063	32.625	42	.041	32.625	28	43509.276	45900	2673.75	2673.75	2...	H1-1b
367	M282	PIPE 2.0	.063	0	29	.031	20.605	3	43509.276	45900	2673.75	2673.75	2...	H1-1b
368	M449	PIPE 2.0	.063	32.625	33	.032	20.605	13	43509.276	45900	2673.75	2673.75	2...	H1-1b
369	M445	PIPE 2.0	.062	32.625	31	.031	32.625	30	43509.276	45900	2673.75	2673.75	2...	H1-1b
370	M447	PIPE 2.0	.061	32.625	33	.041	32.625	33	43509.276	45900	2673.75	2673.75	2...	H1-1b
371	M280	PIPE 2.0	.061	32.625	22	.041	32.625	23	43509.276	45900	2673.75	2673.75	2...	H1-1b
372	M281	PIPE 2.0	.055	20.605	16	.034	0	7	43509.276	45900	2673.75	2673.75	2...	H1-1b
373	M448	PIPE 2.0	.054	20.605	11	.034	0	18	43509.276	45900	2673.75	2673.75	2...	H1-1b
374	M510	PIPE 2.0	.022	28.433	32	.017	57.471	44	24404.861	32130	1871.625	1871.625	1...	H1-1b
375	M512	PIPE 2.0	.022	29.038	22	.012	57.471	50	24404.861	32130	1871.625	1871.625	1...	H1-1b
376	M509	PIPE 2.0	.022	28.433	27	.012	57.471	24	24404.861	32130	1871.625	1871.625	1...	H1-1b
377	M446	PIPE 2.0	.020	0	10	.008	0	8	43509.276	45900	2673.75	2673.75	2...	H1-1b
378	M279	PIPE 2.0	.020	0	15	.009	0	13	43509.276	45900	2673.75	2673.75	2...	H1-1b
379	M82A	PIPE 2.0	.000	2.094	29	.000	0	27	45876.06	45900	2673.75	2673.75	2...	H1-1b

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

Member	Shape	Code ...	Loc[fin]	LC	Shear ...	Loc[fin]	Dir	LC	phi*Pnc [...	phi*Pnt [lb]	phi*Mn v...	phi*Mn z...	Cb	Eqn
380	M90	PIPE 2.0	.000	0	29	.000	0	27	45876.06	45900	2673.75	2673.75	2...	H1-1b
381	M91	PIPE 2.0	.000	0	33	.000	0	27	45876.06	45900	2673.75	2673.75	2...	H1-1b
382	M83A	PIPE 2.0	.000	2.094	33	.000	0	27	45876.06	45900	2673.75	2673.75	2...	H1-1b
383	M416	PIPE 2.0	.000	0	31	.000	0	32	45876.06	45900	2673.75	2673.75	2...	H1-1b
384	M194	PIPE 2.0	.000	0	28	.000	0	30	45876.06	45900	2673.75	2673.75	2...	H1-1b
385	M417	PIPE 2.0	.000	2.094	34	.000	0	32	45876.06	45900	2673.75	2673.75	2...	H1-1b
386	M249	PIPE 2.0	.000	2.094	28	.000	0	30	45876.06	45900	2673.75	2673.75	2...	H1-1b
387	M195	PIPE 2.0	.000	2.094	31	.000	0	30	45876.06	45900	2673.75	2673.75	2...	H1-1b
388	M361	PIPE 2.0	.000	2.094	31	.000	0	32	45876.06	45900	2673.75	2673.75	2...	H1-1b
389	M250	PIPE 2.0	.000	0	31	.000	2.094	30	45876.06	45900	2673.75	2673.75	2...	H1-1b
390	M362	PIPE 2.0	.000	0	34	.000	0	32	45876.06	45900	2673.75	2673.75	2...	H1-1b

Member/ Node Number	Load Comb.	Tensile Load, $T_u$ (kips)	Shear Load, $V_u$ (kips)	Bolt Diameter (in)	Number of Bolts	Shear Planes per Bolt	Bolt Tensile Strength, $F_{nt}$ (ksi)	Bolt Shear Strength, $F_{nv}$ (ksi)	Connected Member Thickness (in)	Connected Member Edge Clear Distance (in)	Connected Member Ultimate Strength, $F_u$ (ksi)	Bolt Tensile Usage	Bolt Shear Usage	Member Bearing Usage
M170	27	1.484	2.828	0.75	2	1	90	54	0.5	1	58	<b>2%</b>	<b>8%</b>	<b>5%</b>
M126	19	3.536	1.885	0.625	1	1	45	27	0.1875	0.875	58	<b>34%</b>	<b>30%</b>	<b>22%</b>
M143	19	0.279	0.328	0.5	2	1	45	27				<b>2%</b>	<b>4%</b>	-



## General Power Density

**Site Name:** New Britain 4, CT

### Cumulative Power Density

Operator	Operating Frequency	Number of Trans.	ERP Per Trans.	Total ERP	Distance to Target	Calculated Power Density	Maximum Permissible Exposure*	Fraction of MPE
	(MHz)		(watts)	(watts)	(feet)	(mW/cm <sup>2</sup> )	(mW/cm <sup>2</sup> )	(%)
VZW PCS	1970	1	5000	5000	103	0.1695	1.0	16.95%
VZW Cellular LTE	869	1	3050	3050	103	0.1034	0.579333333	17.85%
VZW Cellular	869	3	389	1167	103	0.0396	0.579333333	6.83%
VZW AWS	2145	1	7200	7200	103	0.2441	1.0	24.41%
VZW 700	746	1	2200	2200	103	0.0746	0.497333333	14.99%

**Total Percentage of Maximum Permissible Exposure**

81.02%

\*Guidelines adopted by the FCC on August 1, 1996, 47 CFR Section 1.13101 based on NCRP Report 86, 1986 and generally on ANSI/IEEE C95.1-

MHz = Megahertz

mW/cm<sup>2</sup> = milliwatts per square centimeter

ERP = Effective Radiated Power

Absolute worst case maximum values used, including the following assumptions:

1. closest accessible point is distance from antenna to base of pole;
2. continuous transmission from all available channels at full power for indefinite time period; and,
3. all RF energy is assumed to be directed solely to the base of the pole.

## General Power Density

-1992



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## Status

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Your item was delivered at 10:11 am on December 14, 2018 in NEW BRITAIN, CT 06050.

December 14, 2018 at 10:11 am  
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December 7, 2018

Dear Customer:

The following is the proof-of-delivery for tracking number **773900543473**.

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**Delivery Information:**

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<b>Status:</b>	Delivered	<b>Delivered to:</b>	Mailroom
<b>Signed for by:</b>	C.TETI	<b>Delivery location:</b>	27 W MAIN ST NEW BRITAIN, CT 06051
<b>Service type:</b>	FedEx Priority Overnight	<b>Delivery date:</b>	Dec 7, 2018 09:18
<b>Special Handling:</b>	Deliver Weekday		



---

**Shipping Information:**

---

<b>Tracking number:</b>	773900543473	<b>Ship date:</b>	Dec 6, 2018
		<b>Weight:</b>	0.5 lbs/0.2 kg

**Recipient:**  
Scott Wadowski  
Town of New Britain  
27 W. Main St.  
NEW BRITAIN, CT 06051 US

**Shipper:**  
Kristian McKay  
3530 Toringdon Way  
STE 300  
CHARLOTTE, NC 28277 US

**Reference** 1766.6680

Thank you for choosing FedEx.



December 7, 2018

Dear Customer:

The following is the proof-of-delivery for tracking number **773900525923**.

---

**Delivery Information:**

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<b>Status:</b>	Delivered	<b>Delivered to:</b>	Mailroom
<b>Signed for by:</b>	C.TETI	<b>Delivery location:</b>	27 W MAIN ST NEW BRITAIN, CT 06051
<b>Service type:</b>	FedEx Priority Overnight	<b>Delivery date:</b>	Dec 7, 2018 09:18
<b>Special Handling:</b>	Deliver Weekday		



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**Shipping Information:**

---

<b>Tracking number:</b>	773900525923	<b>Ship date:</b>	Dec 6, 2018
		<b>Weight:</b>	0.5 lbs/0.2 kg

**Recipient:**  
Erin E. Steward  
Town of New Britain  
27 W. Main St.  
NEW BRITAIN, CT 06051 US

**Shipper:**  
Kristian McKay  
3530 Toringdon Way  
STE 300  
CHARLOTTE, NC 28277 US

**Reference** 1766.6680

Thank you for choosing FedEx.