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

March 4, 2019

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

RE: **Notice of Exempt Modification for Crown Site BU: 806366**
AT&T Site ID: 10035085
73 North Main Street, Marlborough, CT 06447
Latitude: 41° 37′ 47.30″/ Longitude: -72° 27′ 59.40″

Dear Ms. Bachman:

AT&T currently maintains (9) antennas at the 144-foot level of the existing 155.5-foot monopole at 73 North Main Street in Marlborough, Connecticut. The tower is owned by Crown Castle. The property is owned by Village Properties LLC, C/O Crown Atlantic Co. AT&T intends to replace (3) antennas, replace (3) RRHs, add (3) RRHs, add (1) DC6, add (2) DC power cables and (1) fiber line.

The facility was approved by the Connecticut Siting Council in Docket No. 169 on October 25, 1995. This approval included the following conditions: The tower shall be constructed as a monopole, no taller than necessary to provide the proposed communication service, sufficient to accommodate the antennas of Springwich Cellular Limited Partnership and the Town of Marlborough, and not to exceed the total height of 160 feet above ground level (AGL). AT&T's proposed modifications will comply with these 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 First Selectman Amy Traversa for the Town of Marlborough, as well as, the Planning Commission for the Town of Marlborough. Crown Castle is the tower owner and Crown Atlantic CO (aka Crown Castle) is the property owner as well.

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.

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, Sprint 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: Anne Marie Zsamba.

Sincerely,

Anne Marie Zsamba, Esq.
Real Estate Specialist
3 Corporate Park Drive, Suite 101, Clifton Park, NY 12065
(201) 236-9224
annemarie.zsamba@crowncastle.com

Attachments:

Exhibit-A: Compound Plan and Elevation Depicting the Planned Changes
Exhibit-B: Structural Modification Report
Exhibit-C: General Power Density Table Report (RF Emissions Analysis Report)

cc: Amy J. Traversa, First Selectman
Town of Marlborough
26 North Main Street
Marlborough, CT 06447
860-295-6204

Town of Marlborough Planning Commission
Town of Marlborough
26 North Main Street
Marlborough, CT 06447
860-295-6200

ORIGIN ID:GFLA (518) 373-3523
WILL STONE
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 04MAR19
ACTWGT: 3.00 LB
CAD: 104924194/INET4100

BILL SENDER

TO **MELANIE BACHMAN**
CONNECTICUT SITING COUNCIL
10 FRANKLIN SQUARE

NEW BRITAIN CT 06051
(860) 827-2951 REF: 1765.6680
INV:
PO: DEPT:

565J1/46D3/23AD

FedEx Express

J191019010701uv

TRK# **7746 0786 2745**
0201

TUE - 05 MAR 10:30A
PRIORITY OVERNIGHT

EB BDLA

06051
CT-US **BDL**

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Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

ORIGIN ID:GFLA (518) 373-3523
WILL STONE
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 04MAR19
ACTWGT: 1.50 LB
CAD: 104924194/INET4100

BILL SENDER

TO **AMY J. TRAVERSA, FIRST SELECTMAN**
TOWN OF MARLBOROUGH
26 NORTH MAIN STREET
MARLBOROUGH CT 06447
(860) 295-6204 REF: 1734.7680
INV:
PO: DEPT:

565J1/46D3/23AD

FedEx Express

J191019010701uv

TRK# 0201 **7746 0788 8675**

TUE - 05 MAR 12:00P
PRIORITY OVERNIGHT

EB SKKA

06447
CT-US **BDL**

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ORIGIN ID:GFLA (518) 373-3523
WILL STONE
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 04MAR19
ACTWGT: 1.50 LB
CAD: 104924194/INET4100

BILL SENDER

TO PLANNING COMMISSION
TOWN OF MARLBOROUGH
26 NORTH MAIN STREET
MARLBOROUGH CT 06447
(860) 295-6200 REF: 1734.7680
INV:
PO: DEPT:

565J1/46D3/23AD

FedEx Express

J191019010701uv

TRK# 0201 7746 0796 1156

TUE - 05 MAR 12:00P
PRIORITY OVERNIGHT

EB SKKA

06447
CT-US BDL

After printing this label:
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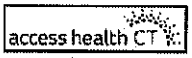
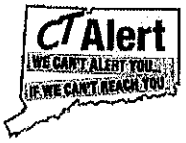
Robert Stein
Chairman

Filing Guides
Meetings & Minutes
Public Participation
Audio Link to New Britain Hearing Rooms
Programs & Services
Telecommunications Database
Publications
Other Resources
Statutes & Regulations
Electric Transmission Upgrade Projects
Frequently Asked Questions





DOCKET NO. 169 - An application of Bell Atlantic NYNEX Mobile, for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a telecommunications tower and associated equipment located within a 56+/- acre parcel at 56 East Hampton Road, in Marlborough, Connecticut. The proposed alternatives are located within a 21.7+/- acre parcel at North Main Street and within a 2.5+/- acre parcel at 9-11 South Main Street, in Marlborough, Connecticut.

Connecticut Siting Council

October 25, 1995

DECISION AND ORDER

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a cellular telecommunications tower and equipment building at the proposed first alternate site in Marlborough, Connecticut, including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate either alone or cumulatively with other effects when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes § 16-50k, be issued to Bell Atlantic NYNEX Mobile, Inc. (BANM) for the construction, operation, and maintenance of a cellular telecommunications tower, associated equipment, and building at the proposed first alternate site, located within a 21.7+/- acre parcel at North Main Street, Marlborough, Connecticut. We find the effects on scenic resources and adjacent land uses of the prime site and second alternate site to be significant, and therefore deny certification of these sites.

The facility shall be constructed, operated, and maintained as a monopole substantially as specified in the Council's record in this matter, and subject to the following conditions:

1. The tower shall be constructed as a monopole, no taller than necessary to provide the proposed communications service, sufficient to accommodate the antennas of Springwich Cellular Limited Partnership and the Town of Marlborough, and not to exceed a total height of 160 feet above ground level (AGL).

2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be submitted to and approved by the Council prior to the commencement of facility construction and shall include placement of utilities underground, relocation of the tower within the leased parcel to provide the maximum practicable buffer of the tower from adjacent land owners; plans for the tower foundation; specifications for the placement of all antennas to be attached to this tower; plans for the equipment building and security fence; plans for the access road and utility line installation from North Main Street; plans for site clearing and tree trimming; and plans for water drainage and erosion and sedimentation controls consistent with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.

3. Upon the establishment of any new State or federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.

4. The Certificate Holder shall provide the Council a recalculated report of electromagnetic radio frequency power density if and when circumstances in operation cause a change in power density above the levels originally calculated and provided in the application.

5. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.

6. If the facility does not initially provide, or permanently ceases to provide cellular services following completion of construction, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapplication for any continued or new use shall be made to the Council before any such use is made.

7. Unless otherwise approved by the Council, this Decision and Order shall be void if all construction authorized herein is not completed within three years of the effective date of this Decision and Order or within three years after all appeals to this Decision and Order have been resolved.

8. The Certificate Holder shall notify the Council upon completion of construction and provide the final cost to construct the facility.

Pursuant to General Statutes § 16-50p, we hereby direct that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below, and notice of issuance shall be published in The Hartford Courant, and the Middletown Press.

By this Decision and Order, the Council disposes of the legal rights, duties, and privileges of each party named or admitted to the proceeding in accordance with Section 16-50j-17 of the Regulations of Connecticut State Agencies.

The parties and intervenors to this proceeding are:

APPLICANT	**ITS REPRESENTATIVE**
Bell Atlantic NYNEX Mobile, Inc.	Brian C. S. Freeman, Esq. Kenneth C. Baldwin, Esq. Robinson & Cole One Commercial Plaza Hartford, CT 06103-3597 David S. Malko General Manager - Engineering Sandy M. Ranciato Regulatory Services Bell Atlantic NYNEX Mobile, Inc. 20 Alexander Drive Wallingford, CT 06492
INTERVENOR	**ITS REPRESENTATIVE**
Springwich Cellular Limited Partnership	Peter J. Tyrrell, Esq. Springwich Cellular Limited Partnership 227 Church Street New Haven, CT 06510
PARTY	**ITS REPRESENTATIVE**
Town of Marlborough	William S. Fish, Jr. Tyler, Cooper & Alcorn CityPlace, 35th Floor Hartford, CT 06103-3488
PARTY	**ITS REPRESENTATIVE**
Neighbors Endorsing an Appropriate Tower (NEAT)	Barry S. Zitser Perakos, Kindl & Zitser 207 Main Street Hartford, CT 06106

Content Last Modified on 8/9/2002 11:28:31 AM

Property Location: 73 NO MAIN ST | MAP ID: 6/ 26/ 65T/ / | Bldg Name: | State Use: 200

Vision ID: 100287 | Account #2014T | Bldg #: 1 of 1 | Sec #: 1 of 1 | Card 1 of 1 | Print Date: 10/18/2017 15:54

CURRENT OWNER	TOPO.	UTILITIES	STRT./ROAD	LOCATION
VILLAGE PROPERTIES LLC C/O CROWN ATLANTIC CO PMB 353 4017 WASHINGTON RD MCMURRAY, PA 15317 Additional Owners:	2 Above Street		1 Paved	

SUPPLEMENTAL DATA

Other ID: 2014T	EXEMPT CO
Census	Lake Area
Dev. Lot	Photo Retake
Dev. Map	CB Letter
GIS ID: 6/26/65T	ASSOC PID#

CURRENT ASSESSMENT

Description	Code	Appraised Value	Assessed Value
Comm Land	2-1	121,900	85,330
Comm Bldg	2-2	80,600	56,420
Comm OB	2-5	663,000	464,100
	Total	865,500	605,850

6079
MARLBOROUGH, CT

VISION

RECORD OF OWNERSHIP	BK-VOL/PAGE	SALE DATE	q/u	v/i	SALE PRICE	V.C.
VILLAGE PROPERTIES LLC	127/ 9	02/03/1999	U	I		29

PREVIOUS ASSESSMENTS (HISTORY)

Yr.	Code	Assessed Value	Yr.	Code	Assessed Value	Yr.	Code	Assessed Value
2015	2-1	85,330	2014	2-1	90,300	2014	2-1	90,300
2015	2-2	56,420	2014	2-2	25,270	2014	2-2	25,270
2015	2-5	578,620	2014	2-5	463,260	2014	2-5	463,260
	Total:	720,370		Total:	578,830		Total:	578,830

EXEMPTIONS

Year	Type	Description	Amount
		Total:	

OTHER ASSESSMENTS

Code	Description	Number	Amount	Comm. Int.

This signature acknowledges a visit by a Data Collector or Assessor

ASSESSING NEIGHBORHOOD

NBHD/ SUB	NBHD Name	Street Index Name	Tracing	Batch
0001/A				

NOTES

CELL TOWER LOCATED BEHIND MARLBORO BARN
CELLULAR TOWER; GATED
500 FT LF FALL DOWN ZONE = 5.74 AC
1.84 COMMERCIAL SITE
3.9 COMMERCIAL EXCESS
CELL TOWER VALUE = $2083/MONTH-5% VAC-
15% EXPENSES = $20,184 CAPPED AT 10% =
$201,880 PER SITE X 5 SITES = $1,009,400
2017 UPDATE-TERMINATION/EXPIRATION OFONE
CARRIER/SPRINT/NEXTEL

APPRAISED VALUE SUMMARY

Appraised Bldg. Value (Card)	80,600
Appraised XF (B) Value (Bldg)	0
Appraised OB (L) Value (Bldg)	663,000
Appraised Land Value (Bldg)	121,900
Special Land Value	0
Total Appraised Parcel Value	865,500
Valuation Method:	C
Adjustment:	0
Net Total Appraised Parcel Value	**865,500**

BUILDING PERMIT RECORD

Permit ID	Issue Date	Type	Description	Amount	Insp. Date	% Comp.	Date Comp.	Comments
17-035	03/09/2017	BP		7,500		0		REPLACE 3 RRUS TO E
15-101	05/12/2015	CM	Commercial	0	07/27/2015	100		ANTENNA UPGRADE
1128	12/27/2012	CM	Commercial	0	07/27/2015	100		GROUND MOUNTED C
500	12/13/2011	CM	Commercial	0	07/27/2015	100		CHANGE SEVEN (7) AN

VISIT/ CHANGE HISTORY

Date	Type	IS	ID	Cd.	Purpose/Result
07/27/2015			LM	99	Vacant Land

LAND LINE VALUATION SECTION

B #	Use Code	Use Description	Zone	D	Front	Depth	Units		Unit Price	I. Factor	S.A.	Acre Disc	C. Factor	ST. Idx	Adj.	Notes- Adj	Special Pricing		S Adj Fact	Adj. Unit Price	Land Value
1	200	Commercial	R	A	181		1.84	AC	76,000.00	0.6150	C	1.0000	1.00	D	1.10				1.00		94,600
1	200	Commercial	R				3.90	AC	7,000.00	1.0000	0	1.0000	1.00		0.00				1.00		27,300

Total Card Land Units: 5.74 AC | Parcel Total Land Area: 5.74 AC | Total Land Value: 121,900

Property Location: 73 NO MAIN ST | **MAP ID:** 6/ 26/ 65T/ / | **Bldg Name:** | **State Use:** 200

Vision ID: 100287 | **Account #** 2014T | **Bldg #:** 1 of 1 | **Sec #:** 1 of 1 | **Card** 1 of 1 | **Print Date:** 10/18/2017 15:54

CONSTRUCTION DETAIL

Element	Cd.	Ch.	Description
Style	91		Support Shed
Model	94		Commercial
Grade	03		Average
Stories	1		
Occupancy	1		
Exterior Wall A	24		Reinforc Concr
Exterior Wall B			
Roof Structure	01		Flat
Roof Cover	04		T&G/Rubber
Interior Wall A	01		Minimum
Interior Wall B			
Interior Floor A	03		Concrete
Interior Floor B			
Heating Fuel	01		Coal or Wood
Heating Type	01		None
AC Type	03		Central
Bldg Use	200		Commercial
Heat/AC	02		HEAT/AC SPLIT
Frame Type	04		Reinforced Cnc
Baths/Plumbing	00		None
Ceiling/Walls	00		None
Rooms/Prtns	01		Light
Wall Height	8		
% Comn Wall			

CONSTRUCTION DETAIL (CONTINUED)

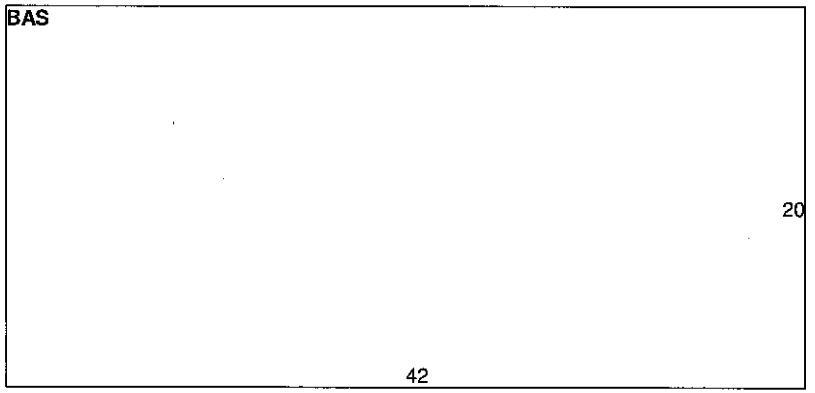
Element	Cd.	Ch.	Description

MIXED USE

Code	Description	Percentage
200	Commercial	100

COST/MARKET VALUATION

Adj. Base Rate:	110.32
Replace Cost	92,669
AYB	2000
Dep Code	A
Remodel Rating	
Year Remodeled	
Dep %	13
Functional Obslnc	
External Obslnc	
Cost Trend Factor	1
Condition	
% Complete	
Overall % Cond	87
Apprais Val	80,600
Dep % Ovr	0
Dep Ovr Comment	
Misc Imp Ovr	0
Misc Imp Ovr Comment	
Cost to Cure Ovr	0
Cost to Cure Ovr Comment	



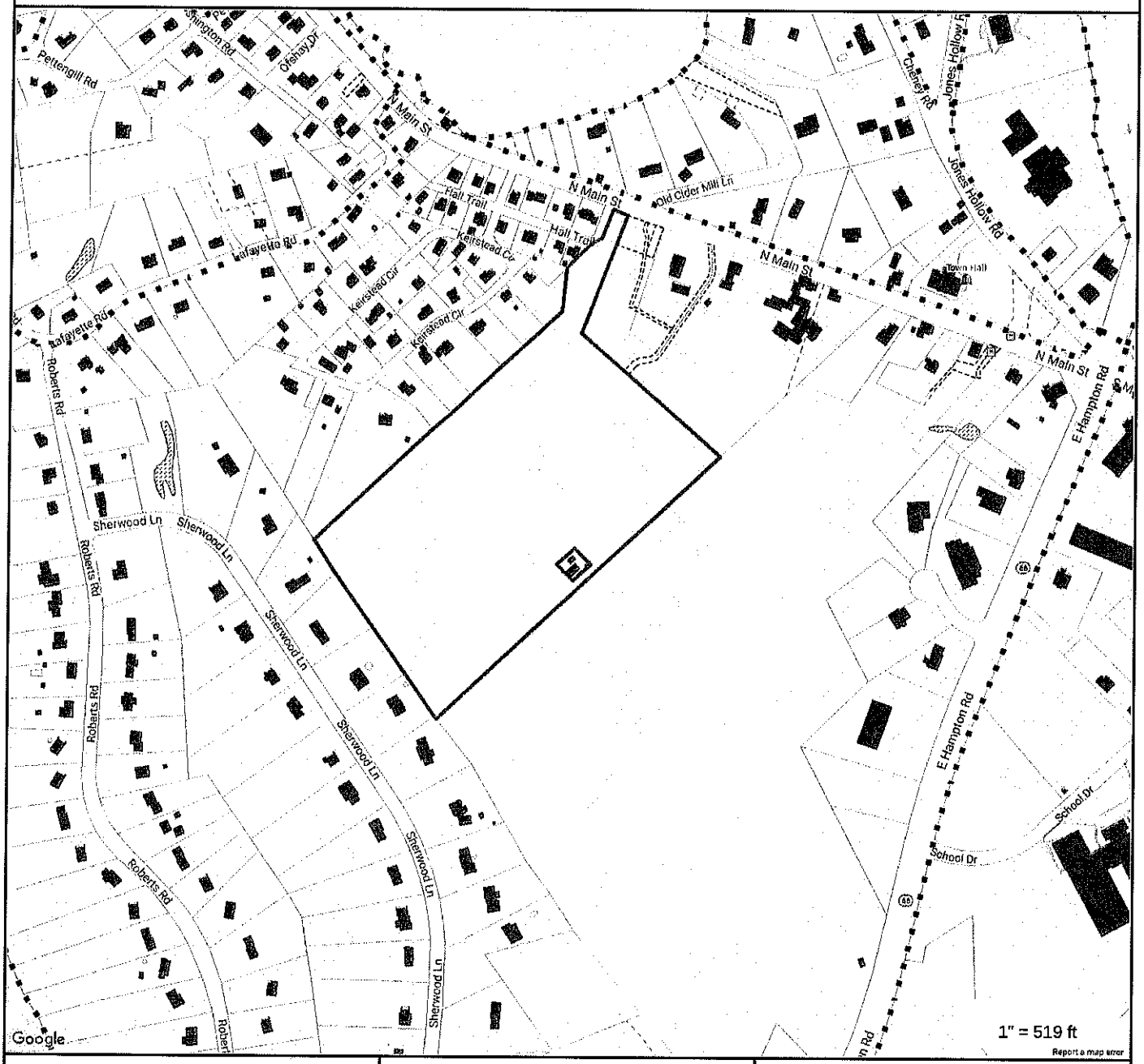
OB-OUTBUILDING & YARD ITEMS(L) / XF-BUILDING EXTRA FEATURES(B)

Code	Description	Sub	Sub Descript	L/B	Units	Unit Price	Yr	Gde	Dp Rt	Cnd	%Cnd	Apr Value
SHD1	Shed	FR	Frame	L	360	20.00	1999			5	60	4,300
FN4	Fence 8'			L	322	20.00	2000			5	60	3,900
PAT1	Patio	CR	Concrete	L	192	3.50	2000				60	400
CELL	Cell Tower			L	4	163,600.00	2011		0		100	654,400

BUILDING SUB-AREA SUMMARY SECTION

Code	Description	Living Area	Gross Area	Eff. Area	Unit Cost	Undeprec. Value
BAS	First Floor	840	840	840		92,669
	Ttl. Gross Liv/Lease Area:	840	840	840		92,669

73 North Main Street



Property Information

Property ID	6/26/65
Location	NO MAIN ST
Owner	VILLAGE PROPERTIES LLC

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of Marlborough, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Parcels updated 10/1/2017
Properties updated 08/06/2018

Address 73 NO MAIN ST

ID 6/26/65T

Ownership

Name VILLAGE PROPERTIES LLC

Address PMB 353

Valuation

Total Assessment $865500

Land $121900

Last Sale $0.00 on 1999-02-03

Land

Area 5.74 acres

PROJECT INFORMATION

SCOPE OF WORK:

ITEMS TO BE MOUNTED ON THE EXISTING TOWER:

- REMOVE (3) EXISTING ANTENNAS & (3) RRH's.

- INSTALL AT&T ANTENNA (800-10965) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- INSTALL AT&T 4449 B5/B12 (850/700) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- INSTALL AT&T RRUS-32 (WCS) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- INSTALL SURGE ARRESTOR (DC6-48-60-18-8F) (TOTAL OF 1).
- INSTALL (2) DC TRUNKS & (1) FIBER CABLE.

ITEMS TO BE MOUNTED INSIDE EXISTING SHELTER:

- REPLACE DUS WITH 5516
- ADD NEW XMU
- ADD NEW 6630

ITEMS TO REMAIN:

- (6) ANTENNAS, (3) RRU'S, (6) TMAS, (1) SURGE SUPPRESSOR, (1) FIBER TRUNK CABLE, (2) DC TRUNK CABLES & (12) COAX CABLES.

SITE ADDRESS:	73 NORTH MAIN STREET MARLBOROUGH, CT 06447
LATITUDE (NAD 83):	N 41° 37' 47.30"
LONGITUDE (NAD 83):	W 72° 27' 59.40"
LANDLORD:	CROWN CASTLE INTERNATIONAL 500 W. CUMMINGS PARK, STE 3600 WOBURN, MA 01801
TYPE OF SITE:	MONOPOLE /INDOOR
TOWER HEIGHT:	155'-6"'
RAD CENTER:	144'
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY

DRAWING INDEX

SHEET NO:	SHEET TITLE
T-1	TITLE SHEET
GN-1	GENERAL NOTES I
GN-2	GENERAL NOTES II
C-1	SITE PLAN
C-2	EQUIPMENT LAYOUT & PROPOSED TOWER ELEVATION
C-3	EXISTING & PROPOSED ANTENNA LAYOUT
C-4	EQUIPMENT DETAILS I
RF-1	ANTENNA CHART & RF EQUIPMENT SCHEMATIC
G-1	GROUNDING DETAILS

CROWN CASTLE SITE ID #: 806366
CROWN CASTLE SITE NAME: HRT 107(C) 943204

ENGINEERING

2018 CONNECTICUT STATE BUILDING CODE
2018 AMENDMENT WITH 2015 INTERNATIONAL BUILDING CODE
2009 ICC/ANSI A117.1 ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES
2015 INTERNATIONAL MECHANICAL CODE
2015 INTERNATIONAL ENERGY CONSERVATION CODE
2017 NATIONAL ELECTRICAL CODE (NFPA 70 2017)
ANSI/TIA-222-G

at&t

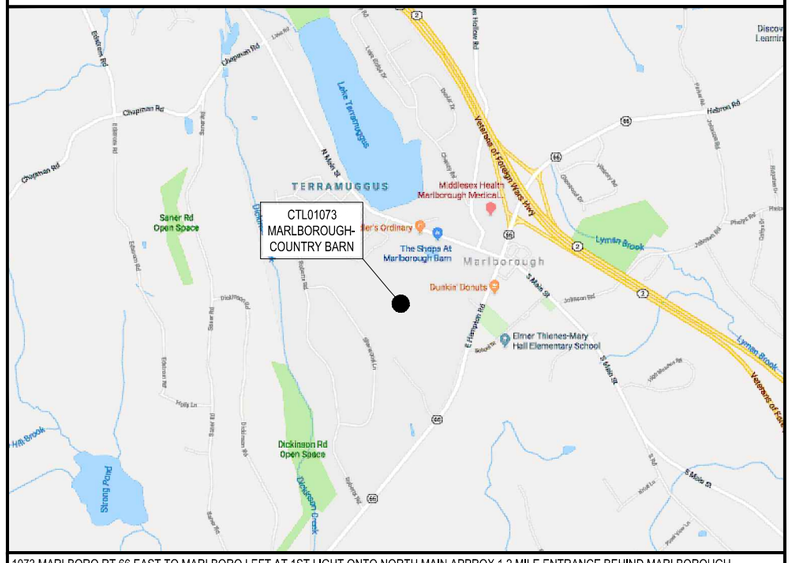
SITE NUMBER: CTL01073

FA LOCATION CODE: 10035085
SITE NAME: MARLBOROUGH-COUNTRY BARN
CROWN SITE NAME: HRT 107(C) 943204
PROJECT: LTE 3C/LTE 4C/4TX4RX SOFTWARE RETROFIT
PACE ID: MRCTB033561, MRCTB033593, MRCTB033666
BU#: 806366

NOTE:

ALL CONSTRUCTION ACTIVITIES ARE TO BE COMPLETED DIRECTLY THROUGH CROWN. CONTRACTOR MUST HAVE CONSTRUCTION PO AND NTP FROM CROWN DIRECT IN ORDER TO BEGIN. PRE-APPROVAL TO ENTER THE PROPERTY MUST BE OBTAINED. FOR ACCESS AUTHORIZATION, PLEASE CONTACT CROWN.

VICINITY MAP



1073 MARLBORO RT 66 EAST TO MARLBORO LEFT AT 1ST LIGHT ONTO NORTH MAIN APPROX 1.2 MILE ENTRANCE BEHIND MARLBOROUGH COUNTRY BARN,ENTRANCE ON LEFT.WHEN YOU PULL INTO THE DRIVEWAY GO BETWEEN BOTH STORES AND FOLLOW DIRT ROAD TO BACK OF STORES,THEN YOU WILL SEE DOUBLE GATES LEADING TO THE SITE.

GENERAL NOTES

1. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.

2. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

CONNECTICUT ONE CALL SYSTEM, INC. — STOP - CALL BEFORE YOU DIG! — 1-800-922-4455

UNDERGROUND SERVICE ALERT

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JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT — CRAIG A. THOMAS — No. 0029052 — LICENSED PROFESSIONAL ENGINEER

PROJECT NO:	ERCC0004
DRAWN BY:	DAP
CHECKED BY:	CAT

SUBMITTALS

0	01/18/19	ISSUED FOR PERMITTING

FA# 10035085
SITE# CTL01073
MARLBOROUGH-
COUNTRY BARN
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

TITLE SHEET

T-1

PART 1 - GENERAL

1.1 GENERAL CONDITIONS:

A. CONTRACTOR SHALL INSPECT THE EXISTING SITE CONDITIONS PRIOR TO SUBMITTING BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARDS TO THE CONTRACTORS FUNCTIONS, THE SCOPE OF WORK, OR ANY OTHER ISSUE RELATED TO THIS PROJECT SHALL BE BROUGHT UP DURING THE BID PERIOD WITH THE PROJECT MANAGER FOR CLARIFICATION, NOT AFTER THE CONTRACT HAS BEEN AWARDED.

B. THE CONTRACTOR SHALL OBTAIN PERMITS, LICENSES, MAKE ALL DEPOSITS, AND PAY ALL FEES REQUIRED FOR THE CONSTRUCTION PERFORMANCE FOR THE WORK UNDER THIS SECTION.

C. DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL SYSTEMS AND COMPONENTS COVERED UNDER THIS SECTION. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS. DRAWING SHALL NOT BE SCALED TO DETERMINE DIMENSIONS.

1.2 LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES.

A. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, AND ALL APPLICABLE LOCAL LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES. CONDUIT BENDS SHALL BE THE RADIUS BEND FOR THE TRADE SIZE OF CONDUIT IN COMPLIANCE WITH THE LATEST EDITIONS OF NEC.

1.3 REFERENCES:

A. THE PUBLICATIONS LISTED BELOW ARE PART OF THIS SPECIFICATION. EACH PUBLICATION SHALL BE THE LATEST REVISION AND ADDENDUM IN EFFECT ON THE DATE. THIS SPECIFICATION IS ISSUED FOR CONSTRUCTION UNLESS OTHERWISE NOTED. EXCEPT AS MODIFIED BY THE REQUIREMENT SPECIFIED HEREIN OR THE DETAILS OF THE DRAWINGS, WORK INCLUDED IN THIS SPECIFICATION SHALL CONFORM TO THE APPLICABLE PROVISION OF THESE PUBLICATIONS.

1. ANSI/IEEE (AMERICAN NATIONAL STANDARDS INSTITUTE)
2. ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)
3. ICEA (INSULATED CABLE ENGINEERS ASSOCIATION)
4. NEMA (NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION)
5. NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)
6. OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION)
7. UL (UNDERWRITERS LABORATORIES INC.)
8. AT&T GROUNDING AND BONDING STANDARDS TP-76416

1.4 SCOPE OF WORK

A. WORK UNDER THIS SECTION SHALL CONSIST OF FURNISHING ALL LABOR, MATERIAL, AND ASSOCIATED SERVICES REQUIRED TO COMPLETE REQUIRED CONSTRUCTION AND BE OPERATIONAL.

B. ALL ELECTRICAL EQUIPMENT UNDER THIS CONTRACT SHALL BE PROPERLY TESTED, ADJUSTED, AND ALIGNED BY THE CONTRACTOR.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATING, DRAINING, TRENCHES, BACKFILLING, AND REMOVAL OF EXCESS DIRT.

D. THE CONTRACTOR SHALL FURNISH TO THE OWNER WITH CERTIFICATES OF A FINAL INSPECTION AND APPROVAL FROM THE INSPECTION AUTHORITIES HAVING JURISDICTION.

E. THE CONTRACTOR SHALL PREPARE A COMPLETE SET OF AS-BUILT DRAWINGS, DOCUMENT ALL WIRING EQUIPMENT CONDITIONS, AND CHANGES WHILE COMPLETING THIS CONTRACT. THE AS-BUILT DRAWINGS SHALL BE SUBMITTED AT COMPLETION OF THE PROJECT.

PART 2 - PRODUCTS

2.1 GENERAL:

A. ALL MATERIALS AND EQUIPMENT SHALL BE UL LISTED, NEW, AND FREE FROM DEFECTS.

B. ALL ITEMS OF MATERIALS AND EQUIPMENT SHALL BE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION AS SUITABLE FOR THE USE INTENDED.

C. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.

D. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 10,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PER THE GOVERNING JURISDICTION.

2.2 MATERIALS AND EQUIPMENT:

A. CONDUIT:

1. RIGID METAL CONDUIT (RMC) SHALL BE HOT-DIPPED GALVANIZED INSIDE AND OUTSIDE INCLUDING ENDS AND THREADS AND ENAMELED OR LACQUERED INSIDE IN ADDITION TO GALVANIZING.
2. LIQUIDTIGHT FLEXIBLE METAL CONDUIT SHALL BE UL LISTED.
3. CONDUIT CLAMPS, STRAPS AND SUPPORTS SHALL BE STEEL OR MALLEABLE IRON. ALL FITTINGS SHALL BE COMPRESSION AND CONCRETE TIGHT TYPE. GROUNDING BUSHINGS WITH INSULATED THROATS SHALL BE INSTALLED ON ALL CONDUIT TERMINATIONS.
4. NONMETALLIC CONDUIT AND FITTINGS SHALL BE SCHEDULE 40 PVC. INSTALL USING SOLVENT-CEMENT-TYPE JOINTS AS RECOMMENDED BY THE MANUFACTURER.

B. CONDUCTORS AND CABLE:

1. CONDUCTORS AND CABLE SHALL BE FLAME-RETARDANT, MOISTURE AND HEAT RESISTANT THERMOPLASTIC, SINGLE CONDUCTOR, COPPER, TYPE THHN/THWN-2, 600 VOLT, SIZE AS INDICATED, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR USED.
2. #10 AWG AND SMALLER CONDUCTOR SHALL BE SOLID OR STRANDED AND #8 AWG AND LARGER CONDUCTORS SHALL BE STRANDED.
3. SOLDERLESS, COMPRESSION-TYPE CONNECTORS SHALL BE USED FOR TERMINATION OF ALL STRANDED CONDUCTORS.
4. STRAIN-RELIEF SUPPORTS GRIPS SHALL BE HUBBELL KELLEMS OR APPROVED EQUAL. CABLES SHALL BE SUPPORTED IN ACCORDANCE WITH THE NEC AND CABLE MANUFACTURER'S RECOMMENDATIONS.
5. ALL CONDUCTORS SHALL BE TAGGED AT BOTH ENDS OF THE CONDUCTOR, AT ALL PULL BOXES, J-BOXES, EQUIPMENT AND CABINETS AND SHALL BE IDENTIFIED WITH APPROVED PLASTIC TAGS (ACTION CRAFT, BRADY, OR APPROVED EQUAL).

C. DISCONNECT SWITCHES:

1. DISCONNECT SWITCHES SHALL BE HEAVY DUTY, DEAD-FRONT, QUICK-MAKE, QUICK-BREAK, EXTERNALLY OPERABLE, HANDLE LOCKABLE AND INTERLOCK WITH COVER IN CLOSED POSITION, RATING AS INDICATED, UL LABELED FURNISHED IN NEMA 3R ENCLOSURE, SQUARE-D OR ENGINEER APPROVED EQUAL.

D. CHEMICAL ELECTROLYTIC GROUNDING SYSTEM:

1. INSTALL CHEMICAL GROUNDING AS REQUIRED. THE SYSTEM SHALL BE ELECTROLYTIC MAINTENANCE FREE ELECTRODE CONSISTING OF RODS WITH A MINIMUM #2 AWG CU EXOTHERMICALLY WELDED PIGTAIL, PROTECTIVE BOXES, AND BACKFILL MATERIAL. MANUFACTURER SHALL BE LYNCOLE XIT GROUNDING ROD TYPES K2-(*)CS OR K2L-(*)CS (*) LENGTH AS REQUIRED.
2. GROUND ACCESS BOX SHALL BE A POLYPLASTIC BOX FOR NON-TRAFFIC APPLICATIONS, INCLUDING BOLT DOWN FLUSH COVER WITH "BREATHER" HOLES, XIT MODEL #XB-22. ALL DISCONNECT SWITCHES AND CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED LAMICOID NAMEPLATES INDICATING EQUIPMENT CONTROLLED, BRANCH CIRCUITS ID NUMBERING, AND THE ELECTRICAL POWER SOURCE.
3. BACKFILL MATERIAL SHALL BE LYNCONITE AND LYNCOLE GROUNDING GRAVEL.

E. SYSTEM GROUNDING:

1. ALL GROUNDING COMPONENTS SHALL BE TINNED AND GROUNDING CONDUCTOR SHALL BE #2 AWG BARE, SOLID, TINNED, COPPER. ABOVE GRADE GROUNDING CONDUCTORS SHALL BE INSULATED WHERE NOTED.
2. GROUNDING BUSES SHALL BE BARE, TINNED, ANNEALED COPPER BARS OF RECTANGULAR CROSS SECTION. STANDARD BUS BARS MGB, SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. THEY SHALL NOT BE FABRICATED OR MODIFIED IN THE FIELD. ALL GROUNDING BUSES SHALL BE IDENTIFIED WITH MINIMUM 3/4" LETTERS BY WAY OF STENCILING OR DESIGNATION PLATE.
3. CONNECTORS SHALL BE HIGH-CONDUCTIVITY, HEAVY DUTY, LISTED AND LABELED AS GROUNDING CONNECTORS FOR THE MATERIALS USED. USE TWO-HOLE COMPRESSION LUGS WITH HEAT SHRINK FOR MECHANICAL CONNECTIONS. INTERIOR CONNECTIONS USE TWO-HOLE COMPRESSION LUGS WITH INSPECTION WINDOW AND CLEAR HEAT SHRINK.
4. EXOTHERMIC WELDED CONNECTIONS SHALL BE PROVIDED IN KIT FORM AND SELECTED FOR THE SPECIFIC TYPES, SIZES, AND COMBINATIONS OF CONDUCTORS AND OTHER ITEMS TO BE CONNECTED.
5. GROUND RODS SHALL BE COPPER-CLAD STEEL WITH HIGH-STRENGTH STEEL CORE AND ELECTROLYTIC-GRADE COPPER OUTER SHEATH, MOLTEN WELDED TO CORE, 5/8"x10'-0". ALL GROUNDING RODS SHALL BE INSTALLED WITH INSPECTION SLEEVES.
6. INSTALL AN EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS IN COMPLIANCE WITH THE AT&T SPECIFICATIONS AND NEC. THE EQUIPMENT GROUNDING CONDUCTORS SHALL BE BONDED AT ALL JUNCTION BOXES, PULLBOXES, DISCONNECT SWITCHES, STARTERS, AND EQUIPMENT CABINETS.

F. OTHER MATERIALS:

6. THE CONTRACTOR SHALL PROVIDE OTHER MATERIALS, THOUGH NOT SPECIFICALLY DESCRIBED, WHICH ARE REQUIRED FOR A COMPLETELY OPERATIONAL SYSTEM AND PROPER INSTALLATION OF THE WORK.
7. PROVIDE PULL BOXES AND JUNCTION BOXES WHERE SHOWN OR REQUIRED BY NEC.

G. PANELS AND LOAD CENTERS:

1. ALL PANEL DIRECTORIES SHALL BE TYPEWRITTEN.

PART 3 - EXECUTION

3.1 GENERAL:

A. ALL MATERIAL AND EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. EQUIPMENT SHALL BE TIGHTLY COVERED AND PROTECTED AGAINST DIRT OR WATER, AND AGAINST CHEMICAL OR MECHANICAL INJURY DURING INSTALLATION AND CONSTRUCTION PERIODS.

3.2 LABOR AND WORKMANSHIP:

A. ALL LABOR FOR THE INSTALLATION OF MATERIALS AND EQUIPMENT FURNISHED FOR THE ELECTRICAL SYSTEM SHALL BE INSTALLED BY EXPERIENCED WIREMEN, IN A NEAT AND WORKMAN-LIKE MANNER.

B. ALL ELECTRICAL EQUIPMENT SHALL BE ADJUSTED, ALIGNED AND TESTED BY THE CONTRACTOR AS REQUIRED TO PRODUCE THE INTENDED PERFORMANCE.

C. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL THOROUGHLY CLEAN ALL EXPOSED EQUIPMENT, REMOVE ALL LABELS AND ANY DEBRIS, CRATING OR CARTONS AND LEAVE THE INSTALLATION FINISHED AND READY FOR OPERATION.

3.3 COORDINATION:

A. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ELECTRICAL ITEMS WITH THE OWNER-FURNISHED EQUIPMENT DELIVERY SCHEDULE TO PREVENT UNNECESSARY DELAYS IN THE TOTAL WORK.

3.4 INSTALLATION:

A. CONDUIT:

1. ALL ELECTRICAL WIRING SHALL BE INSTALLED IN CONDUIT AS SPECIFIED. NO CONDUIT OR TUBING OF LESS THAN 3/4 INCH TRADE SIZE.
2. PROVIDE RIGID PVC SCHEDULE 80 CONDUITS FOR ALL RISERS, RMC OTHERWISE NOTED. EMT MAY BE INSTALLED FOR EXTERIOR CONDUITS WHERE NOT SUBJECT TO PHYSICAL DAMAGE.
3. INSTALL SCHEDULE 40 PVC CONDUIT WITH A MINIMUM COVER OF 24" UNDER ROADWAYS, PARKING LOTS, STREETS, AND ALLEYS. CONDUIT SHALL HAVE A MINIMUM COVER OF 18" IN ALL OTHER NON-TRAFFIC APPLICATIONS (REFER TO 2017 NEC, TABLE 300.5).
4. USE GALVANIZED FLEXIBLE STEEL CONDUIT WHERE DIRECT CONNECTION TO EQUIPMENT WITH MOVEMENT, VIBRATION, OR FOR EASE OF MAINTENANCE. USE LIQUID TIGHT, FLEXIBLE METAL CONDUIT FOR OUTDOOR APPLICATIONS. INSTALL GALVANIZED FLEXIBLE STEEL CONDUIT AT ALL POINTS OF CONNECTION TO EQUIPMENT MOUNTED ON SUPPORT TO ALLOW FOR EXPANSION AND CONTRACTION.
5. A RUN OF CONDUIT BETWEEN BOXES OR EQUIPMENT SHALL NOT CONTAIN MORE THAN THE EQUIVALENT OF THREE QUARTER-BENDS. CONDUIT BEND SHALL BE MADE WITH THE UL LISTED BENDER OR FACTORY 90 DEGREE ELBOWS MAY BE USED.
6. FIELD FABRICATED CONDUITS SHALL BE CUT SQUARE WITH A CONDUIT CUTTING TOOL AND REAMED TO PROVIDE A SMOOTH INSIDE SURFACE.
7. PROVIDE INSULATED GROUNDING BUSHING FOR ALL CONDUITS.
8. CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL CONDUITS DURING CONSTRUCTION. TEMPORARY OPENINGS IN THE CONDUIT SYSTEM SHALL BE PLUGGED OR CAPPED TO PREVENT ENTRANCE OF MOISTURE OR FOREIGN MATTER. CONTRACTOR SHALL REPLACE ANY CONDUITS CONTAINING FOREIGN MATERIALS THAT CANNOT BE REMOVED.
9. ALL CONDUITS SHALL BE SWABBED CLEAN BY PULLING AN APPROPRIATE SIZE MANDREL THROUGH THE CONDUIT BEFORE INSTALLATION OF CONDUCTORS OR CABLES. CONDUIT SHALL BE FREE OF DIRT AND DEBRIS.
10. INSTALL PULL STRINGS IN ALL CLEAN EMPTY CONDUITS. IDENTIFY PULL STRINGS AT EACH END.
11. INSTALL 2" HIGHLY VISIBLE AND DETECTABLE TAPE 12" ABOVE ALL UNDERGROUND CONDUITS AND CONDUCTORS.
12. CONDUITS SHALL BE INSTALLED IN SUCH A MANNER AS TO INSURE AGAINST COLLECTION OF TRAPPED CONDENSATION.
13. PROVIDE CORE DRILLING AS NECESSARY FOR PENETRATIONS TO ALLOW FOR RACEWAYS AND CABLES TO BE ROUTED THROUGH THE BUILDING. DO NOT PENETRATE STRUCTURAL MEMBERS. SLEEVES AND/OR PENETRATIONS IN FIRE RATED CONSTRUCTION SHALL BE EFFECTIVELY SEALED WITH FIRE RATED MATERIAL WHICH SHALL MAINTAIN THE FIRE RATING OF THE WALL OR STRUCTURE. FIRE STOPS AT FLOOR PENETRATIONS SHALL PREVENT PASSAGE OF WATER, SMOKE, FIRE, AND FUMES. ALL MATERIAL SHALL BE UL APPROVED FOR THIS PURPOSE.

B. CONDUCTORS AND CABLE:

1. ALL POWER WIRING SHALL BE COLOR CODED AS FOLLOWS:

DESCRIPTION	208/240/120 VOLT SYSTEMS
PHASE A	BLACK
PHASE B	RED
PHASE C	BLUE
NEUTRAL	WHITE
GROUNDING	GREEN

2. SPLICES SHALL BE MADE ONLY AT OUTLETS, JUNCTION BOXES, OR ACCESSIBLE RACEWAY CONDUITS APPROVED FOR THIS PURPOSE.
3. PULLING LUBRICANTS SHALL BE UL APPROVED. CONTRACTOR SHALL USE NYLON OR HEMP ROPE FOR PULLING CONDUCTOR OR CABLES INTO THE CONDUIT.
4. CABLES SHALL BE NEATLY TRAINED, WITHOUT INTERLACING, AND BE OF SUFFICIENT LENGTH IN ALL BOXES & EQUIPMENT TO PERMIT MAKING A NEAT ARRANGEMENT. CABLES SHALL BE SECURED IN A MANNER TO AVOID TENSION ON CONDUCTORS OR TERMINALS. CONDUCTORS SHALL BE PROTECTED FROM MECHANICAL INJURY AND MOISTURE. SHARP BENDS OVER CONDUIT BUSHINGS IS PROHIBITED. DAMAGED CABLES SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.

C. DISCONNECT SWITCHES:

1. INSTALL DISCONNECT SWITCHES LEVEL AND PLUMB. CONNECT TO WIRING SYSTEM AND GROUNDING SYSTEM AS INDICATED.

D. GROUNDING:

1. ALL METALLIC PARTS OF ELECTRICAL EQUIPMENT WHICH DO NOT CARRY CURRENT SHALL BE GROUNDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE BUILDING MANUFACTURER, AT&T GROUNDING AND BONDING STANDARDS TP-76416, ND-00135, AND THE NATIONAL ELECTRICAL CODE.
2. PROVIDE ELECTRICAL GROUNDING AND BONDING SYSTEM INDICATED WITH ASSEMBLY OF MATERIALS, INCLUDING GROUNDING ELECTRODES, BONDING JUMPERS AND ADDITIONAL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.
3. ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUNDING CONDUCTORS SHALL NOT BE LOOPED OR SHARPLY BENT. ROUTE GROUNDING CONNECTIONS AND CONDUCTORS TO GROUND IN THE SHORTEST AND STRAIGHTEST PATHS POSSIBLE TO MINIMIZE TRANSIENT VOLTAGE RISES.
4. BUILDINGS AND/OR NEW TOWERS GREATER THAN 75 FEET IN HEIGHT AND WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 AWG COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY). SEE STANDARD 6.3.2.2.
5. TIGHTEN GROUNDING AND BONDING CONNECTORS, INCLUDING SCREWS AND BOLTS, IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED TORQUE TIGHTENING VALUES FOR CONNECTORS AND BOLTS. WHERE MANUFACTURER'S TORQUING REQUIREMENTS ARE NOT AVAILABLE, TIGHTEN CONNECTIONS TO COMPLY WITH TIGHTENING TORQUE VALUES SPECIFIED IN UL TO ASSURE PERMANENT AND EFFECTIVE GROUNDING.
6. CONTRACTOR SHALL VERIFY THE LOCATIONS OF GROUNDING TIE-IN-POINTS TO THE EXISTING GROUNDING SYSTEM. ALL UNDERGROUND GROUNDING CONNECTIONS SHALL BE MADE BY THE EXOTHERMIC WELD PROCESS AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
7. ALL GROUNDING CONNECTIONS SHALL BE INSPECTED FOR TIGHTNESS. EXOTHERMIC WELDED CONNECTIONS SHALL BE APPROVED BY THE INSPECTOR HAVING JURISDICTION BEFORE BEING PERMANENTLY CONCEALED.
8. APPLY CORROSION-RESISTANT FINISH TO FIELD CONNECTIONS AND PLACES WHERE FACTORY APPLIED PROTECTIVE COATINGS HAVE BEEN DESTROYED. USE KOPR-SHIELD ANTI-OXIDATION COMPOUND ON ALL COMPRESSION GROUNDING CONNECTIONS.
9. A SEPARATE, CONTINUOUS, INSULATED EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL FEEDER AND BRANCH CIRCUITS.
10. BOND ALL INSULATED GROUNDING BUSHINGS WITH A BARE #6 AWG GROUNDING CONDUCTOR TO A GROUND BUS.
11. DIRECT BURIED GROUNDING CONDUCTORS SHALL BE INSTALLED AT A NOMINAL DEPTH OF 36" MINIMUM BELOW GRADE, OR 6" BELOW THE FROST LINE, USE THE GREATER OF THE TWO DISTANCES.
12. ALL GROUNDING CONDUCTORS EMBEDDED IN OR PENETRATING CONCRETE SHALL BE INSTALLED IN SCHEDULE 40 PVC CONDUIT.
13. THE INSTALLATION OF CHEMICAL ELECTROLYTIC GROUNDING SYSTEM IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. REMOVE SEALING TAPE FROM LEACHING AND BREATHER HOLES. INSTALL PROTECTIVE BOX FLUSH WITH GRADE.
14. DRIVE GROUND RODS UNTIL TOPS ARE A MINIMUM DISTANCE OF 36" DEPTH OR 6" BELOW FROST LINE, USING THE GREATER OF THE TWO DISTANCES.
15. IF COAX ON THE ICE BRIDGE IS MORE THAN 6 FT. FROM THE GROUNDING BAR AT THE BASE OF THE TOWER, A SECOND GROUNDING BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE, TO GROUND THE COAX CABLE GROUNDING KITS AND IN-LINE ARRESTORS.
16. CONTRACTOR SHALL REPAIR, AND/OR REPLACE, EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.

3.5 ACCEPTANCE TESTING:

A. CERTIFIED PERSONNEL USING CERTIFIED EQUIPMENT SHALL PERFORM REQUIRED TESTS AND SUBMIT WRITTEN TEST REPORTS UPON COMPLETION.

B. WHEN MATERIAL AND/OR WORKMANSHIP IS FOUND NOT TO COMPLY WITH THE SPECIFIED REQUIREMENTS, THE NON-COMPLYING ITEMS SHALL BE REMOVED FROM THE PROJECT SITE AND REPLACED WITH ITEMS COMPLYING WITH THE SPECIFIED REQUIREMENTS PROMPTLY AFTER RECEIPT OF NOTICE FOR NON-COMPLIANCE.

C. TEST PROCEDURES:

1. ALL FEEDERS SHALL HAVE INSULATION TESTED AFTER INSTALLATION, BEFORE CONNECTION TO DEVICES. THE CONDUCTORS SHALL TEST FREE FROM SHORT CIRCUITS AND GROUNDS. TESTING SHALL BE FOR ONE MINUTE USING 1000V DC. PROVIDE WRITTEN DOCUMENTATION FOR ALL TEST RESULTS.
2. PRIOR TO ENERGIZING CIRCUITRY, TEST WIRING DEVICES FOR ELECTRICAL CONTINUITY AND PROPER POLARITY CONNECTIONS.
3. MEASURE AND RECORD VOLTAGES BETWEEN PHASES AND BETWEEN PHASE CONDUCTORS AND NEUTRALS. SUBMIT A REPORT OF MAXIMUM AND MINIMUM VOLTAGES.
4. PERFORM GROUNDING TEST TO MEASURE GROUNDING RESISTANCE OF GROUNDING SYSTEM USING THE IEEE STANDARD 3-POINT "FALL-OF-POTENTIAL" METHOD. PROVIDE PLOTTED TEST VALUES AND LOCATION SKETCH. NOTIFY THE ENGINEER IMMEDIATELY IF MEASURED VALUE IS OVER 5 OHMS.

at&t
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EAST SYRACUSE, NY 13057

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JACOBS
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120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
CRAIG A. THOMAS
No. 0029052
LICENSED
PROFESSIONAL ENGINEER

PROJECT NO: ERCC0004

DRAWN BY: DAP

CHECKED BY: CAT

SUBMITTALS

0	01/18/19	ISSUED FOR PERMITTING

FA# 10035085
SITE# CTL01073
MARLBOROUGH-
COUNTRY BARN
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

GENERAL NOTES I

GN-1

ANTENNA MOUNTING

1. DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO CURRENT ANSI/TIA-222 OR APPLICABLE LOCAL CODES.
2. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS NOTED OTHERWISE.
3. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS NOTED OTHERWISE.
4. DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.
5. ALL ANTENNA MOUNTS SHALL BE INSTALLED WITH LOCK NUTS, DOUBLE NUTS AND SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS.
6. CONTRACTOR SHALL INSTALL ANTENNA PER MANUFACTURER'S RECOMMENDATION FOR INSTALLATION AND GROUNDING.
7. ALL UNUSED PORTS ON ANY ANTENNAS SHALL BE TERMINATED WITH A 50-OHM LOAD TO ENSURE ANTENNAS PERFORM AS DESIGNED.
8. PRIOR TO SETTING ANTENNA AZIMUTHS AND DOWNTILTS, ANTENNA CONTRACTOR SHALL CHECK THE ANTENNA MOUNT FOR TIGHTNESS AND ENSURE THAT THEY ARE PLUMB. ANTENNA AZIMUTHS SHALL BE SET FROM TRUE NORTH AND BE ORIENTED WITHIN +/- 5% AS DEFINED BY THE RFDS. ANTENNA DOWNTILTS SHALL BE WITHIN +/- 0.5% AS DEFINED BY THE RFDS. REFER TO ND-00246.
9. JUMPERS FROM THE TMA'S MUST TERMINATE TO OPPOSITE POLARIZATION'S IN EACH SECTOR.
10. CONTRACTOR SHALL RECORD THE SERIAL #, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE INFORMATION TO AT&T.
11. TMA'S SHALL BE MOUNTED ON PIPE DIRECTLY BEHIND ANTENNAS AS CLOSE TO ANTENNA AS FEASIBLE IN A VERTICAL POSITION.

TORQUE REQUIREMENTS

12. ALL RF CONNECTIONS SHALL BE TIGHTENED BY A TORQUE WRENCH.
13. ALL RF CONNECTIONS, GROUNDING HARDWARE AND ANTENNA HARDWARE SHALL HAVE A TORQUE MARK INSTALLED IN A CONTINUOUS STRAIGHT LINE FROM BOTH SIDES OF THE CONNECTION.
    A. RF CONNECTION BOTH SIDES OF THE CONNECTOR.
    B. GROUNDING AND ANTENNA HARDWARE ON THE NUT SIDE STARTING FROM THE THREADS TO THE SOLID SURFACE. EXAMPLE OF SOLID SURFACE: GROUND BAR, ANTENNA BRACKET METAL.
    C. ALL 8M ANTENNA HARDWARE SHALL BE TIGHTENED TO 9 LB-FT (12 NM).
14. ALL 12M ANTENNA HARDWARE SHALL BE TIGHTENED TO 43 LB-FT (58 NM).
15. ALL GROUNDING HARDWARE SHALL BE TIGHTENED UNTIL THE LOCK WASHER COLLAPSES AND THE GROUNDING HARDWARE IS NO LONGER LOOSE.
16. ALL DIN TYPE CONNECTIONS SHALL BE TIGHTENED TO 18-22 LB-FT (24.4 - 29.8 NM).
17. ALL N TYPE CONNECTIONS SHALL BE TIGHTENED TO 15-20 LB-IN (1.7 - 2.3 NM).

FIBER & POWER CABLE MOUNTING

18. THE FIBER OPTIC TRUNK CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY. WHEN INSTALLING FIBER OPTIC TRUNK CABLES INTO A CABLE TRAY SYSTEM, THEY SHALL BE INSTALLED INTO AN INTER DUCT AND A PARTITION BARRIER SHALL BE INSTALLED BETWEEN THE 600 VOLT CABLES AND THE INTER DUCT IN ORDER TO SEGREGATE CABLE TYPES. OPTIC FIBER TRUNK CABLES SHALL HAVE APPROVED CABLE RESTRAINTS EVERY (60) SIXTY FEET AND SECURELY FASTENED TO THE CABLE TRAY SYSTEM. NFPA 70 (NEC) ARTICLE 770 RULES SHALL APPLY.
19. THE TYPE TC-ER CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY AND SHALL BE SECURED AT INTERVALS NOT EXCEEDING (6) SIX FEET. AN EXCEPTION; WHERE TYPE TC-ER CABLES ARE NOT SUBJECT TO PHYSICAL DAMAGE, CABLES SHALL BE PERMITTED TO MAKE A TRANSITION BETWEEN CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY WHICH ARE SERVING UTILIZATION EQUIPMENT OR DEVICES, A DISTANCE (6) SIX FEET SHALL NOT BE EXCEEDED WITHOUT CONTINUOUS SUPPORTING. NFPA 70 (NEC) ARTICLES 336 AND 392 RULES SHALL APPLY.
20. WHEN INSTALLING OPTIC FIBER TRUNK CABLES OR TYPE TC-ER CABLES INTO CONDUITS, NFPA 70 (NEC) ARTICLE 300 RULES SHALL APPLY.

COAXIAL CABLE NOTES

21. TYPES AND SIZES OF THE ANTENNA CABLE ARE BASED ON ESTIMATED LENGTHS. PRIOR TO ORDERING CABLE, CONTRACTOR SHALL VERIFY ACTUAL LENGTH BASED ON CONSTRUCTION LAYOUT AND NOTIFY THE PROJECT MANAGER IF ACTUAL LENGTHS EXCEED ESTIMATED LENGTHS.
22. CONTRACTOR SHALL VERIFY THE DOWN-TILT OF EACH ANTENNA WITH A DIGITAL LEVEL.
23. CONTRACTOR SHALL CONFIRM COAX COLOR CODING PRIOR TO CONSTRUCTION. REFER TO "ANTENNA SYSTEM LABELING STANDARD" ND-00027 LATEST VERSION.
24. ALL JUMPERS TO THE ANTENNAS FROM THE MAIN TRANSMISSION LINE SHALL BE 1/2" DIA. LDF AND SHALL NOT EXCEED 6'-0".
25. ALL COAXIAL CABLE SHALL BE SECURED TO THE DESIGNED SUPPORT STRUCTURE, IN AN APPROVED MANNER, AT DISTANCES NOT TO EXCEED 4'-0" O.C.
26. CONTRACTOR SHALL FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING BOTH THE INSTALLATION AND GROUNDING OF ALL COAXIAL CABLES, CONNECTORS, ANTENNAS, AND ALL OTHER EQUIPMENT.
27. CONTRACTOR SHALL WEATHERPROOF ALL ANTENNA CONNECTORS WITH SELF AMALGAMATING TAPE. WEATHERPROOFING SHALL BE COMPLETED IN STRICT ACCORDANCE WITH AT&T STANDARDS.
28. CONTRACTOR SHALL GROUND ALL EQUIPMENT, INCLUDING ANTENNAS, RET MOTORS, TMA'S, COAX CABLES, AND RET CONTROL CABLES AS A COMPLETE SYSTEM. GROUNDING SHALL BE EXECUTED BY QUALIFIED WIREMEN IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATION AND RECOMMENDATION.
29. CONTRACTOR SHALL PROVIDE STRAIN-RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES, COAX CABLES, AND RET CONTROL CABLES. CABLE STRAIN-RELIEFS AND CABLE SUPPORTS SHALL BE APPROVED FOR THE PURPOSE. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
30. CONTRACTOR TO VERIFY THAT EXISTING COAX HANGERS ARE STACKABLE SNAP IN HANGERS. IF EXISTING HANGERS ARE NOT STACKABLE SNAP IN HANGERS THE CONTRACTOR SHALL REPLACE EXISTING HANGERS WITH NEW SNAP IN HANGERS IF APPLICABLE.

GENERAL CABLE AND EQUIPMENT NOTES

31. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ANTENNA, TMAS, DIPLEXERS, AND COAX CONFIGURATION, MAKE AND MODELS PRIOR TO INSTALLATION.
32. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S RECOMMENDATIONS.
33. CONTRACTOR SHALL REFERENCE THE TOWER STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.
34. ALL OUTDOOR RF CONNECTORS/CONNECTIONS SHALL BE WEATHERPROOFED, EXCEPT THE RET CONNECTORS, USING BUTYL TAPE AFTER INSTALLATION AND FINAL CONNECTIONS ARE MADE. BUTYL TAPE SHALL HAVE A MINIMUM OF ONE-HALF TAPE WIDTH OVERLAP ON EACH TURN AND EACH LAYER SHALL BE WRAPPED THREE TIMES. WEATHERPROOFING SHALL BE SMOOTH WITHOUT BUCKLING. BUTYL BLEEDING IS NOT ALLOWED.
35. IF REQUIRED TO PAINT ANTENNAS AND/OR COAX:
    A. TEMPERATURE SHALL BE ABOVE 50° F.
    B. PAINT COLOR MUST BE APPROVED BY BUILDING OWNER/LANDLORD.
    C. FOR REGULATED TOWERS, FAA/FCC APPROVED PAINT IS REQUIRED.
    D. DO NOT PAINT OVER COLOR CODING OR ON EQUIPMENT MODEL NUMBERS.
36. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUND KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
    A. GROUNDING AT THE ANTENNA LEVEL.
    B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200'-0", ADDITIONAL CABLE GROUNDING REQUIRED.
    C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
    D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
    E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
37. ALL PROPOSED GROUND BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUND
38. BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUND BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.
39. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ANTENNA AND THE COAX CONFIGURATION IS THE CORRECT MAKE AND MODELS, PRIOR TO INSTALLATION.
40. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S SPECIFICATION & RECOMMENDATIONS.
41. ANTENNA CONTRACTOR SHALL FURNISH AND INSTALL A 12'-0" T-BOOM SECTOR ANTENNA MOUNT, IF APPLICABLE, INCLUDING ALL HARDWARE.

GROUNDING NOTES

42. GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY.
43. CONTRACTOR SHALL GROUND ALL EQUIPMENT AS A COMPLETE SYSTEM. GROUNDING SHALL BE IN COMPLIANCE WITH NEC SECTION 250 AND AT&T GROUNDING AND BONDING REQUIREMENTS (ATT-TP-76416) AND MANUFACTURER'S SPECIFICATIONS.
44. ALL GROUND CONDUCTORS SHALL BE COPPER; NO ALUMINUM CONDUCTORS SHALL BE USED.
45. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUNDING KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
    A. GROUNDING AT THE ANTENNA LEVEL.
    B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200', ADDITIONAL CABLE GROUNDING REQUIRED.
    C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
    D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
    E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
46. ALL PROPOSED GROUNDING BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUNDING BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUNDING BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.

EXOTHERMIC CONNECTION
MECHANICAL CONNECTION
CHEMICAL ELECTROLYTIC GROUNDING SYSTEM
TEST CHEMICAL ELECTROLYTIC GROUNDING SYSTEM (T)
EXOTHERMIC WITH INSPECTION SLEEVE
GROUNDING BAR
SHELTER GROUNDING BAR
GROUND ROD
TEST GROUND ROD WITH INSPECTION SLEEVE (T)
SINGLE POLE SWITCH ($)
DUPLEX RECEPTACLE
DUPLEX GFCI RECEPTACLE (GFCI)
FLUORESCENT LIGHTING FIXTURE (2) TWO LAMPS 48-T8 (F)
EXISTING SMOKE DETECTION (DC) (SD)
EXISTING EMERGENCY LIGHTING (DC)
SECURITY LIGHT W/PHOTOCELL LITHONIA ALXW LED-1-25A400/51K-SR4-120-PE-DDBTXD
EXISTING UTILITY POLE
EXISTING CHAIN LINK FENCE
EXISTING WOOD/WROUGHT IRON FENCE
EXISTING WALL STRUCTURE
LEASE AREA
PROPERTY LINE (PL)
SETBACKS
PROPOSED/EXISTING ICE BRIDGE
PROPOSED/EXISTING CABLE TRAY
EXISTING WATER LINE
PROPOSED UNDERGROUND POWER (W)
PROPOSED UNDERGROUND TELCO (UGP)
PROPOSED OVERHEAD POWER (UGT)
PROPOSED OVERHEAD TELCO (OHP)
PROPOSED OVERHEAD UTILITIES (OHT)
PROPOSED ABOVE GROUND POWER (OHT)
PROPOSED ABOVE GROUND TELCO (AGP / AGT)

CALLOUT REFERENCE (X)
REVISION REFERENCE (1)
WORKPOINT (W.P.)
SECTION REFERENCE (XX / X-X)
DETAIL REFERENCE (XX / X-X)
ELEVATION REFERENCE (X / X)

THESE DOCUMENTS ARE IN COMPLIANCE WITH AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE FOLLOW CODES AND STANDARDS AS APPLICABLE: 2018 CONNECTICUT STATE BUILDING CODE, 2017 NATIONAL ELECTRIC CODE OR LATEST EDITION.

AB	ANCHOR BOLT	COL	COLUMN	FIN	FINISH(ED)	MAS	MASONRY	QTY	QUANTITY	TOF	TOP OF FOUNDATION
ABV	ABOVE	COMM	COMMON	FLR	FLOOR	MAX	MAXIMUM	RAD	RADIUS	TOP	TOP OF PLATE (PARAPET)
AC	ALTERNATING CURRENT	CONC	CONCRETE	FDN	FOUNDATION	MB	MACHINE BOLT	RECT	RECTIFIER	TOS	TOP OF STEEL
ADDL	ADDITIONAL	CONSTR	CONSTRUCTION	FOC	FACE OF CONCRETE	MECH	MECHANICAL	REF	REFERENCE	TOW	TOP OF WALL
AFF	ABOVE FINISHED FLOOR	DBL	DOUBLE	FOM	FACE OF MASONRY	MFR	MANUFACTURER	REINF	REINFORCEMENT	TVSS	TRANSIENT VOLTAGE SUPPRESSION
AFG	ABOVE FINISHED GRADE	DC	DIRECT CURRENT	FOS	FACE OF STUD	MGB	MASTER GROUND BAR	REQ'D	REQUIRED		SYSTEM
AIC	AMPERAGE INTERRUPTION CAPACITY	DEPT	DEPARTMENT	FOW	FACE OF WALL	MIN	MINIMUM	RET	REMOTE ELECTRIC TILT	TYP	TYPICAL
ALUM	ALUMINUM	DF	DOUGLAS FIR	FS	FINISH SURFACE	MISC	MISCELLANEOUS	RMC	RIGID METALLIC CONDUIT	UG	UNDERGROUND
ALT	ALTERNATE	DIA	DIAMETER	FT	FOOT	MTL	METAL	RRH	REMOTE RADIO HEAD	UL	UNDERWRITERS LABORATORY
ANT	ANTENNA	DIAG	DIAGONAL	FTG	FOOTING	MTS	MANUAL TRANSFER SWITCH	RRU	REMOTE RADIO UNIT	UNO	UNLESS NOTED OTHERWISE
APPROX	APPROXIMATE	DIM	DIMENSION	GA	GAUGE	MW	MICROWAVE	RWY	RACEWAY	UMTS	UNIVERSAL MOBILE
ARCH	ARCHITECTURAL	DWG	DRAWING	GEN	GENERATOR	(N)	NEW	SCH	SCHEDULE		TELECOMMUNICATIONS SYSTEM
ATS	AUTOMATIC TRANSFER SWITCH	DWL	DOWEL	GFCI	GROUND FAULT CIRCUIT INTERRUPTER	NEC	NATIONAL ELECTRIC CODE	SHT	SHEET	UPS	UNINTERRUPTIBLE POWER SYSTEM
AWG	AMERICAN WIRE GAUGE	(E)	EXISTING	GLB	GLUE LAMINATED BEAM	NO.(#)	NUMBER	SIAD	SMART INTEGRATED DEVICE		(DC POWER PLANT)
BATT	BATTERY	EA	EACH	GLV	GALVANIZED	NTS	NOT TO SCALE	SIM	SIMILAR	VIF	VERIFIED IN FIELD
BLDG	BUILDING	EC	ELECTRICAL CONDUCTOR	GPS	GLOBAL POSITIONING SYSTEM	OC	ON CENTER	SPEC	SPECIFICATION	W	WIDE
BLK	BLOCK	EL	ELEVATION	GND	GROUND	OPNG	OPENING	SQ	SQUARE	W/	WITH
BLKG	BLOCKING	ELEC	ELECTRICAL	GSM	GLOBAL SYSTEM FOR MOBILE	(P)	PROPOSED	SS	STAINLESS STEEL	WD	WOOD
BM	BEAM	EMT	ELECTRICAL METALLIC TUBING	HDR	HEADER	P/C	PRECAST CONCRETE	STD	STANDARD	W.P.	WORK POINT
BTC	BARE TINNED COPPER CONDUCTOR	ENG	ENGINEER	HGR	HANGER	PCS	PERSONAL COMMUNICATION SERVICES	STL	STEEL	WP	WEATHERPROOF
BOF	BOTTOM OF FOOTING	EQ	EQUAL	HVAC	HEAT/VENTILATION/AIR CONDITIONING	PCU	PRIMARY CONTROL UNIT	STRUCT	STRUCTURAL	WT	WEIGHT
CAB	CABINET	EXP	EXPANSION	HT	HEIGHT	PRC	PRIMARY RADIO CABINET	TEMP	TEMPORARY		
CANT	CANTILEVERED	EXT	EXTERIOR	IGR	INTERIOR GROUND RING	PP	POLARIZING PRESERVING	THK	THICKNESS		
CEC	CALIFORNIA ELECTRIC CODE	FAB	FABRICATION	IN	INCH	PSF	POUNDS PER SQUARE FOOT	TMA	TOWER MOUNTED AMPLIFIER		
CHG	CHARGING	FF	FINISH FLOOR	INT	INTERIOR	PSI	POUNDS PER SQUARE INCH	TN	TOE NAIL		
CLG	CEILING	FG	FINISH GRADE	LB(S)	POUND(S)	PT	PRESSURE TREATED	TOA	TOP OF ANTENNA		
CLR	CLEAR	FIF	FACILITY INTERFACE FRAME	LF	LINEAR FEET	PWR	POWER CABINET	TOC	TOP OF CURB		

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CROWN CASTLE
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SUITE 101
CLIFTON PARK, NY 12065

JACOBS
JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
CRAIG A. THOMAS
No. 0029052
LICENSED
PROFESSIONAL ENGINEER

PROJECT NO: ERCC0004

DRAWN BY: DAP

CHECKED BY: CAT

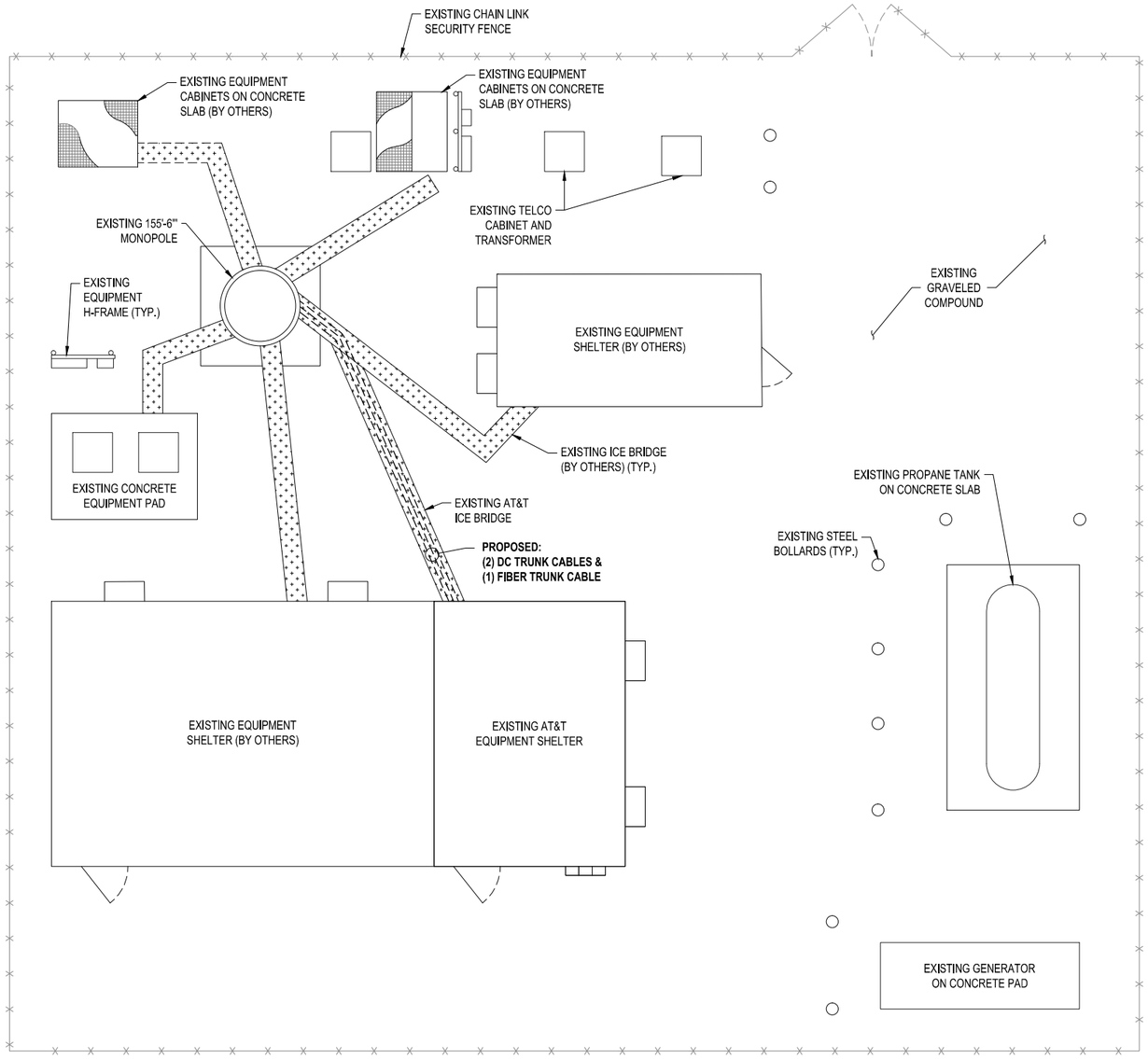
SUBMITTALS

0	01/18/19	ISSUED FOR PERMITTING

FA# 10035085
SITE# CTL01073
MARLBOROUGH-COUNTRY BARN
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

GENERAL NOTES II

GN-2



NOTES:

1. PLAN BASED ON AS-BUILT DRAWINGS ISSUED BY CENTEK ENGINEERING ON 01/19/17. CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS AND LOCATION/ORIENTATION OF EXISTING EQUIPMENT.

1 SITE PLAN

SCALE: 3/16" = 1'-0"

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3 CORPORATE PARK DRIVE
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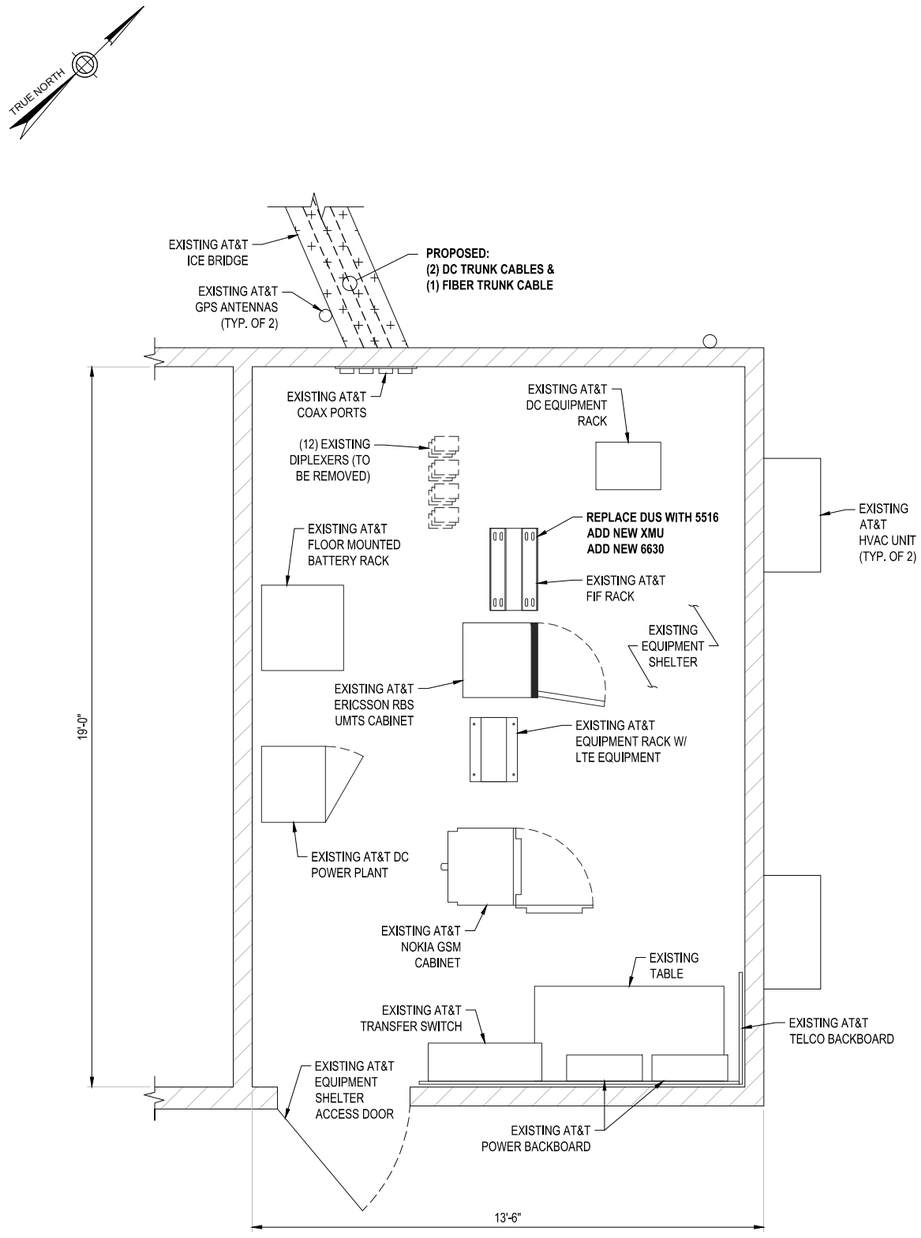
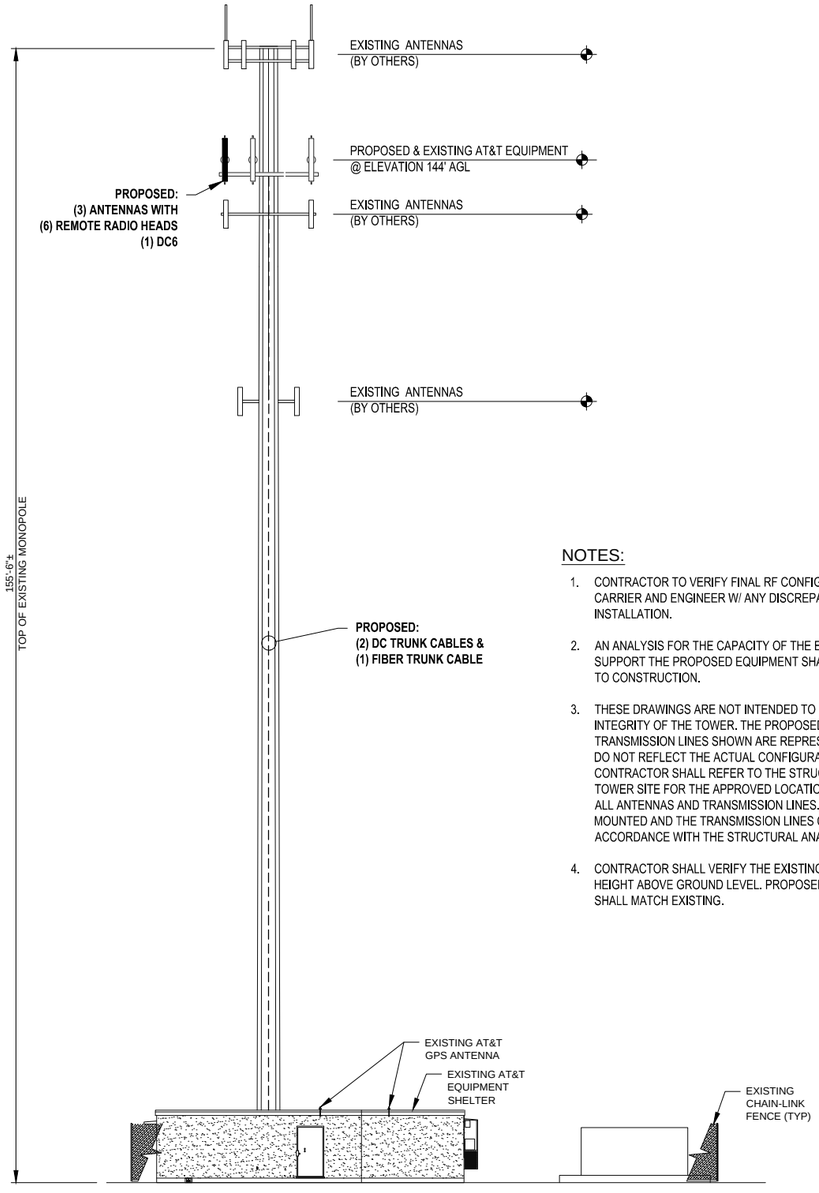
SITE PLAN

C-1



1 EQUIPMENT LAYOUT — SCALE: 1/2" = 1'-0"



2 TOWER ELEVATION — SCALE: 3/32" = 1'-0"

NOTES:

1. CONTRACTOR TO VERIFY FINAL RF CONFIGURATION AND NOTIFY CARRIER AND ENGINEER W/ ANY DISCREPANCIES PRIOR TO THE INSTALLATION.
2. AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.
3. THESE DRAWINGS ARE NOT INTENDED TO REFLECT THE STRUCTURAL INTEGRITY OF THE TOWER. THE PROPOSED ANTENNAS AND TRANSMISSION LINES SHOWN ARE REPRESENTATIVE IN NATURE AND DO NOT REFLECT THE ACTUAL CONFIGURATIONS REQUIRED. THE CONTRACTOR SHALL REFER TO THE STRUCTURAL ANALYSIS OF THIS TOWER SITE FOR THE APPROVED LOCATION AND CONFIGURATION OF ALL ANTENNAS AND TRANSMISSION LINES. ALL ANTENNAS MUST BE MOUNTED AND THE TRANSMISSION LINES CONFIGURED IN STRICT ACCORDANCE WITH THE STRUCTURAL ANALYSIS.
4. CONTRACTOR SHALL VERIFY THE EXISTING ANTENNA CENTERLINE HEIGHT ABOVE GROUND LEVEL. PROPOSED ANTENNA CENTERLINE SHALL MATCH EXISTING.

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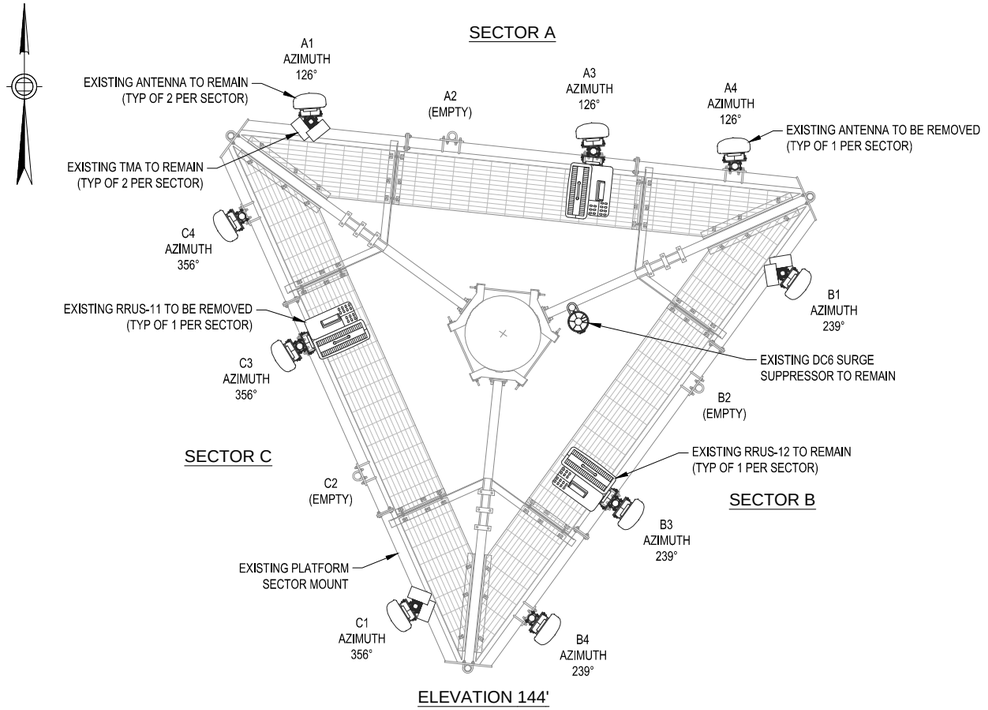
EQUIPMENT LAYOUT & PROPOSED TOWER ELEVATION

C-2



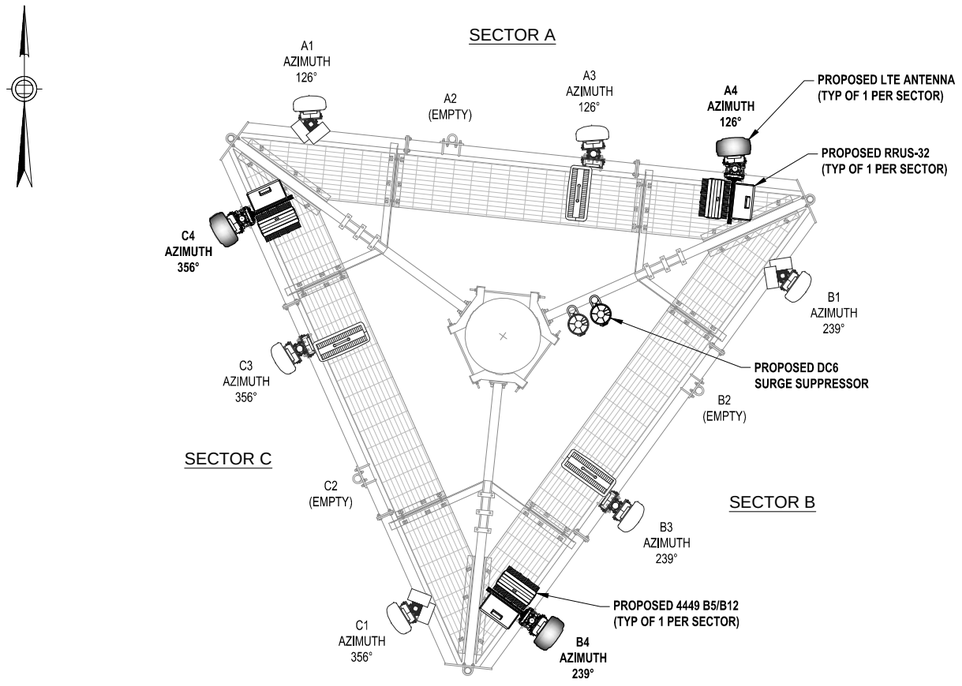
1 EXISTING ANTENNA LAYOUT

SCALE: N.T.S.

NOTES:

1. THESE DRAWINGS ARE NOT INTENDED TO REFLECT THE STRUCTURAL INTEGRITY OF THE TOWER. THE PROPOSED ANTENNAS AND ASSOCIATED EQUIPMENT SHOWN ARE REPRESENTATIVE IN NATURE AND DO NOT REFLECT THE ACTUAL CONFIGURATIONS REQUIRED. THE CONTRACTOR SHALL REFER TO THE MOUNT ANALYSIS OF THIS SITE FOR THE APPROVED LOCATION AND CONFIGURATION OF ALL ANTENNAS AND EQUIPMENT. ALL ANTENNAS AND EQUIPMENT MUST BE MOUNTED IN STRICT ACCORDANCE WITH THE MOUNT ANALYSIS.

DO NOT INSTALL PROPOSED SQUID OR SURGE SUPPRESSOR ON TOWER LEG



1 PROPOSED ANTENNA LAYOUT

SCALE: N.T.S.

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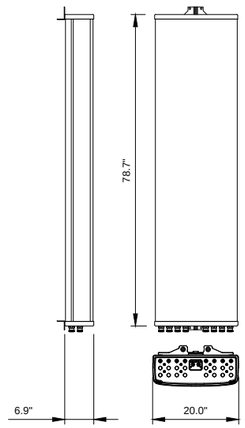
COUNTRY BARN
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

EXISTING & PROPOSED
ANTENNA LAYOUT

C-3

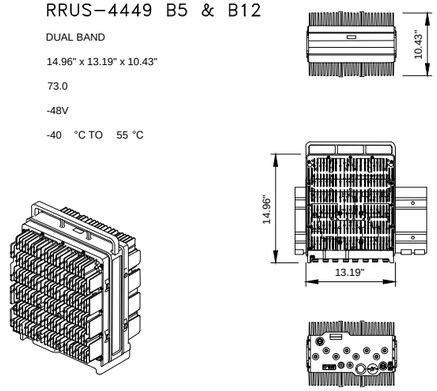
MANUFACTURER:	KATHREIN
MODEL NO.:	80010965
RADOME MATERIAL:	FIBERGLASS, UV RESISTANT
COLOR:	LIGHT GRAY
DIMENSIONS (LxWxD):	78.7" x 20.0" x 6.9" 1999mm x 508mm x 175mm
WEIGHT (lbs):	97.6
CONNECTOR:	8 x 4.3-10 FEMALE
FRONT WIND LOAD:	254 LBF @ 93 MPH 1130 N @ 150 KM/H
SIDE WIND LOAD:	256 LBF @ 93 MPH 1140 N @ 150 KM/H
WIND SPEED MAX.:	>150 MPH (>241 KM/H)



1 ANTENNA SPECIFICATIONS

SCALE: N.T.S.

MANUFACTURER:	ERICSSON
MODEL NO.:	RRUS-4449 B5 & B12
TECHNOLOGY:	DUAL BAND
DIMENSIONS (HxWxD):	14.96" x 13.19" x 10.43"
WEIGHT (lbs):	73.0
POWER SUPPLY:	-48V
TEMPERATURE:	-40 °C TO 55 °C

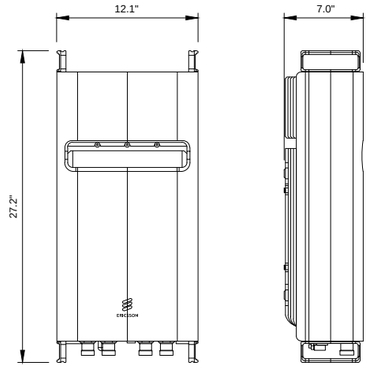


2 RRUS SPECIFICATIONS

SCALE: N.T.S.

MANUFACTURER:	ERICSSON
MODEL NO.:	RRUS-32
TECHNOLOGY:	WCS
DIMENSIONS (HxWxD):	27.2" x 12.1" x 7.0"
WEIGHT (lbs):	53
POWER SUPPLY:	-48V
TEMPERATURE:	-40 °C TO 55 °C

NOTE:
PENDING FINAL PRODUCT SPECIFICATION

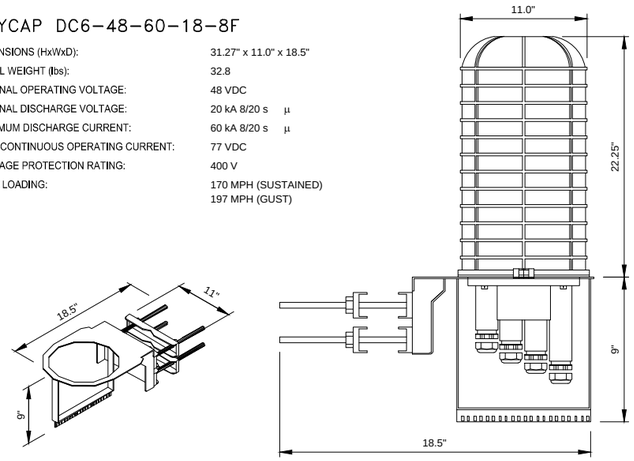


3 RRUS SPECIFICATIONS

SCALE: N.T.S.

RAYCAP DC6-48-60-18-8F

DIMENSIONS (HxWxD):	31.27" x 11.0" x 18.5"
TOTAL WEIGHT (lbs):	32.8
NOMINAL OPERATING VOLTAGE:	48 VDC
NOMINAL DISCHARGE VOLTAGE:	20 kA 8/20 s μ
MAXIMUM DISCHARGE CURRENT:	60 kA 8/20 s μ
MAX. CONTINUOUS OPERATING CURRENT:	77 VDC
VOLTAGE PROTECTION RATING:	400 V
WIND LOADING:	170 MPH (SUSTAINED) 197 MPH (GUST)



5 DC SURGE PROTECTION SPECIFICATIONS

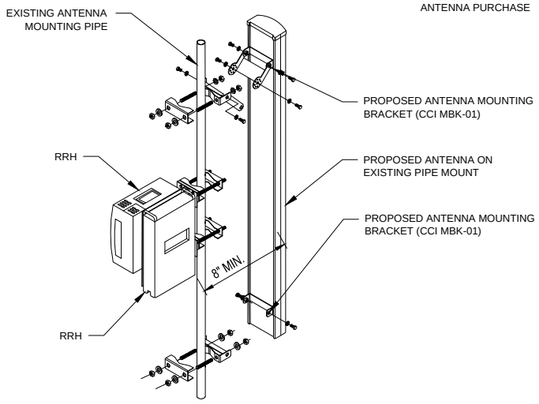
SCALE: N.T.S.

PART #	PIPE SIZE	STAND-OFF ARM
BBPM-K1	2-3/8"	3-1/2" - 4-1/2"
BBPM-K2	2-7/8"	3-1/2" - 4-1/2"
BBPM-K3	2-3/8"	3-1/2" - 6"
BBPM-U	2-3/8" - 4-1/2"	2-3/8" - 4-1/2"

5 DC6 MOUNTING DETAIL

SCALE: N.T.S.

NOTE
MOUNTING OPTIONS ARE INCLUDED PRODUCTS WITH ANTENNA PURCHASE



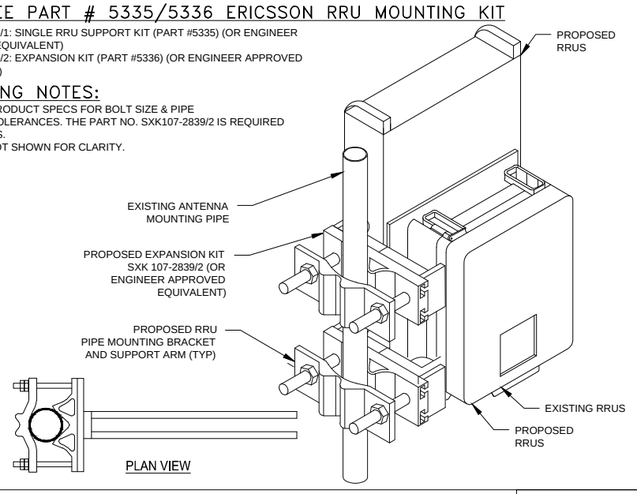
6 ANTENNA & RRH MOUNTING DETAIL

SCALE: N.T.S.

CUE DEE PART # 5335/5336 ERICSSON RRU MOUNTING KIT

SXK 107 2839/1: SINGLE RRU SUPPORT KIT (PART #5335) (OR ENGINEER APPROVED EQUIVALENT)
SXK 107 2839/2: EXPANSION KIT (PART #5336) (OR ENGINEER APPROVED EQUIVALENT)

MOUNTING NOTES:
REFER TO PRODUCT SPECS FOR BOLT SIZE & PIPE DIAMETER TOLERANCES. THE PART NO. SXK107-2839/2 IS REQUIRED FOR (2) RRUS.
ANTENNA NOT SHOWN FOR CLARITY.



7 RRU MOUNTING DETAIL

SCALE: N.T.S.

NOT USED

NOT USED

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5841 BRIDGE STREET
EAST SYRACUSE, NY 13057

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3 CORPORATE PARK DRIVE
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PROJECT NO:	ERCC0004
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CHECKED BY:	CAT

SUBMITTALS

0	01/18/19	ISSUED FOR PERMITTING

FA# 10035085
SITE# CTL01073
MARLBOROUGH-COUNTRY BARN
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

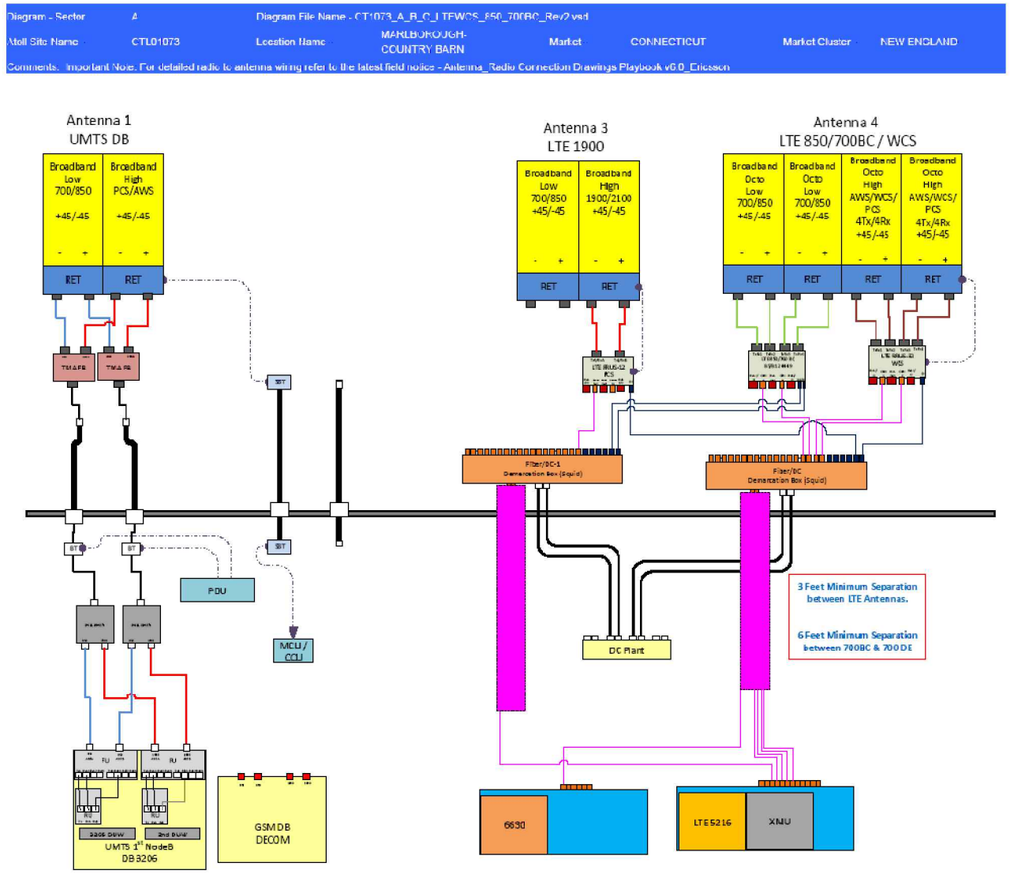
EQUIPMENT DETAILS I

C-4

ANTENNA NUMBER	ANTENNA MODEL	ANTENNA BAND	AZIMUTH	ANTENNA CENTERLINE FROM GROUND	TMA's	RRH's	FEEDER	RAYCAP
A1	7770 (55"x11"x5")	UMTS	126°	144'	(1) LGP 17201	-	(4) 1-1/4" EXISTING (LENGTH @ 170')	(1) RAYCAP DC6-48-60-0-8F
A2	-	-	-	-	-	-	-	
A3	AM-X-CD-16-65-00T-RET (72"x11.8"x5.9")	LTE	126°	144'	-	(1) RRUS-12 (PCS)	(1) FIBER (2) DC (LENGTH @ 170')	(1) RAYCAP DC6-48-60-18-8C
A4	**800-10965 (78.7"x20"x6.9")**	**LTE**	**126°**	**144'**	-	**(1) 4449 B5/B12 (850/700) (1) RRUS-32 (WCS)**	**(1) FIBER (2) DC (LENGTH @ 170')**	
B1	7770 (55"x11"x5")	UMTS	239°	144'	(1) LGP 17201	-	(4) 1-1/4" EXISTING (LENGTH @ 170')	
B2	-	-	-	-	-	-	-	
B3	AM-X-CD-16-65-00T-RET (72"x11.8"x5.9")	LTE	239°	144'	-	(1) RRUS-12 (PCS)	-	
B4	**800-10965 (78.7"x20"x6.9")**	**LTE**	**239°**	**144'**	-	**(1) 4449 B5/B12 (850/700) (1) RRUS-32 (WCS)**	-	
G1	7770 (55"x11"x5")	UMTS	356°	144'	(1) LGP 17201	-	(4) 1-1/4" EXISTING (LENGTH @ 170')	
G2	-	-	-	-	-	-	-	
G3	AM-X-CD-16-65-00T-RET (72"x11.8"x5.9")	LTE	356°	144'	-	(1) RRUS-12 (PCS)	-	
G4	**800-10965 (78.7"x20"x6.9")**	**LTE**	**356°**	**144'**	-	**(1) 4449 B5/B12 (850/700) (1) RRUS-32 (WCS)**	-	

*EQUIPMENT LISTED IN **BOLD**, DELINEATES THAT THE EQUIPMENT IS PROPOSED

1 ANTENNA INFORMATION CHART SCALE: NONE



2 RF EQUIPMENT SCHEMATIC SCALE: NONE

at&t
5841 BRIDGE STREET
EAST SYRACUSE, NY 13057

CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065

JACOBS
JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
CRAIG A. THOMAS
No. 0029052
LICENSED PROFESSIONAL ENGINEER

PROJECT NO: ERCC0004

DRAWN BY: DAP

CHECKED BY: CAT

SUBMITTALS

0	01/18/19	ISSUED FOR PERMITTING

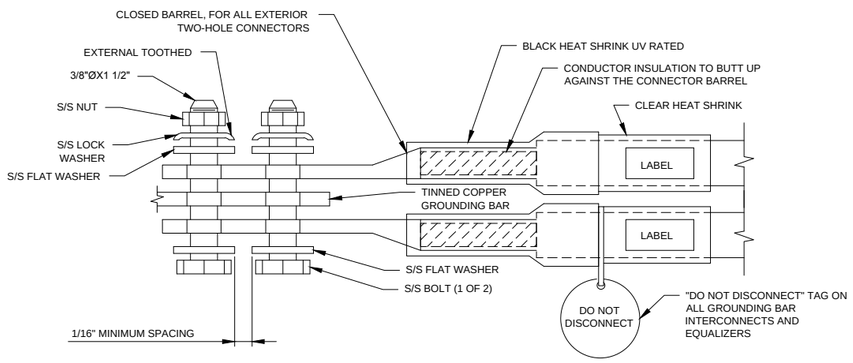
FA# 10035085
SITE# CTL01073
MARLBOROUGH-COUNTRY BARN
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

ANTENNA CHART & RF EQUIPMENT SCHEMATIC

RF-1

NOTES:

1. EXOTHERMIC WELD (2) TWO, #2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUNDING BAR. ROUTE CONDUCTORS TO BURIED GROUNDING RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
2. ALL GROUNDING BARS SHALL BE STAMPED IN TO THE METAL "IF STOLEN DO NOT RECYCLE." THE CONTRACTOR SHALL USE PERMANENT MARKER TO DRAW THE LINES BETWEEN EACH SECTION AND LABEL EACH SECTION ("P", "A", "N", "I") WITH 1" HIGH LETTERS.
3. ALL HARDWARE SHALL BE STAINLESS STEEL 3/8" DIAMETER OR LARGER. ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
4. FOR GROUND BOND TO STEEL ONLY: INSERT A CADMIUM FLAT WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
5. DO NOT INSTALL CABLE GROUNDING KIT AT A BEND AND ALWAYS DIRECT GROUNDING CONDUCTOR DOWN TO GROUNDING BUS.
6. NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUNDING BAR AND BOLTED ON THE BACK SIDE. INSTALL BLACK HEAT-SHRINKING TUBE, 600 VOLT INSULATION, ON ALL GROUNDING TERMINATIONS. THE INTENT IS TO WEATHERPROOF THE COMPRESSION CONNECTION.
7. SUPPLIED AND INSTALLED BY CONTRACTOR.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUNDING BAR AS REQUIRED, PROVIDING 50% SPARE CONNECTION POINTS.
9. ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL (NO SHINERS).



1 EXTERIOR TWO HOLE LUG DETAIL — SCALE: NONE

GENERAL NOTES:

1. CONTRACTOR SHALL HAVE A COMPLETE UNDERSTANDING OF THE CONTENTS OF AT&T STANDARD TP-76416.
2. ALL INSTALLATIONS SHALL BE FIELD VERIFIED.
3. ALL GROUND CONNECTIONS FOR ALL RELOCATED EQUIPMENT SHALL BE RE-ESTABLISHED BY THE CONTRACTOR. CONTRACTOR SHALL FURNISH ALL MATERIALS AS REQUIRED.

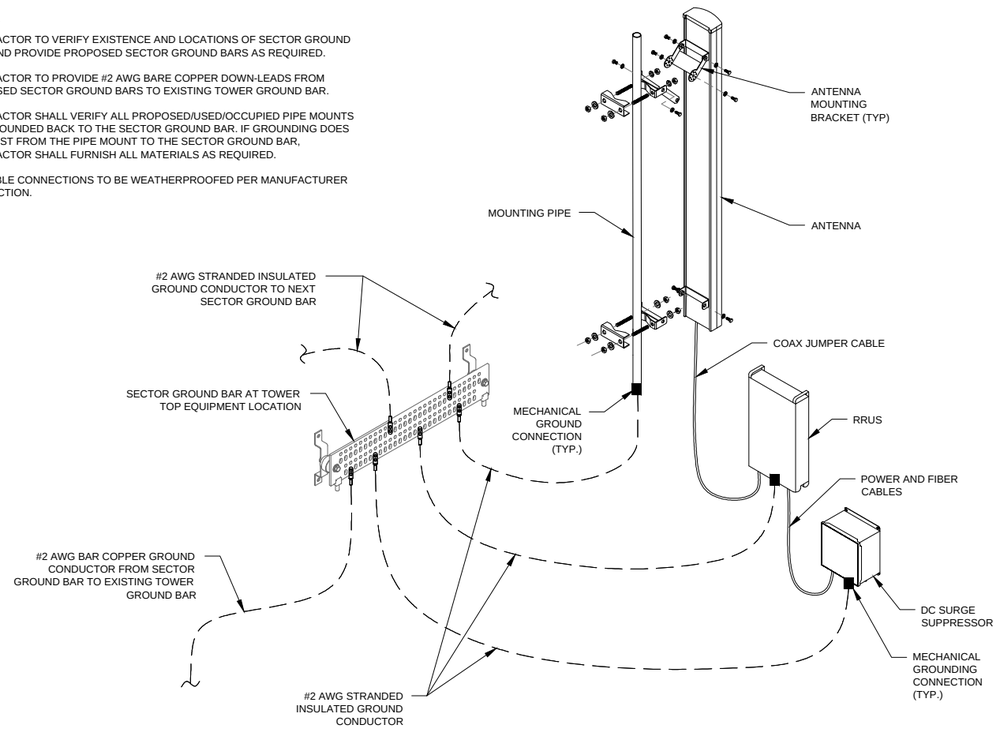
GROUNDING NOTES:

1. TOWER GROUNDING BAR: EXTEND (2) #2 AWG TINNED CU WIRE FROM BURIED GROUND RING UP TO THE TOWER GROUND BAR AND MAKE A MECHANICAL CONNECTION. SECURE GROUND BAR DIRECTLY TO TOWER WITH STAINLESS STEEL MOUNTING MATERIAL.
2. ANTENNA GROUNDING BAR: ANDREW CORPORATION PART #UGBKIT-0424-T MOUNT GROUND BAR DIRECTLY TO TOWER. SECURE TO TOWER WITH STAINLESS STEEL MOUNTING MATERIAL.
3. GROUNDING BAR: LOCATED CLOSE TO GRADE LOCK BOX TESSCO PART #351546: INSTALL PER MANUFACTURER GUIDELINES.
4. EXOTHERMIC OR COMPRESSION CONNECTION FOR PIPE MOUNT TO ANTENNA ROUTE CONDUCTOR TO NEAREST GROUNDING BAR SO THE GROUNDING CONDUCTORS PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND. USE #2 AWG SOLID TINNED COPPER CONDUCTOR. GROUNDING CONNECTION SHALL BE LOCATED AT THE TOP 2" OF PIPE.
5. ALL GROUNDING CONDUCTORS SHALL BE #2 AWG COPPER TINNED UNLESS NOTED OTHERWISE.
6. ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
7. KOPR-SHIELD ANTI-OXIDATION COMPOUND SHALL BE USED ON ALL COMPRESSION GROUNDING CONNECTIONS.
8. ALL EXOTHERMIC CONNECTIONS SHALL BE INSTALLED UTILIZING THE PROPER CONNECTION/MOLD AND MATERIALS FOR THE PARTICULAR APPLICATION.
9. ALL BOLTED GROUNDING CONNECTIONS SHALL BE INSTALLED WITH AN EXTERNAL TOOTHED LOCK WASHER. GROUNDING BUS BARS MAY HAVE PRE-PUNCHED HOLES OR TAPPED HOLES. ALL HARDWARE SHALL BE SECURITY TORQUE HARDWARE 3/8" STAINLESS STEEL.
10. EXTERNAL GROUNDING CONDUCTOR SHALL NOT BE INSTALLED OR ROUTED THROUGH HOLES IN ANY METAL OBJECTS, CONDUITS, OR SUPPORTS TO PRECLUDE ESTABLISHING A MAGNETIC CHOKE POINT.
11. PLASTIC CLIPS SHALL BE USED TO FASTEN AND SUPPORT GROUNDING CONDUCTORS. FERROUS METAL CLIPS WHICH COMPLETELY SURROUND THE GROUNDING CONDUCTOR SHALL NOT BE USED.
12. IF COAX ON ICE BRIDGE IS MORE THAT 6' FROM THE GROUND BAR AT THE BASE OF THE TOWER, A SECOND GROUND BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE RUN TO GROUND THE COAX GROUND KIT AND THE IN-LINE SURGE ARRESTORS (SURGE ARRESTORS INSTALLED BY LUCENT ONLY HAVE 6' GROUND TAILS).
13. CONTRACTOR SHALL REPAIR/PLACE EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.
14. DO NOT ALLOW THE COPPER CONDUCTOR TO TOUCH THE GALVANIZED GUY WIRE AT THE CONNECTION POINT OR AT ANY OTHER POINT. NO EXOTHERMICALLY WELDED CONNECTION SHALL BE MADE TO THE GUY WIRE.
15. CONTRACTOR SHALL VERIFY EXISTING SECTOR GROUNDING CONDITION AND GROUND THE PROPOSED EQUIPMENT IN THE SAME MANNER. A PROPOSED SECTOR GROUND BAR SHALL BE INSTALLED IF REQUIRED.

2 GROUNDING BAR DETAIL — SCALE: NONE

NOTES:

1. CONTRACTOR TO VERIFY EXISTENCE AND LOCATIONS OF SECTOR GROUND BARS AND PROVIDE PROPOSED SECTOR GROUND BARS AS REQUIRED.
2. CONTRACTOR TO PROVIDE #2 AWG BARE COPPER DOWN-LEADS FROM PROPOSED SECTOR GROUND BARS TO EXISTING TOWER GROUND BAR.
3. CONTRACTOR SHALL VERIFY ALL PROPOSED/USED/OCCUPIED PIPE MOUNTS ARE GROUNDED BACK TO THE SECTOR GROUND BAR. IF GROUNDING DOES NOT EXIST FROM THE PIPE MOUNT TO THE SECTOR GROUND BAR, CONTRACTOR SHALL FURNISH ALL MATERIALS AS REQUIRED.
4. ALL CABLE CONNECTIONS TO BE WEATHERPROOFED PER MANUFACTURER INSTRUCTION.



3 TYPICAL ANTENNA GROUNDING SCHEMATIC — SCALE: NONE

NOT USED

at&t
5841 BRIDGE STREET
EAST SYRACUSE, NY 13057

CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065

JACOBS
JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
CRAIG A. THOMAS
No. 0029052
LICENSED
PROFESSIONAL ENGINEER

PROJECT NO: ERCC0004

DRAWN BY: DAP

CHECKED BY: CAT

SUBMITTALS

0	01/18/19	ISSUED FOR PERMITTING

FA# 10035085
SITE# CTL01073
MARLBOROUGH-COUNTRY BARN
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

GROUNDING DETAILS

G-1

Date: **January 10, 2019**

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

FDH Infrastructure Services, LLC
6521 Meridien Drive, Suite 107
Raleigh, North Carolina 27616
(919) 755-1012

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	10035085
	Carrier Site Name:	MARLBOROUGH-COUNTRY BARN
Crown Castle Designation:	**Crown Castle BU Number:**	806366
	Crown Castle Site Name:	HRT 107(C) 943204
	Crown Castle JDE Job Number:	549808
	Crown Castle Work Order Number:	1678487
	Crown Castle Order Number:	472663 Rev. 0
Engineering Firm Designation:	**FDH-IS Project Number:**	19BAHV1400
Site Data:	**73 North Main Street, Marlborough, Hartford County, CT** **Latitude *41° 37' 47.30"*, Longitude *-72° 27' 59.40"*** **155.5 Foot - Monopole Tower**	

Dear Denice Nicholson,

FDH Infrastructure Services, LLC 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**

This analysis utilizes an ultimate 3-second gust wind speed of 130 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Respectfully submitted by:

Ashley O'Neal
Project Engineer I

Reviewed by:

Dennis D. Abel, PE
Chief Engineer
CT PE License No. 23247

STATE OF CONNECTICUT
DENNIS D. ABEL
No. 23247
LICENSED
PROFESSIONAL ENGINEER

01-10-2019

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 155.5 ft Monopole tower designed by FWT, Inc.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	130 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	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)
144.0	144.0	3	kathrein	80010965	12 2 4	1-1/4 3/8 3/4
		3	kmw communications	AM-X-CD-16-65-00T-RET		
		3	powerwave technologies	7770.00		
		3	ericsson	RRUS 12		
		3	ericsson	RRUS 32		
		3	ericsson	RRUS 4449 B5/B12		
		3	powerwave technologies	1001940		
		6	powerwave technologies	LGP 17201		
		6	powerwave technologies	LGP21903		
		2	raycap	DC6-48-60-18-8F		
		1	-	Platform Mount [LP 1002-1]		

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)
156.0	159.0	3	alcatel lucent	B13 RRH 4x30	17	1-5/8
		6	andrew	SBNHH-1D65B		
		3	commscope	LNX-6514DS-A1M		
		2	commscope	LNX-6514DS-AIM		
		1	commscope	LNX-8513DS-VTM		
		3	decibel	DB809K-Y		
		2	raycap	RRFDC-3315-PF-48		
	156.0	1	-	Platform Mount [LP 1002-1]		
135.0	135.0	3	kathrein	742 213	6	1-1/4

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
128.0	130.0	3	alcatel lucent	PCS 1900MHZ 4X45W-65MHZ	3 1	1-1/4 7/8
		6	alcatel lucent	RRH2X50-800		
		3	alcatel lucent	TD-RRH8X20-25		
		3	commscope	NNVV-65B-R4		
		3	rfs celwave	APXVTM14-ALU-I20		
	128.0	2	-	T-Arm Mount [TA 602-3]		
100.0	100.0	3	commscope	LNX-6515DS-A1M	12	1-1/4
		3	ems wireless	RV90-17-00DP		
		6	ericsson	KRY 112 489/2		
		1	-	Side Arm Mount [SO 701-3]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-TOWER MANUFACTURER DRAWINGS	FWT, Inc.	823126	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	FWT, Inc.	823125	CCISITES
4-GEOTECHNICAL REPORTS	FDH Engineering, Inc.	2208816	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	Crown Castle	7837006	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.5.0), 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. *FDH Infrastructure Services, LLC* 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	155.5 - 110	Pole	TP64.606x58.6x0.375	1	-29.06	4083.22	15.8	Pass
L2	110 - 72.5	Pole	TP68.805x62.8x0.4375	2	-47.98	5456.99	29.1	Pass
L3	72.5 - 36	Pole	TP72.748x66.8082x0.5	3	-69.74	6956.40	37.7	Pass
L4	36 - 0	Pole	TP76.5x70.56x0.5	4	-98.25	7106.06	56.1	Pass
							Summary	
						Pole (L4)	56.1	Pass
						RATING =	**56.1**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	0.0	57.2	Pass
1,2	Base Plate	0.0	24.9	Pass
1,2	Base Foundation	0.0	31.9	Pass
1,2	Base Foundation Soil Interaction	0.0	35.5	Pass

Structure Rating (max from all components) =	**57.2%[2]**

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.
2) Rating per TIA-222-H Section 15.5.

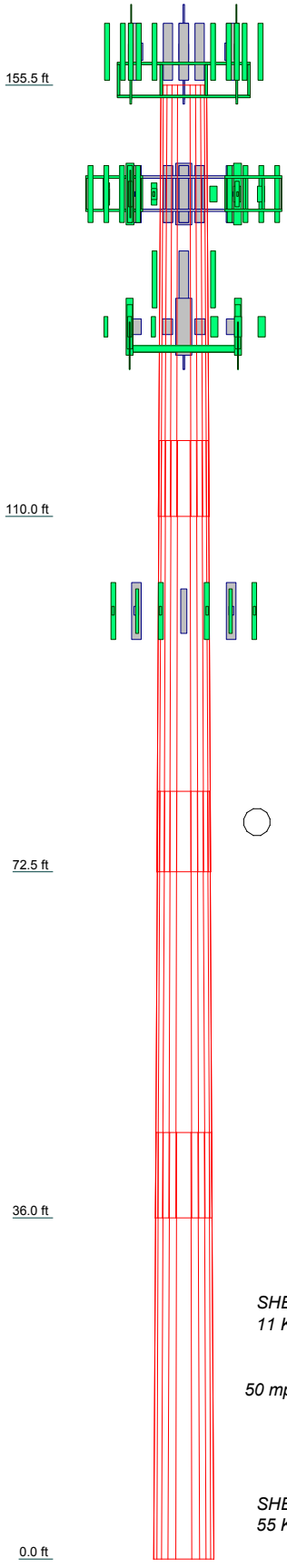
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	45.50	12	0.3750	8.00	58.6000	64.6060	A572-65	11.4
2	45.50	12	0.4375	8.50	62.8000	68.8050		14.3
3	45.00	12	0.5000	9.00	66.8082	72.7480		17.1
4	45.00	12	0.5000		70.5600	76.5000		18.0
								60.8



ALL REACTIONS ARE FACTORED

AXIAL 140 K

SHEAR 11 K *MOMENT 1267 kip-ft*

TORQUE 0 kip-ft

50 mph WIND - 1.5000 in ICE

AXIAL 98 K

SHEAR 55 K *MOMENT 6019 kip-ft*

TORQUE 0 kip-ft

REACTIONS - 130 mph WIND

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 130 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TIA-222-H Annex S
9. TOWER RATING: 56.1%

FDH Infrastructure Services
6521 Meridien Drive, Suite 107
Raleigh, North Carolina 27616
FDH-IS
Phone: (919) 755-1012
FAX: (919) 755-1031

Job: *806366_HRT 107(C) 943204*			
Project: *19BAHV1400*			
Client: Crown Castle	Drawn by: AONeal	App'd:	
Code: TIA-222-H	Date: 01/10/19	Scale: NTS	
Path:		Dwg No. E-1	

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
Tower base elevation above sea level: 578.00 ft.
Basic wind speed of 130 mph.
Risk Category II.
Exposure Category B.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.00 ft.
Nominal ice thickness of 1.5000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
TIA-222-H Annex S.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.05.
Tower analysis based on target reliabilities in accordance with Annex S.
Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
Use Code Stress Ratios	Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-H Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-H Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	√ Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	155.50-110.00	45.50	8.00	12	58.6000	64.6060	0.3750	1.5000	A572-65 (65 ksi)
L2	110.00-72.50	45.50	8.50	12	62.8000	68.8050	0.4375	1.7500	A572-65 (65 ksi)
L3	72.50-36.00	45.00	9.00	12	66.8082	72.7480	0.5000	2.0000	A572-65 (65 ksi)
L4	36.00-0.00	45.00		12	70.5600	76.5000	0.5000	2.0000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	60.5349	70.3067	30422.9680	20.8446	30.3548	1002.2457	61645.1813	34.6028	14.6998	39.199
	66.7528	77.5589	40842.0131	22.9947	33.4659	1220.4065	82756.9913	38.1721	16.3094	43.492
L2	65.9541	87.8532	43610.4361	22.3258	32.5304	1340.6056	88366.5670	43.2387	15.6579	35.789
	71.0778	96.3127	57460.4440	24.4756	35.6410	1612.2011	116430.4378	47.4022	17.2672	39.468
L3	70.1501	106.7562	59911.9268	23.7383	34.6066	1731.2263	121397.8066	52.5421	16.5646	33.129
	75.1379	116.3193	77497.7893	25.8648	37.6835	2056.5463	157031.5318	57.2488	18.1565	36.313
L4	74.1026	112.7967	70668.0184	25.0815	36.5501	1933.4563	143192.5643	55.5151	17.5701	35.14
	79.0222	122.3600	90209.5680	27.2080	39.6270	2276.4673	182789.0418	60.2219	19.1620	38.324

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 155.50-110.00				1	1	1			
L2 110.00-72.50				1	1	1			
L3 72.50-36.00				1	1	1			
L4 36.00-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
Safety Line 3/8 ***	A	No	Surface Ar (CaAa)	155.50 - 8.00	1	1	0.000 0.000	0.3750		0.22

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
***									
HB158-1-08U8-S8J 18(1-5/8)	C	No	No	Inside Pole	155.50 - 8.00	2	No Ice	0.00	1.30
							1/2" Ice	0.00	1.30
							1" Ice	0.00	1.30
							2" Ice	0.00	1.30
561(1-5/8")	C	No	No	Inside Pole	155.50 - 8.00	12	No Ice	0.00	1.35
							1/2" Ice	0.00	1.35
							1" Ice	0.00	1.35
							2" Ice	0.00	1.35
LDF7-50A(1-5/8")	A	No	No	Inside Pole	155.50 - 8.00	3	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
***									
UCF114-50JA(1 1/4")	B	No	No	Inside Pole	144.00 - 8.00	12	No Ice	0.00	0.55
							1/2" Ice	0.00	0.55
							1" Ice	0.00	0.55
							2" Ice	0.00	0.55
FB-L98B-002-75000 (3/8")	B	No	No	Inside Pole	144.00 - 8.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	B	No	No	Inside Pole	144.00 - 8.00	2	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
							2" Ice	0.00	0.58
2" Conduit	B	No	No	Inside Pole	144.00 - 8.00	1	No Ice	0.00	2.40
							1/2" Ice	0.00	2.40
							1" Ice	0.00	2.40
							2" Ice	0.00	2.40
FB-L98B-034-XXX(3/8)	C	No	No	Inside Pole	144.00 - 0.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	144.00 - 0.00	2	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
							2" Ice	0.00	0.58
***									
AVA6-50(1-1/4")	A	No	No	Inside Pole	135.00 - 8.00	6	No Ice	0.00	0.45
							1/2" Ice	0.00	0.45
							1" Ice	0.00	0.45
							2" Ice	0.00	0.45
***									
HB114-08U3M12-X XXF(7/8)	C	No	No	Inside Pole	128.00 - 8.00	1	No Ice	0.00	0.68
							1/2" Ice	0.00	0.68
							1" Ice	0.00	0.68
							2" Ice	0.00	0.68
HB114-1-08U4-M5 F(1-1/4)	C	No	No	Inside Pole	128.00 - 8.00	3	No Ice	0.00	1.30
							1/2" Ice	0.00	1.30
							1" Ice	0.00	1.30
							2" Ice	0.00	1.30
***									
LDF6-50A(1-1/4")	A	No	No	Inside Pole	100.00 - 8.00	6	No Ice	0.00	0.66

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
							1/2" Ice	0.00	0.66
							1" Ice	0.00	0.66
							2" Ice	0.00	0.66
AVA6-50(1-1/4")	A	No	No	Inside Pole	100.00 - 8.00	6	No Ice	0.00	0.45
							1/2" Ice	0.00	0.45
							1" Ice	0.00	0.45
							2" Ice	0.00	0.45
***									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	155.50-110.00	A	0.000	0.000	1.706	0.000	0.19
		B	0.000	0.000	0.000	0.000	0.35
		C	0.000	0.000	0.000	0.000	0.98
L2	110.00-72.50	A	0.000	0.000	1.406	0.000	0.38
		B	0.000	0.000	0.000	0.000	0.38
		C	0.000	0.000	0.000	0.000	0.92
L3	72.50-36.00	A	0.000	0.000	1.369	0.000	0.44
		B	0.000	0.000	0.000	0.000	0.37
		C	0.000	0.000	0.000	0.000	0.90
L4	36.00-0.00	A	0.000	0.000	1.050	0.000	0.34
		B	0.000	0.000	0.000	0.000	0.29
		C	0.000	0.000	0.000	0.000	0.70

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	155.50-110.00	A	1.465	0.000	0.000	15.041	0.000	0.34
		B		0.000	0.000	0.000	0.000	0.35
		C		0.000	0.000	0.000	0.000	0.98
L2	110.00-72.50	A	1.412	0.000	0.000	12.396	0.000	0.51
		B		0.000	0.000	0.000	0.000	0.38
		C		0.000	0.000	0.000	0.000	0.92
L3	72.50-36.00	A	1.341	0.000	0.000	11.673	0.000	0.55
		B		0.000	0.000	0.000	0.000	0.37
		C		0.000	0.000	0.000	0.000	0.90
L4	36.00-0.00	A	1.199	0.000	0.000	8.557	0.000	0.42
		B		0.000	0.000	0.000	0.000	0.29
		C		0.000	0.000	0.000	0.000	0.70

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	155.50-110.00	-0.1983	-0.1145	-1.2695	-0.7330
L2	110.00-72.50	-0.1983	-0.1145	-1.2773	-0.7374
L3	72.50-36.00	-0.1984	-0.1145	-1.2449	-0.7187
L4	36.00-0.00	-0.1534	-0.0886	-0.9328	-0.5386

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	1	Safety Line 3/8	110.00 - 155.50	1.0000	1.0000
L2	1	Safety Line 3/8	72.50 - 110.00	1.0000	1.0000
L3	1	Safety Line 3/8	36.00 - 72.50	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
DB809K-Y	A	From Leg	4.00 0.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.85 4.03 5.21 7.17	2.85 4.03 5.21 7.17	0.03 0.05 0.08 0.16
DB809K-Y	B	From Leg	4.00 0.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.85 4.03 5.21 7.17	2.85 4.03 5.21 7.17	0.03 0.05 0.08 0.16
DB809K-Y	C	From Leg	4.00 0.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.85 4.03 5.21 7.17	2.85 4.03 5.21 7.17	0.03 0.05 0.08 0.16
(2) Pipe Mount	A	From Leg	4.00 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.20 1.50 1.81 2.47	1.20 1.50 1.81 2.47	0.02 0.03 0.04 0.08
(2) Pipe Mount	B	From Leg	4.00 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.20 1.50 1.81 2.47	1.20 1.50 1.81 2.47	0.02 0.03 0.04 0.08
(2) Pipe Mount	C	From Leg	4.00 0.00	0.0000	156.00	No Ice 1/2" Ice	1.20 1.50	1.20 1.50	0.02 0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	1.81	1.81	0.04
						2" Ice	2.47	2.47	0.08
*									
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00 0.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.62 9.28 9.91 11.11	7.30 8.58 9.72 11.66	0.07 0.14 0.22 0.41
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00 0.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.62 9.28 9.91 11.11	7.30 8.58 9.72 11.66	0.07 0.14 0.22 0.41
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00 0.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.62 9.28 9.91 11.11	7.30 8.58 9.72 11.66	0.07 0.14 0.22 0.41
LNX-8513DS-VTM w/ Mount Pipe	A	From Leg	4.00 0.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.41 8.97 9.50 10.59	7.08 8.27 9.18 11.02	0.06 0.13 0.21 0.39
LNX-6514DS-A1M w/ Mount Pipe	A	From Leg	4.00 0.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.41 8.97 9.50 10.59	7.08 8.27 9.18 11.02	0.06 0.13 0.21 0.39
LNX-6514DS-AIM w/ Mount Pipe	B	From Leg	4.00 0.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.41 8.97 9.50 10.59	7.08 8.27 9.18 11.02	0.06 0.13 0.21 0.39
LNX-6514DS-A1M w/ Mount Pipe	B	From Leg	4.00 0.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.41 8.97 9.50 10.59	7.08 8.27 9.18 11.02	0.06 0.13 0.21 0.39
LNX-6514DS-AIM w/ Mount Pipe	C	From Leg	4.00 0.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.41 8.97 9.50 10.59	7.08 8.27 9.18 11.02	0.06 0.13 0.21 0.39
LNX-6514DS-A1M w/ Mount Pipe	C	From Leg	4.00 0.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.41 8.97 9.50 10.59	7.08 8.27 9.18 11.02	0.06 0.13 0.21 0.39
B13 RRH 4x30	A	From Leg	4.00 0.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.06 2.24 2.43 2.84	1.32 1.48 1.64 2.00	0.06 0.07 0.09 0.14
B13 RRH 4x30	B	From Leg	4.00 0.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.06 2.24 2.43 2.84	1.32 1.48 1.64 2.00	0.06 0.07 0.09 0.14
B13 RRH 4x30	C	From Leg	4.00 0.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.06 2.24 2.43 2.84	1.32 1.48 1.64 2.00	0.06 0.07 0.09 0.14
(2) RRFDC-3315-PF-48	A	From Leg	2.00 0.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.02 3.24 3.47 3.94	1.96 2.15 2.35 2.76	0.03 0.06 0.09 0.16
Platform Mount [LP 1002-1]	C	None		0.0000	156.00	No Ice 1/2" Ice	77.10 93.30	77.10 93.30	4.05 5.27

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	109.50	109.50	6.48
						2" Ice	141.90	141.90	8.91
***									
80010965 w/ Mount Pipe	A	From Leg	4.00	0.0000	144.00	No Ice	13.81	7.16	0.13
			0.00			1/2" Ice	14.35	7.96	0.22
			0.00			1" Ice	14.89	8.77	0.32
						2" Ice	15.99	10.44	0.55
80010965 w/ Mount Pipe	B	From Leg	4.00	0.0000	144.00	No Ice	13.81	7.16	0.13
			0.00			1/2" Ice	14.35	7.96	0.22
			0.00			1" Ice	14.89	8.77	0.32
						2" Ice	15.99	10.44	0.55
80010965 w/ Mount Pipe	C	From Leg	4.00	0.0000	144.00	No Ice	13.81	7.16	0.13
			0.00			1/2" Ice	14.35	7.96	0.22
			0.00			1" Ice	14.89	8.77	0.32
						2" Ice	15.99	10.44	0.55
7770.00 w/ Mount Pipe	A	From Leg	4.00	0.0000	144.00	No Ice	5.75	4.25	0.06
			0.00			1/2" Ice	6.18	5.01	0.10
			0.00			1" Ice	6.61	5.71	0.16
						2" Ice	7.49	7.16	0.29
7770.00 w/ Mount Pipe	B	From Leg	4.00	0.0000	144.00	No Ice	5.75	4.25	0.06
			0.00			1/2" Ice	6.18	5.01	0.10
			0.00			1" Ice	6.61	5.71	0.16
						2" Ice	7.49	7.16	0.29
7770.00 w/ Mount Pipe	C	From Leg	4.00	0.0000	144.00	No Ice	5.75	4.25	0.06
			0.00			1/2" Ice	6.18	5.01	0.10
			0.00			1" Ice	6.61	5.71	0.16
						2" Ice	7.49	7.16	0.29
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.00	0.0000	144.00	No Ice	8.26	6.30	0.07
			0.00			1/2" Ice	8.82	7.48	0.14
			0.00			1" Ice	9.35	8.37	0.21
						2" Ice	10.42	10.18	0.38
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.00	0.0000	144.00	No Ice	8.26	6.30	0.07
			0.00			1/2" Ice	8.82	7.48	0.14
			0.00			1" Ice	9.35	8.37	0.21
						2" Ice	10.42	10.18	0.38
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.00	0.0000	144.00	No Ice	8.26	6.30	0.07
			0.00			1/2" Ice	8.82	7.48	0.14
			0.00			1" Ice	9.35	8.37	0.21
						2" Ice	10.42	10.18	0.38
(2) RRUS 4449 B5/B12	A	From Leg	4.00	0.0000	144.00	No Ice	1.97	1.41	0.07
			0.00			1/2" Ice	2.14	1.56	0.09
			0.00			1" Ice	2.33	1.73	0.11
						2" Ice	2.72	2.07	0.16
RRUS 4449 B5/B12	B	From Leg	4.00	0.0000	144.00	No Ice	1.97	1.41	0.07
			0.00			1/2" Ice	2.14	1.56	0.09
			0.00			1" Ice	2.33	1.73	0.11
						2" Ice	2.72	2.07	0.16
RRUS 32	B	From Leg	4.00	0.0000	144.00	No Ice	2.86	1.78	0.06
			0.00			1/2" Ice	3.08	1.97	0.08
			0.00			1" Ice	3.32	2.17	0.10
						2" Ice	3.81	2.58	0.16
(2) RRUS 32	C	From Leg	4.00	0.0000	144.00	No Ice	2.86	1.78	0.06
			0.00			1/2" Ice	3.08	1.97	0.08
			0.00			1" Ice	3.32	2.17	0.10
						2" Ice	3.81	2.58	0.16
DC6-48-60-18-8F	C	From Leg	4.00	0.0000	144.00	No Ice	1.21	1.21	0.03
			0.00			1/2" Ice	1.89	1.89	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	2.11	2.11	0.08
						2" Ice	2.57	2.57	0.14
(2) LGP 17201	A	From Leg	4.00	0.0000	144.00	No Ice	1.67	0.47	0.03
			0.00			1/2" Ice	1.83	0.57	0.04
			0.00			1" Ice	2.00	0.68	0.06
						2" Ice	2.36	0.91	0.09
(2) LGP 17201	B	From Leg	4.00	0.0000	144.00	No Ice	1.67	0.47	0.03
			0.00			1/2" Ice	1.83	0.57	0.04
			0.00			1" Ice	2.00	0.68	0.06
						2" Ice	2.36	0.91	0.09
(2) LGP 17201	C	From Leg	4.00	0.0000	144.00	No Ice	1.67	0.47	0.03
			0.00			1/2" Ice	1.83	0.57	0.04
			0.00			1" Ice	2.00	0.68	0.06
						2" Ice	2.36	0.91	0.09
(2) LGP21903	A	From Leg	4.00	0.0000	144.00	No Ice	0.23	0.16	0.01
			0.00			1/2" Ice	0.29	0.21	0.01
			0.00			1" Ice	0.36	0.28	0.02
						2" Ice	0.53	0.42	0.03
(2) LGP21903	B	From Leg	4.00	0.0000	144.00	No Ice	0.23	0.16	0.01
			0.00			1/2" Ice	0.29	0.21	0.01
			0.00			1" Ice	0.36	0.28	0.02
						2" Ice	0.53	0.42	0.03
(2) LGP21903	C	From Leg	4.00	0.0000	144.00	No Ice	0.23	0.16	0.01
			0.00			1/2" Ice	0.29	0.21	0.01
			0.00			1" Ice	0.36	0.28	0.02
						2" Ice	0.53	0.42	0.03
(3) RRUS 12	B	From Leg	4.00	0.0000	144.00	No Ice	3.15	1.29	0.06
			0.00			1/2" Ice	3.36	1.44	0.08
			0.00			1" Ice	3.59	1.60	0.11
						2" Ice	4.07	1.95	0.17
DC6-48-60-18-8F	B	From Leg	4.00	0.0000	144.00	No Ice	1.21	1.21	0.03
			0.00			1/2" Ice	1.89	1.89	0.05
			0.00			1" Ice	2.11	2.11	0.08
						2" Ice	2.57	2.57	0.14
1001940	B	From Leg	4.00	0.0000	144.00	No Ice	0.18	0.08	0.00
			0.00			1/2" Ice	0.23	0.13	0.00
			0.00			1" Ice	0.30	0.18	0.01
						2" Ice	0.44	0.30	0.01
(2) 1001940	C	From Leg	4.00	0.0000	144.00	No Ice	0.18	0.08	0.00
			0.00			1/2" Ice	0.23	0.13	0.00
			0.00			1" Ice	0.30	0.18	0.01
						2" Ice	0.44	0.30	0.01
(2) Pipe Mount	A	From Leg	4.00	0.0000	144.00	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
						2" Ice	2.47	2.47	0.08
(2) Pipe Mount	B	From Leg	4.00	0.0000	144.00	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
						2" Ice	2.47	2.47	0.08
(2) Pipe Mount	C	From Leg	4.00	0.0000	144.00	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
						2" Ice	2.47	2.47	0.08
Platform Mount [LP 1002-1]	C	None		0.0000	144.00	No Ice	77.10	77.10	4.05
						1/2" Ice	93.30	93.30	5.27
						1" Ice	109.50	109.50	6.48

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	141.90	141.90	8.91
***									
742 213 w/ Mount Pipe	A	From Leg	1.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.37 5.95 6.50 7.61	4.62 6.00 6.98 8.85	0.05 0.09 0.15 0.28
742 213 w/ Mount Pipe	B	From Leg	1.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.37 5.95 6.50 7.61	4.62 6.00 6.98 8.85	0.05 0.09 0.15 0.28
742 213 w/ Mount Pipe	C	From Leg	1.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.37 5.95 6.50 7.61	4.62 6.00 6.98 8.85	0.05 0.09 0.15 0.28
***									
NNVV-65B-R4 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.56 13.14 13.70 14.85	7.76 8.80 9.69 11.52	0.12 0.21 0.32 0.55
NNVV-65B-R4 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.56 13.14 13.70 14.85	7.76 8.80 9.69 11.52	0.12 0.21 0.32 0.55
NNVV-65B-R4 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.56 13.14 13.70 14.85	7.76 8.80 9.69 11.52	0.12 0.21 0.32 0.55
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.58 7.03 7.47 8.38	4.96 5.75 6.47 7.94	0.08 0.13 0.19 0.34
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.58 7.03 7.47 8.38	4.96 5.75 6.47 7.94	0.08 0.13 0.19 0.34
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.58 7.03 7.47 8.38	4.96 5.75 6.47 7.94	0.08 0.13 0.19 0.34
(4) RRH2X50-800	A	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.13 2.32 2.51 2.92	1.79 1.96 2.14 2.53	0.05 0.07 0.10 0.15
RRH2X50-800	B	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.13 2.32 2.51 2.92	1.79 1.96 2.14 2.53	0.05 0.07 0.10 0.15
RRH2X50-800	C	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.13 2.32 2.51 2.92	1.79 1.96 2.14 2.53	0.05 0.07 0.10 0.15
(3) TD-RRH8X20-25	B	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.70 3.95 4.20 4.72	1.29 1.46 1.64 2.02	0.07 0.09 0.12 0.18
(3) PCS 1900MHZ 4X45W-65MHZ	C	From Leg	4.00 0.00	0.0000	128.00	No Ice 1/2" Ice	2.32 2.53	2.24 2.44	0.06 0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			2.00			1" Ice	2.74	2.65	0.11
						2" Ice	3.19	3.09	0.17
Empty Mount Pipe	A	From Leg	4.00	0.0000	128.00	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
						2" Ice	2.47	2.47	0.08
Empty Mount Pipe	B	From Leg	4.00	0.0000	128.00	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
						2" Ice	2.47	2.47	0.08
Empty Mount Pipe	C	From Leg	4.00	0.0000	128.00	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
						2" Ice	2.47	2.47	0.08
Empty Mount Pipe	A	From Leg	4.00	0.0000	128.00	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
						2" Ice	2.47	2.47	0.08
Empty Mount Pipe	B	From Leg	4.00	0.0000	128.00	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
						2" Ice	2.47	2.47	0.08
Empty Mount Pipe	C	From Leg	4.00	0.0000	128.00	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
						2" Ice	2.47	2.47	0.08
T-Arm Mount [TA 602-3]	C	None		0.0000	128.00	No Ice	11.59	11.59	0.77
						1/2" Ice	15.44	15.44	0.99
						1" Ice	19.29	19.29	1.21
						2" Ice	26.99	26.99	1.64
T-Arm Mount [TA 602-3]	C	None		0.0000	128.00	No Ice	11.59	11.59	0.77
						1/2" Ice	15.44	15.44	0.99
						1" Ice	19.29	19.29	1.21
						2" Ice	26.99	26.99	1.64
***									
LNX-6515DS-A1M w/ Mount Pipe	A	From Leg	3.00	0.0000	100.00	No Ice	11.47	9.38	0.07
			0.00			1/2" Ice	12.09	10.70	0.15
			0.00			1" Ice	12.72	11.74	0.25
						2" Ice	13.98	13.84	0.47
LNX-6515DS-A1M w/ Mount Pipe	B	From Leg	3.00	0.0000	100.00	No Ice	11.47	9.38	0.07
			0.00			1/2" Ice	12.09	10.70	0.15
			0.00			1" Ice	12.72	11.74	0.25
						2" Ice	13.98	13.84	0.47
LNX-6515DS-A1M w/ Mount Pipe	C	From Leg	3.00	0.0000	100.00	No Ice	11.47	9.38	0.07
			0.00			1/2" Ice	12.09	10.70	0.15
			0.00			1" Ice	12.72	11.74	0.25
						2" Ice	13.98	13.84	0.47
RV90-17-00DP w/ Mount Pipe	A	From Leg	3.00	0.0000	100.00	No Ice	4.59	3.32	0.04
			0.00			1/2" Ice	5.02	4.09	0.08
			0.00			1" Ice	5.44	4.78	0.12
						2" Ice	6.30	6.23	0.23
RV90-17-00DP w/ Mount Pipe	B	From Leg	3.00	0.0000	100.00	No Ice	4.59	3.32	0.04
			0.00			1/2" Ice	5.02	4.09	0.08
			0.00			1" Ice	5.44	4.78	0.12
						2" Ice	6.30	6.23	0.23
RV90-17-00DP w/ Mount Pipe	C	From Leg	3.00	0.0000	100.00	No Ice	4.59	3.32	0.04
			0.00			1/2" Ice	5.02	4.09	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	5.44	4.78	0.12
						2" Ice	6.30	6.23	0.23
(2) KRY 112 489/2	A	From Leg	3.00	0.0000	100.00	No Ice	0.56	0.37	0.02
			0.00			1/2" Ice	0.66	0.45	0.02
			0.00			1" Ice	0.76	0.54	0.03
						2" Ice	1.00	0.75	0.05
(2) KRY 112 489/2	B	From Leg	3.00	0.0000	100.00	No Ice	0.56	0.37	0.02
			0.00			1/2" Ice	0.66	0.45	0.02
			0.00			1" Ice	0.76	0.54	0.03
						2" Ice	1.00	0.75	0.05
(2) KRY 112 489/2	C	From Leg	3.00	0.0000	100.00	No Ice	0.56	0.37	0.02
			0.00			1/2" Ice	0.66	0.45	0.02
			0.00			1" Ice	0.76	0.54	0.03
						2" Ice	1.00	0.75	0.05
Side Arm Mount [SO 701-3]	C	None		0.0000	100.00	No Ice	2.83	2.83	0.20
						1/2" Ice	3.92	3.92	0.24
						1" Ice	5.01	5.01	0.28
						2" Ice	7.19	7.19	0.36
***									

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	60.79					
Bracing Weight	0.00					
Total Member Self-Weight	60.79			0.69	-1.15	
Total Weight	81.89			0.69	-1.15	
Wind 0 deg - No Ice		-0.18	-54.83	-5875.36	23.64	0.08
Wind 30 deg - No Ice		27.32	-47.39	-5075.73	-2925.25	0.08
Wind 60 deg - No Ice		47.50	-27.26	-2915.87	-5090.63	0.05
Wind 90 deg - No Ice		54.96	0.18	25.48	-5892.28	0.02
Wind 120 deg - No Ice		47.68	27.57	2960.18	-5115.42	-0.03
Wind 150 deg - No Ice		27.64	47.58	5101.89	-2968.19	-0.07
Wind 180 deg - No Ice		0.18	54.83	5876.74	-25.94	-0.08
Wind 210 deg - No Ice		-27.32	47.39	5077.10	2922.94	-0.08
Wind 240 deg - No Ice		-47.50	27.26	2917.24	5088.32	-0.05
Wind 270 deg - No Ice		-54.96	-0.18	-24.11	5889.98	-0.02
Wind 300 deg - No Ice		-47.68	-27.57	-2958.81	5113.12	0.03
Wind 330 deg - No Ice		-27.64	-47.58	-5100.52	2965.89	0.07
Member Ice	18.22					
Total Weight Ice	120.69			0.73	-1.23	
Wind 0 deg - Ice		-0.03	-11.20	-1221.20	2.78	0.04
Wind 30 deg - Ice		5.59	-9.69	-1055.49	-609.96	0.05
Wind 60 deg - Ice		9.70	-5.58	-606.76	-1059.59	0.06
Wind 90 deg - Ice		11.22	0.03	4.74	-1225.63	0.04
Wind 120 deg - Ice		9.73	5.63	615.16	-1063.60	0.02
Wind 150 deg - Ice		5.64	9.72	1060.95	-616.90	-0.01
Wind 180 deg - Ice		0.03	11.20	1222.65	-5.24	-0.04

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 210 deg - Ice		-5.59	9.69	1056.94	607.50	-0.05
Wind 240 deg - Ice		-9.70	5.58	608.22	1057.13	-0.06
Wind 270 deg - Ice		-11.22	-0.03	-3.28	1223.17	-0.04
Wind 300 deg - Ice		-9.73	-5.63	-613.71	1061.14	-0.02
Wind 330 deg - Ice		-5.64	-9.72	-1059.50	614.44	0.01
Total Weight	81.89			0.69	-1.15	
Wind 0 deg - Service		-0.04	-11.00	-1178.16	3.74	0.02
Wind 30 deg - Service		5.48	-9.51	-1017.73	-587.88	0.02
Wind 60 deg - Service		9.53	-5.47	-584.40	-1022.31	0.01
Wind 90 deg - Service		11.03	0.04	5.71	-1183.15	0.00
Wind 120 deg - Service		9.57	5.53	594.49	-1027.29	-0.01
Wind 150 deg - Service		5.54	9.55	1024.17	-596.50	-0.01
Wind 180 deg - Service		0.04	11.00	1179.62	-6.20	-0.02
Wind 210 deg - Service		-5.48	9.51	1019.19	585.42	-0.02
Wind 240 deg - Service		-9.53	5.47	585.87	1019.85	-0.01
Wind 270 deg - Service		-11.03	-0.04	-4.24	1180.69	-0.00
Wind 300 deg - Service		-9.57	-5.53	-593.02	1024.83	0.01
Wind 330 deg - Service		-5.54	-9.55	-1022.70	594.04	0.01

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	155.5 - 110	Pole	Max Tension	26	0.00	0.00	0.00
			Max. Compression	26	-52.97	-2.39	-1.40
			Max. Mx	8	-29.07	-788.40	-4.18
			Max. My	14	-29.07	-4.77	-787.39
			Max. Vy	8	30.24	-788.40	-4.18
			Max. Vx	14	30.12	-4.77	-787.39
			Max. Torque	8			0.84
L2	110 - 72.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-78.82	-2.08	-1.22
			Max. Mx	8	-47.99	-2097.38	-11.08
			Max. My	14	-47.99	-11.67	-2091.69
			Max. Vy	8	40.31	-2097.38	-11.08
			Max. Vx	14	40.18	-11.67	-2091.69
			Max. Torque	14			0.09
L3	72.5 - 36	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-105.86	-1.77	-1.04
			Max. Mx	8	-69.75	-3685.52	-17.81
			Max. My	14	-69.75	-18.39	-3675.26
			Max. Vy	8	47.65	-3685.52	-17.81
			Max. Vx	14	47.52	-18.39	-3675.26
			Max. Torque	14			0.09
L4	36 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-140.07	-1.46	-0.87
			Max. Mx	8	-98.25	-6001.09	-26.13
			Max. My	14	-98.25	-26.70	-5985.16
			Max. Vy	8	54.99	-6001.09	-26.13
			Max. Vx	14	54.86	-26.70	-5985.16
			Max. Torque	14			0.09

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	140.07	0.00	0.00
	Max. H_x	20	98.27	54.96	0.18
	Max. H_z	2	98.27	0.18	54.83
	Max. M_x	2	5983.46	0.18	54.83
	Max. M_z	8	6001.09	-54.96	-0.18
	Max. Torsion	14	0.09	-0.18	-54.83
	Min. Vert	5	73.70	-27.32	47.39
	Min. H_x	8	98.27	-54.96	-0.18
	Min. H_z	14	98.27	-0.18	-54.83
	Min. M_x	14	-5985.16	-0.18	-54.83
	Min. M_z	20	-5998.24	54.96	0.18
	Min. Torsion	2	-0.09	0.18	54.83

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	81.89	0.00	0.00	0.69	-1.15	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	98.27	-0.18	-54.83	-5983.46	23.85	0.09
0.9 Dead+1.0 Wind 0 deg - No Ice	73.70	-0.18	-54.83	-5955.98	24.09	0.09
1.2 Dead+1.0 Wind 30 deg - No Ice	98.27	27.32	-47.39	-5169.08	-2979.37	0.08
0.9 Dead+1.0 Wind 30 deg - No Ice	73.70	27.32	-47.39	-5145.37	-2965.23	0.08
1.2 Dead+1.0 Wind 60 deg - No Ice	98.27	47.50	-27.26	-2969.42	-5184.65	0.06
0.9 Dead+1.0 Wind 60 deg - No Ice	73.70	47.50	-27.26	-2955.89	-5160.30	0.06
1.2 Dead+1.0 Wind 90 deg - No Ice	98.27	54.96	0.18	26.13	-6001.09	0.02
0.9 Dead+1.0 Wind 90 deg - No Ice	73.70	54.96	0.18	25.79	-5972.96	0.02
1.2 Dead+1.0 Wind 120 deg - No Ice	98.27	47.69	27.57	3014.89	-5209.92	-0.03
0.9 Dead+1.0 Wind 120 deg - No Ice	73.70	47.68	27.57	3000.72	-5185.45	-0.03
1.2 Dead+1.0 Wind 150 deg - No Ice	98.27	27.64	47.58	5196.05	-3023.15	-0.07
0.9 Dead+1.0 Wind 150 deg - No Ice	73.70	27.64	47.58	5171.78	-3008.79	-0.07
1.2 Dead+1.0 Wind 180 deg - No Ice	98.27	0.18	54.83	5985.16	-26.70	-0.09
0.9 Dead+1.0 Wind 180 deg - No Ice	73.70	0.18	54.83	5957.25	-26.21	-0.09
1.2 Dead+1.0 Wind 210 deg - No Ice	98.27	-27.32	47.39	5170.78	2976.52	-0.09
0.9 Dead+1.0 Wind 210 deg - No Ice	73.70	-27.32	47.39	5146.64	2963.11	-0.09
1.2 Dead+1.0 Wind 240 deg - No Ice	98.27	-47.50	27.26	2971.12	5181.81	-0.06
0.9 Dead+1.0 Wind 240 deg - No Ice	73.70	-47.50	27.26	2957.16	5158.19	-0.06
1.2 Dead+1.0 Wind 270 deg - No Ice	98.27	-54.96	-0.18	-24.43	5998.24	-0.01

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.0 Wind 270 deg - No Ice	73.70	-54.96	-0.18	-24.52	5970.84	-0.01
1.2 Dead+1.0 Wind 300 deg - No Ice	98.27	-47.69	-27.57	-3013.19	5207.08	0.04
0.9 Dead+1.0 Wind 300 deg - No Ice	73.70	-47.68	-27.57	-2999.45	5183.33	0.03
1.2 Dead+1.0 Wind 330 deg - No Ice	98.27	-27.64	-47.58	-5194.35	3020.30	0.07
0.9 Dead+1.0 Wind 330 deg - No Ice	73.70	-27.64	-47.58	-5170.52	3006.67	0.07
1.2 Dead+1.0 Ice+1.0 Temp	140.07	0.00	0.00	0.87	-1.46	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	140.07	-0.03	-11.20	-1258.40	2.58	0.04
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	140.07	5.59	-9.69	-1087.62	-628.91	0.06
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	140.07	9.70	-5.58	-625.16	-1092.30	0.06
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	140.07	11.22	0.03	5.06	-1263.43	0.04
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	140.07	9.73	5.63	634.16	-1096.43	0.01
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	140.07	5.64	9.72	1093.59	-636.07	-0.01
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	140.07	0.03	11.20	1260.24	-5.69	-0.04
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	140.07	-5.59	9.69	1089.45	625.80	-0.06
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	140.07	-9.70	5.58	627.00	1089.19	-0.06
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	140.07	-11.22	-0.03	-3.22	1260.32	-0.04
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	140.07	-9.73	-5.63	-632.32	1093.33	-0.01
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	140.07	-5.64	-9.72	-1091.75	632.96	0.01
Dead+Wind 0 deg - Service	81.89	-0.04	-11.00	-1196.34	3.88	0.02
Dead+Wind 30 deg - Service	81.89	5.48	-9.51	-1033.44	-596.86	0.02
Dead+Wind 60 deg - Service	81.89	9.53	-5.47	-593.44	-1037.98	0.01
Dead+Wind 90 deg - Service	81.89	11.03	0.04	5.76	-1201.30	0.00
Dead+Wind 120 deg - Service	81.89	9.57	5.53	603.60	-1043.04	-0.01
Dead+Wind 150 deg - Service	81.89	5.54	9.55	1039.90	-605.62	-0.01
Dead+Wind 180 deg - Service	81.89	0.04	11.00	1197.75	-6.24	-0.02
Dead+Wind 210 deg - Service	81.89	-5.48	9.51	1034.85	594.50	-0.02
Dead+Wind 240 deg - Service	81.89	-9.53	5.47	594.85	1035.62	-0.01
Dead+Wind 270 deg - Service	81.89	-11.03	-0.04	-4.35	1198.94	-0.00
Dead+Wind 300 deg - Service	81.89	-9.57	-5.53	-602.20	1040.68	0.01
Dead+Wind 330 deg - Service	81.89	-5.54	-9.55	-1038.49	603.26	0.01

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-81.89	0.00	0.00	81.89	0.00	0.000%
2	-0.18	-98.27	-54.83	0.18	98.27	54.83	0.000%
3	-0.18	-73.70	-54.83	0.18	73.70	54.83	0.000%
4	27.32	-98.27	-47.39	-27.32	98.27	47.39	0.000%
5	27.32	-73.70	-47.39	-27.32	73.70	47.39	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
6	47.50	-98.27	-27.26	-47.50	98.27	27.26	0.000%
7	47.50	-73.70	-27.26	-47.50	73.70	27.26	0.000%
8	54.96	-98.27	0.18	-54.96	98.27	-0.18	0.000%
9	54.96	-73.70	0.18	-54.96	73.70	-0.18	0.000%
10	47.68	-98.27	27.57	-47.69	98.27	-27.57	0.000%
11	47.68	-73.70	27.57	-47.68	73.70	-27.57	0.000%
12	27.64	-98.27	47.58	-27.64	98.27	-47.58	0.000%
13	27.64	-73.70	47.58	-27.64	73.70	-47.58	0.000%
14	0.18	-98.27	54.83	-0.18	98.27	-54.83	0.000%
15	0.18	-73.70	54.83	-0.18	73.70	-54.83	0.000%
16	-27.32	-98.27	47.39	27.32	98.27	-47.39	0.000%
17	-27.32	-73.70	47.39	27.32	73.70	-47.39	0.000%
18	-47.50	-98.27	27.26	47.50	98.27	-27.26	0.000%
19	-47.50	-73.70	27.26	47.50	73.70	-27.26	0.000%
20	-54.96	-98.27	-0.18	54.96	98.27	0.18	0.000%
21	-54.96	-73.70	-0.18	54.96	73.70	0.18	0.000%
22	-47.68	-98.27	-27.57	47.69	98.27	27.57	0.000%
23	-47.68	-73.70	-27.57	47.68	73.70	27.57	0.000%
24	-27.64	-98.27	-47.58	27.64	98.27	47.58	0.000%
25	-27.64	-73.70	-47.58	27.64	73.70	47.58	0.000%
26	0.00	-140.07	0.00	0.00	140.07	0.00	0.000%
27	-0.03	-140.07	-11.20	0.03	140.07	11.20	0.000%
28	5.59	-140.07	-9.69	-5.59	140.07	9.69	0.000%
29	9.70	-140.07	-5.58	-9.70	140.07	5.58	0.000%
30	11.22	-140.07	0.03	-11.22	140.07	-0.03	0.000%
31	9.73	-140.07	5.63	-9.73	140.07	-5.63	0.000%
32	5.64	-140.07	9.72	-5.64	140.07	-9.72	0.000%
33	0.03	-140.07	11.20	-0.03	140.07	-11.20	0.000%
34	-5.59	-140.07	9.69	5.59	140.07	-9.69	0.000%
35	-9.70	-140.07	5.58	9.70	140.07	-5.58	0.000%
36	-11.22	-140.07	-0.03	11.22	140.07	0.03	0.000%
37	-9.73	-140.07	-5.63	9.73	140.07	5.63	0.000%
38	-5.64	-140.07	-9.72	5.64	140.07	9.72	0.000%
39	-0.04	-81.89	-11.00	0.04	81.89	11.00	0.000%
40	5.48	-81.89	-9.51	-5.48	81.89	9.51	0.000%
41	9.53	-81.89	-5.47	-9.53	81.89	5.47	0.000%
42	11.03	-81.89	0.04	-11.03	81.89	-0.04	0.000%
43	9.57	-81.89	5.53	-9.57	81.89	-5.53	0.000%
44	5.54	-81.89	9.55	-5.54	81.89	-9.55	0.000%
45	0.04	-81.89	11.00	-0.04	81.89	-11.00	0.000%
46	-5.48	-81.89	9.51	5.48	81.89	-9.51	0.000%
47	-9.53	-81.89	5.47	9.53	81.89	-5.47	0.000%
48	-11.03	-81.89	-0.04	11.03	81.89	0.04	0.000%
49	-9.57	-81.89	-5.53	9.57	81.89	5.53	0.000%
50	-5.54	-81.89	-9.55	5.54	81.89	9.55	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00007750
3	Yes	4	0.00000001	0.00003906
4	Yes	4	0.00000001	0.00086909
5	Yes	4	0.00000001	0.00056735
6	Yes	4	0.00000001	0.00086675

7	Yes	4	0.00000001	0.00056570
8	Yes	4	0.00000001	0.00007812
9	Yes	4	0.00000001	0.00003949
10	Yes	4	0.00000001	0.00088977
11	Yes	4	0.00000001	0.00058004
12	Yes	4	0.00000001	0.00089157
13	Yes	4	0.00000001	0.00058135
14	Yes	4	0.00000001	0.00007858
15	Yes	4	0.00000001	0.00003994
16	Yes	4	0.00000001	0.00086488
17	Yes	4	0.00000001	0.00056465
18	Yes	4	0.00000001	0.00086837
19	Yes	4	0.00000001	0.00056689
20	Yes	4	0.00000001	0.00007789
21	Yes	4	0.00000001	0.00003934
22	Yes	4	0.00000001	0.00088884
23	Yes	4	0.00000001	0.00057988
24	Yes	4	0.00000001	0.00088584
25	Yes	4	0.00000001	0.00057797
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00075396
28	Yes	4	0.00000001	0.00076675
29	Yes	4	0.00000001	0.00076854
30	Yes	4	0.00000001	0.00075871
31	Yes	4	0.00000001	0.00077475
32	Yes	4	0.00000001	0.00077375
33	Yes	4	0.00000001	0.00075637
34	Yes	4	0.00000001	0.00076655
35	Yes	4	0.00000001	0.00076621
36	Yes	4	0.00000001	0.00075457
37	Yes	4	0.00000001	0.00076971
38	Yes	4	0.00000001	0.00076927
39	Yes	4	0.00000001	0.00001323
40	Yes	4	0.00000001	0.00001852
41	Yes	4	0.00000001	0.00001848
42	Yes	4	0.00000001	0.00001330
43	Yes	4	0.00000001	0.00001882
44	Yes	4	0.00000001	0.00001884
45	Yes	4	0.00000001	0.00001326
46	Yes	4	0.00000001	0.00001843
47	Yes	4	0.00000001	0.00001849
48	Yes	4	0.00000001	0.00001325
49	Yes	4	0.00000001	0.00001872
50	Yes	4	0.00000001	0.00001867

Maximum Tower Deflections - Service Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load Comb.*	*Tilt*	*Twist*
	ft	*in*		°	°
L1	155.5 - 110	6.355	43	0.2945	0.0000
L2	118 - 72.5	4.090	43	0.2748	0.0000
L3	81 - 36	2.136	43	0.2191	0.0000
L4	45 - 0	0.740	43	0.1396	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
156.00	DB809K-Y	43	6.355	0.2945	0.0000	407475
144.00	80010965 w/ Mount Pipe	43	5.646	0.2909	0.0000	177163
135.00	742 213 w/ Mount Pipe	43	5.097	0.2871	0.0000	99384
128.00	NNVV-65B-R4 w/ Mount Pipe	43	4.677	0.2830	0.0000	74086
100.00	LNX-6515DS-A1M w/ Mount Pipe	43	3.092	0.2519	0.0000	43345

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	155.5 - 110	31.729	10	1.4699	0.0002
L2	118 - 72.5	20.429	10	1.3723	0.0001
L3	81 - 36	10.669	10	1.0943	0.0000
L4	45 - 0	3.696	10	0.6973	0.0000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
156.00	DB809K-Y	10	31.729	1.4699	0.0002	82218
144.00	80010965 w/ Mount Pipe	10	28.192	1.4518	0.0001	35747
135.00	742 213 w/ Mount Pipe	10	25.453	1.4329	0.0001	20052
128.00	NNVV-65B-R4 w/ Mount Pipe	10	23.355	1.4128	0.0001	14948
100.00	LNX-6515DS-A1M w/ Mount Pipe	10	15.445	1.2579	0.0000	8714

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	155.5 - 153.526	TP64.606x58.6x0.375	45.50	0.00	0.0	70.6213	-6.73	3832.44	0.002
	153.526 - 151.553					70.9359	-7.37	3836.54	0.002
	151.553 - 149.579					71.2504	-8.01	3840.54	0.002
	149.579 - 147.605					71.5650	-8.65	3844.41	0.002
	147.605 - 145.632					71.8796	-9.30	3848.18	0.002
	145.632 -					72.1942	-16.75	3851.82	0.004

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
	143.658								
	143.658 - 141.684					72.5088	-17.40	3855.36	0.005
	141.684 - 139.711					72.8234	-18.06	3858.77	0.005
	139.711 - 137.737					73.1380	-18.72	3862.08	0.005
	137.737 - 135.763					73.4525	-19.38	3865.26	0.005
	135.763 - 133.789					73.7671	-20.20	3868.34	0.005
	133.789 - 131.816					74.0817	-20.87	3871.29	0.005
	131.816 - 129.842					74.3963	-21.54	3874.14	0.006
	129.842 - 127.868					74.7109	-25.66	3876.86	0.007
	127.868 - 125.895					75.0255	-26.33	3879.48	0.007
	125.895 - 123.921					75.3401	-27.01	3881.97	0.007
	123.921 - 121.947					75.6546	-27.69	3884.36	0.007
	121.947 - 119.974					75.9692	-28.37	3886.62	0.007
	119.974 - 118					76.2838	-29.06	3888.78	0.007
	118 - 110					77.5589	-16.22	3896.32	0.004
L2	118 - 110	TP68.805x62.8x0.4375	45.50	0.00	0.0	89.3406	-18.53	5106.94	0.004
	110 - 108.389					89.6401	-35.43	5112.60	0.007
	108.389 - 106.778					89.9397	-36.11	5118.18	0.007
	106.778 - 105.167					90.2392	-36.78	5123.69	0.007
	105.167 - 103.556					90.5387	-37.46	5129.12	0.007
	103.556 - 101.944					90.8383	-38.15	5134.48	0.007
	101.944 - 100.333					91.1378	-38.83	5139.76	0.008
	100.333 - 98.7222					91.4374	-40.26	5144.96	0.008
	98.7222 - 97.1111					91.7369	-40.95	5150.09	0.008
	97.1111 - 95.5					92.0365	-41.64	5155.14	0.008
	95.5 - 93.8889					92.3360	-42.33	5160.11	0.008
	93.8889 - 92.2778					92.6356	-43.03	5165.00	0.008
	92.2778 - 90.6667					92.9351	-43.73	5169.82	0.008
	90.6667 - 89.0556					93.2346	-44.43	5174.57	0.009
	89.0556 - 87.4444					93.5342	-45.14	5179.23	0.009
	87.4444 - 85.8333					93.8337	-45.85	5183.82	0.009
	85.8333 - 84.2222					94.1333	-46.56	5188.33	0.009
	84.2222 - 82.6111					94.4328	-47.27	5192.77	0.009
	82.6111 - 81					94.7324	-47.98	5197.13	0.009

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
	81 - 72.5					96.3127	-26.20	5218.86	0.005
L3	81 - 72.5	TP72.748x66.8082x0.5	45.00	0.00	0.0	108.5630	-29.29	6350.91	0.005
	72.5 - 70.9722					108.8870	-56.26	6369.90	0.009
	70.9722 - 69.4444					109.2120	-57.04	6388.90	0.009
	69.4444 - 67.9167					109.5370	-57.81	6407.89	0.009
	67.9167 - 66.3889					109.8610	-58.59	6426.88	0.009
	66.3889 - 64.8611					110.1860	-59.37	6445.88	0.009
	64.8611 - 63.3333					110.5110	-60.15	6464.87	0.009
	63.3333 - 61.8056					110.8350	-60.94	6483.86	0.009
	61.8056 - 60.2778					111.1600	-61.73	6502.86	0.009
	60.2778 - 58.75					111.4850	-62.52	6521.85	0.010
	58.75 - 57.2222					111.8090	-63.31	6540.84	0.010
	57.2222 - 55.6944					112.1340	-64.11	6559.84	0.010
	55.6944 - 54.1667					112.4590	-64.91	6578.83	0.010
	54.1667 - 52.6389					112.7830	-65.71	6590.96	0.010
	52.6389 - 51.1111					113.1080	-66.51	6597.93	0.010
	51.1111 - 49.5833					113.4330	-67.31	6604.84	0.010
	49.5833 - 48.0556					113.7570	-68.12	6611.67	0.010
	48.0556 - 46.5278					114.0820	-68.93	6618.44	0.010
	46.5278 - 45					114.4070	-69.74	6625.14	0.011
	45 - 36					116.3190	-39.74	6663.19	0.006
L4	45 - 36	TP76.5x70.56x0.5	45.00	0.00	0.0	114.7090	-38.95	6631.32	0.006
	36 - 34.1053					115.1120	-79.70	6639.45	0.012
	34.1053 - 32.2105					115.5150	-80.70	6647.47	0.012
	32.2105 - 30.3158					115.9170	-81.70	6655.39	0.012
	30.3158 - 28.4211					116.3200	-82.71	6663.20	0.012
	28.4211 - 26.5263					116.7230	-83.72	6670.91	0.013
	26.5263 - 24.6316					117.1250	-84.73	6678.51	0.013
	24.6316 - 22.7368					117.5280	-85.75	6686.01	0.013
	22.7368 - 20.8421					117.9310	-86.77	6693.40	0.013
	20.8421 -					118.3330	-87.79	6700.68	0.013

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
	18.9474					0			
	18.9474 - 17.0526					118.736 0	-88.82	6707.86	0.013
	17.0526 - 15.1579					119.139 0	-89.85	6714.93	0.013
	15.1579 - 13.2632					119.541 0	-90.89	6721.89	0.014
	13.2632 - 11.3684					119.944 0	-91.93	6728.75	0.014
	11.3684 - 9.47368					120.347 0	-92.97	6735.50	0.014
	9.47368 - 7.57895					120.749 0	-94.02	6742.15	0.014
	7.57895 - 5.68421					121.152 0	-95.07	6748.69	0.014
	5.68421 - 3.78947					121.555 0	-96.13	6755.13	0.014
	3.78947 - 1.89474					121.957 0	-97.19	6761.46	0.014
	1.89474 - 0					122.360 0	-98.25	6767.68	0.015

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	155.5 - 153.526	TP64.606x58.6x0.375	40.52	4573.23	0.009	0.00	4573.23	0.000
	153.526 - 151.553		60.71	4598.65	0.013	0.00	4598.65	0.000
	151.553 - 149.579		81.81	4623.98	0.018	0.00	4623.98	0.000
	149.579 - 147.605		103.82	4649.22	0.022	0.00	4649.22	0.000
	147.605 - 145.632		126.73	4674.35	0.027	0.00	4674.35	0.000
	145.632 - 143.658		153.47	4699.38	0.033	0.00	4699.38	0.000
	143.658 - 141.684		192.72	4724.32	0.041	0.00	4724.32	0.000
	141.684 - 139.711		232.89	4749.15	0.049	0.00	4749.15	0.000
	139.711 - 137.737		273.96	4773.88	0.057	0.00	4773.88	0.000
	137.737 - 135.763		315.95	4798.49	0.066	0.00	4798.49	0.000
	135.763 - 133.789		359.51	4823.00	0.075	0.00	4823.00	0.000
	133.789 - 131.816		404.40	4847.39	0.083	0.00	4847.39	0.000
	131.816 - 129.842		450.21	4871.68	0.092	0.00	4871.68	0.000
	129.842 - 127.868		503.31	4895.85	0.103	0.00	4895.85	0.000
	127.868 -		559.02	4919.90	0.114	0.00	4919.90	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
	125.895							
	125.895 - 123.921		615.69	4943.83	0.125	0.00	4943.83	0.000
	123.921 - 121.947		673.35	4967.65	0.136	0.00	4967.65	0.000
	121.947 - 119.974		731.92	4991.34	0.147	0.00	4991.34	0.000
	119.974 - 118		791.40	5014.91	0.158	0.00	5014.91	0.000
	118 - 110		491.63	5109.13	0.096	0.00	5109.13	0.000
L2	118 - 110	TP68.805x62.8x0.4375	550.53	6604.87	0.083	0.00	6604.87	0.000
	110 - 108.389		1094.53	6634.52	0.165	0.00	6634.52	0.000
	108.389 - 106.778		1147.48	6664.11	0.172	0.00	6664.11	0.000
	106.778 - 105.167		1201.03	6693.65	0.179	0.00	6693.65	0.000
	105.167 - 103.556		1255.15	6723.14	0.187	0.00	6723.14	0.000
	103.556 - 101.944		1309.86	6752.57	0.194	0.00	6752.57	0.000
	101.944 - 100.333		1365.15	6781.96	0.201	0.00	6781.96	0.000
	100.333 - 98.7222		1423.15	6811.29	0.209	0.00	6811.29	0.000
	98.7222 - 97.1111		1482.28	6840.56	0.217	0.00	6840.56	0.000
	97.1111 - 95.5		1541.99	6869.77	0.224	0.00	6869.77	0.000
	95.5 - 93.8889		1602.28	6898.92	0.232	0.00	6898.92	0.000
	93.8889 - 92.2778		1663.14	6928.02	0.240	0.00	6928.02	0.000
	92.2778 - 90.6667		1724.58	6957.06	0.248	0.00	6957.06	0.000
	90.6667 - 89.0556		1786.58	6986.03	0.256	0.00	6986.03	0.000
	89.0556 - 87.4444		1849.17	7014.95	0.264	0.00	7014.95	0.000
	87.4444 - 85.8333		1912.33	7043.79	0.271	0.00	7043.79	0.000
	85.8333 - 84.2222		1976.04	7072.58	0.279	0.00	7072.58	0.000
	84.2222 - 82.6111		2040.33	7101.30	0.287	0.00	7101.30	0.000
	82.6111 - 81		2105.19	7129.95	0.295	0.00	7129.95	0.000
	81 - 72.5		1172.94	7279.98	0.161	0.00	7279.98	0.000
L3	81 - 72.5	TP72.748x66.8082x0.5	1284.23	8925.58	0.144	0.00	8925.58	0.000
	72.5 - 70.9722		2522.17	8963.33	0.281	0.00	8963.33	0.000
	70.9722 - 69.4444		2587.63	9001.00	0.287	0.00	9001.00	0.000
	69.4444 - 67.9167		2653.58	9038.67	0.294	0.00	9038.67	0.000
	67.9167 - 66.3889		2720.00	9076.33	0.300	0.00	9076.33	0.000
	66.3889 - 64.8611		2786.89	9113.92	0.306	0.00	9113.92	0.000
	64.8611 - 63.3333		2854.24	9151.50	0.312	0.00	9151.50	0.000
	63.3333 - 61.8056		2922.07	9189.08	0.318	0.00	9189.08	0.000
	61.8056 - 60.2778		2990.35	9226.58	0.324	0.00	9226.58	0.000
	60.2778 -		3059.09	9264.08	0.330	0.00	9264.08	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
	58.75							
	58.75 - 57.2222		3128.29	9301.50	0.336	0.00	9301.50	0.000
	57.2222 - 55.6944		3197.95	9338.92	0.342	0.00	9338.92	0.000
	55.6944 - 54.1667		3268.05	9376.25	0.349	0.00	9376.25	0.000
	54.1667 - 52.6389		3338.61	9413.58	0.355	0.00	9413.58	0.000
	52.6389 - 51.1111		3409.61	9450.83	0.361	0.00	9450.83	0.000
	51.1111 - 49.5833		3481.05	9488.08	0.367	0.00	9488.08	0.000
	49.5833 - 48.0556		3552.93	9525.25	0.373	0.00	9525.25	0.000
	48.0556 - 46.5278		3625.26	9562.42	0.379	0.00	9562.42	0.000
	46.5278 - 45		3698.01	9599.50	0.385	0.00	9599.50	0.000
	45 - 36		2112.16	9817.17	0.215	0.00	9817.17	0.000
L4	45 - 36	TP76.5x70.56x0.5	2023.72	9634.08	0.210	0.00	9634.08	0.000
	36 - 34.1053		4229.99	9680.00	0.437	0.00	9680.00	0.000
	34.1053 - 32.2105		4324.68	9725.83	0.445	0.00	9725.83	0.000
	32.2105 - 30.3158		4419.92	9771.58	0.452	0.00	9771.58	0.000
	30.3158 - 28.4211		4515.72	9817.25	0.460	0.00	9817.25	0.000
	28.4211 - 26.5263		4612.07	9862.92	0.468	0.00	9862.92	0.000
	26.5263 - 24.6316		4709.00	9908.42	0.475	0.00	9908.42	0.000
	24.6316 - 22.7368		4806.48	9953.92	0.483	0.00	9953.92	0.000
	22.7368 - 20.8421		4904.52	9999.25	0.490	0.00	9999.25	0.000
	20.8421 - 18.9474		5003.10	10044.58	0.498	0.00	10044.58	0.000
	18.9474 - 17.0526		5102.25	10089.75	0.506	0.00	10089.75	0.000
	17.0526 - 15.1579		5201.95	10134.92	0.513	0.00	10134.92	0.000
	15.1579 - 13.2632		5302.20	10179.92	0.521	0.00	10179.92	0.000
	13.2632 - 11.3684		5403.01	10224.83	0.528	0.00	10224.83	0.000
	11.3684 - 9.47368		5504.37	10269.67	0.536	0.00	10269.67	0.000
	9.47368 - 7.57895		5606.27	10314.50	0.544	0.00	10314.50	0.000
	7.57895 - 5.68421		5708.72	10359.08	0.551	0.00	10359.08	0.000
	5.68421 - 3.78947		5811.72	10403.67	0.559	0.00	10403.67	0.000
	3.78947 - 1.89474		5915.27	10448.17	0.566	0.00	10448.17	0.000
	1.89474 - 0		6019.37	10492.50	0.574	0.00	10492.50	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	155.5 - 153.526	TP64.606x58.6x0.375	10.00	1239.40	0.008	0.00	6376.18	0.000
	153.526 - 151.553		10.46	1244.92	0.008	0.00	6433.12	0.000
	151.553 - 149.579		10.92	1250.45	0.009	0.00	6490.30	0.000
	149.579 - 147.605		11.38	1255.97	0.009	0.00	6547.74	0.000
	147.605 - 145.632		11.84	1261.49	0.009	0.00	6605.43	0.000
	145.632 - 143.658		19.66	1267.01	0.016	0.56	6663.37	0.000
	143.658 - 141.684		20.12	1272.53	0.016	0.56	6721.57	0.000
	141.684 - 139.711		20.58	1278.05	0.016	0.56	6780.02	0.000
	139.711 - 137.737		21.05	1283.57	0.016	0.56	6838.73	0.000
	137.737 - 135.763		21.51	1289.09	0.017	0.56	6897.68	0.000
	135.763 - 133.789		22.52	1294.61	0.017	0.56	6956.90	0.000
	133.789 - 131.816		22.98	1300.13	0.018	0.56	7016.36	0.000
	131.816 - 129.842		23.44	1305.66	0.018	0.56	7076.07	0.000
	129.842 - 127.868		28.00	1311.18	0.021	0.56	7136.04	0.000
	127.868 - 125.895		28.46	1316.70	0.022	0.07	7196.27	0.000
	125.895 - 123.921		28.99	1322.22	0.022	0.03	7256.74	0.000
	123.921 - 121.947		29.45	1327.74	0.022	0.03	7317.47	0.000
	121.947 - 119.974		29.91	1333.26	0.022	0.03	7378.45	0.000
	119.974 - 118		30.37	1338.78	0.023	0.03	7439.68	0.000
	118 - 110		15.72	1361.16	0.012	0.01	7690.48	0.000
L2	118 - 110	TP68.805x62.8x0.4375	16.61	1567.93	0.011	0.02	8746.58	0.000
	110 - 108.389		32.69	1573.18	0.021	0.03	8805.33	0.000
	108.389 - 106.778		33.06	1578.44	0.021	0.03	8864.33	0.000
	106.778 - 105.167		33.42	1583.70	0.021	0.03	8923.50	0.000
	105.167 - 103.556		33.78	1588.95	0.021	0.03	8982.83	0.000
	103.556 - 101.944		34.15	1594.21	0.021	0.03	9042.33	0.000
	101.944 - 100.333		34.51	1599.47	0.022	0.03	9102.08	0.000
	100.333 - 98.7222		36.53	1604.73	0.023	0.03	9162.00	0.000
	98.7222 - 97.1111		36.89	1609.98	0.023	0.03	9222.17	0.000
	97.1111 - 95.5		37.25	1615.24	0.023	0.03	9282.42	0.000
	95.5 - 93.8889		37.61	1620.50	0.023	0.03	9343.00	0.000
	93.8889 -		37.96	1625.75	0.023	0.03	9403.67	0.000

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
	92.2778							
	92.2778 - 90.6667		38.32	1631.01	0.023	0.03	9464.58	0.000
	90.6667 - 89.0556		38.68	1636.27	0.024	0.03	9525.75	0.000
	89.0556 - 87.4444		39.03	1641.52	0.024	0.03	9587.00	0.000
	87.4444 - 85.8333		39.38	1646.78	0.024	0.03	9648.50	0.000
	85.8333 - 84.2222		39.74	1652.04	0.024	0.03	9710.25	0.000
	84.2222 - 82.6111		40.09	1657.30	0.024	0.03	9772.08	0.000
	82.6111 - 81		40.44	1662.55	0.024	0.03	9834.25	0.000
	81 - 72.5		20.72	1690.29	0.012	0.01	10165.08	0.000
L3	81 - 72.5	TP72.748x66.8082x0.5	21.69	1905.27	0.011	0.02	11300.83	0.000
	72.5 - 70.9722		42.71	1910.97	0.022	0.03	11368.58	0.000
	70.9722 - 69.4444		43.02	1916.67	0.022	0.03	11436.42	0.000
	69.4444 - 67.9167		43.33	1922.37	0.023	0.03	11504.50	0.000
	67.9167 - 66.3889		43.64	1928.06	0.023	0.03	11572.83	0.000
	66.3889 - 64.8611		43.95	1933.76	0.023	0.03	11641.33	0.000
	64.8611 - 63.3333		44.25	1939.46	0.023	0.03	11710.08	0.000
	63.3333 - 61.8056		44.56	1945.16	0.023	0.03	11779.00	0.000
	61.8056 - 60.2778		44.86	1950.86	0.023	0.03	11848.08	0.000
	60.2778 - 58.75		45.16	1956.55	0.023	0.03	11917.42	0.000
	58.75 - 57.2222		45.46	1962.25	0.023	0.03	11986.92	0.000
	57.2222 - 55.6944		45.75	1967.95	0.023	0.03	12056.58	0.000
	55.6944 - 54.1667		46.05	1973.65	0.023	0.03	12126.50	0.000
	54.1667 - 52.6389		46.34	1979.35	0.023	0.03	12196.67	0.000
	52.6389 - 51.1111		46.63	1985.04	0.023	0.03	12267.00	0.000
	51.1111 - 49.5833		46.92	1990.74	0.024	0.03	12337.50	0.000
	49.5833 - 48.0556		47.21	1996.44	0.024	0.03	12408.25	0.000
	48.0556 - 46.5278		47.49	2002.14	0.024	0.03	12479.17	0.000
	46.5278 - 45		47.78	2007.84	0.024	0.03	12550.25	0.000
	45 - 36		25.74	2041.40	0.013	0.01	12973.42	0.000
L4	45 - 36	TP76.5x70.56x0.5	23.84	2013.15	0.012	0.01	12616.75	0.000
	36 - 34.1053		49.84	2020.22	0.025	0.03	12705.50	0.000
	34.1053 - 32.2105		50.14	2027.28	0.025	0.03	12794.58	0.000
	32.2105 - 30.3158		50.44	2034.35	0.025	0.03	12883.92	0.000
	30.3158 - 28.4211		50.73	2041.42	0.025	0.03	12973.58	0.000
	28.4211 -		51.03	2048.48	0.025	0.03	13063.58	0.000

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
	26.5263							
	26.5263 - 24.6316		51.32	2055.55	0.025	0.03	13153.83	0.000
	24.6316 - 22.7368		51.62	2062.62	0.025	0.03	13244.42	0.000
	22.7368 - 20.8421		51.91	2069.68	0.025	0.03	13335.33	0.000
	20.8421 - 18.9474		52.21	2076.75	0.025	0.03	13426.58	0.000
	18.9474 - 17.0526		52.50	2083.82	0.025	0.03	13518.08	0.000
	17.0526 - 15.1579		52.79	2090.88	0.025	0.03	13609.92	0.000
	15.1579 - 13.2632		53.08	2097.95	0.025	0.03	13702.08	0.000
	13.2632 - 11.3684		53.38	2105.02	0.025	0.03	13794.58	0.000
	11.3684 - 9.47368		53.67	2112.08	0.025	0.03	13887.33	0.000
	9.47368 - 7.57895		53.96	2119.15	0.025	0.03	13980.42	0.000
	7.57895 - 5.68421		54.25	2126.22	0.026	0.03	14073.83	0.000
	5.68421 - 3.78947		54.54	2133.28	0.026	0.03	14167.50	0.000
	3.78947 - 1.89474		54.83	2140.35	0.026	0.03	14261.58	0.000
	1.89474 - 0		55.11	2147.42	0.026	0.03	14355.92	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	155.5 - 153.526	0.002	0.009	0.000	0.008	0.000	0.011	1.050	4.8.2
	153.526 - 151.553	0.002	0.013	0.000	0.008	0.000	0.015	1.050	4.8.2
	151.553 - 149.579	0.002	0.018	0.000	0.009	0.000	0.020	1.050	4.8.2
	149.579 - 147.605	0.002	0.022	0.000	0.009	0.000	0.025	1.050	4.8.2
	147.605 - 145.632	0.002	0.027	0.000	0.009	0.000	0.030	1.050	4.8.2
	145.632 - 143.658	0.004	0.033	0.000	0.016	0.000	0.037	1.050	4.8.2
	143.658 - 141.684	0.005	0.041	0.000	0.016	0.000	0.046	1.050	4.8.2
	141.684 - 139.711	0.005	0.049	0.000	0.016	0.000	0.054	1.050	4.8.2
	139.711 - 137.737	0.005	0.057	0.000	0.016	0.000	0.063	1.050	4.8.2
	137.737 - 135.763	0.005	0.066	0.000	0.017	0.000	0.071	1.050	4.8.2
	135.763 -	0.005	0.075	0.000	0.017	0.000	0.080	1.050	4.8.2

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	133.789								
	133.789 - 131.816	0.005	0.083	0.000	0.018	0.000	0.089	1.050	4.8.2
	131.816 - 129.842	0.006	0.092	0.000	0.018	0.000	0.098	1.050	4.8.2
	129.842 - 127.868	0.007	0.103	0.000	0.021	0.000	0.110	1.050	4.8.2
	127.868 - 125.895	0.007	0.114	0.000	0.022	0.000	0.121	1.050	4.8.2
	125.895 - 123.921	0.007	0.125	0.000	0.022	0.000	0.132	1.050	4.8.2
	123.921 - 121.947	0.007	0.136	0.000	0.022	0.000	0.143	1.050	4.8.2
	121.947 - 119.974	0.007	0.147	0.000	0.022	0.000	0.154	1.050	4.8.2
	119.974 - 118	0.007	0.158	0.000	0.023	0.000	0.166	1.050	4.8.2
	118 - 110	0.004	0.096	0.000	0.012	0.000	0.101	1.050	4.8.2
L2	118 - 110	0.004	0.083	0.000	0.011	0.000	0.087	1.050	4.8.2
	110 - 108.389	0.007	0.165	0.000	0.021	0.000	0.172	1.050	4.8.2
	108.389 - 106.778	0.007	0.172	0.000	0.021	0.000	0.180	1.050	4.8.2
	106.778 - 105.167	0.007	0.179	0.000	0.021	0.000	0.187	1.050	4.8.2
	105.167 - 103.556	0.007	0.187	0.000	0.021	0.000	0.194	1.050	4.8.2
	103.556 - 101.944	0.007	0.194	0.000	0.021	0.000	0.202	1.050	4.8.2
	101.944 - 100.333	0.008	0.201	0.000	0.022	0.000	0.209	1.050	4.8.2
	100.333 - 98.7222	0.008	0.209	0.000	0.023	0.000	0.217	1.050	4.8.2
	98.7222 - 97.1111	0.008	0.217	0.000	0.023	0.000	0.225	1.050	4.8.2
	97.1111 - 95.5	0.008	0.224	0.000	0.023	0.000	0.233	1.050	4.8.2
	95.5 - 93.8889	0.008	0.232	0.000	0.023	0.000	0.241	1.050	4.8.2
	93.8889 - 92.2778	0.008	0.240	0.000	0.023	0.000	0.249	1.050	4.8.2
	92.2778 - 90.6667	0.008	0.248	0.000	0.023	0.000	0.257	1.050	4.8.2
	90.6667 - 89.0556	0.009	0.256	0.000	0.024	0.000	0.265	1.050	4.8.2
	89.0556 - 87.4444	0.009	0.264	0.000	0.024	0.000	0.273	1.050	4.8.2
	87.4444 - 85.8333	0.009	0.271	0.000	0.024	0.000	0.281	1.050	4.8.2
	85.8333 - 84.2222	0.009	0.279	0.000	0.024	0.000	0.289	1.050	4.8.2
	84.2222 - 82.6111	0.009	0.287	0.000	0.024	0.000	0.297	1.050	4.8.2
	82.6111 - 81	0.009	0.295	0.000	0.024	0.000	0.305	1.050	4.8.2
	81 - 72.5	0.005	0.161	0.000	0.012	0.000	0.166	1.050	4.8.2
L3	81 - 72.5	0.005	0.144	0.000	0.011	0.000	0.149	1.050	4.8.2
	72.5 - 70.9722	0.009	0.281	0.000	0.022	0.000	0.291	1.050	4.8.2
	70.9722 - 69.4444	0.009	0.287	0.000	0.022	0.000	0.297	1.050	4.8.2
	69.4444 - 67.9167	0.009	0.294	0.000	0.023	0.000	0.303	1.050	4.8.2
	67.9167 - 66.3889	0.009	0.300	0.000	0.023	0.000	0.309	1.050	4.8.2
	66.3889 -	0.009	0.306	0.000	0.023	0.000	0.316	1.050	4.8.2

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	64.8611								
	64.8611 - 63.3333	0.009	0.312	0.000	0.023	0.000	0.322	1.050	4.8.2
	63.3333 - 61.8056	0.009	0.318	0.000	0.023	0.000	0.328	1.050	4.8.2
	61.8056 - 60.2778	0.009	0.324	0.000	0.023	0.000	0.334	1.050	4.8.2
	60.2778 - 58.75	0.010	0.330	0.000	0.023	0.000	0.340	1.050	4.8.2
	58.75 - 57.2222	0.010	0.336	0.000	0.023	0.000	0.347	1.050	4.8.2
	57.2222 - 55.6944	0.010	0.342	0.000	0.023	0.000	0.353	1.050	4.8.2
	55.6944 - 54.1667	0.010	0.349	0.000	0.023	0.000	0.359	1.050	4.8.2
	54.1667 - 52.6389	0.010	0.355	0.000	0.023	0.000	0.365	1.050	4.8.2
	52.6389 - 51.1111	0.010	0.361	0.000	0.023	0.000	0.371	1.050	4.8.2
	51.1111 - 49.5833	0.010	0.367	0.000	0.024	0.000	0.378	1.050	4.8.2
	49.5833 - 48.0556	0.010	0.373	0.000	0.024	0.000	0.384	1.050	4.8.2
	48.0556 - 46.5278	0.010	0.379	0.000	0.024	0.000	0.390	1.050	4.8.2
	46.5278 - 45	0.011	0.385	0.000	0.024	0.000	0.396	1.050	4.8.2
	45 - 36	0.006	0.215	0.000	0.013	0.000	0.221	1.050	4.8.2
L4	45 - 36	0.006	0.210	0.000	0.012	0.000	0.216	1.050	4.8.2
	36 - 34.1053	0.012	0.437	0.000	0.025	0.000	0.450	1.050	4.8.2
	34.1053 - 32.2105	0.012	0.445	0.000	0.025	0.000	0.457	1.050	4.8.2
	32.2105 - 30.3158	0.012	0.452	0.000	0.025	0.000	0.465	1.050	4.8.2
	30.3158 - 28.4211	0.012	0.460	0.000	0.025	0.000	0.473	1.050	4.8.2
	28.4211 - 26.5263	0.013	0.468	0.000	0.025	0.000	0.481	1.050	4.8.2
	26.5263 - 24.6316	0.013	0.475	0.000	0.025	0.000	0.489	1.050	4.8.2
	24.6316 - 22.7368	0.013	0.483	0.000	0.025	0.000	0.496	1.050	4.8.2
	22.7368 - 20.8421	0.013	0.490	0.000	0.025	0.000	0.504	1.050	4.8.2
	20.8421 - 18.9474	0.013	0.498	0.000	0.025	0.000	0.512	1.050	4.8.2
	18.9474 - 17.0526	0.013	0.506	0.000	0.025	0.000	0.520	1.050	4.8.2
	17.0526 - 15.1579	0.013	0.513	0.000	0.025	0.000	0.527	1.050	4.8.2
	15.1579 - 13.2632	0.014	0.521	0.000	0.025	0.000	0.535	1.050	4.8.2
	13.2632 - 11.3684	0.014	0.528	0.000	0.025	0.000	0.543	1.050	4.8.2
	11.3684 - 9.47368	0.014	0.536	0.000	0.025	0.000	0.550	1.050	4.8.2
	9.47368 - 7.57895	0.014	0.544	0.000	0.025	0.000	0.558	1.050	4.8.2
	7.57895 - 5.68421	0.014	0.551	0.000	0.026	0.000	0.566	1.050	4.8.2
	5.68421 -	0.014	0.559	0.000	0.026	0.000	0.574	1.050	4.8.2

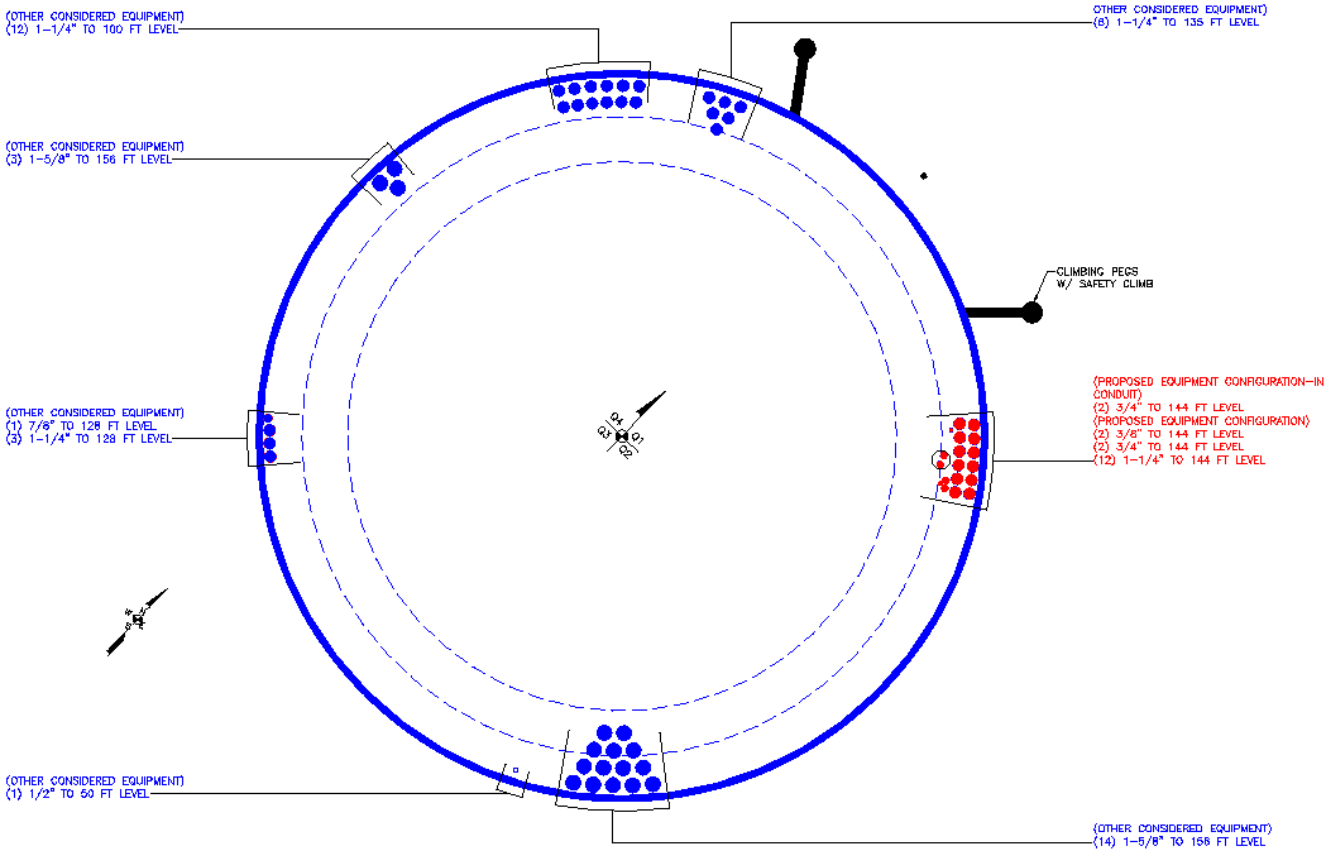
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	3.78947								
	3.78947 - 1.89474	0.014	0.566	0.000	0.026	0.000	0.581	1.050	4.8.2
	1.89474 - 0	0.015	0.574	0.000	0.026	0.000	0.589	1.050	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	155.5 - 110	Pole	TP64.606x58.6x0.375	1	-29.06	4083.22	15.8	Pass
L2	110 - 72.5	Pole	TP68.805x62.8x0.4375	2	-47.98	5456.99	29.1	Pass
L3	72.5 - 36	Pole	TP72.748x66.8082x0.5	3	-69.74	6956.40	37.7	Pass
L4	36 - 0	Pole	TP76.5x70.56x0.5	4	-98.25	7106.06	56.1	Pass
							Summary	
						Pole (L4)	56.1	Pass
						RATING =	**56.1**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(OTHER CONSIDERED EQUIPMENT)
(12) 1-1/4" TO 100 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(8) 1-1/4" TO 135 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(3) 1-5/8" TO 156 FT LEVEL
CLIMBING PEGS
W/ SAFETY CLIMB
(PROPOSED EQUIPMENT CONFIGURATION-IN CONDUIT)
(2) 3/4" TO 144 FT LEVEL
(PROPOSED EQUIPMENT CONFIGURATION)
(2) 3/8" TO 144 FT LEVEL
(2) 3/4" TO 144 FT LEVEL
(12) 1-1/4" TO 144 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 7/8" TO 128 FT LEVEL
(3) 1-1/4" TO 128 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 50 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(14) 1-5/8" TO 156 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

FDH INFRASTRUCTURE SERVICES
ENGINEERING INNOVATION

Version: 1.2
Issue Date: 2/20/2017

Monopole Slip Splice Length

FDHV Project No.:	19BAHV1400
Site Name:	HRT 107(C) 943204
Site ID/BU:	806366
Date:	1/9/2019

Section Range	Req. Splice Length, 1.5D (ft)	Act. Splice Length (ft)	Top Section Base Ø (in)	Top Section Thickness (in)	Top Section Inside Width, D (in)	Section Scenario	Top Elevation (ft)	Bottom Elevation (ft)	Section Results
L1-L2	7.982	8.000	64.606	0.375	63.856	**A**	118.00	110.00	OK
L2-L3	8.491	8.500	68.805	0.4375	67.930	**A**	81.00	72.50	OK
L3-L4	8.969	9.000	72.748	0.5	71.748	**A**	45.00	36.00	OK

Section Mods?	Plate F_y (ksi)	Plate F_u (ksi)	Plate Width (in)	Plate Thick (in)	Total No. Plates	Int. Bolt Spacing (in)	Bolt Hole Ø (in)	M_u (kip-ft)	$P_u/\Phi P_n$ (%)	$V_u/\Phi V_n$ (%)	$T_u/\Phi T_n$ (%)

Scenario Definitions:	
A	No stress reduction and no additional capacity evaluation for the slip splice is required.
B	Reduction in effective yield stress for the slip splice per ANSI/TIA-222-H Section 13.3.5. Capacity evaluation for the slip splice is required.
C	Reinforcement of the slip splice is required. The shaft cannot be considered effective and therefore the reinforcement must take 100% of the load.

Notes:

1. This sheet applies only to monopoles being analyzed under ANSI/TIA-222-H.
2. The capacities computed in this sheet supersede both tnx and CCIPole.
3. This sheet is currently set up to handle one size of flat plate monopole reinforcement.
4. Make sure to fill out "Section Mods?" in order to display proper capacity.
5. If "N/A" is displayed, it means there is an existing flange connection at that elevation.

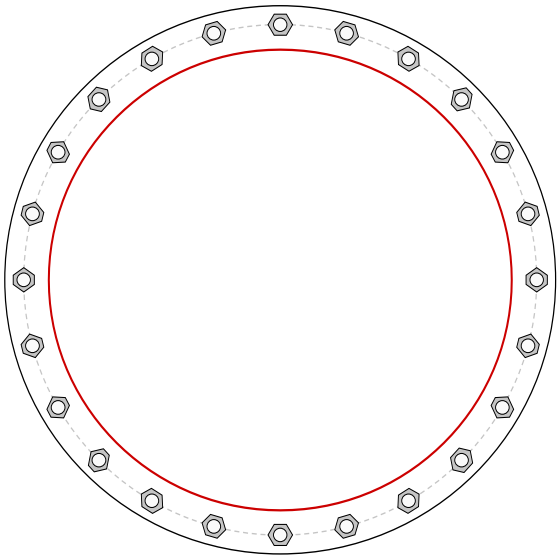
Monopole Base Plate Connection

Site Info	
BU #	806366
Site Name	HRT 107(C) 943204
Order #	472663 R0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	1.25

Applied Loads	
Moment (kip-ft)	6019.37
Axial Force (kips)	98.25
Shear Force (kips)	55.11

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(24) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 84.75" BC

Base Plate Data

91" OD x 3.25" Plate (A633 Gr.E; Fy=60 ksi, Fu=80 ksi)

Stiffener Data

N/A

Pole Data

76.5" x 0.5" 12-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_c = 146.1	ϕPn_c = 243.75	**Stress Rating**
Vu = 2.3	ϕVn = 73.13	**57.2%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	14.12	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**24.9%**	**Pass**

Pier and Pad Foundation

BU # :	806366
Site Name:	HRT 107(C) 94320
App. Number:	472663 R0

TIA-222 Revision:	H
Tower Type:	Monopole

Top & Bot. Pad Rein. Different?:	☐
Block Foundation?:	☐

Superstructure Analysis Reactions		
Compression, P_{comp}:	98	kips
Base Shear, Vu_comp:	55	kips
Moment, M_u:	6019	ft-kips
Tower Height, **H**:	155.5	ft
BP Dist. Above Fdn, bp_{dist}:	3.5	in

Pier Properties		
Pier Shape:	Square	
Pier Diameter, **dpier**:	9	ft
Ext. Above Grade, **E**:	0.5	ft
Pier Rebar Size, **Sc**:	11	
Pier Rebar Quantity, **mc**:	59	
Pier Tie/Spiral Size, **St**:	5	
Pier Tie/Spiral Quantity, **mt**:	7	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties		
Depth, **D**:	7.5	ft
Pad Width, **W**:	33.25	ft
Pad Thickness, **T**:	4.5	ft
Pad Rebar Size (Bottom), **Sp**:	11	
Pad Rebar Quantity (Bottom), **mp**:	25	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, **Fy**:	60000	psi
Concrete Compressive Strength, **F'c**:	4000	psi
Dry Concrete Density, **δc**:	150	pcf

Soil Properties		
Total Soil Unit Weight, **γ**:	130	pcf
Ultimate Net Bearing, Qnet:	21.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, **ϕ**:	40	degrees
SPT Blow Count, N_{blows}:	120	
Base Friction, **μ**:	0.4	
Neglected Depth, **N**:	4.50	ft
Foundation Bearing on Rock?	Yes	
Groundwater Depth, **gw**:	14.5	ft

<--Toggle between Gross and Net

Foundation Analysis Checks	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	611.27	55.00	**8.6%**	**Pass**
Bearing Pressure (ksf)	16.48	2.85	**16.5%**	**Pass**
*Overturning (kip*ft)*	18231.43	6475.04	**35.5%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	18533.65	6211.50	**31.9%**	**Pass**
Pier Compression (kip)	51554.88	149.03	**0.3%**	**Pass**
*Pad Flexure (kip*ft)*	8427.96	2200.81	**24.9%**	**Pass**
Pad Shear - 1-way (kips)	1850.42	241.33	**12.4%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.190	0.022	**11.3%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	11161.59	3726.90	**31.8%**	**Pass**

**Rating per TIA-222-H Section 15.5*

Soil Rating*:	**35.5%**
Structural Rating*:	**31.9%**

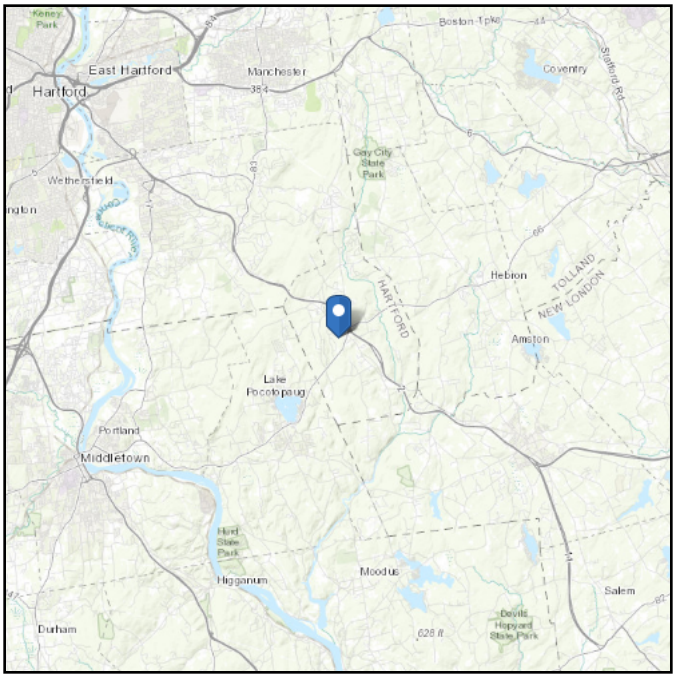
Version 3.1.0

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 577.55 ft (NAVD 88)
Latitude: 41.629806
Longitude: -72.4665



Wind

Results:

Wind Speed:	126 Vmph
10-year MRI	78 Vmph
25-year MRI	87 Vmph
50-year MRI	95 Vmph
100-year MRI	103 Vmph

Data Source: ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014

Date Accessed: Tue Jan 08 2019

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

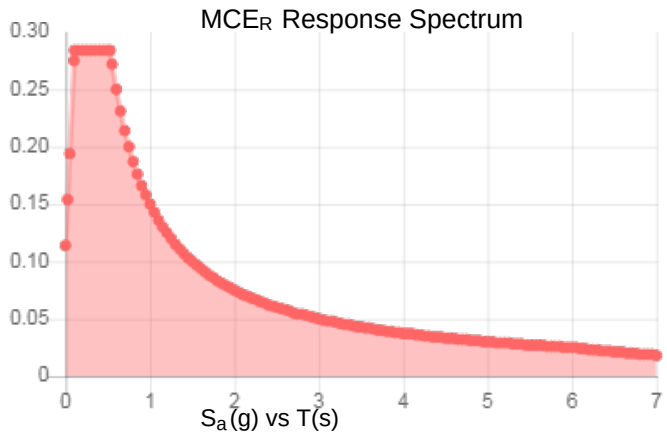
Seismic

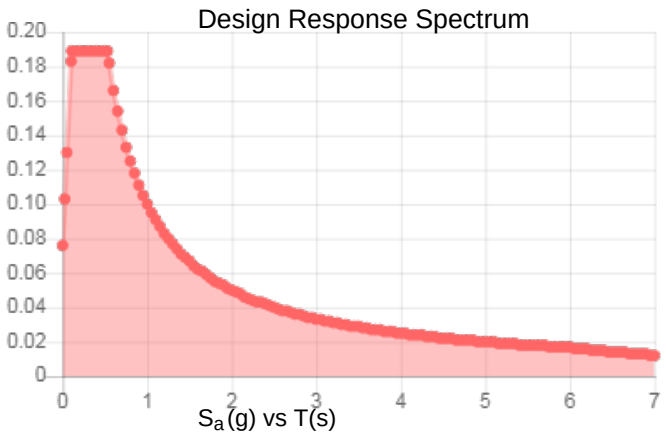
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.177	S_{DS} :	0.189
S_1 :	0.062	S_{D1} :	0.1
F_a :	1.6	T_L :	
F_v :	2.4	PGA :	0.09
S_{MS} :		PGA_M :	0.143
S_{M1} :		F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Tue Jan 08 2019

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Tue Jan 08 2019

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Date: **February 26, 2019**

Charles McGuirt
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704-405-6607

Jacobs Engineering Group, Inc.
5449 Bells Ferry Rd
Acworth, GA 30102
770-701-2500
www.jacobs.com

Subject:	**Mount Analysis Report**	
Carrier Designation:	**AT&T Equipment Change-Out**	
	Carrier Site Number:	10035085
	Carrier Site Name:	Marlborough – Country Barn
Crown Castle Designation:	**Crown Castle BU Number:**	806366
	Crown Castle Site Name:	HRT 107(C) 943204
	Crown Castle JDE Job Number:	549808
	Crown Castle PO Number:	1311809
	Crown Castle Application Number:	472663 Revision 0
Engineering Firm Designation:	**Jacobs Engineering Group, Inc. Report Designation:** ERCC0303	
Site Data:	**73 North Main Street** **Marlborough, Hartford County, CT, 06447** **Latitude 41°37'47.30" Longitude -72°27'59.40"**	
Structure Information:	**Tower Height & Type:**	**155.5 ft Monopole**
	Mount Elevation:	**144 ft**
	Mount Type:	**19 ft Platform**

Dear Charles McGuirt,

Jacobs Engineering Group, Inc. is pleased to submit this **"Mount Analysis Report"** to determine the structural integrity of AT&T's antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

Platform (single) **Sufficient**

The analysis has been performed in accordance with the TIA-222-H Standard based upon an ultimate 3-second gust wind speed of 120 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

We at Jacobs Engineering Group, Inc. appreciate the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this, please give us a call.

Mount analysis prepared by: Alexandre Matout

Engineer of Record:

Craig Thomas, PE
PE No. 0029052

TABLE OF CONTENTS

1) INTRODUCTION

This mount is a 19 ft Platform mapped by Hightower Solutions Inc., dated 2/20/2019

2) ANALYSIS CRITERIA

Building Code:	2018 IBC
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	120 mph
Exposure Category:	B
Topographic Factor at Mount:	1
Ice Thickness:	1 in
Wind Speed with Ice:	50 mph
Live Loading Wind Speed:	30 mph
Man Live Load at Mid/End-Points:	250 lb
Man Live Load at Mount Pipes:	500 lb

Table 1 - Proposed Equipment Configuration Information

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
144.0	144.0	3	KATHREIN	80010965	Platform
		3	KMW COMMUNICATIONS	AM-X-CD-16-65-00T-RET	
		3	POWERWAVE TECHNOLOGIES	7770.00	
		3	ERICSSON	RRUS 12	
		3	ERICSSON	RRUS 32	
		3	ERICSSON	RRUS 4449 B5/B12	
		3	POWERWAVE TECHNOLOGIES	1001940	
		6	POWERWAVE TECHNOLOGIES	LGP 17201	
		6	POWERWAVE TECHNOLOGIES	LGP21903	
		2	RAYCAP	DC6-48-60-18-8F	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
4-MOUNT MAPPING	Hightower Solutions Inc.	2/20/2019	CCISITES
MOUNT PHOTOS	AT&T		CCISITES
APPLICATION	AT&T	472663 Revision 0	CCISITES

3.1) Analysis Method

RISA-3D (Version 17.0.1), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

A tool internally developed, using Microsoft Excel, by Jacobs was used to calculate wind loading on all appurtenances, dishes, and mount members for various load cases. Selected output from the analysis is included in Appendix B.

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 Tower Mount Analysis (Revision C).

3.2) Assumptions

1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
4) The analysis will be required to be revised if the existing conditions in the field differ from those shown in the above-referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.
5) Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM 500 (GR B-46)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325
U-Bolts	ASTM A307

6) Antenna pipes to be implemented vertically on/between the face members and equally spaced horizontally along the mount face.
7) RRHs to be implemented vertically between the face members.

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 antenna mounting system.

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Platform)

Notes	Component	Critical Member	Mount Centerline (ft)	% Capacity	Pass / Fail
1	Antenna Pipe Members	M2	144.0	22.0	Pass
1	Brace Members	M15	144.0	91.7	Pass
1	Diagonal Members	M24	144.0	27.1	Pass
1	Horizontal Members	M43	144.0	45.9	Pass
1	Plate Members	M37	144.0	86.2	Pass
1	Standoff Members	M83	144.0	72.6	Pass
1	Vertical Members	M96	144.0	57.9	Pass
2	Mount-to-Tower Connection	-	144.0	15.5	Pass

Structure Rating (max from all components) =	91.7%

Notes:

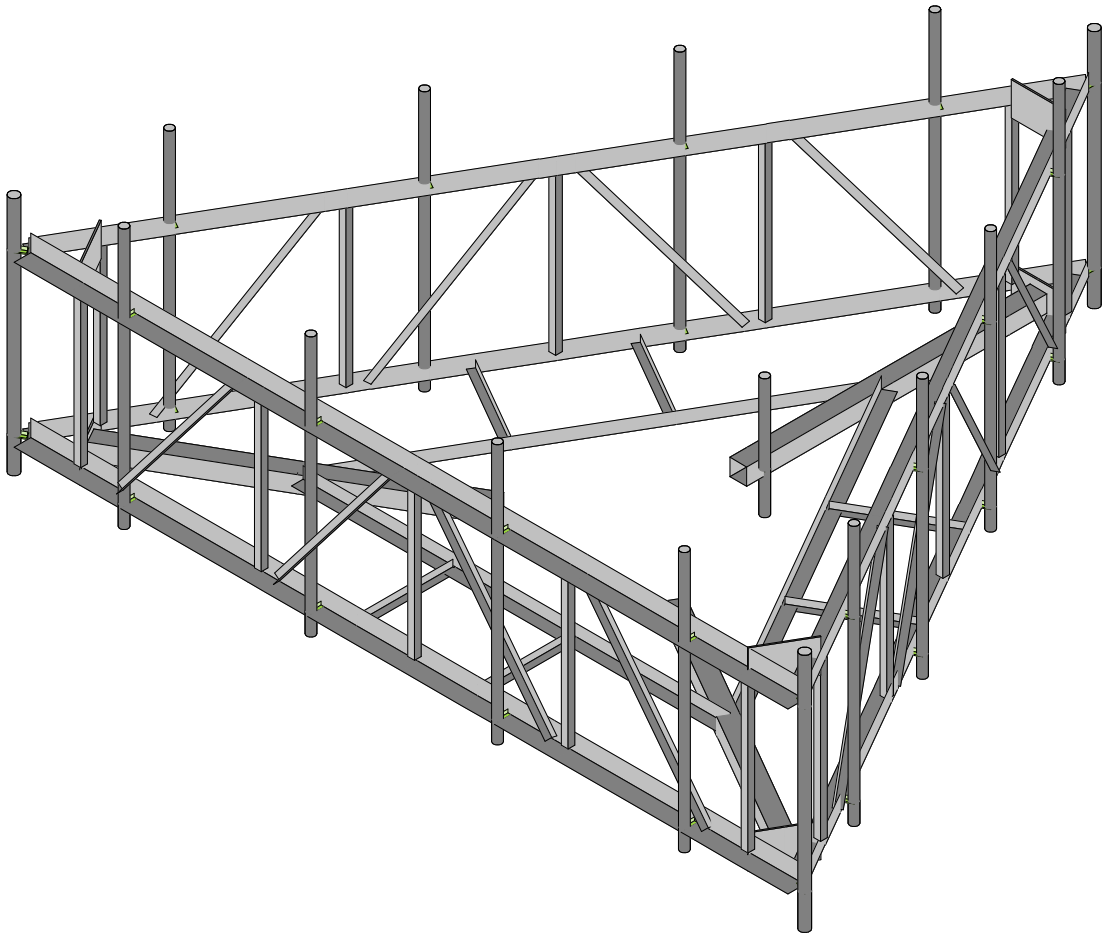
1) See additional documentation in "Appendix C - Analysis Output" for calculations supporting the % capacity consumed.
2) See additional documentation in "Appendix D - Analysis Output" for calculations supporting the % capacity consumed.
3) Rating per TIA-222-H, Section 15.5.

4.1) Recommendations

The mount has sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

APPENDIX A

WIRE FRAME AND RENDERED MODELS



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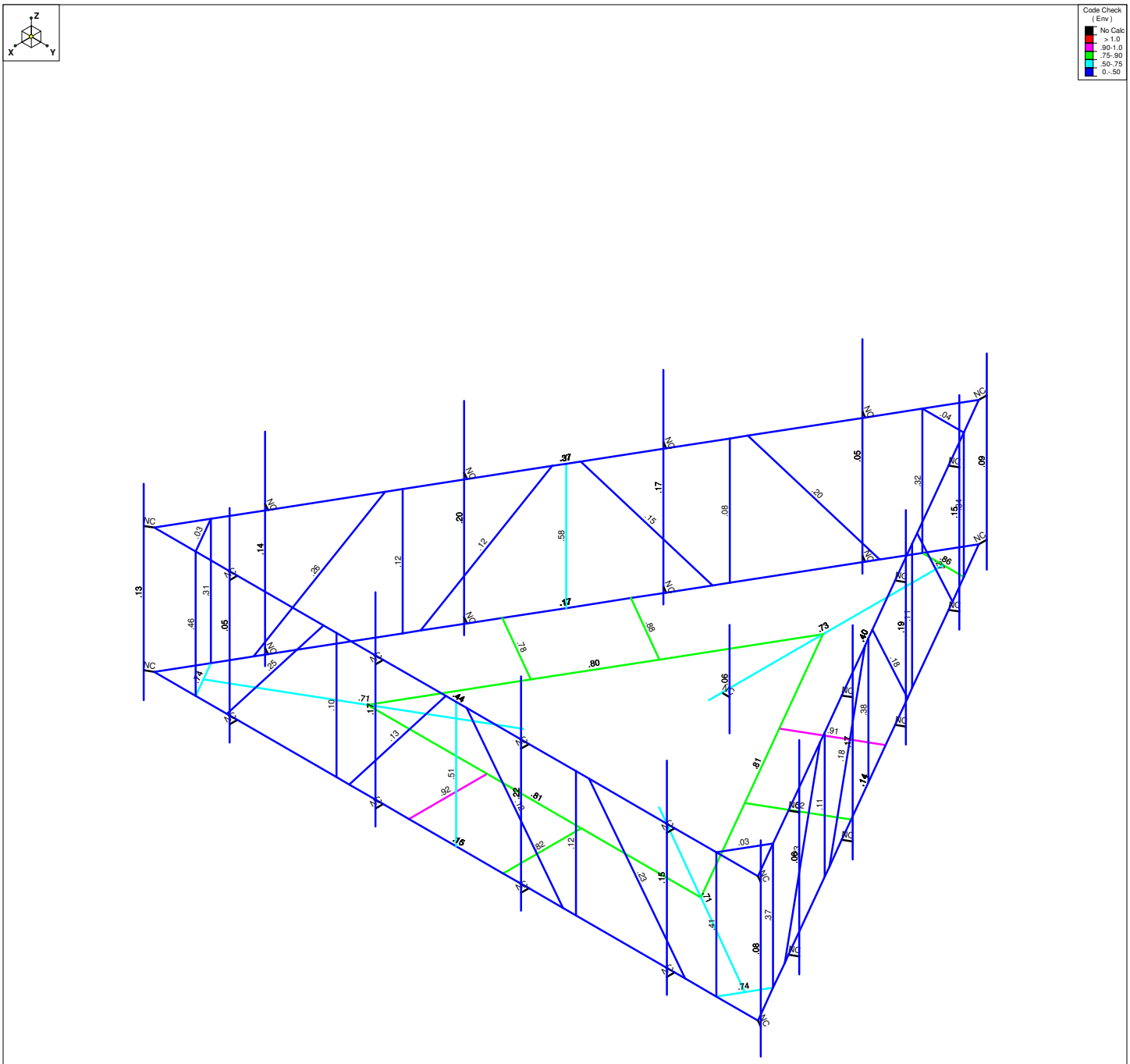

Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Jacobs Engineering Group...		Page 2
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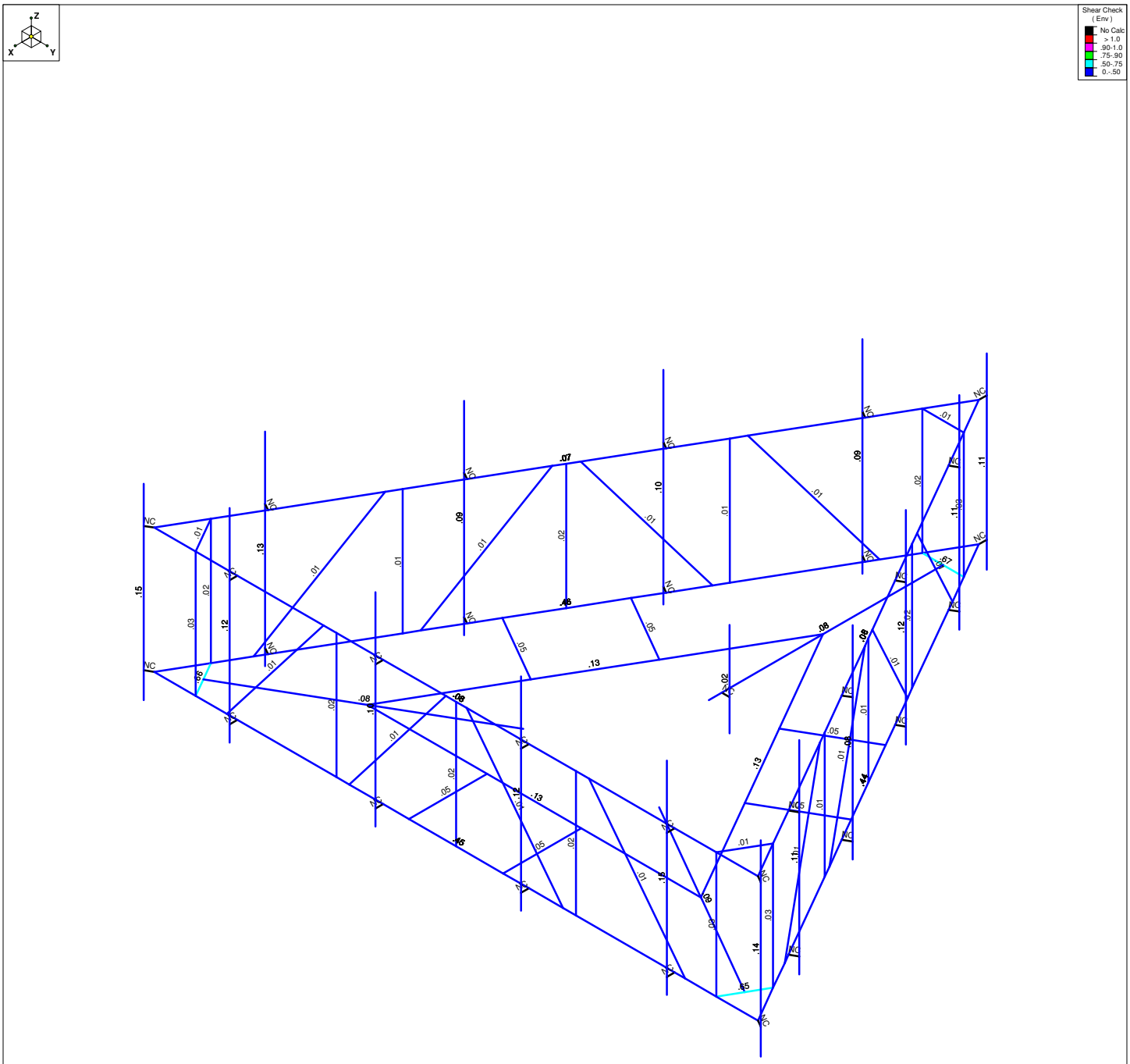
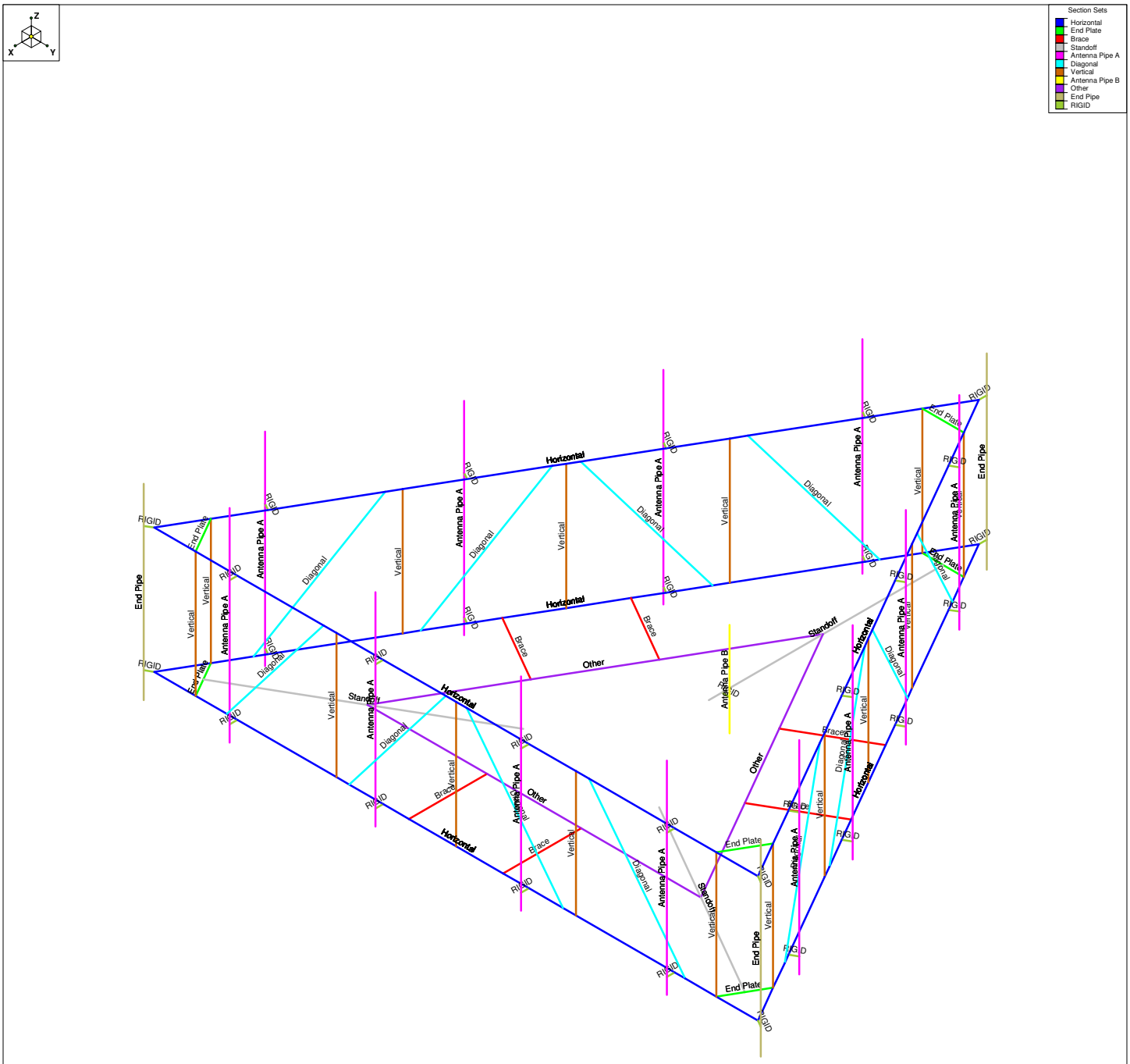
ERCC0303 - 806366		Platform_18FT_A.r3d

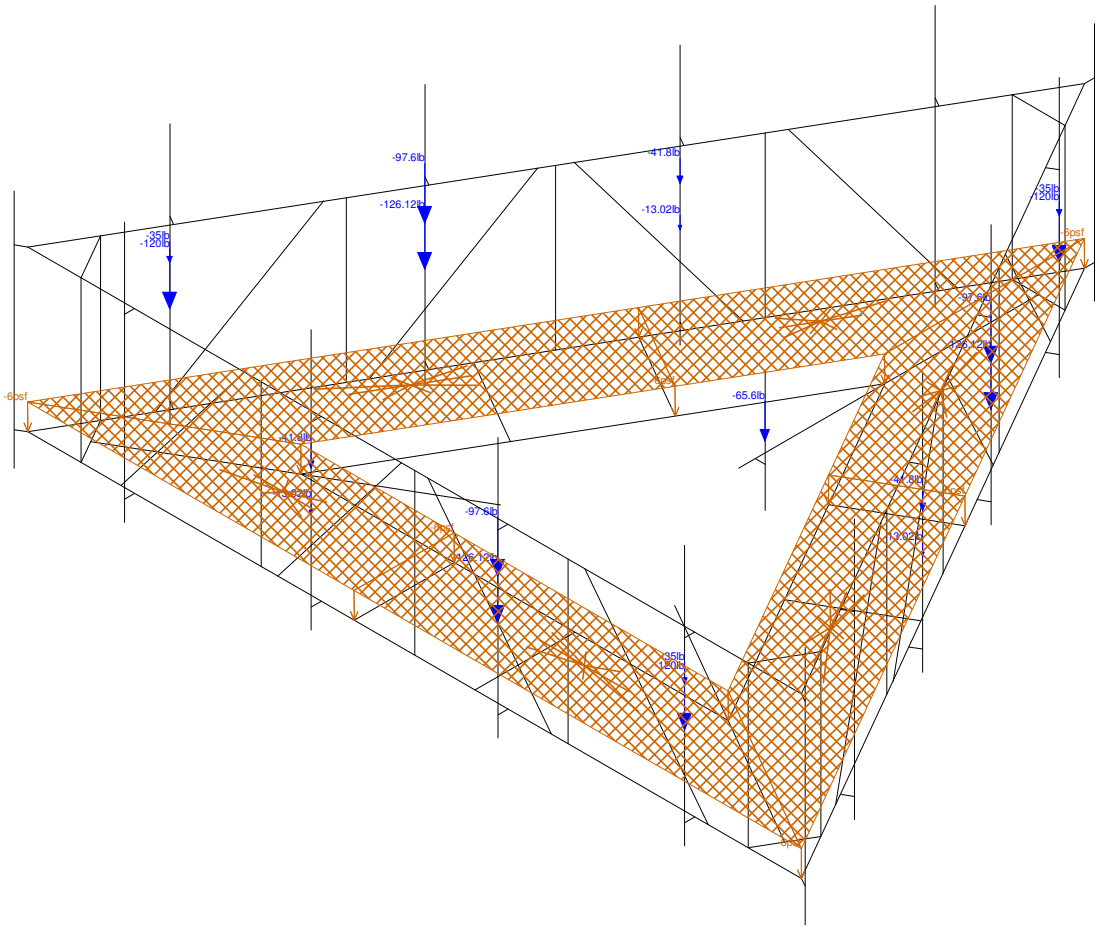


Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Jacobs Engineering Group...		Page 3
AM	Mapped Mount	Feb 26, 2019 at 1:08 PM
ERCC0303 - 806366		Platform_18FT_A.r3d



Jacobs Engineering Group...		Page 4
AM	Mapped Mount	Feb 26, 2019 at 1:08 PM
ERCC0303 - 806366		Platform_18FT_A.r3d



Loads: BLC 1, DEAD LOAD
Envelope Only Solution

Jacobs Engineering Group...		Page 5
AM	Mapped Mount	Feb 26, 2019 at 1:08 PM
ERCC0303 - 806366		Platform_18FT_A.r3d

APPENDIX B

SOFTWARE INPUT CALCULATIONS

JACOBS™

WIND/ICE/SERVICE LOADING
ANTENNA MOUNTING SYSTEM
ANSI/TIA-222-H

Project Number:	ERCC0303
Site Name:	806366
Engineer:	AM
Date:	02/26/2019
Carrier:	AT&T
Reviewed By:	B. Bartlett

Input Data

Front

Manufacturer	**POWERWAVE TECHNOLOGIES**		
Model #	**7770**		
Length	55	in	
Width	11	in	
Depth	5	in	
Weight	35	lb	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	5.000		(w/o ice)
Length / Width	4.304		(w/ ice)
C_a	1.311		(w/o ice)
C_a	1.280		(w/ ice)
C_a	1.311		(service)
$(EPA)_A$	4.958	ft^2	(w/o ice)
$(EPA)_A$	6.107	ft^2	(w/ ice)
$(EPA)_A$	4.958	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	190.417	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	40.726	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	11.901	lb	(service)
Ice Weight	85.919	lb	
Weight	120.919	lb	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	115.198		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	47.999		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	28.800		(service)
$G_h =$	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
$K_a =$	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)

Position	1	x	1
		x	
		x	
		x	

Side

Manufacturer	POWERWAVE TECHNOLOGIES		
Model #	7770		
Length	55	in	
Width	11	in	
Depth	5	in	
Weight	35	lb	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	11.000		(w/o ice)
Length / Width	7.833		(w/ ice)
C_a	1.533		(w/o ice)
C_a	1.428		(w/ ice)
C_a	1.533		(service)
$(EPA)_A$	2.635	ft^2	(w/o ice)
$(EPA)_A$	3.743	ft^2	(w/ ice)
$(EPA)_A$	2.635	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	101.223	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	24.957	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	6.326	lb	(service)
Ice Weight	85.919	lb	
Weight	120.919	lb	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	52.363		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	21.818		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	13.091		(service)
$G_h =$	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
$K_a =$	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)

Position	1	x	1
		x	
		x	
		x	

JACOBS™

WIND/ICE/SERVICE LOADING
ANTENNA MOUNTING SYSTEM
ANSI/TIA-222-H

Project Number:	ERCC0303
Site Name:	806366
Engineer:	AM
Date:	02/26/2019
Carrier:	AT&T
Reviewed By:	B. Bartlett

Input Data

Front

Manufacturer	**KMW COMMUNICATIONS**	
Model #	**AM-X-CW-16-65-00T-RET**	
Length	72	in
Width	11.8	in
Depth	5.9	in
Weight	41.8	lb
Design Ice Thickness (t_i)	1	in
Structure Type	M	(S, G, M, B)
Structure Height (h)	155.5	ft
Antenna Centerline (z)	144	ft
Basic Wind Speed (V)	120	mph (w/o ice)
Basic Wind Speed (V_i)	50	mph (w/ ice)
Basic Wind Speed (V_s)	30	mph (service)
Risk Category	II	(I, II, III, IV)
Exposure Category	B	(B, C or D)
Topographic Category	1	(1, 2, 3 or 4)
Crest Height (H)	0	ft
Shape	F	(R / F / S)
Length / Width	6.102	(w/o ice)
Length / Width	5.264	(w/ ice)
C_a	1.360	(w/o ice)
C_a	1.323	(w/ ice)
C_a	1.360	(service)
$(EPA)_A$	7.222	ft^2 (w/o ice)
$(EPA)_A$	8.674	ft^2 (w/ ice)
$(EPA)_A$	7.222	ft^2 (service)
$F_A = q_z G_h (EPA)_A$	277.389	lb (w/o ice)
$F_A = q_z G_h (EPA)_A$	57.843	lb (w/ ice)
$F_A = q_z G_h (EPA)_A$	17.337	lb (service)
Ice Weight	121.902	lb
Weight	163.702	lb (w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	123.576		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	51.490		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	30.894		(service)
$G_h =$	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
$K_a =$	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)

Position	3	x	1
		x	
		x	
		x	

Side

Manufacturer	KMW COMMUNICATIONS	
Model #	AM-X-CW-16-65-00T-RET	
Length	72	in
Width	11.8	in
Depth	5.9	in
Weight	41.8	lb
Design Ice Thickness (t_i)	1	in
Structure Type	M	(S, G, M, B)
Structure Height (h)	155.5	ft
Antenna Centerline (z)	144	ft
Basic Wind Speed (V)	120	mph (w/o ice)
Basic Wind Speed (V_i)	50	mph (w/ ice)
Basic Wind Speed (V_s)	30	mph (service)
Risk Category	II	(I, II, III, IV)
Exposure Category	B	(B, C or D)
Topographic Category	1	(1, 2, 3 or 4)
Crest Height (H)	0	ft
Shape	F	(R / F / S)
Length / Width	12.203	(w/o ice)
Length / Width	9.044	(w/ ice)
C_a	1.573	(w/o ice)
C_a	1.468	(w/ ice)
C_a	1.573	(service)
$(EPA)_A$	4.178	ft^2 (w/o ice)
$(EPA)_A$	5.604	ft^2 (w/ ice)
$(EPA)_A$	4.178	ft^2 (service)
$F_A = q_z G_h (EPA)_A$	160.453	lb (w/o ice)
$F_A = q_z G_h (EPA)_A$	37.366	lb (w/ ice)
$F_A = q_z G_h (EPA)_A$	10.028	lb (service)
Ice Weight	121.902	lb
Weight	163.702	lb (w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	61.788		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	25.745		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	15.447		(service)
$G_h =$	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
$K_a =$	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)

Position	3	x	1
		x	
		x	
		x	

JACOBS™

WIND/ICE/SERVICE LOADING
ANTENNA MOUNTING SYSTEM
ANSI/TIA-222-H

Project Number:	ERCC0303
Site Name:	806366
Engineer:	AM
Date:	02/26/2019
Carrier:	AT&T
Reviewed By:	B. Bartlett

Input Data

Front

Manufacturer	**KATHREIN**		
Model #	**80010965**		
Length	78.7	in	
Width	20	in	
Depth	6.9	in	
Weight	97.6	lb	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	3.935		(w/o ice)
Length / Width	3.630		(w/ ice)
C_a	1.264		(w/o ice)
C_a	1.250		(w/ ice)
C_a	1.264		(service)
$(EPA)_A$	12.432	ft^2	(w/o ice)
$(EPA)_A$	14.128	ft^2	(w/ ice)
$(EPA)_A$	12.432	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	477.514	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	94.211	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	29.845	lb	(service)
Ice Weight	207.186	lb	
Weight	304.786	lb	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	209.451		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	87.271		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	52.363		(service)
$G_h =$	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
$K_a =$	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)

Position	2	x	1
		x	
		x	
		x	

Side

Manufacturer	KATHREIN		
Model #	80010965		
Length	78.7	in	
Width	20	in	
Depth	6.9	in	
Weight	97.6	lb	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	11.406		(w/o ice)
Length / Width	8.790		(w/ ice)
C_a	1.547		(w/o ice)
C_a	1.460		(w/ ice)
C_a	1.547		(service)
$(EPA)_A$	5.250	ft^2	(w/o ice)
$(EPA)_A$	6.813	ft^2	(w/ ice)
$(EPA)_A$	5.250	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	201.644	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	45.429	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	12.603	lb	(service)
Ice Weight	207.186	lb	
Weight	304.786	lb	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	72.261		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	30.109		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	18.065		(service)
$G_h =$	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
$K_a =$	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)

Position	2	x	1
		x	
		x	
		x	

JACOBS™

WIND/ICE/SERVICE LOADING
ANTENNA MOUNTING SYSTEM
ANSI/TIA-222-H

Project Number:	ERCC0303
Site Name:	806366
Engineer:	AM
Date:	02/26/2019
Carrier:	AT&T
Reviewed By:	B. Bartlett

Input Data

Front

Manufacturer	**RAYCAP**		
Model #	**DC6-48-60-18-8F**		
Length	31.25	in	
Width	11	in	
Depth	11	in	
Weight	32.8	lb	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	2.841		(w/o ice)
Length / Width	2.521		(w/ ice)
C_a	1.215		(w/o ice)
C_a	1.201		(w/ ice)
C_a	1.215		(service)
$(EPA)_A$	2.611	ft^2	(w/o ice)
$(EPA)_A$	3.355	ft^2	(w/ ice)
$(EPA)_A$	2.611	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	100.273	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	22.374	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	6.267	lb	(service)
Ice Weight	61.622	lb	
Weight	94.422	lb	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	115.198		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	47.999		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	28.800		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)

Position	5	x	1
	6	x	1
		x	
		x	

Side

Manufacturer	RAYCAP		
Model #	DC6-48-60-18-8F		
Length	31.25	in	
Width	11	in	
Depth	11	in	
Weight	32.8	lb	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	2.841		(w/o ice)
Length / Width	2.521		(w/ ice)
C_a	1.215		(w/o ice)
C_a	1.201		(w/ ice)
C_a	1.215		(service)
$(EPA)_A$	2.611	ft^2	(w/o ice)
$(EPA)_A$	3.355	ft^2	(w/ ice)
$(EPA)_A$	2.611	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	100.273	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	22.374	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	6.267	lb	(service)
Ice Weight	61.622	lb	
Weight	94.422	lb	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	115.198		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	47.999		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	28.800		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)

Position	5	x	1
	6	x	1
		x	
		x	

JACOBS™

WIND/ICE/SERVICE LOADING
ANTENNA MOUNTING SYSTEM
ANSI/TIA-222-H

Project Number:	ERCC0303
Site Name:	806366
Engineer:	AM
Date:	02/26/2019
Carrier:	AT&T
Reviewed By:	B. Bartlett

Input Data

Front

Manufacturer	**POWERWAVE TECHNOLOGIES**		
Model #	**LGP17201**		
Length	14.4	in	
Width	13.9	in	
Depth	3.7	in	
Weight	31	lb	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	1.036		(w/o ice)
Length / Width	1.031		(w/ ice)
C_a	1.200		(w/o ice)
C_a	1.200		(w/ ice)
C_a	1.200		(service)
$(EPA)_A$	1.501	ft^2	(w/o ice)
$(EPA)_A$	2.033	ft^2	(w/ ice)
$(EPA)_A$	1.501	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	57.659	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	13.559	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	3.604	lb	(service)
Ice Weight	26.404	lb	
Weight	57.404	lb	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	145.568		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	60.654		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	36.392		(service)
$G_h =$	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
$K_a =$	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)

Position	1	x	2
		x	
		x	
		x	

Side

Manufacturer	POWERWAVE TECHNOLOGIES		
Model #	LGP17201		
Length	14.4	in	
Width	13.9	in	
Depth	3.7	in	
Weight	31	lb	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	3.892		(w/o ice)
Length / Width	2.778		(w/ ice)
C_a	1.262		(w/o ice)
C_a	1.212		(w/ ice)
C_a	1.262		(service)
$(EPA)_A$	0.420	ft^2	(w/o ice)
$(EPA)_A$	0.762	ft^2	(w/ ice)
$(EPA)_A$	0.420	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	16.139	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	5.083	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	1.009	lb	(service)
Ice Weight	26.404	lb	
Weight	57.404	lb	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	38.748		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	16.145		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	9.687		(service)
$G_h =$	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
$K_a =$	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)

Position	1	x	2
		x	
		x	
		x	

JACOBS™

WIND/ICE/SERVICE LOADING
ANTENNA MOUNTING SYSTEM
ANSI/TIA-222-H

Project Number:	ERCC0303
Site Name:	806366
Engineer:	AM
Date:	02/26/2019
Carrier:	AT&T
Reviewed By:	B. Bartlett

Input Data

Front

Manufacturer	**POWERWAVE TECHNOLOGIES**		
Model #	**LGP21903**		
Length	6.3	in	
Width	4.4	in	
Depth	3	in	
Weight	5.51	lb	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	1.432		(w/o ice)
Length / Width	1.283		(w/ ice)
C_a	1.200		(w/o ice)
C_a	1.200		(w/ ice)
C_a	1.200		(service)
$(EPA)_A$	0.208	ft^2	(w/o ice)
$(EPA)_A$	0.434	ft^2	(w/ ice)
$(EPA)_A$	0.208	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	7.985	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	2.895	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	0.499	lb	(service)
Ice Weight	4.819	lb	
Weight	10.329	lb	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	46.079		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	19.200		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	11.520		(service)
$G_h =$	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
$K_a =$	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)

Position	3	x	2
		x	
		x	
		x	

Side

Manufacturer	POWERWAVE TECHNOLOGIES		
Model #	LGP21903		
Length	6.3	in	
Width	4.4	in	
Depth	3	in	
Weight	5.51	lb	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	2.100		(w/o ice)
Length / Width	1.621		(w/ ice)
C_a	1.200		(w/o ice)
C_a	1.200		(w/ ice)
C_a	1.200		(service)
$(EPA)_A$	0.142	ft^2	(w/o ice)
$(EPA)_A$	0.344	ft^2	(w/ ice)
$(EPA)_A$	0.142	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	5.444	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	2.292	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	0.340	lb	(service)
Ice Weight	4.819	lb	
Weight	10.329	lb	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	31.418		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	13.091		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	7.854		(service)
$G_h =$	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
$K_a =$	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)

Position	3	x	2
		x	
		x	
		x	

JACOBS™

WIND/ICE/SERVICE LOADING
ANTENNA MOUNTING SYSTEM
ANSI/TIA-222-H

Project Number:	ERCC0303
Site Name:	806366
Engineer:	AM
Date:	02/26/2019
Carrier:	AT&T
Reviewed By:	B. Bartlett

Input Data

Front

Manufacturer	**ERICSSON**		
Model #	**RRUS 12**		
Length	20.4	in	
Width	18.5	in	
Depth	7.5	in	
Weight	58	lb	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	1.103		(w/o ice)
Length / Width	1.091		(w/ ice)
C_a	1.200		(w/o ice)
C_a	1.200		(w/ ice)
C_a	1.200		(service)
$(EPA)_A$	2.831	ft^2	(w/o ice)
$(EPA)_A$	3.547	ft^2	(w/ ice)
$(EPA)_A$	2.831	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	108.716	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	23.651	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	6.795	lb	(service)
Ice Weight	50.831	lb	
Weight	108.831	lb	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	193.742		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	80.726		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	48.436		(service)
$G_h =$	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
$K_a =$	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)

Position	1	x	1
		x	
		x	
		x	

Side

Manufacturer	ERICSSON		
Model #	RRUS 12		
Length	20.4	in	
Width	18.5	in	
Depth	7.5	in	
Weight	58	lb	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	2.720		(w/o ice)
Length / Width	2.314		(w/ ice)
C_a	1.210		(w/o ice)
C_a	1.200		(w/ ice)
C_a	1.210		(service)
$(EPA)_A$	1.157	ft^2	(w/o ice)
$(EPA)_A$	1.673	ft^2	(w/ ice)
$(EPA)_A$	1.157	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	44.433	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	11.154	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	2.777	lb	(service)
Ice Weight	50.831	lb	
Weight	108.831	lb	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	78.544		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	32.727		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	19.636		(service)
$G_h =$	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
$K_a =$	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)

Position	1	x	1
		x	
		x	
		x	

JACOBS™

WIND/ICE/SERVICE LOADING
ANTENNA MOUNTING SYSTEM
ANSI/TIA-222-H

Project Number:	ERCC0303
Site Name:	806366
Engineer:	AM
Date:	02/26/2019
Carrier:	AT&T
Reviewed By:	B. Bartlett

Input Data

Front

Manufacturer	**ERICSSON**		
Model #	**RRUS 4449 B5/B12**		
Length	17.9	in	
Width	13.19	in	
Depth	9.44	in	
Weight	71	lb	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	1.357		(w/o ice)
Length / Width	1.304		(w/ ice)
C_a	1.200		(w/o ice)
C_a	1.200		(w/ ice)
C_a	1.200		(service)
$(EPA)_A$	1.771	ft^2	(w/o ice)
$(EPA)_A$	2.351	ft^2	(w/ ice)
$(EPA)_A$	1.771	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	68.013	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	15.680	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	4.251	lb	(service)
Ice Weight	36.699	lb	
Weight	107.699	lb	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	138.133		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	57.555		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	34.533		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)

Position	2	x	1
		x	
		x	
		x	

Side

Manufacturer	ERICSSON		
Model #	RRUS 4449 B5/B12		
Length	17.9	in	
Width	13.19	in	
Depth	9.44	in	
Weight	71	lb	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	1.896		(w/o ice)
Length / Width	1.720		(w/ ice)
C_a	1.200		(w/o ice)
C_a	1.200		(w/ ice)
C_a	1.200		(service)
$(EPA)_A$	1.267	ft^2	(w/o ice)
$(EPA)_A$	1.783	ft^2	(w/ ice)
$(EPA)_A$	1.267	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	48.676	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	11.888	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	3.042	lb	(service)
Ice Weight	36.699	lb	
Weight	107.699	lb	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	98.861		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	41.192		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	24.715		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)

Position	2	x	1
		x	
		x	
		x	

JACOBS™

WIND/ICE/SERVICE LOADING
ANTENNA MOUNTING SYSTEM
ANSI/TIA-222-H

Project Number:	ERCC0303
Site Name:	806366
Engineer:	AM
Date:	02/26/2019
Carrier:	AT&T
Reviewed By:	B. Bartlett

Input Data

Front

Manufacturer	**ERICSSON**		
Model #	**RRUS 32**		
Length	27.56	in	
Width	12.44	in	
Depth	7.4	in	
Weight	55.12	lb	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	2.215		(w/o ice)
Length / Width	2.025		(w/ ice)
C_a	1.200		(w/o ice)
C_a	1.200		(w/ ice)
C_a	1.200		(service)
$(EPA)_A$	2.571	ft^2	(w/o ice)
$(EPA)_A$	3.307	ft^2	(w/ ice)
$(EPA)_A$	2.571	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	98.762	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	22.051	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	6.173	lb	(service)
Ice Weight	50.829	lb	
Weight	105.949	lb	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	130.279		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	54.283		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	32.570		(service)
$G_h =$	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
$K_a =$	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)

Position	2	x	1
		x	
		x	
		x	

Side

Manufacturer	ERICSSON		
Model #	RRUS 32		
Length	27.56	in	
Width	12.44	in	
Depth	7.4	in	
Weight	55.12	lb	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	3.724		(w/o ice)
Length / Width	3.075		(w/ ice)
C_a	1.254		(w/o ice)
C_a	1.226		(w/ ice)
C_a	1.254		(service)
$(EPA)_A$	1.599	ft^2	(w/o ice)
$(EPA)_A$	2.224	ft^2	(w/ ice)
$(EPA)_A$	1.599	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	61.413	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	14.829	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	3.838	lb	(service)
Ice Weight	50.829	lb	
Weight	105.949	lb	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	77.497		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	32.290		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	19.374		(service)
$G_h =$	1.00		
$K_d =$	0.95		
$K_s =$	1.00		
$K_a =$	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)

Position	2	x	1
		x	
		x	
		x	

JACOBS™

WIND/ICE/SERVICE LOADING
ANTENNA MOUNTING SYSTEM
ANSI/TIA-222-H

Project Number:	ERCC0303
Site Name:	806366
Engineer:	AM
Date:	02/26/2019
Carrier:	AT&T
Reviewed By:	B. Bartlett

Input Data

Front

Manufacturer	**POWERWAVE TECHNOLOGIES**		
Model #	**1001940**		
Length	5.7	in	
Width	3.7	in	
Depth	1.7	in	
Weight	2	lb	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	1.541		(w/o ice)
Length / Width	1.332		(w/ ice)
C_a	1.200		(w/o ice)
C_a	1.200		(w/ ice)
C_a	1.200		(service)
$(EPA)_A$	0.158	ft^2	(w/o ice)
$(EPA)_A$	0.362	ft^2	(w/ ice)
$(EPA)_A$	0.158	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	6.075	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	2.413	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	0.380	lb	(service)
Ice Weight	3.517	lb	
Weight	5.517	lb	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	38.748		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	16.145		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	9.687		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)

Position	3	x	1
		x	
		x	
		x	

Side

Manufacturer	POWERWAVE TECHNOLOGIES		
Model #	1001940		
Length	5.7	in	
Width	3.7	in	
Depth	1.7	in	
Weight	2	lb	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	3.353		(w/o ice)
Length / Width	1.996		(w/ ice)
C_a	1.238		(w/o ice)
C_a	1.200		(w/ ice)
C_a	1.238		(service)
$(EPA)_A$	0.075	ft^2	(w/o ice)
$(EPA)_A$	0.242	ft^2	(w/ ice)
$(EPA)_A$	0.075	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	2.880	lb	(w/o ice)
$F_A = q_z G_h (EPA)_A$	1.611	lb	(w/ ice)
$F_A = q_z G_h (EPA)_A$	0.180	lb	(service)
Ice Weight	3.517	lb	
Weight	5.517	lb	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	17.803		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	7.418		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	4.451		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)

Position	3	x	1
		x	
		x	
		x	

JACOBS™

WIND/ICE/SERVICE LOADING
ANTENNA MOUNTING SYSTEM
ANSI/TIA-222-H

Project Number:	ERCC0303
Site Name:	806366
Engineer:	AM
Date:	02/26/2019
Carrier:	AT&T
Reviewed By:	B. Bartlett

Input Data

Front

Member	**Antenna Pipe A**		
Size	**Pipe 2.0**		
Length	72	in	
Width	2.38	in	
Depth	2.38	in	
Weight	0	lb/ft	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	R	(R / F / S)	
Length / Width	30.252		(w/o ice)
Length / Width	15.821		(w/ ice)
C_a	1.200		(w/o ice)
C_a	0.996		(w/ ice)
C_a	1.200		(service)
$(EPA)_A$	1.285	ft^2	(w/o ice)
$(EPA)_A$	2.173	ft^2	(w/ ice)
$(EPA)_A$	1.285	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	0.686	lb/in	(w/o ice)
$F_A = q_z G_h (EPA)_A$	0.201	lb/in	(w/ ice)
$F_A = q_z G_h (EPA)_A$	0.043	lb/in	(service)
Ice Weight	0.534	lb/in	
Weight	0.534	lb/in	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	24.925		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	10.385		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	6.231		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)
Quantity	12		(18 max)

Side

Member	Antenna Pipe A		
Size	Pipe 2.0		
Length	72	in	
Width	2.38	in	
Depth	2.38	in	
Weight	0	lb/ft	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	R	(R / F / S)	
Length / Width	30.252		(w/o ice)
Length / Width	15.821		(w/ ice)
C_a	1.200		(w/o ice)
C_a	0.996		(w/ ice)
C_a	1.200		(service)
$(EPA)_A$	1.285	ft^2	(w/o ice)
$(EPA)_A$	2.173	ft^2	(w/ ice)
$(EPA)_A$	1.285	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	0.686	lb/in	(w/o ice)
$F_A = q_z G_h (EPA)_A$	0.201	lb/in	(w/ ice)
$F_A = q_z G_h (EPA)_A$	0.043	lb/in	(service)
Ice Weight	0.534	lb/in	
Weight	0.534	lb/in	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	24.925		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	10.385		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	6.231		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)
Quantity	12		(18 max)

JACOBS™

WIND/ICE/SERVICE LOADING
ANTENNA MOUNTING SYSTEM
ANSI/TIA-222-H

Project Number:	ERCC0303
Site Name:	806366
Engineer:	AM
Date:	02/26/2019
Carrier:	AT&T
Reviewed By:	B. Bartlett

Input Data

Front

Member Size	**Antenna Pipe B** **Pipe 2.0**		
Length	36	in	
Width	2.38	in	
Depth	2.38	in	
Weight	0	lb/ft	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	R	(R / F / S)	
Length / Width	15.126		(w/o ice)
Length / Width	8.157		(w/ ice)
C_a	0.981		(w/o ice)
C_a	0.826		(w/ ice)
C_a	0.981		(service)
$(EPA)_A$	0.525	ft^2	(w/o ice)
$(EPA)_A$	0.929	ft^2	(w/ ice)
$(EPA)_A$	0.525	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	0.560	lb/in	(w/o ice)
$F_A = q_z G_h (EPA)_A$	0.172	lb/in	(w/ ice)
$F_A = q_z G_h (EPA)_A$	0.035	lb/in	(service)
Ice Weight	0.534	lb/in	
Weight	0.534	lb/in	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	24.925		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	10.385		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	6.231		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)
Quantity	1		(18 max)

Side

Member Size	Antenna Pipe B Pipe 2.0		
Length	36	in	
Width	2.38	in	
Depth	2.38	in	
Weight	0	lb/ft	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	R	(R / F / S)	
Length / Width	15.126		(w/o ice)
Length / Width	8.157		(w/ ice)
C_a	0.981		(w/o ice)
C_a	0.826		(w/ ice)
C_a	0.981		(service)
$(EPA)_A$	0.525	ft^2	(w/o ice)
$(EPA)_A$	0.929	ft^2	(w/ ice)
$(EPA)_A$	0.525	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	0.560	lb/in	(w/o ice)
$F_A = q_z G_h (EPA)_A$	0.172	lb/in	(w/ ice)
$F_A = q_z G_h (EPA)_A$	0.035	lb/in	(service)
Ice Weight	0.534	lb/in	
Weight	0.534	lb/in	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	24.925		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	10.385		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	6.231		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)
Quantity	1		(18 max)

JACOBS™

WIND/ICE/SERVICE LOADING
ANTENNA MOUNTING SYSTEM
ANSI/TIA-222-H

Project Number:	ERCC0303
Site Name:	806366
Engineer:	AM
Date:	02/26/2019
Carrier:	AT&T
Reviewed By:	B. Bartlett

Input Data

Front

Member Size	**Diagonal L2x2**		
Length	61	in	
Width	2	in	
Depth	2	in	
Weight	0	lb/ft	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	30.500		(w/o ice)
Length / Width	14.665		(w/ ice)
C_a	2.000		(w/o ice)
C_a	1.656		(w/ ice)
C_a	2.000		(service)
$(EPA)_A$	1.525	ft^2	(w/o ice)
$(EPA)_A$	2.829	ft^2	(w/ ice)
$(EPA)_A$	1.525	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	0.960	lb/in	(w/o ice)
$F_A = q_z G_h (EPA)_A$	0.309	lb/in	(w/ ice)
$F_A = q_z G_h (EPA)_A$	0.060	lb/in	(service)
Ice Weight	0.470	lb/in	
Weight	0.470	lb/in	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	20.945		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	8.727		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	5.236		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)
Quantity	12		(12 max)

Side

Member Size	Diagonal L2x2		
Length	61	in	
Width	2	in	
Depth	2	in	
Weight	0	lb/ft	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	30.500		(w/o ice)
Length / Width	14.665		(w/ ice)
C_a	2.000		(w/o ice)
C_a	1.656		(w/ ice)
C_a	2.000		(service)
$(EPA)_A$	1.525	ft^2	(w/o ice)
$(EPA)_A$	2.829	ft^2	(w/ ice)
$(EPA)_A$	1.525	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	0.960	lb/in	(w/o ice)
$F_A = q_z G_h (EPA)_A$	0.309	lb/in	(w/ ice)
$F_A = q_z G_h (EPA)_A$	0.060	lb/in	(service)
Ice Weight	0.470	lb/in	
Weight	0.470	lb/in	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	20.945		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	8.727		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	5.236		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)
Quantity	12		(12 max)

JACOBS™

WIND/ICE/SERVICE LOADING
ANTENNA MOUNTING SYSTEM
ANSI/TIA-222-H

Project Number:	ERCC0303
Site Name:	806366
Engineer:	AM
Date:	02/26/2019
Carrier:	AT&T
Reviewed By:	B. Bartlett

Input Data

Front

Member Size	**Horizontal L5x5**		
Length	232	in	
Width	5	in	
Depth	5	in	
Weight	0	lb/ft	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	46.400		(w/o ice)
Length / Width	32.022		(w/ ice)
C_a	2.000		(w/o ice)
C_a	2.000		(w/ ice)
C_a	2.000		(service)
$(EPA)_A$	14.500	ft^2	(w/o ice)
$(EPA)_A$	21.433	ft^2	(w/ ice)
$(EPA)_A$	14.500	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	2.401	lb/in	(w/o ice)
$F_A = q_z G_h (EPA)_A$	0.616	lb/in	(w/ ice)
$F_A = q_z G_h (EPA)_A$	0.150	lb/in	(service)
Ice Weight	0.971	lb/in	
Weight	0.971	lb/in	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	52.363		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	21.818		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	13.091		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)
Quantity	6		(18 max)

Side

Member Size	Horizontal L5x5		
Length	232	in	
Width	5	in	
Depth	5	in	
Weight	0	lb/ft	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	46.400		(w/o ice)
Length / Width	32.022		(w/ ice)
C_a	2.000		(w/o ice)
C_a	2.000		(w/ ice)
C_a	2.000		(service)
$(EPA)_A$	14.500	ft^2	(w/o ice)
$(EPA)_A$	21.433	ft^2	(w/ ice)
$(EPA)_A$	14.500	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	2.401	lb/in	(w/o ice)
$F_A = q_z G_h (EPA)_A$	0.616	lb/in	(w/ ice)
$F_A = q_z G_h (EPA)_A$	0.150	lb/in	(service)
Ice Weight	0.971	lb/in	
Weight	0.971	lb/in	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	52.363		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	21.818		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	13.091		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)
Quantity	6		(18 max)

JACOBS™

WIND/ICE/SERVICE LOADING
ANTENNA MOUNTING SYSTEM
ANSI/TIA-222-H

Project Number:	ERCC0303
Site Name:	806366
Engineer:	AM
Date:	02/26/2019
Carrier:	AT&T
Reviewed By:	B. Bartlett

Input Data

Front

Member Size	**End Pipe** **Pipe 2.5**		
Length	72	in	
Width	2.88	in	
Depth	2.88	in	
Weight	0	lb/ft	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	R	(R / F / S)	
Length / Width	25.000		(w/o ice)
Length / Width	14.299		(w/ ice)
C_a	1.200		(w/o ice)
C_a	0.962		(w/ ice)
C_a	1.200		(service)
$(EPA)_A$	1.555	ft^2	(w/o ice)
$(EPA)_A$	2.323	ft^2	(w/ ice)
$(EPA)_A$	1.555	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	0.830	lb/in	(w/o ice)
$F_A = q_z G_h (EPA)_A$	0.215	lb/in	(w/ ice)
$F_A = q_z G_h (EPA)_A$	0.052	lb/in	(service)
Ice Weight	0.617	lb/in	
Weight	0.617	lb/in	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	30.161		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	12.567		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	7.540		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)
Quantity	3		(12 max)

Side

Member Size	End Pipe Pipe 2.5		
Length	72	in	
Width	2.88	in	
Depth	2.88	in	
Weight	0	lb/ft	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	R	(R / F / S)	
Length / Width	25.000		(w/o ice)
Length / Width	14.299		(w/ ice)
C_a	1.200		(w/o ice)
C_a	0.962		(w/ ice)
C_a	1.200		(service)
$(EPA)_A$	1.555	ft^2	(w/o ice)
$(EPA)_A$	2.323	ft^2	(w/ ice)
$(EPA)_A$	1.555	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	0.830	lb/in	(w/o ice)
$F_A = q_z G_h (EPA)_A$	0.215	lb/in	(w/ ice)
$F_A = q_z G_h (EPA)_A$	0.052	lb/in	(service)
Ice Weight	0.617	lb/in	
Weight	0.617	lb/in	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	30.161		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	12.567		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	7.540		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)
Quantity	3		(12 max)

JACOBS™

WIND/ICE/SERVICE LOADING
ANTENNA MOUNTING SYSTEM
ANSI/TIA-222-H

Project Number:	ERCC0303
Site Name:	806366
Engineer:	AM
Date:	02/26/2019
Carrier:	AT&T
Reviewed By:	B. Bartlett

Input Data

Front

Member Size	**Vertical L2x2**		
Length	48	in	
Width	2	in	
Depth	2	in	
Weight	0	lb/ft	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	24.000		(w/o ice)
Length / Width	11.654		(w/ ice)
C_a	1.967		(w/o ice)
C_a	1.555		(w/ ice)
C_a	1.967		(service)
$(EPA)_A$	1.180	ft^2	(w/o ice)
$(EPA)_A$	2.112	ft^2	(w/ ice)
$(EPA)_A$	1.180	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	0.944	lb/in	(w/o ice)
$F_A = q_z G_h (EPA)_A$	0.293	lb/in	(w/ ice)
$F_A = q_z G_h (EPA)_A$	0.059	lb/in	(service)
Ice Weight	0.470	lb/in	
Weight	0.470	lb/in	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	20.945		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	8.727		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	5.236		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)
Quantity	3		(18 max)

Side

Member Size	Vertical L2x2		
Length	48	in	
Width	2	in	
Depth	2	in	
Weight	0	lb/ft	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	24.000		(w/o ice)
Length / Width	11.654		(w/ ice)
C_a	1.967		(w/o ice)
C_a	1.555		(w/ ice)
C_a	1.967		(service)
$(EPA)_A$	1.180	ft^2	(w/o ice)
$(EPA)_A$	2.112	ft^2	(w/ ice)
$(EPA)_A$	1.180	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	0.944	lb/in	(w/o ice)
$F_A = q_z G_h (EPA)_A$	0.293	lb/in	(w/ ice)
$F_A = q_z G_h (EPA)_A$	0.059	lb/in	(service)
Ice Weight	0.470	lb/in	
Weight	0.470	lb/in	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	20.945		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	8.727		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	5.236		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)
Quantity	3		(18 max)

JACOBS™

WIND/ICE/SERVICE LOADING
ANTENNA MOUNTING SYSTEM
ANSI/TIA-222-H

Project Number:	ERCC0303
Site Name:	806366
Engineer:	AM
Date:	02/26/2019
Carrier:	AT&T
Reviewed By:	B. Bartlett

Input Data

Front

Member	**Standoff**		
Size	**HSS 5x5**		
Length	90	in	
Width	5	in	
Depth	5	in	
Weight	0	lb/ft	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	S	(R / F / S)	
Length / Width	18.000		(w/o ice)
Length / Width	12.616		(w/ ice)
C_a	1.114		(w/o ice)
C_a	1.009		(w/ ice)
C_a	1.114		(service)
$(EPA)_A$	3.133	ft^2	(w/o ice)
$(EPA)_A$	4.261	ft^2	(w/ ice)
$(EPA)_A$	3.133	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	1.337	lb/in	(w/o ice)
$F_A = q_z G_h (EPA)_A$	0.316	lb/in	(w/ ice)
$F_A = q_z G_h (EPA)_A$	0.084	lb/in	(service)
Ice Weight	0.971	lb/in	
Weight	0.971	lb/in	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	52.363		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	21.818		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	13.091		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)
Quantity	3		(12 max)

Side

Member	Standoff		
Size	HSS 5x5		
Length	90	in	
Width	5	in	
Depth	5	in	
Weight	0	lb/ft	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	S	(R / F / S)	
Length / Width	18.000		(w/o ice)
Length / Width	12.616		(w/ ice)
C_a	1.114		(w/o ice)
C_a	1.009		(w/ ice)
C_a	1.114		(service)
$(EPA)_A$	3.133	ft^2	(w/o ice)
$(EPA)_A$	4.261	ft^2	(w/ ice)
$(EPA)_A$	3.133	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	1.337	lb/in	(w/o ice)
$F_A = q_z G_h (EPA)_A$	0.316	lb/in	(w/ ice)
$F_A = q_z G_h (EPA)_A$	0.084	lb/in	(service)
Ice Weight	0.971	lb/in	
Weight	0.971	lb/in	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	52.363		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	21.818		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	13.091		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)
Quantity	3		(12 max)

JACOBS™

WIND/ICE/SERVICE LOADING
ANTENNA MOUNTING SYSTEM
ANSI/TIA-222-H

Project Number:	ERCC0303
Site Name:	806366
Engineer:	AM
Date:	02/26/2019
Carrier:	AT&T
Reviewed By:	B. Bartlett

Input Data

Front

Member Size	**Vertical L2x2**		
Length	48	in	
Width	2	in	
Depth	2	in	
Weight	0	lb/ft	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	24.000		(w/o ice)
Length / Width	11.654		(w/ ice)
C_a	1.967		(w/o ice)
C_a	1.555		(w/ ice)
C_a	1.967		(service)
$(EPA)_A$	1.180	ft^2	(w/o ice)
$(EPA)_A$	2.112	ft^2	(w/ ice)
$(EPA)_A$	1.180	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	0.944	lb/in	(w/o ice)
$F_A = q_z G_h (EPA)_A$	0.293	lb/in	(w/ ice)
$F_A = q_z G_h (EPA)_A$	0.059	lb/in	(service)
Ice Weight	0.470	lb/in	
Weight	0.470	lb/in	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	20.945		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	8.727		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	5.236		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.41	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.67	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.40	psf	(service)
Quantity	12		(12 max)

Side

Member Size	Vertical L2x2		
Length	48	in	
Width	2	in	
Depth	2	in	
Weight	0	lb/ft	
Design Ice Thickness (t_i)	1	in	
Structure Type	M	(S, G, M, B)	
Structure Height (h)	155.5	ft	
Antenna Centerline (z)	144	ft	
Basic Wind Speed (V)	120	mph	(w/o ice)
Basic Wind Speed (V_i)	50	mph	(w/ ice)
Basic Wind Speed (V_s)	30	mph	(service)
Risk Category	II	(I, II, III, IV)	
Exposure Category	B	(B, C or D)	
Topographic Category	1	(1, 2, 3 or 4)	
Crest Height (H)	0	ft	
Shape	F	(R / F / S)	
Length / Width	24.000		(w/o ice)
Length / Width	11.654		(w/ ice)
C_a	1.967		(w/o ice)
C_a	1.555		(w/ ice)
C_a	1.967		(service)
$(EPA)_A$	1.180	ft^2	(w/o ice)
$(EPA)_A$	2.112	ft^2	(w/ ice)
$(EPA)_A$	1.180	ft^2	(service)
$F_A = q_z G_h (EPA)_A$	0.944	lb/in	(w/o ice)
$F_A = q_z G_h (EPA)_A$	0.293	lb/in	(w/ ice)
$F_A = q_z G_h (EPA)_A$	0.059	lb/in	(service)
Ice Weight	0.470	lb/in	
Weight	0.470	lb/in	(w/ ice)

Equations

$K_z = 2.01[z/z_g]^{(2/\alpha)}$	1.097		$K_{zmin} \le K_z \le 2.01$
$K_h = e^{[(f)(z)/H]}$	1.000		
$K_{zt} = [1+(K_c K_t)/K_h]^2$	1.000		
$K_{iz} = [z/33]^{(0.10)}$	1.159		$K_{iz} \le 1.4$
$t_{iz} = (t_i)(I)(K_{iz})(K_{zt})^{(0.35)}$	1.159	in	(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	20.945		(w/o ice)
$C = (K_{zt}K_zK_e)^{0.5}(V_i)(D)$	8.727		(w/ ice)
$C = (K_{zt}K_zK_e)^{0.5}(V)(D)$	5.236		(service)
G_h =	1.00		
K_d =	0.95		
K_s =	1.00		
K_a =	0.90		
$K_e = e^{-0.0000362zs}$	1.00		
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV^2$	38.409	psf	(w/o ice)
$q_z = 0.00256K_zK_{zt}K_eK_dV_i^2$	6.668	psf	(w/ ice)
$q_z = 0.00256K_zK_{zt}K_sK_eK_dV_s^2$	2.401	psf	(service)
Quantity	12		(12 max)

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(M...	Surface...
1	DEAD LOAD	None			-1		29		6	
2	DEAD LOAD (ICE)	None					29	52	6	
3	WIND LOAD (NO ICE) FRONT	None					29	52		
4	WIND LOAD (NO ICE) SIDE	None					29	52		
5	WIND LOAD (ICE) FRONT	None					29	52		
6	WIND LOAD (ICE) SIDE	None					29	52		
7	LIVE LOAD (MAN)	None							6	
8	WIND LOAD (SERVICE) FRO...	None					29	52		
9	WIND LOAD (SERVICE) SIDE	None					29	52		
10	LIVE LOAD (SERVICE)	None					3			
11	SEISMIC LOAD (LATERAL) F...	None								
12	SEISMIC LOAD (LATERAL) S...	None								
13	BLC 1 Transient Area Loads	None						63		
14	BLC 2 Transient Area Loads	None						63		
15	BLC 7 Transient Area Loads	None						63		

Load Combinations

	Description	Solve	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	DEAD LOAD	Yes	Y		1	1.4																				
2	DEAD LOAD + WIND LOAD (NO ICE) 0 D...	Yes	Y		1	1.2			3	1	4															
3	DEAD LOAD + WIND LOAD (NO ICE) 30 ...	Yes	Y		1	1.2			3	.866	4	.5														
4	DEAD LOAD + WIND LOAD (NO ICE) 60 ...	Yes	Y		1	1.2			3	.5	4	.866														
5	DEAD LOAD + WIND LOAD (NO ICE) 90 ...	Yes	Y		1	1.2			3		4	1														
6	DEAD LOAD + WIND LOAD (NO ICE) 120...	Yes	Y		1	1.2			3	-.5	4	.866														
7	DEAD LOAD + WIND LOAD (NO ICE) 150...	Yes	Y		1	1.2			3	-.8...	4	.5														
8	DEAD LOAD + WIND LOAD (NO ICE) 180...	Yes	Y		1	1.2			3	-1	4															
9	DEAD LOAD + WIND LOAD (NO ICE) 210...	Yes	Y		1	1.2			3	-.8...	4	-.5														
10	DEAD LOAD + WIND LOAD (NO ICE) 240...	Yes	Y		1	1.2			3	-.5	4	-.8...														
11	DEAD LOAD + WIND LOAD (NO ICE) 270...	Yes	Y		1	1.2			3		4	-1														
12	DEAD LOAD + WIND LOAD (NO ICE) 300...	Yes	Y		1	1.2			3	.5	4	-.8...														
13	DEAD LOAD + WIND LOAD (NO ICE) 330...	Yes	Y		1	1.2			3	.866	4	-.5														
14	DEAD LOAD + DEAD LOAD (ICE) + WIN...	Yes	Y		1	1.2	2	1					5	1	6											
15	DEAD LOAD + DEAD LOAD (ICE) + WIN...	Yes	Y		1	1.2	2	1					5	.866	6	.5										
16	DEAD LOAD + DEAD LOAD (ICE) + WIN...	Yes	Y		1	1.2	2	1					5	.5	6	.866										
17	DEAD LOAD + DEAD LOAD (ICE) + WIN...	Yes	Y		1	1.2	2	1					5		6	1										
18	DEAD LOAD + DEAD LOAD (ICE) + WIN...	Yes	Y		1	1.2	2	1					5	-.5	6	.866										
19	DEAD LOAD + DEAD LOAD (ICE) + WIN...	Yes	Y		1	1.2	2	1					5	-.8...	6	.5										
20	DEAD LOAD + DEAD LOAD (ICE) + WIN...	Yes	Y		1	1.2	2	1					5	-1	6											
21	DEAD LOAD + DEAD LOAD (ICE) + WIN...	Yes	Y		1	1.2	2	1					5	-.8...	6	-.5										
22	DEAD LOAD + DEAD LOAD (ICE) + WIN...	Yes	Y		1	1.2	2	1					5	-.5	6	-.8...										
23	DEAD LOAD + DEAD LOAD (ICE) + WIN...	Yes	Y		1	1.2	2	1					5		6	-1										
24	DEAD LOAD + DEAD LOAD (ICE) + WIN...	Yes	Y		1	1.2	2	1					5	.5	6	-.8...										
25	DEAD LOAD + DEAD LOAD (ICE) + WIN...	Yes	Y		1	1.2	2	1					5	.866	6	-.5										
26	DEAD LOAD + LIVE LOAD (MAN)	Yes	Y		1	1.2											7	1.5								
27	DEAD LOAD + LIVE LOAD (SERVICE) + ...	Yes	Y		1	1.2													8	1	9		10	1.5		
28	DEAD LOAD + LIVE LOAD (SERVICE) + ...	Yes	Y		1	1.2													8	.866	9	.5	10	1.5		
29	DEAD LOAD + LIVE LOAD (SERVICE) + ...	Yes	Y		1	1.2													8	.5	9	.866	10	1.5		
30	DEAD LOAD + LIVE LOAD (SERVICE) + ...	Yes	Y		1	1.2													8		9	1	10	1.5		
31	DEAD LOAD + LIVE LOAD (SERVICE) + ...	Yes	Y		1	1.2													8	-.5	9	.866	10	1.5		
32	DEAD LOAD + LIVE LOAD (SERVICE) + ...	Yes	Y		1	1.2													8	-.8...	9	.5	10	1.5		
33	DEAD LOAD + LIVE LOAD (SERVICE) + ...	Yes	Y		1	1.2													8	-1	9		10	1.5		
34	DEAD LOAD + LIVE LOAD (SERVICE) + ...	Yes	Y		1	1.2													8	-.8...	9	-.5	10	1.5		
35	DEAD LOAD + LIVE LOAD (SERVICE) + ...	Yes	Y		1	1.2													8	-.5	9	-.8...	10	1.5		
36	DEAD LOAD + LIVE LOAD (SERVICE) + ...	Yes	Y		1	1.2													8		9	-1	10	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...
37	DEAD LOAD + LIVE LOAD (SERVICE) + ...	Yes	Y		1	1.2													8	.5	9	-.8...	10	1.5
38	DEAD LOAD + LIVE LOAD (SERVICE) + ...	Yes	Y		1	1.2													8	.866	9	-.5	10	1.5
39	DEAD LOAD + SEISMIC LOAD (VERTICA...	Yes	Y		1	1.2	1				11	1	12											
40	DEAD LOAD + SEISMIC LOAD (VERTICA...	Yes	Y		1	1.2	1				11	.866	12	.5										
41	DEAD LOAD + SEISMIC LOAD (VERTICA...	Yes	Y		1	1.2	1				11	.5	12	.866										
42	DEAD LOAD + SEISMIC LOAD (VERTICA...	Yes	Y		1	1.2	1				11		12	1										
43	DEAD LOAD + SEISMIC LOAD (VERTICA...	Yes	Y		1	1.2	1				11	-.5	12	.866										
44	DEAD LOAD + SEISMIC LOAD (VERTICA...	Yes	Y		1	1.2	1				11	-.8...	12	.5										
45	DEAD LOAD + SEISMIC LOAD (VERTICA...	Yes	Y		1	1.2	1				11	-1	12											
46	DEAD LOAD + SEISMIC LOAD (VERTICA...	Yes	Y		1	1.2	1				11	-.8...	12	-.5										
47	DEAD LOAD + SEISMIC LOAD (VERTICA...	Yes	Y		1	1.2	1				11	-.5	12	-.8...										
48	DEAD LOAD + SEISMIC LOAD (VERTICA...	Yes	Y		1	1.2	1				11		12	-1										
49	DEAD LOAD + SEISMIC LOAD (VERTICA...	Yes	Y		1	1.2	1				11	.5	12	-.8...										
50	DEAD LOAD + SEISMIC LOAD (VERTICA...	Yes	Y		1	1.2	1				11	.866	12	-.5										

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N85	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N86	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N87	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4	N154						
5	N155						
6	N73						
7	N172						

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Horizontal	L5X5X6	Beam	Single Angle	A36 Gr.36	Typical	3.65	8.76	8.76	.183
2	End Plate	PL10"x3/8"	Beam	RECT	A36 Gr.36	Typical	3.75	.044	31.25	.172
3	Brace	L2x2x3	Beam	Single Angle	A36 Gr.36	Typical	.722	.271	.271	.009
4	Standoff	HSS5X5X5	Beam	SquareTube	A500 Gr.B ...	Typical	5.26	19	19	31.2
5	Antenna Pipe A	PIPE_2.0	Column	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
6	Diagonal	L2x2x3	VBrace	Single Angle	A36 Gr.36	Typical	.722	.271	.271	.009
7	Vertical	L2x2x3	Column	Single Angle	A36 Gr.36	Typical	.722	.271	.271	.009
8	Antenna Pipe B	PIPE_2.0	Column	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
9	Other	L3.5X3.5X4	Beam	Single Angle	A36 Gr.36	Typical	1.7	2	2	.039
10	End Pipe	PIPE_2.5	Column	Pipe	A53 Gr.B	Typical	1.61	1.45	1.45	2.89

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N6	N159			Antenna Pipe A	Column	Pipe	A53 Gr.B	Typical
2	M2	N1	N166			Antenna Pipe A	Column	Pipe	A53 Gr.B	Typical
3	M3	N12	N165			Antenna Pipe A	Column	Pipe	A53 Gr.B	Typical
4	M4	N7	N160			Antenna Pipe A	Column	Pipe	A53 Gr.B	Typical
5	M5	N9	N162			Antenna Pipe A	Column	Pipe	A53 Gr.B	Typical
6	M6	N8	N161			Antenna Pipe A	Column	Pipe	A53 Gr.B	Typical
7	M7	N4	N157			Antenna Pipe A	Column	Pipe	A53 Gr.B	Typical
8	M8	N5	N158			Antenna Pipe A	Column	Pipe	A53 Gr.B	Typical
9	M9	N3	N167			Antenna Pipe A	Column	Pipe	A53 Gr.B	Typical
10	M10	N11	N164			Antenna Pipe A	Column	Pipe	A53 Gr.B	Typical
11	M11	N2	N168			Antenna Pipe A	Column	Pipe	A53 Gr.B	Typical
12	M12	N10	N163			Antenna Pipe A	Column	Pipe	A53 Gr.B	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
13	M13	N73	N172			Antenna Pipe B	Column	Pipe	A53 Gr.B	Typical
14	M14	N98	N96			Brace	Beam	Single Angle	A36 Gr.36	Typical
15	M15	N97	N93			Brace	Beam	Single Angle	A36 Gr.36	Typical
16	M16	N102	N95			Brace	Beam	Single Angle	A36 Gr.36	Typical
17	M17	N101	N92			Brace	Beam	Single Angle	A36 Gr.36	Typical
18	M18	N94	N100			Brace	Beam	Single Angle	A36 Gr.36	Typical
19	M19	N91	N99			Brace	Beam	Single Angle	A36 Gr.36	Typical
20	M20	N34	N115			Diagonal	VBrace	Single Angle	A36 Gr.36	Typical
21	M21	N35	N116			Diagonal	VBrace	Single Angle	A36 Gr.36	Typical
22	M22	N117	N36			Diagonal	VBrace	Single Angle	A36 Gr.36	Typical
23	M23	N118	N37			Diagonal	VBrace	Single Angle	A36 Gr.36	Typical
24	M24	N38	N119			Diagonal	VBrace	Single Angle	A36 Gr.36	Typical
25	M25	N39	N120			Diagonal	VBrace	Single Angle	A36 Gr.36	Typical
26	M26	N121	N40			Diagonal	VBrace	Single Angle	A36 Gr.36	Typical
27	M27	N122	N41			Diagonal	VBrace	Single Angle	A36 Gr.36	Typical
28	M28	N42	N123			Diagonal	VBrace	Single Angle	A36 Gr.36	Typical
29	M29	N43	N124			Diagonal	VBrace	Single Angle	A36 Gr.36	Typical
30	M30	N125	N44			Diagonal	VBrace	Single Angle	A36 Gr.36	Typical
31	M31	N126	N45			Diagonal	VBrace	Single Angle	A36 Gr.36	Typical
32	M32	N15	N171			End Pipe	Column	Pipe	A53 Gr.B	Typical
33	M33	N13	N169			End Pipe	Column	Pipe	A53 Gr.B	Typical
34	M34	N14	N170			End Pipe	Column	Pipe	A53 Gr.B	Typical
35	M35	N75	N76			End Plate	Beam	RECT	A36 Gr.36	Typical
36	M36	N78	N79			End Plate	Beam	RECT	A36 Gr.36	Typical
37	M37	N81	N82			End Plate	Beam	RECT	A36 Gr.36	Typical
38	M38	N17	N16			End Plate	Beam	RECT	A36 Gr.36	Typical
39	M39	N18	N19			End Plate	Beam	RECT	A36 Gr.36	Typical
40	M40	N20	N21			End Plate	Beam	RECT	A36 Gr.36	Typical
41	M41	N103	N104			Horizontal	Beam	Single Angle	A36 Gr.36	Typical
42	M42	N105	N104			Horizontal	Beam	Single Angle	A36 Gr.36	Typical
43	M43	N105	N103			Horizontal	Beam	Single Angle	A36 Gr.36	Typical
44	M44	N22	N23			Horizontal	Beam	Single Angle	A36 Gr.36	Typical
45	M45	N24	N23			Horizontal	Beam	Single Angle	A36 Gr.36	Typical
46	M46	N24	N22			Horizontal	Beam	Single Angle	A36 Gr.36	Typical
47	M47	N89	N90			Other	Beam	Single Angle	A36 Gr.36	Typical
48	M48	N90	N88			Other	Beam	Single Angle	A36 Gr.36	Typical
49	M49	N88	N89			Other	Beam	Single Angle	A36 Gr.36	Typical
50	M50	N46	N47			RIGID	None	None	RIGID	Typical
51	M51	N127	N128			RIGID	None	None	RIGID	Typical
52	M52	N48	N49			RIGID	None	None	RIGID	Typical
53	M53	N129	N130			RIGID	None	None	RIGID	Typical
54	M54	N50	N51			RIGID	None	None	RIGID	Typical
55	M55	N131	N132			RIGID	None	None	RIGID	Typical
56	M56	N52	N53			RIGID	None	None	RIGID	Typical
57	M57	N133	N134			RIGID	None	None	RIGID	Typical
58	M58	N54	N55			RIGID	None	None	RIGID	Typical
59	M59	N135	N136			RIGID	None	None	RIGID	Typical
60	M60	N56	N57			RIGID	None	None	RIGID	Typical
61	M61	N137	N138			RIGID	None	None	RIGID	Typical
62	M62	N58	N59			RIGID	None	None	RIGID	Typical
63	M63	N139	N140			RIGID	None	None	RIGID	Typical
64	M64	N60	N61			RIGID	None	None	RIGID	Typical
65	M65	N141	N142			RIGID	None	None	RIGID	Typical
66	M66	N62	N63			RIGID	None	None	RIGID	Typical
67	M67	N143	N144			RIGID	None	None	RIGID	Typical
68	M68	N64	N65			RIGID	None	None	RIGID	Typical
69	M69	N145	N146			RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
70	M70	N66	N67			RIGID	None	None	RIGID	Typical
71	M71	N147	N148			RIGID	None	None	RIGID	Typical
72	M72	N68	N69			RIGID	None	None	RIGID	Typical
73	M73	N149	N150			RIGID	None	None	RIGID	Typical
74	M74	N105	N151			RIGID	None	None	RIGID	Typical
75	M75	N24	N70			RIGID	None	None	RIGID	Typical
76	M76	N103	N152			RIGID	None	None	RIGID	Typical
77	M77	N22	N71			RIGID	None	None	RIGID	Typical
78	M78	N104	N153			RIGID	None	None	RIGID	Typical
79	M79	N23	N72			RIGID	None	None	RIGID	Typical
80	M80	N154	N155			RIGID	None	None	RIGID	Typical
81	M81	N85	N77			Standoff	Beam	SquareTube	A500 Gr....	Typical
82	M82	N86	N80			Standoff	Beam	SquareTube	A500 Gr....	Typical
83	M83	N87	N83			Standoff	Beam	SquareTube	A500 Gr....	Typical
84	M84	N18	N78			Vertical	Column	Single Angle	A36 Gr.36	Typical
85	M85	N25	N106			Vertical	Column	Single Angle	A36 Gr.36	Typical
86	M86	N26	N107			Vertical	Column	Single Angle	A36 Gr.36	Typical
87	M87	N27	N108			Vertical	Column	Single Angle	A36 Gr.36	Typical
88	M88	N17	N76			Vertical	Column	Single Angle	A36 Gr.36	Typical
89	M89	N20	N81			Vertical	Column	Single Angle	A36 Gr.36	Typical
90	M90	N28	N109			Vertical	Column	Single Angle	A36 Gr.36	Typical
91	M91	N29	N110			Vertical	Column	Single Angle	A36 Gr.36	Typical
92	M92	N30	N111			Vertical	Column	Single Angle	A36 Gr.36	Typical
93	M93	N19	N79			Vertical	Column	Single Angle	A36 Gr.36	Typical
94	M94	N16	N75			Vertical	Column	Single Angle	A36 Gr.36	Typical
95	M95	N31	N112			Vertical	Column	Single Angle	A36 Gr.36	Typical
96	M96	N32	N113			Vertical	Column	Single Angle	A36 Gr.36	Typical
97	M97	N33	N114			Vertical	Column	Single Angle	A36 Gr.36	Typical
98	M98	N21	N82			Vertical	Column	Single Angle	A36 Gr.36	Typical

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp to...	Lcomp bo...	L-tor...	Kyy	Kzz	Cb	Func...
1	M1	Antenna Pipe A	78	Segment	Segment	Lbyy			2.1	2.1		Lateral
2	M2	Antenna Pipe A	78	Segment	Segment	Lbyy			2.1	2.1		Lateral
3	M3	Antenna Pipe A	78	Segment	Segment	Lbyy			2.1	2.1		Lateral
4	M4	Antenna Pipe A	78	Segment	Segment	Lbyy			2.1	2.1		Lateral
5	M5	Antenna Pipe A	78	Segment	Segment	Lbyy			2.1	2.1		Lateral
6	M6	Antenna Pipe A	78	Segment	Segment	Lbyy			2.1	2.1		Lateral
7	M7	Antenna Pipe A	78	Segment	Segment	Lbyy			2.1	2.1		Lateral
8	M8	Antenna Pipe A	78	Segment	Segment	Lbyy			2.1	2.1		Lateral
9	M9	Antenna Pipe A	78	Segment	Segment	Lbyy			2.1	2.1		Lateral
10	M10	Antenna Pipe A	78	Segment	Segment	Lbyy			2.1	2.1		Lateral
11	M11	Antenna Pipe A	78	Segment	Segment	Lbyy			2.1	2.1		Lateral
12	M12	Antenna Pipe A	78	Segment	Segment	Lbyy			2.1	2.1		Lateral
13	M13	Antenna Pipe B	36	Segment	Segment	Lbyy			2.1	2.1		Lateral
14	M14	Brace	30	Segment	Segment	Lbyy			.65	.65		Lateral
15	M15	Brace	30	Segment	Segment	Lbyy			.65	.65		Lateral
16	M16	Brace	29.959	Segment	Segment	Lbyy			.65	.65		Lateral
17	M17	Brace	29.959	Segment	Segment	Lbyy			.65	.65		Lateral
18	M18	Brace	29.959	Segment	Segment	Lbyy			.65	.65		Lateral
19	M19	Brace	29.959	Segment	Segment	Lbyy			.65	.65		Lateral
20	M20	Diagonal	60.605	Segment	Segment	Lbyy			.65	.65		Lateral
21	M21	Diagonal	60.605	Segment	Segment	Lbyy			.65	.65		Lateral
22	M22	Diagonal	60.663	Segment	Segment	Lbyy			.65	.65		Lateral
23	M23	Diagonal	60.663	Segment	Segment	Lbyy			.65	.65		Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp to...	Lcomp bo...	L-tor...	Kyy	Kzz	Cb	Func...
24	M24	Diagonal	60.605	Segment	Segment	Lbyy			.65	.65		Lateral
25	M25	Diagonal	60.605	Segment	Segment	Lbyy			.65	.65		Lateral
26	M26	Diagonal	60.663	Segment	Segment	Lbyy			.65	.65		Lateral
27	M27	Diagonal	60.663	Segment	Segment	Lbyy			.65	.65		Lateral
28	M28	Diagonal	60.605	Segment	Segment	Lbyy			.65	.65		Lateral
29	M29	Diagonal	60.605	Segment	Segment	Lbyy			.65	.65		Lateral
30	M30	Diagonal	60.663	Segment	Segment	Lbyy			.65	.65		Lateral
31	M31	Diagonal	60.663	Segment	Segment	Lbyy			.65	.65		Lateral
32	M32	End Pipe	72	Segment	Segment	Lbyy			2.1	2.1		Lateral
33	M33	End Pipe	72	Segment	Segment	Lbyy			2.1	2.1		Lateral
34	M34	End Pipe	72	Segment	Segment	Lbyy			2.1	2.1		Lateral
35	M35	End Plate	15.953	Segment	Segment	Lbyy			.65	.65		Lateral
36	M36	End Plate	15.953	Segment	Segment	Lbyy			.65	.65		Lateral
37	M37	End Plate	15.905	Segment	Segment	Lbyy			.65	.65		Lateral
38	M38	End Plate	15.953	Segment	Segment	Lbyy			.65	.65		Lateral
39	M39	End Plate	15.953	Segment	Segment	Lbyy			.65	.65		Lateral
40	M40	End Plate	15.905	Segment	Segment	Lbyy			.65	.65		Lateral
41	M41	Horizontal	232	Segment	Segment	Lbyy			.65	.65		Lateral
42	M42	Horizontal	232	Segment	Segment	Lbyy			.65	.65		Lateral
43	M43	Horizontal	232	Segment	Segment	Lbyy			.65	.65		Lateral
44	M44	Horizontal	232	Segment	Segment	Lbyy			.65	.65		Lateral
45	M45	Horizontal	232	Segment	Segment	Lbyy			.65	.65		Lateral
46	M46	Horizontal	232	Segment	Segment	Lbyy			.65	.65		Lateral
47	M47	Other	128.172	Segment	Segment	Lbyy			.65	.65		Lateral
48	M48	Other	128.172	Segment	Segment	Lbyy			.65	.65		Lateral
49	M49	Other	128.172	Segment	Segment	Lbyy			.65	.65		Lateral
50	M81	Standoff	90	Segment	Segment	Lbyy			.65	.65		Lateral
51	M82	Standoff	90	Segment	Segment	Lbyy			.65	.65		Lateral
52	M83	Standoff	90	Segment	Segment	Lbyy			.65	.65		Lateral
53	M84	Vertical	48	Segment	Segment	Lbyy			.65	.65		Lateral
54	M85	Vertical	48	Segment	Segment	Lbyy			.65	.65		Lateral
55	M86	Vertical	48	Segment	Segment	Lbyy			.65	.65		Lateral
56	M87	Vertical	48	Segment	Segment	Lbyy			.65	.65		Lateral
57	M88	Vertical	48	Segment	Segment	Lbyy			.65	.65		Lateral
58	M89	Vertical	48	Segment	Segment	Lbyy			.65	.65		Lateral
59	M90	Vertical	48	Segment	Segment	Lbyy			.65	.65		Lateral
60	M91	Vertical	48	Segment	Segment	Lbyy			.65	.65		Lateral
61	M92	Vertical	48	Segment	Segment	Lbyy			.65	.65		Lateral
62	M93	Vertical	48	Segment	Segment	Lbyy			.65	.65		Lateral
63	M94	Vertical	48	Segment	Segment	Lbyy			.65	.65		Lateral
64	M95	Vertical	48	Segment	Segment	Lbyy			.65	.65		Lateral
65	M96	Vertical	48	Segment	Segment	Lbyy			.65	.65		Lateral
66	M97	Vertical	48	Segment	Segment	Lbyy			.65	.65		Lateral
67	M98	Vertical	48	Segment	Segment	Lbyy			.65	.65		Lateral

Plate Primary Data

Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness[in]
No Data to Print ...						

Member Point Loads (BLC 1 : DEAD LOAD)

	Member Label	Direction	Magnitude[lb,lb-in]	Location[in,%]
1	M1	Z	-35	36
2	M1	Z	-62	48
3	M1	Z	-58	48

Member Point Loads (BLC 1 : DEAD LOAD) (Continued)

	Member Label	Direction	Magnitude[lb,lb-in]	Location[in,%]
4	M2	Z	-97.6	36
5	M2	Z	-55.12	48
6	M2	Z	-71	48
7	M3	Z	-2	48
8	M3	Z	-41.8	36
9	M3	Z	-11.02	48
10	M7	Z	-35	36
11	M7	Z	-62	48
12	M7	Z	-58	48
13	M6	Z	-97.6	36
14	M6	Z	-55.12	48
15	M6	Z	-71	48
16	M8	Z	-2	48
17	M8	Z	-41.8	36
18	M8	Z	-11.02	48
19	M12	Z	-35	36
20	M12	Z	-62	48
21	M12	Z	-58	48
22	M11	Z	-97.6	36
23	M11	Z	-55.12	48
24	M11	Z	-71	48
25	M10	Z	-2	48
26	M10	Z	-41.8	36
27	M10	Z	-11.02	48
28	M13	Z	-32.8	%50
29	M13	Z	-32.8	%50

Member Point Loads (BLC 2 : DEAD LOAD (ICE))

	Member Label	Direction	Magnitude[lb,lb-in]	Location[in,%]
1	M1	Z	-85.9	36
2	M1	Z	-52.8	48
3	M1	Z	-50.8	48
4	M2	Z	-207.2	36
5	M2	Z	-50.8	48
6	M2	Z	-36.7	48
7	M3	Z	-3.5	48
8	M3	Z	-121.9	36
9	M3	Z	-9.6	48
10	M7	Z	-85.9	36
11	M7	Z	-52.8	48
12	M7	Z	-50.8	48
13	M6	Z	-207.2	36
14	M6	Z	-50.8	48
15	M6	Z	-36.7	48
16	M8	Z	-3.5	48
17	M8	Z	-121.9	36
18	M8	Z	-9.6	48
19	M12	Z	-85.9	36
20	M12	Z	-52.8	48
21	M12	Z	-50.8	48
22	M11	Z	-207.2	36
23	M11	Z	-50.8	48
24	M11	Z	-36.7	48
25	M10	Z	-3.5	48
26	M10	Z	-121.9	36
27	M10	Z	-9.6	48

Member Point Loads (BLC 2 : DEAD LOAD (ICE)) (Continued)

	Member Label	Direction	Magnitude[lb,lb-in]	Location[in,%]
28	M13	Z	-61.6	%50
29	M13	Z	-61.6	%50

Member Point Loads (BLC 3 : WIND LOAD (NO ICE) FRONT)

	Member Label	Direction	Magnitude[lb,lb-in]	Location[in,%]
1	M1	X	190.4	36
2	M1	X	115.3	48
3	M1	X	108.7	48
4	M2	X	477.5	36
5	M2	X	98.8	48
6	M2	X	68	48
7	M3	X	6.1	48
8	M3	X	277.4	36
9	M3	X	16	48
10	M7	X	190.4	36
11	M7	X	115.3	48
12	M7	X	108.7	48
13	M6	X	477.5	36
14	M6	X	98.8	48
15	M6	X	68	48
16	M8	X	6.1	48
17	M8	X	277.4	36
18	M8	X	16	48
19	M12	X	190.4	36
20	M12	X	115.3	48
21	M12	X	108.7	48
22	M11	X	477.5	36
23	M11	X	98.8	48
24	M11	X	68	48
25	M10	X	6.1	48
26	M10	X	277.4	36
27	M10	X	16	48
28	M13	X	100.3	%50
29	M13	X	100.3	%50

Member Point Loads (BLC 4 : WIND LOAD (NO ICE) SIDE)

	Member Label	Direction	Magnitude[lb,lb-in]	Location[in,%]
1	M1	Y	101.2	36
2	M1	Y	32.3	48
3	M1	Y	44.4	48
4	M2	Y	201.6	36
5	M2	Y	61.4	48
6	M2	Y	48.7	48
7	M3	Y	2.9	48
8	M3	Y	160.5	36
9	M3	Y	10.9	48
10	M7	Y	101.2	36
11	M7	Y	32.3	48
12	M7	Y	44.4	48
13	M6	Y	201.6	36
14	M6	Y	61.4	48
15	M6	Y	48.7	48
16	M8	Y	2.9	48
17	M8	Y	160.5	36
18	M8	Y	10.9	48
19	M12	Y	101.2	36

Member Point Loads (BLC 4 : WIND LOAD (NO ICE) SIDE) (Continued)

	Member Label	Direction	Magnitude[lb,lb-in]	Location[in,%]
20	M12	Y	32.3	48
21	M12	Y	44.4	48
22	M11	Y	201.6	36
23	M11	Y	61.4	48
24	M11	Y	48.7	48
25	M10	Y	2.9	48
26	M10	Y	160.5	36
27	M10	Y	10.9	48
28	M13	Y	100.3	%50
29	M13	Y	100.3	%50

Member Point Loads (BLC 5 : WIND LOAD (ICE) FRONT)

	Member Label	Direction	Magnitude[lb,lb-in]	Location[in,%]
1	M1	X	40.7	36
2	M1	X	27.1	48
3	M1	X	23.7	48
4	M2	X	94.2	36
5	M2	X	22.1	48
6	M2	X	15.7	48
7	M3	X	2.4	48
8	M3	X	57.8	36
9	M3	X	5.8	48
10	M7	X	40.7	36
11	M7	X	27.1	48
12	M7	X	23.7	48
13	M6	X	94.2	36
14	M6	X	22.1	48
15	M6	X	15.7	48
16	M8	X	2.4	48
17	M8	X	57.8	36
18	M8	X	5.8	48
19	M12	X	40.7	36
20	M12	X	27.1	48
21	M12	X	23.7	48
22	M11	X	94.2	36
23	M11	X	22.1	48
24	M11	X	15.7	48
25	M10	X	2.4	48
26	M10	X	57.8	36
27	M10	X	5.8	48
28	M13	X	22.4	%50
29	M13	X	22.4	%50

Member Point Loads (BLC 6 : WIND LOAD (ICE) SIDE)

	Member Label	Direction	Magnitude[lb,lb-in]	Location[in,%]
1	M1	Y	25	36
2	M1	Y	10.2	48
3	M1	Y	11.2	48
4	M2	Y	45.4	36
5	M2	Y	14.8	48
6	M2	Y	11.9	48
7	M3	Y	1.6	48
8	M3	Y	37.4	36
9	M3	Y	4.6	48
10	M7	Y	25	36
11	M7	Y	10.2	48

Member Point Loads (BLC 6 : WIND LOAD (ICE) SIDE) (Continued)

	Member Label	Direction	Magnitude[lb,lb-in]	Location[in,%]
12	M7	Y	11.2	48
13	M6	Y	45.4	36
14	M6	Y	14.8	48
15	M6	Y	11.9	48
16	M8	Y	1.6	48
17	M8	Y	37.4	36
18	M8	Y	4.6	48
19	M12	Y	25	36
20	M12	Y	10.2	48
21	M12	Y	11.2	48
22	M11	Y	45.4	36
23	M11	Y	14.8	48
24	M11	Y	11.9	48
25	M10	Y	1.6	48
26	M10	Y	37.4	36
27	M10	Y	4.6	48
28	M13	Y	22.4	%50
29	M13	Y	22.4	%50

Member Point Loads (BLC 8 : WIND LOAD (SERVICE) FRONT)

	Member Label	Direction	Magnitude[lb,lb-in]	Location[in,%]
1	M1	X	11.9	36
2	M1	X	7.2	48
3	M1	X	6.8	48
4	M2	X	29.8	36
5	M2	X	6.2	48
6	M2	X	4.3	48
7	M3	X	.4	48
8	M3	X	17.3	36
9	M3	X	1	48
10	M7	X	11.9	36
11	M7	X	7.2	48
12	M7	X	6.8	48
13	M6	X	29.8	36
14	M6	X	6.2	48
15	M6	X	4.3	48
16	M8	X	.4	48
17	M8	X	17.3	36
18	M8	X	1	48
19	M12	X	11.9	36
20	M12	X	7.2	48
21	M12	X	6.8	48
22	M11	X	29.8	36
23	M11	X	6.2	48
24	M11	X	4.3	48
25	M10	X	.4	48
26	M10	X	17.3	36
27	M10	X	1	48
28	M13	X	6.3	%50
29	M13	X	6.3	%50

Member Point Loads (BLC 9 : WIND LOAD (SERVICE) SIDE)

	Member Label	Direction	Magnitude[lb,lb-in]	Location[in,%]
1	M1	Y	6.3	36
2	M1	Y	2	48
3	M1	Y	2.8	48

Member Point Loads (BLC 9 : WIND LOAD (SERVICE) SIDE) (Continued)

	Member Label	Direction	Magnitude[lb,lb-in]	Location[in,%]
4	M2	Y	12.6	36
5	M2	Y	3.8	48
6	M2	Y	3	48
7	M3	Y	.2	48
8	M3	Y	10	36
9	M3	Y	.7	48
10	M7	Y	6.3	36
11	M7	Y	2	48
12	M7	Y	2.8	48
13	M6	Y	12.6	36
14	M6	Y	3.8	48
15	M6	Y	3	48
16	M8	Y	.2	48
17	M8	Y	10	36
18	M8	Y	.7	48
19	M12	Y	6.3	36
20	M12	Y	2	48
21	M12	Y	2.8	48
22	M11	Y	12.6	36
23	M11	Y	3.8	48
24	M11	Y	3	48
25	M10	Y	.2	48
26	M10	Y	10	36
27	M10	Y	.7	48
28	M13	Y	6.3	%50
29	M13	Y	6.3	%50

Member Point Loads (BLC 10 : LIVE LOAD (SERVICE))

	Member Label	Direction	Magnitude[lb,lb-in]	Location[in,%]
1	M32	Z	-500	0
2	M33	Z	-500	0
3	M34	Z	-500	0

Member Distributed Loads (BLC 2 : DEAD LOAD (ICE))

	Member Label	Direction	Start Magnitude[lb/in,F,psf]	End Magnitude[l...	Start Location[in,%]	End Location[in,%]
1	M1	Z	-.534	-.534	0	0
2	M2	Z	-.534	-.534	0	0
3	M3	Z	-.534	-.534	0	0
4	M4	Z	-.534	-.534	0	0
5	M5	Z	-.534	-.534	0	0
6	M6	Z	-.534	-.534	0	0
7	M7	Z	-.534	-.534	0	0
8	M8	Z	-.534	-.534	0	0
9	M9	Z	-.534	-.534	0	0
10	M10	Z	-.534	-.534	0	0
11	M11	Z	-.534	-.534	0	0
12	M12	Z	-.534	-.534	0	0
13	M13	Z	-.534	-.534	0	0
14	M20	Z	-.47	-.47	0	0
15	M21	Z	-.47	-.47	0	0
16	M22	Z	-.47	-.47	0	0
17	M23	Z	-.47	-.47	0	0
18	M24	Z	-.47	-.47	0	0
19	M25	Z	-.47	-.47	0	0
20	M26	Z	-.47	-.47	0	0

Member Distributed Loads (BLC 2 : DEAD LOAD (ICE)) (Continued)

	Member Label	Direction	Start Magnitude[lb/in,F,psf]	End Magnitude[l...	Start Location[in,%]	End Location[in,%]
21	M27	Z	-.47	-.47	0	0
22	M28	Z	-.47	-.47	0	0
23	M29	Z	-.47	-.47	0	0
24	M30	Z	-.47	-.47	0	0
25	M31	Z	-.47	-.47	0	0
26	M32	Z	-.617	-.617	0	0
27	M33	Z	-.617	-.617	0	0
28	M34	Z	-.617	-.617	0	0
29	M41	Z	-.971	-.971	0	0
30	M42	Z	-.971	-.971	0	0
31	M43	Z	-.971	-.971	0	0
32	M44	Z	-.971	-.971	0	0
33	M45	Z	-.971	-.971	0	0
34	M46	Z	-.971	-.971	0	0
35	M81	Z	-.971	-.971	0	0
36	M82	Z	-.971	-.971	0	0
37	M83	Z	-.971	-.971	0	0
38	M84	Z	-.47	-.47	0	0
39	M85	Z	-.47	-.47	0	0
40	M86	Z	-.47	-.47	0	0
41	M87	Z	-.47	-.47	0	0
42	M88	Z	-.47	-.47	0	0
43	M89	Z	-.47	-.47	0	0
44	M90	Z	-.47	-.47	0	0
45	M91	Z	-.47	-.47	0	0
46	M92	Z	-.47	-.47	0	0
47	M93	Z	-.47	-.47	0	0
48	M94	Z	-.47	-.47	0	0
49	M95	Z	-.47	-.47	0	0
50	M96	Z	-.47	-.47	0	0
51	M97	Z	-.47	-.47	0	0
52	M98	Z	-.47	-.47	0	0

Member Distributed Loads (BLC 3 : WIND LOAD (NO ICE) FRONT)

	Member Label	Direction	Start Magnitude[lb/in,F,psf]	End Magnitude[l...	Start Location[in,%]	End Location[in,%]
1	M1	X	.686	.686	0	0
2	M2	X	.686	.686	0	0
3	M3	X	.686	.686	0	0
4	M4	X	.686	.686	0	0
5	M5	X	.686	.686	0	0
6	M6	X	.686	.686	0	0
7	M7	X	.686	.686	0	0
8	M8	X	.686	.686	0	0
9	M9	X	.686	.686	0	0
10	M10	X	.686	.686	0	0
11	M11	X	.686	.686	0	0
12	M12	X	.686	.686	0	0
13	M13	X	.56	.56	0	0
14	M20	X	.96	.96	0	0
15	M21	X	.96	.96	0	0
16	M22	X	.96	.96	0	0
17	M23	X	.96	.96	0	0
18	M24	X	.96	.96	0	0
19	M25	X	.96	.96	0	0
20	M26	X	.96	.96	0	0
21	M27	X	.96	.96	0	0

Member Distributed Loads (BLC 3 : WIND LOAD (NO ICE) FRONT) (Continued)

	Member Label	Direction	Start Magnitude[lb/in,F,psf]	End Magnitude[l...	Start Location[in,%]	End Location[in,%]
22	M28	X	.96	.96	0	0
23	M29	X	.96	.96	0	0
24	M30	X	.96	.96	0	0
25	M31	X	.96	.96	0	0
26	M32	X	.83	.83	0	0
27	M33	X	.83	.83	0	0
28	M34	X	.83	.83	0	0
29	M41	X	2.401	2.401	0	0
30	M42	X	2.401	2.401	0	0
31	M43	X	2.401	2.401	0	0
32	M44	X	2.401	2.401	0	0
33	M45	X	2.401	2.401	0	0
34	M46	X	2.401	2.401	0	0
35	M81	X	1.337	1.337	0	0
36	M82	X	1.337	1.337	0	0
37	M83	X	1.337	1.337	0	0
38	M84	X	.944	.944	0	0
39	M85	X	.944	.944	0	0
40	M86	X	.944	.944	0	0
41	M87	X	.944	.944	0	0
42	M88	X	.944	.944	0	0
43	M89	X	.944	.944	0	0
44	M90	X	.944	.944	0	0
45	M91	X	.944	.944	0	0
46	M92	X	.944	.944	0	0
47	M93	X	.944	.944	0	0
48	M94	X	.944	.944	0	0
49	M95	X	.944	.944	0	0
50	M96	X	.944	.944	0	0
51	M97	X	.944	.944	0	0
52	M98	X	.944	.944	0	0

Member Distributed Loads (BLC 4 : WIND LOAD (NO ICE) SIDE)

	Member Label	Direction	Start Magnitude[lb/in,F,psf]	End Magnitude[l...	Start Location[in,%]	End Location[in,%]
1	M1	Y	.686	.686	0	0
2	M2	Y	.686	.686	0	0
3	M3	Y	.686	.686	0	0
4	M4	Y	.686	.686	0	0
5	M5	Y	.686	.686	0	0
6	M6	Y	.686	.686	0	0
7	M7	Y	.686	.686	0	0
8	M8	Y	.686	.686	0	0
9	M9	Y	.686	.686	0	0
10	M10	Y	.686	.686	0	0
11	M11	Y	.686	.686	0	0
12	M12	Y	.686	.686	0	0
13	M13	Y	.56	.56	0	0
14	M20	Y	.96	.96	0	0
15	M21	Y	.96	.96	0	0
16	M22	Y	.96	.96	0	0
17	M23	Y	.96	.96	0	0
18	M24	Y	.96	.96	0	0
19	M25	Y	.96	.96	0	0
20	M26	Y	.96	.96	0	0
21	M27	Y	.96	.96	0	0
22	M28	Y	.96	.96	0	0

Member Distributed Loads (BLC 4 : WIND LOAD (NO ICE) SIDE) (Continued)

	Member Label	Direction	Start Magnitude[lb/in,F,psf]	End Magnitude[l...	Start Location[in,%]	End Location[in,%]
23	M29	Y	.96	.96	0	0
24	M30	Y	.96	.96	0	0
25	M31	Y	.96	.96	0	0
26	M32	Y	.83	.83	0	0
27	M33	Y	.83	.83	0	0
28	M34	Y	.83	.83	0	0
29	M41	Y	2.401	2.401	0	0
30	M42	Y	2.401	2.401	0	0
31	M43	Y	2.401	2.401	0	0
32	M44	Y	2.401	2.401	0	0
33	M45	Y	2.401	2.401	0	0
34	M46	Y	2.401	2.401	0	0
35	M81	Y	1.337	1.337	0	0
36	M82	Y	1.337	1.337	0	0
37	M83	Y	1.337	1.337	0	0
38	M84	Y	.944	.944	0	0
39	M85	Y	.944	.944	0	0
40	M86	Y	.944	.944	0	0
41	M87	Y	.944	.944	0	0
42	M88	Y	.944	.944	0	0
43	M89	Y	.944	.944	0	0
44	M90	Y	.944	.944	0	0
45	M91	Y	.944	.944	0	0
46	M92	Y	.944	.944	0	0
47	M93	Y	.944	.944	0	0
48	M94	Y	.944	.944	0	0
49	M95	Y	.944	.944	0	0
50	M96	Y	.944	.944	0	0
51	M97	Y	.944	.944	0	0
52	M98	Y	.944	.944	0	0

Member Distributed Loads (BLC 5 : WIND LOAD (ICE) FRONT)

	Member Label	Direction	Start Magnitude[lb/in,F,psf]	End Magnitude[l...	Start Location[in,%]	End Location[in,%]
1	M1	X	.201	.201	0	0
2	M2	X	.201	.201	0	0
3	M3	X	.201	.201	0	0
4	M4	X	.201	.201	0	0
5	M5	X	.201	.201	0	0
6	M6	X	.201	.201	0	0
7	M7	X	.201	.201	0	0
8	M8	X	.201	.201	0	0
9	M9	X	.201	.201	0	0
10	M10	X	.201	.201	0	0
11	M11	X	.201	.201	0	0
12	M12	X	.201	.201	0	0
13	M13	X	.172	.172	0	0
14	M20	X	.309	.309	0	0
15	M21	X	.309	.309	0	0
16	M22	X	.309	.309	0	0
17	M23	X	.309	.309	0	0
18	M24	X	.309	.309	0	0
19	M25	X	.309	.309	0	0
20	M26	X	.309	.309	0	0
21	M27	X	.309	.309	0	0
22	M28	X	.309	.309	0	0
23	M29	X	.309	.309	0	0

Member Distributed Loads (BLC 5 : WIND LOAD (ICE) FRONT) (Continued)

	Member Label	Direction	Start Magnitude[lb/in,F,psf]	End Magnitude[l...	Start Location[in,%]	End Location[in,%]
24	M30	X	.309	.309	0	0
25	M31	X	.309	.309	0	0
26	M32	X	.215	.215	0	0
27	M33	X	.215	.215	0	0
28	M34	X	.215	.215	0	0
29	M41	X	.616	.616	0	0
30	M42	X	.616	.616	0	0
31	M43	X	.616	.616	0	0
32	M44	X	.616	.616	0	0
33	M45	X	.616	.616	0	0
34	M46	X	.616	.616	0	0
35	M81	X	.316	.316	0	0
36	M82	X	.316	.316	0	0
37	M83	X	.316	.316	0	0
38	M84	X	.293	.293	0	0
39	M85	X	.293	.293	0	0
40	M86	X	.293	.293	0	0
41	M87	X	.293	.293	0	0
42	M88	X	.293	.293	0	0
43	M89	X	.293	.293	0	0
44	M90	X	.293	.293	0	0
45	M91	X	.293	.293	0	0
46	M92	X	.293	.293	0	0
47	M93	X	.293	.293	0	0
48	M94	X	.293	.293	0	0
49	M95	X	.293	.293	0	0
50	M96	X	.293	.293	0	0
51	M97	X	.293	.293	0	0
52	M98	X	.293	.293	0	0

Member Distributed Loads (BLC 6 : WIND LOAD (ICE) SIDE)

	Member Label	Direction	Start Magnitude[lb/in,F,psf]	End Magnitude[l...	Start Location[in,%]	End Location[in,%]
1	M1	Y	.201	.201	0	0
2	M2	Y	.201	.201	0	0
3	M3	Y	.201	.201	0	0
4	M4	Y	.201	.201	0	0
5	M5	Y	.201	.201	0	0
6	M6	Y	.201	.201	0	0
7	M7	Y	.201	.201	0	0
8	M8	Y	.201	.201	0	0
9	M9	Y	.201	.201	0	0
10	M10	Y	.201	.201	0	0
11	M11	Y	.201	.201	0	0
12	M12	Y	.201	.201	0	0
13	M13	Y	.172	.172	0	0
14	M20	Y	.309	.309	0	0
15	M21	Y	.309	.309	0	0
16	M22	Y	.309	.309	0	0
17	M23	Y	.309	.309	0	0
18	M24	Y	.309	.309	0	0
19	M25	Y	.309	.309	0	0
20	M26	Y	.309	.309	0	0
21	M27	Y	.309	.309	0	0
22	M28	Y	.309	.309	0	0
23	M29	Y	.309	.309	0	0
24	M30	Y	.309	.309	0	0

Member Distributed Loads (BLC 6 : WIND LOAD (ICE) SIDE) (Continued)

	Member Label	Direction	Start Magnitude[lb/in,F,psf]	End Magnitude[l...	Start Location[in,%]	End Location[in,%]
25	M31	Y	.309	.309	0	0
26	M32	Y	.215	.215	0	0
27	M33	Y	.215	.215	0	0
28	M34	Y	.215	.215	0	0
29	M41	Y	.616	.616	0	0
30	M42	Y	.616	.616	0	0
31	M43	Y	.616	.616	0	0
32	M44	Y	.616	.616	0	0
33	M45	Y	.616	.616	0	0
34	M46	Y	.616	.616	0	0
35	M81	Y	.316	.316	0	0
36	M82	Y	.316	.316	0	0
37	M83	Y	.316	.316	0	0
38	M84	Y	.293	.293	0	0
39	M85	Y	.293	.293	0	0
40	M86	Y	.293	.293	0	0
41	M87	Y	.293	.293	0	0
42	M88	Y	.293	.293	0	0
43	M89	Y	.293	.293	0	0
44	M90	Y	.293	.293	0	0
45	M91	Y	.293	.293	0	0
46	M92	Y	.293	.293	0	0
47	M93	Y	.293	.293	0	0
48	M94	Y	.293	.293	0	0
49	M95	Y	.293	.293	0	0
50	M96	Y	.293	.293	0	0
51	M97	Y	.293	.293	0	0
52	M98	Y	.293	.293	0	0

Member Distributed Loads (BLC 8 : WIND LOAD (SERVICE) FRONT)

	Member Label	Direction	Start Magnitude[lb/in,F,psf]	End Magnitude[l...	Start Location[in,%]	End Location[in,%]
1	M1	X	.043	.043	0	0
2	M2	X	.043	.043	0	0
3	M3	X	.043	.043	0	0
4	M4	X	.043	.043	0	0
5	M5	X	.043	.043	0	0
6	M6	X	.043	.043	0	0
7	M7	X	.043	.043	0	0
8	M8	X	.043	.043	0	0
9	M9	X	.043	.043	0	0
10	M10	X	.043	.043	0	0
11	M11	X	.043	.043	0	0
12	M12	X	.043	.043	0	0
13	M13	X	.035	.035	0	0
14	M20	X	.06	.06	0	0
15	M21	X	.06	.06	0	0
16	M22	X	.06	.06	0	0
17	M23	X	.06	.06	0	0
18	M24	X	.06	.06	0	0
19	M25	X	.06	.06	0	0
20	M26	X	.06	.06	0	0
21	M27	X	.06	.06	0	0
22	M28	X	.06	.06	0	0
23	M29	X	.06	.06	0	0
24	M30	X	.06	.06	0	0
25	M31	X	.06	.06	0	0

Member Distributed Loads (BLC 8 : WIND LOAD (SERVICE) FRONT) (Continued)

	Member Label	Direction	Start Magnitude[lb/in,F,psf]	End Magnitude[l...	Start Location[in,%]	End Location[in,%]
26	M32	X	.052	.052	0	0
27	M33	X	.052	.052	0	0
28	M34	X	.052	.052	0	0
29	M41	X	.15	.15	0	0
30	M42	X	.15	.15	0	0
31	M43	X	.15	.15	0	0
32	M44	X	.15	.15	0	0
33	M45	X	.15	.15	0	0
34	M46	X	.15	.15	0	0
35	M81	X	.084	.084	0	0
36	M82	X	.084	.084	0	0
37	M83	X	.084	.084	0	0
38	M84	X	.059	.059	0	0
39	M85	X	.059	.059	0	0
40	M86	X	.059	.059	0	0
41	M87	X	.059	.059	0	0
42	M88	X	.059	.059	0	0
43	M89	X	.059	.059	0	0
44	M90	X	.059	.059	0	0
45	M91	X	.059	.059	0	0
46	M92	X	.059	.059	0	0
47	M93	X	.059	.059	0	0
48	M94	X	.059	.059	0	0
49	M95	X	.059	.059	0	0
50	M96	X	.059	.059	0	0
51	M97	X	.059	.059	0	0
52	M98	X	.059	.059	0	0

Member Distributed Loads (BLC 9 : WIND LOAD (SERVICE) SIDE)

	Member Label	Direction	Start Magnitude[lb/in,F,psf]	End Magnitude[l...	Start Location[in,%]	End Location[in,%]
1	M1	Y	.043	.043	0	0
2	M2	Y	.043	.043	0	0
3	M3	Y	.043	.043	0	0
4	M4	Y	.043	.043	0	0
5	M5	Y	.043	.043	0	0
6	M6	Y	.043	.043	0	0
7	M7	Y	.043	.043	0	0
8	M8	Y	.043	.043	0	0
9	M9	Y	.043	.043	0	0
10	M10	Y	.043	.043	0	0
11	M11	Y	.043	.043	0	0
12	M12	Y	.043	.043	0	0
13	M13	Y	.035	.035	0	0
14	M20	Y	.06	.06	0	0
15	M21	Y	.06	.06	0	0
16	M22	Y	.06	.06	0	0
17	M23	Y	.06	.06	0	0
18	M24	Y	.06	.06	0	0
19	M25	Y	.06	.06	0	0
20	M26	Y	.06	.06	0	0
21	M27	Y	.06	.06	0	0
22	M28	Y	.06	.06	0	0
23	M29	Y	.06	.06	0	0
24	M30	Y	.06	.06	0	0
25	M31	Y	.06	.06	0	0
26	M32	Y	.052	.052	0	0

Member Distributed Loads (BLC 9 : WIND LOAD (SERVICE) SIDE) (Continued)

	Member Label	Direction	Start Magnitude[lb/in,F,psf]	End Magnitude[l...	Start Location[in,%]	End Location[in,%]
27	M33	Y	.052	.052	0	0
28	M34	Y	.052	.052	0	0
29	M41	Y	.15	.15	0	0
30	M42	Y	.15	.15	0	0
31	M43	Y	.15	.15	0	0
32	M44	Y	.15	.15	0	0
33	M45	Y	.15	.15	0	0
34	M46	Y	.15	.15	0	0
35	M81	Y	.084	.084	0	0
36	M82	Y	.084	.084	0	0
37	M83	Y	.084	.084	0	0
38	M84	Y	.059	.059	0	0
39	M85	Y	.059	.059	0	0
40	M86	Y	.059	.059	0	0
41	M87	Y	.059	.059	0	0
42	M88	Y	.059	.059	0	0
43	M89	Y	.059	.059	0	0
44	M90	Y	.059	.059	0	0
45	M91	Y	.059	.059	0	0
46	M92	Y	.059	.059	0	0
47	M93	Y	.059	.059	0	0
48	M94	Y	.059	.059	0	0
49	M95	Y	.059	.059	0	0
50	M96	Y	.059	.059	0	0
51	M97	Y	.059	.059	0	0
52	M98	Y	.059	.059	0	0

Member Distributed Loads (BLC 13 : BLC 1 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/in,F,psf]	End Magnitude[l...	Start Location[in,%]	End Location[in,%]
1	M15	Z	-.476	-.476	2.889e-12	30
2	M35	Z	-.142	-.142	3.191	15.953
3	M41	Z	-.026	-.257	0	18.56
4	M41	Z	-.257	-.441	18.56	37.12
5	M41	Z	-.441	-.615	37.12	55.68
6	M41	Z	-.615	-.574	55.68	74.24
7	M41	Z	-.574	-.243	74.24	92.8
8	M49	Z	-.634	-.634	.794	34.308
9	M81	Z	-1.421	-.834	45	60
10	M81	Z	-.834	-.41	60	75
11	M81	Z	-.41	-.149	75	90
12	M14	Z	-.853	-.853	0	30
13	M15	Z	-.377	-.377	0	30
14	M36	Z	-.142	-.142	0	12.762
15	M41	Z	-.603	-.197	92.8	120.64
16	M41	Z	-.197	-.359	120.64	148.48
17	M41	Z	-.359	-.596	148.48	176.32
18	M41	Z	-.596	-.303	176.32	204.16
19	M41	Z	-.303	.006	204.16	232
20	M49	Z	-.165	-.423	51.269	89.72
21	M49	Z	-.423	-.682	89.72	128.172
22	M82	Z	-1.423	-.835	45	60
23	M82	Z	-.835	-.401	60	75
24	M82	Z	-.401	-.121	75	90
25	M18	Z	-.377	-.377	1.14e-7	29.959
26	M19	Z	-.853	-.853	1.455e-7	29.959
27	M36	Z	-.142	-.142	3.191	15.953

Member Distributed Loads (BLC 13 : BLC 1 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/in,F,psf]	End Magnitude[l...	Start Location[in,%]	End Location[in,%]
28	M42	Z	-.602	-.197	92.8	120.64
29	M42	Z	-.197	-.359	120.64	148.48
30	M42	Z	-.359	-.595	148.48	176.32
31	M42	Z	-.595	-.302	176.32	204.16
32	M42	Z	-.302	.006	204.16	232
33	M47	Z	-.682	-.423	0	38.452
34	M47	Z	-.423	-.164	38.452	76.903
35	M18	Z	-.477	-.477	0	29.959
36	M37	Z	-.241	-.241	2.009	7.647
37	M42	Z	-.026	-.259	0	18.56
38	M42	Z	-.259	-.443	18.56	37.12
39	M42	Z	-.443	-.614	37.12	55.68
40	M42	Z	-.614	-.573	55.68	74.24
41	M42	Z	-.573	-.243	74.24	92.8
42	M47	Z	-.633	-.633	93.876	127.407
43	M83	Z	-1.417	-.832	45	60
44	M83	Z	-.832	-.418	60	75
45	M83	Z	-.418	-.177	75	90
46	M17	Z	-.477	-.477	0	29.959
47	M37	Z	-.233	-.233	8.122	13.941
48	M43	Z	-.026	-.259	0	18.56
49	M43	Z	-.259	-.443	18.56	37.12
50	M43	Z	-.443	-.614	37.12	55.68
51	M43	Z	-.614	-.573	55.68	74.24
52	M43	Z	-.573	-.243	74.24	92.8
53	M48	Z	-.633	-.633	.764	34.296
54	M16	Z	-.853	-.853	1.056e-6	29.959
55	M17	Z	-.377	-.377	8.433e-7	29.959
56	M35	Z	-.241	-.241	2.015	7.659
57	M43	Z	-.603	-.197	92.8	120.64
58	M43	Z	-.197	-.359	120.64	148.48
59	M43	Z	-.359	-.596	148.48	176.32
60	M43	Z	-.596	-.305	176.32	204.16
61	M43	Z	-.305	.005	204.16	232
62	M48	Z	-.164	-.423	51.269	89.72
63	M48	Z	-.423	-.682	89.72	128.172

Member Distributed Loads (BLC 14 : BLC 2 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/in,F,psf]	End Magnitude[l...	Start Location[in,%]	End Location[in,%]
1	M15	Z	-.429	-.429	2.889e-12	30
2	M35	Z	-.128	-.128	3.191	15.953
3	M41	Z	-.024	-.231	0	18.56
4	M41	Z	-.231	-.397	18.56	37.12
5	M41	Z	-.397	-.555	37.12	55.68
6	M41	Z	-.555	-.517	55.68	74.24
7	M41	Z	-.517	-.219	74.24	92.8
8	M49	Z	-.572	-.572	.794	34.308
9	M81	Z	-1.281	-.752	45	60
10	M81	Z	-.752	-.37	60	75
11	M81	Z	-.37	-.135	75	90
12	M14	Z	-.769	-.769	0	30
13	M15	Z	-.34	-.34	0	30
14	M36	Z	-.128	-.128	0	12.762
15	M41	Z	-.544	-.178	92.8	120.64
16	M41	Z	-.178	-.324	120.64	148.48
17	M41	Z	-.324	-.537	148.48	176.32

Member Distributed Loads (BLC 14 : BLC 2 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/in,F,psf]	End Magnitude[l...	Start Location[in,%]	End Location[in,%]
18	M41	Z	-.537	-.273	176.32	204.16
19	M41	Z	-.273	.005	204.16	232
20	M49	Z	-.148	-.382	51.269	89.72
21	M49	Z	-.382	-.615	89.72	128.172
22	M82	Z	-1.283	-.753	45	60
23	M82	Z	-.753	-.362	60	75
24	M82	Z	-.362	-.109	75	90
25	M18	Z	-.34	-.34	1.14e-7	29.959
26	M19	Z	-.769	-.769	1.455e-7	29.959
27	M36	Z	-.128	-.128	3.191	15.953
28	M42	Z	-.543	-.177	92.8	120.64
29	M42	Z	-.177	-.323	120.64	148.48
30	M42	Z	-.323	-.537	148.48	176.32
31	M42	Z	-.537	-.273	176.32	204.16
32	M42	Z	-.273	.005	204.16	232
33	M47	Z	-.615	-.381	0	38.452
34	M47	Z	-.381	-.148	38.452	76.903
35	M18	Z	-.43	-.43	0	29.959
36	M37	Z	-.217	-.217	2.009	7.647
37	M42	Z	-.024	-.233	0	18.56
38	M42	Z	-.233	-.399	18.56	37.12
39	M42	Z	-.399	-.554	37.12	55.68
40	M42	Z	-.554	-.517	55.68	74.24
41	M42	Z	-.517	-.219	74.24	92.8
42	M47	Z	-.571	-.571	93.876	127.407
43	M83	Z	-1.278	-.75	45	60
44	M83	Z	-.75	-.377	60	75
45	M83	Z	-.377	-.159	75	90
46	M17	Z	-.43	-.43	0	29.959
47	M37	Z	-.21	-.21	8.122	13.941
48	M43	Z	-.024	-.233	0	18.56
49	M43	Z	-.233	-.399	18.56	37.12
50	M43	Z	-.399	-.554	37.12	55.68
51	M43	Z	-.554	-.517	55.68	74.24
52	M43	Z	-.517	-.219	74.24	92.8
53	M48	Z	-.571	-.571	.764	34.296
54	M16	Z	-.769	-.769	1.056e-6	29.959
55	M17	Z	-.34	-.34	8.433e-7	29.959
56	M35	Z	-.217	-.217	2.015	7.659
57	M43	Z	-.543	-.178	92.8	120.64
58	M43	Z	-.178	-.324	120.64	148.48
59	M43	Z	-.324	-.537	148.48	176.32
60	M43	Z	-.537	-.275	176.32	204.16
61	M43	Z	-.275	.005	204.16	232
62	M48	Z	-.148	-.381	51.269	89.72
63	M48	Z	-.381	-.615	89.72	128.172

Member Distributed Loads (BLC 15 : BLC 7 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/in,F,psf]	End Magnitude[l...	Start Location[in,%]	End Location[in,%]
1	M15	Z	-3.175	-3.175	2.889e-12	30
2	M35	Z	-.946	-.946	3.191	15.953
3	M41	Z	-.175	-1.711	0	18.56
4	M41	Z	-1.711	-2.938	18.56	37.12
5	M41	Z	-2.938	-4.102	37.12	55.68
6	M41	Z	-4.102	-3.825	55.68	74.24
7	M41	Z	-3.825	-1.62	74.24	92.8

Member Distributed Loads (BLC 15 : BLC 7 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/in,F,psf]	End Magnitude[l...	Start Location[in,%]	End Location[in,%]
8	M49	Z	-4.229	-4.229	.794	34.308
9	M81	Z	-9.471	-5.56	45	60
10	M81	Z	-5.56	-2.735	60	75
11	M81	Z	-2.735	-.995	75	90
12	M14	Z	-5.687	-5.687	0	30
13	M15	Z	-2.512	-2.512	0	30
14	M36	Z	-.946	-.946	0	12.762
15	M41	Z	-4.021	-1.314	92.8	120.64
16	M41	Z	-1.314	-2.394	120.64	148.48
17	M41	Z	-2.394	-3.973	148.48	176.32
18	M41	Z	-3.973	-2.018	176.32	204.16
19	M41	Z	-2.018	.04	204.16	232
20	M49	Z	-1.097	-2.823	51.269	89.72
21	M49	Z	-2.823	-4.549	89.72	128.172
22	M82	Z	-9.485	-5.566	45	60
23	M82	Z	-5.566	-2.673	60	75
24	M82	Z	-2.673	-.806	75	90
25	M18	Z	-2.512	-2.512	1.14e-7	29.959
26	M19	Z	-5.689	-5.689	1.455e-7	29.959
27	M36	Z	-.945	-.945	3.191	15.953
28	M42	Z	-4.015	-1.312	92.8	120.64
29	M42	Z	-1.312	-2.392	120.64	148.48
30	M42	Z	-2.392	-3.968	148.48	176.32
31	M42	Z	-3.968	-2.015	176.32	204.16
32	M42	Z	-2.015	.04	204.16	232
33	M47	Z	-4.545	-2.82	0	38.452
34	M47	Z	-2.82	-1.095	38.452	76.903
35	M18	Z	-3.179	-3.179	0	29.959
36	M37	Z	-1.604	-1.604	2.009	7.647
37	M42	Z	-.174	-1.726	0	18.56
38	M42	Z	-1.726	-2.953	18.56	37.12
39	M42	Z	-2.953	-4.096	37.12	55.68
40	M42	Z	-4.096	-3.823	55.68	74.24
41	M42	Z	-3.823	-1.622	74.24	92.8
42	M47	Z	-4.223	-4.223	93.876	127.407
43	M83	Z	-9.447	-5.546	45	60
44	M83	Z	-5.546	-2.79	60	75
45	M83	Z	-2.79	-1.178	75	90
46	M17	Z	-3.179	-3.179	0	29.959
47	M37	Z	-1.554	-1.554	8.122	13.941
48	M43	Z	-.174	-1.726	0	18.56
49	M43	Z	-1.726	-2.953	18.56	37.12
50	M43	Z	-2.953	-4.096	37.12	55.68
51	M43	Z	-4.096	-3.823	55.68	74.24
52	M43	Z	-3.823	-1.622	74.24	92.8
53	M48	Z	-4.223	-4.223	.764	34.296
54	M16	Z	-5.689	-5.689	1.056e-6	29.959
55	M17	Z	-2.512	-2.512	8.433e-7	29.959
56	M35	Z	-1.607	-1.607	2.015	7.659
57	M43	Z	-4.018	-1.315	92.8	120.64
58	M43	Z	-1.315	-2.395	120.64	148.48
59	M43	Z	-2.395	-3.97	148.48	176.32
60	M43	Z	-3.97	-2.034	176.32	204.16
61	M43	Z	-2.034	.036	204.16	232
62	M48	Z	-1.095	-2.82	51.269	89.72
63	M48	Z	-2.82	-4.545	89.72	128.172

Member Area Loads (BLC 1 : DEAD LOAD)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N103	N88	N93	N97	Z	Two Way	-6
2	N93	N97	N104	N89	Z	Two Way	-6
3	N104	N89	N94	N100	Z	Two Way	-6
4	N100	N94	N90	N105	Z	Two Way	-6
5	N105	N90	N92	N101	Z	Two Way	-6
6	N92	N88	N103	N101	Z	Two Way	-6

Member Area Loads (BLC 2 : DEAD LOAD (ICE))

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N103	N88	N93	N97	Z	Two Way	-5.41
2	N93	N97	N104	N89	Z	Two Way	-5.41
3	N104	N89	N94	N100	Z	Two Way	-5.41
4	N100	N94	N90	N105	Z	Two Way	-5.41
5	N105	N90	N92	N101	Z	Two Way	-5.41
6	N92	N88	N103	N101	Z	Two Way	-5.41

Member Area Loads (BLC 7 : LIVE LOAD (MAN))

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N103	N88	N93	N97	Z	Two Way	-40
2	N93	N97	N104	N89	Z	Two Way	-40
3	N104	N89	N94	N100	Z	Two Way	-40
4	N100	N94	N90	N105	Z	Two Way	-40
5	N105	N90	N92	N101	Z	Two Way	-40
6	N92	N88	N103	N101	Z	Two Way	-40

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-in]	LC	MY [lb-in]	LC	MZ [lb-...	LC
1	N85	max	2870.3...	6	5213.5...	12	4188.3...	26	-26040.512	6	-10853.887	7	960.428	3
2		min	-2988....	12	-5157....	6	646.322	6	-232227.446	24	-133458.34	25	-1326....	9
3	N86	max	2935.8	10	5200.9...	10	4168.9...	26	230676.98	16	-8563.47	9	1016.5...	7
4		min	-2969....	4	-5243....	4	648.894	10	26642.313	10	-134872.526	15	-225.2...	13
5	N87	max	7427.9...	8	119.085	5	4353.5...	20	13836.389	5	272595.327	20	1138.8...	16
6		min	-7278....	2	-135.7...	11	455.516	2	-12246.965	11	5801.287	2	-101.2...	10
7	Totals:	max	10198...	8	8115.1...	11	12644...	26						
8		min	-10198...	2	-8115....	5	5897.5...	7						

Envelope Member Section Forces

	Member	Sec		Axial[lb]	LC	y Shear[l...	LC	z Shear[lb]	LC	Torque[l...	LC	y-y Moment[lb-in]	LC	z-z Mom...	LC
1	M1	1	max	0	50	.018	11	.032	8	0	50	0	50	0	50
2			min	0	1	-.017	5	-.037	2	0	1	0	1	0	1
3		2	max	187.027	8	-5.003	30	88.04	2	1959.439	8	2155.291	2	492.421	11
4			min	-421.369	2	-40.675	23	-62.231	8	-2405.258	2	-2636.725	8	-738.065	5
5		3	max	0	50	.004	5	.013	2	0	50	0	50	0	50
6			min	0	1	-.005	11	-.013	8	0	1	0	1	0	1
7	M2	1	max	0	50	.018	11	.063	8	0	50	0	50	0	50
8			min	0	1	-.018	5	-.074	2	0	1	0	1	0	1
9		2	max	429.947	8	15.995	6	133.469	19	1047.3	9	2801.372	2	894.272	11
10			min	-982.417	2	-23.399	12	24.13	2	-1359.995	3	-3071.424	8	-1001.584	5
11		3	max	0	50	.005	5	.027	14	0	50	0	50	0	50
12			min	0	1	-.005	11	-.017	8	0	1	0	1	0	1
13	M3	1	max	0	50	.018	11	.068	8	0	50	0	50	0	50
14			min	0	1	-.019	5	-.077	2	0	1	0	1	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[l...	LC	z Shear[lb]	LC	Torque[l...	LC	y-y Moment[lb-in]	LC	z-z Mom...	LC
15		2	max	87.918	8	33.153	12	119.089	20	1454.775	13	1377.663	2	724.889	11
16			min	-603.215	2	-24.338	6	-9.5	2	-1053.977	7	-1544.698	8	-605.965	5
17		3	max	0	50	.005	5	.025	14	0	50	0	50	0	50
18			min	0	1	-.005	11	-.017	8	0	1	0	1	0	1
19	M4	1	max	0	50	.017	11	.039	8	0	50	0	50	0	50
20			min	0	1	-.017	5	-.041	2	0	1	0	1	0	1
21		2	max	114.762	3	33.595	11	10.884	12	2264.47	2	699.695	3	314.543	11
22			min	-197.897	9	-13.058	5	-6.164	6	-1921.118	8	-878.13	9	-196.821	5
23		3	max	0	50	.004	5	.012	2	0	50	0	50	0	50
24			min	0	1	-.004	11	-.012	8	0	1	0	1	0	1
25	M5	1	max	0	50	.03	11	.026	9	0	50	0	50	0	50
26			min	0	1	-.027	5	-.025	3	0	1	0	1	0	1
27		2	max	61.387	12	16.03	2	21.014	7	1798.603	10	312.138	4	388.551	12
28			min	-157.566	6	-31.507	8	-3.866	13	-1457.499	4	-323.642	10	-630.885	6
29		3	max	0	50	.008	5	.007	3	0	50	0	50	0	50
30			min	0	1	-.009	11	-.007	9	0	1	0	1	0	1
31	M6	1	max	0	50	.058	22	.042	9	0	50	0	50	0	50
32			min	0	1	-.043	4	-.036	3	0	1	0	1	0	1
33		2	max	174.626	4	-25.92	7	-20.006	7	799.505	5	2294.173	2	1291.471	10
34			min	-741.605	10	-117.961	25	-72.56	23	-1072.866	11	-2057.231	8	-1505.951	4
35		3	max	0	50	.011	4	.009	3	0	50	0	50	0	50
36			min	0	1	-.022	22	-.014	21	0	1	0	1	0	1
37	M7	1	max	0	50	.028	22	.029	8	0	50	0	50	0	50
38			min	0	1	-.023	4	-.026	2	0	1	0	1	0	1
39		2	max	32.06	4	15.333	5	28.299	2	1562.844	3	1901.799	2	1177.748	10
40			min	-263.267	10	-20.994	11	-73.023	8	-2046.651	9	-1446.284	8	-1471.254	4
41		3	max	0	50	.009	4	.008	2	0	50	0	50	0	50
42			min	0	1	-.009	10	-.009	8	0	1	0	1	0	1
43	M8	1	max	0	50	.055	22	.039	9	0	50	0	50	0	50
44			min	0	1	-.044	4	-.035	3	0	1	0	1	0	1
45		2	max	32.042	3	-20.145	11	29.64	8	1435.826	9	1189.627	2	713.583	11
46			min	-589.688	21	-106.102	17	-72.407	2	-1022.249	3	-1199.241	8	-937.073	5
47		3	max	0	50	.01	4	.008	3	0	50	0	50	0	50
48			min	0	1	-.02	22	-.012	21	0	1	0	1	0	1
49	M9	1	max	0	50	.029	12	.032	8	0	50	0	50	0	50
50			min	0	1	-.032	6	-.03	2	0	1	0	1	0	1
51		2	max	187.284	10	6.305	13	15.229	12	2048.924	7	600.593	4	656.84	2
52			min	-352.905	4	-15.005	7	-39.909	6	-1622.876	13	-271.996	10	-429.873	8
53		3	max	0	50	.007	6	.008	2	0	50	0	50	0	50
54			min	0	1	-.008	12	-.009	8	0	1	0	1	0	1
55	M10	1	max	0	50	.044	12	.043	7	0	50	0	50	0	50
56			min	0	1	-.057	18	-.037	13	0	1	0	1	0	1
57		2	max	-24.069	11	94.39	24	24.267	8	1207.75	5	1334.637	2	976.695	12
58			min	-483.195	17	4.686	6	-80.009	2	-764.755	11	-1217.529	8	-984.81	6
59		3	max	0	50	.021	18	.009	13	0	50	0	50	0	50
60			min	0	1	-.011	12	-.014	19	0	1	0	1	0	1
61	M11	1	max	0	50	.041	12	.039	7	0	50	0	50	0	50
62			min	0	1	-.058	18	-.033	13	0	1	0	1	0	1
63		2	max	206.891	13	115.72	17	-1.642	7	1002.761	13	2288.16	2	1543.738	11
64			min	-675.015	7	44.08	11	-60.395	25	-1468.048	7	-2299.58	8	-1353.915	5
65		3	max	0	50	.022	18	.009	13	0	50	0	50	0	50
66			min	0	1	-.011	12	-.015	19	0	1	0	1	0	1
67	M12	1	max	0	50	.026	11	.027	8	0	50	0	50	0	50
68			min	0	1	-.034	17	-.025	2	0	1	0	1	0	1
69		2	max	395.808	13	52.559	18	66.49	3	1479.485	12	1206.924	13	1285.791	10
70			min	-693.672	7	-9.25	12	-46.765	9	-1892.71	6	-1114.995	7	-588.457	4
71		3	max	0	50	.009	5	.007	13	0	50	0	50	0	50

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[l...	LC	z Shear[lb]	LC	Torque[l...	LC	y-y Moment[lb-in]	LC	z-z Mom...	LC
72			min	0	1	-.008	11	-.006	7	0	1	0	1	0	1
73	M13	1	max	0	50	.021	11	.34	20	0	50	0	50	0	50
74			min	0	1	-.022	5	-.011	2	0	1	0	1	0	1
75		2	max	116.82	25	110.401	11	110.506	8	0	50	105.278	8	103.397	5
76			min	45.608	2	-110.402	5	-110.391	2	0	1	-103.2	2	-103.379	11
77		3	max	0	50	0	5	0	2	0	50	0	50	0	50
78			min	0	1	0	11	-.016	20	0	1	0	1	0	1
79	M14	1	max	483.985	8	-49.338	26	230.488	6	12.779	6	2040.882	23	-1539.755	12
80			min	-454.011	2	-219.483	19	-70.847	12	-16.208	13	-98.213	5	-8526.105	18
81		2	max	483.985	8	-82.084	13	230.488	6	12.779	6	1317.88	26	-1511.639	12
82			min	-454.011	2	-250.06	19	-70.847	12	-16.208	13	96.467	2	-3944.723	26
83		3	max	483.985	8	-101.124	13	230.488	6	12.779	6	1594.225	6	1906.931	6
84			min	-454.011	2	-343.331	26	-70.847	12	-16.208	13	-1498.783	13	-1281.573	12
85	M15	1	max	320.288	8	-46.071	26	159.595	4	16.214	3	3013.548	22	-2754.77	11
86			min	-411.636	2	-214.301	21	-94.06	10	-12.353	10	-281.584	4	-7229.077	18
87		2	max	320.288	8	-91.254	3	159.595	4	16.214	3	1159.197	26	-1124.433	3
88			min	-411.636	2	-244.879	21	-94.06	10	-12.353	10	312.312	7	-4153.009	21
89		3	max	320.288	8	-110.294	3	159.595	4	16.214	3	1187.425	3	1581.261	3
90			min	-411.636	2	-340.065	26	-94.06	10	-12.353	10	-2159.149	9	-2099.259	9
91	M16	1	max	403.643	4	-42.527	26	252.994	2	15.631	2	1952.071	20	-944.525	8
92			min	-378.174	10	-210.594	14	-96.889	8	-19.021	8	-303.332	2	-8280.661	14
93		2	max	403.643	4	-71.156	8	252.994	2	15.631	2	1290.822	26	-1316.43	7
94			min	-378.174	10	-241.139	14	-96.889	8	-19.021	8	135.04	9	-3811.745	26
95		3	max	403.643	4	-90.175	8	252.994	2	15.631	2	1818	2	2150.219	2
96			min	-378.174	10	-336.217	26	-96.889	8	-19.021	8	-1666.946	8	-1489.666	8
97	M17	1	max	260.721	4	-39.491	26	158.412	12	16.035	12	2927.058	18	-2388.633	7
98			min	-334.335	10	-203.581	18	-99.244	6	-12.087	6	-310.771	12	-6940.038	25
99		2	max	260.721	4	-91.911	12	158.412	12	16.035	12	1124.737	26	-1276.234	11
100			min	-334.335	10	-234.133	18	-99.244	6	-12.087	6	293.235	3	-3981.447	26
101		3	max	260.721	4	-110.935	12	158.412	12	16.035	12	1098	12	1337.577	12
102			min	-334.335	10	-333.265	26	-99.244	6	-12.087	6	-2105.383	6	-1894.893	6
103	M18	1	max	335.398	12	341.713	26	90.547	10	11.952	10	1118.15	4	1349.48	4
104			min	-417.924	6	118.769	4	-166.292	4	-14.701	4	-2014.029	10	-1793.608	10
105		2	max	335.398	12	245.008	23	90.547	10	11.952	10	1163.925	26	-1308.235	6
106			min	-417.924	6	99.746	4	-166.292	4	-14.701	4	299.643	13	-4143.288	24
107		3	max	335.398	12	214.455	23	90.547	10	11.952	10	2910.274	22	-2428.626	9
108			min	-417.924	6	47.94	26	-166.292	4	-14.701	4	-291.568	4	-7465.686	15
109	M19	1	max	367.011	13	345.764	26	113.367	8	19.586	8	2103.187	2	2442.101	2
110			min	-357.94	7	94.596	8	-284.911	2	-15.441	2	-1881.609	8	-1709.811	8
111		2	max	367.011	13	256.548	14	113.367	8	19.586	8	1328.367	26	-1382.487	9
112			min	-357.94	7	75.577	8	-284.911	2	-15.441	2	158.522	7	-4000.94	15
113		3	max	367.011	13	226.003	14	113.367	8	19.586	8	2121.001	8	-909.253	8
114			min	-357.94	7	52.073	26	-284.911	2	-15.441	2	-491.932	2	-8932.649	14
115	M20	1	max	1734.927	6	28.612	10	16.252	9	5.628	9	311.278	3	477.728	15
116			min	-533.933	12	-12.927	4	-17.257	3	-7.261	3	-442.826	9	-15.992	9
117		2	max	1756.204	6	19.533	7	13.387	13	5.628	9	125.568	22	492	2
118			min	-543.417	12	-12.915	13	-14.532	7	-7.261	3	-15.648	5	-378.833	8
119		3	max	1777.48	6	32.382	6	41.487	2	5.628	9	413.685	3	1388.912	13
120			min	-552.901	12	-34.807	12	-42.557	8	-7.261	3	-307.769	9	-1342.913	7
121	M21	1	max	746.946	5	22.494	10	24.094	8	-.089	11	177.587	4	-5.142	7
122			min	-685.209	11	-20.58	4	-15.717	2	-4.63	16	-296.455	10	-468.736	25
123		2	max	770.602	5	4.242	7	13.374	2	-.089	11	131.433	9	206.254	6
124			min	-697.073	11	-11.468	13	-4.996	8	-4.63	16	-125.763	3	-412.515	12
125		3	max	794.259	5	17.817	6	42.464	2	-.089	11	279.203	4	643.307	2
126			min	-708.936	11	-34.111	12	-34.087	8	-4.63	16	-340.384	10	-425.176	8
127	M22	1	max	1787.801	10	37.609	4	44.935	8	6.021	13	462.658	13	1595.427	3
128			min	-824.326	4	-33.138	10	-43.499	2	-5.282	7	-421.238	7	-1500.978	9

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[l...	LC	z Shear[lb]	LC	Torque[l...	LC	y-y Moment[lb-in]	LC	z-z Mom...	LC
129		2	max	1766.485	10	14.695	3	17.374	9	6.021	13	111.685	17	592.504	2
130			min	-814.803	4	-19.267	9	-15.936	3	-5.282	7	-28.983	10	-471.761	8
131		3	max	1745.169	10	11.914	13	16.452	13	6.021	13	299.071	13	475.246	25
132			min	-805.279	4	-25.631	7	-14.988	7	-5.282	7	-392.3	7	-100.889	7
133	M23	1	max	1084.948	11	33.326	5	34.989	8	4.217	24	332.03	13	708.141	2
134			min	-419.186	5	-19.588	11	-42.335	2	-.149	6	-375.351	7	-504.804	8
135		2	max	1061.246	11	9.548	3	6.156	9	4.217	24	100.129	7	212.483	11
136			min	-407.277	5	-4.871	9	-13.542	3	-.149	6	-104.303	13	-352.273	5
137		3	max	1037.544	11	17.916	12	15.901	2	4.217	24	169.723	12	38.561	10
138			min	-395.368	5	-22.424	6	-23.248	8	-.149	6	-329.67	6	-342.575	4
139	M24	1	max	2008.444	8	27.873	14	16.523	13	4.259	13	211.98	7	743.85	7
140			min	-874.664	2	-6.611	8	-20.638	7	-5.317	7	-315.459	13	-221.139	13
141		2	max	2029.721	8	14.737	10	10.32	5	4.259	13	124.611	14	571.287	7
142			min	-884.148	2	-5.894	4	-14.437	11	-5.317	7	6.651	10	-420.972	13
143		3	max	2050.998	8	31.413	9	38.017	6	4.259	13	557.123	7	1069.611	6
144			min	-893.633	2	-31.673	3	-42.092	12	-5.317	7	-463.27	13	-1096.322	12
145	M25	1	max	1475.143	9	19.907	2	24.998	12	.272	2	192.95	8	90.153	10
146			min	-1366.703	3	-18.175	8	-16.614	6	-4.068	20	-299.724	2	-497.696	4
147		2	max	1498.799	9	4.19	11	12.782	5	.272	2	112.794	12	281.973	10
148			min	-1378.566	3	-11.666	5	-4.394	11	-4.068	20	-103.955	6	-448.883	4
149		3	max	1522.455	9	19.557	9	41.566	6	.272	2	324.268	8	630.402	6
150			min	-1390.43	3	-36.03	3	-33.182	12	-4.068	20	-391.838	2	-360.421	12
151	M26	1	max	1662.777	3	34.647	9	41.554	12	4.381	5	527.097	5	1307.388	7
152			min	-755.048	9	-30.983	3	-40.008	6	-3.146	11	-454.981	11	-1169.276	13
153		2	max	1639.076	3	8.753	8	14.988	13	4.381	5	137.619	8	513.511	6
154			min	-743.139	9	-14.159	2	-13.482	7	-3.146	11	-47.404	3	-325.499	12
155		3	max	1615.374	3	7.198	4	20.079	5	4.381	5	203.541	5	633.142	5
156			min	-731.231	9	-24.364	22	-18.422	11	-3.146	11	-291.593	11	-199.094	11
157	M27	1	max	1695.149	3	36.853	9	32.71	12	4.622	16	335.036	5	671.077	7
158			min	-1111.78	9	-21.606	3	-41.433	6	-.5	9	-373.058	11	-364.549	13
159		2	max	1671.448	3	11.071	8	4.804	13	4.622	16	110.794	11	253.043	2
160			min	-1099.871	9	-4.901	2	-13.518	7	-.5	9	-105.142	6	-362.892	8
161		3	max	1647.746	3	15.726	4	16.802	6	4.622	16	159.307	4	117.601	3
162			min	-1087.962	9	-18.707	10	-25.526	12	-.5	9	-303.926	10	-443.911	8
163	M28	1	max	2123.107	2	26.651	5	14.975	5	4.027	5	236.092	11	510.739	25
164			min	-939.306	8	-10.792	11	-16.681	11	-5.703	11	-354.192	5	-54.269	8
165		2	max	2144.384	2	23.056	3	17.962	9	4.027	5	130.418	18	366.693	10
166			min	-948.79	8	-16.343	9	-19.638	3	-5.703	11	-18.083	12	-238.276	4
167		3	max	2165.661	2	37.367	2	44.506	10	4.027	5	437.306	11	1484.698	9
168			min	-958.274	8	-39.72	8	-46.197	4	-5.703	11	-338.446	5	-1437.115	3
169	M29	1	max	968.26	13	19.975	6	25.127	4	.376	7	177.578	12	124.203	2
170			min	-800.356	7	-17.585	12	-16.811	10	-5.214	24	-321.731	6	-601.947	8
171		2	max	991.916	13	4.708	3	13.461	9	.376	7	136.669	4	272.104	2
172			min	-812.219	7	-11.487	9	-5.153	3	-5.214	24	-149.95	10	-524.763	8
173		3	max	1015.572	13	20.213	13	41.369	10	.376	7	268.29	12	485.782	9
174			min	-824.082	7	-35.995	7	-33.052	4	-5.214	24	-341.896	6	-321.358	3
175	M30	1	max	1668.439	6	35.203	12	40.994	4	7.112	9	463.794	9	1255.13	11
176			min	-665.611	12	-30.327	6	-41.009	10	-5.922	3	-399.886	3	-1135.979	5
177		2	max	1647.123	6	10.986	11	13.673	5	7.112	9	111.04	14	415.226	9
178			min	-656.087	12	-15.173	5	-13.621	11	-5.922	3	-9.706	7	-302.019	3
179		3	max	1625.807	6	10.33	8	18.259	9	7.112	9	246.691	9	437.658	8
180			min	-646.564	12	-23.636	2	-18.299	3	-5.922	3	-362.213	3	-132.949	2
181	M31	1	max	1190.329	7	33.471	13	32.128	4	5.188	8	316.052	9	552.566	10
182			min	-631.86	13	-19.017	7	-39.89	10	-1.011	2	-368.24	3	-352.853	4
183		2	max	1166.627	7	8.118	11	3.284	5	5.188	8	107.469	4	270.095	6
184			min	-619.951	13	-2.69	5	-11.062	11	-1.011	2	-113.775	10	-443.243	12
185		3	max	1142.926	7	17.949	7	18.346	10	5.188	8	177.453	8	49.82	7

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[l...	LC	z Shear[lb]	LC	Torque[l...	LC	y-y Moment[lb-in]	LC	z-z Mom...	LC
186			min	-608.042	13	-21.722	13	-26.107	4	-1.011	2	-330.869	2	-403.334	13
187	M32	1	max	750	38	.015	11	.021	8	0	50	0	50	0	50
188			min	0	1	-.485	30	-.513	27	0	1	0	1	0	1
189		2	max	354.932	29	80.691	37	64.123	5	4923.305	7	104.855	10	185.849	11
190			min	-12.695	10	-122.358	6	-59.025	11	-4879.564	13	-140.687	29	-326.9	5
191		3	max	0	50	.01	5	.015	2	0	50	0	50	0	50
192			min	0	1	-.011	11	-.015	8	0	1	0	1	0	1
193	M33	1	max	750	38	.152	36	.644	33	0	50	0	50	0	50
194			min	0	1	-.186	30	-.022	2	0	1	0	1	0	1
195		2	max	346.485	35	149.954	13	78.008	7	3760.206	11	179.842	27	316.135	13
196			min	-90.058	4	-110.231	7	-93.035	38	-3979.781	5	-270.002	8	-265.809	7
197		3	max	0	50	.01	5	.016	2	0	50	0	50	0	50
198			min	0	1	-.009	11	-.015	8	0	1	0	1	0	1
199	M34	1	max	750	38	.526	36	.112	33	0	50	0	50	0	50
200			min	0	1	-.013	5	-.314	27	0	1	0	1	0	1
201		2	max	302.835	6	156.741	11	176.928	8	4863.622	3	400.415	2	392.763	11
202			min	-586.734	12	-158.247	5	-223.728	2	-5047.609	9	-267.998	8	-361.026	5
203		3	max	0	50	.009	5	.012	2	0	50	0	50	0	50
204			min	0	1	-.009	11	-.012	8	0	1	0	1	0	1
205	M35	1	max	1114.684	14	-106.022	5	1787.459	12	-1458.721	6	6972.842	6	4712.093	10
206			min	-169.33	8	-1560.69	23	-1762.109	6	-5575.678	24	-7141.867	12	-1623.586	4
207		2	max	1143.194	26	1449.274	25	1795.59	7	5526.129	24	7782.876	13	17161.5...	2
208			min	118.974	4	-143.56	7	-1868.874	13	1446.3	6	-7490.629	7	-4261.073	8
209		3	max	1143.194	26	1436.717	25	1795.59	7	5526.129	24	6969.078	6	6735.662	2
210			min	118.974	4	-155.096	7	-1868.874	13	1446.3	6	-7260.432	12	-3553.018	8
211	M36	1	max	1288.301	19	281.937	9	1874.478	3	-1641.772	10	7507.185	10	6108.136	13
212			min	-224.952	13	-1614.655	3	-1971.406	9	-5521.819	16	-7176.519	4	-3291.406	7
213		2	max	1288.301	19	269.586	9	1874.478	3	-1641.772	10	7815.978	3	18032.5...	2
214			min	-224.952	13	-1627.005	3	-1971.406	9	-5521.819	16	-8244.579	9	-4543.25	8
215		3	max	1226.79	26	1395.44	17	1836.155	10	5568.499	16	7305.346	10	7696.654	7
216			min	329.21	8	128.793	12	-1736.131	4	1521.772	10	-6939.667	4	-4391.063	13
217	M37	1	max	966.653	26	-133.175	13	2291.647	8	-1223.384	2	8336.929	2	7155.678	6
218			min	82.47	4	-1527.702	19	-2124.641	2	-5645.824	20	-9016.014	8	-4072.644	12
219		2	max	979.091	26	1642.859	9	2162.563	7	5166.284	16	9208.527	8	16772.1...	6
220			min	263.681	2	-1540.7	19	-2223.362	8	-5645.824	20	-8559.486	2	-1586.707	2
221		3	max	979.091	26	1631.084	9	2047.582	2	5599.195	20	8129.493	2	4147.424	11
222			min	-96.848	12	-394.697	3	-2223.362	8	1319.405	2	-8858.994	8	-973.922	5
223	M38	1	max	2104.565	6	375.874	3	5.716	9	11.567	9	84.887	5	3947.389	2
224			min	-2766.594	12	-347.04	9	-5.417	3	-13.302	3	-107.712	11	-3582.258	8
225		2	max	2104.565	6	365.696	3	5.716	9	11.567	9	81.575	6	1164.034	2
226			min	-2766.594	12	-357.218	9	-5.417	3	-13.302	3	-101.38	12	-944.451	8
227		3	max	2104.565	6	355.518	3	5.716	9	11.567	9	97.718	7	2129.019	9
228			min	-2766.594	12	-367.396	9	-5.417	3	-13.302	3	-115.385	13	-1893.395	3
229	M39	1	max	2292.111	10	520.903	13	8.182	2	7.108	4	91.585	5	3315.844	13
230			min	-3062.598	4	-540.065	7	-6.83	8	-11.444	10	-77.985	11	-3393.512	7
231		2	max	2292.111	10	510.725	13	8.182	2	7.108	4	103.53	4	954.798	7
232			min	-3062.598	4	-550.243	7	-6.83	8	-11.444	10	-78.884	10	-798.439	13
233		3	max	2292.111	10	500.546	13	8.182	2	7.108	4	149.873	3	5384.292	7
234			min	-3062.598	4	-560.421	7	-6.83	8	-11.444	10	-114.393	9	-4831.538	13
235	M40	1	max	2797.554	2	400.971	6	4.973	5	19.14	2	133.741	9	4552.644	6
236			min	-3644.494	8	-371.129	12	-5.922	11	-20.125	8	-99.988	3	-4201.231	12
237		2	max	2797.554	2	390.823	6	4.973	5	19.14	2	126.56	8	1404.237	6
238			min	-3644.494	8	-381.277	12	-5.922	11	-20.125	8	-100.248	2	-1209.441	12
239		3	max	2797.554	2	380.675	6	4.973	5	19.14	2	132.087	7	1863.05	12
240			min	-3644.494	8	-391.425	12	-5.922	11	-20.125	8	-113.659	13	-1663.467	6
241	M41	1	max	174.094	10	307.372	11	361.935	13	37.777	4	4513.153	5	5486.471	9
242			min	-422.666	5	-200.447	5	-1008.022	7	-37.76	10	-2157.088	11	-4708.809	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[l...	LC	z Shear[lb]	LC	Torque[l...	LC	y-y Moment[lb-in]	LC	z-z Mom...	LC
243		2	max	1016.607	2	151.992	13	37.062	10	1995.96	20	2522.618	14	7493.18	26
244			min	-1805.625	8	-53.137	7	-66.778	4	607.112	3	117.894	8	1572.061	2
245		3	max	-23.344	5	76.375	10	1269.338	9	17.992	4	4564.921	9	6438.925	7
246			min	-579.779	23	-302.858	4	-549.329	3	-15.369	10	-3579.938	3	-3905.683	13
247	M42	1	max	476.18	9	85.89	2	993.388	2	28.36	2	2498.744	7	2064.083	10
248			min	-816.736	3	-335.857	33	-565.918	8	-17.503	7	-3975.325	13	-1133.707	4
249		2	max	169.844	6	287.616	7	174.601	14	2268.856	25	1373.042	6	-4017.815	13
250			min	-938.536	24	-276.099	18	-34.099	9	-2207.19	23	-1573.631	13	-10092.8...	26
251		3	max	508.967	3	408.669	4	277.145	4	20.351	5	1506.882	5	63.071	2
252			min	-889.863	9	-64.253	10	-1067.881	10	-23.798	11	-3452.892	10	-2020.719	33
253	M43	1	max	187.206	7	265.928	7	664.253	9	26.356	13	4649.432	2	4359.075	5
254			min	-373.402	13	-137.718	13	-1116.751	3	-22.769	7	-3744.793	8	-4106.962	11
255		2	max	873.784	10	195.499	20	46.138	7	1542.139	17	3916.886	21	6321.668	26
256			min	-1560.225	4	-20.971	2	-72.537	13	490.303	11	1264.171	3	1430.036	10
257		3	max	115.314	13	237.203	7	922.915	5	52.15	2	4074.135	7	6122.992	3
258			min	-580.201	7	-391.623	13	-344.163	11	-35.574	8	-3282.076	13	-4233.339	9
259	M44	1	max	1354.733	13	195.911	7	1813.578	12	43.458	3	5894.851	5	2083.051	8
260			min	-1184.982	7	-438.632	13	-1393.981	6	-30.29	9	-6406.094	11	-2737.592	2
261		2	max	954.53	23	631.222	11	176.623	6	479.007	6	7486.179	8	32139.2...	8
262			min	162.909	30	-512.29	5	-225.429	12	-103.009	12	-12068.308	2	-35160.4...	2
263		3	max	1731.676	3	631.018	3	1389.69	10	18.076	4	3984.166	11	1438.569	9
264			min	-1396.934	9	-454.387	9	-1857.451	4	-17.571	10	-5491.911	5	-1540.304	3
265	M45	1	max	1517.389	7	770.874	9	1823.785	2	26.901	13	5367.338	8	5007.429	10
266			min	-1118.923	13	-487.191	3	-2367.503	8	-28.391	7	-5089.641	2	-2608.112	4
267		2	max	1056.845	18	778.252	8	181.604	9	460.663	10	4824.711	6	35226.2...	6
268			min	-246.029	12	-867.739	3	-207.502	2	-564.274	2	-6175.329	12	-25707.2...	12
269		3	max	1038.879	5	486.215	9	2264.211	3	26.261	4	5755.636	3	4238.901	2
270			min	-800.209	11	-684.271	3	-1761.848	9	-16.764	10	-4914.475	9	-3446.392	8
271	M46	1	max	1555.064	9	395.478	2	2449.602	8	27.629	13	5892.591	13	1042.348	3
272			min	-1300.125	3	-681.892	8	-1877.343	2	-18.666	7	-7105.509	7	-2976.56	9
273		2	max	924.048	20	719.055	7	238.938	2	537.516	2	5713.35	4	25551.6...	4
274			min	129.683	27	-669.523	13	-287.209	8	-119.251	8	-9763.975	10	-28168.9...	10
275		3	max	1264.739	11	326.318	11	1568.128	7	47.078	3	6659.684	8	1882.556	4
276			min	-966.624	5	-227.107	5	-1961.317	13	-45.529	9	-8288.555	2	-966.102	10
277	M47	1	max	2242.595	6	694.596	26	340.789	12	-103.948	12	4182.099	7	24386.3...	26
278			min	-2118.454	12	70.208	9	-373.3	6	-374.643	18	-13733.091	13	-341.752	11
279		2	max	2259.177	6	97.315	3	32.939	9	93.933	2	4034.089	12	7166.049	24
280			min	-2305.985	12	-103.348	9	-62.279	3	-79.054	8	-3845.208	6	2172.359	6
281		3	max	2167.269	6	-92.055	3	406.855	6	369.301	18	2701.887	5	24840.4...	26
282			min	-2292.574	12	-676.776	26	-338.994	12	66.775	12	-11684.991	11	-2991.472	13
283	M48	1	max	2115.175	10	666.051	26	302.237	4	-74.097	4	2376.904	11	24307.4...	26
284			min	-2267.95	4	89.735	13	-352.972	10	-367.665	22	-11727.373	26	-1806.304	3
285		2	max	2204.26	10	96.603	7	82.706	2	73.958	8	3838.886	4	7466.117	16
286			min	-2295.124	4	-91.15	13	-47.595	8	-90.52	2	-3666.098	10	2584.626	11
287		3	max	2195.444	10	-74.103	7	369.566	10	371.608	22	3675.658	9	24314.5...	26
288			min	-2130.819	4	-686.812	26	-344.91	4	104.534	4	-13084.434	3	-667.36	5
289	M49	1	max	2584.523	2	673.468	26	366.979	8	-50.022	8	3861.112	3	24561.7...	26
290			min	-2675.622	8	113.733	5	-434.636	2	-372.169	14	-12810.259	9	-1853.536	7
291		2	max	2700.581	2	77.912	11	70.814	7	60.46	12	4645.246	8	7230.317	20
292			min	-2722.616	8	-72.958	5	-28.71	13	-76.926	6	-4528.753	2	2305.986	2
293		3	max	2688.209	2	-107.319	12	447.293	2	374.249	14	4244.768	13	24481.4...	26
294			min	-2553.189	8	-694.106	26	-413.525	8	94.113	8	-13649.85	7	-2102.672	9
295	M50	1	max	27.496	7	211.269	9	23.866	17	513.519	5	1895.134	8	467.185	3
296			min	-34.149	2	-101.462	3	-1.468	35	-939.285	11	-2298.072	2	-384.992	9
297		2	max	27.496	7	211.269	9	23.866	17	513.519	5	1908.127	8	619.379	3
298			min	-34.149	2	-101.462	3	-1.468	35	-939.285	11	-2281.271	2	-701.896	9
299		3	max	27.496	7	211.269	9	23.866	17	513.519	5	1921.119	8	771.572	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[l...	LC	z Shear[lb]	LC	Torque[l...	LC	y-y Moment[lb-in]	LC	z-z Mom...	LC
300			min	-34.149	2	-101.462	3	-1.468	35	-939.285	11	-2264.47	2	-1018.799	9
301	M51	1	max	27.466	9	128.093	3	39.545	5	595.219	5	2297.084	2	184.109	6
302			min	-19.753	3	-184.651	9	-60.968	11	-1155.216	11	-1895.935	8	-331.908	12
303		2	max	27.466	9	128.093	3	39.545	5	595.219	5	2280.777	2	288.579	8
304			min	-19.753	3	-184.651	9	-60.968	11	-1155.216	11	-1908.526	8	-343.891	2
305		3	max	27.466	9	128.093	3	39.545	5	595.219	5	2264.47	2	513.99	8
306			min	-19.753	3	-184.651	9	-60.968	11	-1155.216	11	-1921.118	8	-484.858	2
307	M52	1	max	194.641	8	776.703	14	166.082	5	715.595	10	1056.354	8	298.727	2
308			min	-282.776	2	-27.377	8	-156.29	11	-965.513	4	-1481.809	2	-82.305	8
309		2	max	194.641	8	776.703	14	166.082	5	715.595	10	1041.709	8	-41.24	8
310			min	-282.776	2	-27.377	8	-156.29	11	-965.513	4	-1451.498	2	-869.823	25
311		3	max	194.641	8	776.703	14	166.082	5	715.595	10	1053.991	7	-.175	8
312			min	-282.776	2	-27.377	8	-156.29	11	-965.513	4	-1454.774	13	-2033.263	25
313	M53	1	max	158.417	8	114.556	8	61.693	5	819.775	6	1607.801	13	-1778.324	3
314			min	-70.229	2	-575.475	2	-71.4	11	-993.816	12	-1177.31	7	-4762.279	21
315		2	max	158.417	8	114.556	8	61.693	5	819.775	6	1531.288	13	-1036.041	2
316			min	-70.229	2	-575.475	2	-71.4	11	-993.816	12	-1115.644	7	-4209.321	21
317		3	max	158.417	8	114.556	8	61.693	5	819.775	6	1454.776	13	-172.828	2
318			min	-70.229	2	-575.475	2	-71.4	11	-993.816	12	-1053.977	7	-3685.445	20
319	M54	1	max	413.208	8	1104.062	2	239.18	5	1708.295	11	1341.518	2	338.529	15
320			min	-509.583	2	-305.555	8	-247.808	11	-1485.558	5	-1005.041	8	78.648	11
321		2	max	413.208	8	1104.062	2	239.18	5	1708.295	11	1316.418	2	597.738	8
322			min	-509.583	2	-305.555	8	-247.808	11	-1485.558	5	-996.133	8	-1512.331	2
323		3	max	413.208	8	1104.062	2	239.18	5	1708.295	11	1359.997	3	1056.071	8
324			min	-509.583	2	-305.555	8	-247.808	11	-1485.558	5	-1047.296	9	-3168.423	2
325	M55	1	max	284.485	8	590.169	8	125.886	5	1586.617	5	1243.164	9	-1535.111	13
326			min	-188.248	2	-821.639	2	-117.348	11	-1439.972	11	-1586.494	3	-4739.757	18
327		2	max	284.485	8	590.169	8	125.886	5	1586.617	5	1145.231	9	-465.839	2
328			min	-188.248	2	-821.639	2	-117.348	11	-1439.972	11	-1473.244	3	-4582.076	20
329		3	max	284.485	8	590.169	8	125.886	5	1586.617	5	1047.299	9	766.619	2
330			min	-188.248	2	-821.639	2	-117.348	11	-1439.972	11	-1359.994	3	-4550.101	8
331	M56	1	max	281.921	8	474.301	2	116.463	5	982.405	11	2482.853	13	224.699	11
332			min	-301.27	2	-133.66	8	-153.428	11	-192.414	5	-1914.42	7	-68.069	5
333		2	max	281.921	8	474.301	2	116.463	5	982.405	11	2434.061	2	331.058	9
334			min	-301.27	2	-133.66	8	-153.428	11	-192.414	5	-1926.668	8	-689.664	3
335		3	max	281.921	8	474.301	2	116.463	5	982.405	11	2405.259	2	524.979	9
336			min	-301.27	2	-133.66	8	-153.428	11	-192.414	5	-1959.44	8	-1400.033	3
337	M57	1	max	186.012	8	342.229	8	114.941	5	1822.688	5	1902.681	8	147.917	11
338			min	-166.687	2	-265.962	2	-77.987	11	-870.703	11	-2453.762	2	-298.588	5
339		2	max	186.012	8	342.229	8	114.941	5	1822.688	5	1931.06	8	277.488	2
340			min	-166.687	2	-265.962	2	-77.987	11	-870.703	11	-2429.51	2	-535.604	7
341		3	max	186.012	8	342.229	8	114.941	5	1822.688	5	1959.439	8	676.431	2
342			min	-166.687	2	-265.962	2	-77.987	11	-870.703	11	-2405.258	2	-1046.734	8
343	M58	1	max	31.09	11	366.375	4	50.173	7	395.437	11	1694.922	13	544.253	6
344			min	-33.786	6	-173.798	10	-23.693	13	-942.934	5	-2201.503	7	-393.273	12
345		2	max	31.09	11	366.375	4	50.173	7	395.437	11	1658.897	13	437.484	8
346			min	-33.786	6	-173.798	10	-23.693	13	-942.934	5	-2125.213	7	-582.59	2
347		3	max	31.09	11	366.375	4	50.173	7	395.437	11	1622.871	13	572.215	9
348			min	-33.786	6	-173.798	10	-23.693	13	-942.934	5	-2048.923	7	-1012.762	3
349	M59	1	max	25.053	13	200.816	10	25.35	11	436.978	11	2119.467	7	316.677	10
350			min	-19.919	7	-339.369	4	-52.592	4	-1104.217	5	-1614.221	13	-545.337	4
351		2	max	25.053	13	200.816	10	25.35	11	436.978	11	2084.191	7	96.61	13
352			min	-19.919	7	-339.369	4	-52.592	4	-1104.217	5	-1618.545	13	-119.235	32
353		3	max	25.053	13	200.816	10	25.35	11	436.978	11	2048.915	7	494.255	3
354			min	-19.919	7	-339.369	4	-52.592	4	-1104.217	5	-1622.868	13	-300.523	9
355	M60	1	max	127.62	12	688.813	17	232.827	9	1209.193	2	895.33	13	292.236	17
356			min	-220.398	6	86.942	11	-223.75	3	-1429.86	8	-1353.951	7	-33.235	11

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[l...	LC	z Shear[lb]	LC	Torque[l...	LC	y-y Moment[lb-in]	LC	z-z Mom...	LC
357		2	max	127.62	12	688.813	17	232.827	9	1209.193	2	790.814	12	-165.433	11
358			min	-220.398	6	86.942	11	-223.75	3	-1429.86	8	-1245.725	6	-755.122	17
359		3	max	127.62	12	688.813	17	232.827	9	1209.193	2	764.699	11	-297.631	11
360			min	-220.398	6	86.942	11	-223.75	3	-1429.86	8	-1207.792	5	-1802.48	17
361	M61	1	max	135.542	13	4.206	11	88.798	9	1234.946	9	1367.045	5	-1355.368	8
362			min	-40.9	7	-419.388	17	-97.895	3	-1390.702	3	-896.357	11	-4714.679	14
363		2	max	135.542	13	4.206	11	88.798	9	1234.946	9	1287.4	5	-1066.711	8
364			min	-40.9	7	-419.388	17	-97.895	3	-1390.702	3	-830.551	11	-4152.416	25
365		3	max	135.542	13	4.206	11	88.798	9	1234.946	9	1207.756	5	-629.881	7
366			min	-40.9	7	-419.388	17	-97.895	3	-1390.702	3	-764.746	11	-3628.782	25
367	M62	1	max	250.349	13	860.6	19	418.192	9	2939.808	3	1131.091	5	263.921	19
368			min	-357.915	7	-78.853	13	-428.08	3	-2736.262	9	-660.247	11	103.88	2
369		2	max	250.349	13	860.6	19	418.192	9	2939.808	3	1096.271	6	224.997	13
370			min	-357.915	7	-78.853	13	-428.08	3	-2736.262	9	-621.537	12	-1088.585	7
371		3	max	250.349	13	860.6	19	418.192	9	2939.808	3	1468.026	7	344.895	13
372			min	-357.915	7	-78.853	13	-428.08	3	-2736.262	9	-1002.803	13	-2353.209	19
373	M63	1	max	212.571	12	369.452	13	195.918	9	2668.068	8	1459.333	2	-1694.874	5
374			min	-103.609	6	-511.879	7	-186.755	3	-2553.811	2	-1953.605	8	-4466.333	23
375		2	max	212.571	12	369.452	13	195.918	9	2668.068	8	1201.541	13	-1083.339	6
376			min	-103.609	6	-511.879	7	-186.755	3	-2553.811	2	-1681.743	7	-4374.149	24
377		3	max	212.571	12	369.452	13	195.918	9	2668.068	8	1002.763	13	-347.151	7
378			min	-103.609	6	-511.879	7	-186.755	3	-2553.811	2	-1468.039	7	-4303.272	25
379	M64	1	max	182.528	13	747.697	7	222.172	9	2003.992	3	2030.778	5	459.44	6
380			min	-201.017	7	-341.403	13	-264.42	3	-1162.027	9	-1499.41	11	-260.526	12
381		2	max	182.528	13	747.697	7	222.172	9	2003.992	3	1869.204	6	400.787	2
382			min	-201.017	7	-341.403	13	-264.42	3	-1162.027	9	-1393.124	12	-824.133	8
383		3	max	182.528	13	747.697	7	222.172	9	2003.992	3	1892.78	6	900.415	2
384			min	-201.017	7	-341.403	13	-264.42	3	-1162.027	9	-1479.548	12	-1941.643	8
385	M65	1	max	120.262	13	552.497	13	197.962	8	2954.818	8	1622.308	12	305.118	2
386			min	-101.781	7	-536.838	7	-154.786	2	-1976.962	2	-2152.267	6	-477.315	8
387		2	max	120.262	13	552.497	13	197.962	8	2954.818	8	1550.896	12	365.038	7
388			min	-101.781	7	-536.838	7	-154.786	2	-1976.962	2	-2022.487	6	-562.545	13
389		3	max	120.262	13	552.497	13	197.962	8	2954.818	8	1479.484	12	1181.314	7
390			min	-101.781	7	-536.838	7	-154.786	2	-1976.962	2	-1892.707	6	-1402.631	13
391	M66	1	max	35.555	3	171.152	18	27.924	24	437.225	2	1448.952	4	344.04	11
392			min	-40.696	10	-47.903	12	-1.381	30	-906.885	8	-1858.514	10	-246.004	5
393		2	max	35.555	3	171.152	18	27.924	24	437.225	2	1453.246	4	404.479	11
394			min	-40.696	10	-47.903	12	-1.381	30	-906.885	8	-1828.531	10	-494.494	6
395		3	max	35.555	3	171.152	18	27.924	24	437.225	2	1457.54	4	476.549	12
396			min	-40.696	10	-47.903	12	-1.381	30	-906.885	8	-1798.548	10	-754.592	6
397	M67	1	max	22.067	5	74.836	12	35.603	13	505.188	13	1857.591	10	329.867	2
398			min	-15.684	11	-144.127	6	-59.281	7	-1120.534	7	-1449.65	4	-501.658	8
399		2	max	22.067	5	74.836	12	35.603	13	505.188	13	1828.104	10	397.72	3
400			min	-15.684	11	-144.127	6	-59.281	7	-1120.534	7	-1453.576	4	-457.183	9
401		3	max	22.067	5	74.836	12	35.603	13	505.188	13	1798.617	10	513.654	4
402			min	-15.684	11	-144.127	6	-59.281	7	-1120.534	7	-1457.502	4	-468.533	10
403	M68	1	max	126.193	4	795.293	21	238.83	13	1125.139	7	736.675	4	401.347	10
404			min	-221.892	10	30.288	3	-226.653	7	-1403.957	13	-1182.01	10	-124.681	4
405		2	max	126.193	4	795.293	21	238.83	13	1125.139	7	795.542	3	-168	2
406			min	-221.892	10	30.288	3	-226.653	7	-1403.957	13	-1229.962	9	-838.584	20
407		3	max	126.193	4	795.293	21	238.83	13	1125.139	7	1022.225	3	-214.703	3
408			min	-221.892	10	30.288	3	-226.653	7	-1403.957	13	-1435.831	9	-2045.012	21
409	M69	1	max	133.131	16	59.896	3	82.901	13	1157.75	2	1652.655	9	-2000.227	12
410			min	-37.155	10	-543.476	9	-95.412	8	-1369.771	8	-1202.778	3	-4892.509	18
411		2	max	133.131	16	59.896	3	82.901	13	1157.75	2	1544.245	9	-1438.427	10
412			min	-37.155	10	-543.476	9	-95.412	8	-1369.771	8	-1112.513	3	-4257.422	16
413		3	max	133.131	16	59.896	3	82.901	13	1157.75	2	1435.834	9	-661.019	10

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[l...	LC	z Shear[lb]	LC	Torque[l...	LC	y-y Moment[lb-in]	LC	z-z Mom...	LC
414			min	-37.155	10	-543.476	9	-95.412	8	-1369.771	8	-1022.249	3	-3669.502	16
415	M70	1	max	234.458	3	971.515	22	435.908	2	3368.328	8	1610.22	9	371.945	23
416			min	-348.673	9	-46.805	4	-438.429	8	-3196.371	2	-1332.054	3	-54.512	5
417		2	max	234.458	3	971.515	22	435.908	2	3368.328	8	1146.009	10	52.71	3
418			min	-348.673	9	-46.805	4	-438.429	8	-3196.371	2	-869.231	4	-1109.251	22
419		3	max	234.458	3	971.515	22	435.908	2	3368.328	8	1072.89	11	118.066	4
420			min	-348.673	9	-46.805	4	-438.429	8	-3196.371	2	-799.495	5	-2586.465	22
421	M71	1	max	225.827	3	336.762	4	181.862	13	2348.444	13	1081.486	6	-1454.996	8
422			min	-111.683	9	-578.642	10	-176.642	7	-2262.285	7	-1383.781	12	-4919.318	14
423		2	max	225.827	3	336.762	4	181.862	13	2348.444	13	899.148	5	-795.288	9
424			min	-111.683	9	-578.642	10	-176.642	7	-2262.285	7	-1182.961	11	-4667.337	15
425		3	max	225.827	3	336.762	4	181.862	13	2348.444	13	799.504	5	10.52	9
426			min	-111.683	9	-578.642	10	-176.642	7	-2262.285	7	-1072.875	11	-4449.049	15
427	M72	1	max	169.376	3	399.807	22	214.586	13	1869.128	8	2613.843	9	383.581	9
428			min	-193.958	9	22.392	4	-251.017	7	-1082.398	2	-2015.337	3	-233.617	3
429		2	max	169.376	3	399.807	22	214.586	13	1869.128	8	2330.232	9	-27.344	8
430			min	-193.958	9	22.392	4	-251.017	7	-1082.398	2	-1789.103	3	-436.748	14
431		3	max	169.376	3	399.807	22	214.586	13	1869.128	8	2046.621	9	-213.966	5
432			min	-193.958	9	22.392	4	-251.017	7	-1082.398	2	-1562.868	3	-1008.608	24
433	M73	1	max	133.491	3	188.351	4	194.046	13	2969.988	13	1340.021	4	237.72	7
434			min	-108.862	9	-106.777	10	-157.895	7	-2026.493	7	-1924.138	10	-405.861	13
435		2	max	133.491	3	188.351	4	194.046	13	2969.988	13	1432.54	4	225.201	8
436			min	-108.862	9	-106.777	10	-157.895	7	-2026.493	7	-1963.267	10	-514.042	2
437		3	max	133.491	3	188.351	4	194.046	13	2969.988	13	1562.848	3	314.19	9
438			min	-108.862	9	-106.777	10	-157.895	7	-2026.493	7	-2046.652	9	-724.665	3
439	M74	1	max	94.547	38	366.258	35	169.27	12	3702.16	13	3354.746	11	2081.871	7
440			min	-103.817	7	-70.327	4	-130.073	6	-2719.664	7	-3699.825	5	-1174.45	38
441		2	max	94.547	38	366.258	35	169.27	12	3702.16	13	3557.475	11	2033.676	7
442			min	-103.817	7	-70.327	4	-130.073	6	-2719.664	7	-3839.804	5	-1713.843	38
443		3	max	94.547	38	366.258	35	169.27	12	3702.16	13	3760.204	11	1985.482	7
444			min	-103.817	7	-70.327	4	-130.073	6	-2719.664	7	-3979.782	5	-2253.236	38
445	M75	1	max	55.252	6	437.633	29	95.477	7	3555.442	13	3878.245	5	1883.768	7
446			min	-91.51	37	-118.15	10	-134.86	13	-2631.203	7	-3534.227	11	-1081.082	13
447		2	max	55.252	6	437.633	29	95.477	7	3555.442	13	3929.008	5	1873.149	7
448			min	-91.51	37	-118.15	10	-134.86	13	-2631.203	7	-3647.213	11	-1571.873	38
449		3	max	55.252	6	437.633	29	95.477	7	3555.442	13	3979.771	5	1862.53	7
450			min	-91.51	37	-118.15	10	-134.86	13	-2631.203	7	-3760.199	11	-2216.602	38
451	M76	1	max	174.397	6	321.865	6	253.102	3	5669.437	3	4114.683	3	2398.747	12
452			min	-197.736	12	-567.76	12	-212.599	9	-4718.486	9	-4418.524	9	-2716.929	6
453		2	max	174.397	6	321.865	6	253.102	3	5669.437	3	4489.153	3	3238.76	12
454			min	-197.736	12	-567.76	12	-212.599	9	-4718.486	9	-4733.068	9	-3193.135	6
455		3	max	174.397	6	321.865	6	253.102	3	5669.437	3	4863.623	3	4078.773	12
456			min	-197.736	12	-567.76	12	-212.599	9	-4718.486	9	-5047.613	9	-3669.342	6
457	M77	1	max	137.951	12	692.097	37	152.873	9	5123.665	3	4595.276	9	5759.116	12
458			min	-114.645	6	-282.656	6	-193.463	3	-4141.319	9	-4291.159	3	-4294.175	6
459		2	max	137.951	12	692.097	37	152.873	9	5123.665	3	4821.455	9	4861.031	12
460			min	-114.645	6	-282.656	6	-193.463	3	-4141.319	9	-4577.391	3	-3875.98	6
461		3	max	137.951	12	692.097	37	152.873	9	5123.665	3	5047.634	9	3962.946	12
462			min	-114.645	6	-282.656	6	-193.463	3	-4141.319	9	-4863.624	3	-3457.785	6
463	M78	1	max	98.55	37	374.698	29	130.306	6	2755.099	5	4622.534	7	2262.406	6
464			min	-96.383	6	6.856	10	-105.62	12	-2202.097	11	-4644.16	13	-1270.584	37
465		2	max	98.55	37	374.698	29	130.306	6	2755.099	5	4772.918	7	2153.654	6
466			min	-96.383	6	6.856	10	-105.62	12	-2202.097	11	-4761.86	13	-1818.083	37
467		3	max	98.55	37	374.698	29	130.306	6	2755.099	5	4923.301	7	2044.902	6
468			min	-96.383	6	6.856	10	-105.62	12	-2202.097	11	-4879.561	13	-2365.581	37
469	M79	1	max	78.927	7	421.137	35	71.98	11	2650.521	5	4821.911	13	1830.022	7
470			min	-97.473	38	-65.152	4	-96.63	5	-2018.988	11	-4797.625	7	-1079.905	37

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[l...	LC	z Shear[lb]	LC	Torque[l...	LC	y-y Moment[lb-in]	LC	z-z Mom...	LC
471		2	max	78.927	7	421.137	35	71.98	11	2650.521	5	4850.753	13	1869.519	6
472			min	-97.473	38	-65.152	4	-96.63	5	-2018.988	11	-4860.459	7	-1700.411	37
473		3	max	78.927	7	421.137	35	71.98	11	2650.521	5	4879.596	13	1919.957	6
474			min	-97.473	38	-65.152	4	-96.63	5	-2018.988	11	-4923.293	7	-2320.917	37
475	M80	1	max	220.76	11	233.639	25	220.76	8	1327.524	8	662.28	2	1598.59	5
476			min	-220.76	5	91.171	5	-220.76	2	-1324.82	2	-662.28	8	-1051.525	11
477		2	max	220.76	11	233.639	25	220.76	8	1327.524	8	331.14	2	1461.834	5
478			min	-220.76	5	91.171	5	-220.76	2	-1324.82	2	-331.14	8	-1188.289	11
479		3	max	220.76	11	233.639	25	220.76	8	1327.524	8	0	50	1325.077	5
480			min	-220.76	5	91.171	5	-220.76	2	-1324.82	2	0	1	-1325.054	11
481	M81	1	max	5901.381	6	4186.783	26	481.283	9	11455.4...	3	960.428	3	267770....	24
482			min	-6009.221	12	652.193	6	-407.276	3	-12454.1...	9	-1326.632	9	28881.1...	6
483		2	max	3579.604	6	3150.94	24	951.073	3	13298.4...	3	39105.792	9	125883....	24
484			min	-3669.016	12	326.232	6	-989.819	9	-14380.6...	9	-37104.234	3	8755.949	6
485		3	max	3519.441	6	2956.989	24	890.909	3	13298.4...	3	4340.409	3	-2905.021	6
486			min	-3608.853	12	203.275	6	-929.655	9	-14380.6...	9	-4082.405	9	-11101.8...	24
487	M82	1	max	5972.082	10	4167.818	26	420.032	13	15265.9...	7	1016.549	7	266963....	16
488			min	-6025.881	4	654.845	10	-425.843	7	-15570.4...	13	-225.235	13	28948.5...	10
489		2	max	3797.182	10	3141.785	16	970.757	7	17702.05	7	38565.118	13	125334....	16
490			min	-3600.481	4	330.153	10	-984.228	13	-18074.8...	13	-37973.221	7	8667.507	10
491		3	max	3737.019	10	2945.125	16	910.593	7	17702.05	7	4357.152	7	-3163.544	10
492			min	-3540.318	4	207.388	10	-923.651	13	-18074.8...	13	-4352.845	13	-11090.3...	16
493	M83	1	max	7278.505	2	4350.288	20	119.085	5	12246.9...	11	1138.898	16	272595....	20
494			min	-7427.957	8	455.842	2	-135.781	11	-13836.3...	5	-101.216	10	5801.287	2
495		2	max	4226.826	2	3190.879	20	802.547	11	12819.24	11	32048.474	5	127490....	20
496			min	-4561.577	8	61.5	2	-818.668	5	-13736.2...	5	-31309.193	11	-2807.979	2
497		3	max	4166.661	2	2992.855	20	742.297	11	12819.24	11	3450.774	11	-2542.789	2
498			min	-4501.412	8	-62.575	2	-758.39	5	-13736.2...	5	-3436.616	5	-11245.0...	20
499	M84	1	max	1720.708	2	67.756	13	98.502	7	14.959	7	480.721	13	2938.016	13
500			min	-1207.077	8	-80.969	7	-89.859	13	-15.905	13	-402.393	7	-3311.475	7
501		2	max	1726.604	2	79.084	13	118.122	7	14.959	7	100.45	3	72.607	10
502			min	-1201.18	8	-92.297	7	-109.479	13	-15.905	13	-99.839	9	-74.64	4
503		3	max	1732.501	2	91.383	12	137.742	7	14.959	7	525.21	8	3830.413	7
504			min	-1195.284	8	-104.773	6	-129.099	13	-15.905	13	-605.446	2	-3462.013	13
505	M85	1	max	900.652	13	15.316	4	19.523	2	11.541	8	139.739	22	544.514	2
506			min	-1156.691	7	-24.035	10	-13.49	8	-14.777	2	-14.158	4	-685.946	8
507		2	max	906.548	13	4.884	13	9.166	8	11.541	8	236.125	3	620.925	2
508			min	-1150.794	7	-13.377	7	-3.133	2	-14.777	2	-171.529	9	-515.952	8
509		3	max	912.445	13	23.194	12	31.822	8	11.541	8	168.185	11	490.021	4
510			min	-1144.898	7	-31.806	6	-25.789	2	-14.777	2	-148.378	5	-131.815	10
511	M86	1	max	356.216	2	-6.735	4	101.097	15	4.012	11	-88.614	12	-13.356	2
512			min	-99.68	8	-61.02	22	44.325	10	-3.621	5	-340.287	17	-1009.822	20
513		2	max	362.113	2	-14.403	13	104.04	20	4.012	11	460.949	15	1758.325	25
514			min	-93.783	8	-58.166	19	28.682	2	-3.621	5	115.256	10	731.065	7
515		3	max	368.009	2	3.589	12	111.072	20	4.012	11	1268.035	21	4501.902	19
516			min	-87.887	8	-63.826	18	6.026	2	-3.621	5	244.304	3	1438.568	13
517	M87	1	max	738.215	4	20.629	5	22.033	2	14.936	2	55.152	12	372.534	2
518			min	-1051.686	10	-18.484	11	-18.561	8	-11.572	8	-130.058	6	-210.398	8
519		2	max	744.111	4	4.381	10	4.095	8	14.936	2	192.143	3	560.693	2
520			min	-1045.79	10	-2.326	4	-.623	2	-11.572	8	-173.286	9	-372.122	8
521		3	max	750.007	4	26.828	11	26.751	8	14.936	2	255.571	10	391.104	3
522			min	-1039.893	10	-24.683	5	-23.279	2	-11.572	8	-143.442	4	-175.857	9
523	M88	1	max	1142.575	2	56.932	3	90.035	9	15.638	3	1018.916	3	2871.491	2
524			min	-657.653	8	-52.142	9	-97.329	3	-15.37	9	-974.202	9	-2637.669	8
525		2	max	1148.472	2	55.529	2	111.1	8	15.638	3	74.656	4	149.652	13
526			min	-651.756	8	-51.015	8	-118.238	2	-15.37	9	-72.422	10	-113.75	7
527		3	max	1154.368	2	62.576	13	133.756	8	15.638	3	1362.319	9	2864.705	8

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[l...	LC	z Shear[lb]	LC	Torque[l...	LC	y-y Moment[lb-in]	LC	z-z Mom...	LC
528			min	-645.86	8	-58.197	7	-140.894	2	-15.37	9	-1402.617	3	-3026.346	2
529	M89	1	max	727.627	4	91.654	12	90.322	5	11.673	11	203.01	6	3194.427	12
530			min	-733.383	10	-91.498	6	-82.701	11	-13.115	5	-330.258	12	-3350.42	6
531		2	max	733.524	4	111.274	12	96.328	6	11.673	11	71.911	4	73.733	13
532			min	-727.487	10	-111.118	6	-88.593	12	-13.115	5	-65.309	10	-101.015	7
533		3	max	739.42	4	130.894	12	107.656	6	11.673	11	556.198	11	3690.543	6
534			min	-721.59	10	-130.739	6	-99.921	12	-13.115	5	-409.846	5	-3589.288	12
535	M90	1	max	884.299	3	22.704	5	14.958	2	9.265	13	22.086	11	335.8	13
536			min	-1082.496	9	-17.484	11	-15.769	8	-14.397	7	-125.45	16	-448.253	7
537		2	max	890.195	3	6.154	23	6.887	8	9.265	13	88.883	4	435.136	12
538			min	-1076.599	9	.048	5	-7.698	2	-14.397	7	-106.984	10	-649.982	6
539		3	max	896.092	3	27.828	11	29.543	8	9.265	13	336.407	9	26.281	12
540			min	-1070.703	9	-22.608	5	-30.354	2	-14.397	7	-279.988	3	-370.897	18
541	M91	1	max	521.204	7	86.415	16	-23.503	3	4.923	3	73.73	9	886.756	24
542			min	-119.866	13	22.438	10	-76.336	21	-4.78	9	-92.878	3	97.3	6
543		2	max	527.1	7	84.602	24	-22.152	7	4.923	3	169.851	4	-691.72	11
544			min	-113.97	13	27.157	7	-75.642	25	-4.78	9	-44.379	10	-1865.397	18
545		3	max	532.996	7	90.8	23	-.071	8	4.923	3	370.623	10	-1574.33	7
546			min	-108.073	13	7.989	6	-82.353	14	-4.78	9	-100.683	4	-4555.112	25
547	M92	1	max	881.67	9	21.011	5	13.869	2	13.095	6	116.267	21	249.072	12
548			min	-1099.033	3	-18.606	11	-18.93	8	-7.863	12	6.25	3	-298.234	6
549		2	max	887.566	9	4.05	11	3.747	9	13.095	6	132.047	4	378.548	12
550			min	-1093.137	3	-1.645	5	-8.84	3	-7.863	12	-92.975	10	-555.34	6
551		3	max	893.463	9	26.706	11	26.382	8	13.095	6	294.246	9	35.769	10
552			min	-1087.241	3	-24.301	5	-31.443	2	-7.863	12	-301.568	3	-368.626	17
553	M93	1	max	789.371	8	111.09	13	97.36	7	16.045	7	354.374	8	3705.166	13
554			min	-802.636	2	-120.88	7	-91.906	13	-14.907	13	-279.018	2	-4003.596	7
555		2	max	795.268	8	122.418	13	116.98	7	16.045	7	72.95	4	44.489	11
556			min	-796.739	2	-132.208	7	-111.527	13	-14.907	13	-72.892	10	-84.63	5
557		3	max	801.164	8	133.746	13	136.6	7	16.045	7	242.477	11	4454.111	7
558			min	-790.843	2	-143.536	7	-131.147	13	-14.907	13	-309.212	5	-4235.177	13
559	M94	1	max	1184.295	10	31.963	9	21.525	8	14.318	3	1211.207	3	971.224	12
560			min	-715.008	3	-21.912	3	-35.083	2	-15.823	9	-1159.425	9	-565.075	6
561		2	max	1190.191	10	50.68	10	44.181	8	14.318	3	76.765	4	141.385	11
562			min	-709.111	3	-40.75	4	-57.739	2	-15.823	9	-82.817	10	-126.171	5
563		3	max	1196.088	10	70.3	10	66.837	8	14.318	3	1528.978	9	849.25	6
564			min	-703.215	3	-60.37	4	-80.395	2	-15.823	9	-1592.783	3	-1226.055	12
565	M95	1	max	1087.88	8	22.621	5	8.203	2	8.414	4	113.633	4	359.859	24
566			min	-1364.836	2	-21.479	11	-16.334	8	-11.514	10	-58.144	10	92.954	7
567		2	max	1093.776	8	5.002	2	6.322	8	8.414	4	241.687	4	321.718	11
568			min	-1358.94	2	-3.844	8	-14.453	2	-11.514	10	-305.354	10	-147.478	5
569		3	max	1099.673	8	23.833	11	28.978	8	8.414	4	54.291	8	444.785	8
570			min	-1353.043	2	-22.691	5	-37.109	2	-11.514	10	-236.238	2	-429.452	2
571	M96	1	max	292.671	22	-36.584	6	16.18	3	5.359	7	792.696	15	-231.054	11
572			min	-.582	4	-101.6	24	-12.565	9	-4.846	13	267.245	9	-912.51	16
573		2	max	309.848	22	-34.474	10	10.952	7	5.359	7	-297.145	4	903.501	24
574			min	5.315	4	-101.77	16	-7.401	13	-4.846	13	-877.542	22	282.543	7
575		3	max	327.024	22	-12.589	11	32.786	8	5.359	7	-750.35	9	2692.514	18
576			min	11.211	4	-108.601	17	-29.182	2	-4.846	13	-2567.867	15	858.353	12
577	M97	1	max	663.041	12	11.943	5	22.678	3	12.915	9	5.511	2	126.599	10
578			min	-955.023	6	-21.558	11	-15.198	9	-9.517	3	-53.3	26	-420.646	4
579		2	max	668.937	12	1.639	12	11.219	6	12.915	9	224.479	4	229.393	11
580			min	-949.126	6	-12.266	18	-3.764	12	-9.517	3	-305.345	10	-234.101	5
581		3	max	674.833	12	23.754	11	30.783	8	12.915	9	-31.04	8	542.245	7
582			min	-943.23	6	-33.369	5	-23.204	2	-9.517	3	-131.245	14	-252.565	13
583	M98	1	max	1108.815	10	58.111	12	28.633	5	12.289	11	642.277	6	1662.127	12
584			min	-595.938	4	-57.769	6	-24.408	11	-12.115	5	-724.72	12	-1742.548	6

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[l...	LC	z Shear[lb]	LC	Torque[l...	LC	y-y Moment[lb-in]	LC	z-z Mom...	LC
585		2	max	1114.711	10	77.731	12	36.423	6	12.289	11	82.215	3	95.199	2
586			min	-590.041	4	-77.389	6	-32.069	12	-12.115	5	-84.947	9	-106.674	8
587		3	max	1120.608	10	97.351	12	54.527	7	12.289	11	940.414	11	2120.356	6
588			min	-584.145	4	-97.009	6	-50.308	13	-12.115	5	-857.733	5	-2064.632	12

Envelope Member Section Stresses

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
1	M1	1	max	0	50	0	11	0	8	0	50	0	50	0	50	0	50
2			min	0	1	0	5	0	2	0	1	0	1	0	1	0	1
3		2	max	.183	8	-.01	30	.173	2	1.398	5	.933	11	4.082	2	4.994	8
4			min	-.413	2	-.08	23	-.122	8	-.933	11	-1.398	5	-4.994	8	-4.082	2
5		3	max	0	50	0	5	0	2	0	50	0	50	0	50	0	50
6			min	0	1	0	11	0	8	0	1	0	1	0	1	0	1
7	M2	1	max	0	50	0	11	0	8	0	50	0	50	0	50	0	50
8			min	0	1	0	5	0	2	0	1	0	1	0	1	0	1
9		2	max	.422	8	.031	6	.262	19	1.897	5	1.694	11	5.306	2	5.817	8
10			min	-.963	2	-.046	12	.047	2	-1.694	11	-1.897	5	-5.817	8	-5.306	2
11		3	max	0	50	0	5	0	14	0	50	0	50	0	50	0	50
12			min	0	1	0	11	0	8	0	1	0	1	0	1	0	1
13	M3	1	max	0	50	0	11	0	8	0	50	0	50	0	50	0	50
14			min	0	1	0	5	0	2	0	1	0	1	0	1	0	1
15		2	max	.086	8	.065	12	.234	20	1.148	5	1.373	11	2.609	2	2.926	8
16			min	-.591	2	-.048	6	-.019	2	-1.373	11	-1.148	5	-2.926	8	-2.609	2
17		3	max	0	50	0	5	0	14	0	50	0	50	0	50	0	50
18			min	0	1	0	11	0	8	0	1	0	1	0	1	0	1
19	M4	1	max	0	50	0	11	0	8	0	50	0	50	0	50	0	50
20			min	0	1	0	5	0	2	0	1	0	1	0	1	0	1
21		2	max	.113	3	.066	11	.021	12	.373	5	.596	11	1.325	3	1.663	9
22			min	-.194	9	-.026	5	-.012	6	-.596	11	-.373	5	-1.663	9	-1.325	3
23		3	max	0	50	0	5	0	2	0	50	0	50	0	50	0	50
24			min	0	1	0	11	0	8	0	1	0	1	0	1	0	1
25	M5	1	max	0	50	0	11	0	9	0	50	0	50	0	50	0	50
26			min	0	1	0	5	0	3	0	1	0	1	0	1	0	1
27		2	max	.06	12	.031	2	.041	7	1.195	6	.736	12	.591	4	.613	10
28			min	-.154	6	-.062	8	-.008	13	-.736	12	-1.195	6	-.613	10	-.591	4
29		3	max	0	50	0	5	0	3	0	50	0	50	0	50	0	50
30			min	0	1	0	11	0	9	0	1	0	1	0	1	0	1
31	M6	1	max	0	50	0	22	0	9	0	50	0	50	0	50	0	50
32			min	0	1	0	4	0	3	0	1	0	1	0	1	0	1
33		2	max	.171	4	-.051	7	-.039	7	2.852	4	2.446	10	4.345	2	3.896	8
34			min	-.727	10	-.231	25	-.142	23	-2.446	10	-2.852	4	-3.896	8	-4.345	2
35		3	max	0	50	0	4	0	3	0	50	0	50	0	50	0	50
36			min	0	1	0	22	0	21	0	1	0	1	0	1	0	1
37	M7	1	max	0	50	0	22	0	8	0	50	0	50	0	50	0	50
38			min	0	1	0	4	0	2	0	1	0	1	0	1	0	1
39		2	max	.031	4	.03	5	.055	2	2.786	4	2.231	10	3.602	2	2.739	8
40			min	-.258	10	-.041	11	-.143	8	-2.231	10	-2.786	4	-2.739	8	-3.602	2
41		3	max	0	50	0	4	0	2	0	50	0	50	0	50	0	50
42			min	0	1	0	10	0	8	0	1	0	1	0	1	0	1
43	M8	1	max	0	50	0	22	0	9	0	50	0	50	0	50	0	50
44			min	0	1	0	4	0	3	0	1	0	1	0	1	0	1
45		2	max	.031	3	-.04	11	.058	8	1.775	5	1.351	11	2.253	2	2.271	8
46			min	-.578	21	-.208	17	-.142	2	-1.351	11	-1.775	5	-2.271	8	-2.253	2
47		3	max	0	50	0	4	0	3	0	50	0	50	0	50	0	50
48			min	0	1	0	22	0	21	0	1	0	1	0	1	0	1

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
49	M9	1	max	0	50	0	12	0	8	0	50	0	50	0	50	0	50
50			min	0	1	0	6	0	2	0	1	0	1	0	1	0	1
51		2	max	.184	10	.012	13	.03	12	.814	8	1.244	2	1.137	4	.515	10
52			min	-.346	4	-.029	7	-.078	6	-1.244	2	-.814	8	-.515	10	-1.137	4
53		3	max	0	50	0	6	0	2	0	50	0	50	0	50	0	50
54			min	0	1	0	12	0	8	0	1	0	1	0	1	0	1
55	M10	1	max	0	50	0	12	0	7	0	50	0	50	0	50	0	50
56			min	0	1	0	18	0	13	0	1	0	1	0	1	0	1
57		2	max	-.024	11	.185	24	.048	8	1.865	6	1.85	12	2.528	2	2.306	8
58			min	-.474	17	.009	6	-.157	2	-1.85	12	-1.865	6	-2.306	8	-2.528	2
59		3	max	0	50	0	18	0	13	0	50	0	50	0	50	0	50
60			min	0	1	0	12	0	19	0	1	0	1	0	1	0	1
61	M11	1	max	0	50	0	12	0	7	0	50	0	50	0	50	0	50
62			min	0	1	0	18	0	13	0	1	0	1	0	1	0	1
63		2	max	.203	13	.227	17	-.003	7	2.564	5	2.924	11	4.334	2	4.355	8
64			min	-.662	7	.086	11	-.118	25	-2.924	11	-2.564	5	-4.355	8	-4.334	2
65		3	max	0	50	0	18	0	13	0	50	0	50	0	50	0	50
66			min	0	1	0	12	0	19	0	1	0	1	0	1	0	1
67	M12	1	max	0	50	0	11	0	8	0	50	0	50	0	50	0	50
68			min	0	1	0	17	0	2	0	1	0	1	0	1	0	1
69		2	max	.388	13	.103	18	.13	3	1.115	4	2.435	10	2.286	13	2.112	7
70			min	-.68	7	-.018	12	-.092	9	-2.435	10	-1.115	4	-2.112	7	-2.286	13
71		3	max	0	50	0	5	0	13	0	50	0	50	0	50	0	50
72			min	0	1	0	11	0	7	0	1	0	1	0	1	0	1
73	M13	1	max	0	50	0	11	0	20	0	50	0	50	0	50	0	50
74			min	0	1	0	5	0	2	0	1	0	1	0	1	0	1
75		2	max	.115	25	.216	11	.217	8	.196	11	.196	5	.199	8	.195	2
76			min	.045	2	-.216	5	-.216	2	-.196	5	-.196	11	-.195	2	-.199	8
77		3	max	0	50	0	5	0	2	0	50	0	50	0	50	0	50
78			min	0	1	0	11	0	20	0	1	0	1	0	1	0	1
79	M14	1	max	.67	8	-.157	26	.736	6	26.554	18	-4.795	12	12.839	23	.713	5
80			min	-.629	2	-.7	19	-.226	12	4.795	12	-26.554	18	-.618	5	-14.82	23
81		2	max	.67	8	-.262	13	.736	6	12.285	26	-4.708	12	8.291	26	-.701	2
82			min	-.629	2	-.798	19	-.226	12	4.708	12	-12.285	26	.607	2	-9.57	26
83		3	max	.67	8	-.323	13	.736	6	3.991	12	5.939	6	10.029	6	10.884	13
84			min	-.629	2	-1.096	26	-.226	12	-5.939	6	-3.991	12	-9.429	13	-11.577	6
85	M15	1	max	.444	8	-.147	26	.509	4	22.514	18	-8.579	11	18.958	22	2.045	4
86			min	-.57	2	-.684	21	-.3	10	8.579	11	-22.514	18	-1.771	4	-21.884	22
87		2	max	.444	8	-.291	3	.509	4	12.934	21	-3.502	3	7.292	26	-2.268	7
88			min	-.57	2	-.782	21	-.3	10	3.502	3	-12.934	21	1.965	7	-8.418	26
89		3	max	.444	8	-.352	3	.509	4	6.538	9	4.925	3	7.47	3	15.679	9
90			min	-.57	2	-1.085	26	-.3	10	-4.925	3	-6.538	9	-13.583	9	-8.623	3
91	M16	1	max	.559	4	-.136	26	.807	2	25.789	14	-2.942	8	12.28	20	2.203	2
92			min	-.524	10	-.672	14	-.309	8	2.942	8	-25.789	14	-1.908	2	-14.175	20
93		2	max	.559	4	-.227	8	.807	2	11.871	26	-4.1	7	8.12	26	-.981	9
94			min	-.524	10	-.77	14	-.309	8	4.1	7	-11.871	26	.85	9	-9.374	26
95		3	max	.559	4	-.288	8	.807	2	4.639	8	6.697	2	11.437	2	12.105	8
96			min	-.524	10	-1.073	26	-.309	8	-6.697	2	-4.639	8	-10.487	8	-13.202	2
97	M17	1	max	.361	4	-.126	26	.506	12	21.614	25	-7.439	7	18.414	18	2.257	12
98			min	-.463	10	-.65	18	-.317	6	7.439	7	-21.614	25	-1.955	12	-21.256	18
99		2	max	.361	4	-.293	12	.506	12	12.4	26	-3.975	11	7.076	26	-2.129	3
100			min	-.463	10	-.747	18	-.317	6	3.975	11	-12.4	26	1.845	3	-8.168	26
101		3	max	.361	4	-.354	12	.506	12	5.901	6	4.166	12	6.907	12	15.289	6
102			min	-.463	10	-1.064	26	-.317	6	-4.166	12	-5.901	6	-13.245	6	-7.973	12
103	M18	1	max	.465	12	1.091	26	.289	10	5.586	10	4.203	4	7.034	4	14.625	10
104			min	-.579	6	.379	4	-.531	4	-4.203	4	-5.586	10	-12.67	10	-8.12	4
105		2	max	.465	12	.782	23	.289	10	12.904	24	-4.074	6	7.322	26	-2.176	13

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
106			min	-.579	6	.318	4	-.531	4	4.074	6	-12.904	24	1.885	13	-8.452	26
107		3	max	.465	12	.684	23	.289	10	23.251	15	-7.564	9	18.308	22	2.117	4
108			min	-.579	6	.153	26	-.531	4	7.564	9	-23.251	15	-1.834	4	-21.134	22
109	M19	1	max	.508	13	1.104	26	.362	8	5.325	8	7.606	2	13.231	2	13.664	8
110			min	-.496	7	.302	8	-.909	2	-7.606	2	-5.325	8	-11.837	8	-15.273	2
111		2	max	.508	13	.819	14	.362	8	12.461	15	-4.306	9	8.357	26	-1.151	7
112			min	-.496	7	.241	8	-.909	2	4.306	9	-12.461	15	.997	7	-9.646	26
113		3	max	.508	13	.721	14	.362	8	27.82	14	-2.832	8	13.343	8	3.572	2
114			min	-.496	7	.166	26	-.909	2	2.832	8	-27.82	14	-3.095	2	-15.402	8
115	M20	1	max	2.403	6	.091	10	.052	9	.05	9	1.488	15	1.958	3	3.216	9
116			min	-.74	12	-.041	4	-.055	3	-1.488	15	-.05	9	-2.786	9	-2.26	3
117		2	max	2.432	6	.062	7	.043	13	1.18	8	1.532	2	.79	22	.114	5
118			min	-.753	12	-.041	13	-.046	7	-1.532	2	-1.18	8	-.098	5	-.912	22
119		3	max	2.462	6	.103	6	.132	2	4.182	7	4.326	13	2.602	3	2.235	9
120			min	-.766	12	-.111	12	-.136	8	-4.326	13	-4.182	7	-1.936	9	-3.004	3
121	M21	1	max	1.035	5	.072	10	.077	8	1.46	25	-.016	7	1.117	4	2.153	10
122			min	-.949	11	-.066	4	-.05	2	.016	7	-1.46	25	-1.865	10	-1.29	4
123		2	max	1.067	5	.014	7	.043	2	1.285	12	.642	6	.827	9	.913	3
124			min	-.965	11	-.037	13	-.016	8	-.642	6	-1.285	12	-.791	3	-.954	9
125		3	max	1.1	5	.057	6	.136	2	1.324	8	2.004	2	1.756	4	2.472	10
126			min	-.982	11	-.109	12	-.109	8	-2.004	2	-1.324	8	-2.141	10	-2.028	4
127	M22	1	max	2.476	10	.12	4	.143	8	4.675	9	4.969	3	2.911	13	3.059	7
128			min	-1.142	4	-.106	10	-.139	2	-4.969	3	-4.675	9	-2.65	7	-3.36	13
129		2	max	2.447	10	.047	3	.055	9	1.469	8	1.845	2	.703	17	.21	10
130			min	-1.129	4	-.061	9	-.051	3	-1.845	2	-1.469	8	-.182	10	-.811	17
131		3	max	2.417	10	.038	13	.053	13	.314	7	1.48	25	1.881	13	2.849	7
132			min	-1.115	4	-.082	7	-.048	7	-1.48	25	-.314	7	-2.468	7	-2.172	13
133	M23	1	max	1.503	11	.106	5	.112	8	1.572	8	2.205	2	2.089	13	2.726	7
134			min	-.581	5	-.063	11	-.135	2	-2.205	2	-1.572	8	-2.361	7	-2.411	13
135		2	max	1.47	11	.03	3	.02	9	1.097	5	.662	11	.63	7	.757	13
136			min	-.564	5	-.016	9	-.043	3	-.662	11	-1.097	5	-.656	13	-.727	7
137		3	max	1.437	11	.057	12	.051	2	1.067	4	.12	10	1.068	12	2.394	6
138			min	-.548	5	-.072	6	-.074	8	-.12	10	-1.067	4	-2.074	6	-1.232	12
139	M24	1	max	2.782	8	.089	14	.053	13	.689	13	2.317	7	1.334	7	2.291	13
140			min	-1.211	2	-.021	8	-.066	7	-2.317	7	-.689	13	-1.985	13	-1.539	7
141		2	max	2.811	8	.047	10	.033	5	1.311	13	1.779	7	.784	14	-.048	10
142			min	-1.225	2	-.019	4	-.046	11	-1.779	7	-1.311	13	.042	10	-.905	14
143		3	max	2.841	8	.1	9	.121	6	3.414	12	3.331	6	3.505	7	3.364	13
144			min	-1.238	2	-.101	3	-.134	12	-3.331	6	-3.414	12	-2.914	13	-4.046	7
145	M25	1	max	2.043	9	.064	2	.08	12	1.55	4	.281	10	1.214	8	2.177	2
146			min	-1.893	3	-.058	8	-.053	6	-.281	10	-1.55	4	-1.886	2	-1.401	8
147		2	max	2.076	9	.013	11	.041	5	1.398	4	.878	10	.71	12	.755	6
148			min	-1.909	3	-.037	5	-.014	11	-.878	10	-1.398	4	-.654	6	-.819	12
149		3	max	2.109	9	.062	9	.133	6	1.122	12	1.963	6	2.04	8	2.845	2
150			min	-1.926	3	-.115	3	-.106	12	-1.963	6	-1.122	12	-2.465	2	-2.355	8
151	M26	1	max	2.303	3	.111	9	.133	12	3.642	13	4.072	7	3.316	5	3.304	11
152			min	-1.046	9	-.099	3	-.128	6	-4.072	7	-3.642	13	-2.862	11	-3.828	5
153		2	max	2.27	3	.028	8	.048	13	1.014	12	1.599	6	.866	8	.344	3
154			min	-1.029	9	-.045	2	-.043	7	-1.599	6	-1.014	12	-.298	3	-.999	8
155		3	max	2.237	3	.023	4	.064	5	.62	11	1.972	5	1.28	5	2.117	11
156			min	-1.013	9	-.078	22	-.059	11	-1.972	5	-.62	11	-1.834	11	-1.478	5
157	M27	1	max	2.348	3	.118	9	.104	12	1.135	13	2.09	7	2.108	5	2.709	11
158			min	-1.54	9	-.069	3	-.132	6	-2.09	7	-1.135	13	-2.347	11	-2.433	5
159		2	max	2.315	3	.035	8	.015	13	1.13	8	.788	2	.697	11	.764	6
160			min	-1.523	9	-.016	2	-.043	7	-.788	2	-1.13	8	-.661	6	-.805	11
161		3	max	2.282	3	.05	4	.054	6	1.383	8	.366	3	1.002	4	2.207	10
162			min	-1.507	9	-.06	10	-.081	12	-.366	3	-1.383	8	-1.912	10	-1.157	4

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
163	M28	1	max	2.941	2	.085	5	.048	5	.169	8	1.591	25	1.485	11	2.572	5
164			min	-1.301	8	-.034	11	-.053	11	-1.591	25	-.169	8	-2.228	5	-1.714	11
165		2	max	2.97	2	.074	3	.057	9	.742	4	1.142	10	.82	18	.131	12
166			min	-1.314	8	-.052	9	-.063	3	-1.142	10	-.742	4	-.114	12	-.947	18
167		3	max	3	2	.119	2	.142	10	4.476	3	4.624	9	2.751	11	2.458	5
168			min	-1.327	8	-.127	8	-.147	4	-4.624	9	-4.476	3	-2.129	5	-3.176	11
169	M29	1	max	1.341	13	.064	6	.08	4	1.875	8	.387	2	1.117	12	2.336	6
170			min	-1.109	7	-.056	12	-.054	10	-.387	2	-1.875	8	-2.024	6	-1.29	12
171		2	max	1.374	13	.015	3	.043	9	1.634	8	.847	2	.86	4	1.089	10
172			min	-1.125	7	-.037	9	-.016	3	-.847	2	-1.634	8	-.943	10	-.992	4
173		3	max	1.407	13	.065	13	.132	10	1.001	3	1.513	9	1.688	12	2.483	6
174			min	-1.141	7	-.115	7	-.105	4	-1.513	9	-1.001	3	-2.151	6	-1.948	12
175	M30	1	max	2.311	6	.112	12	.131	4	3.538	5	3.909	11	2.918	9	2.904	3
176			min	-.922	12	-.097	6	-.131	10	-3.909	11	-3.538	5	-2.516	3	-3.368	9
177		2	max	2.281	6	.035	11	.044	5	.941	3	1.293	9	.699	14	.07	7
178			min	-.909	12	-.048	5	-.043	11	-1.293	9	-.941	3	-.061	7	-.806	14
179		3	max	2.252	6	.033	8	.058	9	.414	2	1.363	8	1.552	9	2.63	3
180			min	-.896	12	-.075	2	-.058	3	-1.363	8	-.414	2	-2.279	3	-1.791	9
181	M31	1	max	1.649	7	.107	13	.103	4	1.099	4	1.721	10	1.988	9	2.674	3
182			min	-.875	13	-.061	7	-.127	10	-1.721	10	-1.099	4	-2.317	3	-2.295	9
183		2	max	1.616	7	.026	11	.01	5	1.38	12	.841	6	.676	4	.826	10
184			min	-.859	13	-.009	5	-.035	11	-.841	6	-1.38	12	-.716	10	-.78	4
185		3	max	1.583	7	.057	7	.059	10	1.256	13	.155	7	1.116	8	2.403	2
186			min	-.842	13	-.069	13	-.083	4	-.155	7	-1.256	13	-2.081	2	-1.289	8
187	M32	1	max	.466	38	0	11	0	8	0	50	0	50	0	50	0	50
188			min	0	1	0	30	0	27	0	1	0	1	0	1	0	1
189		2	max	.22	29	.1	37	.08	5	.324	5	.184	11	.104	10	.139	29
190			min	-.008	10	-.152	6	-.073	11	-.184	11	-.324	5	-.139	29	-.104	10
191		3	max	0	50	0	5	0	2	0	50	0	50	0	50	0	50
192			min	0	1	0	11	0	8	0	1	0	1	0	1	0	1
193	M33	1	max	.466	38	0	36	0	33	0	50	0	50	0	50	0	50
194			min	0	1	0	30	0	2	0	1	0	1	0	1	0	1
195		2	max	.215	35	.186	13	.097	7	.264	7	.313	13	.178	27	.268	8
196			min	-.056	4	-.137	7	-.116	38	-.313	13	-.264	7	-.268	8	-.178	27
197		3	max	0	50	0	5	0	2	0	50	0	50	0	50	0	50
198			min	0	1	0	11	0	8	0	1	0	1	0	1	0	1
199	M34	1	max	.466	38	0	36	0	33	0	50	0	50	0	50	0	50
200			min	0	1	0	5	0	27	0	1	0	1	0	1	0	1
201		2	max	.188	6	.195	11	.22	8	.358	5	.389	11	.397	2	.266	8
202			min	-.364	12	-.197	5	-.278	2	-.389	11	-.358	5	-.266	8	-.397	2
203		3	max	0	50	0	5	0	2	0	50	0	50	0	50	0	50
204			min	0	1	0	11	0	8	0	1	0	1	0	1	0	1
205	M35	1	max	.297	14	-.042	5	.715	12	.26	4	.754	10	29.751	6	30.472	12
206			min	-.045	8	-.624	23	-.705	6	-.754	10	-.26	4	-30.472	12	-29.751	6
207		2	max	.305	26	.58	25	.718	7	.682	8	2.746	2	33.207	13	31.96	7
208			min	.032	4	-.057	7	-.748	13	-2.746	2	-.682	8	-31.96	7	-33.207	13
209		3	max	.305	26	.575	25	.718	7	.568	8	1.078	2	29.735	6	30.978	12
210			min	.032	4	-.062	7	-.748	13	-1.078	2	-.568	8	-30.978	12	-29.735	6
211	M36	1	max	.344	19	.113	9	.75	3	.527	7	.977	13	32.031	10	30.62	4
212			min	-.06	13	-.646	3	-.789	9	-.977	13	-.527	7	-30.62	4	-32.031	10
213		2	max	.344	19	.108	9	.75	3	.727	8	2.885	2	33.348	3	35.177	9
214			min	-.06	13	-.651	3	-.789	9	-2.885	2	-.727	8	-35.177	9	-33.348	3
215		3	max	.327	26	.558	17	.734	10	.703	13	1.231	7	31.169	10	29.609	4
216			min	.088	8	.052	12	-.694	4	-1.231	7	-.703	13	-29.609	4	-31.169	10
217	M37	1	max	.258	26	-.053	13	.917	8	.652	12	1.145	6	35.571	2	38.468	8
218			min	.022	4	-.611	19	-.85	2	-1.145	6	-.652	12	-38.468	8	-35.571	2
219		2	max	.261	26	.657	9	.865	7	.254	2	2.684	6	39.29	8	36.52	2

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
220			min	.07	2	-.616	19	-.889	8	-2.684	6	-.254	2	-36.52	2	-39.29	8
221		3	max	.261	26	.652	9	.819	2	.156	5	.664	11	34.686	2	37.798	8
222			min	-.026	12	-.158	3	-.889	8	-.664	11	-.156	5	-37.798	8	-34.686	2
223	M38	1	max	.561	6	.15	3	.002	9	.573	8	.632	2	.362	5	.46	11
224			min	-.738	12	-.139	9	-.002	3	-.632	2	-.573	8	-.46	11	-.362	5
225		2	max	.561	6	.146	3	.002	9	.151	8	.186	2	.348	6	.433	12
226			min	-.738	12	-.143	9	-.002	3	-.186	2	-.151	8	-.433	12	-.348	6
227		3	max	.561	6	.142	3	.002	9	.303	3	.341	9	.417	7	.492	13
228			min	-.738	12	-.147	9	-.002	3	-.341	9	-.303	3	-.492	13	-.417	7
229	M39	1	max	.611	10	.208	13	.003	2	.543	7	.531	13	.391	5	.333	11
230			min	-.817	4	-.216	7	-.003	8	-.531	13	-.543	7	-.333	11	-.391	5
231		2	max	.611	10	.204	13	.003	2	.128	13	.153	7	.442	4	.337	10
232			min	-.817	4	-.22	7	-.003	8	-.153	7	-.128	13	-.337	10	-.442	4
233		3	max	.611	10	.2	13	.003	2	.773	13	.861	7	.639	3	.488	9
234			min	-.817	4	-.224	7	-.003	8	-.861	7	-.773	13	-.488	9	-.639	3
235	M40	1	max	.746	2	.16	6	.002	5	.672	12	.728	6	.571	9	.427	3
236			min	-.972	8	-.148	12	-.002	11	-.728	6	-.672	12	-.427	3	-.571	9
237		2	max	.746	2	.156	6	.002	5	.194	12	.225	6	.54	8	.428	2
238			min	-.972	8	-.153	12	-.002	11	-.225	6	-.194	12	-.428	2	-.54	8
239		3	max	.746	2	.152	6	.002	5	.266	6	.298	12	.564	7	.485	13
240			min	-.972	8	-.157	12	-.002	11	-.298	12	-.266	6	-.485	13	-.564	7
241	M41	1	max	.048	10	.197	11	.232	13	1.147	3	1.336	9	2.201	5	1.178	11
242			min	-.116	5	-.128	5	-.645	7	-1.336	9	-1.147	3	-1.052	11	-2.464	5
243		2	max	.279	2	.097	13	.024	10	-.383	2	1.825	26	1.23	14	-.064	8
244			min	-.495	8	-.034	7	-.043	4	-1.825	26	.383	2	.057	8	-1.377	14
245		3	max	-.006	5	.049	10	.812	9	.951	13	1.568	7	2.226	9	1.955	3
246			min	-.159	23	-.194	4	-.352	3	-1.568	7	-.951	13	-1.746	3	-2.492	9
247	M42	1	max	.13	9	.055	2	.636	2	.276	4	.503	10	1.219	7	2.171	13
248			min	-.224	3	-.215	33	-.362	8	-.503	10	-.276	4	-1.939	13	-1.364	7
249		2	max	.047	6	.184	7	.112	14	2.458	26	-.979	13	.67	6	.859	13
250			min	-.257	24	-.177	18	-.022	9	.979	13	-2.458	26	-.767	13	-.75	6
251		3	max	.139	3	.262	4	.177	4	.492	33	.015	2	.735	5	1.885	10
252			min	-.244	9	-.041	10	-.683	10	-.015	2	-.492	33	-1.684	10	-.823	5
253	M43	1	max	.051	7	.17	7	.425	9	1	11	1.062	5	2.268	2	2.045	8
254			min	-.102	13	-.088	13	-.715	3	-1.062	5	-1	11	-1.826	8	-2.539	2
255		2	max	.239	10	.125	20	.03	7	-.348	10	1.54	26	1.91	21	-.69	3
256			min	-.427	4	-.013	2	-.046	13	-1.54	26	.348	10	.617	3	-2.139	21
257		3	max	.032	13	.152	7	.591	5	1.031	9	1.491	3	1.987	7	1.792	13
258			min	-.159	7	-.251	13	-.22	11	-1.491	3	-1.031	9	-1.601	13	-2.224	7
259	M44	1	max	.371	13	.125	7	1.161	12	.667	2	.507	8	2.875	5	3.498	11
260			min	-.325	7	-.281	13	-.892	6	-.507	8	-.667	2	-3.124	11	-3.219	5
261		2	max	.262	23	.404	11	.113	6	8.564	2	7.828	8	3.651	8	6.589	2
262			min	.045	30	-.328	5	-.144	12	-7.828	8	-8.564	2	-5.886	2	-4.087	8
263		3	max	.474	3	.404	3	.889	10	.375	3	.35	9	1.943	11	2.999	5
264			min	-.383	9	-.291	9	-1.189	4	-.35	9	-.375	3	-2.678	5	-2.175	11
265	M45	1	max	.416	7	.493	9	1.167	2	.635	4	1.22	10	2.618	8	2.779	2
266			min	-.307	13	-.312	3	-1.515	8	-1.22	10	-.635	4	-2.482	2	-2.931	8
267		2	max	.29	18	.498	8	.116	9	6.261	12	8.58	6	2.353	6	3.372	12
268			min	-.067	12	-.555	3	-.133	2	-8.58	6	-6.261	12	-3.012	12	-2.634	6
269		3	max	.285	5	.311	9	1.449	3	.839	8	1.032	2	2.807	3	2.683	9
270			min	-.219	11	-.438	3	-1.128	9	-1.032	2	-.839	8	-2.397	9	-3.143	3
271	M46	1	max	.426	9	.253	2	1.568	8	.725	9	.254	3	2.874	13	3.88	7
272			min	-.356	3	-.436	8	-1.201	2	-.254	3	-.725	9	-3.465	7	-3.217	13
273		2	max	.253	20	.46	7	.153	2	6.861	10	6.223	4	2.786	4	5.331	10
274			min	.036	27	-.428	13	-.184	8	-6.223	4	-6.861	10	-4.762	10	-3.119	4
275		3	max	.347	11	.209	11	1.004	7	.235	10	.459	4	3.248	8	4.526	2
276			min	-.265	5	-.145	5	-1.255	13	-.459	4	-.235	10	-4.042	2	-3.636	8

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
277	M47	1	max	1.319	6	.953	26	.467	12	.255	11	18.213	26	6.31	7	23.025	13
278			min	-1.246	12	.096	9	-.512	6	-18.213	26	-.255	11	-20.72	13	-7.012	7
279		2	max	1.329	6	.133	3	.045	9	-1.622	6	5.352	24	6.087	12	6.447	6
280			min	-1.356	12	-.142	9	-.085	3	-5.352	24	1.622	6	-5.802	6	-6.764	12
281		3	max	1.275	6	-.126	3	.558	6	2.234	13	18.553	26	4.077	5	19.591	11
282			min	-1.349	12	-.928	26	-.465	12	-18.553	26	-2.234	13	-17.63	11	-4.53	5
283	M48	1	max	1.244	10	.913	26	.414	4	1.349	3	18.155	26	3.586	11	19.662	26
284			min	-1.334	4	.123	13	-.484	10	-18.154	26	-1.349	3	-17.694	26	-3.985	11
285		2	max	1.297	10	.132	7	.113	2	-1.93	11	5.576	16	5.792	4	6.147	10
286			min	-1.35	4	-.125	13	-.065	8	-5.576	16	1.93	11	-5.531	10	-6.436	4
287		3	max	1.291	10	-.102	7	.507	10	.498	5	18.16	26	5.546	9	21.938	3
288			min	-1.253	4	-.942	26	-.473	4	-18.16	26	-.498	5	-19.742	3	-6.163	9
289	M49	1	max	1.52	2	.924	26	.503	8	1.384	7	18.344	26	5.826	3	21.478	9
290			min	-1.574	8	.156	5	-.596	2	-18.344	26	-1.384	7	-19.328	9	-6.474	3
291		2	max	1.589	2	.107	11	.097	7	-1.722	2	5.4	20	7.009	8	7.593	2
292			min	-1.602	8	-.1	5	-.039	13	-5.4	20	1.722	2	-6.833	2	-7.788	8
293		3	max	1.581	2	-.147	12	.613	2	1.57	9	18.284	26	6.404	13	22.886	7
294			min	-1.502	8	-.952	26	-.567	8	-18.284	26	-1.57	9	-20.595	7	-7.117	13
295	M50	1	max	0	50	0	50	0	50	0	50	0	50	0	50	0	50
296			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
297		2	max	0	50	0	50	0	50	0	50	0	50	0	50	0	50
298			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
299		3	max	0	50	0	50	0	50	0	50	0	50	0	50	0	50
300			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
301	M51	1	max	0	50	0	50	0	50	0	50	0	50	0	50	0	50
302			min	0	1	0	1	0	1	0	1	0	1	0	1	0	1
303		2	max	0	50	0	50	0	50	0	50	0	50	0	50	0	50
304			min	0	1	0	1	0	1	0	1	0	1	0	1	0	1
305		3	max	0	50	0	50	0	50	0	50	0	50	0	50	0	50
306			min	0	1	0	1	0	1	0	1	0	1	0	1	0	1
307	M52	1	max	0	8	0	50	0	50	0	50	0	50	0	50	0	50
308			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
309		2	max	0	8	0	50	0	50	0	50	0	50	0	50	0	50
310			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
311		3	max	0	8	0	50	0	50	0	50	0	50	0	50	0	50
312			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
313	M53	1	max	0	8	0	50	0	50	0	50	0	50	0	50	0	50
314			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
315		2	max	0	8	0	50	0	50	0	50	0	50	0	50	0	50
316			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
317		3	max	0	8	0	50	0	50	0	50	0	50	0	50	0	50
318			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
319	M54	1	max	0	8	0	50	0	50	0	50	0	50	0	50	0	50
320			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
321		2	max	0	8	0	50	0	50	0	50	0	50	0	50	0	50
322			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
323		3	max	0	8	0	50	0	50	0	50	0	50	0	50	0	50
324			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
325	M55	1	max	0	8	0	50	0	50	0	50	0	50	0	50	0	50
326			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
327		2	max	0	8	0	50	0	50	0	50	0	50	0	50	0	50
328			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
329		3	max	0	8	0	50	0	50	0	50	0	50	0	50	0	50
330			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
331	M56	1	max	0	8	0	50	0	50	0	50	0	50	0	50	0	50
332			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
333		2	max	0	8	0	50	0	50	0	50	0	50	0	50	0	50

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
334			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
335		3	max	0	8	0	50	0	50	0	50	0	50	0	50	0	50
336			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
337	M57	1	max	0	8	0	50	0	50	0	50	0	50	0	50	0	50
338			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
339		2	max	0	8	0	50	0	50	0	50	0	50	0	50	0	50
340			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
341		3	max	0	8	0	50	0	50	0	50	0	50	0	50	0	50
342			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
343	M58	1	max	0	50	0	50	0	50	0	50	0	50	0	50	0	50
344			min	0	5	0	1	0	1	0	1	0	1	0	1	0	1
345		2	max	0	50	0	50	0	50	0	50	0	50	0	50	0	50
346			min	0	5	0	1	0	1	0	1	0	1	0	1	0	1
347		3	max	0	50	0	50	0	50	0	50	0	50	0	50	0	50
348			min	0	5	0	1	0	1	0	1	0	1	0	1	0	1
349	M59	1	max	0	50	0	50	0	50	0	50	0	50	0	50	0	50
350			min	0	1	0	1	0	1	0	1	0	1	0	1	0	1
351		2	max	0	50	0	50	0	50	0	50	0	50	0	50	0	50
352			min	0	1	0	1	0	1	0	1	0	1	0	1	0	1
353		3	max	0	50	0	50	0	50	0	50	0	50	0	50	0	50
354			min	0	1	0	1	0	1	0	1	0	1	0	1	0	1
355	M60	1	max	0	12	0	50	0	50	0	50	0	50	0	50	0	50
356			min	0	6	0	1	0	1	0	1	0	1	0	1	0	1
357		2	max	0	12	0	50	0	50	0	50	0	50	0	50	0	50
358			min	0	6	0	1	0	1	0	1	0	1	0	1	0	1
359		3	max	0	12	0	50	0	50	0	50	0	50	0	50	0	50
360			min	0	6	0	1	0	1	0	1	0	1	0	1	0	1
361	M61	1	max	0	25	0	50	0	50	0	50	0	50	0	50	0	50
362			min	0	6	0	1	0	1	0	1	0	1	0	1	0	1
363		2	max	0	25	0	50	0	50	0	50	0	50	0	50	0	50
364			min	0	6	0	1	0	1	0	1	0	1	0	1	0	1
365		3	max	0	25	0	50	0	50	0	50	0	50	0	50	0	50
366			min	0	6	0	1	0	1	0	1	0	1	0	1	0	1
367	M62	1	max	0	13	0	50	0	50	0	50	0	50	0	50	0	50
368			min	0	7	0	1	0	1	0	1	0	1	0	1	0	1
369		2	max	0	13	0	50	0	50	0	50	0	50	0	50	0	50
370			min	0	7	0	1	0	1	0	1	0	1	0	1	0	1
371		3	max	0	13	0	50	0	50	0	50	0	50	0	50	0	50
372			min	0	7	0	1	0	1	0	1	0	1	0	1	0	1
373	M63	1	max	0	13	0	50	0	50	0	50	0	50	0	50	0	50
374			min	0	6	0	1	0	1	0	1	0	1	0	1	0	1
375		2	max	0	13	0	50	0	50	0	50	0	50	0	50	0	50
376			min	0	6	0	1	0	1	0	1	0	1	0	1	0	1
377		3	max	0	13	0	50	0	50	0	50	0	50	0	50	0	50
378			min	0	6	0	1	0	1	0	1	0	1	0	1	0	1
379	M64	1	max	0	13	0	50	0	50	0	50	0	50	0	50	0	50
380			min	0	6	0	1	0	1	0	1	0	1	0	1	0	1
381		2	max	0	13	0	50	0	50	0	50	0	50	0	50	0	50
382			min	0	6	0	1	0	1	0	1	0	1	0	1	0	1
383		3	max	0	13	0	50	0	50	0	50	0	50	0	50	0	50
384			min	0	6	0	1	0	1	0	1	0	1	0	1	0	1
385	M65	1	max	0	13	0	50	0	50	0	50	0	50	0	50	0	50
386			min	0	6	0	1	0	1	0	1	0	1	0	1	0	1
387		2	max	0	13	0	50	0	50	0	50	0	50	0	50	0	50
388			min	0	6	0	1	0	1	0	1	0	1	0	1	0	1
389		3	max	0	13	0	50	0	50	0	50	0	50	0	50	0	50
390			min	0	6	0	1	0	1	0	1	0	1	0	1	0	1

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
391	M66	1	max	0	4	0	50	0	50	0	50	0	50	0	50	0	50
392			min	0	9	0	1	0	1	0	1	0	1	0	1	0	1
393		2	max	0	4	0	50	0	50	0	50	0	50	0	50	0	50
394			min	0	9	0	1	0	1	0	1	0	1	0	1	0	1
395		3	max	0	4	0	50	0	50	0	50	0	50	0	50	0	50
396			min	0	9	0	1	0	1	0	1	0	1	0	1	0	1
397	M67	1	max	0	50	0	50	0	50	0	50	0	50	0	50	0	50
398			min	0	1	0	1	0	1	0	1	0	1	0	1	0	1
399		2	max	0	50	0	50	0	50	0	50	0	50	0	50	0	50
400			min	0	1	0	1	0	1	0	1	0	1	0	1	0	1
401		3	max	0	50	0	50	0	50	0	50	0	50	0	50	0	50
402			min	0	1	0	1	0	1	0	1	0	1	0	1	0	1
403	M68	1	max	0	4	0	50	0	50	0	50	0	50	0	50	0	50
404			min	0	9	0	1	0	1	0	1	0	1	0	1	0	1
405		2	max	0	4	0	50	0	50	0	50	0	50	0	50	0	50
406			min	0	9	0	1	0	1	0	1	0	1	0	1	0	1
407		3	max	0	4	0	50	0	50	0	50	0	50	0	50	0	50
408			min	0	9	0	1	0	1	0	1	0	1	0	1	0	1
409	M69	1	max	0	25	0	50	0	50	0	50	0	50	0	50	0	50
410			min	0	10	0	1	0	1	0	1	0	1	0	1	0	1
411		2	max	0	25	0	50	0	50	0	50	0	50	0	50	0	50
412			min	0	10	0	1	0	1	0	1	0	1	0	1	0	1
413		3	max	0	25	0	50	0	50	0	50	0	50	0	50	0	50
414			min	0	10	0	1	0	1	0	1	0	1	0	1	0	1
415	M70	1	max	0	4	0	50	0	50	0	50	0	50	0	50	0	50
416			min	0	9	0	1	0	1	0	1	0	1	0	1	0	1
417		2	max	0	4	0	50	0	50	0	50	0	50	0	50	0	50
418			min	0	9	0	1	0	1	0	1	0	1	0	1	0	1
419		3	max	0	4	0	50	0	50	0	50	0	50	0	50	0	50
420			min	0	9	0	1	0	1	0	1	0	1	0	1	0	1
421	M71	1	max	0	4	0	50	0	50	0	50	0	50	0	50	0	50
422			min	0	9	0	1	0	1	0	1	0	1	0	1	0	1
423		2	max	0	4	0	50	0	50	0	50	0	50	0	50	0	50
424			min	0	9	0	1	0	1	0	1	0	1	0	1	0	1
425		3	max	0	4	0	50	0	50	0	50	0	50	0	50	0	50
426			min	0	9	0	1	0	1	0	1	0	1	0	1	0	1
427	M72	1	max	0	4	0	50	0	50	0	50	0	50	0	50	0	50
428			min	0	9	0	1	0	1	0	1	0	1	0	1	0	1
429		2	max	0	4	0	50	0	50	0	50	0	50	0	50	0	50
430			min	0	9	0	1	0	1	0	1	0	1	0	1	0	1
431		3	max	0	4	0	50	0	50	0	50	0	50	0	50	0	50
432			min	0	9	0	1	0	1	0	1	0	1	0	1	0	1
433	M73	1	max	0	3	0	50	0	50	0	50	0	50	0	50	0	50
434			min	0	9	0	1	0	1	0	1	0	1	0	1	0	1
435		2	max	0	3	0	50	0	50	0	50	0	50	0	50	0	50
436			min	0	9	0	1	0	1	0	1	0	1	0	1	0	1
437		3	max	0	3	0	50	0	50	0	50	0	50	0	50	0	50
438			min	0	9	0	1	0	1	0	1	0	1	0	1	0	1
439	M74	1	max	0	38	0	50	0	50	0	50	0	50	0	50	0	50
440			min	0	7	0	1	0	1	0	1	0	1	0	1	0	1
441		2	max	0	38	0	50	0	50	0	50	0	50	0	50	0	50
442			min	0	7	0	1	0	1	0	1	0	1	0	1	0	1
443		3	max	0	38	0	50	0	50	0	50	0	50	0	50	0	50
444			min	0	7	0	1	0	1	0	1	0	1	0	1	0	1
445	M75	1	max	0	26	0	50	0	50	0	50	0	50	0	50	0	50
446			min	0	27	0	1	0	1	0	1	0	1	0	1	0	1
447		2	max	0	26	0	50	0	50	0	50	0	50	0	50	0	50

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
448			min	0	27	0	1	0	1	0	1	0	1	0	1	0	1
449		3	max	0	26	0	50	0	50	0	50	0	50	0	50	0	50
450			min	0	27	0	1	0	1	0	1	0	1	0	1	0	1
451	M76	1	max	0	6	0	50	0	50	0	50	0	50	0	50	0	50
452			min	0	12	0	1	0	1	0	1	0	1	0	1	0	1
453		2	max	0	6	0	50	0	50	0	50	0	50	0	50	0	50
454			min	0	12	0	1	0	1	0	1	0	1	0	1	0	1
455		3	max	0	6	0	50	0	50	0	50	0	50	0	50	0	50
456			min	0	12	0	1	0	1	0	1	0	1	0	1	0	1
457	M77	1	max	0	12	0	50	0	50	0	50	0	50	0	50	0	50
458			min	0	6	0	1	0	1	0	1	0	1	0	1	0	1
459		2	max	0	12	0	50	0	50	0	50	0	50	0	50	0	50
460			min	0	6	0	1	0	1	0	1	0	1	0	1	0	1
461		3	max	0	12	0	50	0	50	0	50	0	50	0	50	0	50
462			min	0	6	0	1	0	1	0	1	0	1	0	1	0	1
463	M78	1	max	0	38	0	50	0	50	0	50	0	50	0	50	0	50
464			min	0	5	0	1	0	1	0	1	0	1	0	1	0	1
465		2	max	0	38	0	50	0	50	0	50	0	50	0	50	0	50
466			min	0	5	0	1	0	1	0	1	0	1	0	1	0	1
467		3	max	0	38	0	50	0	50	0	50	0	50	0	50	0	50
468			min	0	5	0	1	0	1	0	1	0	1	0	1	0	1
469	M79	1	max	0	8	0	50	0	50	0	50	0	50	0	50	0	50
470			min	0	27	0	1	0	1	0	1	0	1	0	1	0	1
471		2	max	0	8	0	50	0	50	0	50	0	50	0	50	0	50
472			min	0	27	0	1	0	1	0	1	0	1	0	1	0	1
473		3	max	0	8	0	50	0	50	0	50	0	50	0	50	0	50
474			min	0	27	0	1	0	1	0	1	0	1	0	1	0	1
475	M80	1	max	0	11	0	50	0	50	0	50	0	50	0	50	0	50
476			min	0	5	0	1	0	1	0	1	0	1	0	1	0	1
477		2	max	0	11	0	50	0	50	0	50	0	50	0	50	0	50
478			min	0	5	0	1	0	1	0	1	0	1	0	1	0	1
479		3	max	0	11	0	50	0	50	0	50	0	50	0	50	0	50
480			min	0	5	0	1	0	1	0	1	0	1	0	1	0	1
481	M81	1	max	1.122	6	1.743	26	.2	9	-3.8	6	35.233	24	.126	3	.175	9
482			min	-1.142	12	.272	6	-.17	3	-35.233	24	3.8	6	-.175	9	-.126	3
483		2	max	.681	6	1.312	24	.396	3	-1.152	6	16.564	24	5.145	9	4.882	3
484			min	-.698	12	.136	6	-.412	9	-16.564	24	1.152	6	-4.882	3	-5.145	9
485		3	max	.669	6	1.231	24	.371	3	1.461	24	-.382	6	.571	3	.537	9
486			min	-.686	12	.085	6	-.387	9	.382	6	-1.461	24	-.537	9	-.571	3
487	M82	1	max	1.135	10	1.735	26	.175	13	-3.809	10	35.127	16	.134	7	.03	13
488			min	-1.146	4	.273	10	-.177	7	-35.127	16	3.809	10	-.03	13	-.134	7
489		2	max	.722	10	1.308	16	.404	7	-1.14	10	16.491	16	5.074	13	4.996	7
490			min	-.685	4	.137	10	-.41	13	-16.491	16	1.14	10	-4.996	7	-5.074	13
491		3	max	.71	10	1.226	16	.379	7	1.459	16	-.416	10	.573	7	.573	13
492			min	-.673	4	.086	10	-.385	13	.416	10	-1.459	16	-.573	13	-.573	7
493	M83	1	max	1.384	2	1.811	20	.05	5	-.763	2	35.868	20	.15	16	.013	10
494			min	-1.412	8	.19	2	-.057	11	-35.868	20	.763	2	-.013	10	-.15	16
495		2	max	.804	2	1.328	20	.334	11	.369	2	16.775	20	4.217	5	4.12	11
496			min	-.867	8	.026	2	-.341	5	-16.775	20	-.369	2	-4.12	11	-4.217	5
497		3	max	.792	2	1.246	20	.309	11	1.48	20	-.335	2	.454	11	.452	5
498			min	-.856	8	-.026	2	-.316	5	.335	2	-1.48	20	-.452	5	-.454	11
499	M84	1	max	2.383	2	.216	13	.314	7	10.313	7	9.15	13	3.024	13	2.922	7
500			min	-1.672	8	-.258	7	-.287	13	-9.15	13	-10.313	7	-2.531	7	-3.491	13
501		2	max	2.391	2	.252	13	.377	7	.232	4	.226	10	.632	3	.725	9
502			min	-1.664	8	-.295	7	-.349	13	-.226	10	-.232	4	-.628	9	-.729	3
503		3	max	2.4	2	.292	12	.44	7	10.782	13	11.929	7	3.304	8	4.397	2
504			min	-1.656	8	-.334	6	-.412	13	-11.929	7	-10.782	13	-3.809	2	-3.814	8

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
505	M85	1	max	1.247	13	.049	4	.062	2	2.136	8	1.696	2	.879	22	.103	4
506			min	-1.602	7	-.077	10	-.043	8	-1.696	2	-2.136	8	-.089	4	-1.015	22
507		2	max	1.256	13	.016	13	.029	8	1.607	8	1.934	2	1.485	3	1.246	9
508			min	-1.594	7	-.043	7	-.01	2	-1.934	2	-1.607	8	-1.079	9	-1.715	3
509		3	max	1.264	13	.074	12	.102	8	.411	10	1.526	4	1.058	11	1.077	5
510			min	-1.586	7	-.102	6	-.082	2	-1.526	4	-.411	10	-.933	5	-1.221	11
511	M86	1	max	.493	2	-.021	4	.323	15	3.145	20	-.042	2	-.557	12	2.471	17
512			min	-.138	8	-.195	22	.141	10	.042	2	-3.145	20	-2.141	17	.643	12
513		2	max	.502	2	-.046	13	.332	20	-2.277	7	5.476	25	2.9	15	-.837	10
514			min	-.13	8	-.186	19	.092	2	-5.476	25	2.277	7	.725	10	-3.347	15
515		3	max	.51	2	.011	12	.354	20	-4.48	13	14.021	19	7.977	21	-1.774	3
516			min	-.122	8	-.204	18	.019	2	-14.021	19	4.48	13	1.537	3	-9.208	21
517	M87	1	max	1.022	4	.066	5	.07	2	.655	8	1.16	2	.347	12	.944	6
518			min	-1.457	10	-.059	11	-.059	8	-1.16	2	-.655	8	-.818	6	-.401	12
519		2	max	1.031	4	.014	10	.013	8	1.159	8	1.746	2	1.209	3	1.258	9
520			min	-1.448	10	-.007	4	-.002	2	-1.746	2	-1.159	8	-1.09	9	-1.395	3
521		3	max	1.039	4	.086	11	.085	8	.548	9	1.218	3	1.608	10	1.042	4
522			min	-1.44	10	-.079	5	-.074	2	-1.218	3	-.548	9	-.902	4	-1.856	10
523	M88	1	max	1.583	2	.182	3	.287	9	8.215	8	8.943	2	6.41	3	7.074	9
524			min	-.911	8	-.166	9	-.311	3	-8.943	2	-8.215	8	-6.129	9	-7.399	3
525		2	max	1.591	2	.177	2	.355	8	.354	7	.466	13	.47	4	.526	10
526			min	-.903	8	-.163	8	-.377	2	-.466	13	-.354	7	-.456	10	-.542	4
527		3	max	1.599	2	.2	13	.427	8	9.425	2	8.922	8	8.57	9	10.185	3
528			min	-.895	8	-.186	7	-.45	2	-8.922	8	-9.425	2	-8.824	3	-9.893	9
529	M89	1	max	1.008	4	.293	12	.288	5	10.435	6	9.949	12	1.277	6	2.398	12
530			min	-1.016	10	-.292	6	-.264	11	-9.949	12	-10.435	6	-2.078	12	-1.474	6
531		2	max	1.016	4	.355	12	.307	6	.315	7	.23	13	.452	4	.474	10
532			min	-1.008	10	-.355	6	-.283	12	-.23	13	-.315	7	-.411	10	-.522	4
533		3	max	1.024	4	.418	12	.344	6	11.178	12	11.494	6	3.499	11	2.976	5
534			min	-.999	10	-.417	6	-.319	12	-11.494	6	-11.178	12	-2.578	5	-4.039	11
535	M90	1	max	1.225	3	.072	5	.048	2	1.396	7	1.046	13	.139	11	.911	16
536			min	-1.499	9	-.056	11	-.05	8	-1.046	13	-1.396	7	-.789	16	-.16	11
537		2	max	1.233	3	.02	23	.022	8	2.024	6	1.355	12	.559	4	.777	10
538			min	-1.491	9	0	5	-.025	2	-1.355	12	-2.024	6	-.673	10	-.645	4
539		3	max	1.241	3	.089	11	.094	8	1.155	18	.082	12	2.116	9	2.033	3
540			min	-1.483	9	-.072	5	-.097	2	-.082	12	-1.155	18	-1.761	3	-2.443	9
541	M91	1	max	.722	7	.276	16	-.075	3	-.303	6	2.762	24	.464	9	.674	3
542			min	-.166	13	.072	10	-.244	21	-2.762	24	.303	6	-.584	3	-.535	9
543		2	max	.73	7	.27	24	-.071	7	5.81	18	-2.154	11	1.069	4	.322	10
544			min	-.158	13	.087	7	-.241	25	2.154	11	-5.81	18	-.279	10	-1.233	4
545		3	max	.738	7	.29	23	0	8	14.186	25	-4.903	7	2.332	10	.731	4
546			min	-.15	13	.025	6	-.263	14	4.903	7	-14.186	25	-.633	4	-2.691	10
547	M92	1	max	1.221	9	.067	5	.044	2	.929	6	.776	12	.731	21	-.045	3
548			min	-1.522	3	-.059	11	-.06	8	-.776	12	-.929	6	.039	3	-.844	21
549		2	max	1.229	9	.013	11	.012	9	1.73	6	1.179	12	.831	4	.675	10
550			min	-1.514	3	-.005	5	-.028	3	-1.179	12	-1.73	6	-.585	10	-.959	4
551		3	max	1.237	9	.085	11	.084	8	1.148	17	.111	10	1.851	9	2.19	3
552			min	-1.506	3	-.078	5	-.1	2	-.111	10	-1.148	17	-1.897	3	-2.137	9
553	M93	1	max	1.093	8	.355	13	.311	7	12.469	7	11.539	13	2.229	8	2.026	2
554			min	-1.112	2	-.386	7	-.293	13	-11.539	13	-12.469	7	-1.755	2	-2.573	8
555		2	max	1.101	8	.391	13	.373	7	.264	5	.139	11	.459	4	.529	10
556			min	-1.104	2	-.422	7	-.356	13	-.139	11	-.264	5	-.459	10	-.53	4
557		3	max	1.11	8	.427	13	.436	7	13.19	13	13.872	7	1.525	11	2.245	5
558			min	-1.095	2	-.458	7	-.419	13	-13.872	7	-13.19	13	-1.945	5	-1.761	11
559	M94	1	max	1.64	10	.102	9	.069	8	1.76	6	3.025	12	7.62	3	8.419	9
560			min	-.99	3	-.07	3	-.112	2	-3.025	12	-1.76	6	-7.294	9	-8.795	3
561		2	max	1.648	10	.162	10	.141	8	.393	5	.44	11	.483	4	.601	10

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
562			min	-.982	3	-.13	4	-.184	2	-.44	11	-.393	5	-.521	10	-.557	4
563		3	max	1.657	10	.224	10	.213	8	3.818	12	2.645	6	9.619	9	11.566	3
564			min	-.974	3	-.193	4	-.257	2	-2.645	6	-3.818	12	-10.02	3	-11.103	9
565	M95	1	max	1.507	8	.072	5	.026	2	-.289	7	1.121	24	.715	4	.422	10
566			min	-1.89	2	-.069	11	-.052	8	-1.121	24	.289	7	-.366	10	-.825	4
567		2	max	1.515	8	.016	2	.02	8	.459	5	1.002	11	1.52	4	2.217	10
568			min	-1.882	2	-.012	8	-.046	2	-1.002	11	-.459	5	-1.921	10	-1.755	4
569		3	max	1.523	8	.076	11	.092	8	1.337	2	1.385	8	.342	8	1.715	2
570			min	-1.874	2	-.072	5	-.118	2	-1.385	8	-1.337	2	-1.486	2	-.394	8
571	M96	1	max	.405	22	-.117	6	.052	3	2.842	16	-.72	11	4.987	15	-1.941	9
572			min	0	4	-.324	24	-.04	9	.72	11	-2.842	16	1.681	9	-5.756	15
573		2	max	.429	22	-.11	10	.035	7	-.88	7	2.814	24	-1.869	4	6.372	22
574			min	.007	4	-.325	16	-.024	13	-2.814	24	.88	7	-5.521	22	2.158	4
575		3	max	.453	22	-.04	11	.105	8	-2.673	12	8.386	18	-4.72	9	18.647	15
576			min	.016	4	-.347	17	-.093	2	-8.386	18	2.673	12	-16.154	15	5.449	9
577	M97	1	max	.918	12	.038	5	.072	3	1.31	4	.394	10	.035	2	.387	26
578			min	-1.323	6	-.069	11	-.049	9	-.394	10	-1.31	4	-.335	26	-.04	2
579		2	max	.927	12	.005	12	.036	6	.729	5	.714	11	1.412	4	2.217	10
580			min	-1.315	6	-.039	18	-.012	12	-.714	11	-.729	5	-1.921	10	-1.63	4
581		3	max	.935	12	.076	11	.098	8	.787	13	1.689	7	-.195	8	.953	14
582			min	-1.306	6	-.106	5	-.074	2	-1.689	7	-.787	13	-.826	14	.225	8
583	M98	1	max	1.536	10	.185	12	.091	5	5.427	6	5.177	12	4.041	6	5.263	12
584			min	-.825	4	-.184	6	-.078	11	-5.177	12	-5.427	6	-4.559	12	-4.664	6
585		2	max	1.544	10	.248	12	.116	6	.332	8	.296	2	.517	3	.617	9
586			min	-.817	4	-.247	6	-.102	12	-.296	2	-.332	8	-.534	9	-.597	3
587		3	max	1.552	10	.311	12	.174	7	6.43	12	6.604	6	5.916	11	6.229	5
588			min	-.809	4	-.31	6	-.161	13	-6.604	6	-6.43	12	-5.396	5	-6.829	11

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

	Member	Shape	Code Check	Loc[...	LC	Shea...	Loc[...	Dir	LC	phi*Pn...	phi*Pnt...	phi*Mn...	phi*Mn...	Cb	Eqn
1	M15	L2x2x3	.917	0	22	.047	30	y	26	20494....	23392.8	6692.5...	14865....	1...	H2-1
2	M18	L2x2x3	.907	29.9...	22	.048	0	y	26	20501....	23392.8	6692.5...	14871....	1...	H2-1
3	M17	L2x2x3	.878	0	18	.046	29.9...	y	26	20501....	23392.8	6692.5...	14857....	1...	H2-1
4	M37	PL10"x3/8"	.862	7.953	8	.666	7.953	y	20	10775...	121500	11390....	28836...	1...	H1-1b
5	M14	L2x2x3	.822	0	20	.048	30	y	26	20494....	23392.8	6692.5...	14871....	1...	H2-1
6	M19	L2x2x3	.817	29.9...	24	.052	15.2...	z	2	20501....	23392.8	6692.5...	14871....	1...	H2-1
7	M49	L3.5X3.5X4	.807	128....	26	.127	128....	y	26	48170....	55080	28986....	62747....	2...	H2-1
8	M47	L3.5X3.5X4	.806	0	26	.127	0	y	26	48170....	55080	28986....	62747....	2...	H2-1
9	M48	L3.5X3.5X4	.803	128....	26	.127	128....	y	26	48170....	55080	28986....	62747....	2...	H2-1
10	M16	L2x2x3	.778	0	16	.048	1.529	z	2	20501....	23392.8	6692.5...	14871....	1...	H2-1
11	M36	PL10"x3/8"	.745	7.976	3	.654	8.139	y	16	10760...	121500	11390....	303750	1...	H1-1b
12	M35	PL10"x3/8"	.740	7.976	13	.659	7.814	y	24	10760...	121500	11390....	303750	1...	H1-1b
13	M83	HSS5X5X5	.726	0	20	.083	0	y	18	21772...	217764	379224	379224	1...	H1-1b
14	M81	HSS5X5X5	.711	0	24	.078	0	y	2	21449...	217764	379224	379224	1...	H1-1b
15	M82	HSS5X5X5	.710	0	16	.092	0	y	2	21449...	217764	379224	379224	1...	H1-1b
16	M96	L2x2x3	.579	48	16	.016	48	y	18	16672....	23392.8	6692.5...	14660....	2...	H2-1
17	M86	L2x2x3	.510	48	20	.016	48	z	21	16672....	23392.8	6692.5...	14501.2	2...	H2-1
18	M88	L2x2x3	.460	48	3	.032	48	z	3	16672....	23392.8	6692.5...	14749....	2...	H2-1
19	M44	L5X5X6	.443	118....	2	.082	16.5...	z	2	11413...	118260	89011....	11613...	1	H2-1
20	M84	L2x2x3	.406	48	13	.032	48	z	7	16672....	23392.8	6692.5...	14863....	2...	H2-1
21	M45	L5X5X6	.405	16.5...	8	.078	215....	z	6	11376...	118260	89011....	12143...	1...	H2-1
22	M91	L2x2x3	.383	48	22	.013	48	z	2	16672....	23392.8	6692.5...	14410....	1...	H2-1
23	M93	L2x2x3	.370	48	7	.034	48	y	7	16672....	23392.8	6692.5...	14820....	2...	H2-1
24	M46	L5X5X6	.366	144....	9	.071	215....	z	9	11366...	118260	89011....	12231...	1...	H2-1
25	M89	L2x2x3	.337	48	11	.029	48	y	5	16672....	23392.8	6692.5...	14811....	2...	H2-1

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

	Member	Shape	Code Check	Loc[...	LC	Shea...	Loc[...	Dir	LC	phi*Pn...	phi*Pnt...	phi*Mn...	phi*Mn...	Cb	Eqn
26	M98	L2x2x3	.317	48	11	.024	48	y	11	16672....	23392.8	6692.5...	14871....	2...	H2-1
27	M94	L2x2x3	.306	48	10	.022	48	z	3	16672....	23392.8	6692.5...	14579....	2...	H2-1
28	M24	L2x2x3	.271	60.6...	7	.009	60.6...	z	6	13633....	23392.8	6692.5...	12541....	1...	H2-1
29	M28	L2x2x3	.260	60.6...	2	.011	60.6...	z	10	13633....	23392.8	6692.5...	14593....	2...	H2-1
30	M22	L2x2x3	.251	0	9	.011	0	z	2	13619....	23392.8	6692.5...	14312....	2...	H2-1
31	M26	L2x2x3	.227	0	5	.009	0	z	6	13619....	23392.8	6692.5...	12734....	1...	H2-1
32	M20	L2x2x3	.226	60.6...	7	.012	60.6...	z	2	13633....	23392.8	6692.5...	14507....	2...	H2-1
33	M2	PIPE_2.0	.220	71.6...	8	.118	24.6...		2	13787....	32130	22459.5	22459.5	2...	H1-1b
34	M30	L2x2x3	.202	0	5	.011	0	z	10	13619....	23392.8	6692.5...	14577....	2...	H2-1
35	M6	PIPE_2.0	.198	71.6...	15	.085	24.6...		10	13787....	32130	22459.5	22459.5	2...	H1-1b
36	M11	PIPE_2.0	.190	71.6...	25	.121	24.6...		7	13787....	32130	22459.5	22459.5	2...	H1-1b
37	M27	L2x2x3	.179	0	4	.008	0	z	5	13619....	23392.8	6692.5...	12991....	1...	H2-1
38	M25	L2x2x3	.179	60.6...	8	.008	60.6...	z	6	13633....	23392.8	6692.5...	13591....	1...	H2-1
39	M43	L5X5X6	.171	203....	2	.459	142....	z	14	11413...	118260	89011....	12109...	1...	H2-1
40	M3	PIPE_2.0	.168	71.6...	20	.100	24.6...		2	13787....	32130	22459.5	22459.5	2...	H1-1b
41	M8	PIPE_2.0	.168	71.6...	16	.098	24.6...		9	13787....	32130	22459.5	22459.5	2...	H1-1b
42	M10	PIPE_2.0	.166	71.6...	25	.080	24.6...		6	13787....	32130	22459.5	22459.5	2...	H1-1b
43	M41	L5X5X6	.154	217....	9	.446	142....	z	18	11377...	118260	89011....	15816...	2...	H2-1
44	M31	L2x2x3	.149	0	8	.009	0	z	9	13619....	23392.8	6692.5...	13321....	1...	H2-1
45	M1	PIPE_2.0	.149	48.5...	8	.150	24.6...		2	13787....	32130	22459.5	22459.5	2...	H1-1b
46	M12	PIPE_2.0	.146	71.6...	8	.114	24.6...		6	13787....	32130	22459.5	22459.5	2...	H1-1b
47	M42	L5X5X6	.141	217....	10	.445	142....	z	14	11377...	118260	89011....	19205...	2...	H2-1
48	M7	PIPE_2.0	.136	71.6...	2	.129	24.6...		9	13787....	32130	22459.5	22459.5	1...	H1-1b
49	M23	L2x2x3	.135	0	12	.008	0	z	2	13619....	23392.8	6692.5...	13551....	1...	H2-1
50	M34	PIPE_2.5	.135	61.7...	2	.146	61.7...		9	28468....	50715	43155	43155	1...	H1-1b
51	M85	L2x2x3	.123	22.0...	2	.016	48	z	2	16672....	23392.8	6692.5...	12795....	1...	H2-1
52	M95	L2x2x3	.122	48	2	.013	0	y	10	16672....	23392.8	6692.5...	14716....	2...	H2-1
53	M29	L2x2x3	.118	0	7	.008	60.6...	z	11	13633....	23392.8	6692.5...	12658....	1...	H2-1
54	M21	L2x2x3	.117	60.6...	4	.008	60.6...	z	3	13633....	23392.8	6692.5...	14118....	2...	H2-1
55	M92	L2x2x3	.111	48	3	.014	48	y	6	16672....	23392.8	6692.5...	14820....	2...	H2-1
56	M90	L2x2x3	.108	48	3	.016	48	z	7	16672....	23392.8	6692.5...	14871....	2...	H2-1
57	M87	L2x2x3	.105	23.02	3	.016	48	z	2	16672....	23392.8	6692.5...	12683....	1...	H2-1
58	M33	PIPE_2.5	.091	61.7...	13	.111	61.7...		5	28468....	50715	43155	43155	2...	H1-1b
59	M97	L2x2x3	.083	24	11	.015	48	z	9	16672....	23392.8	6692.5...	12984....	1...	H2-1
60	M32	PIPE_2.5	.080	61.7...	6	.138	61.7...		7	28468....	50715	43155	43155	1...	H1-1b
61	M13	PIPE_2.0	.061	23.8...	8	.022	23.8...		8	26005....	32130	22459.5	22459.5	1...	H1-1b
62	M9	PIPE_2.0	.056	71.6...	5	.107	24.6...		7	13787....	32130	22459.5	22459.5	2...	H1-1b
63	M4	PIPE_2.0	.053	71.6...	11	.115	24.6...		2	13787....	32130	22459.5	22459.5	2...	H1-1b
64	M5	PIPE_2.0	.052	71.6...	7	.093	24.6...		10	13787....	32130	22459.5	22459.5	2...	H1-1b
65	M40	PL10"x3/8"	.037	0	2	.010	0	y	6	75171....	121500	11390....	303750	2...	H1-1b*
66	M39	PL10"x3/8"	.035	15.9...	2	.012	15.9...	y	7	74955....	121500	11390....	303750	2...	H1-1b
67	M38	PL10"x3/8"	.028	0	6	.009	0	y	3	74955....	121500	11390....	303750	1...	H1-1b*

Envelope Plate/Shell Principal Stresses

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

APPENDIX D

ADDITIONAL CALCUATIONS

JACOBS™

MANUFACTURER COMPARISON
MOUNT CONNECTION AND COMPONENTS

ANSI/TIA-222-H

Project Number:	ERCC0303
Site Number:	806366
Engineer:	AM
Date:	2/26/2019
Carrier:	AT&T
Reviewed By:	B. Bartlett

Input Data

Mount Design Loading

Item	-Other-	
Description	Bolt Only Comparison	
Mount Type	Full-Assembly	
Design Height	n/a	ft
Design Ultimate Windspeed	n/a	mph (no ice)
Design Nominal Windspeed	n/a	mph (no ice)
Design Ice Windspeed	n/a	mph (w/ice)
Structure Class	n/a	(I, II, III)
Exposure Category	n/a	(B, C or D)
Topographic Category	n/a	(1, 2, 3 or 4)
Design Ice Thickness	n/a	in
Wind Direction Probability	n/a	K_d
Gust Effect Factor	n/a	G_h
Shielding Factor	n/a	K_a

→ *Assumed Equivalent to Existing*

Mount Design Capacity (Unfactored Loads)

Dead Load	n/a	lb
Live Load	n/a	lb
Max Normal	n/a	lb
Max Tangential	n/a	lb
Max Standoff/Offset	n/a	in
No. of Weldments Considered	1	
Assembly Weight	n/a	lb

Bolt Capacity

Type		Tower Connection Bolt	
Tower Bolt Quantity		4	
Tower Bolt Size		1/2	in
Tower Bolt Grade		A325	
Theads in Shear Plane?		Yes	
Tensile (lb)	35280	Shear (lb)	21168

Mount Parameters

Item	Mount Analyzed		Design Check
Mount Height		ft	n/a
Ultimate Windspeed		mph (no ice)	n/a
Nominal Windspeed	0	mph (no ice)	n/a
Nominal Ice Windspeed		mph (w/ice)	n/a
Structure Class		(I, II, III)	n/a
Exposure Category		(B, C or D)	n/a
Topographic Category		(1, 2, 3 or 4)	n/a
Ice Thickness		in	n/a
Wind Direction Probability		K_d	n/a
Gust Effect Factor		G_h	n/a
Shielding Factor		K_a	n/a

Proposed Loading (Factored Loads from Model)

Dead Load	4353	lb	
Live Load	500	lb	
Max Normal	7427	lb	
Max Tangential	5243	lb	
Max Standoff/Offset	6	in	✓
No. of Weldments Considered	1		✓

Loading Comparison

Item	Max Loading			
Configuration	**Dead Load**	**Normal**	**Tangential**	
Design Load	n/a	n/a	n/a	lb
Proposed Load	3109	4642	3277	lb
Tower Bolt Capacity	21168	35280	21168	lb
Loading Ratio	**14.7%**	**13.2%**	**15.5%**	

Capacity By Comparison
15.5%

→ Estimated capacity is less than 100.0%; no additional analysis is required.

Considerations/Assumptions

- Typical loading comparison per **individual mount or platform**.
- If the design loading criteria are unknown, they are assumed based on common structure type.
- Proposed loading converted to allowable for comparison purposes.
  (Factors: 1.4 Deadload, 1.6 Normal, 1.6 Tangential)
- Comparison of design parameters are for evaluation purposes only; final capacity comparison based on design loading.

RF EMISSIONS COMPLIANCE REPORT

Crown Castle on behalf of AT&T Mobility, LLC

Crown Castle Site Name: HRT 107(C) 943204
Crown Castle Site ID: 806366
AT&T Mobility, LLC FA #: 10035085
73 North Main Street
MARLBOROUGH, CT
1/22/2019

Report Status:

AT&T Mobility, LLC Is Compliant

Prepared By:

Sitesafe, LLC

8618 Westwood Center Drive,
Suite 315

Vienna, VA 22182

Voice 703-276-1100
Fax 703-276-1169

Engineering Statement in Re:
Electromagnetic Energy Analysis
Crown Castle
MARLBOROUGH, CT

My signature on the cover of this document indicates:

That I am registered as a Professional Engineer in the jurisdiction indicated; and

That I have extensive professional experience in the wireless communications engineering industry; and

That I am an employee of Sitesafe, LLC in Vienna, Virginia; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission ("the FCC" and "the FCC Rules") both in general and specifically as they apply to the FCC's Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; and

That the technical information serving as the basis for this report was supplied by Crown Castle (See attached Site Summary and Carrier documents), and that AT&T Mobility, LLC's installations involve communications equipment, antennas and associated technical equipment at a location referred to as the "HRT 107(C) 943204" ("the site"); and

That AT&T Mobility, LLC proposes to operate at the site with transmit antennas listed in the carrier summary and with a maximum effective radiated power as specified by AT&T Mobility, LLC and shown on the worksheet, and that worst-case 100% duty cycle have been assumed; and

That this analysis has been performed with the assumption that the ground immediately surrounding the tower is primarily flat or falling; and

That at this time, the FCC requires that certain licensees address specific levels of radio-frequency energy to which workers or members of the public might possibly be exposed (at §1.1307(b) of the FCC Rules); and

That such consideration of possible exposure of humans to radio-frequency radiation must utilize the standards set by the FCC, which is the Federal Agency having jurisdiction over communications facilities; and

That the FCC rules define two tiers of permissible exposure guidelines: 1) "uncontrolled environments," defined as situations in which persons may not be aware of (the "general public"), or may not be able to control their exposure to a transmission facility; and (2) "controlled environments," which defines situations in which persons are aware of their potential for exposure (industry personnel); and

That this statement specifically addresses the uncontrolled environment (which is more conservative than the controlled environment) and the limit set forth in the FCC rules for licensees of AT&T Mobility, LLC's operating frequency as shown on the attached antenna worksheet; and

That when applying the uncontrolled environment standards, the predicted Maximum Power Density at two meters above ground level from the proposed AT&T Mobility, LLC operation is no more than 1.916% of the maximum in any accessible area on the ground and

That it is understood per FCC Guidelines and OET65 Appendix A, that regardless of the existent radio-frequency environment, only those licenses whose contributions exceed five percent of the exposure limit pertinent to their operation(s) bear any responsibility for bringing any non-compliant area(s) into compliance; and

That when applying the uncontrolled environment standards, the cumulative predicted energy density from the proposed operation is no more than 5.279% of the maximum in any accessible area up to two meters above the ground per OET-65; and

That the calculations provided in this report are based on data provided by the client and antenna pattern data supplied by the antenna manufacturer, in accordance with FCC guidelines listed in OET-65. Horizontal and vertical antenna patterns are combined for modeling purposes to accurately reflect the energy two meters above ground level where on-axis energy refers to maximum energy two meters above the ground along the azimuth of the antenna and where area energy refers to the maximum energy anywhere two meters above the ground regardless of the antenna azimuth, accounting for cumulative energy from multiple antennas for the carrier and frequency range indicated; and

That the Occupational Safety and Health Administration has policies in place which address worker safety in and around communications sites, thus individual companies will be responsible for their employees' training regarding Radio Frequency Safety.

In summary, it is stated here that the proposed operation at the site would not result in exposure of the Public to excessive levels of radio-frequency energy as defined in the FCC Rules and Regulations, specifically 47 CFR 1.1307 and that AT&T Mobility, LLC's proposed operation is completely compliant.

Finally, it is stated that access to the tower should be restricted to communication industry professionals, and approved contractor personnel trained in radio-frequency safety; and that the instant analysis addresses exposure levels at two meters above ground level and does not address exposure levels on the tower, or in the immediate proximity of the antennas.

Crown Castle
HRT 107(C) 943204
Site Summary

Carrier	Area Maximum Percentage MPE
AT&T Mobility, LLC	0.197 %
AT&T Mobility, LLC	0.358 %
AT&T Mobility, LLC	0.176 %
AT&T Mobility, LLC (Proposed)	0.198 %
AT&T Mobility, LLC (Proposed)	0.381 %
AT&T Mobility, LLC (Proposed)	0.289 %
AT&T Mobility, LLC (Proposed)	0.317 %
MetroPCS (Decommissioned)	0 %
Sprint	0.383 %
Sprint	0.369 %
Sprint	0.245 %
Sprint (Decommissioned)	0 %
T-Mobile	0.231 %
T-Mobile	0.302 %
Tolland County Mutual Aid Five SVC	0.193 %
Verizon Wireless	0.412 %
Verizon Wireless	0.458 %
Verizon Wireless	0.293 %
Verizon Wireless	0.478 %
Composite Site MPE:	5.279 %

AT&T Mobility, LLC
HRT 107(C) 943204
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	1.9657	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.19657	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
KMW	AM-X-CD-16-65	144	356	4888	1.07609	0.107609	1.797385	0.179739
KMW	AM-X-CD-16-65	144	126	4888	1.074719	0.107472	1.797385	0.179739
KMW	AM-X-CD-16-65	144	239	4888	1.07609	0.107609	1.797385	0.179739

AT&T Mobility, LLC
HRT 107(C) 943204
Carrier Summary

Frequency:	737	MHz
Maximum Permissible Exposure (MPE):	491.33	µW/cm^2
Maximum power density at ground level:	1.75761	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.35772	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
KMW	AM-X-CD-16-65	144	356	3305	1.665595	0.338995	1.749902	0.356154
KMW	AM-X-CD-16-65	144	126	3305	1.669846	0.33986	1.749902	0.356154
KMW	AM-X-CD-16-65	144	239	3305	1.665595	0.338995	1.749902	0.356154

AT&T Mobility, LLC
HRT 107(C) 943204
Carrier Summary

Frequency:	850	MHz
Maximum Permissible Exposure (MPE):	566.67	µW/cm^2
Maximum power density at ground level:	0.99687	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.17592	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Powerwave	7770	144	356	1094	0.499035	0.088065	0.787257	0.138928
Powerwave	7770	144	126	1094	0.4984	0.087953	0.787257	0.138928
Powerwave	7770	144	239	1094	0.499035	0.088065	0.787257	0.138928

AT&T Mobility, LLC (Proposed)
HRT 107(C) 943204
Carrier Summary

Frequency:	2300	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	1.98196	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.1982	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10965	144	356	3954	0.996091	0.099609	1.851942	0.185194
Kathrein-Scala	800-10965	144	126	3954	0.996091	0.099609	1.851942	0.185194
Kathrein-Scala	800-10965	144	239	3954	0.996091	0.099609	1.851942	0.185194

AT&T Mobility, LLC (Proposed)
HRT 107(C) 943204
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	3.80984	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.38098	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10965	144	356	7114	1.54621	0.154621	3.549903	0.35499
Kathrein-Scala	800-10965	144	126	7114	1.54621	0.154621	3.549903	0.35499
Kathrein-Scala	800-10965	144	239	7114	1.508042	0.150804	3.549903	0.35499

AT&T Mobility, LLC (Proposed)
HRT 107(C) 943204
Carrier Summary

Frequency:	850	MHz
Maximum Permissible Exposure (MPE):	566.67	µW/cm^2
Maximum power density at ground level:	1.63585	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.28868	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10965	144	356	3607	1.084597	0.191399	1.110991	0.196057
Kathrein-Scala	800-10965	144	126	3607	1.084597	0.191399	1.110991	0.196057
Kathrein-Scala	800-10965	144	239	3607	1.088918	0.192162	1.110991	0.196057

AT&T Mobility, LLC (Proposed)
HRT 107(C) 943204
Carrier Summary

Frequency:	763	MHz
Maximum Permissible Exposure (MPE):	508.67	µW/cm^2
Maximum power density at ground level:	1.61406	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.31731	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10965	144	356	2959	1.119641	0.220113	1.433264	0.281769
Kathrein-Scala	800-10965	144	126	2959	1.113106	0.218828	1.433264	0.281769
Kathrein-Scala	800-10965	144	239	2959	1.119641	0.220113	1.433264	0.281769

MetroPCS (Decommissioned)
HRT 107(C) 943204
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	0	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	742213	135	30	0	0	0	0	0
Kathrein-Scala	742213	135	150	0	0	0	0	0
Kathrein-Scala	742213	135	270	0	0	0	0	0

Sprint
HRT 107(C) 943204
Carrier Summary

Frequency:	2500	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	3.82802	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.3828	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APXVTM14-C-I20	130	90	6168	1.336927	0.133693	2.539901	0.25399
RFS	APXVTM14-C-I20	130	210	6168	1.336927	0.133693	2.539901	0.25399
RFS	APXVTM14-C-I20	130	315	6168	1.336927	0.133693	2.539901	0.25399

Sprint
HRT 107(C) 943204
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	3.68786	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.36879	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Commscope	NNVV-65B-R4	130	90	2781	1.364888	0.136489	1.786951	0.178695
Commscope	NNVV-65B-R4	130	90	2781	1.364888	0.136489	1.786951	0.178695
Commscope	NNVV-65B-R4	130	210	2781	1.360443	0.136044	1.786951	0.178695
Commscope	NNVV-65B-R4	130	210	2781	1.360443	0.136044	1.786951	0.178695
Commscope	NNVV-65B-R4	130	315	2781	1.364888	0.136489	1.786951	0.178695
Commscope	NNVV-65B-R4	130	315	2781	1.364888	0.136489	1.786951	0.178695

Sprint
HRT 107(C) 943204
Carrier Summary

Frequency:	862	MHz
Maximum Permissible Exposure (MPE):	574.67	µW/cm^2
Maximum power density at ground level:	1.40575	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.24462	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Commscope	NNVV-65B-R4	130	90	951	0.531869	0.092553	0.546632	0.095122
Commscope	NNVV-65B-R4	130	90	951	0.531869	0.092553	0.546632	0.095122
Commscope	NNVV-65B-R4	130	210	951	0.531869	0.092553	0.546632	0.095122
Commscope	NNVV-65B-R4	130	210	951	0.531869	0.092553	0.546632	0.095122
Commscope	NNVV-65B-R4	130	315	951	0.531869	0.092553	0.546632	0.095122
Commscope	NNVV-65B-R4	130	315	951	0.531869	0.092553	0.546632	0.095122

Sprint (Decommissioned)
HRT 107(C) 943204
Carrier Summary

Frequency:	862	MHz
Maximum Permissible Exposure (MPE):	574.67	µW/cm^2
Maximum power density at ground level:	0	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
ANDREW	DB809	159	0	0	0	0	0	0
ANDREW	DB809	159	0	0	0	0	0	0
ANDREW	DB809	159	0	0	0	0	0	0

T-Mobile
HRT 107(C) 943204
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	2.31279	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.23128	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
EMS	RV90-17-00	100	10	1755	0.626189	0.062619	1.428076	0.142808
EMS	RV90-17-00	100	120	1755	0.626189	0.062619	1.428076	0.142808
EMS	RV90-17-00	100	250	1755	0.626189	0.062619	1.428076	0.142808

T-Mobile
HRT 107(C) 943204
Carrier Summary

Frequency:	700	MHz
Maximum Permissible Exposure (MPE):	466.67	µW/cm^2
Maximum power density at ground level:	1.40897	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.30192	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
ANDREW	LNX-6515DS-VTM	100	10	1715	0.892744	0.191302	1.048652	0.224711
ANDREW	LNX-6515DS-VTM	100	120	1715	0.892744	0.191302	1.048652	0.224711
ANDREW	LNX-6515DS-VTM	100	250	1715	0.892744	0.191302	1.048652	0.224711

Tolland County Mutual Aid Fire SVC
HRT 107(C) 943204
Carrier Summary

Frequency:	450	MHz
Maximum Permissible Exposure (MPE):	300	µW/cm^2
Maximum power density at ground level:	0.57864	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.19288	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Generic	Omni	130	0	100	0.289321	0.09644	0.289321	0.09644
Generic	Omni	130	0	100	0.289321	0.09644	0.289321	0.09644

Verizon Wireless
HRT 107(C) 943204
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	4.11992	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.41199	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
ANDREW	SBNHH-1D65B	159	0	4583	3.086746	0.308675	3.998603	0.39986
ANDREW	SBNHH-1D65B	159	140	4583	3.086746	0.308675	3.998603	0.39986
ANDREW	SBNHH-1D65B	159	250	4583	3.086746	0.308675	3.998603	0.39986

Verizon Wireless
HRT 107(C) 943204
Carrier Summary

Frequency:	850	MHz
Maximum Permissible Exposure (MPE):	566.67	µW/cm^2
Maximum power density at ground level:	2.59605	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.45813	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
ANDREW	LNX-8514DS-VTM	159	0	4028	1.028572	0.181513	2.387195	0.42127
ANDREW	LNX-6514DS-VTM	159	140	3784	1.162399	0.205129	1.736496	0.306441
ANDREW	LNX-6514DS-VTM	159	250	3784	1.160475	0.20479	1.736496	0.306441

Verizon Wireless
HRT 107(C) 943204
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	2.92653	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.29265	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
ANDREW	SBNHH-1D65B	159	0	5154	1.720698	0.17207	2.675144	0.267514
ANDREW	SBNHH-1D65B	159	140	5154	1.72355	0.172355	2.675143	0.267514
ANDREW	SBNHH-1D65B	159	250	5154	1.72355	0.172355	2.675144	0.267514

Verizon Wireless
HRT 107(C) 943204
Carrier Summary

Frequency:	751	MHz
Maximum Permissible Exposure (MPE):	500.67	µW/cm^2
Maximum power density at ground level:	2.39425	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.47821	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
ANDREW	SBNHH-1D65B	159	0	1021	0.291989	0.05832	0.469909	0.093857
ANDREW	LNX-6514DS-VTM	159	0	2827	0.969578	0.193657	1.469624	0.293533
ANDREW	SBNHH-1D65B	159	0	1021	0.291989	0.05832	0.469909	0.093857
ANDREW	SBNHH-1D65B	159	140	1021	0.291989	0.05832	0.469909	0.093857
ANDREW	LNX-6514DS-VTM	159	140	2827	0.969578	0.193657	1.469624	0.293533
ANDREW	SBNHH-1D65B	159	140	1021	0.291989	0.05832	0.469909	0.093857
ANDREW	SBNHH-1D65B	159	250	1021	0.291617	0.058246	0.469909	0.093857
ANDREW	LNX-6514DS-VTM	159	250	2827	0.969331	0.193608	1.469624	0.293533
ANDREW	SBNHH-1D65B	159	250	1021	0.291617	0.058246	0.469909	0.093857