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

October 10, 2018

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

RE: **Notice of Exempt Modification for T-Mobile-Crown Site BU: 807133**
T-Mobile Site ID: CT11114D
50 Rockland Road, Norwalk, CT 06854
Latitude: 41° 4' 54.44" / Longitude: -73° 25' 49.52"

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 173-foot level of the existing 180-foot self-support tower at 50 Rockland Road in Norwalk, CT. The tower and property is owned by Crown Castle. T-Mobile now intends to replace six (6) of its existing antennas with six (6) antennas. These antennas would be installed at the same 173'level of the tower. T-Mobile also intends to replace three (3) RRUs and install two (2) new hybrid fiber cables.

This facility was approved by the by the Connecticut Siting Council in Docket No. 73 on April 1, 1987. This approval included the conditions that:

1. The Norwalk Tower, including antennas, shall be no taller than necessary to provide the proposed service, and in no event shall exceed 193 feet.
2. A fence not lower than eight feet shall surround the Norwalk tower.
3. Unless necessary to comply with condition number four, below, no light shall be installed on the Norwalk tower.
4. The facilities shall be constructed in accordance with all applicable federal, state, and municipal laws and regulations.

This modification complies with the aforementioned condition(s).

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b) (2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to Mayor Harry Rilling, City of Norwalk, and the City of Norwalk Planning and Zoning Office, as well as the property owner, and Crown Castle as the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.
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, T-Mobile 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: William Stone.

Sincerely,

William Stone
Real Estate Specialist
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
518-373-3543
William.stone@crowncastle.com

Attachments:

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

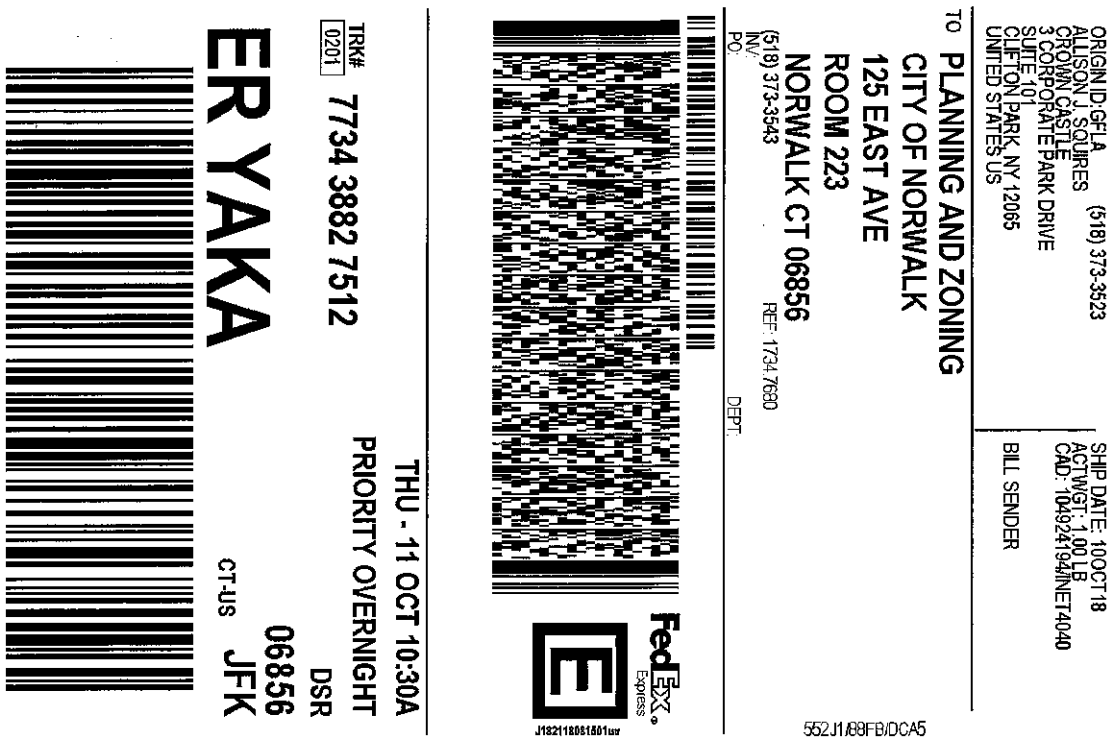
cc:

The Honorable Harry Rilling, Mayor
City of Norwalk
125 East Avenue PO Box 5125
Norwalk, CT 06856

Planning and Zoning
125 East Avenue Room 223
Norwalk, CT 06856

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

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.



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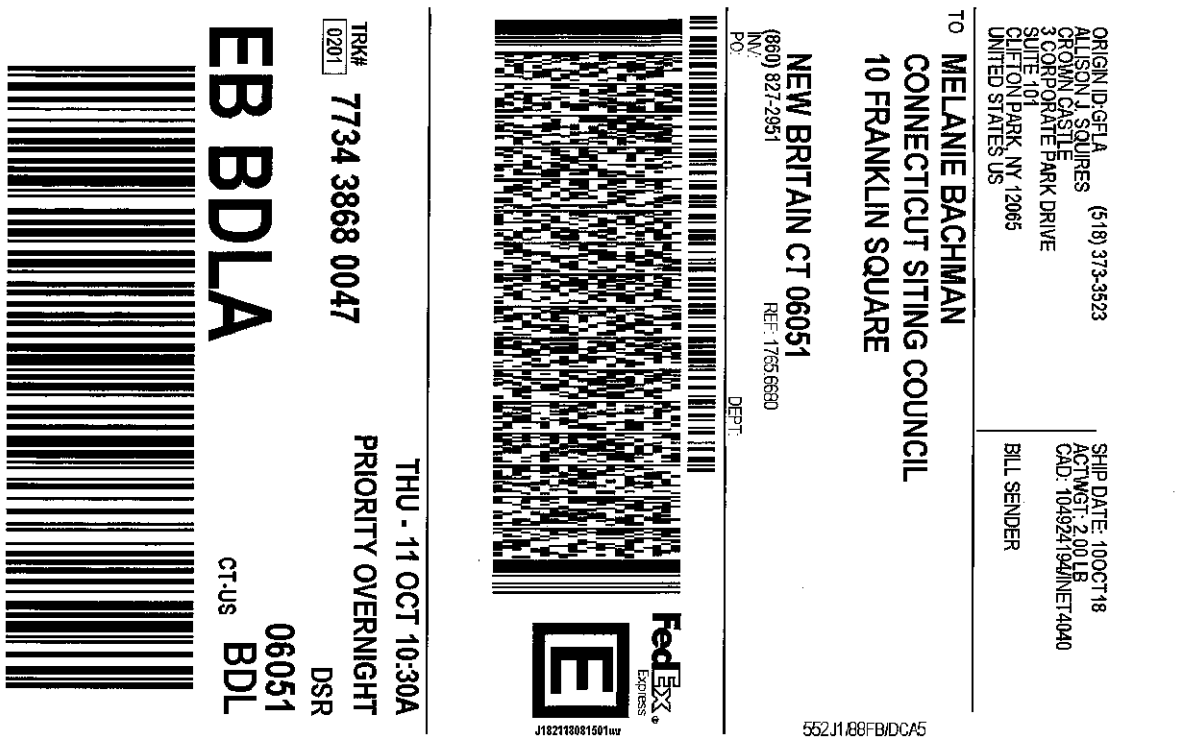

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50 ROCKLAND RD

Location	50 ROCKLAND RD	**Mblu**	5/ 82/ 58/ 0/
Acct#	25665	**Owner**	CROWN ATLANTIC COMPANY LLC
Assessment	$1,007,240	**Appraisal**	$1,438,900
PID	25665	**Building Count**	1

Assessing Distr...

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$991,370	$447,530	$1,438,900
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$693,970	$313,270	$1,007,240

Owner of Record

Owner	CROWN ATLANTIC COMPANY LLC	**Sale Price**	$1,600,000
Co-Owner		**Certificate**	
Address	PMB 353 4017 WASHINGTON RD McMURRAY, PA 15317-0000	**Book & Page**	3701/331
		Sale Date	04/16/1999

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
CROWN ATLANTIC COMPANY LLC	$1,600,000		3701/331	04/16/1999
CELLCO PARTNERSHIP,	$1,020,000		3489/348	04/03/1998
DEVIVO MARIO + WENCHE	$0		0/0	

Building Information

Building 1 : Section 1

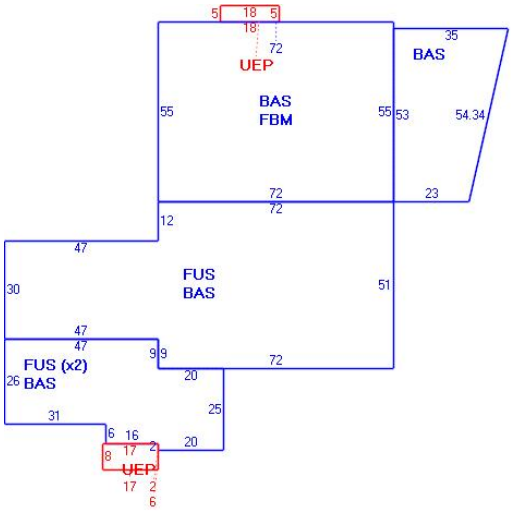
Year Built:	1987
Living Area:	21,115
Replacement Cost:	$1,084,957
Building Percent Good:	47
Replacement Cost Less Depreciation:	$509,930

Building Photo

Building Attributes	
Field	**Description**
STYLE	Light Indust
MODEL	Industrial
Stories:	3.00
Occupancy	1.00
Exterior Wall 1	Concrete
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Rolled Compos
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	Concrete
Heating Fuel	Gas
Heating Type	Forced Air
AC Percent	60
Heat Percent	100
Bldg Use	Industrial
Total Rooms	0
Bedrooms	0
FBM Area	
Heat/AC	Heat/AC Pkg
Frame	Masonry
Plumbing	Average
Foundation	Slab
Partitions	Average
Wall Height	13.00
% Sprinkler	40.00

(http://images.vgsi.com/photos/NorwalkCTPhotos//00\00\72/74.jpg)

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	12,397	12,397
FUS	Finished Upper Story	8,718	8,718
FBM	Finished Basement	3,960	0
UEP	Utility Enclosed Porch	226	0
		25,301	21,115

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
ELV1	Pass Elevator	1.00 UNITS	$21,150	1
A/C	Air Conditioning	12669.00 S.F.	$14,890	1
SPR	Sprinklers	8446.00 S.F.	$7,940	1
ELVS	Elevator per stop	1.00 UNITS	$3,760	1

Land

Land Use

Use Code	301
Description	Industrial
Zone	RI
Neighborhood	C530

Land Line Valuation

Size (Acres)	0.82
Frontage	
Depth	
Assessed Value	$313,270
Appraised Value	$447,530

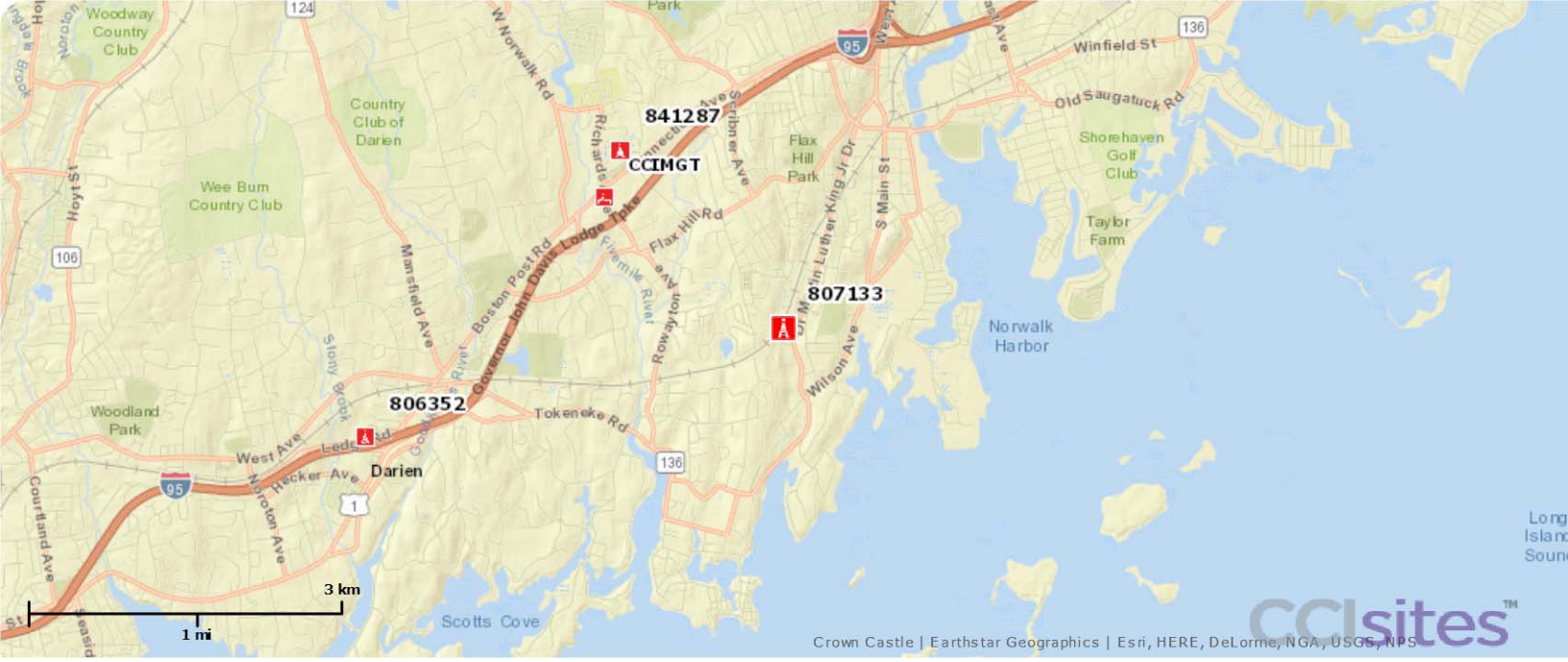
Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
PAV1	Paving Asph.			16900.00 S.F.	$17,750	1
FN6	Fence 6'			450.00 L.F.	$3,150	1
SHD4	Cell Equip	FR	Frame	128.00 S.F.	$6,400	1
CEL1	Cell Tower			5.00 UNITS	$400,000	1
SHD4	Cell Equip	FR	Frame	128.00 S.F.	$6,400	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$991,370	$447,530	$1,438,900
2013	$991,370	$447,530	$1,438,900
2012	$560,200	$461,300	$1,021,500

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$693,970	$313,270	$1,007,240
2013	$693,970	$313,270	$1,007,240
2012	$392,140	$322,910	$715,050


841287
CCIMGT
807133
806352
Woodway Country Club
Country Club of Darien
Wee Burn Country Club
Woodland Park
Darien
Norwalk Harbor
Shorehaven Golf Club
Taylor Farm
Flax Hill Park
Scotts Cove
Winfield St
Old Saugatuck Rd
Flax Hill Rd
Tokeneke Rd
West Ave
Leeds Rd
Hecker Ave
Boston Post Rd
Governor John Davis Lodge Tpke
Mansfield Ave
Rowayton Ave
Wilson Ave
S Main St
Dr Martin Luther King Jr Dr
Scribner Ave
Richards Ln
Stony Brook
Courtland Ave
Norton Ave
W Norwalk Rd
3 km
1 mi
Crown Castle | Earthstar Geographics | Esri, HERE, DeLorme, NGA, USGS, NPS
CCIsites™

DOCKET NO. 73

AN APPLICATION OF METRO MOBILE CTS OF FAIRFIELD COUNTY, INC., FOR CERTIFICATES OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE, AND OPERATION OF THREE FACILITIES CONSISTING OF TELECOMMUNICATIONS TOWERS AND ASSOCIATED EQUIPMENT FOR THE PURPOSE OF PROVIDING DOMESTIC PUBLIC CELLULAR RADIO TELECOMMUNICATIONS SERVICE IN THE TOWN OF GREENWICH AND IN THE CITIES OF NORWALK AND STAMFORD, CONNECTICUT.	:	CONNECTICUT SITING COUNCIL
	:	April 1, 1987

D E C I S I O N A N D O R D E R

Pursuant to the foregoing opinion, the Connecticut Siting Council (Council) hereby directs that a Certificate of Environmental Compatibility and Public Need, as provided by Section 16-50k of the General Statutes of Connecticut (CGS), be issued to Metro Mobile CTS of Fairfield County, Inc., for the construction, operation, and maintenance of cellular mobile telecommunications equipment in the Town of Greenwich, and the Cities of Norwalk and Stamford, Connecticut.

The facilities shall be constructed, operated, and maintained as specified in the Council's record on this matter, and subject to the following conditions.

1. The Norwalk tower, including antennas, shall be no taller than necessary to provide the proposed service, and in no event shall exceed 193 feet.
2. A fence not lower than eight feet shall surround the Norwalk tower.
3. Unless necessary to comply with condition number four, below, no lights shall be installed on the Norwalk tower.
4. The facilities shall be constructed in accordance with all applicable federal, state, and municipal laws and regulations.

5. The certificate holder shall prepare a development and management (D&M) plan for the Norwalk site in compliance with sections 16-50j-75 through 16-50j-77 of the Regulations of State Agencies. The D&M plan shall provide for evergreen screening around the perimeter of the fence at this site, and for other landscaping to improve the appearance of the facility.
6. The receive antennas at the Greenwich and Stamford sites shall be mounted below the high points of the facades of their respective buildings to minimize their visibility.
7. No construction activities shall take place outside the hours of 7:00 A.M. to 7:00 P.M., Monday through Saturday.
8. The certificate holder or its successor shall notify the Council if and when directional antennas or any equipment other than that listed in this application is added to these facilities.
9. The certificate holder or its successor shall permit public or private entities to share space on the Norwalk tower, for due consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.
10. If these facilities do not provide or permanently cease to provide cellular service following completion of construction, this Decision and Order shall be void, and the tower and all associated equipment in this application shall be dismantled and removed or reapplication for any new use shall be made to the Council before any such new use is made.

11. 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 issuance of this Decision and Order, or within three years of the completion of any appeal taken in this Decision.

12. The certificate holder shall comply with any future radio frequency (RF) standards promulgated by state or federal regulatory agencies. Upon the establishment of any new governmental RF standards, the facilities granted in this Decision shall continue to be in compliance with such standards.

Pursuant to CGS section 16-50p, we hereby direct that a copy of the Decision and Order be served on each person listed below. A notice of the issuance shall be published in the Stamford Advocate, the Greenwich Times, the Norwalk Hour, and the Bridgeport Post.

The parties to the proceeding are:

Mr. Armand Mascioli (Applicant)
General Manager
Metro Mobile CTS of Fairfield
County, Inc.
5 Eversley Avenue
Norwalk, Connecticut 06855

Howard L. Slater, Esquire (its attorney)
Byrne, Slater, Sandler,
Shulman & Rouse, P.C.
330 Main Street
P.O. Box 3216
Hartford, Connecticut 06103

Richard Rubin, Esquire (its attorney)
Fleischman and Walsh, P.C.
1725 N Street, N.W.
Washington, D.C. 20036

Southern New England
Telephone Company

(its attorney)

Mr. Peter J. Tyrrell
Senior Attorney
Southern New England
Telephone Company
227 Church Street
New Haven, Connecticut 06506

C E R T I F I C A T I O N

The undersigned members of the Connecticut Siting Council hereby certify that they have heard this case or read the record thereof, and that we voted as follows:

Dated at New Britain, Connecticut, this 1st day of April, 1987.

Council Members	Vote Cast
Gloria Dibble Pond Gloria Dibble Pond Chairperson	Yes
_____ Commissioner John Downey Designee: Commissioner Peter G. Boucher	Yes
Brian J. Emerick Acting Commissioner John Anderson Designee: Brian Emerick	Yes
Owen L. Clark Owen L. Clark	Yes
Fred J. Doocy Fred J. Doocy	Yes
Mortimer A. Gelston Mortimer A. Gelston	Yes
_____ James G. Horsfall	Absent
_____ William H. Smith	Absent
Colin C. Tait Colin C. Tait	Yes

STATE OF CONNECTICUT)
: ss. New Britain, April 1, 1987
COUNTY OF HARTFORD)

I hereby certify that the foregoing is a true and correct copy of the decision and order issued by the Connecticut Siting Council, State of Connecticut.

ATTEST:

John C. Kelly
Executive Director
Connecticut Siting Council

I certify that a copy of the opinion and decision and order have been forwarded by mail to all parties of record on April 3, 1987.

ATTEST:

Robert K. Erling
Siting Analyst
Connecticut Siting Council

SHEET INDEX

NO.	DESCRIPTION
T1	TITLE PAGE
N1	NOTES
C1	PLAN & ELEVATION
C2	RF CHART AND ORIENTATION
D1	EQUIPMENT DETAILS
E1	GROUNDING & ELECTRICAL DETAILS
E2	RF PLUMBING DIAGRAM

TOWER OWNER NOTIFICATION

ONCE THE CONTRACTOR HAS RECEIVED AND ACCEPTED THE NOTICE TO PROCEED, CONTRACTOR WILL CONTACT THE CROWN CASTLE CONSTRUCTION MANAGER OF RECORD (NOTED ON THE FIRST PAGE ON THIS CONSTRUCTION DRAWING) A MINIMUM OF 48 HOURS PRIOR TO WORK START. UPON ARRIVAL TO THE JOB SITE, CONTRACTOR CREW IS REQUIRED CALL 1-800-788-7011 TO NOTIFY THE CROWN CASTLE NOC WORK HAS BEGUN.

T-Mobile

CROWN CASTLE

CBU

CBU 807133

SITE ID

CT11114D

SITE NAME

NORWALK / SOUTH NORWALK

SITE ADDRESS

50 ROCKLAND ROAD
NORWALK, CT 06854

CONFIGURATION

67D92M

PROJECT SITE INFORMATION

SITE ID:	CT11114D
SITE NAME:	NORWALK / SOUTH NORWALK
SITE ADDRESS:	50 ROCKLAND ROAD NORWALK, CT 06854
PERMITTING JURISDICTION:	CITY OF NORWALK
COUNTY:	FAIRFIELD
ZONING:	RI
SITE COORDINATES: LATITUDE:	41° 04' 54.44" N (41.081852°) (NAD 83)
LONGITUDE:	73° 25' 49.55" W (-73.430458°) (NAD 83)
APPLICANT:	T-MOBILE NORTHEAST LLC 103 MONARCH DRIVE LIVERPOOL, NY 13088

STRUCTURAL ANALYSIS INFORMATION

TOWER ANALYSIS

INFINIGY ENGINEERING HAS NOT EVALUATED THE EXISTING **TOWER** FOR THIS SITE, AND ASSUMES NO RESPONSIBILITY FOR ITS STRUCTURAL INTEGRITY. REFER TO STRUCTURAL ANALYSIS FROM TOWER OWNER PRIOR TO ANY CONSTRUCTION.

ANTENNA MOUNTS

INFINIGY ENGINEERING HAS NOT EVALUATED THE EXISTING **MOUNTS** FOR THIS SITE, AND ASSUMES NO RESPONSIBILITY FOR ITS STRUCTURAL INTEGRITY. REFER TO PASSING MOUNT ANALYSIS PRIOR TO ANY CONSTRUCTION.

PROJECT TEAM INFORMATION

CLIENT REPRESENTATIVE:	CROWN CASTLE 3 CORPORATE PARK DRIVE SUITE 101 CLIFTON PARK, NY 12065
CLIENT REP. CONTACT:	WILL STONE (518) 373-3543
ENGINEER:	INFINIGY 6865 DEERPATH ROAD SUITE 152 ELKRIDGE, MD 21075
ENGINEER CONTACT:	MATTHEW LIVERETTE (518) 690-0790

SCOPE OF WORK

SCOPE OF WORK:
TMO L700 4X2 67D92M OUTDOOR (CONNECTICUT MARKET) REPLACING (6) EXISTING ANTENNAS WITH NEW MODELS. ADDING (2) HYBRID FIBER CABLES. REPLACING (3) EXISTING RRU'S WITH NEW MODELS. CURRENT INSTALL: (9) ANTENNAS, (12) COAX, (1) HYBRID FIBER CABLE, (3) TMA'S, AND (3) RRUS.

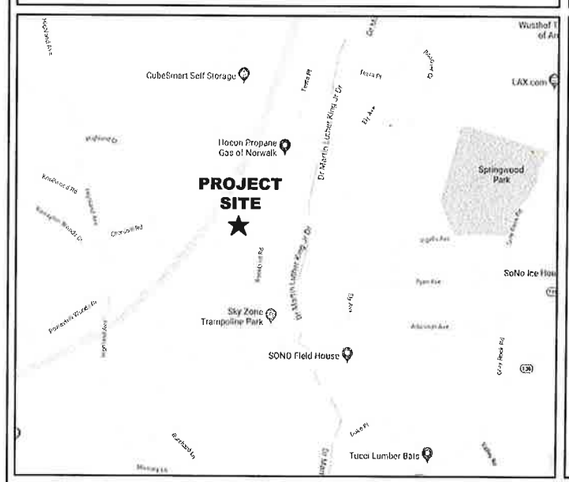
GROUND CHANGES: KEEPING (2) EXISTING CABINETS-- NO OTHER CHANGES MADE TO LEASED GROUND SPACE.

FINAL CONFIGURATION: (9) ANTENNAS, (12) COAX, (3) HYBRID FIBER CABLES, (3) TMA'S, AND (3) RRUS.

811 Know what's below. Call before you dig.

TO OBTAIN LOCATION OF PARTICIPANTS UNDERGROUND FACILITIES BEFORE YOU DIG IN CONNECTICUT, CONTACT CALL BEFORE YOU DIG
TOLL FREE: 1-800-922-4455 OR
www.cbyd.com
CONNECTICUT STATUTE REQUIRES MIN OF 2 WORKING DAYS NOTICE BEFORE YOU EXCAVATE

LOCATION MAP



GENERAL NOTES

- HANDICAP ACCESS REQUIREMENTS ARE NOT REQUIRED.
- FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION.
- FACILITY HAS NO PLUMBING OR REFRIGERANTS.
- THIS FACILITY SHALL MEET OR EXCEED ALL FAA AND FCC REGULATORY REQUIREMENTS.
- ALL NEW MATERIAL SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR UNLESS NOTED OTHERWISE. EQUIPMENT, ANTENNAS/RRH AND CABLES FURNISHED BY OWNER AND INSTALLED BY CONTRACTOR.
- THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON STORMWATER DRAINAGE.
- NO SANITARY SEWER, POTABLE WATER, OR TRASH DISPOSAL SERVICE IS REQUIRED
- NO COMMERCIAL SIGNAGE IS PROPOSED

CODE COMPLIANCE

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED WITH ANY LOCAL AMENDMENTS BY THE LOCAL GOVERNING AUTHORITIES:

- INTERNATIONAL BUILDING CODE
- NATIONAL ELECTRICAL CODE
- NATIONAL FIRE PROTECTION ASSOCIATION 101
- NATIONAL FIRE PROTECTION ASSOCIATION 1
- LOCAL BUILDING CODES
- CITY/COUNTY ORDINANCES
- AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATIONS (AISC)
- UNDERWRITERS LABORATORIES APPROVED ELECTRICAL PRODUCTS.
- ANSI EIA/TIA 222 REV. G
- TIA 607
- INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS 81
- IEEE C2 (LATEST EDITION)
- TELCORDIA GR-1275
- ANSI T1.311

T-Mobile
T-MOBILE NORTHEAST LLC
103 MONARCH DRIVE
LIVERPOOL, NY 13088

INFINIGY
6865 DEERPATH ROAD SUITE 152
ELKRIDGE, MD 21075
TEL (443) 592-3143

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
04.2018

No.	Submittal / Revision	Appd	Date
1	SCOPE UPDATED	SL	10/03/18
0	ISSUED FOR CONSTRUCTION	SL	09/20/18
A	ISSUED FOR REVIEW	SL	09/07/18

Drawn: RCD
Designed: MRL
Checked: AJD

Project Number:
600-007

Project Title:
CT11114D
NORWALK / SOUTH NORWALK
50 ROCKLAND ROAD
NORWALK, CT 06854

Prepared For:
CROWN CASTLE

Drawing Title
TITLE PAGE

Drawing Number
T1

GENERAL NOTES

PART 1 – GENERAL REQUIREMENTS

1.1 THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
- A. GR-63-CORE NEBS REQUIREMENTS: PHYSICAL PROTECTION
- B. GR-78-CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
- C. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE – "NEC").
- D. AND NFPA 101 (LIFE SAFETY CODE).
- E. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM).
- F. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE).

1.2 DEFINITIONS:
A: WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.
B: COMPANY: T-MOBILE CORPORATION
C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E". THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.
D: CONTRACTOR: CONSTRUCTION CONTRACTOR; CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.
E: THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.

1.3 POINT OF CONTACT: COMMUNICATION BETWEEN THE COMPANY AND THE CONTRACTOR SHALL FLOW THROUGH THE SINGLE COMPANY SITE DEVELOPMENT SPECIALIST OR OTHER PROJECT COORDINATOR APPOINTED TO MANAGE THE PROJECT FOR THE COMPANY.

1.4 ON-SITE SUPERVISION: THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL EMPLOY A COMPETENT SUPERINTENDENT WHO SHALL BE IN ATTENDANCE AT THE SITE AT ALL TIMES DURING PERFORMANCE OF THE WORK.

1.5 DRAWINGS, SPECIFICATIONS AND DETAILS REQUIRED AT JOBSITE: THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS, STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES, AND THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.
A. THE JOBSITE DRAWINGS, SPECIFICATIONS AND DETAILS SHALL BE CLEARLY MARKED DAILY IN PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS-BUILT" DRAWINGS.

1.6 USE OF JOB SITE: THE CONTRACTOR SHALL CONFINE ALL CONSTRUCTION AND RELATED OPERATIONS INCLUDING STAGING AND STORAGE OF MATERIALS AND EQUIPMENT, PARKING, TEMPORARY FACILITIES, AND WASTE STORAGE TO THE LEASE PARCEL UNLESS OTHERWISE PERMITTED BY THE CONTRACT DOCUMENTS.

1.7 NOTICE TO PROCEED:
A. NO WORK SHALL COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED.
B. UPON RECEIVING NOTICE TO PROCEED, CONTRACTOR SHALL FULLY PERFORM ALL WORK NECESSARY TO PROVIDE T-MOBILE WITH AN OPERATIONAL WIRELESS FACILITY.

PART 2 – EXECUTION

2.1 TEMPORARY UTILITIES AND FACILITIES: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY UTILITIES AND FACILITIES NECESSARY EXCEPT AS OTHERWISE INDICATED IN THE CONSTRUCTION DOCUMENTS. TEMPORARY UTILITIES AND FACILITIES INCLUDE, POTABLE WATER, HEAT, HVAC, ELECTRICITY, SANITARY FACILITIES, WASTE DISPOSAL FACILITIES, AND TELEPHONE/COMMUNICATION SERVICES. PROVIDE TEMPORARY UTILITIES AND FACILITIES IN ACCORDANCE WITH OSHA AND THE AUTHORITY HAVING JURISDICTION. CONTRACTOR MAY UTILIZE THE COMPANY ELECTRICAL SERVICE IN THE COMPLETION OF THE WORK WHEN IT BECOMES AVAILABLE. USE OF THE LESSORS OR SITE OWNER'S UTILITIES OR FACILITIES IS EXPRESSLY FORBIDDEN EXCEPT AS OTHERWISE ALLOWED IN THE CONTRACT DOCUMENTS.

2.2 ACCESS TO WORK: THE CONTRACTOR SHALL PROVIDE ACCESS TO THE JOB SITE FOR AUTHORIZED COMPANY PERSONNEL AND AUTHORIZED REPRESENTATIVES OF THE ARCHITECT/ENGINEER DURING ALL PHASES OF THE WORK.

2.3 TESTING: REQUIREMENTS FOR TESTING BY THIS CONTRACTOR SHALL BE AS INDICATED HEREWITH, ON THE CONSTRUCTION DRAWINGS, AND IN THE INDIVIDUAL SECTIONS OF THESE SPECIFICATIONS. SHOULD COMPANY CHOOSE TO ENGAGE ANY THIRD-PARTY TO CONDUCT ADDITIONAL TESTING, THE CONTRACTOR SHALL COOPERATE WITH AND PROVIDE A WORK AREA FOR COMPANY'S TEST AGENCY.

2.4 COMPANY FURNISHED MATERIAL AND EQUIPMENT: ALL HANDLING, STORAGE AND INSTALLATION OF COMPANY FURNISHED MATERIAL AND EQUIPMENT SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS AND WITH THE MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
A. CONTRACTOR SHALL PROCURE ALL OTHER REQUIRED WORK RELATED MATERIALS NOT PROVIDED BY T-MOBILE TO SUCCESSFULLY CONSTRUCT A WIRELESS FACILITY.

2.5 DIMENSIONS: VERIFY DIMENSIONS INDICATED ON DRAWINGS WITH FIELD DIMENSIONS BEFORE FABRICATION OR ORDERING OF MATERIALS. DO NOT SCALE DRAWINGS.

2.6 EXISTING CONDITIONS: NOTIFY THE COMPANY REPRESENTATIVE OF EXISTING CONDITIONS DIFFERING FROM THOSE INDICATED ON THE DRAWINGS. DO NOT REMOVE OR ALTER STRUCTURAL COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL FROM THE ARCHITECT AND ENGINEER.

PART 3 – RECEIPT OF MATERIAL & EQUIPMENT

3.1 RECEIPT OF MATERIAL AND EQUIPMENT: CONTRACTOR IS RESPONSIBLE FOR T-MOBILE PROVIDED MATERIAL AND EQUIPMENT AND UPON RECEIPT SHALL:
- A. ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.
- B. VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.
- C. TAKE RESPONSIBILITY FOR EQUIPMENT AND PROVIDE INSURANCE PROTECTION AS REQUIRED IN AGREEMENT.
- D. RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY-FOUR HOURS AFTER RECEIPT, REPORT TO T-MOBILE OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.
- E. PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.
- F. COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF-LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

PART 4 – GENERAL REQUIREMENTS FOR CONSTRUCTION

4.1 CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH. AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.

4.2 EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.

4.3 CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.
A. IN THE EVENT CONTRACTOR ENCOUNTERS ANY HAZARDOUS CONDITION WHICH HAS NOT BEEN ABATED OR OTHERWISE MITIGATED, CONTRACTOR AND ALL OTHER PERSONS SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA AND NOTIFY COMPANY IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED EXCEPT BY WRITTEN NOTIFICATION BY COMPANY.
B. CONTRACTOR AGREES TO USE CARE WHILE ON THE SITE AND SHALL NOT TAKE ANY ACTION THAT WILL OR MAY RESULT IN OR CAUSE THE HAZARDOUS CONDITION TO BE FURTHER RELEASED IN THE ENVIRONMENT, OR TO FURTHER EXPOSE INDIVIDUALS TO THE HAZARD.

4.4 CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION.

4.5 CONDUCT TESTING AS REQUIRED HEREIN.

PART 5 – TESTS AND INSPECTIONS

5.1 TESTS AND INSPECTIONS:
- A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTIONS AND PROJECT DOCUMENTATION.
- B. CONTRACTOR SHALL COORDINATE TEST AND INSPECTION SCHEDULES WITH COMPANY'S REPRESENTATIVE WHO MUST BE ON SITE TO WITNESS SUCH TESTS AND INSPECTIONS.
- C. WHEN THE USE OF A THIRD PARTY INDEPENDENT TESTING AGENCY IS REQUIRED, THE AGENCY THAT IS SELECTED MUST PERFORM SUCH WORK ON A REGULAR BASIS IN THE STATE WHERE THE PROJECT IS LOCATED AND HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.
- D. THE THIRD PARTY TESTING AGENCY IS TO BE FAMILIAR WITH THE APPLICABLE REQUIREMENTS FOR THE TESTS TO BE DONE, EQUIPMENT TO BE USED, AND ASSOCIATED HEALTH AND SAFETY ISSUES.
- E. SITE RESISTANCE TO EARTH TESTING PER EXHIBIT: CELL SITE GROUNDING SYSTEM DESIGN.
- F. ANTENNA AND COAX SWEEP TESTS PER EXHIBIT: ANTENNA TRANSMISSION LINE ACCEPTANCE STANDARDS.
- G. ALL OTHER TESTS REQUIRED BY COMPANY OR JURISDICTION.

PART 6 – TRENCHING AND BACKFILLING

6.1 TRENCHING AND BACKFILLING: THE CONTRACTOR SHALL PERFORM ALL EXCAVATION OF EVERY DESCRIPTION AND OF WHATEVER SUBSTANCES ENCOUNTERED, TO THE DEPTHS INDICATED ON THE CONSTRUCTION DRAWINGS OR AS OTHERWISE SPECIFIED.

A. PROTECTION OF EXISTING UTILITIES: THE CONTRACTOR SHALL CHECK WITH THE LOCAL UTILITIES AND THE RESPECTIVE UTILITY LOCATOR COMPANIES PRIOR TO STARTING EXCAVATION OPERATIONS IN EACH RESPECTIVE AREA TO ASCERTAIN THE LOCATIONS OF KNOWN UTILITY LINES. THE LOCATIONS, NUMBER AND TYPES OF EXISTING UTILITY LINES DETAILED ON THE CONSTRUCTION DRAWINGS ARE APPROXIMATE AND DO NOT REPRESENT EXACT INFORMATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ALL LINES DAMAGED DURING EXCAVATION AND ALL ASSOCIATED OPERATIONS. ALL UTILITY LINES UNCOVERED DURING THE EXCAVATION OPERATIONS, SHALL BE PROTECTED FROM DAMAGE DURING EXCAVATION AND ASSOCIATED OPERATIONS. ALL REPAIRS SHALL BE APPROVED BY THE UTILITY COMPANY.

B. HAND DIGGING: UNLESS APPROVED IN WRITING OTHERWISE, ALL DIGGING WITHIN AN EXISTING CELL SITE COMPOUND IS TO BE DONE BY HAND.

C. DURING EXCAVATION, MATERIAL SUITABLE FOR BACKFILLING SHALL BE STOCKPILED IN AN ORDERLY MANNER A SUFFICIENT DISTANCE FROM THE BANKS OF THE TRENCH TO AVOID OVERLOADING AND TO PREVENT SLIDES OR CAVE-INS. ALL EXCAVATED MATERIALS NOT REQUIRED OR SUITABLE FOR BACKFILL SHALL BE REMOVED AND DISPOSED OF AT THE CONTRACTOR'S EXPENSE.

D. GRADING SHALL BE DONE AS MAY BE NECESSARY TO PREVENT SURFACE WATER FROM FLOWING INTO TRENCHES OR OTHER EXCAVATIONS, AND ANY WATER ACCUMULATING THEREIN SHALL BE REMOVED BY PUMPING OR BY OTHER APPROVED METHOD.

E. SHEETING AND SHORING SHALL BE DONE AS NECESSARY FOR THE PROTECTION OF THE WORK AND FOR THE SAFETY OF PERSONNEL. UNLESS OTHERWISE INDICATED, EXCAVATION SHALL BE BY OPEN CUT, EXCEPT THAT SHORT SECTIONS OF A TRENCH MAY BE TUNNELED IF, THE CONDUIT CAN BE SAFELY AND PROPERLY INSTALLED AND BACKFILL CAN BE PROPERLY TAMPED IN SUCH TUNNEL SECTIONS. EARTH EXCAVATION SHALL COMPRISE ALL MATERIALS AND SHALL INCLUDE CLAY, SILT, SAND, MUCK, GRAVEL, HARDPAN, LOOSE SHALE, AND LOOSE STONE.

F. TRENCHES SHALL BE OF NECESSARY WIDTH FOR THE PROPER LAYING OF THE CONDUIT OR CABLE, AND THE BANKS SHALL BE AS NEARLY VERTICAL AS PRACTICABLE. THE BOTTOM OF THE TRENCHES SHALL BE ACCURATELY GRADED TO PROVIDE UNIFORM BEARING AND SUPPORT FOR EACH SECTION OF THE CONDUIT OR CABLE ON UNDISTURBED SOIL AT EVERY POINT ALONG ITS ENTIRE LENGTH. EXCEPT WHERE ROCK IS ENCOUNTERED, CARE SHALL BE TAKEN NOT TO EXCAVATE BELOW THE DEPTHS INDICATED. WHERE ROCK EXCAVATIONS ARE NECESSARY, THE ROCK SHALL BE EXCAVATED TO A MINIMUM OVER DEPTH OF 6 INCHES BELOW THE TRENCH DEPTHS INDICATED ON THE CONSTRUCTION DRAWINGS OR SPECIFIED. OVER DEPTHS IN THE ROCK EXCAVATION AND UNAUTHORIZED OVER DEPTHS SHALL BE THOROUGHLY BACK FILLED AND TAMPED TO THE APPROPRIATE GRADE. WHENEVER WET OR OTHERWISE UNSTABLE SOIL THAT IS INCAPABLE OF PROPERLY SUPPORTING THE CONDUIT OR CABLE IS ENCOUNTERED IN THE BOTTOM OF THE TRENCH, SUCH SOLID SHALL BE REMOVED TO A MINIMUM OVER DEPTH OF 6 INCHES AND THE TRENCH BACKFILLED TO THE PROPER GRADE WITH EARTH OF OTHER SUITABLE MATERIAL, AS HEREINAFTER SPECIFIED.

G. BACKFILLING OF TRENCHES. TRENCHES SHALL NOT BE BACKFILLED UNTIL ALL SPECIFIED TESTS HAVE BEEN PERFORMED AND ACCEPTED. WHERE COMPACTED BACKFILL IS NOT INDICATED THE TRENCHES SHALL BE CAREFULLY BACKFILLED WITH SELECT MATERIAL SUCH AS EXCAVATED SOILS THAT ARE FREE OF ROOTS, SOD, RUBBISH OR STONES, DEPOSITED IN 6 INCH LAYERS AND THOROUGHLY AND CAREFULLY RAMMED UNTIL THE CONDUIT OR CABLE HAS A COVER OF NOT LESS THAN 1 FOOT. THE REMAINDER OF THE BACKFILL MATERIAL SHALL BE GRANULAR IN NATURE AND SHALL NOT CONTAIN ROOTS, SOD, RUBBING, OR STONES OF 2-1/2 INCH MAXIMUM DIMENSION. BACKFILL SHALL BE CAREFULLY PLACED IN THE TRENCH AND IN 1 FOOT LAYERS AND EACH LAYER TAMPED. SETTLING THE BACKFILL WITH WATER WILL BE PERMITTED. THE SURFACE SHALL BE GRADED TO A REASONABLE UNIFORMITY AND THE MOUNDING OVER THE TRENCHES LEFT IN A UNIFORM AND NEAT CONDITION.

SYMBOL	DESCRIPTION
	CIRCUIT BREAKER
	NON-FUSIBLE DISCONNECT SWITCH
F	FUSIBLE DISCONNECT SWITCH
	SURFACE MOUNTED PANEL BOARD
T	TRANSFORMER
M	KILOWATT HOUR METER
JB	JUNCTION BOX
PB	PULL BOX TO NEC/TELCO STANDARDS
	UNDERGROUND UTILITIES
	EXOTHERMIC WELD CONNECTION
	MECHANICAL CONNECTION
OR	GROUND ROD
OR	GROUND ROD WITH INSPECTION SLEEVE
	GROUND BAR
	120AC DUPLEX RECEPTACLE
G	GROUND CONDUCTOR
	DC POWER AND FIBER OPTIC TRUNK CABLES
E	DC POWER CABLES
# / #	REPRESENTS DETAIL NUMBER / REF. DRAWING NUMBER

ABBREVIATIONS

CIGBE	COAX ISOLATED GROUND BAR EXTERNAL
MIGB	MASTER ISOLATED GROUND BAR
SST	SELF SUPPORTING TOWER
GPS	GLOBAL POSITIONING SYSTEM
TYP.	TYPICAL
DWG	DRAWING
BCW	BARE COPPER WIRE
BFG	BELOW FINISH GRADE
PVC	POLYVINYL CHLORIDE
CAB	CABINET
C	CONDUIT
SS	STAINLESS STEEL
G	GROUND
AWG	AMERICAN WIRE GAUGE
RGS	RIGID GALVANIZED STEEL
AHJ	AUTHORITY HAVING JURISDICTION
TTLNA	TOWER TOP LOW NOISE AMPLIFIER
UNO	UNLESS NOTED OTHERWISE
EMT	ELECTRICAL METALLIC TUBING
AGL	ABOVE GROUND LEVEL

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T-MOBILE NORTHEAST LLC
103 MONARCH DRIVE
LIVERPOOL, NY 13088

INFINIGY
6865 DEERPATH ROAD SUITE 152
ELKRIDGE, MD 21075
TEL (443) 592-3143

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED
PROFESSIONAL ENGINEER
6/1/2018

No.	Submittal / Revision	Appd.	Date
1	SCOPE UPDATED	SL	10/03/18
0	ISSUED FOR CONSTRUCTION	SL	09/20/18
A	ISSUED FOR REVIEW	SL	09/07/18

Drawn: RCD
Designed: MRL
Checked: AJD

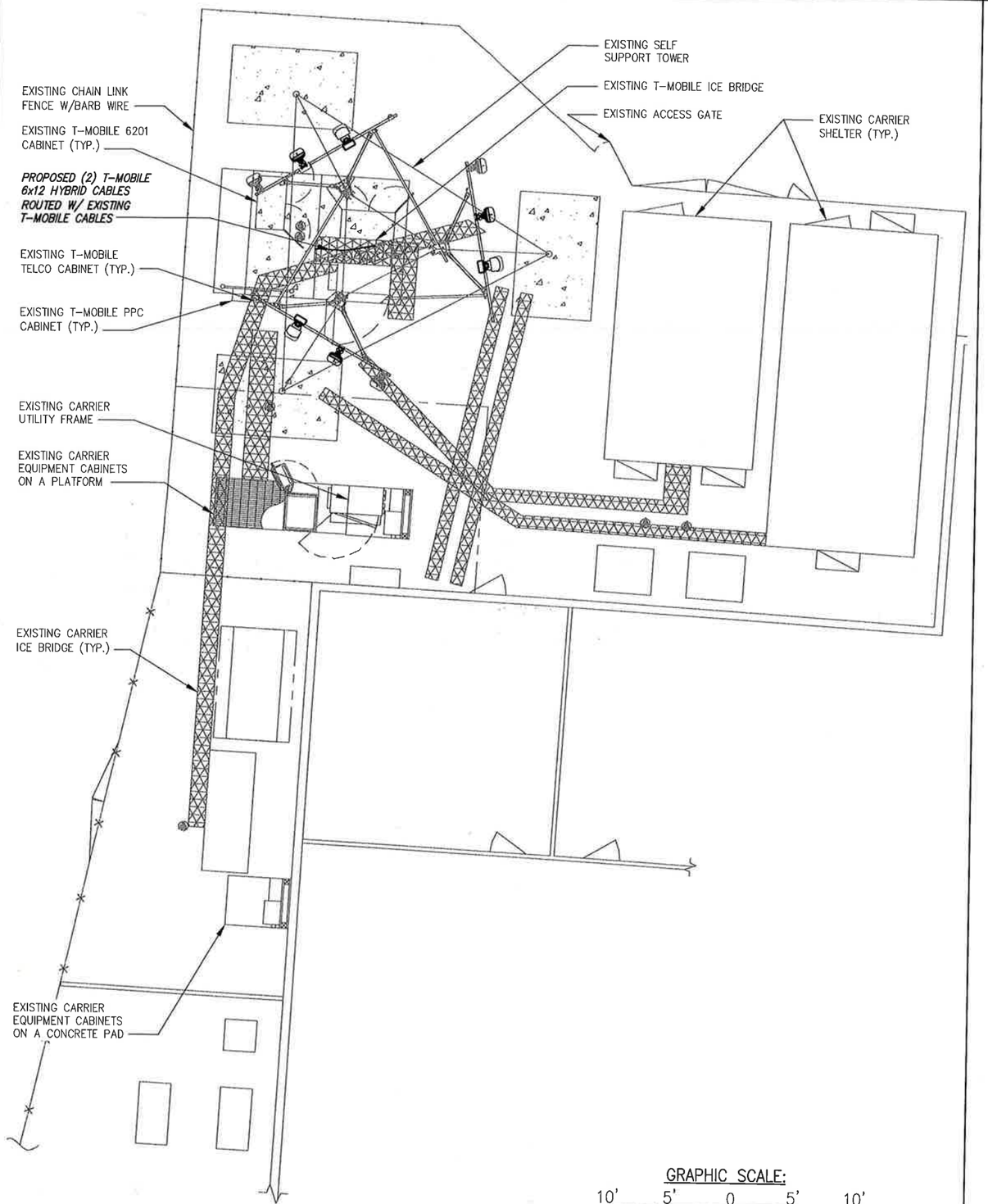
Project Number: 600-007

Project Title:
CT11114D
NORWALK / SOUTH NORWALK
50 ROCKLAND ROAD
NORWALK, CT 06854

Prepared For:
CROWN CASTLE

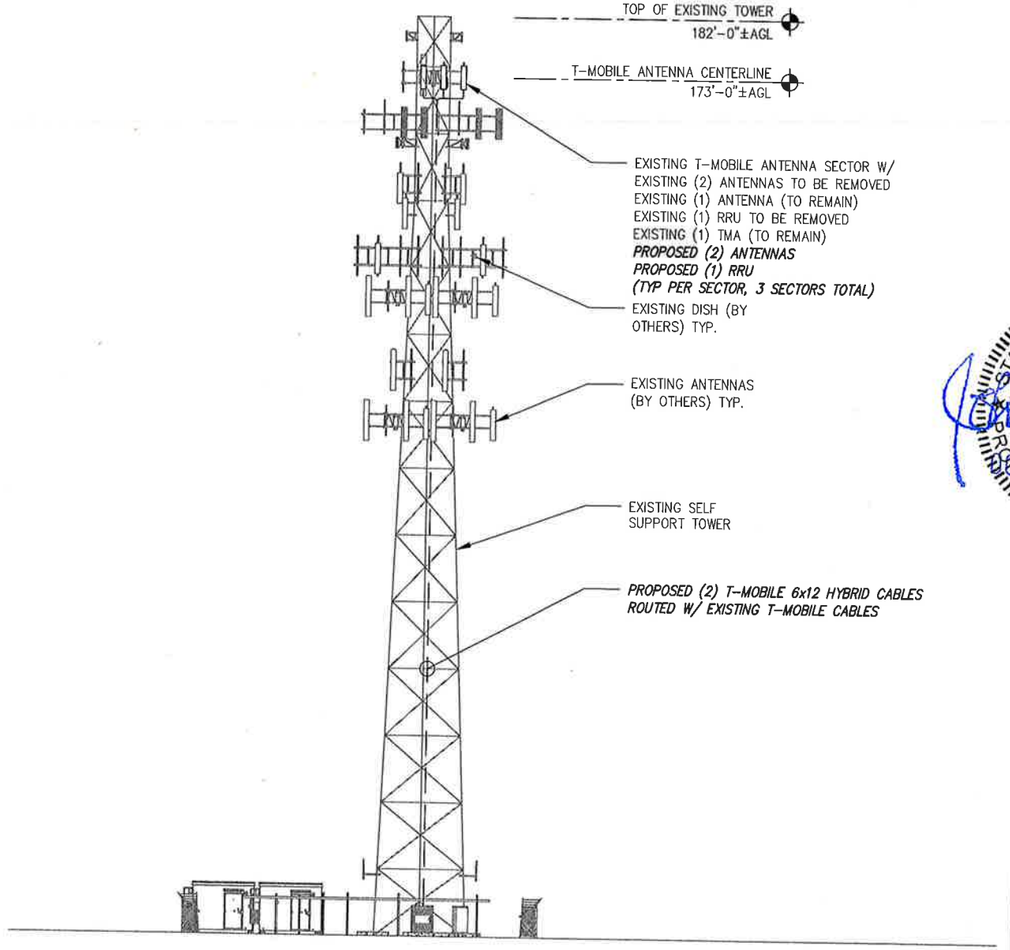
Drawing Title
NOTES

Drawing Number
N1



1 C1 PLAN VIEW
SCALE: AS NOTED

GRAPHIC SCALE:
10' 5' 0 5' 10'
SCALE (11x17): 1" = 10'-0"
SCALE (22x34): 1" = 5'-0"



2 C1 ELEVATION
SCALE: NOT TO SCALE

T-Mobile
T-MOBILE NORTHEAST LLC
103 MONARCH DRIVE
LIVERPOOL, NY 13088

INFINIGY
6865 DEERPATH ROAD SUITE 152
ELKRIDGE, MD 21075
TEL (443) 592-3143

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
10/4/2018

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NORWALK / SOUTH NORWALK
50 ROCKLAND ROAD
NORWALK, CT 06854

Prepared For:
CROWN CASTLE

Drawing Title
PLAN AND ELEVATION

Drawing Number
C1

SECTOR	ANTENNA POSITION	ANTENNA MODEL #	VENDOR	AZIMUTH	M-TILT	E-TILT	ANTENNA CENTERLINE	TMA/RRU MODEL #	CABLE LENGTH	CABLE TYPE AND QUANTITY
ALPHA	A-1	AIR32 KRD901146-1_B66A_B2A	ERICSSON	80°	0	TBD	173'-0"	-	203'±	(1) EXISTING HCS CABLE (SHARED)
	A-2	**AIR3246 B66**	**ERICSSON**	**80°**	0	TBD	173'-0"	-	203'±	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)**
	A-3	**APXVAARR24_43-U-NA20**	**RFS**	**80°**	0	TBD	173'-0"	GENERIC 1B-AWS TMA **RRU 4449 B71+B12**	**203'±**	**(2) 6X12 HYBRID TRUNK CABLE (SHARED)** (4) 5/8" COAX
BETA	B-1	AIR32 KRD901146-1_B66A_B2A	ERICSSON	210°	0	TBD	173'-0"	-	203'±	(1) EXISTING HCS CABLE (SHARED)
	B-2	**AIR3246 B66**	**ERICSSON**	**210°**	0	TBD	173'-0"	-	203'±	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)**
	B-3	**APXVAARR24_43-U-NA20**	**RFS**	**210°**	0	TBD	173'-0"	GENERIC 1B-AWS TMA **RRU 4449 B71+B12**	**203'±**	**(2) 6X12 HYBRID TRUNK CABLE (SHARED)** (2) 5/8" COAX
GAMMA	C-1	AIR32 KRD901146-1_B66A_B2A	ERICSSON	330°	0	TBD	173'-0"	-	203'±	(1) EXISTING HCS CABLE (SHARED)
	C-2	**AIR3246 B66**	**ERICSSON**	**330°**	0	TBD	173'-0"	-	203'±	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)**
	C-3	**APXVAARR24_43-U-NA20**	**RFS**	**330°**	0	TBD	173'-0"	GENERIC 1B-AWS TMA **RRU 4449 B71+B12**	**203'±**	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)** (4) 5/8" COAX

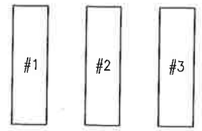
KEY

EXISTING

PROPOSED

ANTENNA LOCATION KEY

VIEWED FROM BEHIND



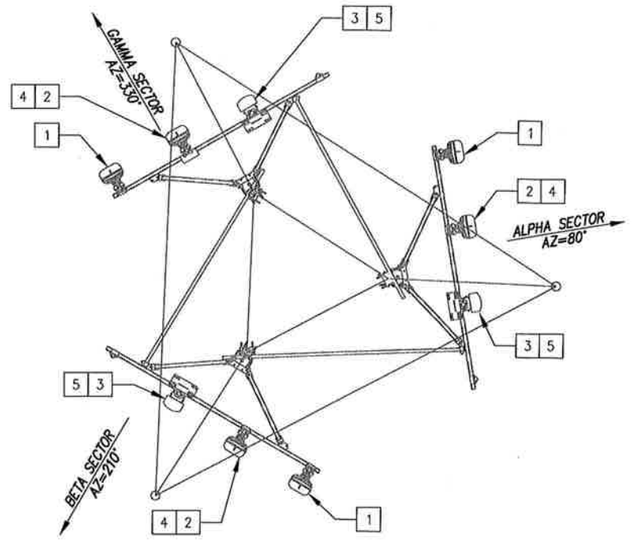
GENERAL NOTES:

1. CONTRACTOR TO VERIFY PROPOSED ANTENNA INFORMATION IS THE MOST CURRENT AT TIME OF CONSTRUCTION.
2. CONTRACTOR TO CONFIRM CABLE LENGTHS FOR ANY PROPOSED CABLES/JUMPERS PRIOR TO CONSTRUCTION.

ORIENTATION PLAN KEY

KEY	DESCRIPTION	TYPE	QTY	STATUS
1	AIR32 KRD901146-1_B66A_B2A	ANTENNA	3	REMAIN
2	AIR21 KRC118023-1_B2A_B4P	ANTENNA	3	REMOVED
3	LNX-6515DS-A1M	ANTENNA	3	REMOVED
4	GENERIC TWIN STYLE 1B-AWS	TMA	3	REMAIN
5	RRUS11 B12	RRU	3	REMOVED
6	**AIR3246 / B66**	**ANTENNA**	**3**	**PROPOSED**
7	**APXVAARR24_43-U-NA20**	**ANTENNA**	**3**	**PROPOSED**
8	**RADIO 4449 B71+B12**	**ANTENNA**	**3**	**PROPOSED**

1 C2 RF SYSTEM CHART
SCALE: NOT TO SCALE



NORTH

2 C2 EXISTING ANTENNA ORIENTATION
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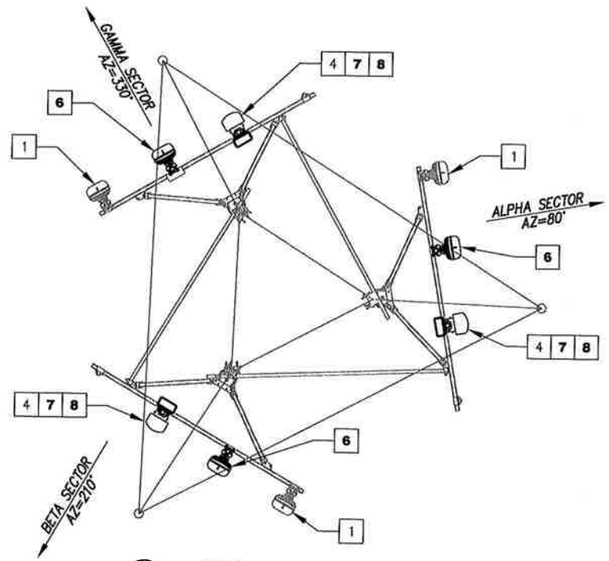

NORTH

3 C2 PROPOSED ANTENNA ORIENTATION
SCALE: NOT TO SCALE

T-MOBILE NORTHEAST LLC
103 MONARCH DRIVE
LIVERPOOL, NY 13088

INFINIGY
6865 DEERPATH ROAD SUITE 152
ELKRIDGE, MD 21075
TEL (443) 592-3143

STATE OF CONNECTICUT
JOHN S. STEVENS
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LICENSED PROFESSIONAL ENGINEER
10-2-2018

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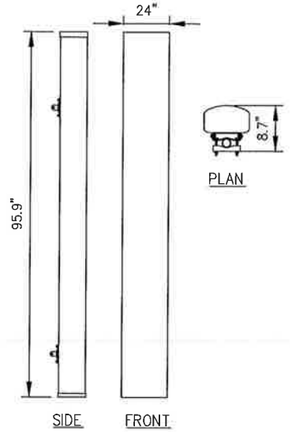
NORWALK / SOUTH NORWALK
50 ROCKLAND ROAD
NORWALK, CT 06854

Prepared For:
CROWN CASTLE

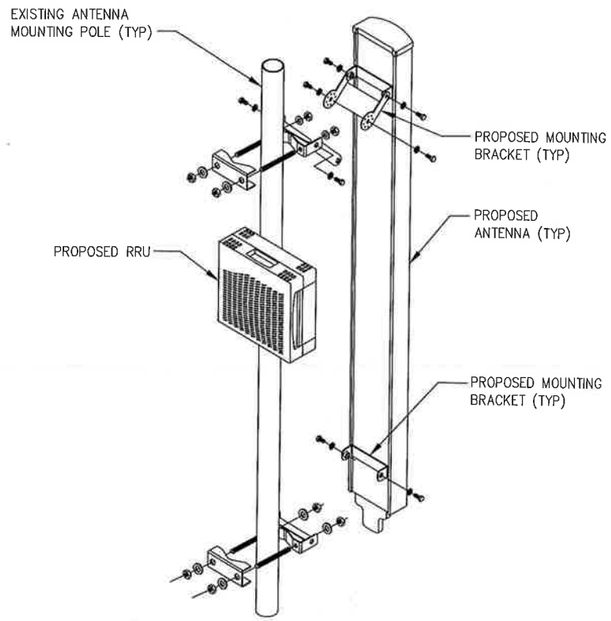
Drawing Title
RF CHART

Drawing Number
C2

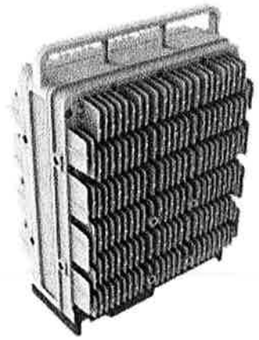


RFS MODEL NO.:	APXVAARR24_43-U-NA20
RADOME MATERIAL:	FIBERGLASS
RADOME COLOR:	LIGHT GREY
DIMENSIONS, HxWxD:	95.9"x24"x8.7"
WEIGHT, W/O MOUNTING KIT:	128 LBS

1/D1 APX ANTENNA DETAIL
SCALE: NOT TO SCALE



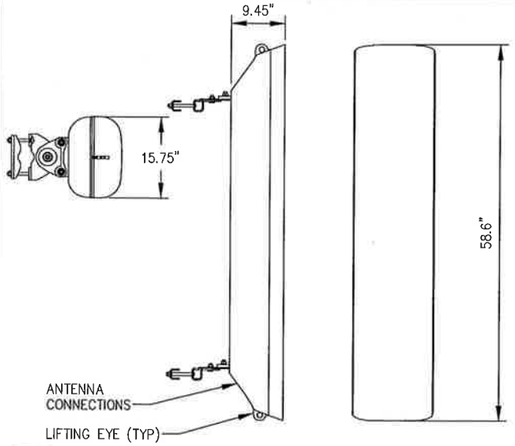
2/D1 ANTENNA/RRU MOUNTING DETAIL
SCALE: NOT TO SCALE



ERICSSON 4449 B71+B12 SPECIFICATIONS

- HxWxD, (INCHES) : 17.91"x13.19"x10.63"
- WEIGHT (LBS) : 74.96
- COLOR : GRAY

3/D1 4449 B71+B12 RRU DETAIL
SCALE: NOT TO SCALE



ERICSSON MODEL NO.:	AIR3246 B66
RADOME MATERIAL:	FIBERGLASS, UV RESISTANT
RADOME COLOR:	LIGHT GRAY
DIMENSIONS, HxWxD:	58.6"X15.75"x9.45"
WEIGHT, W/ PRE-MOUNTED BRACKETS:	198.41 LBS

4/D1 AIR3246 B66 ANTENNA DETAIL
SCALE: NOT TO SCALE

T-MOBILE NORTHEAST LLC
103 MONARCH DRIVE
LIVERPOOL, NY 13088

INFINIGY
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ELKRIDGE, MD 21075
TEL (443) 592-3143

STATE OF CONNECTICUT
JOHN S. STEVENS
LICENSED PROFESSIONAL ENGINEER
OCT 04 2018

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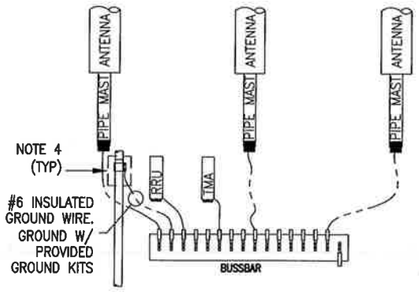
Prepared For: CROWN CASTLE

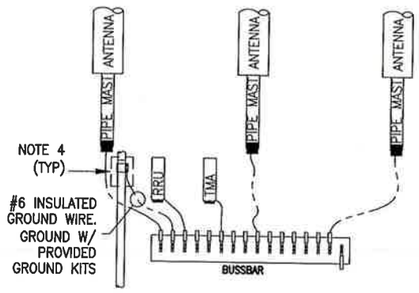
Drawing Title
EQUIPMENT DETAILS

Drawing Number
D1

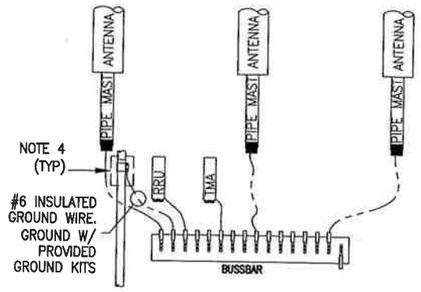
ALPHA SECTOR
(LAYOUT SHOWN GENERICALLY, SEE ANTENNA ORIENTATION)



BETA SECTOR
(LAYOUT SHOWN GENERICALLY, SEE ANTENNA ORIENTATION)

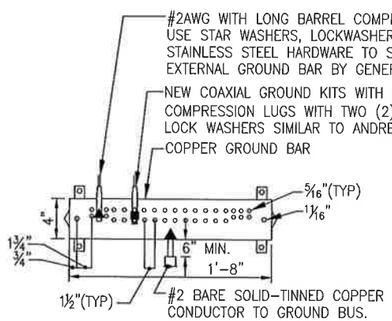


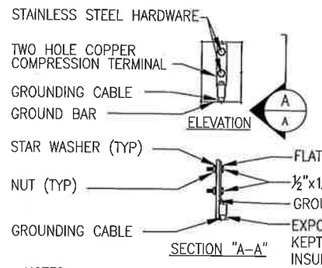
GAMMA SECTOR
(LAYOUT SHOWN GENERICALLY, SEE ANTENNA ORIENTATION)



NOTES:
1. PROVIDE #2AWG GROUNDING CONDUCTOR, U.O.N.
2. PROVIDE BONDING AND GROUNDING CONDUCTORS WITH GREEN TYPE THWN INSULATION, U.O.N.
3. PROVIDE SOLID TINNED BARE COPPER WIRE (BCW) GROUNDING CONDUCTOR.
4. PROVIDE STANDARD COAX OR HYBRID CABLE GROUNDING KIT OR FIELD FABRICATE TO SUIT CONDITIONS. TOTAL LENGTH OF GROUNDING CONDUCTOR SHALL NOT EXCEED 10'-0".
5. PROVIDE GROUNDING ELECTRODES QUANTITY, TYPE AND SIZE AS INDICATED ON SITE GROUNDING PLAN.
6. LEAVE GROUND WIRE COILED UP ABOVE GRADE. CAP END OF CONDUIT.
7. ADD COAX OR HYBRID CABLE GROUND KIT CONNECTION TO BUSSBAR WHEN LENGTH OF CABLE TRAY (FROM TOWER OR MONOPOLE TO EQUIPMENT) IS GREATER THAN 20'-0".
8. ADD #2/0 GREEN INSULATED CONDUCTOR BETWEEN CABLE TRAY AND GRIPSTRUT/COVER.
9. BUSSBARS ARE TO BE TINNED COPPER BARS (¼"X2"X12") MOUNTED ON INSULATORS, U.O.N.
10. GROUND ALL PROPOSED ANTENNAS, DIPLEXERS, TMAS, AND RRUS PER MANU. SPECS.

1 / E1 GROUNDING DIAGRAM
SCALE: NOT TO SCALE

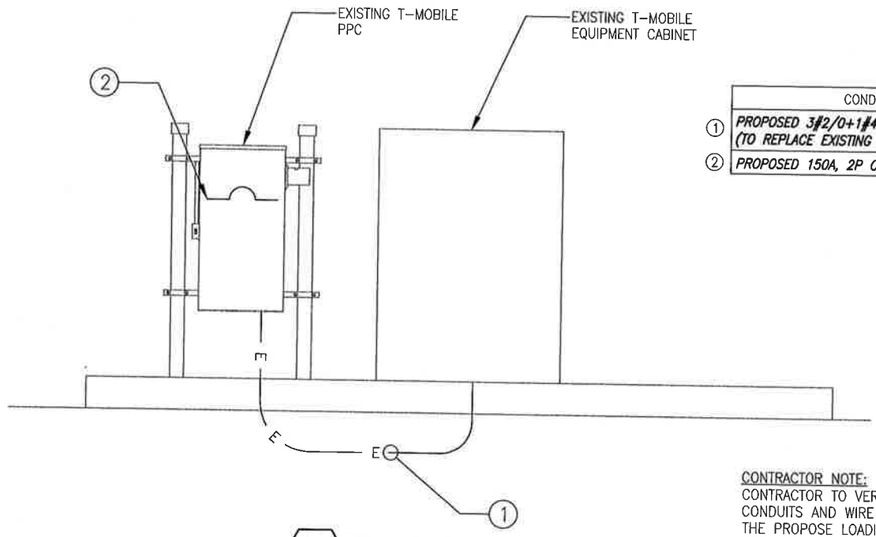




NOTES:
1. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

NOTES:
1. ALL HARDWARE STAINLESS STEEL COAT ALL SURFACES WITH KOPR-SHIELD BEFORE MATING.
2. FOR GROUND BOND TO STEEL ONLY: INSERT A TOOTH WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH KOPR-SHIELD.
3. ALL HOLES ARE COUNTERSUNK 1/16".

2 / E1 GROUND BAR CONNECTION DETAIL
SCALE: NOT TO SCALE



CONDUIT SCHEDULE
① PROPOSED 3#2/0+1#4G IN 2" CONDUIT (TO REPLACE EXISTING CONDUCTOR AND CONDUIT)
② PROPOSED 150A, 2P C.B.

3 / E1 ONE LINE DIAGRAM
SCALE: NOT TO SCALE

CONTRACTOR NOTE:
CONTRACTOR TO VERIFY THAT THE EXISTING CONDUITS AND WIRE SIZES ARE ADEQUATE FOR THE PROPOSE LOADING IN ACCORDANCE WITH NEC AND INCLUDE ELECTRICAL UPGRADES IN THE SCOPE OF WORK AS REQUIRED.

T-Mobile
T-MOBILE NORTHEAST LLC
103 MONARCH DRIVE
LIVERPOOL, NY 13088

INFINIGY
6865 DEERPATH ROAD SUITE 152
ELKRIDGE, MD 21075
TEL (443) 592-3143

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
OCT. 04 2018

No	Submittal / Revision	App'd	Date
1	SCOPE UPDATED	SL	10/03/18
0	ISSUED FOR CONSTRUCTION	SL	09/20/18
A	ISSUED FOR REVIEW	SL	09/07/18

Drawn: RCD
Designed: MRL
Checked: AJD

Project Number: 600-007

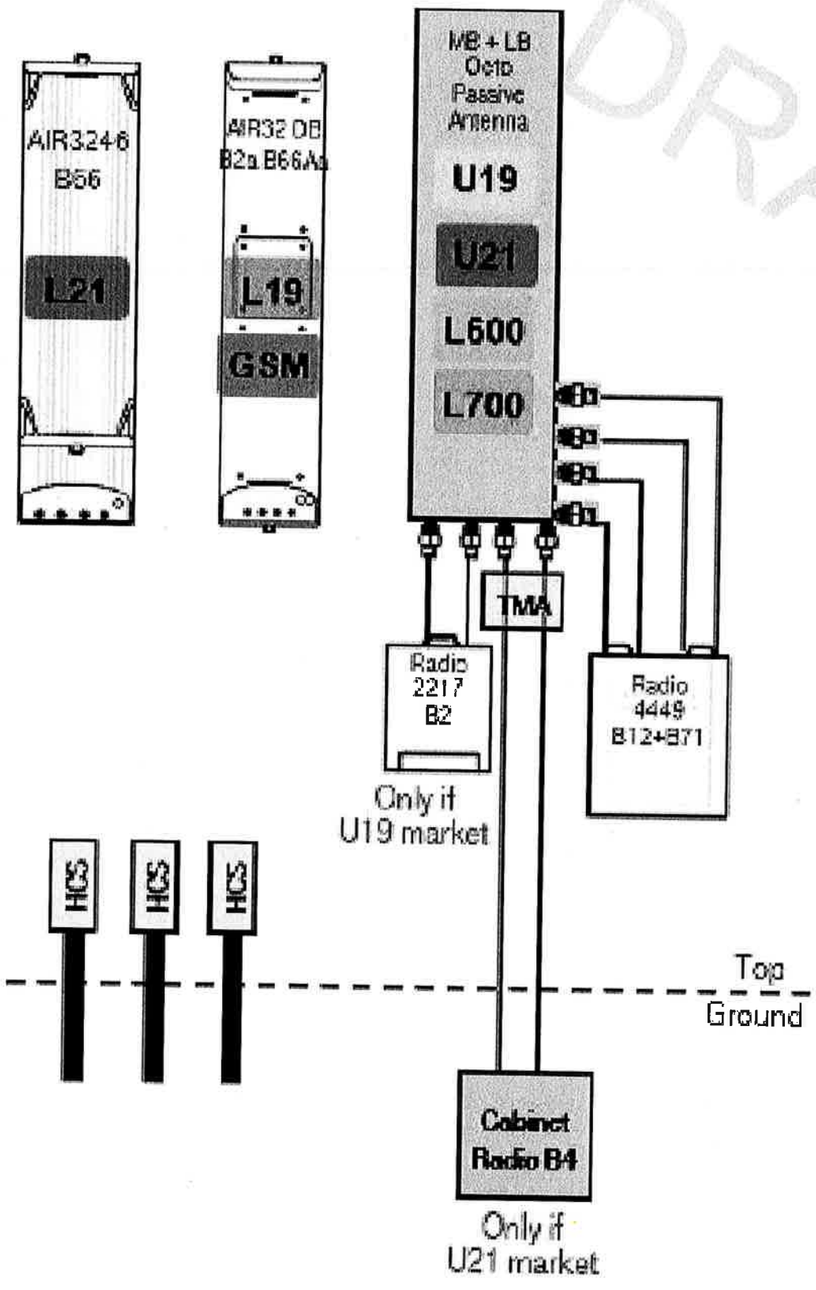
Project Title:
CT11114D
NORWALK / SOUTH
NORWALK
50 ROCKLAND ROAD
NORWALK, CT 06854

Prepared For:
CROWN CASTLE

Drawing Title
GROUNDING & ELECTRICAL DETAILS

Drawing Number
E1

67D92M_2xAIR+1OP.JPG



Notes:

1 / E2 RF PLUMBING DIAGRAM
SCALE: AS NOTED

T-Mobile
T-MOBILE NORTHEAST LLC
103 MONARCH DRIVE
LIVERPOOL, NY 13088

INFINIGY
6865 DEERPATH ROAD SUITE 152
ELKRIDGE, MD 21075
TEL (443) 592-3143

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
10.4.2018

No.	Submittal / Revision	App'd	Date
1	SCOPE UPDATED	SL	10/03/18
0	ISSUED FOR CONSTRUCTION	SL	09/20/18
A	ISSUED FOR REVIEW	SL	09/07/18

Drawn: RCD
Designed: MRL
Checked: AJD

Project Number: 600-007

Project Title:
CT11114D
NORWALK / SOUTH NORWALK
50 ROCKLAND ROAD
NORWALK, CT 06854

Prepared For:
CROWN CASTLE

Drawing Title
RF PLUMBING DIAGRAM

Drawing Number
E2

Date: **August 27, 2018**

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

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

Subject:	**Structural Analysis Report**	
Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11114D
	Carrier Site Name:	Nowalk/South Norwalk
Crown Castle Designation:	**Crown Castle BU Number:**	807133
	Crown Castle Site Name:	BRG 134 943057
	Crown Castle JDE Job Number:	505281
	Crown Castle Work Order Number:	1593023
	Crown Castle Order Number:	441000 Rev. 2
Engineering Firm Designation:	**B+T Group Project Number:**	82164.004.01
Site Data:	**50 Rockland Roadnorwalk Ofc - MTSO, SO Norwalk, Fairfield County, CT** **Latitude *41° 4' 54.44"*, Longitude *-73° 25' 49.52"*** **180 Foot - Self Support Tower**	

Dear Charles McGuirt,

B+T Group is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

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

LC7: Proposed Equipment Configuration **Sufficient Capacity**

The analysis has been performed in accordance with the TIA-222-H Standard. This analysis utilizes an ultimate 3-second gust wind speed of 120 mph from the 2016 Connecticut State Building Code. Exposure Category C and Risk Category II were used in this analysis.

Structural analysis prepared by: Maurizio Benedetti, P.E.

Respectfully submitted by: B+T Engineering, Inc.
COA: PEC.0001564 Expires: 02/10/2019

STATE OF CONNECTICUT
SCOTT S. VANCE
31627
LICENSED
PROFESSIONAL ENGINEER

8/27/18

Scott S. Vance, P.E.

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 180 ft. Self-Support tower designed by Rohn in July of 1987. The tower was originally designed for a wind speed of 85 mph per TIA-222-F. This tower has been modified by Vertical Solutions in November of 2004 and those modifications are incorporated in this analysis.

2) ANALYSIS CRITERIA

Building Code:	2016 Connecticut State Building Code
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	120 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1.275 in
Wind Speed with Ice:	50 mph
Seismic Ss:	0.244
Seismic S1:	0.057
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)
170.0	173.0	1	Ericsson	KRY 112 144/1	2 13	1-3/8 1-5/8
	172.0	2	Ericsson	KRY 112 144/1		
	170.0	3	Rfs Celwave	APXVAARR24_43-U-NA20		
		3	Ericsson	AIR 3246 B66		
		3	Ericsson	RADIO 4449 B12/B71		
		3	Ericsson	AIR-32 B2A/B66AA		
		1	--	Sector Mount [SM 702-3]		

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)
178.0	178.0	2	--	Side Arm Mount [SO 305-1]		
161.0	161.0	1	Andrew	SBNHH-1D65A	6 6 2	1-5/8 5/8 3/8
		2	Cci Antennas	HPA-65R-BUU-H6		
		3	Ericsson	RRUS 11		
		3	Ericsson	RRUS 12		
		3	Ericsson	RRUS 32		
		3	Ericsson	RRUS 32 B2		
		3	Ericsson	RRUS 4426 B66		
		1	Quintel Tech.	QS46512-2		
		2	Quintel Tech.	QS66512-2		
		3	Raycap	DC6-48-60-18-8F		
		1	--	Sector Mount [SM 201-3]		
157.0	157.0	2	Andrew	VHLP2-18	2	7983A
		2	--	Side Arm Mount [SO 203-1]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
148.0	148.0	3	Alcatel Lucent	800 External Notch FILTER	4	1-1/4
		3	Alcatel Lucent	800MHZ 2X50W RRH		
		6	Alcatel Lucent	PCS 1900MHz 4x45W-65MHz		
		3	Alcatel Lucent	TD-RRH8x20-25		
		9	Rfs Celwave	ACU-A20-N		
		3	Rfs Celwave	APXVSPP18-C-A20		
		3	Rfs Celwave	APXVTM14-ALU-I20		
		1	--	Sector Mount [SM 502-3]		
134.0	135.0	1		VHLP2-23	6 1	5/16 1/2
		3	Argus Tech.	LLPX310R		
		3	Samsung Telecom.	RRH-2WB		
	134.0	1	--	Sector Mount [SM 504-3]		
126.0	130.0	1	Gps	GPS_A	19 1	1-5/8 1/2
	128.0	3	Alcatel Lucent	B13 RRH 4X30		
		3	Alcatel Lucent	B25 RRH2x60 PCS		
		3	Alcatel Lucent	B66A RRH4X45		
		6	Commscope	SBNHH-1D65C		
		4	Decibel	DB844G65ZAXY		
		2	Decibel	DB844H80-XY		
		2	Rfs Celwave	DB-T1-6Z-8AB-0Z		
	126.0	1	--	Sector Mount [SM 411-3]		
112.0	112.0	3	Kathrein	800 10504	6	1-5/8
		1	--	Sector Mount [SM 104-3]		
102.0	102.0	6	Cci Antennas	TPX-070821	12 4 2	1-5/8 5/8 3/8
		3	Ericsson	RRUS 11 B2		
		3	Ericsson	RRUS 32		
		3	Ericsson	RRUS 32 B2		
		3	Powerwave Tech.	7770.00		
		6	Powerwave Tech.	LGP2140X		
		3	Powerwave Tech.	P65-16-XLH-RR		
		3	Quintel Tech.	QS66512-2		
		2	Raycap	DC6-48-60-18-8F		
		1	--	Sector Mount [SM 301-3]		
12.0	14.0	1	Decibel	ASPP2933	2	1/2
	13.0	1	Gps	GPS_A		
	12.0	1	--	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Online Order Information	T-Mobile Co-Locate, Rev# 2	441000	CCI Sites
Tower Manufacturer Drawing	Rohn, File No. 22678JC	392878	CCI Sites
Tower Modification Drawing	VSI, Date: 11/17/2004	1257479	CCI Sites
Post-Modification Inspection	All Points Technology, Date: 01/12/2005	4065020	CCI Sites
Foundation Drawings	PJF, Project No. 31298-49	821566	CCI Sites
Geotech Report	FDH, Project No. 08-07100E G1	2311843	CCI Sites
Antenna Configuration	Crown CAD Package	Date: 06/20/2018	CCI Sites

3.1) Analysis Method

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

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Mount areas and weights are assumed based on photographs provided.
5) The existing base plate grout was considered in this analysis. Grout must be maintained and inspected periodically, and must be replaced if damaged or cracked. Refer to crown document ENG-BUL-10122, Tower Base Plate Grout Inspection and Classification.

This analysis may be affected if any assumptions are not valid or have been made in error. B+T Group 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
T1	180 - 160	Leg	ROHN 3 EH	2	-11.012	116.138	9.5	Pass
T2	160 - 153.333	Leg	ROHN 4 EH	35	-17.533	167.901	10.4	Pass
T3	153.333 - 146.667	Leg	ROHN 4 EH	44	-27.835	167.900	16.6	Pass
T4	146.667 - 140	Leg	ROHN 4 EH	56	-38.426	167.901	22.9	Pass
T5	140 - 120	Leg	ROHN 5 EH	68	-78.037	251.347	31.0	Pass
T6	120 - 100	Leg	ROHN 6 EHS	89	-125.485	288.515	43.5	Pass
T7	100 - 80	Leg	ROHN 6 EH	110	-170.894	318.903	53.6	Pass
T8	80 - 70	Leg	ROHN 8 EHS	125	-194.734	405.715	48.0	Pass
T9	70 - 60	Leg	ROHN 8 EHS	134	-219.055	405.715	54.0	Pass
T10	60 - 40	Leg	ROHN 8 EHS	143	-266.830	405.717	65.8	Pass
T11	40 - 20	Leg	ROHN 8 EH	158	-313.892	530.833	59.1	Pass
T12	20 - 0	Leg	ROHN 8 EH	173	-360.403	530.833	67.9	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	180 - 160	Diagonal	L2x2x3/16	10	-2.540	10.104	25.1 30.3 (b)	Pass
T2	160 - 153.333	Diagonal	L2 1/2x2 1/2x1/4	39	-4.205	19.793	21.2 34.0 (b)	Pass
T3	153.333 - 146.667	Diagonal	L2 1/2x2 1/2x1/4	51	-4.686	17.900	26.2 37.2 (b)	Pass
T4	146.667 - 140	Diagonal	L2 1/2x2 1/2x1/4	61	-5.900	16.240	36.3 48.5 (b)	Pass
T5	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	70	-8.345	12.489	66.8 70.1 (b)	Pass
T6	120 - 100	Diagonal	L3x3x1/4	92	-10.300	17.566	58.6 77.2 (b)	Pass
T7	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	113	-12.493	18.890	66.1 84.7 (b)	Pass
T8	80 - 70	Diagonal	L3 1/2x3 1/2x1/4	128	-13.112	17.632	74.4 87.4 (b)	Pass
T9	70 - 60	Diagonal	2L3 1/2x3 1/2x1/4x3/8	137	-14.034	27.940	50.2 65.2 (b)	Pass
T10	60 - 40	Diagonal	L4x4x1/4	146	-14.766	20.589	71.7 96.4 (b)	Pass
T11	40 - 20	Diagonal	L4x4x5/16	161	-15.697	21.559	72.8 80.9 (b)	Pass
T12	20 - 0	Diagonal	2L4x4x5/16x3/8	179	-17.312	31.945	54.2 76.4 (b)	Pass
T1	180 - 160	Top Girt	L2x2x1/8	6	-0.089	4.230	2.1	Pass
T3	153.333 - 146.667	Top Girt	L2 1/2x2 1/2x1/8	48	-0.394	4.069	9.7 11.3 (b)	Pass
T4	146.667 - 140	Top Girt	L2 1/2x2 1/2x1/8	58	0.311	16.822	1.9 5.2 (b)	Pass
T1	180 - 160	Mid Girt	L2x2x1/8	9	-0.536	3.097	17.3	Pass
							Summary	
						Leg (T12)	67.9	Pass
						Diagonal (T10)	96.4	Pass
						Top Girt (T3)	11.3	Pass
						Mid Girt (T1)	17.3	Pass
						Bolt Checks	96.4	Pass
						Rating =	96.4	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	71.4	Pass
1	Base Foundation	Base	99.1	Pass

Structure Rating (max from all components) =	99.1%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

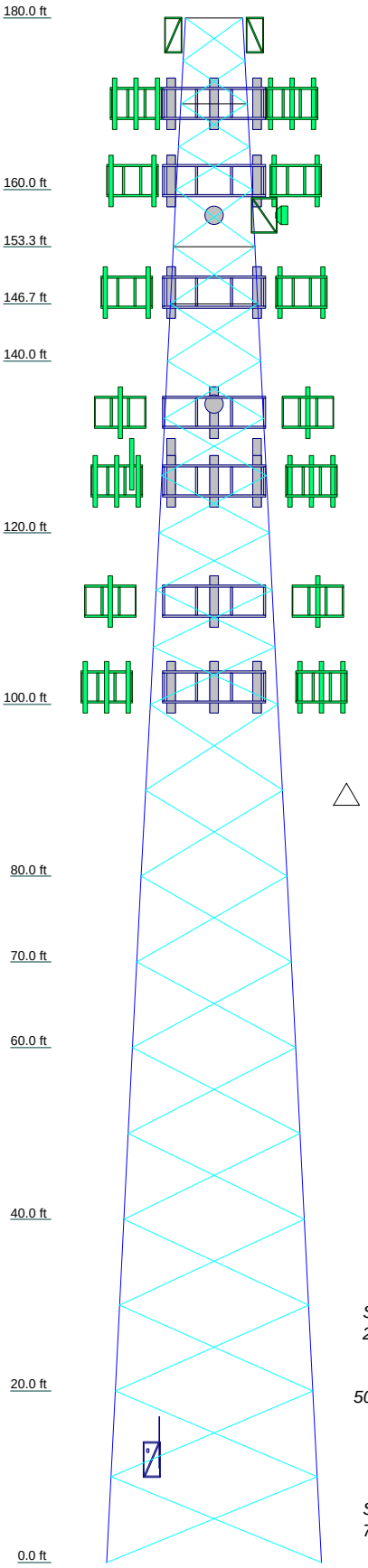
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Girts	Mid Girts	Face Width (ft)	# Panels @ (ft)	Weight (K)
T1	ROHN 3 EH	A572-50	L2x2x3/16	A36	L2x2x1/8	L2x2x1/8	6.6875	4 @ 5	1.3
T2	ROHN 4 EH				N.A.		8.76042	9 @ 6.66667	0.6
T3					L2 1/2x2 1/2x1/8		9.45052		0.7
T4			L2 1/2x2 1/2x1/4				10.1432		0.7
T5	ROHN 5 EH						10.8333		2.4
T6	ROHN 6 EHS		L3x3x1/4				12.9167		2.9
T7	ROHN 6 EH		L3 1/2x3 1/2x1/4	A572-50		N.A.	14.8542	10 @ 10	3.2
T8	ROHN 8 EHS		A	A36			16.9896		1.8
T9							17.9948		2.6
T10			L4x4x1/4	A572-50			19		3.9
T11	ROHN 8 EH		L4x4x5/16				21		5.2
T12			2L4x4x5/16x3/8	A36			23		8.1
							25		33.3



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Side Arm Mount [SO 305-1] (E)	178	(3) 6' x 2" Mount Pipe (E)	134
Side Arm Mount [SO 305-1] (E)	178	(3) 6' x 2" Mount Pipe (E)	134
AIR 32 B2a/B66Aa w/ Mount Pipe (E)	170	(3) 6' x 2" Mount Pipe (E)	134
AIR 32 B2a/B66Aa w/ Mount Pipe (E)	170	6' x 3" Mount Pipe (E)	134
AIR 32 B2a/B66Aa w/ Mount Pipe (E)	170	6' x 3" Mount Pipe (E)	134
(2) KRY 112 144/1 (E)	170	Sector Mount [SM 504-3] (E)	134
KRY 112 144/1 (E)	170	LLPX310R w/ Mount Pipe (E)	134
AIR 3246 B66 w/ Mount Pipe (P)	170	LLPX310R w/ Mount Pipe (E)	134
AIR 3246 B66 w/ Mount Pipe (P)	170	VHLP2-23 (E)	134
AIR 3246 B66 w/ Mount Pipe (P)	170	DB844H80-XY w/ Mount Pipe (E)	126
APXVAARR24_43-U-NA20 w/ Mount Pipe (P)	170	DB-T1-6Z-8AB-0Z (E)	126
APXVAARR24_43-U-NA20 w/ Mount Pipe (P)	170	GPS_A (E)	126
APXVAARR24_43-U-NA20 w/ Mount Pipe (P)	170	(2) SBNHH-1D65C w/ Mount Pipe (R)	126
(2) RADIO 4449 B12/B71 (P)	170	(2) SBNHH-1D65C w/ Mount Pipe (R)	126
RADIO 4449 B12/B71 (P)	170	(2) SBNHH-1D65C w/ Mount Pipe (R)	126
6' x 2" Mount Pipe (E)	170	B25 RRH2x60 PCS (R)	126
6' x 2" Mount Pipe (E)	170	B25 RRH2x60 PCS (R)	126
6' x 2" Mount Pipe (E)	170	B25 RRH2x60 PCS (R)	126
Sector Mount [SM 702-3] (E)	170	B66A RRH4X45 (R)	126
HPA-65R-BUU-H6 (R)	161	B66A RRH4X45 (R)	126
HPA-65R-BUU-H6 (R)	161	B66A RRH4X45 (R)	126
SBNHH-1D65A (R)	161	B13 RRH 4X30 (R)	126
QS66512-2 (R)	161	B13 RRH 4X30 (R)	126
QS66512-2 (R)	161	B13 RRH 4X30 (R)	126
QS46512-2 (R)	161	DB-T1-6Z-8AB-0Z (R)	126
RRUS 4426 B66 (R)	161	(2) 6' x 2" Mount Pipe (E)	126
RRUS 4426 B66 (R)	161	6' x 2" Mount Pipe (E)	126
RRUS 4426 B66 (R)	161	5' x 2" Pipe Mount (E)	126
RRUS 11 (R)	161	Sector Mount [SM 411-3] (E)	126
RRUS 11 (R)	161	Pipe Mount [PM 601-3] (E)	126
RRUS 11 (R)	161	(2) DB844G65ZAXY w/ Mount Pipe (E)	126
RRUS 32 (R)	161	(2) DB844G65ZAXY w/ Mount Pipe (E)	126
RRUS 32 (R)	161	DB844H80-XY w/ Mount Pipe (E)	126
RRUS 32 (R)	161	6' x 2" Mount Pipe (E)	112
RRUS 32 B2 (R)	161	6' x 2" Mount Pipe (E)	112
RRUS 32 B2 (R)	161	6' x 2" Mount Pipe (E)	112
RRUS 32 B2 (R)	161	Sector Mount [SM 104-3] (E)	112
RRUS 12 (R)	161	800 10504 w/ Mount Pipe (E)	112
RRUS 12 (R)	161	800 10504 w/ Mount Pipe (E)	112
RRUS 12 (R)	161	800 10504 w/ Mount Pipe (E)	112
(2) DC6-48-60-18-8F (R)	161	QS66512-2 (E)	102
DC6-48-60-18-8F (R)	161	QS66512-2 (E)	102
Sector Mount [SM 201-3] (R-w/ 4 M.Pipes)	161	QS66512-2 (E)	102
Side Arm Mount [SO 203-1] (E)	157	P65-16-XLH-RR w/ Mount Pipe (E)	102
Side Arm Mount [SO 203-1] (E)	157	P65-16-XLH-RR w/ Mount Pipe (E)	102
VHLP2-18 (E-AZ. Per photo)	157	P65-16-XLH-RR w/ Mount Pipe (E)	102
VHLP2-18 (E-AZ. Per photo)	157	(2) LGP2140X (E)	102
APXVTM14-ALU-I20 w/ Mount Pipe (R)	148	(2) LGP2140X (E)	102
APXVSPP18-C-A20 w/ Mount Pipe (R)	148	(2) LGP2140X (E)	102
APXVSPP18-C-A20 w/ Mount Pipe (R)	148	RRUS 32 B2 (E)	102
APXVSPP18-C-A20 w/ Mount Pipe (R)	148	RRUS 32 B2 (E)	102
(2) PCS 1900MHz 4x45W-65MHz (R)	148	RRUS 32 B2 (E)	102
(2) PCS 1900MHz 4x45W-65MHz (R)	148	RRUS 32 (E)	102
(2) PCS 1900MHz 4x45W-65MHz (R)	148	RRUS 32 (E)	102
800MHZ 2X50W RRH (R)	148	RRUS 32 (E)	102
800MHZ 2X50W RRH (R)	148	DC6-48-60-18-8F (E)	102
800MHZ 2X50W RRH (R)	148	DC6-48-60-18-8F (E)	102
TD-RRH8x20-25 (R)	148	RRUS 11 B2 (E)	102
TD-RRH8x20-25 (R)	148	RRUS 11 B2 (E)	102
TD-RRH8x20-25 (R)	148	RRUS 11 B2 (E)	102
(3) 800 EXTERNAL NOTCH FILTER (R)	148	(2) TPX-070821 (E)	102
(9) ACU-A20-N (R)	148	(2) TPX-070821 (E)	102
Sector Mount [SM 502-3] (R)	148	(2) TPX-070821 (E)	102
APXVTM14-ALU-I20 w/ Mount Pipe (R)	148	(4) 8' x 2" Pipe Mount (2 For TMEs+1 dual antenna+1 for quintel antenna)	102
APXVTM14-ALU-I20 w/ Mount Pipe (R)	148	(4) 8' x 2" Pipe Mount (2 For TMEs+1 dual antenna+1 for quintel antenna)	102
LLPX310R w/ Mount Pipe (E)	134	(4) 8' x 2" Pipe Mount (2 For TMEs+1 dual antenna+1 for quintel antenna)	102
RRH-2WB (E)	134	Sector Mount [SM 301-3] (E)	102
RRH-2WB (E)	134	7770.00 w/ Mount Pipe (E)	102
RRH-2WB (E)	134	7770.00 w/ Mount Pipe (E)	102
J - Box (E-Per photo)	134	7770.00 w/ Mount Pipe (E)	102
		Side Arm Mount [SO 701-1] (E-Per Photo)	12
		GPS_A (E-Per Photo)	12
		3' x 2" Pipe Mount (E-Per Photo)	12
		ASPP2933 (E-Per Photo)	12

SHE
22 k
50 m
SHE
77 k
REAC

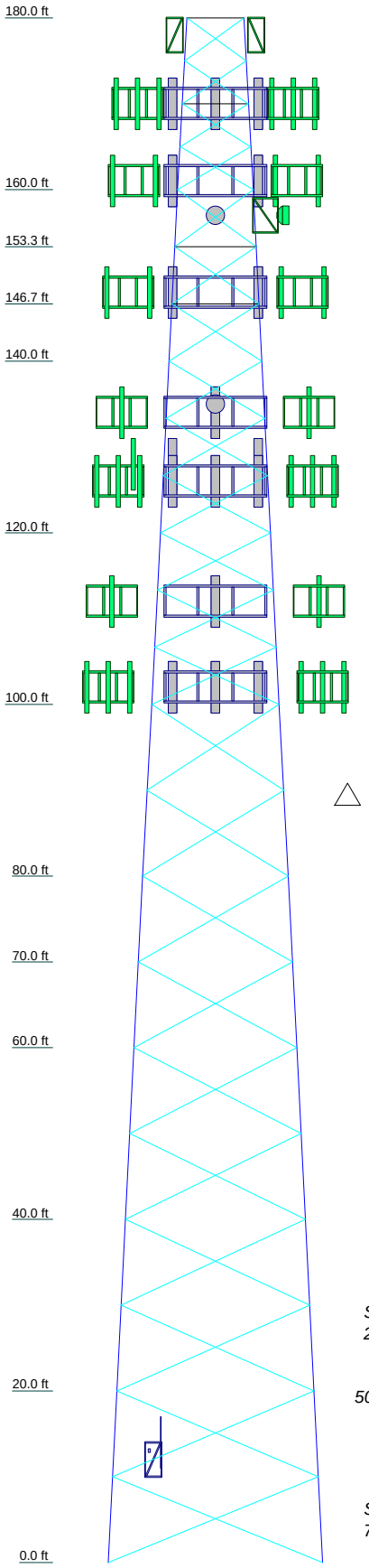
SYMBOL LIST

B+T GRP

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 82164.004.01- BRG 134 943057, CT (BU# 807133
Project:
Client: Crown Castle | Drawn by: Sudhanva | App'd:
Code: TIA-222-H | Date: 08/22/18 | Scale: NTS
Path: | Dwg No. E-1

Section	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	ROHN 8 EH	ROHN 8 EHS				ROHN 6 EH	ROHN 6 EHS	ROHN 5 EH	ROHN 4 EH			ROHN 3 EH
Leg Grade	A572-50											
Diagonals	2L4x4x5/16x3/8	L4x4x5/16	L4x4x1/4	A		L3 1/2x3 1/2x1/4	L3x3x1/4	L2 1/2x2 1/2x1/4				L2x2x3/16
Diagonal Grade	A36	A572-50		A36		A572-50		A36				
Top Girts				N.A.				L2 1/2x2 1/2x1/8		L2 1/2x2 1/2x1/8	N.A.	L2x2x1/8
Mid Girts					N.A.							L2x2x1/8
Face Width (ft)	25	23	21	19	16.9896	14.8542	12.9167	10.8333	10.1432	9.45052	8.76042	6.6875
# Panels @ (ft)	33.3	8.1	5.2	3.9	2.6	1.8	3.2	2.9	2.4	0.7	0.7	0.6	1.3
			10 @ 10					9 @ 6.66667				4 @ 5



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	2L3 1/2x3 1/2x1/4x3/8		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

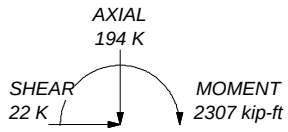
TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.27 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'
8. TIA-222-H Annex S
9. TOWER RATING: 96.4%

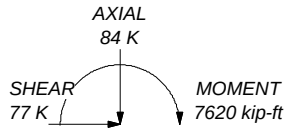
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 372 K
SHEAR: 48 K

UPLIFT: -316 K
SHEAR: 41 K



TORQUE 29 kip-ft
50 mph WIND - 1.275 in ICE



TORQUE 91 kip-ft
REACTIONS - 120 mph WIND

B+T GRP

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
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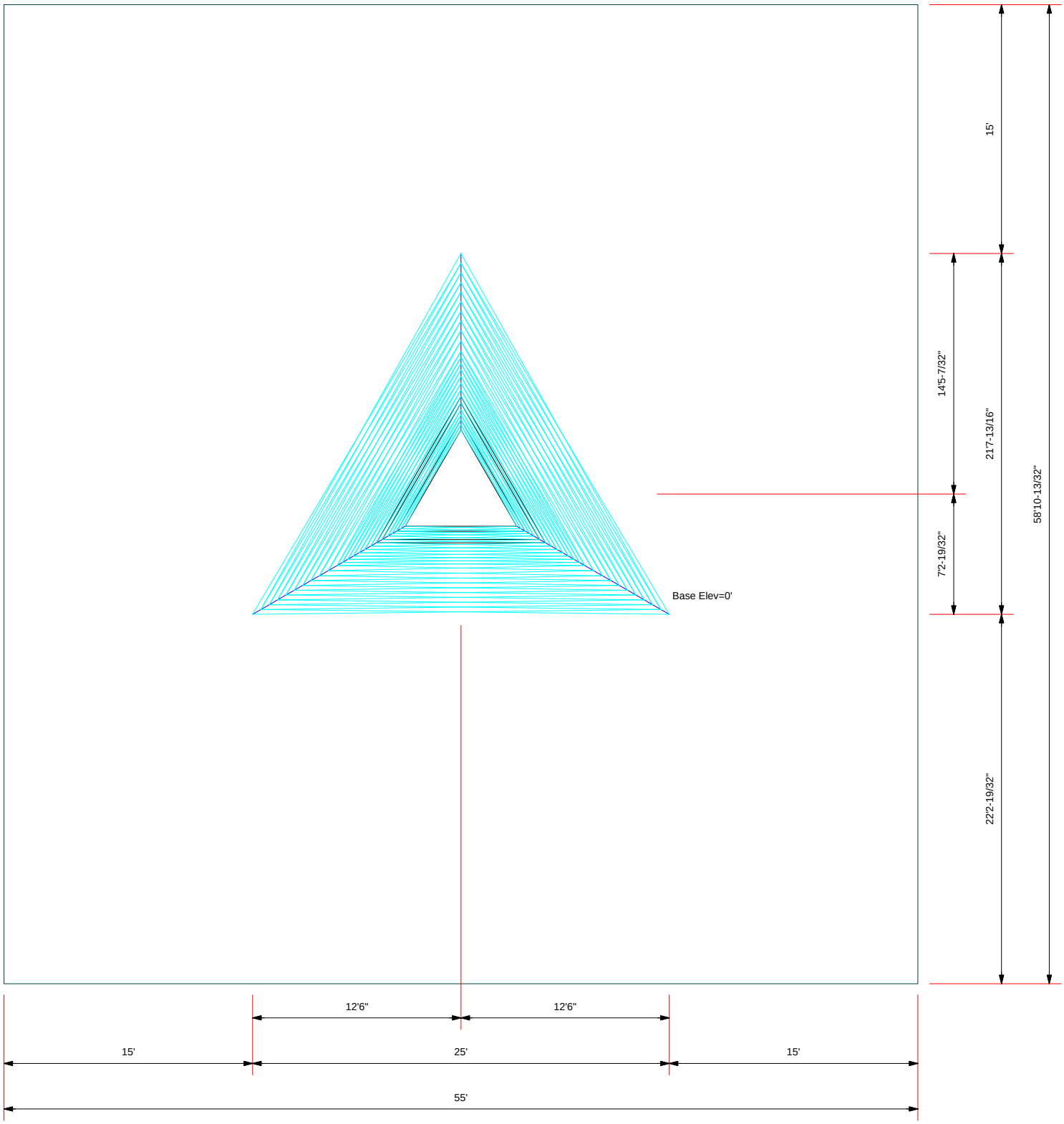
Job:	***82164.004.01- BRG 134 943057, CT (BU# 807133***		
Project:			
Client: Crown Castle	Drawn by: Sudhanva	App'd:	
Code: TIA-222-H	Date: 08/22/18	Scale: NTS	
Path:		Dwg No. E-1	

Plot Plan
Total Area - 0.07 Acres



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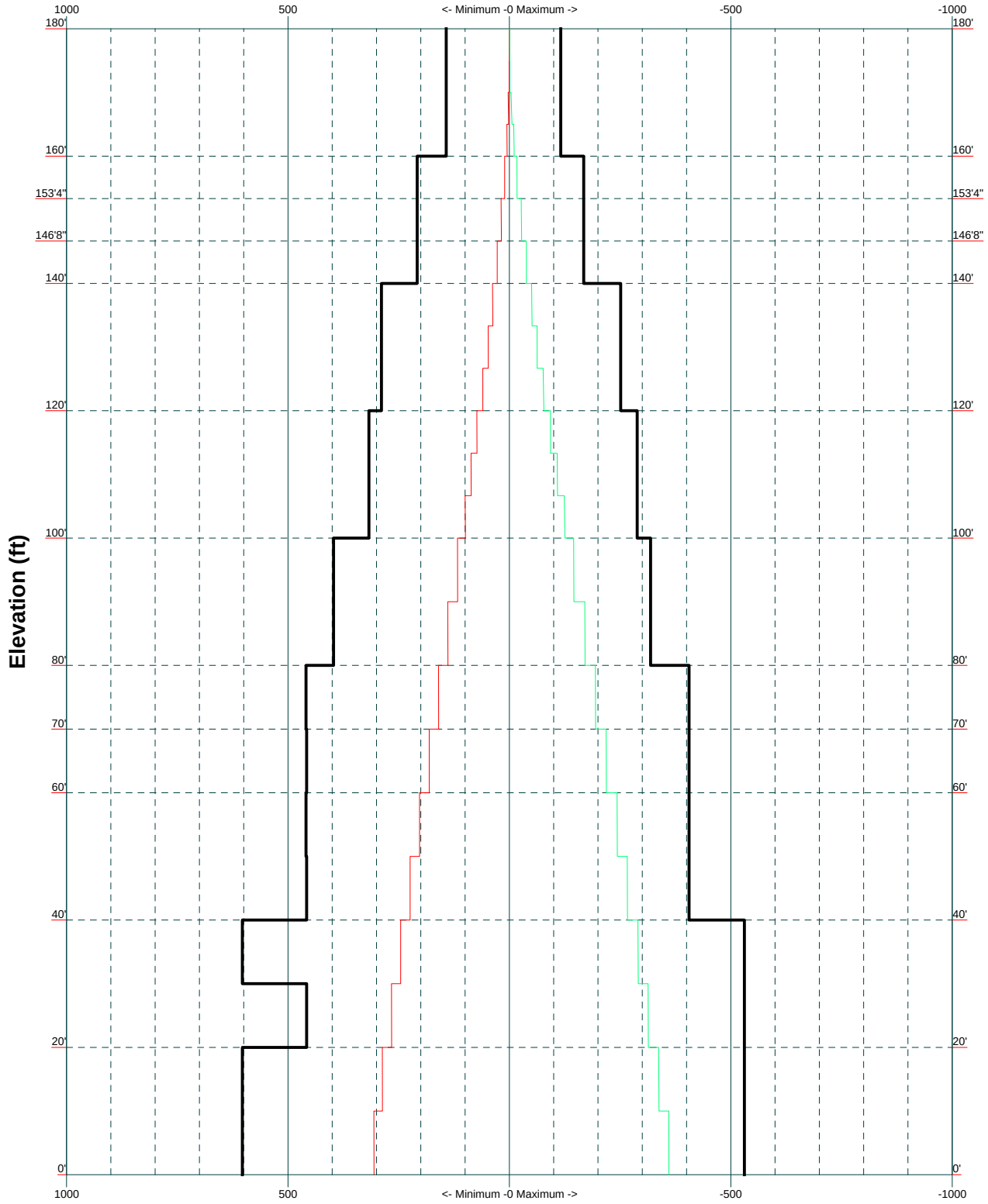
Job: ***82164.004.01- BRG 134 943057, CT (BU# 807133***		
Project:		
Client: Crown Castle	Drawn by: Sudhanva	App'd:
Code: TIA-222-H	Date: 08/22/18	Scale: NTS
Path:		Dwg No. E-2

TIA-222-H - 120 mph/50 mph 1.275 in Ice Exposure C

Leg Capacity ——— Leg Compression (K)



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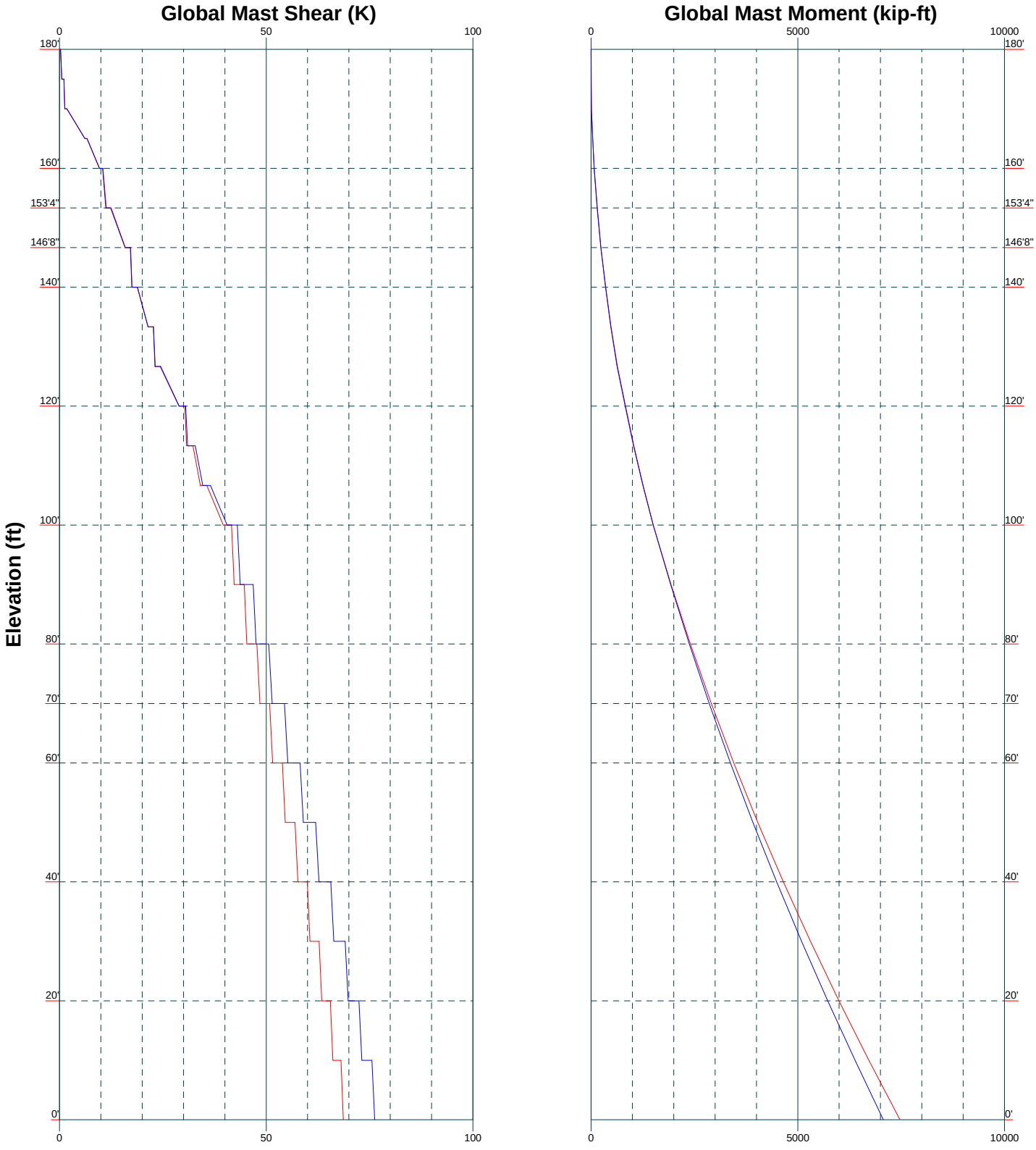
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: ***82164.004.01- BRG 134 943057, CT (BU# 807133***			
Project:			
Client: Crown Castle	Drawn by: Sudhanva	App'd:	
Code: TIA-222-H	Date: 08/22/18	Scale: NTS	
Path:		Dwg No. E-3	

TIA-222-H - 120 mph/50 mph 1.275 in Ice Exposure C

Maximum Values

Vx Vz Mx Mz



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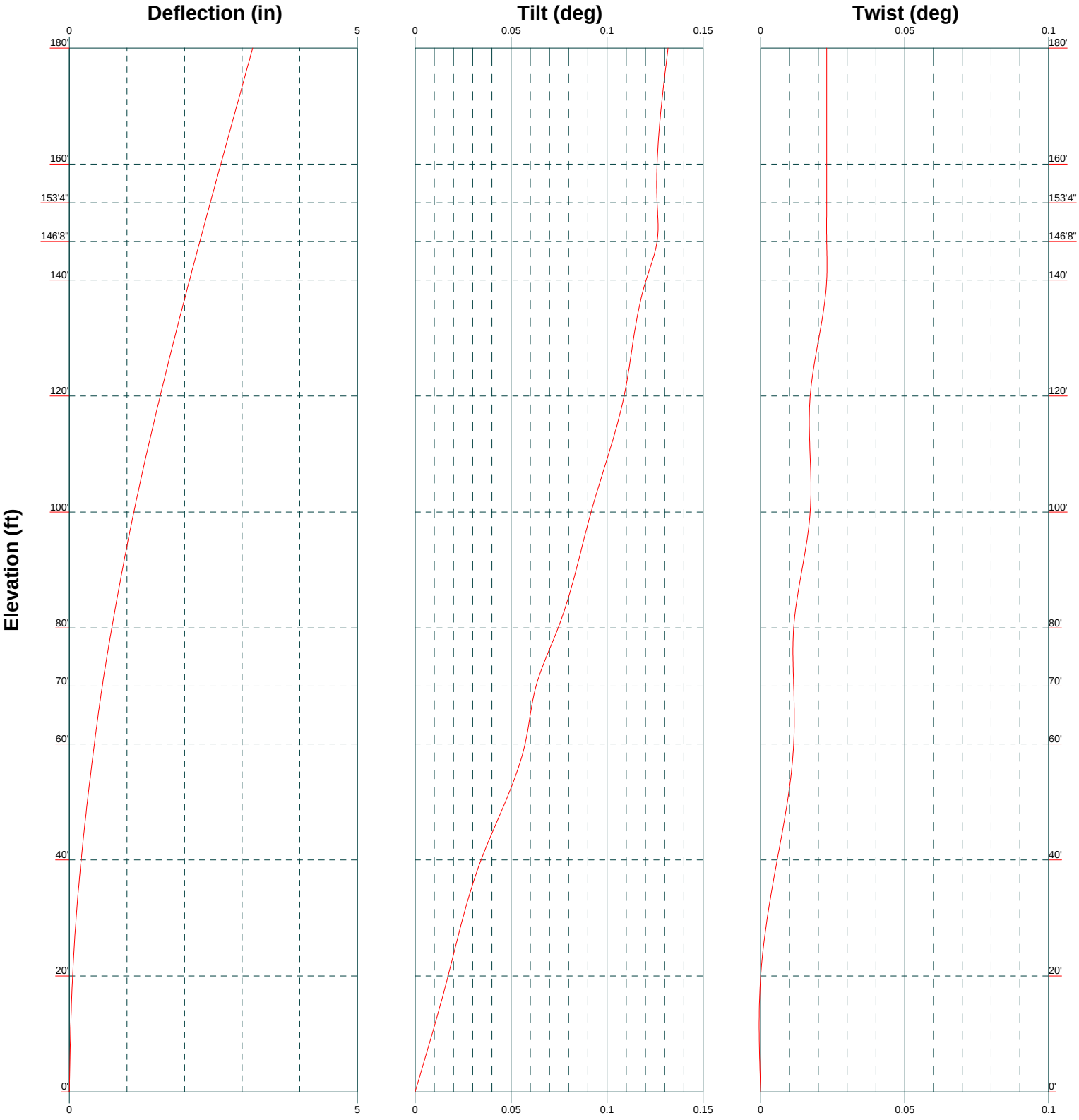
FAX: (918) 295-0265

Job: 82164.004.01- BRG 134 943057, CT (BU# 807133		
Project:		
Client: Crown Castle	Drawn by: Sudhanva	App'd:
Code: TIA-222-H	Date: 08/22/18	Scale: NTS
Path:		Dwg No. E-4

TIA-222-H - Service - 60 mph

Maximum Values



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1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
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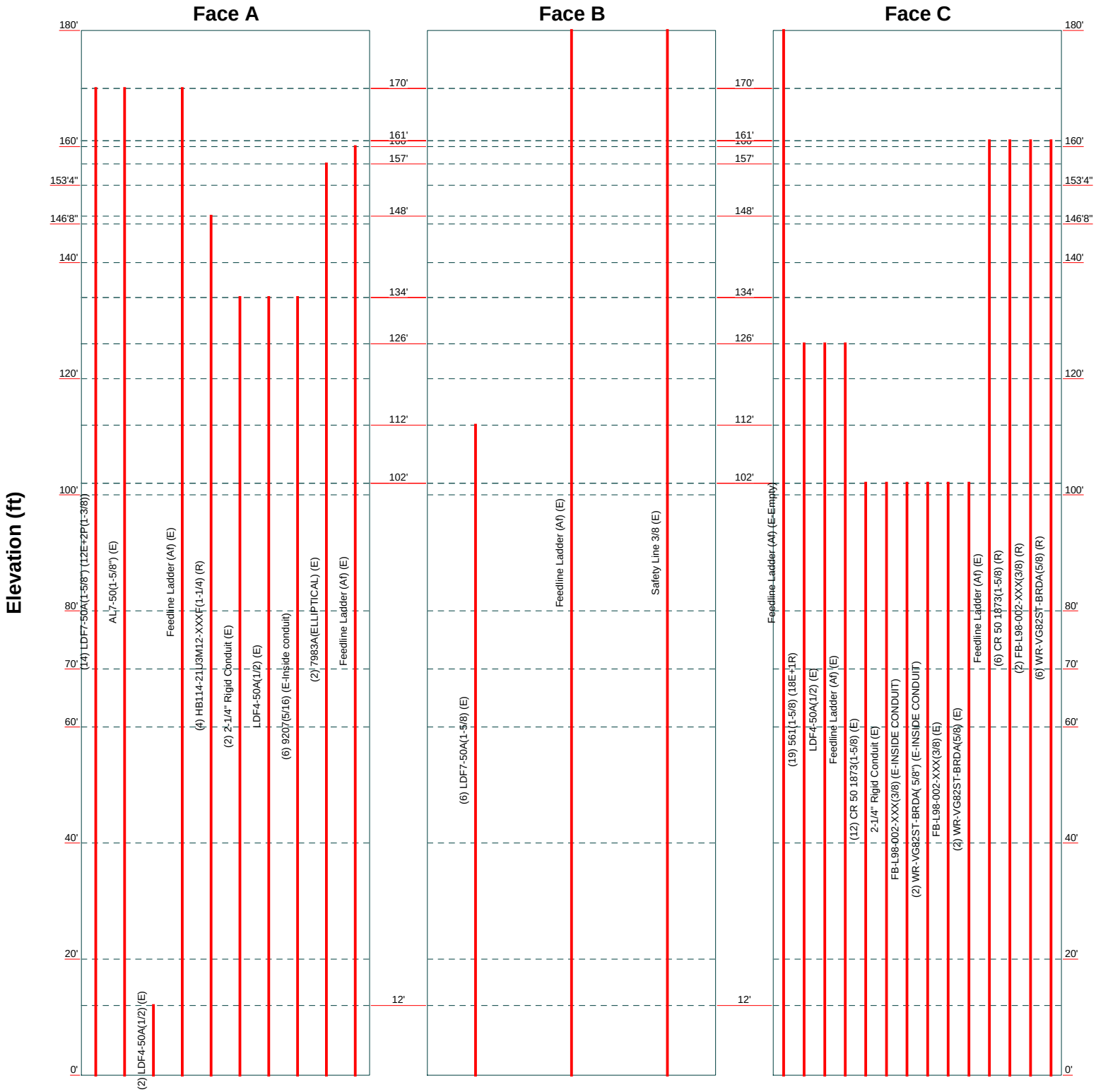
Job: ***82164.004.01- BRG 134 943057, CT (BU# 807133***			
Project:			
Client: Crown Castle	Drawn by: Sudhanva	App'd:	
Code: TIA-222-H	Date: 08/22/18	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart
0' - 180'

Round | Flat | App In Face | App Out Face | Truss Leg



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B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job:	***82164.004.01- BRG 134 943057, CT (BU# 807133***		
Project:			
Client: Crown Castle	Drawn by: Sudhanva	App'd:	
Code: TIA-222-H	Date: 08/22/18	Scale: NTS	
Path:		Dwg No. E-7	

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180' above the ground line.
The base of the tower is set at an elevation of 0' above the ground line.
The face width of the tower is 6'8-1/4" at the top and 25' at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower is located in Fairfield County, Connecticut.
Tower base elevation above sea level: 61'.
Basic wind speed of 120 mph.
Risk Category II.
Exposure Category C.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height 0'.
Nominal ice thickness of 1.275 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
TIA-222-H Annex S.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.05.
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

B+T Group
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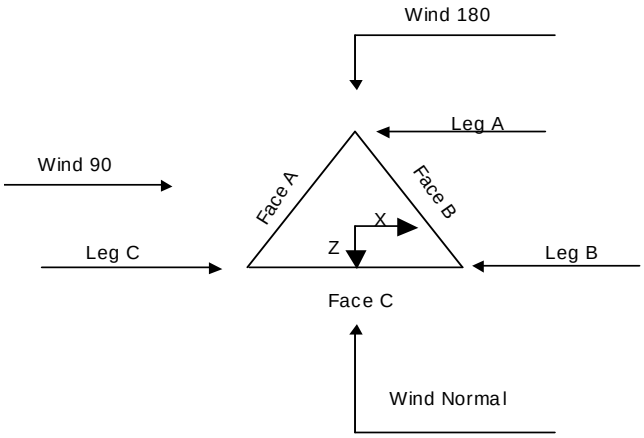

Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	180'-160'			6'8-1/4"	1	20'
T2	160'-153'4"			8'9-1/8"	1	6'8"
T3	153'4"-146'8"			9'5-13/32"	1	6'8"
T4	146'8"-140'			10'1-23/32"	1	6'8"
T5	140'-120'			10'10"	1	20'
T6	120'-100'			12'11"	1	20'
T7	100'-80'			14'10-1/4"	1	20'
T8	80'-70'			16'11-7/8"	1	10'
T9	70'-60'			17'11-15/16"	1	10'
T10	60'-40'			19'	1	20'
T11	40'-20'			21'	1	20'
T12	20'-0'			23'	1	20'

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	180'-160'	5'	X Brace	No	No	0.000	0.000
T2	160'-153'4"	6'8"	X Brace	No	No	0.000	0.000
T3	153'4"-146'8"	6'8"	X Brace	No	No	0.000	0.000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T4	146'8"-140'	6'8"	X Brace	No	No	0.000	0.000
T5	140'-120'	6'8"	X Brace	No	No	0.000	0.000
T6	120'-100'	6'8"	X Brace	No	No	0.000	0.000
T7	100'-80'	10'	X Brace	No	No	0.000	0.000
T8	80'-70'	10'	X Brace	No	No	0.000	0.000
T9	70'-60'	10'	X Brace	No	No	0.000	0.000
T10	60'-40'	10'	X Brace	No	No	0.000	0.000
T11	40'-20'	10'	X Brace	No	No	0.000	0.000
T12	20'-0'	10'	X Brace	No	No	0.000	0.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180'-160'	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T2 160'-153'4"	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T3 153'4"-146'8"	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T4 146'8"-140'	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T5 140'-120'	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T6 120'-100'	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Single Angle	L3x3x1/4	A572-50 (50 ksi)
T7 100'-80'	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T8 80'-70'	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T9 70'-60'	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Double Equal Angle	2L3 1/2x3 1/2x1/4x3/8	A36 (36 ksi)
T10 60'-40'	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Single Angle	L4x4x1/4	A572-50 (50 ksi)
T11 40'-20'	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Single Angle	L4x4x5/16	A572-50 (50 ksi)
T12 20'-0'	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Double Equal Angle	2L4x4x5/16x3/8	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 180'-160'	Equal Angle	L2x2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T3 153'4"-146'8"	Equal Angle	L2 1/2x2 1/2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T4 146'8"-140'	Single Angle	L2 1/2x2 1/2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 180'-160'	1	Equal Angle	L2x2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

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
T1 180'-160'	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T2 160'-153'4"	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T3 153'4"-146'8"	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T4 146'8"-140'	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T5 140'-120'	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T6 120'-100'	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T7 100'-80'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T8 80'-70'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T9 70'-60'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	120.000	Mid-Pt	Mid-Pt
T10 60'-40'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T11 40'-20'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T12 20'-0'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	152.750	Mid-Pt	Mid-Pt

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 180'-160'	Yes	No	1	1	1	1	1	1	1	1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
				1	1	1	1	1	1	1
T2 160'-153'4"	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T3 153'4"-146'8"	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T4 146'8"-140'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T5 140'-120'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T6 120'-100'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T7 100'-80'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T8 80'-70'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T9 70'-60'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T10 60'-40'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T11 40'-20'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T12 20'-0'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 180'-160'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 160'-153'4"	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 153'4"-146'8"	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 146'8"-140'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 140'-120'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 120'-100'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 100'-80'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 80'-70'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T9 70'-60'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T10 60'-40'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T11 40'-20'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T12 20'-0'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 180'-160'	Flange	0.875 A325N	4	0.625 A325N	1	0.625 A325N	1	0.000 A325X	0	0.625 A325N	1	0.625 A325X	0	0.625 A325N	0
T2 160'-153'4"	Flange	0.000 A325N	0	0.625 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T3 153'4"-146'8"	Flange	0.000 A325N	0	0.625 A325N	1	0.625 A325N	1	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T4 146'8"-140'	Flange	1.000 A325N	4	0.625 A325N	1	0.625 A325N	1	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T5 140'-120'	Flange	1.000 A325N	6	0.625 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T6 120'-100'	Flange	1.000 A325N	6	0.625 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T7 100'-80'	Flange	1.000 A325N	8	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T8 80'-70'	Flange	0.000 A325N	0	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T9 70'-60'	Flange	1.000 A325N	8	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T10 60'-40'	Flange	1.000 A325N	8	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T11 40'-20'	Flange	1.000 A325N	8	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T12 20'-0'	Flange	1.000 A449	0	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
LDF7-50A(1-5/8) (E)	B	No	No	Ar (CaAa)	112' - 0'	0.000	0.36	6	6	0.850 0.750	1.980		0.001
Feedline Ladder (Af) (E) ***	B	No	No	Af (CaAa)	180' - 0'	0.000	0.38	1	1	3.000	3.000		0.008
LDF7-50A(1-5/8") (12E+2P(1-3/8))	A	No	No	Ar (CaAa)	170' - 0'	0.000	0	14	9	2.000 0.750	1.980		0.001
AL7-50(1-5/8") (E)	A	No	No	Ar (CaAa)	170' - 0'	5.500	-0.05	1	1	1.980	1.980		0.001
LDF4-50A(1/2) (E)	A	No	No	Ar (CaAa)	12' - 0'	0.000	0.06	2	2	0.500	0.630		0.000
Feedline Ladder (Af) (E) ***	A	No	No	Af (CaAa)	170' - 0'	0.000	0	1	1	3.000	3.000		0.008
HB114-21U3	A	No	No	Ar (CaAa)	148' - 0'	0.000	-0.35	4	2	0.850	1.540		0.001

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
M12-XXXF(1-1/4) (R) ***										0.750			
2-1/4" Rigid Conduit (E)	A	No	No	Ar (CaAa)	134' - 0'	0.000	-0.38	2	2	0.850 0.750	2.250		0.003
LDF4-50A(1/2) (E)	A	No	No	Ar (CaAa)	134' - 0'	0.000	-0.395	1	1	0.630	0.630		0.000
9207(5/16) (E-Inside conduit)	A	No	No	Ar (CaAa)	134' - 0'	0.000	-0.38	6	6	0.200	0.330		0.001
7983A(ELLIPTICAL) (E)	A	No	No	Ar (CaAa)	157' - 0'	0.000	-0.405	2	1	0.500	0.573		0.000
Feedline Ladder (Af) (E) ***	A	No	No	Af (CaAa)	160' - 0'	0.000	-0.36	1	1	3.000	3.000		0.008
Feedline Ladder (Af) (E-Empty) ***	C	No	No	Af (CaAa)	180' - 0'	0.000	-0.4	1	1	3.000	3.000		0.008
561(1-5/8) (18E+1R)	C	No	No	Ar (CaAa)	126' - 0'	-3.000	-0.4	19	12	1.000	1.625		0.001
LDF4-50A(1/2) (E)	C	No	No	Ar (CaAa)	126' - 0'	-1.000	-0.455	1	1	0.500	0.630		0.000
Feedline Ladder (Af) (E) ***	C	No	No	Af (CaAa)	126' - 0'	-1.000	-0.4	1	1	3.000	3.000		0.008
CR 50 1873(1-5/8) (E)	C	No	No	Ar (CaAa)	102' - 0'	0.000	0.42	12	8	0.750	1.980		0.001
2-1/4" Rigid Conduit (E)	C	No	No	Ar (CaAa)	102' - 0'	2.500	0.43	1	1	2.250	2.250		0.003
FB-L98-002-XXX(3/8) (E-INSIDE CONDUIT)	C	No	No	Ar (CaAa)	102' - 0'	2.500	0.43	1	1	0.394	0.394		0.000
WR-VG82ST-BRDA(5/8") (E-INSIDE CONDUIT)	C	No	No	Ar (CaAa)	102' - 0'	2.500	0.43	2	2	0.500	0.645		0.000
FB-L98-002-XXX(3/8) (E)	C	No	No	Ar (CaAa)	102' - 0'	1.200	0.37	1	1	0.850 0.750	0.394		0.000
WR-VG82ST-BRDA(5/8) (E)	C	No	No	Ar (CaAa)	102' - 0'	0.000	0.37	2	2	0.500	0.645		0.000
Feedline Ladder (Af) (E) ***	C	No	No	Af (CaAa)	161' - 0'	0.000	0.4	1	1	3.000	3.000		0.008
CR 50 1873(1-5/8) (R)	C	No	No	Ar (CaAa)	161' - 0'	0.000	0.34	6	3	0.850 0.750	1.980		0.001

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
FB-L98-002-XXX(3/8) (R)	C	No	No	Ar (CaAa)	161' - 0'	0.000	0.36	2	1	0.500	0.394		0.000
WR-VG82ST-BRDA(5/8) (R)	C	No	No	Ar (CaAa)	161' - 0'	4.500	0.34	6	6	0.500	0.645		0.000
***													
Safety Line 3/8 (E)	B	No	No	Ar (CaAa)	180' - 0'	0.000	0.5	1	1	0.375	0.375		0.000
***													

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 klf
***								

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
T1	180'-160'	A	0.000	0.000	34.700	0.000	0.204
		B	0.000	0.000	10.750	0.000	0.172
		C	0.000	0.000	12.154	0.000	0.183
T2	160'-153'4"	A	0.000	0.000	26.887	0.000	0.193
		B	0.000	0.000	3.583	0.000	0.057
		C	0.000	0.000	17.692	0.000	0.158
T3	153'4"-146'8"	A	0.000	0.000	28.052	0.000	0.200
		B	0.000	0.000	3.583	0.000	0.057
		C	0.000	0.000	17.692	0.000	0.158
T4	146'8"-140'	A	0.000	0.000	31.337	0.000	0.226
		B	0.000	0.000	3.583	0.000	0.057
		C	0.000	0.000	17.692	0.000	0.158
T5	140'-120'	A	0.000	0.000	103.966	0.000	0.813
		B	0.000	0.000	10.750	0.000	0.172
		C	0.000	0.000	74.978	0.000	0.680
T6	120'-100'	A	0.000	0.000	108.232	0.000	0.872
		B	0.000	0.000	25.006	0.000	0.231
		C	0.000	0.000	131.960	0.000	1.188
T7	100'-80'	A	0.000	0.000	108.232	0.000	0.872
		B	0.000	0.000	34.510	0.000	0.271
		C	0.000	0.000	184.840	0.000	1.445
T8	80'-70'	A	0.000	0.000	54.116	0.000	0.436
		B	0.000	0.000	17.255	0.000	0.135
		C	0.000	0.000	92.420	0.000	0.723
T9	70'-60'	A	0.000	0.000	54.116	0.000	0.436

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
		B	0.000	0.000	17.255	0.000	0.135
		C	0.000	0.000	92.420	0.000	0.723
T10	60'-40'	A	0.000	0.000	108.232	0.000	0.872
		B	0.000	0.000	34.510	0.000	0.271
		C	0.000	0.000	184.840	0.000	1.445
T11	40'-20'	A	0.000	0.000	108.232	0.000	0.872
		B	0.000	0.000	34.510	0.000	0.271
		C	0.000	0.000	184.840	0.000	1.445
T12	20'-0'	A	0.000	0.000	109.744	0.000	0.876
		B	0.000	0.000	34.510	0.000	0.271
		C	0.000	0.000	184.840	0.000	1.445

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
T1	180'-160'	A	1.502	0.000	0.000	60.018	0.000	1.060
		B		0.000	0.000	22.767	0.000	0.448
		C		0.000	0.000	20.394	0.000	0.441
T2	160'-153'4"	A	1.490	0.000	0.000	47.948	0.000	0.855
		B		0.000	0.000	7.556	0.000	0.148
		C		0.000	0.000	34.456	0.000	0.566
T3	153'4"-146'8"	A	1.483	0.000	0.000	51.696	0.000	0.900
		B		0.000	0.000	7.539	0.000	0.148
		C		0.000	0.000	34.394	0.000	0.564
T4	146'8"-140'	A	1.477	0.000	0.000	58.080	0.000	0.996
		B		0.000	0.000	7.521	0.000	0.147
		C		0.000	0.000	34.330	0.000	0.562
T5	140'-120'	A	1.462	0.000	0.000	207.634	0.000	3.402
		B		0.000	0.000	22.449	0.000	0.438
		C		0.000	0.000	135.110	0.000	2.333
T6	120'-100'	A	1.438	0.000	0.000	220.940	0.000	3.545
		B		0.000	0.000	51.680	0.000	0.811
		C		0.000	0.000	221.520	0.000	3.993
T7	100'-80'	A	1.410	0.000	0.000	219.522	0.000	3.492
		B		0.000	0.000	70.895	0.000	1.047
		C		0.000	0.000	323.254	0.000	5.350
T8	80'-70'	A	1.384	0.000	0.000	109.129	0.000	1.723
		B		0.000	0.000	35.268	0.000	0.516
		C		0.000	0.000	160.677	0.000	2.641
T9	70'-60'	A	1.364	0.000	0.000	108.641	0.000	1.705
		B		0.000	0.000	35.130	0.000	0.510
		C		0.000	0.000	159.943	0.000	2.614
T10	60'-40'	A	1.329	0.000	0.000	215.529	0.000	3.346
		B		0.000	0.000	69.763	0.000	1.000
		C		0.000	0.000	317.251	0.000	5.134
T11	40'-20'	A	1.263	0.000	0.000	212.247	0.000	3.228
		B		0.000	0.000	68.834	0.000	0.962
		C		0.000	0.000	312.317	0.000	4.960
T12	20'-0'	A	1.132	0.000	0.000	213.175	0.000	3.047
		B		0.000	0.000	66.992	0.000	0.889
		C		0.000	0.000	302.538	0.000	4.624

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	180'-160'	-0.002	-0.881	2.296	0.820
T2	160'-153'4"	-11.361	1.034	-11.621	4.428
T3	153'4"-146'8"	-11.297	1.252	-12.202	4.687
T4	146'8"-140'	-13.098	1.886	-14.142	5.373
T5	140'-120'	-10.601	3.906	-12.611	8.086
T6	120'-100'	0.139	7.658	-3.047	12.156
T7	100'-80'	-8.427	11.937	-11.315	17.405
T8	80'-70'	-8.867	12.527	-11.910	18.292
T9	70'-60'	-9.249	13.089	-12.399	19.058
T10	60'-40'	-9.444	13.372	-12.821	19.739
T11	40'-20'	-10.074	14.296	-13.570	20.900
T12	20'-0'	-10.820	14.882	-14.399	20.909

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	2	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T1	5	LDF7-50A(1-5/8")	160.00 - 170.00	0.6000	0.6000
T1	7	AL7-50(1-5/8")	160.00 - 170.00	0.6000	0.6000
T1	9	Feedline Ladder (Af)	160.00 - 170.00	0.6000	0.6000
T1	21	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T1	35	Feedline Ladder (Af)	160.00 - 161.00	0.6000	0.6000
T1	37	CR 50 1873(1-5/8)	160.00 - 161.00	0.6000	0.6000
T1	38	FB-L98-002-XXX(3/8)	160.00 - 161.00	0.6000	0.6000
T1	39	WR-VG82ST-BRDA(5/8)	160.00 - 161.00	0.6000	0.6000
T1	41	Safety Line 3/8	160.00 - 180.00	0.6000	0.6000
T2	2	Feedline Ladder (Af)	153.33 - 160.00	0.6000	0.6000
T2	5	LDF7-50A(1-5/8")	153.33 - 160.00	0.6000	0.6000
T2	7	AL7-50(1-5/8")	153.33 - 160.00	0.6000	0.6000
T2	9	Feedline Ladder (Af)	153.33 - 160.00	0.6000	0.6000
T2	18	7983A(ELLIPTICAL)	153.33 - 157.00	0.6000	0.6000
T2	19	Feedline Ladder (Af)	153.33 - 160.00	0.6000	0.6000
T2	21	Feedline Ladder (Af)	153.33 - 160.00	0.6000	0.6000
T2	35	Feedline Ladder (Af)	153.33 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T2	37	CR 50 1873(1-5/8)	160.00 153.33 - 160.00	0.6000	0.6000
T2	38	FB-L98-002-XXX(3/8)	153.33 - 160.00	0.6000	0.6000
T2	39	WR-VG82ST-BRDA(5/8)	153.33 - 160.00	0.6000	0.6000
T2	41	Safety Line 3/8	153.33 - 160.00	0.6000	0.6000
T3	2	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	5	LDF7-50A(1-5/8")	146.67 - 153.33	0.6000	0.6000
T3	7	AL7-50(1-5/8")	146.67 - 153.33	0.6000	0.6000
T3	9	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	12	HB114-21U3M12-XXXF(1-1/4)	146.67 - 148.00	0.6000	0.6000
T3	18	7983A(ELLIPTICAL)	146.67 - 153.33	0.6000	0.6000
T3	19	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	21	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	35	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	37	CR 50 1873(1-5/8)	146.67 - 153.33	0.6000	0.6000
T3	38	FB-L98-002-XXX(3/8)	146.67 - 153.33	0.6000	0.6000
T3	39	WR-VG82ST-BRDA(5/8)	146.67 - 153.33	0.6000	0.6000
T3	41	Safety Line 3/8	146.67 - 153.33	0.6000	0.6000
T4	2	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	5	LDF7-50A(1-5/8")	140.00 - 146.67	0.6000	0.6000
T4	7	AL7-50(1-5/8")	140.00 - 146.67	0.6000	0.6000
T4	9	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	12	HB114-21U3M12-XXXF(1-1/4)	140.00 - 146.67	0.6000	0.6000
T4	18	7983A(ELLIPTICAL)	140.00 - 146.67	0.6000	0.6000
T4	19	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	21	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	35	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	37	CR 50 1873(1-5/8)	140.00 - 146.67	0.6000	0.6000
T4	38	FB-L98-002-XXX(3/8)	140.00 - 146.67	0.6000	0.6000
T4	39	WR-VG82ST-BRDA(5/8)	140.00 - 146.67	0.6000	0.6000
T4	41	Safety Line 3/8	140.00 - 146.67	0.6000	0.6000
T5	2	Feedline Ladder (Af)	120.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T5	5	LDF7-50A(1-5/8")	120.00 - 140.00	0.6000	0.6000
T5	7	AL7-50(1-5/8")	120.00 - 140.00	0.6000	0.6000
T5	9	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	12	HB114-21U3M12-XXXF(1-1/4)	120.00 - 140.00	0.6000	0.6000
T5	15	2-1/4" Rigid Conduit	120.00 - 134.00	0.6000	0.6000
T5	16	LDF4-50A(1/2)	120.00 - 134.00	0.6000	0.6000
T5	17	9207(5/16)	120.00 - 134.00	0.0000	0.0000
T5	18	7983A(ELLIPTICAL)	120.00 - 140.00	0.6000	0.6000
T5	19	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	21	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	23	561(1-5/8)	120.00 - 126.00	0.6000	0.6000
T5	24	LDF4-50A(1/2)	120.00 - 126.00	0.6000	0.6000
T5	27	Feedline Ladder (Af)	120.00 - 126.00	0.6000	0.6000
T5	35	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	37	CR 50 1873(1-5/8)	120.00 - 140.00	0.6000	0.6000
T5	38	FB-L98-002-XXX(3/8)	120.00 - 140.00	0.6000	0.6000
T5	39	WR-VG82ST-BRDA(5/8)	120.00 - 140.00	0.6000	0.6000
T5	41	Safety Line 3/8	120.00 - 140.00	0.6000	0.6000
T6	1	LDF7-50A(1-5/8)	100.00 - 112.00	0.6000	0.6000
T6	2	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	5	LDF7-50A(1-5/8")	100.00 - 120.00	0.6000	0.6000
T6	7	AL7-50(1-5/8")	100.00 - 120.00	0.6000	0.6000
T6	9	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	12	HB114-21U3M12-XXXF(1-1/4)	100.00 - 120.00	0.6000	0.6000
T6	15	2-1/4" Rigid Conduit	100.00 - 120.00	0.6000	0.6000
T6	16	LDF4-50A(1/2)	100.00 - 120.00	0.6000	0.6000
T6	17	9207(5/16)	100.00 - 120.00	0.0000	0.0000
T6	18	7983A(ELLIPTICAL)	100.00 - 120.00	0.6000	0.6000
T6	19	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	21	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	23	561(1-5/8)	100.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			120.00		
T6	24	LDF4-50A(1/2)	100.00 - 120.00	0.6000	0.6000
T6	27	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	29	CR 50 1873(1-5/8)	100.00 - 102.00	0.6000	0.6000
T6	30	2-1/4" Rigid Conduit	100.00 - 102.00	0.6000	0.6000
T6	31	FB-L98-002-XXX(3/8)	100.00 - 102.00	0.0000	0.0000
T6	32	WR-VG82ST-BRDA(5/8")	100.00 - 102.00	0.0000	0.0000
T6	33	FB-L98-002-XXX(3/8)	100.00 - 102.00	0.6000	0.6000
T6	34	WR-VG82ST-BRDA(5/8)	100.00 - 102.00	0.6000	0.6000
T6	35	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	37	CR 50 1873(1-5/8)	100.00 - 120.00	0.6000	0.6000
T6	38	FB-L98-002-XXX(3/8)	100.00 - 120.00	0.6000	0.6000
T6	39	WR-VG82ST-BRDA(5/8)	100.00 - 120.00	0.6000	0.6000
T6	41	Safety Line 3/8	100.00 - 120.00	0.6000	0.6000
T7	1	LDF7-50A(1-5/8)	80.00 - 100.00	0.6000	0.6000
T7	2	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	5	LDF7-50A(1-5/8")	80.00 - 100.00	0.6000	0.6000
T7	7	AL7-50(1-5/8")	80.00 - 100.00	0.6000	0.6000
T7	9	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	12	HB114-21U3M12-XXXF(1-1/4)	80.00 - 100.00	0.6000	0.6000
T7	15	2-1/4" Rigid Conduit	80.00 - 100.00	0.6000	0.6000
T7	16	LDF4-50A(1/2)	80.00 - 100.00	0.6000	0.6000
T7	17	9207(5/16)	80.00 - 100.00	0.0000	0.0000
T7	18	7983A(ELLIPTICAL)	80.00 - 100.00	0.6000	0.6000
T7	19	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	21	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	23	561(1-5/8)	80.00 - 100.00	0.6000	0.6000
T7	24	LDF4-50A(1/2)	80.00 - 100.00	0.6000	0.6000
T7	27	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	29	CR 50 1873(1-5/8)	80.00 - 100.00	0.6000	0.6000
T7	30	2-1/4" Rigid Conduit	80.00 - 100.00	0.6000	0.6000
T7	31	FB-L98-002-XXX(3/8)	80.00 - 100.00	0.0000	0.0000
T7	32	WR-VG82ST-BRDA(5/8")	80.00 - 100.00	0.0000	0.0000
T7	33	FB-L98-002-XXX(3/8)	80.00 - 100.00	0.6000	0.6000
T7	34	WR-VG82ST-BRDA(5/8)	80.00 - 100.00	0.6000	0.6000
T7	35	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	37	CR 50 1873(1-5/8)	80.00 - 100.00	0.6000	0.6000
T7	38	FB-L98-002-XXX(3/8)	80.00 - 100.00	0.6000	0.6000
T7	39	WR-VG82ST-BRDA(5/8)	80.00 - 100.00	0.6000	0.6000
T7	41	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T8	1	LDF7-50A(1-5/8)	70.00 - 80.00	0.6000	0.6000
T8	2	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	5	LDF7-50A(1-5/8")	70.00 - 80.00	0.6000	0.6000
T8	7	AL7-50(1-5/8")	70.00 - 80.00	0.6000	0.6000
T8	9	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	12	HB114-21U3M12-XXXF(1-1/4)	70.00 - 80.00	0.6000	0.6000
T8	15	2-1/4" Rigid Conduit	70.00 - 80.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T8	16	LDF4-50A(1/2)	70.00 - 80.00	0.6000	0.6000
T8	17	9207(5/16)	70.00 - 80.00	0.0000	0.0000
T8	18	7983A(ELLIPTICAL)	70.00 - 80.00	0.6000	0.6000
T8	19	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	21	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	23	561(1-5/8)	70.00 - 80.00	0.6000	0.6000
T8	24	LDF4-50A(1/2)	70.00 - 80.00	0.6000	0.6000
T8	27	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	29	CR 50 1873(1-5/8)	70.00 - 80.00	0.6000	0.6000
T8	30	2-1/4" Rigid Conduit	70.00 - 80.00	0.6000	0.6000
T8	31	FB-L98-002-XXX(3/8)	70.00 - 80.00	0.0000	0.0000
T8	32	WR-VG82ST-BRDA(5/8")	70.00 - 80.00	0.0000	0.0000
T8	33	FB-L98-002-XXX(3/8)	70.00 - 80.00	0.6000	0.6000
T8	34	WR-VG82ST-BRDA(5/8)	70.00 - 80.00	0.6000	0.6000
T8	35	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	37	CR 50 1873(1-5/8)	70.00 - 80.00	0.6000	0.6000
T8	38	FB-L98-002-XXX(3/8)	70.00 - 80.00	0.6000	0.6000
T8	39	WR-VG82ST-BRDA(5/8)	70.00 - 80.00	0.6000	0.6000
T8	41	Safety Line 3/8	70.00 - 80.00	0.6000	0.6000
T9	1	LDF7-50A(1-5/8)	60.00 - 70.00	0.6000	0.6000
T9	2	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	5	LDF7-50A(1-5/8")	60.00 - 70.00	0.6000	0.6000
T9	7	AL7-50(1-5/8")	60.00 - 70.00	0.6000	0.6000
T9	9	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	12	HB114-21U3M12-XXXF(1-1/4)	60.00 - 70.00	0.6000	0.6000
T9	15	2-1/4" Rigid Conduit	60.00 - 70.00	0.6000	0.6000
T9	16	LDF4-50A(1/2)	60.00 - 70.00	0.6000	0.6000
T9	17	9207(5/16)	60.00 - 70.00	0.0000	0.0000
T9	18	7983A(ELLIPTICAL)	60.00 - 70.00	0.6000	0.6000
T9	19	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	21	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	23	561(1-5/8)	60.00 - 70.00	0.6000	0.6000
T9	24	LDF4-50A(1/2)	60.00 - 70.00	0.6000	0.6000
T9	27	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	29	CR 50 1873(1-5/8)	60.00 - 70.00	0.6000	0.6000
T9	30	2-1/4" Rigid Conduit	60.00 - 70.00	0.6000	0.6000
T9	31	FB-L98-002-XXX(3/8)	60.00 - 70.00	0.0000	0.0000
T9	32	WR-VG82ST-BRDA(5/8")	60.00 - 70.00	0.0000	0.0000
T9	33	FB-L98-002-XXX(3/8)	60.00 - 70.00	0.6000	0.6000
T9	34	WR-VG82ST-BRDA(5/8)	60.00 - 70.00	0.6000	0.6000
T9	35	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	37	CR 50 1873(1-5/8)	60.00 - 70.00	0.6000	0.6000
T9	38	FB-L98-002-XXX(3/8)	60.00 - 70.00	0.6000	0.6000
T9	39	WR-VG82ST-BRDA(5/8)	60.00 - 70.00	0.6000	0.6000
T9	41	Safety Line 3/8	60.00 - 70.00	0.6000	0.6000
T10	1	LDF7-50A(1-5/8)	40.00 - 60.00	0.6000	0.6000
T10	2	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	5	LDF7-50A(1-5/8")	40.00 - 60.00	0.6000	0.6000
T10	7	AL7-50(1-5/8")	40.00 - 60.00	0.6000	0.6000
T10	9	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	12	HB114-21U3M12-XXXF(1-1/4)	40.00 - 60.00	0.6000	0.6000
T10	15	2-1/4" Rigid Conduit	40.00 - 60.00	0.6000	0.6000
T10	16	LDF4-50A(1/2)	40.00 - 60.00	0.6000	0.6000
T10	17	9207(5/16)	40.00 - 60.00	0.0000	0.0000
T10	18	7983A(ELLIPTICAL)	40.00 - 60.00	0.6000	0.6000
T10	19	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	21	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	23	561(1-5/8)	40.00 - 60.00	0.6000	0.6000
T10	24	LDF4-50A(1/2)	40.00 - 60.00	0.6000	0.6000
T10	27	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T10	29	CR 50 1873(1-5/8)	40.00 - 60.00	0.6000	0.6000
T10	30	2-1/4" Rigid Conduit	40.00 - 60.00	0.6000	0.6000
T10	31	FB-L98-002-XXX(3/8)	40.00 - 60.00	0.0000	0.0000
T10	32	WR-VG82ST-BRDA(5/8")	40.00 - 60.00	0.0000	0.0000
T10	33	FB-L98-002-XXX(3/8)	40.00 - 60.00	0.6000	0.6000
T10	34	WR-VG82ST-BRDA(5/8)	40.00 - 60.00	0.6000	0.6000
T10	35	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	37	CR 50 1873(1-5/8)	40.00 - 60.00	0.6000	0.6000
T10	38	FB-L98-002-XXX(3/8)	40.00 - 60.00	0.6000	0.6000
T10	39	WR-VG82ST-BRDA(5/8)	40.00 - 60.00	0.6000	0.6000
T10	41	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T11	1	LDF7-50A(1-5/8)	20.00 - 40.00	0.6000	0.6000
T11	2	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	5	LDF7-50A(1-5/8")	20.00 - 40.00	0.6000	0.6000
T11	7	AL7-50(1-5/8")	20.00 - 40.00	0.6000	0.6000
T11	9	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	12	HB114-21U3M12-XXXF(1-1/4)	20.00 - 40.00	0.6000	0.6000
T11	15	2-1/4" Rigid Conduit	20.00 - 40.00	0.6000	0.6000
T11	16	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T11	17	9207(5/16)	20.00 - 40.00	0.0000	0.0000
T11	18	7983A(ELLIPTICAL)	20.00 - 40.00	0.6000	0.6000
T11	19	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	21	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	23	561(1-5/8)	20.00 - 40.00	0.6000	0.6000
T11	24	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T11	27	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	29	CR 50 1873(1-5/8)	20.00 - 40.00	0.6000	0.6000
T11	30	2-1/4" Rigid Conduit	20.00 - 40.00	0.6000	0.6000
T11	31	FB-L98-002-XXX(3/8)	20.00 - 40.00	0.0000	0.0000
T11	32	WR-VG82ST-BRDA(5/8")	20.00 - 40.00	0.0000	0.0000
T11	33	FB-L98-002-XXX(3/8)	20.00 - 40.00	0.6000	0.6000
T11	34	WR-VG82ST-BRDA(5/8)	20.00 - 40.00	0.6000	0.6000
T11	35	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	37	CR 50 1873(1-5/8)	20.00 - 40.00	0.6000	0.6000
T11	38	FB-L98-002-XXX(3/8)	20.00 - 40.00	0.6000	0.6000
T11	39	WR-VG82ST-BRDA(5/8)	20.00 - 40.00	0.6000	0.6000
T11	41	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T12	1	LDF7-50A(1-5/8)	0.00 - 20.00	0.6000	0.6000
T12	2	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	5	LDF7-50A(1-5/8")	0.00 - 20.00	0.6000	0.6000
T12	7	AL7-50(1-5/8")	0.00 - 20.00	0.6000	0.6000
T12	8	LDF4-50A(1/2)	0.00 - 12.00	0.6000	0.6000
T12	9	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	12	HB114-21U3M12-XXXF(1-1/4)	0.00 - 20.00	0.6000	0.6000
T12	15	2-1/4" Rigid Conduit	0.00 - 20.00	0.6000	0.6000
T12	16	LDF4-50A(1/2)	0.00 - 20.00	0.6000	0.6000
T12	17	9207(5/16)	0.00 - 20.00	0.0000	0.0000
T12	18	7983A(ELLIPTICAL)	0.00 - 20.00	0.6000	0.6000
T12	19	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	21	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	23	561(1-5/8)	0.00 - 20.00	0.6000	0.6000
T12	24	LDF4-50A(1/2)	0.00 - 20.00	0.6000	0.6000
T12	27	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	29	CR 50 1873(1-5/8)	0.00 - 20.00	0.6000	0.6000
T12	30	2-1/4" Rigid Conduit	0.00 - 20.00	0.6000	0.6000
T12	31	FB-L98-002-XXX(3/8)	0.00 - 20.00	0.0000	0.0000
T12	32	WR-VG82ST-BRDA(5/8")	0.00 - 20.00	0.0000	0.0000
T12	33	FB-L98-002-XXX(3/8)	0.00 - 20.00	0.6000	0.6000
T12	34	WR-VG82ST-BRDA(5/8)	0.00 - 20.00	0.6000	0.6000
T12	35	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T12	37	CR 50 1873(1-5/8)	0.00 - 20.00	0.6000	0.6000
T12	38	FB-L98-002-XXX(3/8)	0.00 - 20.00	0.6000	0.6000
T12	39	WR-VG82ST-BRDA(5/8)	0.00 - 20.00	0.6000	0.6000
T12	41	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000

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
Side Arm Mount [SO 305-1]	B	From Leg	1.500 0' 0'	0.000	178'	No Ice 1/2" Ice 1" Ice 2" Ice	0.940 1.480 2.020 3.100	1.410 2.170 2.930 4.450	0.030 0.043 0.057 0.083
(E)									
Side Arm Mount [SO 305-1]	C	From Leg	1.500 0' 0'	0.000	178'	No Ice 1/2" Ice 1" Ice 2" Ice	0.940 1.480 2.020 3.100	1.410 2.170 2.930 4.450	0.030 0.043 0.057 0.083
(E)									
S									
AIR 32 B2a/B66Aa w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	6.747 7.202 7.648 8.565	6.070 6.867 7.583 9.063	0.153 0.214 0.282 0.441
(E)									
AIR 32 B2a/B66Aa w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	6.747 7.202 7.648 8.565	6.070 6.867 7.583 9.063	0.153 0.214 0.282 0.441
(E)									
AIR 32 B2a/B66Aa w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	6.747 7.202 7.648 8.565	6.070 6.867 7.583 9.063	0.153 0.214 0.282 0.441
(E)									
(2) KRY 112 144/1	A	From Leg	4.000 0' 2'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	0.350 0.426 0.509 0.698	0.175 0.234 0.301 0.456	0.011 0.014 0.019 0.032
(E)									
KRY 112 144/1	A	From Leg	4.000 0' 3'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	0.350 0.426 0.509 0.698	0.175 0.234 0.301 0.456	0.011 0.014 0.019 0.032
(E)									
AIR 3246 B66 w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	8.177 8.656 9.124 10.086	6.559 7.393 8.128 9.646	0.201 0.272 0.349 0.529
(P)									
AIR 3246 B66 w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	8.177 8.656 9.124 10.086	6.559 7.393 8.128 9.646	0.201 0.272 0.349 0.529
(P)									
AIR 3246 B66 w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	8.177 8.656 9.124 10.086	6.559 7.393 8.128 9.646	0.201 0.272 0.349 0.529
(P)									

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVAARR24_43-U-NA20 w/ Mount Pipe (P)	A	From Leg	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	20.480 21.231 21.990 23.444	11.024 12.550 14.099 16.451	0.161 0.297 0.444 0.775
APXVAARR24_43-U-NA20 w/ Mount Pipe (P)	B	From Leg	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	20.480 21.231 21.990 23.444	11.024 12.550 14.099 16.451	0.161 0.297 0.444 0.775
APXVAARR24_43-U-NA20 w/ Mount Pipe (P)	C	From Leg	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	20.480 21.231 21.990 23.444	11.024 12.550 14.099 16.451	0.161 0.297 0.444 0.775
(2) RADIO 4449 B12/B71 (P)	B	From Leg	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	1.650 1.810 1.978 2.336	1.300 1.445 1.597 1.924	0.075 0.092 0.112 0.161
RADIO 4449 B12/B71 (P)	C	From Leg	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	1.650 1.810 1.978 2.336	1.300 1.445 1.597 1.924	0.075 0.092 0.112 0.161
6' x 2" Mount Pipe (E)	A	From Leg	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.022 0.033 0.048 0.090
6' x 2" Mount Pipe (E)	B	From Leg	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.022 0.033 0.048 0.090
6' x 2" Mount Pipe (E)	C	From Leg	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.022 0.033 0.048 0.090
Sector Mount [SM 702-3] (E)	C	None		0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	37.400 54.200 71.000 104.600	37.400 54.200 71.000 104.600	1.551 2.352 3.153 4.755
S									
HPA-65R-BUU-H6 (R)	A	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	9.658 10.128 10.606 11.583	6.450 6.913 7.384 8.308	0.051 0.114 0.183 0.342
HPA-65R-BUU-H6 (R)	B	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	9.658 10.128 10.606 11.583	6.450 6.913 7.384 8.308	0.051 0.114 0.183 0.342
SBNHH-1D65A (R)	C	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	5.716 6.078 6.446 7.204	3.864 4.220 4.572 5.285	0.041 0.079 0.122 0.224
QS66512-2 (R)	A	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	2.600 3.500 4.400 6.200	5.000 6.700 8.400 11.800	0.111 0.148 0.185 0.259
QS66512-2 (R)	B	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	2.600 3.500 4.400 6.200	5.000 6.700 8.400 11.800	0.111 0.148 0.185 0.259

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
QS46512-2	C	From Leg	4.000	0.000	161'	No Ice	5.553	4.609	0.104
(R)			0'			1/2" Ice	5.901	4.945	0.147
			0'			1" Ice	6.255	5.287	0.194
						2" Ice	6.985	5.993	0.305
RRUS 4426 B66	A	From Leg	4.000	0.000	161'	No Ice	1.644	0.725	0.048
(R)			0'			1/2" Ice	1.804	0.842	0.061
			0'			1" Ice	1.972	0.969	0.076
						2" Ice	2.329	1.244	0.115
RRUS 4426 B66	B	From Leg	4.000	0.000	161'	No Ice	1.644	0.725	0.048
(R)			0'			1/2" Ice	1.804	0.842	0.061
			0'			1" Ice	1.972	0.969	0.076
						2" Ice	2.329	1.244	0.115
RRUS 4426 B66	C	From Leg	4.000	0.000	161'	No Ice	1.644	0.725	0.048
(R)			0'			1/2" Ice	1.804	0.842	0.061
			0'			1" Ice	1.972	0.969	0.076
						2" Ice	2.329	1.244	0.115
RRUS 11	A	From Leg	4.000	0.000	161'	No Ice	2.784	1.187	0.048
(R)			0'			1/2" Ice	2.992	1.334	0.068
			0'			1" Ice	3.207	1.490	0.092
						2" Ice	3.658	1.833	0.150
RRUS 11	B	From Leg	4.000	0.000	161'	No Ice	2.784	1.187	0.048
(R)			0'			1/2" Ice	2.992	1.334	0.068
			0'			1" Ice	3.207	1.490	0.092
						2" Ice	3.658	1.833	0.150
RRUS 11	C	From Leg	4.000	0.000	161'	No Ice	2.784	1.187	0.048
(R)			0'			1/2" Ice	2.992	1.334	0.068
			0'			1" Ice	3.207	1.490	0.092
						2" Ice	3.658	1.833	0.150
RRUS 32	A	From Leg	4.000	0.000	161'	No Ice	2.857	1.777	0.055
(R)			0'			1/2" Ice	3.083	1.968	0.077
			0'			1" Ice	3.316	2.166	0.103
						2" Ice	3.805	2.583	0.165
RRUS 32	B	From Leg	4.000	0.000	161'	No Ice	2.857	1.777	0.055
(R)			0'			1/2" Ice	3.083	1.968	0.077
			0'			1" Ice	3.316	2.166	0.103
						2" Ice	3.805	2.583	0.165
RRUS 32	C	From Leg	4.000	0.000	161'	No Ice	2.857	1.777	0.055
(R)			0'			1/2" Ice	3.083	1.968	0.077
			0'			1" Ice	3.316	2.166	0.103
						2" Ice	3.805	2.583	0.165
RRUS 32 B2	B	From Leg	4.000	0.000	161'	No Ice	2.731	1.668	0.053
(R)			0'			1/2" Ice	2.953	1.855	0.074
			0'			1" Ice	3.182	2.049	0.098
						2" Ice	3.663	2.458	0.157
RRUS 32 B2	A	From Leg	4.000	0.000	161'	No Ice	2.731	1.668	0.053
(R)			0'			1/2" Ice	2.953	1.855	0.074
			0'			1" Ice	3.182	2.049	0.098
						2" Ice	3.663	2.458	0.157
RRUS 32 B2	C	From Leg	4.000	0.000	161'	No Ice	2.731	1.668	0.053
(R)			0'			1/2" Ice	2.953	1.855	0.074
			0'			1" Ice	3.182	2.049	0.098
						2" Ice	3.663	2.458	0.157
RRUS 12	A	From Leg	4.000	0.000	161'	No Ice	3.145	1.285	0.058
(R)			0'			1/2" Ice	3.365	1.438	0.081
			0'			1" Ice	3.592	1.600	0.108
						2" Ice	4.069	1.954	0.171
RRUS 12	B	From Leg	4.000	0.000	161'	No Ice	3.145	1.285	0.058

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(R)			0'			1/2" Ice	3.365	1.438	0.081
			0'			1" Ice	3.592	1.600	0.108
						2" Ice	4.069	1.954	0.171
RRUS 12	C	From Leg	4.000	0.000	161'	No Ice	3.145	1.285	0.058
(R)			0'			1/2" Ice	3.365	1.438	0.081
			0'			1" Ice	3.592	1.600	0.108
						2" Ice	4.069	1.954	0.171
(2) DC6-48-60-18-8F	A	From Leg	4.000	0.000	161'	No Ice	0.917	0.917	0.019
(R)			0'			1/2" Ice	1.458	1.458	0.037
			0'			1" Ice	1.643	1.643	0.057
						2" Ice	2.042	2.042	0.105
DC6-48-60-18-8F	B	From Leg	4.000	0.000	161'	No Ice	0.917	0.917	0.019
(R)			0'			1/2" Ice	1.458	1.458	0.037
			0'			1" Ice	1.643	1.643	0.057
						2" Ice	2.042	2.042	0.105
Sector Mount [SM 201-3]	C	None		0.000	161'	No Ice	26.690	26.690	1.083
(R-w/ 4 M.Pipes)						1/2" Ice	37.600	37.600	1.490
						1" Ice	48.510	48.510	1.896
						2" Ice	70.330	70.330	2.709
S									
Side Arm Mount [SO 203-1]	A	From Leg	1.500	0.000	157'	No Ice	2.960	3.360	0.125
(E)			0'			1/2" Ice	4.100	4.680	0.154
			0'			1" Ice	5.240	6.000	0.182
						2" Ice	7.520	8.640	0.239
Side Arm Mount [SO 203-1]	B	From Leg	1.500	0.000	157'	No Ice	2.960	3.360	0.125
(E)			0'			1/2" Ice	4.100	4.680	0.154
			0'			1" Ice	5.240	6.000	0.182
						2" Ice	7.520	8.640	0.239
S									
APXVTM14-ALU-I20 w/	A	From Leg	4.000	0.000	148'	No Ice	6.580	4.959	0.077
Mount Pipe			0'			1/2" Ice	7.031	5.754	0.132
(R)			0'			1" Ice	7.473	6.472	0.193
						2" Ice	8.385	7.941	0.339
APXVTM14-ALU-I20 w/	B	From Leg	4.000	0.000	148'	No Ice	6.580	4.959	0.077
Mount Pipe			0'			1/2" Ice	7.031	5.754	0.132
(R)			0'			1" Ice	7.473	6.472	0.193
						2" Ice	8.385	7.941	0.339
APXVTM14-ALU-I20 w/	C	From Leg	4.000	0.000	148'	No Ice	6.580	4.959	0.077
Mount Pipe			0'			1/2" Ice	7.031	5.754	0.132
(R)			0'			1" Ice	7.473	6.472	0.193
						2" Ice	8.385	7.941	0.339
APXVSPP18-C-A20 w/	A	From Leg	4.000	0.000	148'	No Ice	8.262	6.946	0.083
Mount Pipe			0'			1/2" Ice	8.822	8.127	0.151
(R)			0'			1" Ice	9.346	9.021	0.227
						2" Ice	10.418	10.844	0.406
APXVSPP18-C-A20 w/	B	From Leg	4.000	0.000	148'	No Ice	8.262	6.946	0.083
Mount Pipe			0'			1/2" Ice	8.822	8.127	0.151
(R)			0'			1" Ice	9.346	9.021	0.227
						2" Ice	10.418	10.844	0.406
APXVSPP18-C-A20 w/	C	From Leg	4.000	0.000	148'	No Ice	8.262	6.946	0.083
Mount Pipe			0'			1/2" Ice	8.822	8.127	0.151
(R)			0'			1" Ice	9.346	9.021	0.227
						2" Ice	10.418	10.844	0.406
(2) PCS 1900MHz	A	From Leg	4.000	0.000	148'	No Ice	2.322	2.238	0.060
4x45W-65MHz			0'			1/2" Ice	2.527	2.441	0.083
(R)			0'			1" Ice	2.739	2.651	0.110
						2" Ice	3.185	3.093	0.173

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
(2) PCS 1900MHz 4x45W-65MHz (R)	B	From Leg	4.000 0' 0'	0.000	148'	No Ice 1/2" Ice 1" Ice 2" Ice	2.322 2.527 2.739 3.185	2.238 2.441 2.651 3.093	0.060 0.083 0.110 0.173
(2) PCS 1900MHz 4x45W-65MHz (R)	C	From Leg	4.000 0' 0'	0.000	148'	No Ice 1/2" Ice 1" Ice 2" Ice	2.322 2.527 2.739 3.185	2.238 2.441 2.651 3.093	0.060 0.083 0.110 0.173
800MHZ 2X50W RRH (R)	A	From Leg	4.000 0' 0'	0.000	148'	No Ice 1/2" Ice 1" Ice 2" Ice	2.134 2.320 2.512 2.920	1.773 1.946 2.127 2.510	0.053 0.074 0.098 0.157
800MHZ 2X50W RRH (R)	B	From Leg	4.000 0' 0'	0.000	148'	No Ice 1/2" Ice 1" Ice 2" Ice	2.134 2.320 2.512 2.920	1.773 1.946 2.127 2.510	0.053 0.074 0.098 0.157
800MHZ 2X50W RRH (R)	C	From Leg	4.000 0' 0'	0.000	148'	No Ice 1/2" Ice 1" Ice 2" Ice	2.134 2.320 2.512 2.920	1.773 1.946 2.127 2.510	0.053 0.074 0.098 0.157
TD-RRH8x20-25 (R)	A	From Leg	4.000 0' 0'	0.000	148'	No Ice 1/2" Ice 1" Ice 2" Ice	4.045 4.298 4.557 5.098	1.535 1.714 1.901 2.295	0.070 0.097 0.128 0.201
TD-RRH8x20-25 (R)	B	From Leg	4.000 0' 0'	0.000	148'	No Ice 1/2" Ice 1" Ice 2" Ice	4.045 4.298 4.557 5.098	1.535 1.714 1.901 2.295	0.070 0.097 0.128 0.201
TD-RRH8x20-25 (R)	C	From Leg	4.000 0' 0'	0.000	148'	No Ice 1/2" Ice 1" Ice 2" Ice	4.045 4.298 4.557 5.098	1.535 1.714 1.901 2.295	0.070 0.097 0.128 0.201
(3) 800 EXTERNAL NOTCH FILTER (R)	A	From Leg	4.000 0' 0'	0.000	148'	No Ice 1/2" Ice 1" Ice 2" Ice	0.660 0.763 0.873 1.115	0.321 0.398 0.483 0.674	0.011 0.017 0.024 0.045
(9) ACU-A20-N (R)	B	From Leg	4.000 0' 0'	0.000	148'	No Ice 1/2" Ice 1" Ice 2" Ice	0.067 0.104 0.148 0.259	0.117 0.162 0.215 0.343	0.001 0.002 0.004 0.012
Sector Mount [SM 502-3] (R)	C	None		0.000	148'	No Ice 1/2" Ice 1" Ice 2" Ice	33.020 47.360 61.700 90.380	33.020 47.360 61.700 90.380	1.673 2.224 2.775 3.876
S									
LLPX310R w/ Mount Pipe (E)	A	From Leg	4.000 0' 1'	0.000	134'	No Ice 1/2" Ice 1" Ice 2" Ice	4.538 4.892 5.254 6.006	2.985 3.528 4.087 5.237	0.045 0.083 0.126 0.232
LLPX310R w/ Mount Pipe (E)	B	From Leg	4.000 0' 1'	0.000	134'	No Ice 1/2" Ice 1" Ice 2" Ice	4.538 4.892 5.254 6.006	2.985 3.528 4.087 5.237	0.045 0.083 0.126 0.232
LLPX310R w/ Mount Pipe (E)	C	From Leg	4.000 0' 1'	0.000	134'	No Ice 1/2" Ice 1" Ice 2" Ice	4.538 4.892 5.254 6.006	2.985 3.528 4.087 5.237	0.045 0.083 0.126 0.232

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
RRH-2WB	A	From Leg	4.000	0.000	134'	No Ice	2.305	0.783	0.044
(E)			0'			1/2" Ice	2.496	0.917	0.059
			1'			1" Ice	2.695	1.058	0.077
						2" Ice	3.115	1.361	0.121
RRH-2WB	B	From Leg	4.000	0.000	134'	No Ice	2.305	0.783	0.044
(E)			0'			1/2" Ice	2.496	0.917	0.059
			1'			1" Ice	2.695	1.058	0.077
						2" Ice	3.115	1.361	0.121
RRH-2WB	C	From Leg	4.000	0.000	134'	No Ice	2.305	0.783	0.044
(E)			0'			1/2" Ice	2.496	0.917	0.059
			1'			1" Ice	2.695	1.058	0.077
						2" Ice	3.115	1.361	0.121
J - Box	C	From Leg	0.500	0.000	134'	No Ice	0.667	0.500	0.020
(E-Per photo)			0'			1/2" Ice	0.770	0.593	0.027
			0'			1" Ice	0.881	0.693	0.036
						2" Ice	1.126	0.915	0.059
(3) 6' x 2" Mount Pipe	A	From Leg	4.000	0.000	134'	No Ice	1.425	1.425	0.022
(E)			0'			1/2" Ice	1.925	1.925	0.033
			0'			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
(3) 6' x 2" Mount Pipe	B	From Leg	4.000	0.000	134'	No Ice	1.425	1.425	0.022
(E)			0'			1/2" Ice	1.925	1.925	0.033
			0'			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
(3) 6' x 2" Mount Pipe	C	From Leg	4.000	0.000	134'	No Ice	1.425	1.425	0.022
(E)			0'			1/2" Ice	1.925	1.925	0.033
			0'			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
6' x 3" Mount Pipe	A	From Leg	4.000	0.000	134'	No Ice	1.767	1.767	0.030
(E)			0'			1/2" Ice	2.129	2.129	0.044
			0'			1" Ice	2.501	2.501	0.061
						2" Ice	3.272	3.272	0.109
6' x 3" Mount Pipe	C	From Leg	4.000	0.000	134'	No Ice	1.767	1.767	0.030
(E)			0'			1/2" Ice	2.129	2.129	0.044
			0'			1" Ice	2.501	2.501	0.061
						2" Ice	3.272	3.272	0.109
Sector Mount [SM 504-3]	C	None		0.000	134'	No Ice	34.250	34.250	1.708
(E)						1/2" Ice	48.980	48.980	2.286
						1" Ice	63.710	63.710	2.864
						2" Ice	93.170	93.170	4.020
S									
(2) DB844G65ZAXY w/ Mount Pipe	A	From Leg	4.000	0.000	126'	No Ice	4.578	4.802	0.034
(E)			0'			1/2" Ice	4.955	5.416	0.080
			2'			1" Ice	5.340	6.040	0.132
						2" Ice	6.137	7.337	0.257
(2) DB844G65ZAXY w/ Mount Pipe	C	From Leg	4.000	0.000	126'	No Ice	4.578	4.802	0.034
(E)			0'			1/2" Ice	4.955	5.416	0.080
			2'			1" Ice	5.340	6.040	0.132
						2" Ice	6.137	7.337	0.257
DB844H80-XY w/ Mount Pipe	A	From Leg	4.000	0.000	126'	No Ice	3.104	4.984	0.028
(E)			0'			1/2" Ice	3.476	5.600	0.068
			2'			1" Ice	3.848	6.227	0.113
						2" Ice	4.604	7.529	0.224
DB844H80-XY w/ Mount Pipe	B	From Leg	4.000	0.000	126'	No Ice	3.104	4.984	0.028
(E)			0'			1/2" Ice	3.476	5.600	0.068
			2'			1" Ice	3.848	6.227	0.113
						2" Ice	4.604	7.529	0.224

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
DB-T1-6Z-8AB-0Z	C	From Leg	4.000	0.000	126'	No Ice	4.800	2.000	0.044
(E)			0'			1/2" Ice	5.070	2.193	0.080
			2'			1" Ice	5.348	2.393	0.120
						2" Ice	5.926	2.815	0.213
GPS_A	B	From Leg	4.000	0.000	126'	No Ice	0.255	0.255	0.001
(E)			0'			1/2" Ice	0.320	0.320	0.005
			4'			1" Ice	0.393	0.393	0.010
						2" Ice	0.561	0.561	0.025
(2) SBNHH-1D65C w/ Mount Pipe	A	From Leg	4.000	0.000	126'	No Ice	11.626	9.793	0.082
(R)			0'			1/2" Ice	12.346	11.311	0.172
			2'			1" Ice	13.074	12.854	0.271
						2" Ice	14.443	15.192	0.504
(2) SBNHH-1D65C w/ Mount Pipe	B	From Leg	4.000	0.000	126'	No Ice	11.626	9.793	0.082
(R)			0'			1/2" Ice	12.346	11.311	0.172
			2'			1" Ice	13.074	12.854	0.271
						2" Ice	14.443	15.192	0.504
(2) SBNHH-1D65C w/ Mount Pipe	C	From Leg	4.000	0.000	126'	No Ice	11.626	9.793	0.082
(R)			0'			1/2" Ice	12.346	11.311	0.172
			2'			1" Ice	13.074	12.854	0.271
						2" Ice	14.443	15.192	0.504
B25 RRH2x60 PCS	A	From Leg	4.000	0.000	126'	No Ice	2.140	1.306	0.051
(R)			0'			1/2" Ice	2.329	1.463	0.068
			2'			1" Ice	2.526	1.626	0.089
						2" Ice	2.941	1.979	0.139
B25 RRH2x60 PCS	B	From Leg	4.000	0.000	126'	No Ice	2.140	1.306	0.051
(R)			0'			1/2" Ice	2.329	1.463	0.068
			2'			1" Ice	2.526	1.626	0.089
						2" Ice	2.941	1.979	0.139
B25 RRH2x60 PCS	C	From Leg	4.000	0.000	126'	No Ice	2.140	1.306	0.051
(R)			0'			1/2" Ice	2.329	1.463	0.068
			2'			1" Ice	2.526	1.626	0.089
						2" Ice	2.941	1.979	0.139
B66A RRH4X45	A	From Leg	4.000	0.000	126'	No Ice	2.580	1.630	0.057
(R)			0'			1/2" Ice	2.794	1.811	0.077
			2'			1" Ice	3.015	1.999	0.101
						2" Ice	3.479	2.396	0.158
B66A RRH4X45	B	From Leg	4.000	0.000	126'	No Ice	2.580	1.630	0.057
(R)			0'			1/2" Ice	2.794	1.811	0.077
			2'			1" Ice	3.015	1.999	0.101
						2" Ice	3.479	2.396	0.158
B66A RRH4X45	C	From Leg	4.000	0.000	126'	No Ice	2.580	1.630	0.057
(R)			0'			1/2" Ice	2.794	1.811	0.077
			2'			1" Ice	3.015	1.999	0.101
						2" Ice	3.479	2.396	0.158
B13 RRH 4X30	A	From Leg	4.000	0.000	126'	No Ice	2.055	1.320	0.056
(R)			0'			1/2" Ice	2.241	1.475	0.073
			2'			1" Ice	2.433	1.638	0.093
						2" Ice	2.841	1.997	0.142
B13 RRH 4X30	B	From Leg	4.000	0.000	126'	No Ice	2.055	1.320	0.056
(R)			0'			1/2" Ice	2.241	1.475	0.073
			2'			1" Ice	2.433	1.638	0.093
						2" Ice	2.841	1.997	0.142
B13 RRH 4X30	C	From Leg	4.000	0.000	126'	No Ice	2.055	1.320	0.056
(R)			0'			1/2" Ice	2.241	1.475	0.073
			2'			1" Ice	2.433	1.638	0.093
						2" Ice	2.841	1.997	0.142
DB-T1-6Z-8AB-0Z	C	From Leg	4.000	0.000	126'	No Ice	4.800	2.000	0.044

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(R)			0'			1/2" Ice	5.070	2.193	0.080
			2'			1" Ice	5.348	2.393	0.120
						2" Ice	5.926	2.815	0.213
(2) 6' x 2" Mount Pipe	B	From Leg	4.000	0.000	126'	No Ice	1.425	1.425	0.022
(E)			0'			1/2" Ice	1.925	1.925	0.033
			0'			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	126'	No Ice	1.425	1.425	0.022
(E)			0'			1/2" Ice	1.925	1.925	0.033
			0'			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
5' x 2" Pipe Mount	B	From Leg	1.000	0.000	126'	No Ice	1.000	1.000	0.029
(E)			0'			1/2" Ice	1.393	1.393	0.037
			0'			1" Ice	1.703	1.703	0.048
						2" Ice	2.351	2.351	0.082
Sector Mount [SM 411-3]	C	None		0.000	126'	No Ice	21.880	21.880	1.069
(E)						1/2" Ice	30.680	30.680	1.485
						1" Ice	39.480	39.480	1.901
						2" Ice	57.080	57.080	2.733
Pipe Mount [PM 601-3]	C	None		0.000	126'	No Ice	4.390	4.390	0.195
(E)						1/2" Ice	5.480	5.480	0.237
						1" Ice	6.570	6.570	0.280
						2" Ice	8.750	8.750	0.365
S									
800 10504 w/ Mount Pipe	A	From Leg	4.000	0.000	112'	No Ice	3.589	3.178	0.038
(E)			0'			1/2" Ice	4.007	3.905	0.070
			0'			1" Ice	4.422	4.581	0.109
						2" Ice	5.258	5.982	0.207
800 10504 w/ Mount Pipe	B	From Leg	4.000	0.000	112'	No Ice	3.589	3.178	0.038
(E)			0'			1/2" Ice	4.007	3.905	0.070
			0'			1" Ice	4.422	4.581	0.109
						2" Ice	5.258	5.982	0.207
800 10504 w/ Mount Pipe	C	From Leg	4.000	0.000	112'	No Ice	3.589	3.178	0.038
(E)			0'			1/2" Ice	4.007	3.905	0.070
			0'			1" Ice	4.422	4.581	0.109
						2" Ice	5.258	5.982	0.207
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	112'	No Ice	1.425	1.425	0.022
(E)			0'			1/2" Ice	1.925	1.925	0.033
			0'			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	112'	No Ice	1.425	1.425	0.022
(E)			0'			1/2" Ice	1.925	1.925	0.033
			0'			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	112'	No Ice	1.425	1.425	0.022
(E)			0'			1/2" Ice	1.925	1.925	0.033
			0'			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
Sector Mount [SM 104-3]	C	None		0.000	112'	No Ice	30.020	30.020	0.953
(E)						1/2" Ice	40.480	40.480	1.405
						1" Ice	50.940	50.940	1.857
						2" Ice	71.860	71.860	2.761
102									
7770.00 w/ Mount Pipe	A	From Leg	4.000	0.000	102'	No Ice	5.746	4.254	0.055
(E)			0'			1/2" Ice	6.179	5.014	0.103
			0'			1" Ice	6.607	5.711	0.157
						2" Ice	7.488	7.155	0.287

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
7770.00 w/ Mount Pipe	B	From Leg	4.000	0.000	102'	No Ice	5.746	4.254	0.055
(E)			0'			1/2" Ice	6.179	5.014	0.103
			0'			1" Ice	6.607	5.711	0.157
						2" Ice	7.488	7.155	0.287
7770.00 w/ Mount Pipe	C	From Leg	4.000	0.000	102'	No Ice	5.746	4.254	0.055
(E)			0'			1/2" Ice	6.179	5.014	0.103
			0'			1" Ice	6.607	5.711	0.157
						2" Ice	7.488	7.155	0.287
QS66512-2	A	From Leg	4.000	0.000	102'	No Ice	2.600	5.000	0.111
(E)			0'			1/2" Ice	3.500	6.700	0.148
			0'			1" Ice	4.400	8.400	0.185
						2" Ice	6.200	11.800	0.259
QS66512-2	B	From Leg	4.000	0.000	102'	No Ice	2.600	5.000	0.111
(E)			0'			1/2" Ice	3.500	6.700	0.148
			0'			1" Ice	4.400	8.400	0.185
						2" Ice	6.200	11.800	0.259
QS66512-2	C	From Leg	4.000	0.000	102'	No Ice	2.600	5.000	0.111
(E)			0'			1/2" Ice	3.500	6.700	0.148
			0'			1" Ice	4.400	8.400	0.185
						2" Ice	6.200	11.800	0.259
P65-16-XLH-RR w/ Mount Pipe	A	From Leg	4.000	0.000	102'	No Ice	8.371	6.362	0.079
(E)			0'			1/2" Ice	8.931	7.538	0.144
			0'			1" Ice	9.457	8.427	0.218
						2" Ice	10.531	10.239	0.393
P65-16-XLH-RR w/ Mount Pipe	B	From Leg	4.000	0.000	102'	No Ice	8.371	6.362	0.079
(E)			0'			1/2" Ice	8.931	7.538	0.144
			0'			1" Ice	9.457	8.427	0.218
						2" Ice	10.531	10.239	0.393
P65-16-XLH-RR w/ Mount Pipe	C	From Leg	4.000	0.000	102'	No Ice	8.371	6.362	0.079
(E)			0'			1/2" Ice	8.931	7.538	0.144
			0'			1" Ice	9.457	8.427	0.218
						2" Ice	10.531	10.239	0.393
(2) LGP2140X	A	From Leg	4.000	0.000	102'	No Ice	1.080	0.358	0.014
(E)			0'			1/2" Ice	1.214	0.454	0.021
			0'			1" Ice	1.355	0.556	0.030
						2" Ice	1.659	0.782	0.055
(2) LGP2140X	B	From Leg	4.000	0.000	102'	No Ice	1.080	0.358	0.014
(E)			0'			1/2" Ice	1.214	0.454	0.021
			0'			1" Ice	1.355	0.556	0.030
						2" Ice	1.659	0.782	0.055
(2) LGP2140X	C	From Leg	4.000	0.000	102'	No Ice	1.080	0.358	0.014
(E)			0'			1/2" Ice	1.214	0.454	0.021
			0'			1" Ice	1.355	0.556	0.030
						2" Ice	1.659	0.782	0.055
RRUS 32 B2	A	From Leg	4.000	0.000	102'	No Ice	2.731	1.668	0.053
(E)			0'			1/2" Ice	2.953	1.855	0.074
			0'			1" Ice	3.182	2.049	0.098
						2" Ice	3.663	2.458	0.157
RRUS 32 B2	B	From Leg	4.000	0.000	102'	No Ice	2.731	1.668	0.053
(E)			0'			1/2" Ice	2.953	1.855	0.074
			0'			1" Ice	3.182	2.049	0.098
						2" Ice	3.663	2.458	0.157
RRUS 32 B2	C	From Leg	4.000	0.000	102'	No Ice	2.731	1.668	0.053
(E)			0'			1/2" Ice	2.953	1.855	0.074
			0'			1" Ice	3.182	2.049	0.098
						2" Ice	3.663	2.458	0.157
RRUS 32	A	From Leg	4.000	0.000	102'	No Ice	2.857	1.777	0.055

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
(E)			0'			1/2" Ice	3.083	1.968	0.077
			0'			1" Ice	3.316	2.166	0.103
						2" Ice	3.805	2.583	0.165
RRUS 32	B	From Leg	4.000	0.000	102'	No Ice	2.857	1.777	0.055
(E)			0'			1/2" Ice	3.083	1.968	0.077
			0'			1" Ice	3.316	2.166	0.103
						2" Ice	3.805	2.583	0.165
RRUS 32	C	From Leg	4.000	0.000	102'	No Ice	2.857	1.777	0.055
(E)			0'			1/2" Ice	3.083	1.968	0.077
			0'			1" Ice	3.316	2.166	0.103
						2" Ice	3.805	2.583	0.165
DC6-48-60-18-8F	C	From Leg	4.000	0.000	102'	No Ice	0.917	0.917	0.019
(E)			0'			1/2" Ice	1.458	1.458	0.037
			0'			1" Ice	1.643	1.643	0.057
						2" Ice	2.042	2.042	0.105
DC6-48-60-18-8F	A	From Leg	4.000	0.000	102'	No Ice	0.917	0.917	0.019
(E)			0'			1/2" Ice	1.458	1.458	0.037
			0'			1" Ice	1.643	1.643	0.057
						2" Ice	2.042	2.042	0.105
RRUS 11 B2	A	From Leg	4.000	0.000	102'	No Ice	2.833	1.182	0.051
(E)			0'			1/2" Ice	3.043	1.330	0.072
			0'			1" Ice	3.259	1.485	0.095
						2" Ice	3.715	1.826	0.153
RRUS 11 B2	B	From Leg	4.000	0.000	102'	No Ice	2.833	1.182	0.051
(E)			0'			1/2" Ice	3.043	1.330	0.072
			0'			1" Ice	3.259	1.485	0.095
						2" Ice	3.715	1.826	0.153
RRUS 11 B2	C	From Leg	4.000	0.000	102'	No Ice	2.833	1.182	0.051
(E)			0'			1/2" Ice	3.043	1.330	0.072
			0'			1" Ice	3.259	1.485	0.095
						2" Ice	3.715	1.826	0.153
(2) TPX-070821	A	From Leg	4.000	0.000	102'	No Ice	0.469	0.101	0.008
(E)			0'			1/2" Ice	0.559	0.147	0.011
			0'			1" Ice	0.656	0.202	0.016
						2" Ice	0.872	0.334	0.030
(2) TPX-070821	B	From Leg	4.000	0.000	102'	No Ice	0.469	0.101	0.008
(E)			0'			1/2" Ice	0.559	0.147	0.011
			0'			1" Ice	0.656	0.202	0.016
						2" Ice	0.872	0.334	0.030
(2) TPX-070821	C	From Leg	4.000	0.000	102'	No Ice	0.469	0.101	0.008
(E)			0'			1/2" Ice	0.559	0.147	0.011
			0'			1" Ice	0.656	0.202	0.016
						2" Ice	0.872	0.334	0.030
(4) 8' x 2" Pipe Mount (2 For TMEs+1 dual antenna+1 for quintel antenna)	A	From Leg	4.000	0.000	102'	No Ice	1.900	1.900	0.029
			0'			1/2" Ice	2.728	2.728	0.044
			0'			1" Ice	3.401	3.401	0.063
						2" Ice	4.396	4.396	0.119
(4) 8' x 2" Pipe Mount (2 For TMEs+1 dual antenna+1 for quintel antenna)	B	From Leg	4.000	0.000	102'	No Ice	1.900	1.900	0.029
			0'			1/2" Ice	2.728	2.728	0.044
			0'			1" Ice	3.401	3.401	0.063
						2" Ice	4.396	4.396	0.119
(4) 8' x 2" Pipe Mount (2 For TMEs+1 dual antenna+1 for quintel antenna)	C	From Leg	4.000	0.000	102'	No Ice	1.900	1.900	0.029
			0'			1/2" Ice	2.728	2.728	0.044
			0'			1" Ice	3.401	3.401	0.063
						2" Ice	4.396	4.396	0.119
Sector Mount [SM 301-3]	C	None		0.000	102'	No Ice	29.610	29.610	1.302
(E)						1/2" Ice	39.800	39.800	1.843

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	49.990	49.990	2.383
						2" Ice	70.370	70.370	3.465
S									
GPS_A (E-Per Photo)	A	From Face	2.000 0' 1'	0.000	12'	No Ice 1/2" Ice 1" Ice 2" Ice	0.255 0.320 0.393 0.561	0.255 0.320 0.393 0.561	0.001 0.005 0.010 0.025
3' x 2" Pipe Mount (E-Per Photo)	A	From Face	2.000 0' 0'	0.000	12'	No Ice 1/2" Ice 1" Ice 2" Ice	0.583 0.770 0.967 1.388	0.583 0.770 0.967 1.388	0.011 0.017 0.024 0.047
ASPP2933 (E-Per Photo)	A	From Face	0.500 0' 2'	0.000	12'	No Ice 1/2" Ice 1" Ice 2" Ice	0.196 0.320 0.453 0.748	0.196 0.320 0.453 0.748	0.004 0.006 0.009 0.021
Side Arm Mount [SO 701-1] (E-Per Photo)	A	From Face	1.500 0' 0'	0.000	12'	No Ice 1/2" Ice 1" Ice 2" Ice	0.850 1.140 1.430 2.010	1.670 2.340 3.010 4.350	0.065 0.079 0.093 0.121
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Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2-18 (E-AZ. Per photo)	A	Paraboloid w/Shroud (HP)	From Leg	3.000 0' 0'	-10.000		157'	2.175	No Ice 1/2" Ice 1" Ice 2" Ice	3.720 4.010 4.300 4.880	0.031 0.050 0.070 0.110
VHLP2-18 (E-AZ. Per photo)	B	Paraboloid w/Shroud (HP)	From Leg	3.000 0' 0'	-40.000		157'	2.175	No Ice 1/2" Ice 1" Ice 2" Ice	3.720 4.010 4.300 4.880	0.031 0.050 0.070 0.110
**											
VHLP2-23 (E)	A	Paraboloid w/Shroud (HP)	From Leg	4.000 0' 1'	50.000		134'	2.175	No Ice 1/2" Ice 1" Ice 2" Ice	3.720 4.000 4.310 4.940	0.030 0.030 0.040 0.070
**											

Load Combinations

Comb. No.	Description

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
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
T1	180 - 160	Leg	Max Tension	15	5.683	-0.138	0.002
			Max. Compression	10	-11.012	0.505	0.032
			Max. Mx	22	4.041	-0.556	-0.025

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	17	-2.524	-0.028	0.453
			Max. Vy	22	-1.469	0.035	0.000
			Max. Vx	17	1.377	0.004	-0.117
		Diagonal	Max Tension	20	2.590	0.000	0.000
			Max. Compression	20	-2.540	0.000	0.000
			Max. Mx	31	0.607	0.030	-0.004
			Max. My	34	0.669	0.029	0.004
			Max. Vy	31	0.030	0.030	-0.004
			Max. Vx	34	-0.002	0.000	0.000
		Top Girt	Max Tension	11	0.067	0.000	0.000
			Max. Compression	22	-0.089	0.000	0.000
			Max. Mx	26	-0.043	-0.056	0.000
			Max. My	26	-0.044	0.000	0.002
			Max. Vy	26	0.034	0.000	0.000
			Max. Vx	26	0.001	0.000	0.000
		Mid Girt	Max Tension	11	0.528	0.000	0.000
			Max. Compression	22	-0.536	0.000	0.000
			Max. Mx	26	-0.007	-0.075	0.000
			Max. My	26	-0.006	0.000	0.002
			Max. Vy	26	0.039	0.000	0.000
			Max. Vx	26	-0.001	0.000	0.000
T2	160 - 153.333	Leg	Max Tension	23	10.793	-0.549	-0.025
			Max. Compression	10	-17.533	0.255	-0.012
			Max. Mx	22	9.944	-0.556	-0.025
			Max. My	17	-2.557	-0.028	0.453
			Max. Vy	22	-0.187	-0.556	-0.025
			Max. Vx	16	0.180	-0.035	0.453
		Diagonal	Max Tension	25	4.044	0.000	0.000
			Max. Compression	12	-4.205	0.000	0.000
			Max. Mx	30	0.501	0.048	-0.006
			Max. My	27	-1.387	0.045	-0.007
			Max. Vy	30	0.042	0.048	-0.006
			Max. Vx	27	0.003	0.000	0.000
T3	153.333 - 146.667	Leg	Max Tension	23	18.914	-0.284	0.023
			Max. Compression	10	-27.835	0.581	-0.036
			Max. Mx	14	16.450	0.698	-0.050
			Max. My	4	-5.183	-0.021	0.739
			Max. Vy	14	0.990	-0.609	-0.050
			Max. Vx	13	0.939	-0.016	-0.508
		Diagonal	Max Tension	13	4.422	0.000	0.000
			Max. Compression	12	-4.686	0.000	0.000
			Max. Mx	32	0.897	0.054	-0.008
			Max. My	28	0.782	0.054	-0.008
			Max. Vy	32	0.045	0.054	-0.008
			Max. Vx	28	0.003	0.000	0.000
		Top Girt	Max Tension	6	0.669	0.000	0.000
			Max. Compression	11	-0.394	0.000	0.000
			Max. Mx	26	0.383	-0.131	0.000
			Max. My	26	0.378	0.000	0.004
			Max. Vy	26	0.055	0.000	0.000
			Max. Vx	26	-0.002	0.000	0.000
T4	146.667 - 140	Leg	Max Tension	23	27.526	-0.601	0.033
			Max. Compression	10	-38.426	-0.004	-0.034
			Max. Mx	6	25.313	-0.613	0.007
			Max. My	12	-5.254	-0.022	-0.508
			Max. Vy	3	0.149	0.589	0.051
			Max. Vx	13	-0.155	-0.016	-0.508
		Diagonal	Max Tension	21	5.764	0.000	0.000
			Max. Compression	20	-5.900	0.000	0.000
			Max. Mx	37	1.276	0.059	0.008

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	36	-1.932	0.053	0.009
			Max. Vy	37	0.047	0.059	0.008
			Max. Vx	36	-0.003	0.000	0.000
		Top Girt	Max Tension	32	0.318	0.000	0.000
			Max. Compression	1	0.000	0.000	0.000
			Max. Mx	26	0.306	-0.150	0.000
			Max. My	26	0.311	0.000	0.004
			Max. Vy	26	-0.059	0.000	0.000
			Max. Vx	26	-0.002	0.000	0.000
T5	140 - 120	Leg	Max Tension	23	60.104	-0.466	0.046
			Max. Compression	10	-78.037	0.571	-0.049
			Max. Mx	10	-78.037	0.571	-0.049
			Max. My	12	-9.620	-0.002	-0.830
			Max. Vy	6	-1.352	-0.489	0.002
			Max. Vx	24	1.303	-0.046	0.392
		Diagonal	Max Tension	8	8.331	0.000	0.000
			Max. Compression	20	-8.345	0.000	0.000
			Max. Mx	37	1.943	0.083	0.011
			Max. My	38	-1.387	0.079	0.011
			Max. Vy	37	0.057	0.083	0.011
			Max. Vx	38	-0.003	0.000	0.000
T6	120 - 100	Leg	Max Tension	23	100.118	-0.833	0.024
			Max. Compression	10	-125.485	1.407	-0.127
			Max. Mx	22	95.836	-1.442	0.133
			Max. My	12	-13.524	-0.040	-1.165
			Max. Vy	22	1.042	-1.442	0.133
			Max. Vx	24	-0.966	-0.041	1.161
		Diagonal	Max Tension	8	10.279	0.000	0.000
			Max. Compression	8	-10.300	0.000	0.000
			Max. Mx	35	2.498	0.124	0.015
			Max. My	38	-1.435	0.110	0.016
			Max. Vy	33	0.075	0.121	-0.015
			Max. Vx	38	-0.004	0.000	0.000
T7	100 - 80	Leg	Max Tension	23	139.154	-0.376	0.172
			Max. Compression	10	-170.894	0.684	-0.104
			Max. Mx	22	113.841	-1.442	0.133
			Max. My	12	-14.037	-0.040	-1.165
			Max. Vy	6	-0.222	-1.416	-0.064
			Max. Vx	12	-0.258	-0.035	-0.982
		Diagonal	Max Tension	8	12.568	0.000	0.000
			Max. Compression	8	-12.493	0.000	0.000
			Max. Mx	35	3.086	0.195	0.027
			Max. My	38	3.706	0.190	0.028
			Max. Vy	33	0.097	0.194	0.025
			Max. Vx	38	-0.006	0.000	0.000
T8	80 - 70	Leg	Max Tension	23	160.098	-0.720	0.114
			Max. Compression	10	-194.734	2.460	-0.297
			Max. Mx	2	-190.201	2.482	0.166
			Max. My	12	-17.386	0.046	-2.553
			Max. Vy	2	-0.315	2.482	0.166
			Max. Vx	12	0.429	0.046	-2.553
		Diagonal	Max Tension	8	12.968	0.000	0.000
			Max. Compression	8	-13.112	0.000	0.000
			Max. Mx	33	2.674	0.216	-0.027
			Max. My	32	-2.502	0.202	-0.029
			Max. Vy	33	0.102	0.216	-0.027
			Max. Vx	32	0.005	0.000	0.000
T9	70 - 60	Leg	Max Tension	15	181.114	-2.269	-0.171
			Max. Compression	10	-219.055	0.231	0.036
			Max. Mx	2	-214.685	2.482	0.166
			Max. My	12	-18.291	0.046	-2.553

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	2	0.361	2.482	0.166
			Max. Vx	24	0.446	0.044	2.541
		Diagonal	Max Tension	8	13.856	0.000	0.000
			Max. Compression	8	-14.034	0.000	0.000
			Max. Mx	33	3.362	-0.370	-0.042
			Max. My	37	-3.429	-0.316	-0.053
			Max. Vy	33	-0.172	-0.370	-0.042
			Max. Vx	37	0.010	0.000	0.000
T10	60 - 40	Leg	Max Tension	15	224.135	-1.374	-0.072
			Max. Compression	10	-266.830	1.856	-0.180
			Max. Mx	37	21.594	-2.538	0.094
			Max. My	12	-21.925	0.065	-1.685
			Max. Vy	29	0.391	-2.522	-0.051
			Max. Vx	24	-0.345	-0.039	1.620
		Diagonal	Max Tension	8	14.313	0.000	0.000
			Max. Compression	10	-14.766	0.000	0.000
			Max. Mx	35	2.943	0.293	0.035
			Max. My	38	-1.781	0.253	0.040
			Max. Vy	33	0.128	0.291	0.035
			Max. Vx	38	-0.007	0.000	0.000
T11	40 - 20	Leg	Max Tension	15	266.162	-0.876	-0.021
			Max. Compression	10	-313.892	3.134	-0.325
			Max. Mx	37	26.112	-5.916	0.101
			Max. My	12	-24.509	-0.214	-1.709
			Max. Vy	29	0.988	-5.888	-0.054
			Max. Vx	12	-0.227	-0.214	-1.709
		Diagonal	Max Tension	8	15.014	0.000	0.000
			Max. Compression	10	-15.697	0.000	0.000
			Max. Mx	33	2.378	0.390	0.041
			Max. My	38	6.093	0.316	0.050
			Max. Vy	33	0.147	0.390	0.041
			Max. Vx	38	-0.008	0.000	0.000
T12	20 - 0	Leg	Max Tension	15	305.914	-1.175	-0.055
			Max. Compression	10	-360.403	0.000	0.000
			Max. Mx	37	33.327	-5.916	0.101
			Max. My	12	-28.887	-0.297	-3.377
			Max. Vy	29	-1.154	-5.888	-0.054
			Max. Vx	12	-0.517	-0.297	-3.377
		Diagonal	Max Tension	22	16.234	0.000	0.000
			Max. Compression	2	-17.312	0.000	0.000
			Max. Mx	33	-0.664	-0.840	0.074
			Max. My	12	14.909	-0.525	0.108
			Max. Vy	33	-0.267	-0.840	0.074
			Max. Vx	32	-0.014	0.000	0.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	360.715	38.961	-21.469
	Max. H_x	18	360.715	38.961	-21.469
	Max. H_z	5	-260.015	-28.819	19.162
	Min. Vert	7	-293.897	-33.324	18.310
	Min. H_x	7	-293.897	-33.324	18.310
	Min. H_z	18	360.715	38.961	-21.469
Leg B	Max. Vert	10	371.937	-40.741	-21.516

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. H_x	23	-307.550	35.169	18.414
	Max. H_z	25	-280.569	31.514	19.542
	Min. Vert	23	-307.550	35.169	18.414
	Min. H_x	10	371.937	-40.741	-21.516
	Min. H_z	12	331.727	-35.380	-21.661
Leg A	Max. Vert	2	372.494	-0.905	47.527
	Max. H_x	21	17.632	4.803	1.715
	Max. H_z	2	372.494	-0.905	47.527
	Min. Vert	15	-315.838	0.890	-41.319
	Min. H_x	8	25.873	-4.820	2.532
	Min. H_z	15	-315.838	0.890	-41.319

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	70.257	0.000	0.000	57.857	11.415	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	84.309	0.202	-77.458	-7456.277	-13.133	-38.215
0.9 Dead+1.0 Wind 0 deg - No Ice	63.232	0.202	-77.458	-7473.634	-16.558	-38.215
1.2 Dead+1.0 Wind 30 deg - No Ice	84.309	36.166	-62.389	-6034.533	-3529.817	37.493
0.9 Dead+1.0 Wind 30 deg - No Ice	63.232	36.166	-62.389	-6051.890	-3533.241	37.493
1.2 Dead+1.0 Wind 60 deg - No Ice	84.309	59.039	-34.146	-3363.805	-5918.829	36.481
0.9 Dead+1.0 Wind 60 deg - No Ice	63.232	59.039	-34.146	-3381.162	-5922.253	36.481
1.2 Dead+1.0 Wind 90 deg - No Ice	84.309	69.575	-0.165	48.280	-7032.575	35.053
0.9 Dead+1.0 Wind 90 deg - No Ice	63.232	69.575	-0.165	30.923	-7035.999	35.053
1.2 Dead+1.0 Wind 120 deg - No Ice	84.309	64.554	37.142	3768.004	-6420.399	72.373
0.9 Dead+1.0 Wind 120 deg - No Ice	63.232	64.554	37.142	3750.647	-6423.824	72.373
1.2 Dead+1.0 Wind 150 deg - No Ice	84.309	38.562	66.868	6624.801	-3765.758	91.079
0.9 Dead+1.0 Wind 150 deg - No Ice	63.232	38.562	66.868	6607.444	-3769.182	91.079
1.2 Dead+1.0 Wind 180 deg - No Ice	84.309	-0.210	74.025	7311.787	41.284	38.500
0.9 Dead+1.0 Wind 180 deg - No Ice	63.232	-0.210	74.025	7294.430	37.859	38.500
1.2 Dead+1.0 Wind 210 deg - No Ice	84.309	-36.222	62.448	6182.126	3565.383	-37.347
0.9 Dead+1.0 Wind 210 deg - No Ice	63.232	-36.222	62.448	6164.769	3561.959	-37.347
1.2 Dead+1.0 Wind 240 deg - No Ice	84.309	-62.104	35.934	3654.839	6205.175	-36.521
0.9 Dead+1.0 Wind 240 deg - No Ice	63.232	-62.104	35.934	3637.482	6201.750	-36.521
1.2 Dead+1.0 Wind 270 deg - No Ice	84.309	-69.639	0.175	91.954	7069.457	-34.969
0.9 Dead+1.0 Wind 270 deg -	63.232	-69.639	0.175	74.597	7066.033	-34.969

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
No Ice 1.2 Dead+1.0 Wind 300 deg - No Ice	84.309	-61.574	-35.358	-3477.370	6201.421	-72.455
0.9 Dead+1.0 Wind 300 deg - No Ice	63.232	-61.574	-35.358	-3494.727	6197.997	-72.455
1.2 Dead+1.0 Wind 330 deg - No Ice	84.309	-38.563	-66.830	-6479.886	3793.396	-91.341
0.9 Dead+1.0 Wind 330 deg - No Ice	63.232	-38.563	-66.830	-6497.244	3789.971	-91.341
1.2 Dead+1.0 Ice+1.0 Temp	193.992	0.000	-0.000	196.515	103.878	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	193.992	0.046	-21.722	-1953.320	97.689	-13.587
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	193.992	10.301	-17.783	-1579.527	-926.168	6.261
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	193.992	17.240	-9.967	-814.126	-1643.583	13.518
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	193.992	20.312	-0.038	191.543	-1966.055	16.221
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	193.992	18.622	10.721	1277.256	-1774.875	25.459
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	193.992	10.787	18.701	2066.359	-974.529	28.804
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	193.992	-0.048	21.194	2304.134	110.231	13.649
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	193.992	-10.313	17.796	1974.429	1135.676	-6.229
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	193.992	-17.717	10.246	1230.517	1890.807	-13.526
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	193.992	-20.326	0.041	201.784	2175.844	-16.203
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	193.992	-18.163	-10.442	-860.952	1945.858	-25.477
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	193.992	-10.787	-18.693	-1672.033	1182.336	-28.860
Dead+Wind 0 deg - Service	70.257	0.050	-19.365	-1823.569	4.707	-9.554
Dead+Wind 30 deg - Service	70.257	9.042	-15.597	-1468.133	-874.464	9.373
Dead+Wind 60 deg - Service	70.257	14.760	-8.537	-800.451	-1471.717	9.120
Dead+Wind 90 deg - Service	70.257	17.394	-0.041	52.570	-1750.153	8.763
Dead+Wind 120 deg - Service	70.257	16.139	9.286	982.501	-1597.109	18.093
Dead+Wind 150 deg - Service	70.257	9.640	16.717	1696.700	-933.449	22.770
Dead+Wind 180 deg - Service	70.257	-0.052	18.506	1868.447	18.311	9.625
Dead+Wind 210 deg - Service	70.257	-9.055	15.612	1586.032	899.336	-9.337
Dead+Wind 240 deg - Service	70.257	-15.526	8.983	954.210	1559.284	-9.130
Dead+Wind 270 deg - Service	70.257	-17.410	0.044	63.489	1775.355	-8.742
Dead+Wind 300 deg - Service	70.257	-15.394	-8.839	-828.842	1558.346	-18.114
Dead+Wind 330 deg - Service	70.257	-9.641	-16.708	-1579.472	956.339	-22.835

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-70.257	0.000	0.000	70.257	0.000	0.000%
2	0.202	-84.309	-77.458	-0.202	84.309	77.458	0.000%
3	0.202	-63.232	-77.458	-0.202	63.232	77.458	0.000%
4	36.166	-84.309	-62.389	-36.166	84.309	62.389	0.000%
5	36.166	-63.232	-62.389	-36.166	63.232	62.389	0.000%
6	59.039	-84.309	-34.146	-59.039	84.309	34.146	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
7	59.039	-63.232	-34.146	-59.039	63.232	34.146	0.000%
8	69.575	-84.309	-0.165	-69.575	84.309	0.165	0.000%
9	69.575	-63.232	-0.165	-69.575	63.232	0.165	0.000%
10	64.554	-84.309	37.142	-64.554	84.309	-37.142	0.000%
11	64.554	-63.232	37.142	-64.554	63.232	-37.142	0.000%
12	38.562	-84.309	66.868	-38.562	84.309	-66.868	0.000%
13	38.562	-63.232	66.868	-38.562	63.232	-66.868	0.000%
14	-0.210	-84.309	74.025	0.210	84.309	-74.025	0.000%
15	-0.210	-63.232	74.025	0.210	63.232	-74.025	0.000%
16	-36.222	-84.309	62.448	36.222	84.309	-62.448	0.000%
17	-36.222	-63.232	62.448	36.222	63.232	-62.448	0.000%
18	-62.104	-84.309	35.934	62.104	84.309	-35.934	0.000%
19	-62.104	-63.232	35.934	62.104	63.232	-35.934	0.000%
20	-69.639	-84.309	0.175	69.639	84.309	-0.175	0.000%
21	-69.639	-63.232	0.175	69.639	63.232	-0.175	0.000%
22	-61.574	-84.309	-35.358	61.574	84.309	35.358	0.000%
23	-61.574	-63.232	-35.358	61.574	63.232	35.358	0.000%
24	-38.563	-84.309	-66.830	38.563	84.309	66.830	0.000%
25	-38.563	-63.232	-66.830	38.563	63.232	66.830	0.000%
26	0.000	-193.992	0.000	0.000	193.992	0.000	0.000%
27	0.046	-193.992	-21.722	-0.046	193.992	21.722	0.000%
28	10.301	-193.992	-17.783	-10.301	193.992	17.783	0.000%
29	17.240	-193.992	-9.967	-17.240	193.992	9.967	0.000%
30	20.312	-193.992	-0.038	-20.312	193.992	0.038	0.000%
31	18.622	-193.992	10.721	-18.622	193.992	-10.721	0.000%
32	10.787	-193.992	18.701	-10.787	193.992	-18.701	0.000%
33	-0.048	-193.992	21.194	0.048	193.992	-21.194	0.000%
34	-10.313	-193.992	17.796	10.313	193.992	-17.796	0.000%
35	-17.717	-193.992	10.246	17.717	193.992	-10.246	0.000%
36	-20.326	-193.992	0.041	20.326	193.992	-0.041	0.000%
37	-18.163	-193.992	-10.442	18.163	193.992	10.442	0.000%
38	-10.787	-193.992	-18.693	10.787	193.992	18.693	0.000%
39	0.050	-70.257	-19.365	-0.050	70.257	19.365	0.000%
40	9.042	-70.257	-15.597	-9.042	70.257	15.597	0.000%
41	14.760	-70.257	-8.537	-14.760	70.257	8.537	0.000%
42	17.394	-70.257	-0.041	-17.394	70.257	0.041	0.000%
43	16.139	-70.257	9.286	-16.139	70.257	-9.286	0.000%
44	9.640	-70.257	16.717	-9.640	70.257	-16.717	0.000%
45	-0.052	-70.257	18.506	0.052	70.257	-18.506	0.000%
46	-9.055	-70.257	15.612	9.055	70.257	-15.612	0.000%
47	-15.526	-70.257	8.983	15.526	70.257	-8.983	0.000%
48	-17.410	-70.257	0.044	17.410	70.257	-0.044	0.000%
49	-15.394	-70.257	-8.839	15.394	70.257	8.839	0.000%
50	-9.641	-70.257	-16.708	9.641	70.257	16.708	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	3.183	44	0.130	0.021
T2	160 - 153.333	2.630	44	0.129	0.021
T3	153.333 - 146.667	2.447	44	0.127	0.021
T4	146.667 - 140	2.266	44	0.124	0.021
T5	140 - 120	2.087	44	0.120	0.020
T6	120 - 100	1.577	44	0.108	0.018

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T7	100 - 80	1.120	44	0.092	0.015
T8	80 - 70	0.737	44	0.074	0.012
T9	70 - 60	0.572	44	0.065	0.010
T10	60 - 40	0.435	44	0.056	0.009
T11	40 - 20	0.205	44	0.035	0.005
T12	20 - 0	0.057	44	0.018	0.002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178'	Side Arm Mount [SO 305-1]	44	3.128	0.130	0.021	Inf
170'	AIR 32 B2a/B66Aa w/ Mount Pipe	44	2.907	0.130	0.021	Inf
161'	HPA-65R-BUU-H6	44	2.658	0.129	0.021	Inf
157'	VHLP2-18	44	2.547	0.128	0.021	257339
148'	APXVTM14-ALU-I20 w/ Mount Pipe	44	2.302	0.125	0.021	286637
135'	VHLP2-23	44	1.956	0.118	0.020	114548
134'	LLPX310R w/ Mount Pipe	44	1.930	0.117	0.020	112980
126'	(2) DB844G65ZAXY w/ Mount Pipe	44	1.725	0.112	0.019	101826
112'	800 10504 w/ Mount Pipe	44	1.386	0.102	0.017	75038
102'	7770.00 w/ Mount Pipe	44	1.163	0.093	0.015	59932
12'	GPS_A	44	0.027	0.011	0.001	70150

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	12.546	12	0.512	0.085
T2	160 - 153.333	10.371	12	0.506	0.084
T3	153.333 - 146.667	9.648	12	0.499	0.084
T4	146.667 - 140	8.936	12	0.489	0.083
T5	140 - 120	8.232	12	0.474	0.082
T6	120 - 100	6.220	12	0.427	0.072
T7	100 - 80	4.421	12	0.360	0.060
T8	80 - 70	2.911	12	0.291	0.048
T9	70 - 60	2.262	12	0.257	0.041
T10	60 - 40	1.720	12	0.219	0.036
T11	40 - 20	0.812	12	0.139	0.021
T12	20 - 0	0.228	12	0.072	0.007

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178'	Side Arm Mount [SO 305-1]	12	12.328	0.512	0.085	Inf
170'	AIR 32 B2a/B66Aa w/ Mount Pipe	12	11.459	0.511	0.084	562856
161'	HPA-65R-BUU-H6	12	10.480	0.507	0.084	Inf
157'	VHLP2-18	12	10.044	0.504	0.084	69966
148'	APXVTM14-ALU-I20 w/ Mount Pipe	12	9.078	0.491	0.084	75805
135'	VHLP2-23	12	7.713	0.463	0.080	28886
134'	LLPX310R w/ Mount Pipe	12	7.610	0.461	0.080	28473
126'	(2) DB844G65ZAXY w/ Mount Pipe	12	6.805	0.442	0.076	25553
112'	800 10504 w/ Mount Pipe	12	5.470	0.402	0.067	18829
102'	7770.00 w/ Mount Pipe	12	4.588	0.368	0.061	15070
12'	GPS_A	12	0.108	0.044	0.004	17757

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325N	0.875	4	1.421	41.556	0.034 ✔	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	2.590	8.135	0.318 ✔	1.05	Member Block Shear
		Top Girt	A325N	0.625	1	0.067	5.423	0.012 ✔	1.05	Member Block Shear
		Mid Girt	A325N	0.625	1	0.528	5.423	0.097 ✔	1.05	Member Block Shear
T2	160	Diagonal	A325N	0.625	1	4.044	11.310	0.358 ✔	1.05	Member Bearing
T3	153.333	Diagonal	A325N	0.625	1	4.422	11.310	0.391 ✔	1.05	Member Bearing
		Top Girt	A325N	0.625	1	0.669	5.655	0.118 ✔	1.05	Member Bearing
T4	146.667	Leg	A325N	1.000	4	6.881	54.517	0.126 ✔	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	5.764	11.310	0.510 ✔	1.05	Member Bearing
		Top Girt	A325N	0.625	1	0.311	5.655	0.055 ✔	1	Member Bearing
T5	140	Leg	A325N	1.000	6	10.017	54.517	0.184 ✔	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	8.331	11.310	0.737 ✔	1.05	Member Bearing
T6	120	Leg	A325N	1.000	6	16.686	54.517	0.306 ✔	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	10.279	12.675	0.811 ✔	1.05	Member Bearing
T7	100	Leg	A325N	1.000	8	17.394	54.517	0.319 ✔	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	12.568	14.137	0.889 ✔	1.05	Member Bearing
T8	80	Diagonal	A325N	0.750	1	12.968	14.137	0.917 ✔	1.05	Member Bearing
T9	70	Leg	A325N	1.000	8	22.639	54.517	0.415 ✔	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	13.856	20.227	0.685 ✔	1.05	Gusset Bearing
T10	60	Leg	A325N	1.000	8	28.017	54.517	0.514 ✔	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	14.313	14.137	1.012 ✔	1.05	Member Bearing
T11	40	Leg	A325N	1.000	8	33.270	54.517	0.610 ✔	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	15.015	17.672	0.850 ✔	1.05	Member Bearing

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T12	20	Diagonal	A325N	0.750	1	16.235	20.227	0.803 ✔	1.05	Gusset Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 3 EH	20'7/16"	5'3/32"	52.9 K=1.00	3.016	-11.012	110.608	0.100 [1] ✔
T2	160 - 153.333	ROHN 4 EH	6'8-5/32' '	6'8-5/32' '	54.3 K=1.00	4.407	-17.533	159.906	0.110 [1] ✔
T3	153.333 - 146.667	ROHN 4 EH	6'8-5/32' '	6'8-5/32' '	54.3 K=1.00	4.407	-27.835	159.905	0.174 [1] ✔
T4	146.667 - 140	ROHN 4 EH	6'8-5/32' '	6'8-5/32' '	54.3 K=1.00	4.407	-38.426	159.906	0.240 [1] ✔
T5	140 - 120	ROHN 5 EH	20'7/16"	6'8-5/32' '	43.6 K=1.00	6.112	-78.037	239.378	0.326 [1] ✔
T6	120 - 100	ROHN 6 EHS	20'3/8"	6'8-1/8"	36.0 K=1.00	6.713	-125.485	274.776	0.457 [1] ✔
T7	100 - 80	ROHN 6 EH	20'15/32 "	10'7/32"	54.8 K=1.00	8.405	-170.894	303.717	0.563 [1] ✔
T8	80 - 70	ROHN 8 EHS	10'7/32"	10'7/32"	41.2 K=1.00	9.719	-194.734	386.395	0.504 [1] ✔
T9	70 - 60	ROHN 8 EHS	10'7/32"	10'7/32"	41.2 K=1.00	9.719	-219.055	386.395	0.567 [1] ✔
T10	60 - 40	ROHN 8 EHS	20'13/32 "	10'7/32"	41.2 K=1.00	9.719	-266.830	386.397	0.691 [1] ✔
T11	40 - 20	ROHN 8 EH	20'13/32 "	10'7/32"	41.8 K=1.00	12.763	-313.892	505.555	0.621 [1] ✔
T12	20 - 0	ROHN 8 EH	20'13/32 "	10'7/32"	41.8 K=1.00	12.763	-360.403	505.555	0.713 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x3/16	9'10-3/8' '	4'9-15/32" 2"	145.8 K=1.00	0.715	-2.540	9.623	0.264 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	160 - 153.333	L2 1/2x2 1/2x1/4	11'3-7/16"	5'6"	134.4 K=1.00	1.190	-4.205	18.851	0.223 [1] ✔
T3	153.333 - 146.667	L2 1/2x2 1/2x1/4	11'10-7/32"	5'9-13/32"	141.4 K=1.00	1.190	-4.686	17.047	0.275 [1] ✔
T4	146.667 - 140	L2 1/2x2 1/2x1/4	12'5-5/32"	6'7/8"	148.4 K=1.00	1.190	-5.900	15.466	0.381 [1] ✔
T5	140 - 120	L2 1/2x2 1/2x1/4	14'2-3/4''	6'11-3/32"	169.2 K=1.00	1.190	-8.345	11.895	0.702 [1] ✔
T6	120 - 100	L3x3x1/4	15'11-7/8"	7'8-29/32"	157.0 K=1.00	1.440	-10.300	16.730	0.616 [1] ✔
T7	100 - 80	L3 1/2x3 1/2x1/4	19'3-3/32"	9'5-25/32"	164.0 K=1.00	1.690	-12.493	17.990	0.694 [1] ✔
T8	80 - 70	L3 1/2x3 1/2x1/4	20'1-13/16"	9'9-25/32"	169.7 K=1.00	1.690	-13.112	16.792	0.781 [1] ✔
T9	70 - 60	2L3 1/2x3 1/2x1/4x3/8 2L 'a' > 58.773 in - 137	21'11/32"	10'3-3/32"	189.4 K=1.00	3.380	-14.034	26.610	0.527 [1] ✔
T10	60 - 40	L4x4x1/4	22'9-23/32"	11'1-25/32"	168.3 K=1.00	1.940	-14.766	19.609	0.753 [1] ✔
T11	40 - 20	L4x4x5/16	24'7-1/2''	12'11/16"	182.9 K=1.00	2.400	-15.697	20.532	0.765 [1] ✔
T12	20 - 0	2L4x4x5/16x3/8 2L 'a' > 74.511 in - 179	26'5-9/16"	12'11-3/4"	211.6 K=1.00	4.800	-17.312	30.424	0.569 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8	6'8-1/4"	6'1-3/4"	185.5 K=1.00	0.484	-0.089	4.028	0.022 [1] ✔
T3	153.333 - 146.667	L2 1/2x2 1/2x1/8 KL/R > 200 (C) - 48	9'5-13/32"	8'9-29/32"	212.2 K=1.00	0.609	-0.394	3.875	0.102 [1] ✔

[1] P_u / ϕP_n controls

Mid Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8	7'8-11/16"	7'2-3/16''	216.8 K=1.00	0.484	-0.536	2.950	0.182 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
		KL/R > 200 (C) - 9							

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 3 EH	20'7/16"	5'3/32"	52.9	3.016	5.683	135.717	0.042 [1] ✔
T2	160 - 153.333	ROHN 4 EH	6'8-5/32'	6'8-5/32'	54.3	4.407	10.793	198.335	0.054 [1] ✔
T3	153.333 - 146.667	ROHN 4 EH	6'8-5/32'	6'8-5/32'	54.3	4.407	18.914	198.335	0.095 [1] ✔
T4	146.667 - 140	ROHN 4 EH	6'8-5/32'	6'8-5/32'	54.3	4.407	27.526	198.335	0.139 [1] ✔
T5	140 - 120	ROHN 5 EH	20'7/16"	6'8-5/32'	43.6	6.112	60.104	275.039	0.219 [1] ✔
T6	120 - 100	ROHN 6 EHS	20'3/8"	6'8-1/8"	36.0	6.713	100.118	302.097	0.331 [1] ✔
T7	100 - 80	ROHN 6 EH	20'15/32"	10'7/32"	54.8	8.405	139.154	378.222	0.368 [1] ✔
T8	80 - 70	ROHN 8 EHS	10'7/32"	10'7/32"	41.2	9.719	160.098	437.369	0.366 [1] ✔
T9	70 - 60	ROHN 8 EHS	10'7/32"	10'7/32"	41.2	9.719	181.114	437.369	0.414 [1] ✔
T10	60 - 40	ROHN 8 EHS	20'13/32"	10'7/32"	41.2	9.719	224.135	437.369	0.512 [1] ✔
T11	40 - 20	ROHN 8 EH	20'13/32"	10'7/32"	41.8	12.763	266.162	574.322	0.463 [1] ✔
T12	20 - 0	ROHN 8 EH	20'13/32"	10'7/32"	41.8	12.763	305.914	574.322	0.533 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x3/16	9'10-3/8'	4'9-15/32"	95.6	0.431	2.590	18.739	0.138 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	160 - 153.333	L2 1/2x2 1/2x1/4	11'3-7/16"	5'6"	87.8	0.752	4.044	32.707	0.124 [1] ✔
T3	153.333 - 146.667	L2 1/2x2 1/2x1/4	11'10-7/32"	5'9-13/32"	92.2	0.752	4.422	32.707	0.135 [1] ✔
T4	146.667 - 140	L2 1/2x2 1/2x1/4	12'5-5/32"	6'7/8"	96.7	0.752	5.764	32.707	0.176 [1] ✔
T5	140 - 120	L2 1/2x2 1/2x1/4	14'2-3/4''	6'11-3/32"	110.0	0.752	8.331	32.707	0.255 [1] ✔
T6	120 - 100	L3x3x1/4	15'11-7/8"	7'8-29/32"	101.5	0.939	10.279	45.794	0.224 [1] ✔
T7	100 - 80	L3 1/2x3 1/2x1/4	19'3-3/32"	9'5-25/32"	105.9	1.103	12.568	53.793	0.234 [1] ✔
T8	80 - 70	L3 1/2x3 1/2x1/4	20'1-13/16"	9'9-25/32"	109.6	1.103	12.968	53.793	0.241 [1] ✔
T9	70 - 60	2L3 1/2x3 1/2x1/4x3/8 2L 'a' > 58.773 in - 136	21'11/32"	10'3-3/32"	114.4	2.207	13.856	95.999	0.144 [1] ✔
T10	60 - 40	L4x4x1/4	22'9-23/32"	11'1-25/32"	108.3	1.291	14.313	62.933	0.227 [1] ✔
T11	40 - 20	L4x4x5/16	23'8-9/16"	11'7-1/4''	113.6	1.595	15.015	77.752	0.193 [1] ✔
T12	20 - 0	2L4x4x5/16x3/8 2L 'a' > 74.511 in - 176	26'5-9/16"	12'11-3/4"	126.9	3.190	16.235	138.758	0.117 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8	6'8-1/4"	6'1-3/4"	122.6	0.293	0.067	12.744	0.005 [1] ✔
T3	153.333 - 146.667	L2 1/2x2 1/2x1/8	9'5-13/32"	8'9-29/32"	138.3	0.387	0.669	16.822	0.040 [1] ✔
T4	146.667 - 140	L2 1/2x2 1/2x1/8	10'1-23/32"	9'6-7/32''	148.9	0.387	0.311	16.822	0.019*[1] ✔

* DL controls
[1] P_u / ϕP_n controls

Mid Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8	7'8-11/16"	7'2-3/16"	142.4	0.293	0.528	12.744	0.041 [1] ✔

[1] P_u / ϕP_n controls

Section Capacity Table

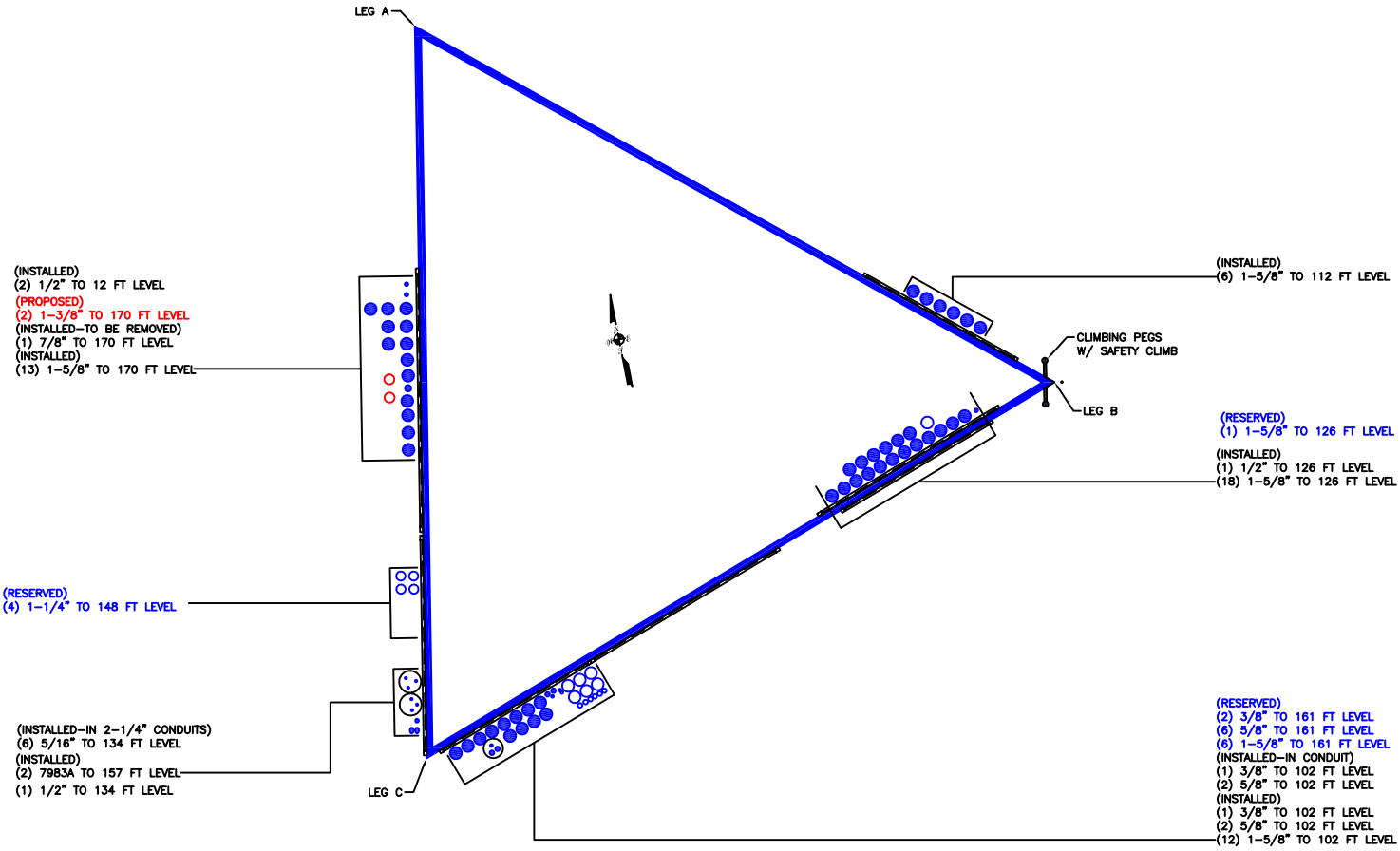
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	180 - 160	Leg	ROHN 3 EH	2	-11.012	116.138	9.5	Pass
T2	160 - 153.333	Leg	ROHN 4 EH	35	-17.533	167.901	10.4	Pass
T3	153.333 - 146.667	Leg	ROHN 4 EH	44	-27.835	167.900	16.6	Pass
T4	146.667 - 140	Leg	ROHN 4 EH	56	-38.426	167.901	22.9	Pass
T5	140 - 120	Leg	ROHN 5 EH	68	-78.037	251.347	31.0	Pass
T6	120 - 100	Leg	ROHN 6 EHS	89	-125.485	288.515	43.5	Pass
T7	100 - 80	Leg	ROHN 6 EH	110	-170.894	318.903	53.6	Pass
T8	80 - 70	Leg	ROHN 8 EHS	125	-194.734	405.715	48.0	Pass
T9	70 - 60	Leg	ROHN 8 EHS	134	-219.055	405.715	54.0	Pass
T10	60 - 40	Leg	ROHN 8 EHS	143	-266.830	405.717	65.8	Pass
T11	40 - 20	Leg	ROHN 8 EH	158	-313.892	530.833	59.1	Pass
T12	20 - 0	Leg	ROHN 8 EH	173	-360.403	530.833	67.9	Pass
T1	180 - 160	Diagonal	L2x2x3/16	10	-2.540	10.104	25.1 30.3 (b)	Pass
T2	160 - 153.333	Diagonal	L2 1/2x2 1/2x1/4	39	-4.205	19.793	21.2 34.0 (b)	Pass
T3	153.333 - 146.667	Diagonal	L2 1/2x2 1/2x1/4	51	-4.686	17.900	26.2 37.2 (b)	Pass
T4	146.667 - 140	Diagonal	L2 1/2x2 1/2x1/4	61	-5.900	16.240	36.3 48.5 (b)	Pass
T5	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	70	-8.345	12.489	66.8 70.1 (b)	Pass
T6	120 - 100	Diagonal	L3x3x1/4	92	-10.300	17.566	58.6 77.2 (b)	Pass
T7	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	113	-12.493	18.890	66.1 84.7 (b)	Pass
T8	80 - 70	Diagonal	L3 1/2x3 1/2x1/4	128	-13.112	17.632	74.4 87.4 (b)	Pass
T9	70 - 60	Diagonal	2L3 1/2x3 1/2x1/4x3/8	137	-14.034	27.940	50.2 65.2 (b)	Pass
T10	60 - 40	Diagonal	L4x4x1/4	146	-14.766	20.589	71.7 96.4 (b)	Pass
T11	40 - 20	Diagonal	L4x4x5/16	161	-15.697	21.559	72.8 80.9 (b)	Pass
T12	20 - 0	Diagonal	2L4x4x5/16x3/8	179	-17.312	31.945	54.2 76.4 (b)	Pass
T1	180 - 160	Top Girt	L2x2x1/8	6	-0.089	4.230	2.1	Pass
T3	153.333 - 146.667	Top Girt	L2 1/2x2 1/2x1/8	48	-0.394	4.069	9.7 11.3 (b)	Pass
T4	146.667 - 140	Top Girt	L2 1/2x2 1/2x1/8	58	0.311	16.822	1.9 5.2 (b)	Pass
T1	180 - 160	Mid Girt	L2x2x1/8	9	-0.536	3.097	17.3	Pass
							Summary	
							Leg (T12) 67.9	Pass
							Diagonal 96.4	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
						(T10) Top Girt	11.3	Pass
						(T3) Mid Girt	17.3	Pass
						(T1) Bolt Checks	96.4	Pass
						RATING =	**96.4**	**Pass**

Program Version 8.0.4.0

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 807133

APPENDIX C

ADDITIONAL CALCULATIONS

CCIplate

Project Information

BU #	807133
Site Name	BRG 134 943057
Order #	441000 Rev # 2

Tower Information

Tower Type	Self Support
TIA-222 Rev	H

Applied Loads

	Comp.	Uplift
Axial (k)	372.00	316.00
Shear (k)	48.00	41.00

Anchor Rod Data

Quantity:	10
Diameter (in):	1
Material Grade:	A449
Grout Considered:	Yes
l_{ar} (in):	1.5
Eta Factor, η:	0.55
Thread Type:	N-Included
Configuration:	Symmetrical

Anchor Rod Results

Axial, Pu (kips)	37.20
Shear, Vu (kips)	4.80
Moment, Mu (kip-ft)	-
Axial Cap., ϕPn (kips)	55.75
Shear Cap., ϕVn (kips)	16.73
Moment Cap., ϕMn (kip-ft)	-
Stress Rating	71.4%

Pass

BU: 807133
WO: 1593023

Date: 8/22/2018

Foundation Analysis - Rock Anchors

Applied Loads:

$U := 316kip$ Uplift Force per Leg

$C := 372kip$ Compression Force per Leg

$d_{pier} := 9ft$ $b_{pier} := 6.25ft$ Pier Dimensions

$L_{pier} := 9ft$ Pier Length

$n := 4$ Number of Anchors

$W_{conc} := \gamma_c \cdot L_{pier} \cdot d_{pier} \cdot b_{pier} = 75.94 \cdot kip$ Pier Weight

$R_u := U - 0.9 \cdot W_{conc} = 247.65 \cdot kip$ Applied Uplift Force

$R_c := C + 1.2 \cdot W_{conc} = 463.13 \cdot kip$ Applied Compression Force

Compression Analysis:

$q_{ult} := 30ksf$ Ultimate Bearing Capacity

$\phi := 0.75$ Bearing Strength Reduction Factor

$A_{bearing} := d_{pier} \cdot b_{pier} = 56.25\ ft^2$ Bearing Area

$R_{n\_bearing} := q_{ult} \cdot A_{bearing} = 1687.5 \cdot kip$ Nominal Bearing Capacity

$\phi R_{n\_bearing} := \phi \cdot R_{n\_bearing} = 1265.63 \cdot kip$ Bearing Capacity

$R_c = 463.10 \cdot kip$ Applied Compression Force

$Compression := \frac{R_c}{\phi R_{n\_bearing}} = 36.59 \cdot \%$ Bearing Stress Rating

Lateral Analysis:

$\mu := 0.3$ Sliding Friction Factor

$\phi := 0.75$ Sliding Strength Reduction Factor

$R_v := 48kip$ Compression Shear per Leg

$R_c = 463.13 \cdot kip$ Applied Compression Force per Leg

$R_s := R_c \cdot \mu = 138.94 \cdot kip$ Nominal Lateral Resistance

$\phi R_s := \phi \cdot R_s = 104.18 \cdot kip$ Lateral Resistance

$Lateral := \frac{R_v}{\phi R_s} = 46.06 \cdot \%$ Lateral Stress Rating

Uplift Analysis:

8.1.a Steel Anchor Nominal Tensile Strength:

$F_u := 90ksi$ — A615 Gr. 60 Rebar

$A_{net} := 1.56in^2$ — #11 Rebar

$R_u = 247.65 \cdot kip$ — Uplift Force per Leg

$R_{n\_steel} := F_u \cdot A_{net} = 140.4 \cdot kip$ — Nominal Steel Anchor Strength per Anchor

8.1.b Steel-to-Grout Nominal Bonding Strength:

$L := 8.5ft$ — Embedded Length

$d_{hole} := 2.25in$ — Hole Diameter

$\theta := 0°$ — Batter Angle

$f_c := 4000psi$ — Grout Compressive Strength (Assumed)

$A_s := \pi \cdot d_{hole} \cdot \left(\frac{L}{\cos(\theta)} \right) = 721 \cdot in^2$ — Rebar Surface Area

$F_{s\_g} := 6 \cdot \sqrt{f_c} \cdot \sqrt{psi} = 379.47 \cdot psi$ — Steel-to-Grout Bond Strength

$R_{n\_steel\_to\_grout} := A_s \cdot F_{s\_g} = 273.6 \cdot kip$ — Nominal Steel-to-Grout Bond Strength per Anchor

8.1.c Grout-Rock Nominal Bonding Strength:

$L_{rock} := 8.5ft$ — Length of Embedment Into Rock Layer

$d_{hole} := 2.25in$ — Hole Diameter

$\theta := 0°$ — Batter Angle

$F_{r\_g} := 110psi$ — Grout-Rock Bond Strength

$A_b := \pi \cdot d_{hole} \cdot \left(\frac{L_{rock}}{\cos(\theta)} \right) = 721 \cdot in^2$ — Grout Surface Area

$R_{n\_rock\_grout} := F_{r\_g} \cdot A_b = 79.31 \cdot kip$ — Nominal Grout-Rock Bond Strength per Anchor

8.1.d Nominal Weight of Rock Prism

$L_{eff} := 11.25\,ft$ Effective Embedment Length Into Rock

$d_{anchors} := 2.083\,ft$ Diameter of Anchor Group @ Effective Embedment (Assumed)

$\phi_{rock} := 40°$ Interal Friction Angle of Rock

$\gamma_{rock} := 140\,pcf$ Unit Weight of Rock

$h_{soil} := 20\,ft$ Soil Layer Height

$\phi_{soil} := 40°$ Internal Friction Angle of Soil

$\gamma_{soil} := 135\,pcf$ Unit Weight of Soil

$d_1 := d_{anchors} = 2.083\ ft$ Diameter of Anchor Group @ Effective Embedment

$d_2 := 2 \cdot L_{eff} \cdot \tan(\phi_{rock}) + d_{anchors} = 20.96\ ft$ Diameter @ Top of Rock Layer

$d_3 := d_2 + 2 \cdot h_{soil} \cdot \tan(\phi_{soil}) = 54.53\ ft$ Diameter @ Top of Soil Layer

$$V_{rock} := \frac{\pi \cdot L_{eff}}{3} \cdot \left[\left(\frac{d_2}{2} \right)^2 + \left(\frac{d_2}{2} \right) \left(\frac{d_1}{2} \right) + \left(\frac{d_1}{2} \right)^2 \right] = 1435.63 \cdot ft^3$$

$$V_{soil} := \frac{\pi \cdot h_{soil}}{3} \cdot \left[\left(\frac{d_3}{2} \right)^2 + \left(\frac{d_3}{2} \right) \left(\frac{d_2}{2} \right) + \left(\frac{d_2}{2} \right)^2 \right] = 23853.22 \cdot ft^3$$

$W_{rock} := \gamma_{rock} \cdot V_{rock} = 200.99 \cdot kip$ Weight of Rock Cone

$W_{soil} := \gamma_{soil} \cdot V_{soil} = 3220.19 \cdot kip$ Weight of Soil Cone

$R_{n\_rock} := W_{rock} + W_{soil} = 3421.17 \cdot kip$ Total Rock & Soil Prism Weight

$R_n := \min(R_{n\_steel}, R_{n\_steel\_to\_grout}, R_{n\_rock\_grout}, R_{n\_rock}) = 79.31 \cdot kip$

$\phi R_n := \phi \cdot R_n = 59.48 \cdot kip$

$P_u := \frac{R_u}{n} = 61.91 \cdot kip$

$Uplift := \frac{P_u}{\phi R_n} = 99.1 \cdot \%$

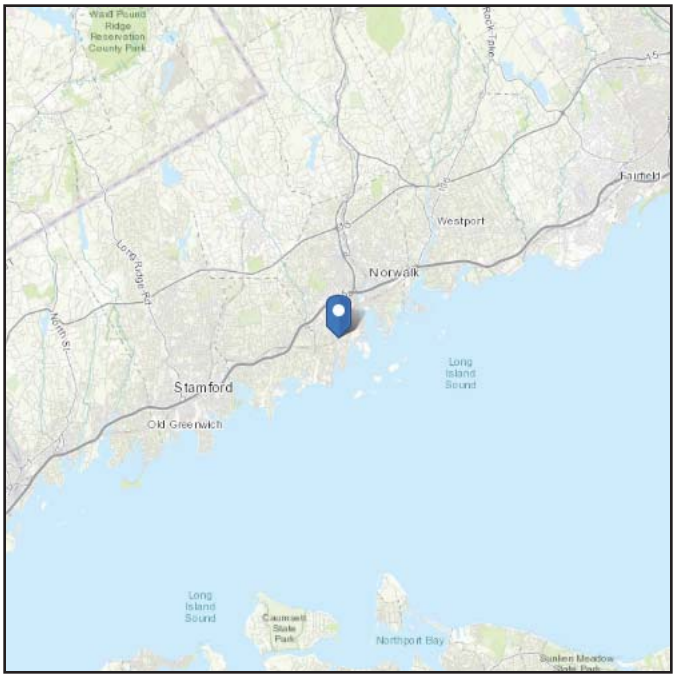
For Rev.H 1.05 has been applied.

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 60.78 ft (NAVD 88)
Latitude: 41.081789
Longitude: -73.430422



Wind

Results:

Wind Speed:	120 Vmph
10-year MRI	76 Vmph
25-year MRI	86 Vmph
50-year MRI	92 Vmph
100-year MRI	98 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:	Sun Aug 26 2018

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).

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

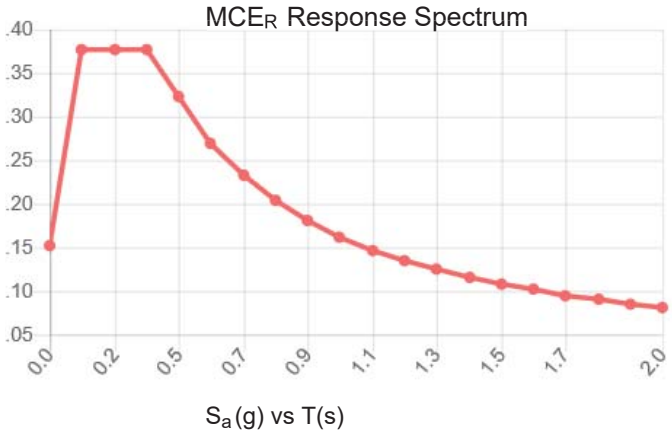
Seismic

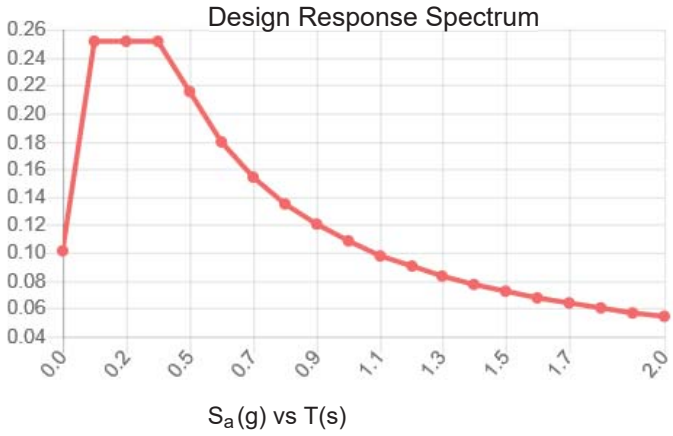
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.236	S_{DS} :	0.252
S_1 :	0.068	S_{D1} :	0.108
F_a :	1.600	T_L :	6.000
F_v :	2.400	PGA :	0.134
S_{MS} :	0.377	PGA_M :	0.206
S_{M1} :	0.162	F_{PGA} :	1.531
		I_e :	1

Seismic Design Category B





Data Accessed: Sun Aug 26 2018

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:	Sun Aug 26 2018

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: **September 26, 2018**

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

Maser Consulting Connecticut
331 Newman Springs Road, Suite 203
Red Bank, NJ 07701
(732) 383-1950

Subject:	**Mount Analysis**	
Carrier Designation:	**T-Mobile Tower Equipment**	
	Carrier Site Number:	CT11114D
	Carrier Site Name:	Norwalk/South Norwalk
Crown Castle Designation:	**Crown Castle BU Number:**	807133
	Crown Castle Site Name:	BRG 134 943057
	Crown Castle JDE Job Number:	505281
	Crown Castle Order Number:	441000 Rev. 0
Engineering Firm Designation:	Maser Consulting Connecticut **Report Designation:** 18922035A	
Site Data:	**50 Rockland Road Norwalk OFC-MTSO, So Norwalk, Fairfield County, CT, 06854** **Latitude 41°4'54.44 " Longitude -73°25'49.52 "**	
Structure Information:	**Tower Height & Type:**	**182 ft Self-Support**
	Mount Elevation:	**170 ft**
	Mount Type:	**13 ft Sector Mount**

Dear Charles McGuirt,

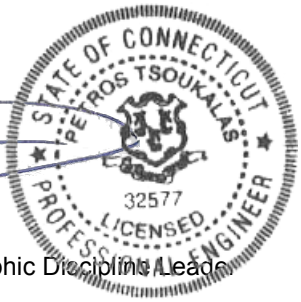
Maser Consulting Connecticut is pleased to submit this **"Mount Analysis Report"** to determine the structural integrity of T-Mobile's antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis.

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:

Sector Mount (Typical of 3) **Sufficient**

The analysis has been performed in accordance with the TIA-222-H Standard. This analysis utilizes an ultimate 3-second gust wind speed of 125 mph from the 2012/2015 International Building Code. Exposure Category B with a maximum topographic factor, Kzt, of 1.0 and Risk Category II was/were used in this analysis.

Mount structural analysis prepared by: Clara Basanti
Respectfully Submitted by:



Petros E. Tsoukalas, P.E.
Principal Associate/Geographic Discipline Leader
Connecticut License: 32557
856-797-0412
Ptsoukalas@Maserconsulting.com

Clara Basanti
Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This mount is a proposed13 ft Sector Mount mapped by Tower Engineers Professionals (TEP).This mount is installed at 170 ft elevation on 3 sector(s) of the 182 ft self-support tower**.**

2) ANALYSIS CRITERIA

Building Code:	2016 Connecticut State Building Code
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	125 mph
Exposure Category:	B
Topographic Category:	1
Topographic Factor:	1.0
Ice Thickness:	1.5 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

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Existing Mount Type
170	170	3	Ericsson	Air 32 B2A/B66Aa	Sector Mount
		3	Ericsson	Air 3246 B66	
		3	RFS	APXVAARR24_43-U-NA20	
172	172	2	Ericsson	KRY 112 144/1	
173	173	1	Ericsson	KRY 112 144/1	
170	170	3	Ericsson	RADIO 4449 B12/B71	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Date/Reference	Source
Sector Frame Specification	TEP	September 21, 2018	TEP Project # 144550.177533

3.1) Analysis Method

RISA-3D, 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.The program performs design checks of structures under user specified loads. The user specified loads have been calculated separately based on the requirements of the above referenced codes. The program performs an analysis based on the steel code to determine the adequacy of the members and produces the reactions at the connection points of the mounts to the existing structure.

Proprietary excel sheets were used to calculate appurtenance and member loading 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 B).

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 Table 1 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) 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

This analysis may be affected if any assumptions are not valid or have been made in error. Maser Consulting Connecticut 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 (Sector Mount, Alpha, Beta & Gamma Sectors)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
2	V-Horizontals	-	170	89.9	Pass
2	Inner Bracings		170	45.9	Pass
2	Main Standoff Pipe		170	67.5	Pass
2	Antenna Pipe 2.5 STD		170	29.2	Pass
2	Antenna Pipe 2.0 STD		170	16.2	Pass
2	Stabilizer		170	31.4	Pass
2	Face Horizontals		170	89.8	Pass
2	Face Diagonal Bracings		170	22.9	Pass
1,2	Mount to Tower Attachment		170	58.5	Pass

Structure Rating (max from all components) =	89.9%

Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
2) All sectors are typical

Table 4 - Tieback Connection Data Table

Tower Connection Node No.	Existing / Proposed	Resultant End Reaction (lb)	Connected Member Type	Connected Member Size	Member Compressive Capacity (lb)[3]	Notes
N62	Existing	1,328	Leg	ROHN 3 EH	110,608	1,3

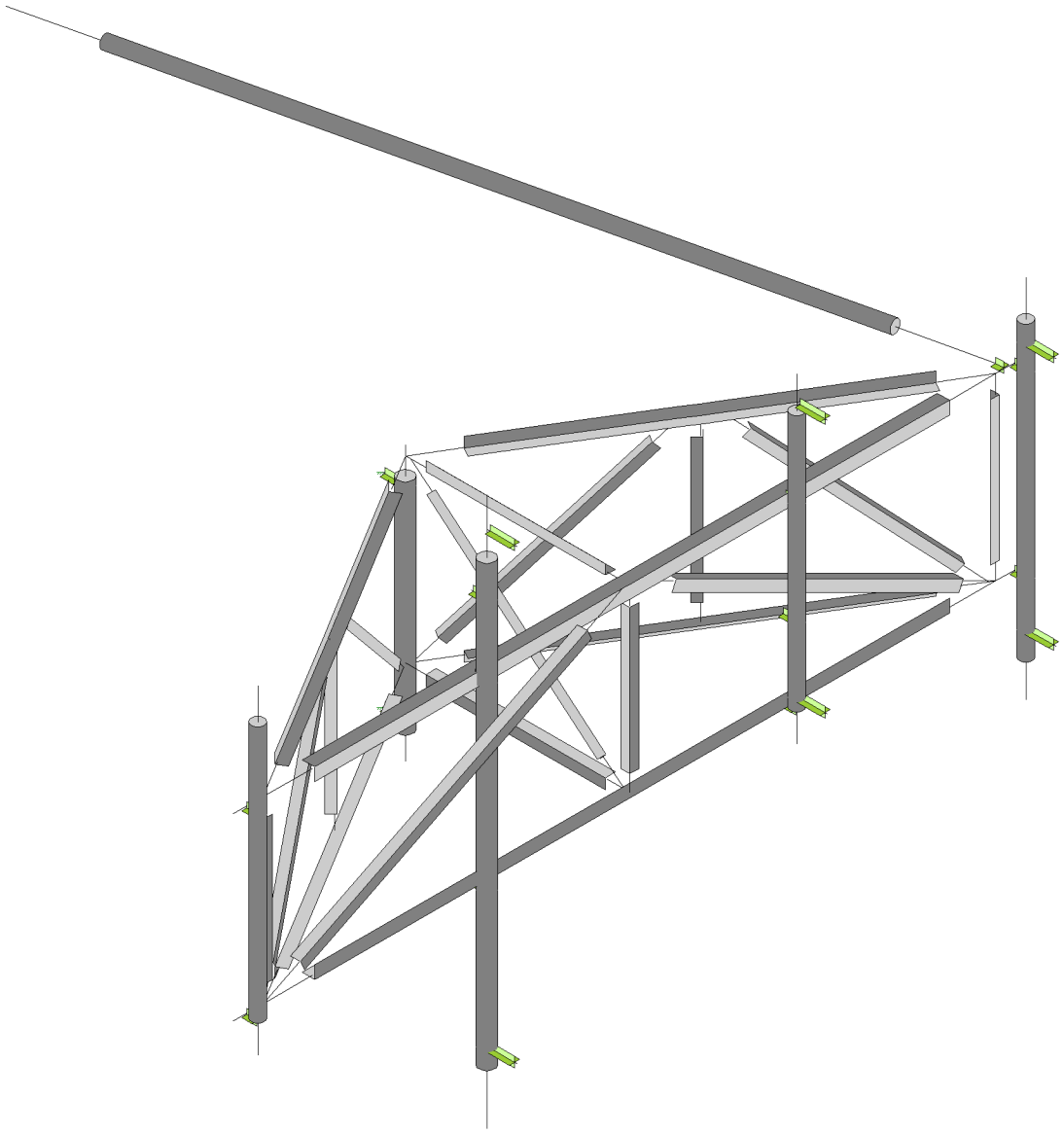
Notes:
1) Tieback connection point is within 25% of either end of the connected tower member
2) Tieback connection point is NOT within 25% of either end of the connected tower member
3) Reduced member compressive capacity according to CED-STD-10294 *Standard for Installation of Mounts and Appurtenances*

4.1) Recommendations

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

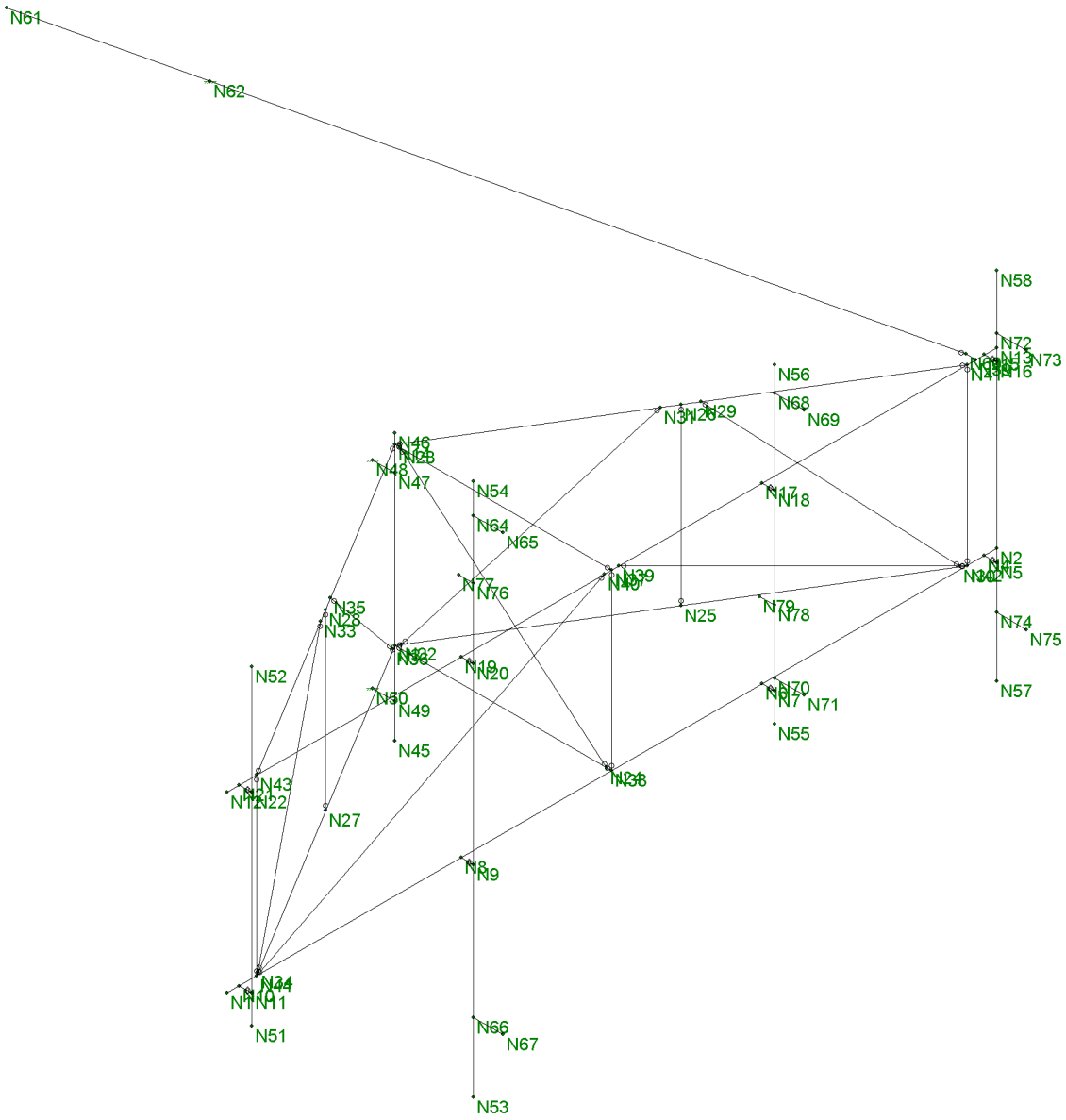
APPENDIX A

WIRE FRAME AND RENDERED MODELS



Envelope Only Solution

Maser Consulting P.A.		SK - 1
CB	Mount Analysis	Sept 26, 2018 at 5:04 PM
18922035A	Rendered View	Sector Frame.r3d



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Maser Consulting P.A.		SK - 2
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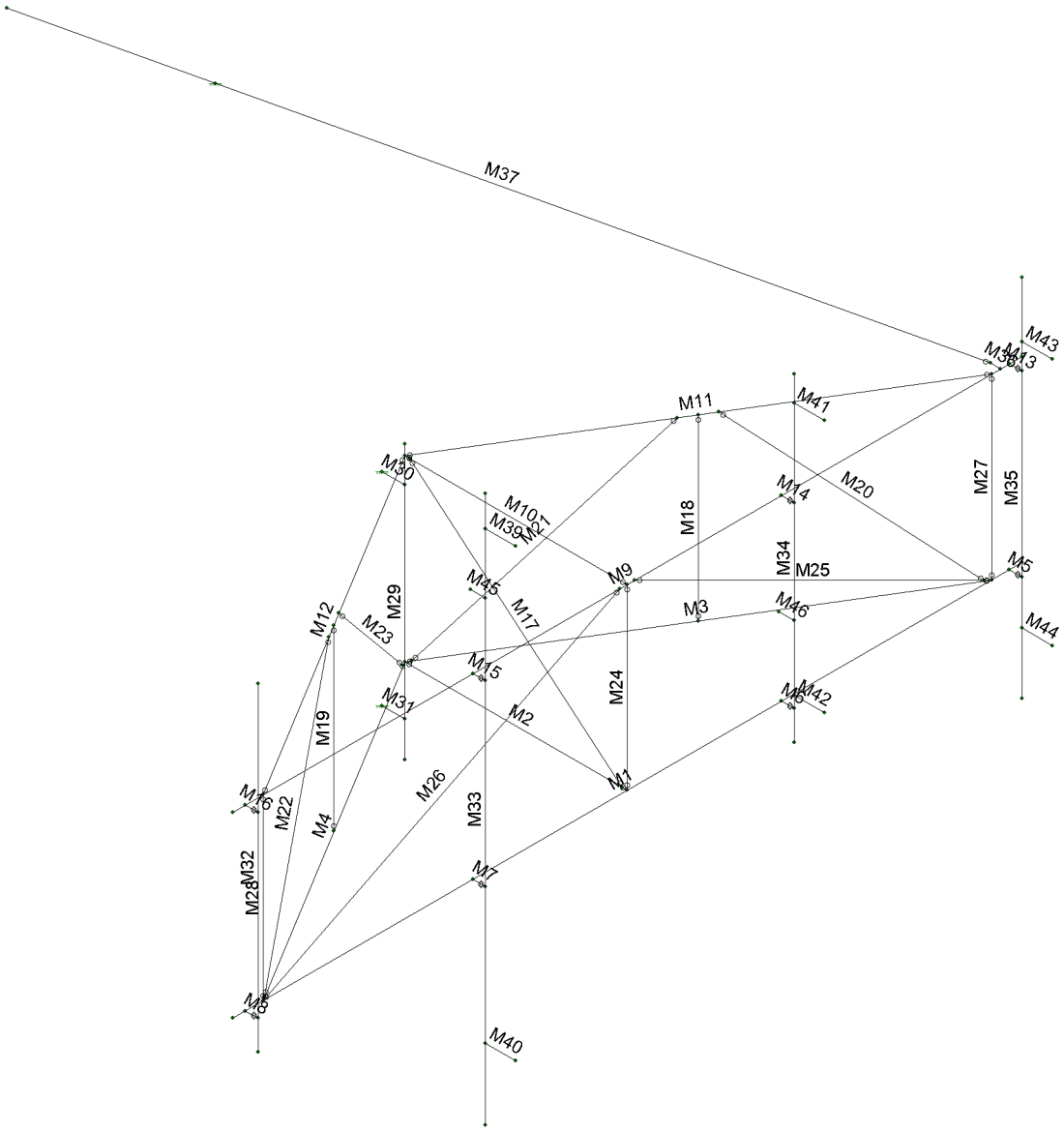
18922035A	Joints	Sector Frame.r3d



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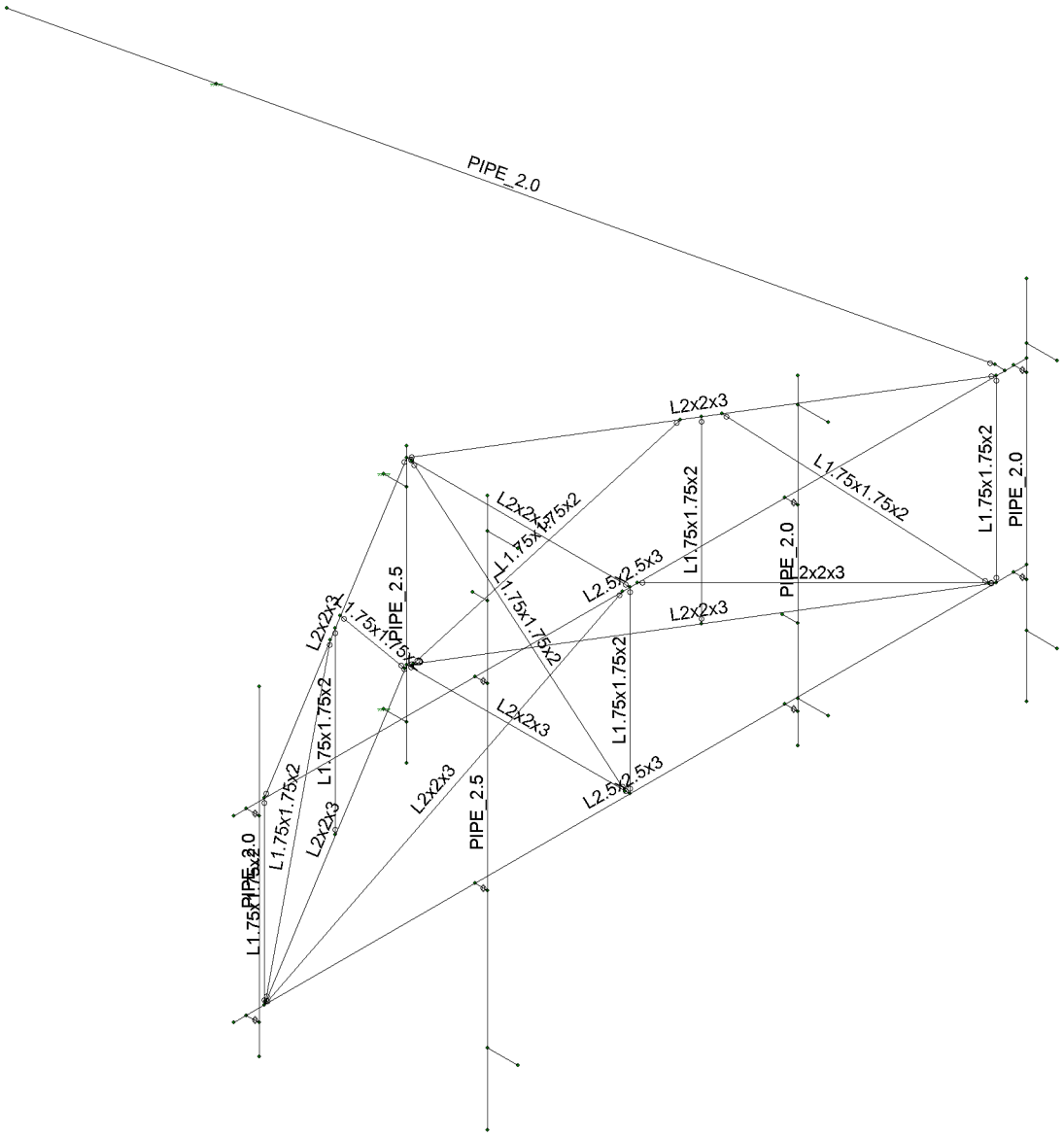

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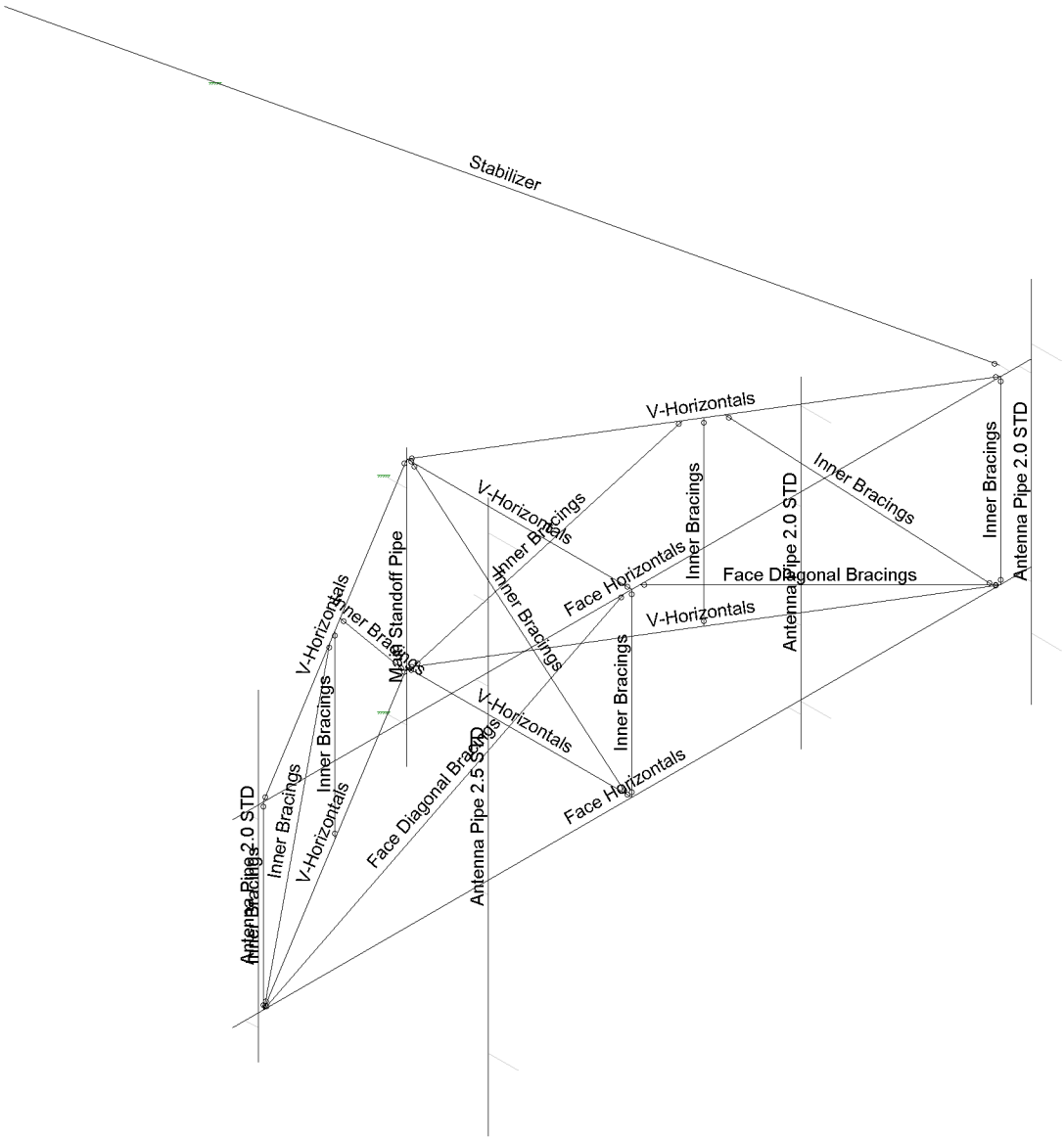

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Maser Consulting P.A.		SK - 5
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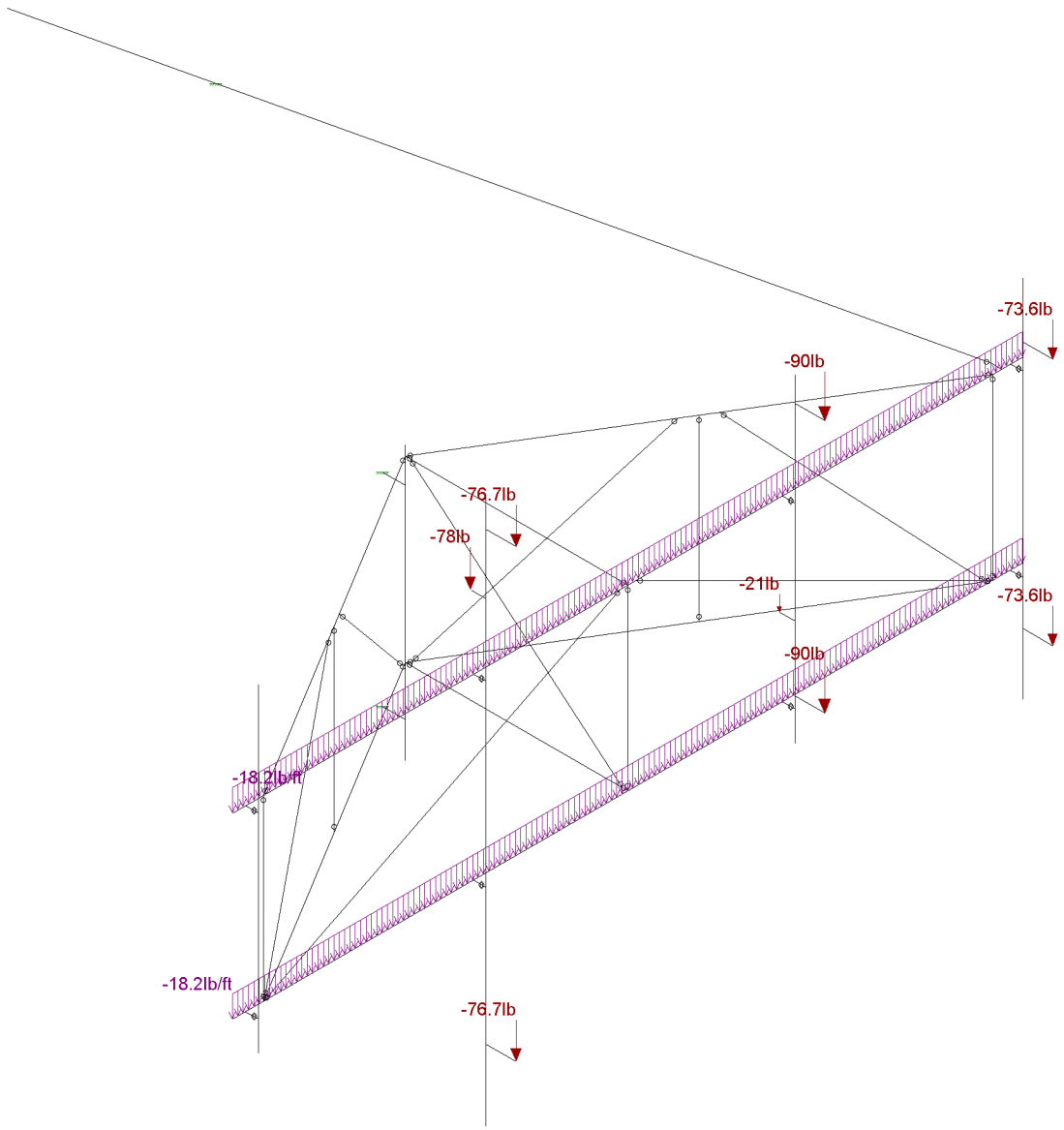
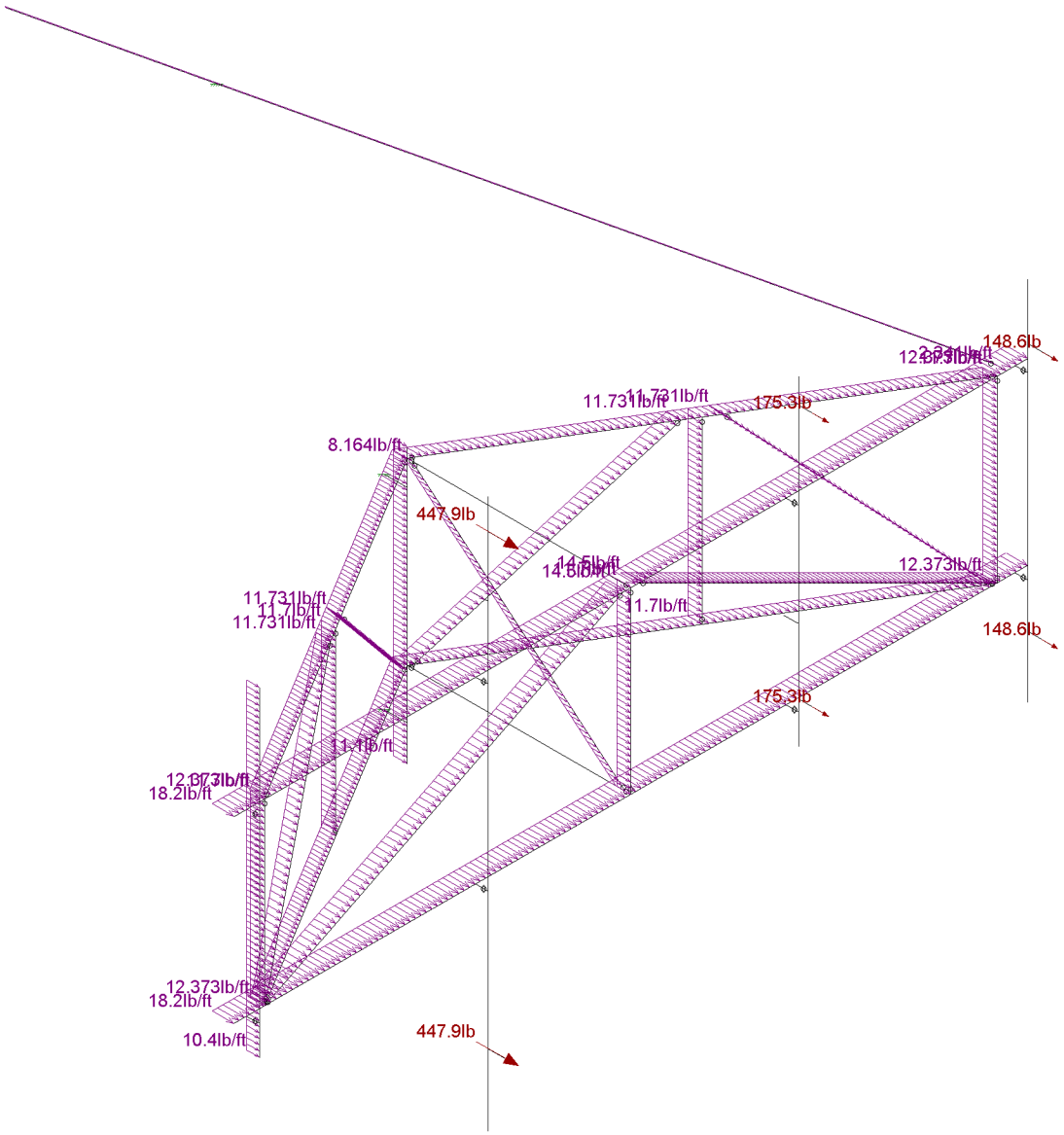
18922035A	Section Sets	Sector Frame.r3d



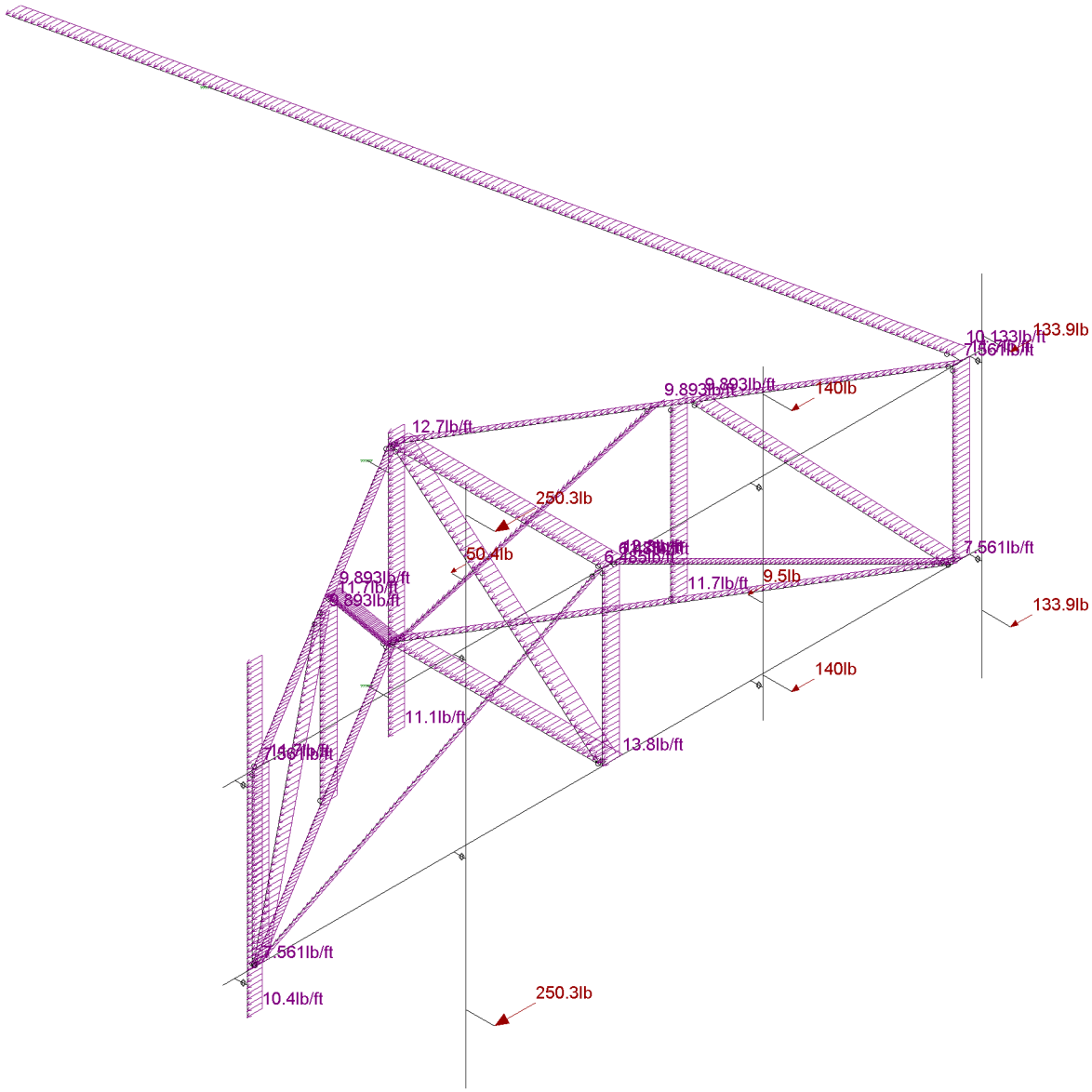
Loads: BLC 1, Dead
Envelope Only Solution

Maser Consulting P.A.		SK - 6
CB	Mount Analysis	Sept 26, 2018 at 5:05 PM
18922035A	Dead Load	Sector Frame.r3d



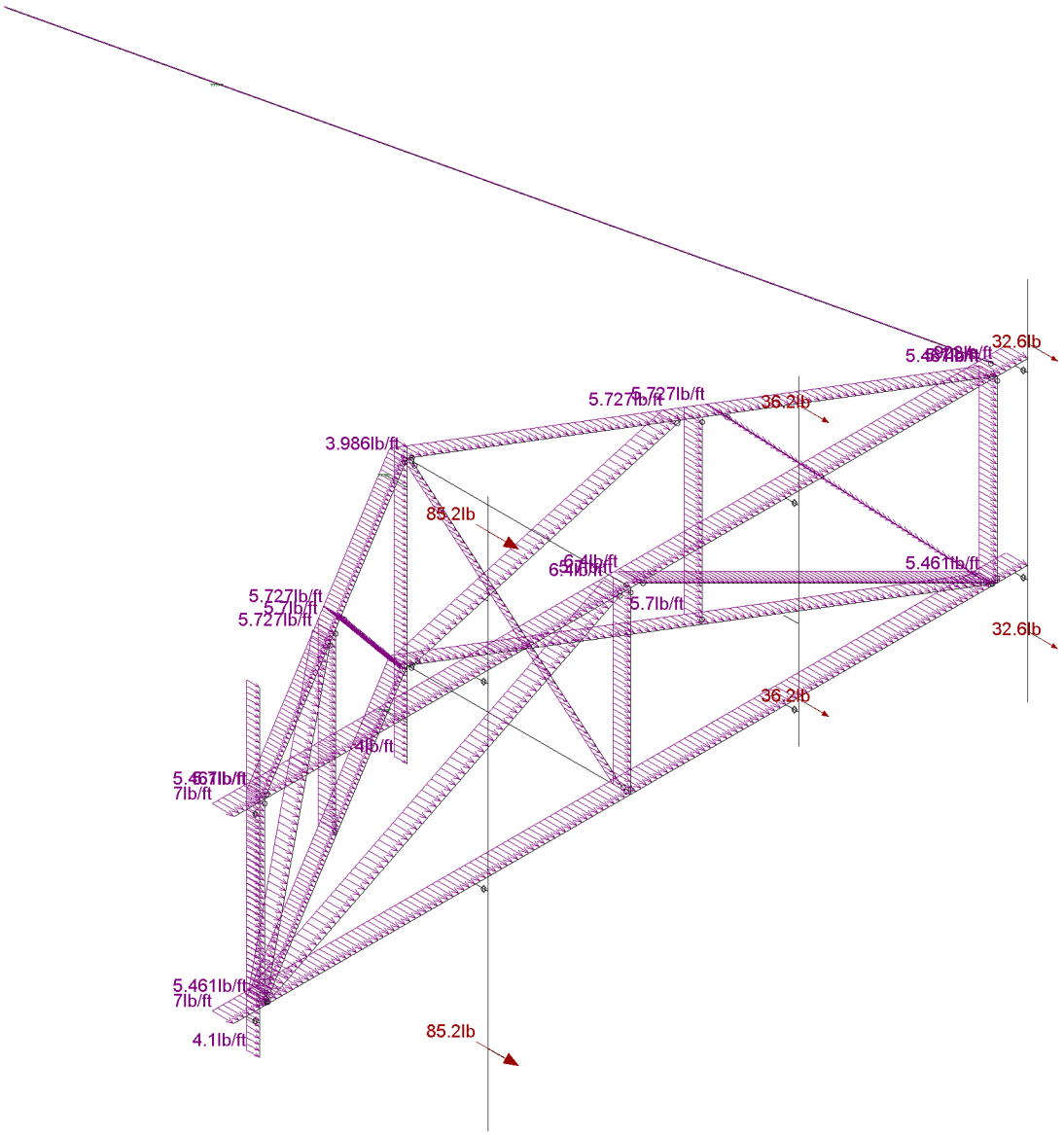
Loads: BLC 2, Wx
Envelope Only Solution

Maser Consulting P.A.		SK - 7
CB	Mount Analysis	Sept 26, 2018 at 5:05 PM
18922035A	Wind X	Sector Frame.r3d



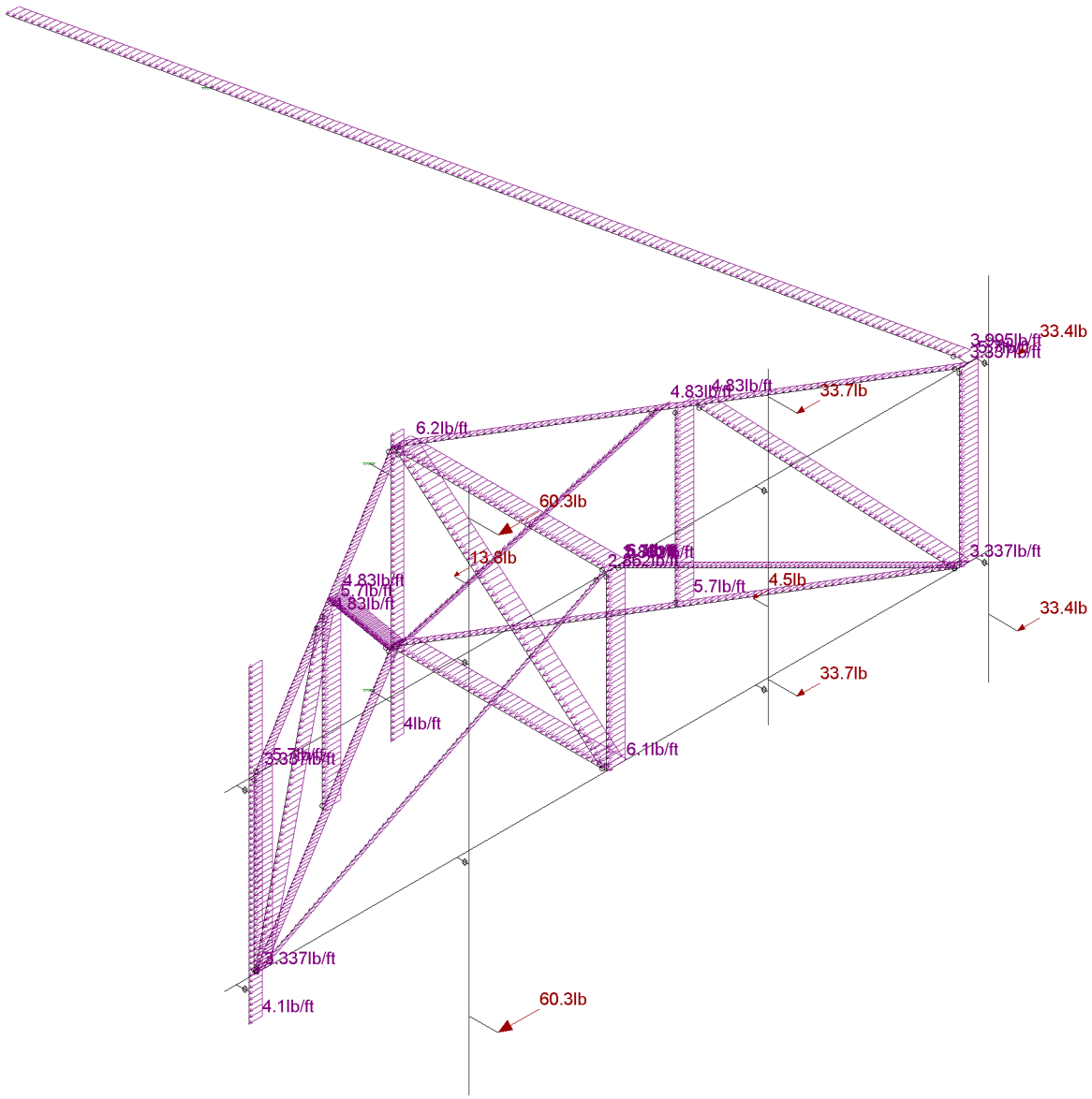
Loads: BLC 3, Wz
Envelope Only Solution

Maser Consulting P.A.		SK - 8
CB	Mount Analysis	Sept 26, 2018 at 5:05 PM
18922035A	Wind Z	Sector Frame.r3d



Loads: BLC 4, Wx Ice
Envelope Only Solution

Maser Consulting P.A.		SK - 9
CB	Mount Analysis	Sept 26, 2018 at 5:10 PM
18922035A	Ice Wind X	Sector Frame.r3d



Loads: BLC 5, Wz Ice
Envelope Only Solution

Maser Consulting P.A.		SK - 10
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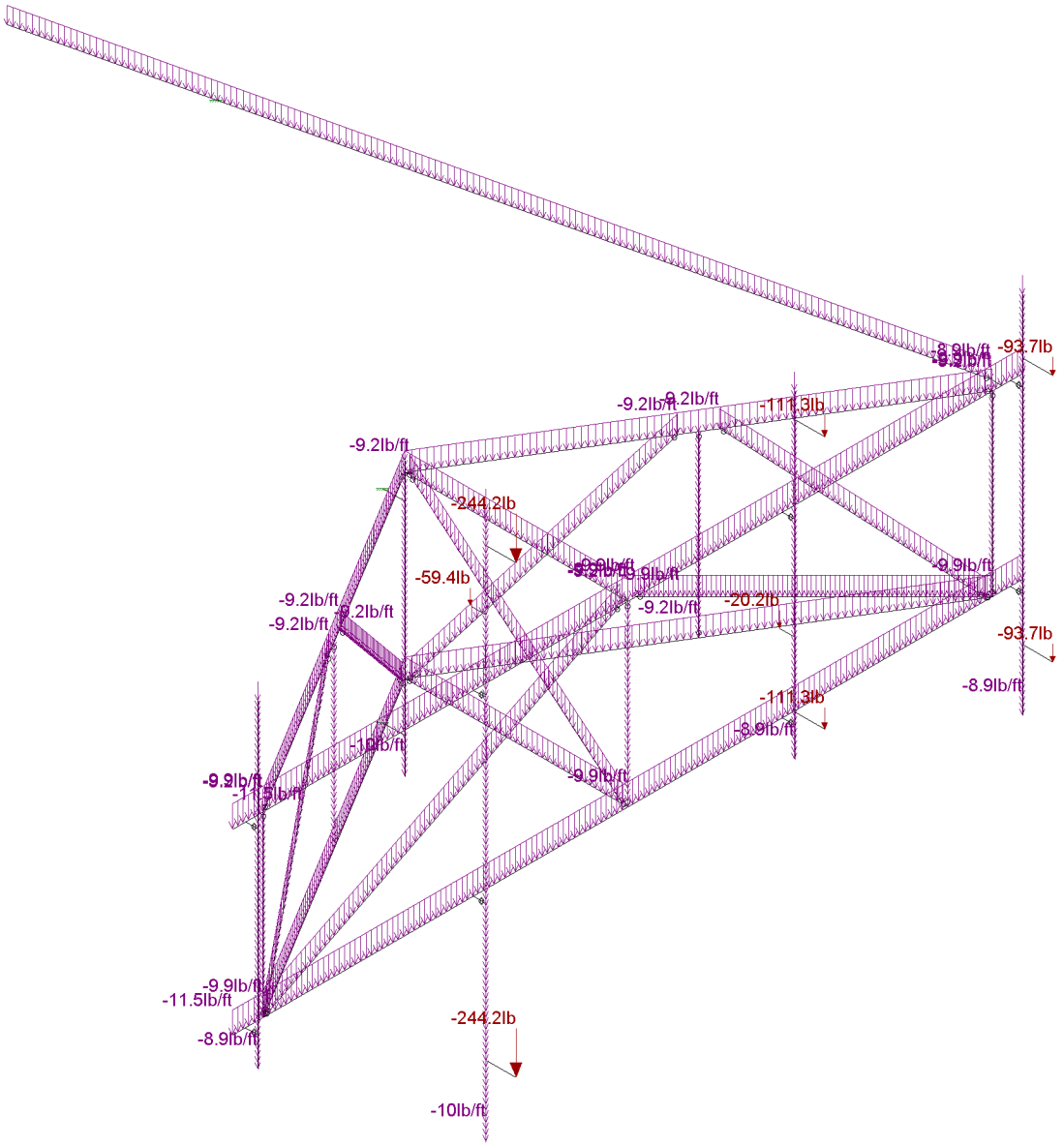
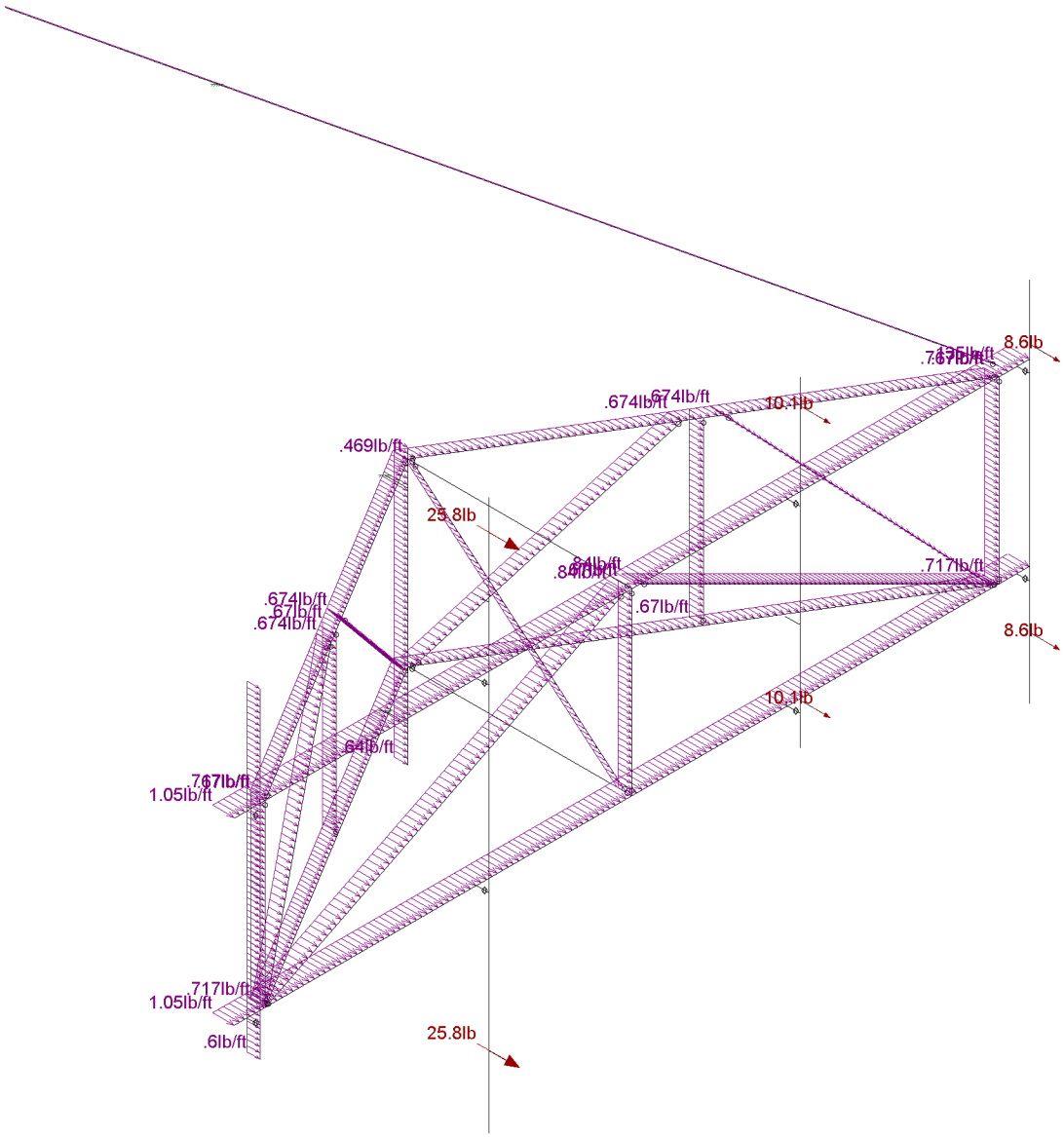


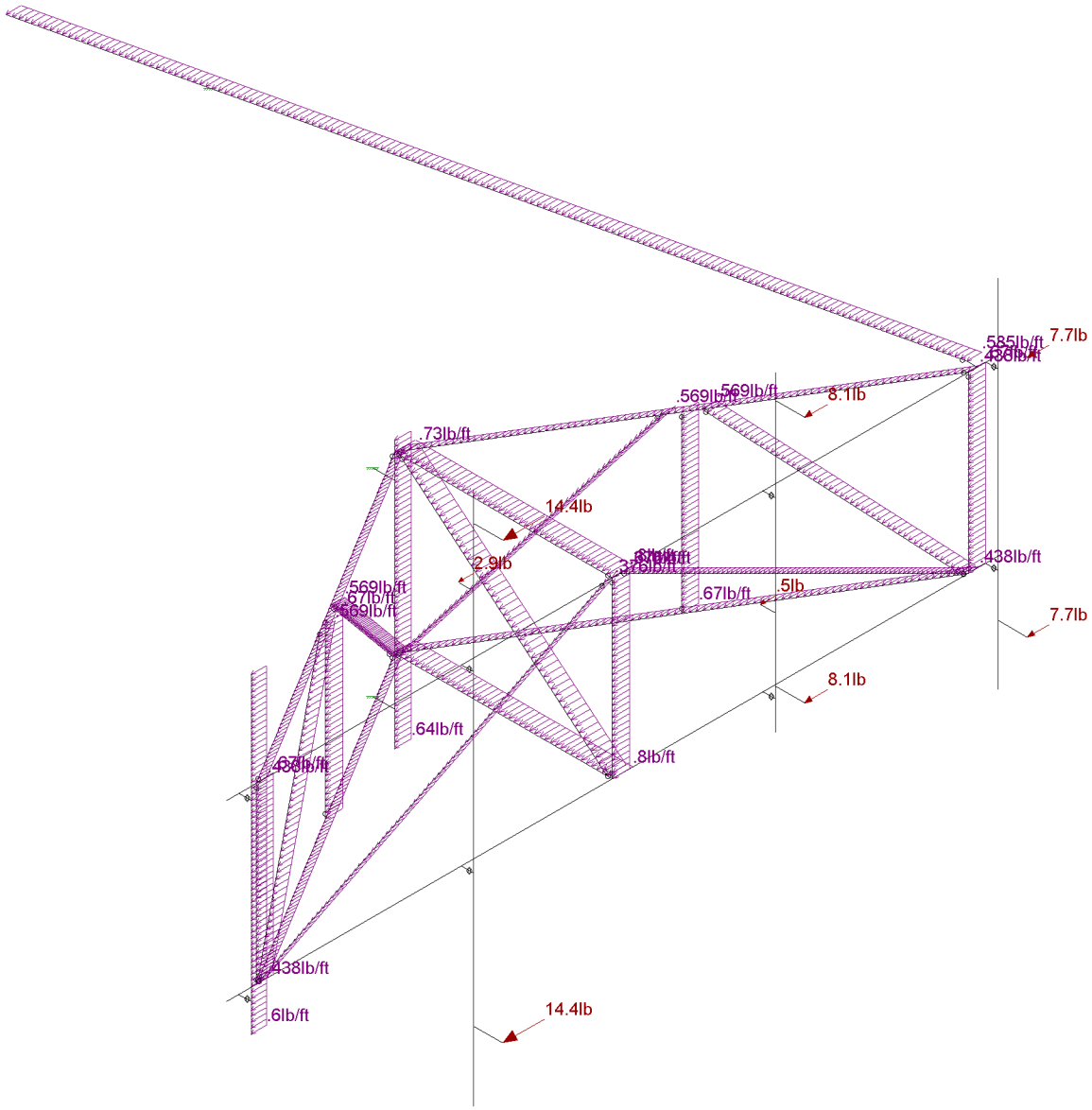
Loads: BLC 6, Ice Weight
Envelope Only Solution

Maser Consulting P.A.		SK - 11
CB	Mount Analysis	Sept 26, 2018 at 5:10 PM
18922035A	Ice Dead Load	Sector Frame.r3d



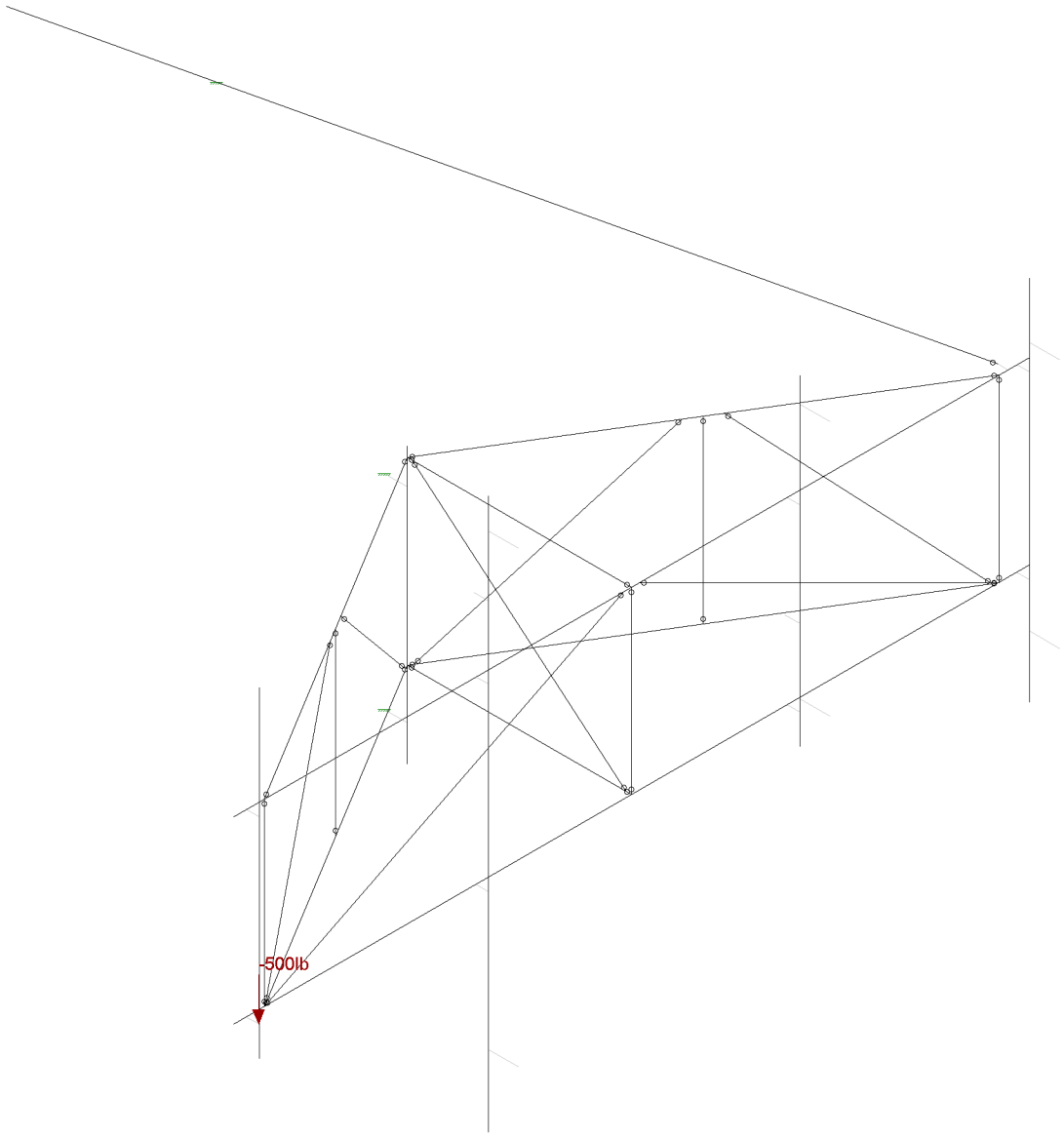
Loads: BLC 7, Wx Service
Envelope Only Solution

Maser Consulting P.A.		SK - 12
CB	Mount Analysis	Sept 26, 2018 at 5:11 PM
18922035A	Service Wind X	Sector Frame.r3d



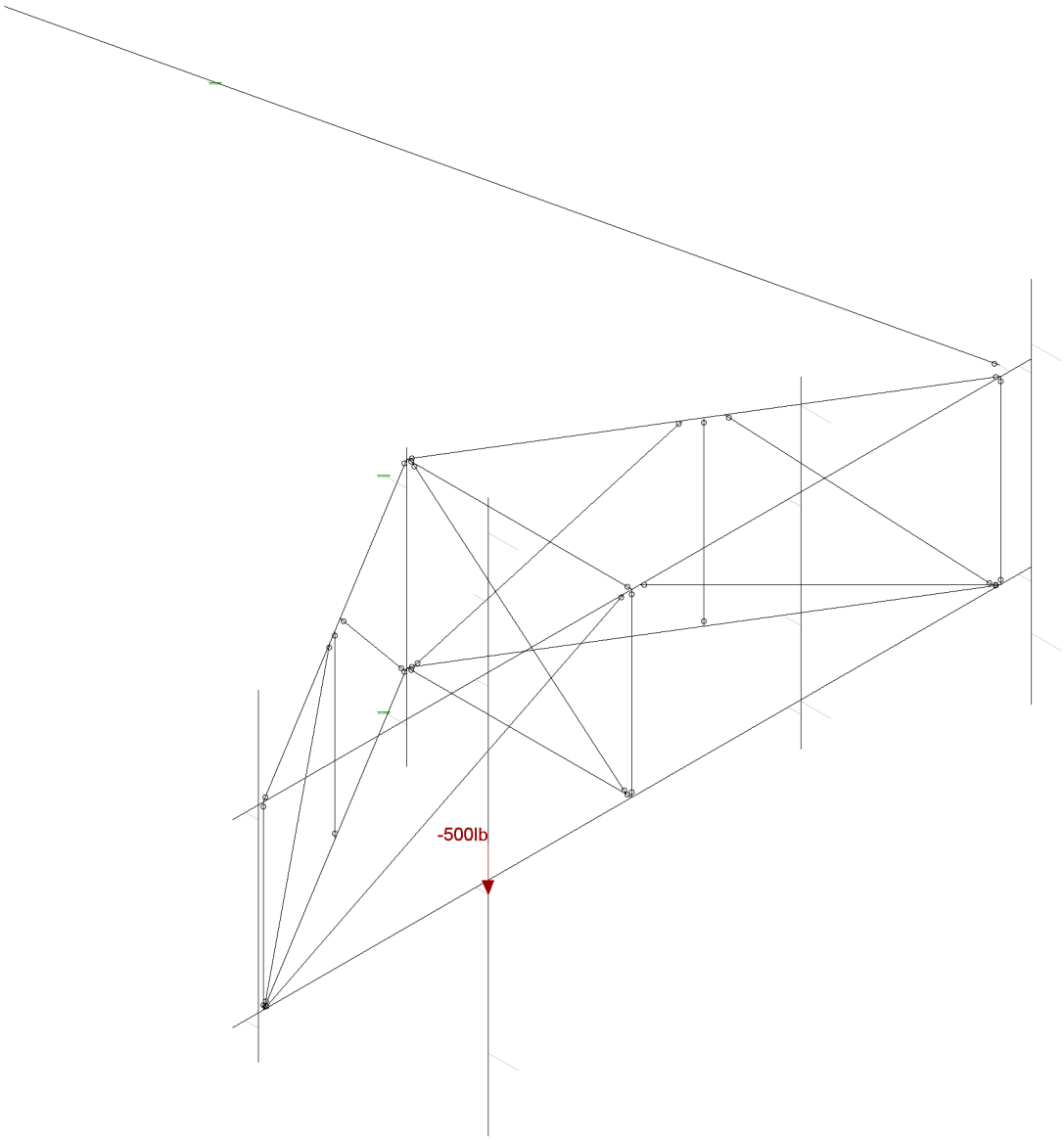
Loads: BLC 8, Wz Service
Envelope Only Solution

Maser Consulting P.A.		SK - 13
CB	Mount Analysis	Sept 26, 2018 at 5:11 PM
18922035A	Service Wind Z	Sector Frame.r3d



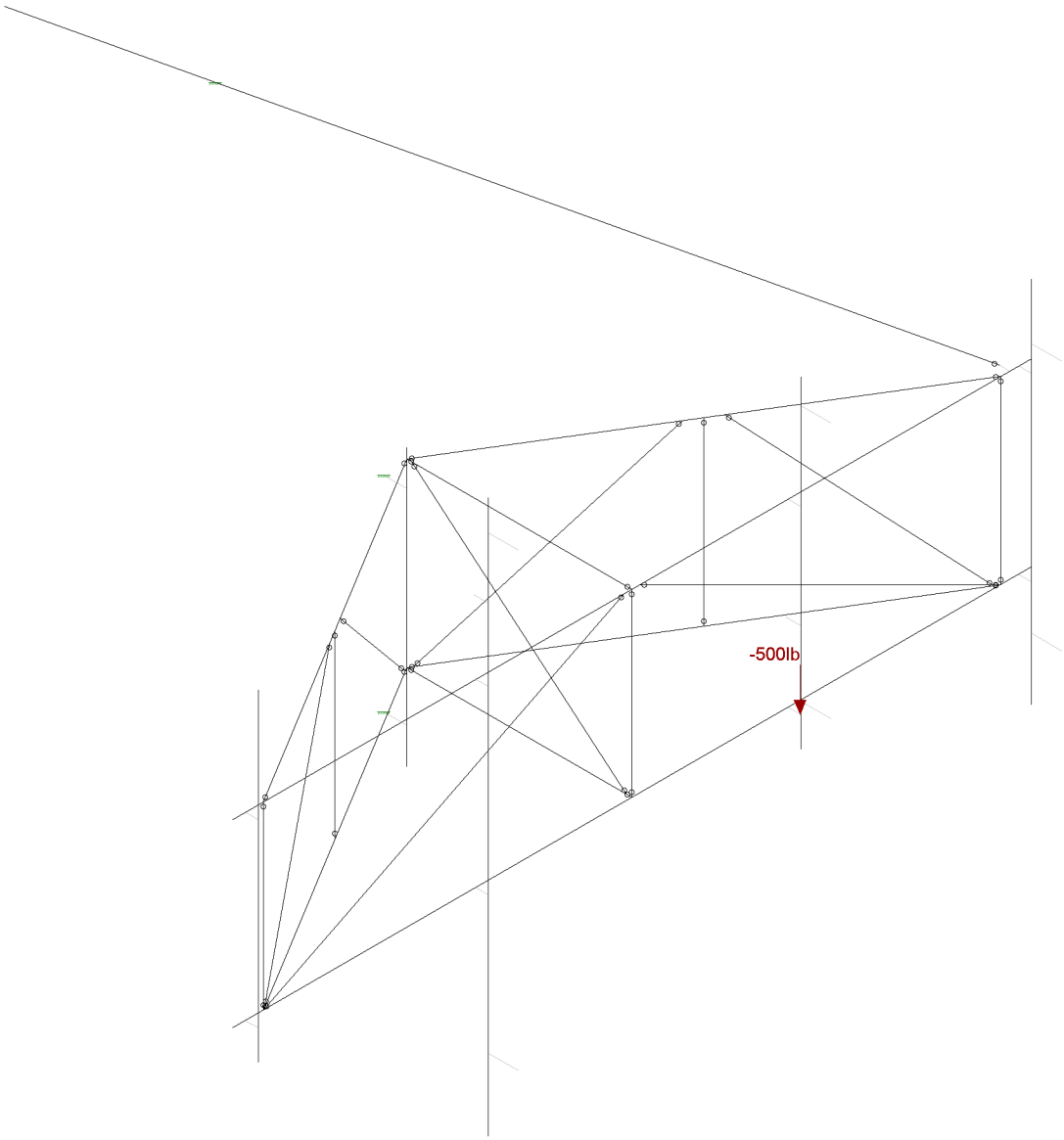
Loads: BLC 9, Maintenance Load LM1
Envelope Only Solution

Maser Consulting P.A.		SK - 20
CB	Mount Analysis	Sept 26, 2018 at 5:15 PM
18922035A	Maintenance 1	Sector Frame.r3d



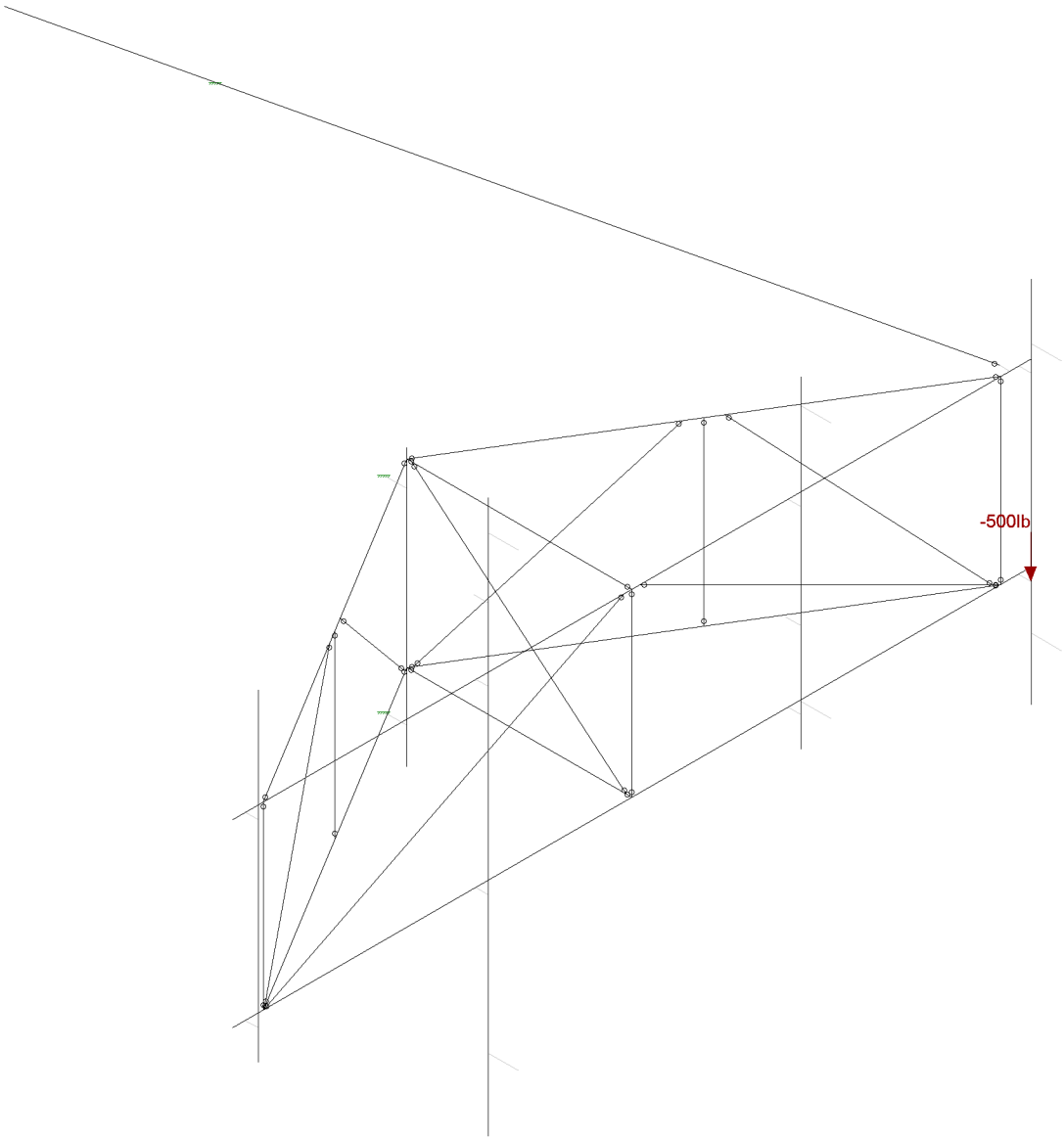
Loads: BLC 10, Maintenance Load LM2
Envelope Only Solution

Maser Consulting P.A.		SK - 21
CB	Mount Analysis	Sept 26, 2018 at 5:15 PM
18922035A	Maintenance 2	Sector Frame.r3d



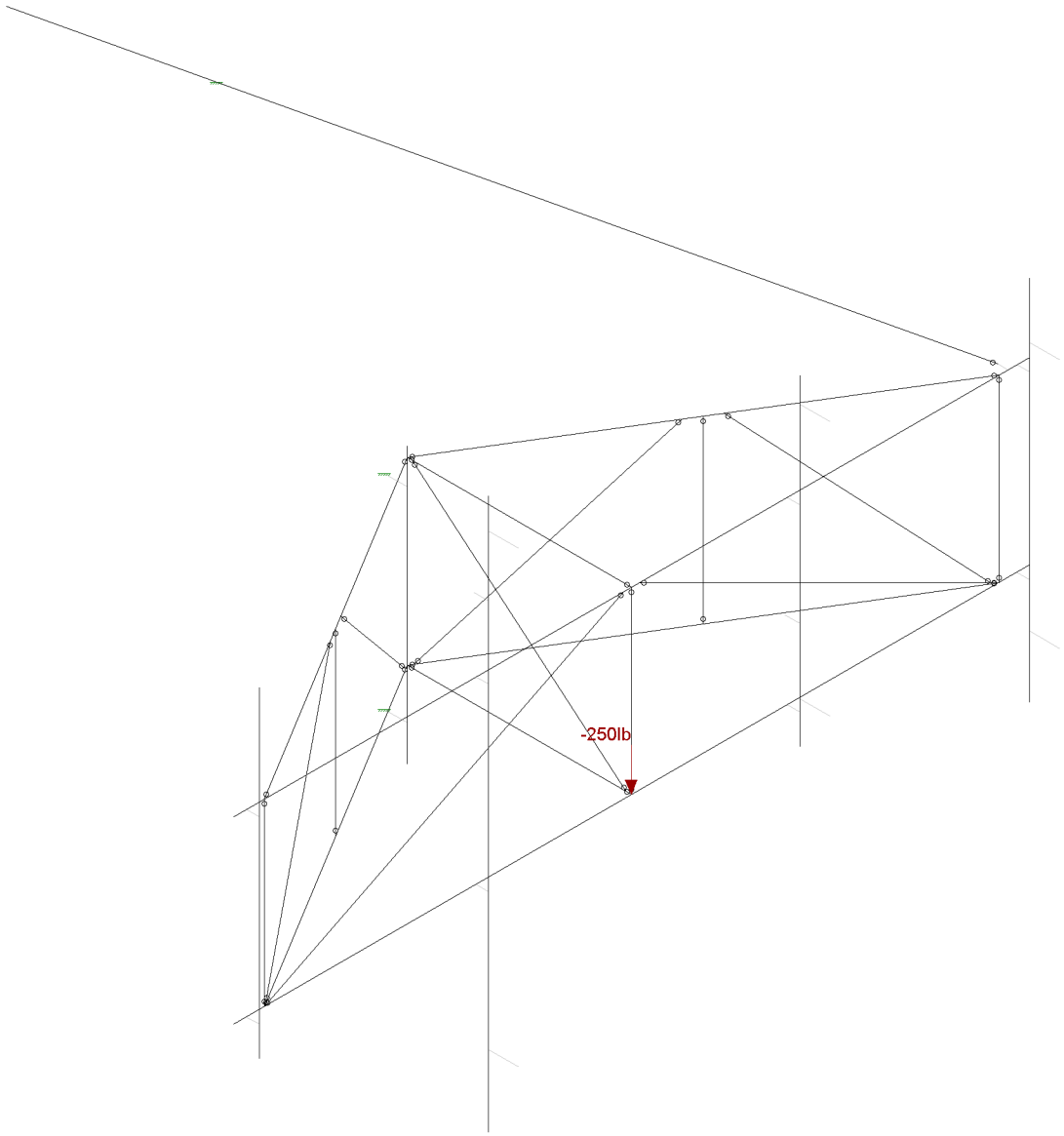
Loads: BLC 11, Maintenance Load LM3
Envelope Only Solution

Maser Consulting P.A.		SK - 22
CB	Mount Analysis	Sept 26, 2018 at 5:15 PM
18922035A	Maintenance 3	Sector Frame.r3d



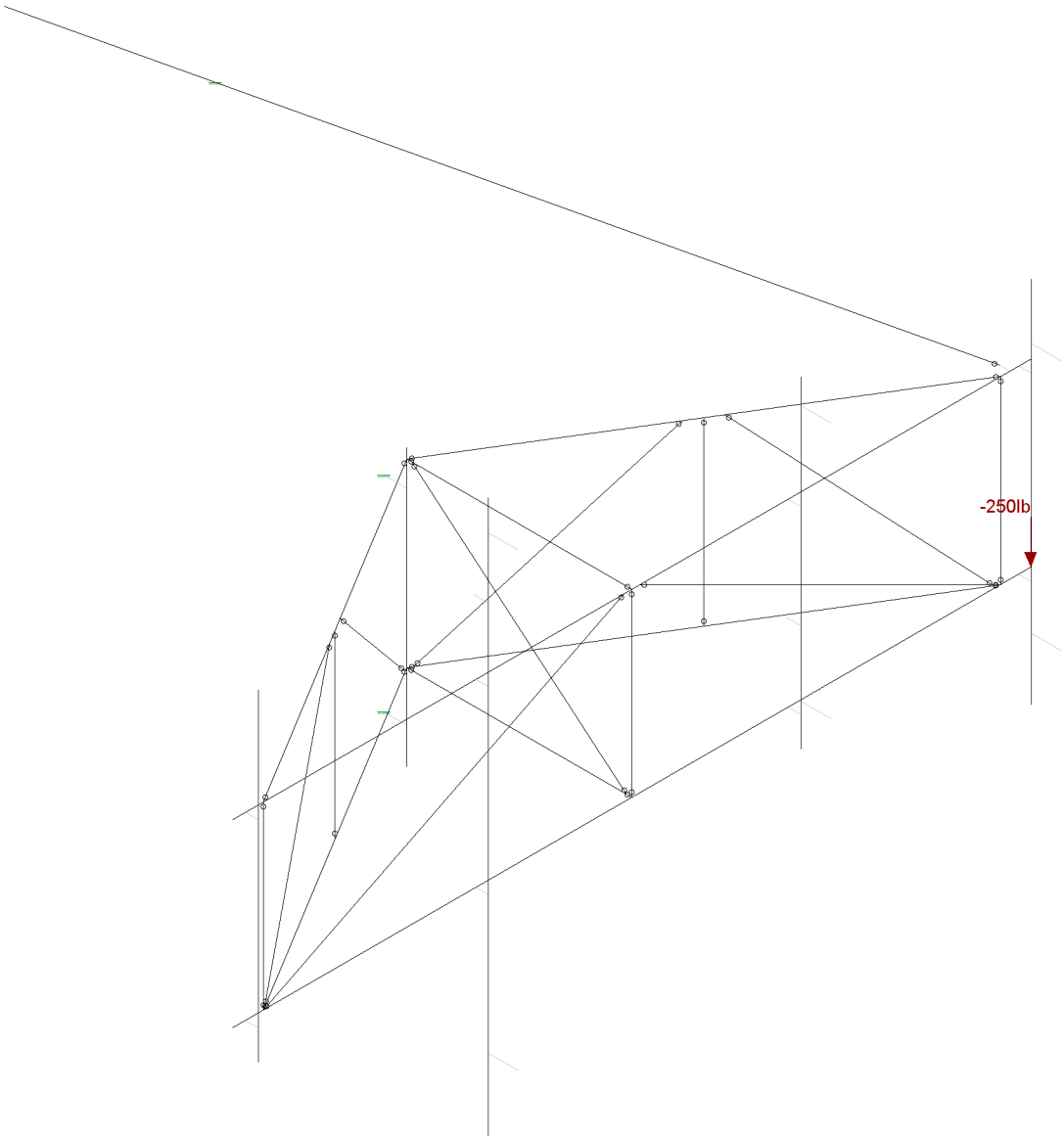
Loads: BLC 12, Maintenance Load LM4
Envelope Only Solution

Maser Consulting P.A.		SK - 23
CB	Mount Analysis	Sept 26, 2018 at 5:15 PM
18922035A	Maintenance 4	Sector Frame.r3d



Loads: BLC 13, Maintenance Load LV1
Envelope Only Solution

Maser Consulting P.A.		SK - 24
CB	Mount Analysis	Sept 26, 2018 at 5:15 PM
18922035A	Maintenance 5	Sector Frame.r3d



Loads: BLC 14, Maintenance Load LV2
Envelope Only Solution

Maser Consulting P.A.		SK - 25
CB	Mount Analysis	Sept 26, 2018 at 5:15 PM
18922035A	Maintenance 6	Sector Frame.r3d

APPENDIX B

SOFTWARE INPUT CALCULATIONS

Client:	TMobile	Computed By:	CB
Site Name:	807133 - BRG 134 943057	Date:	9/26/2018
Project No.	18922035A	Verified By:	SMS
Title:	Antenna Mount Analysis	Page:	1

Version 2.1

LOADING SUMMARY

Quantity	Manufacturer	Antenna/ Appurtenance	Status	Sector
3	ERICSSON	Air 32 DB B2A B66Aa	Existing	Alpha, Beta, & Gamma
3	**RFS**	**APXVAARR24_43-U-NA20**	**Proposed**	**Alpha, Beta, & Gamma**
3	**ERICSSON**	**AIR3246 B66**	**Proposed**	**Alpha, Beta, & Gamma**
3	**ERICSSON**	**RADIO 4449 B12/B71**	**Proposed**	**Alpha, Beta, & Gamma**
3	ERICSSON	KRY 112 144/1	Existing	Alpha, Beta, & Gamma

The worst case loading occurs in the Alpha Sector

Quantity	Manufacturer	Antenna/ Appurtenance	Status
1	ERICSSON	Air 32 DB B2A B66Aa	Existing
1	**RFS**	**APXVAARR24_43-U-NA20**	**Proposed**
1	**ERICSSON**	**AIR3246 B66**	**Proposed**
1	**ERICSSON**	**RADIO 4449 B12/B71**	**Proposed**
1	ERICSSON	KRY 112 144/1	Existing

Client:	TMobile	Computed By:	CB
Site Name:	807133 - BRG 134 943057	Date:	9/26/2018
Project No.	18922035A	Verified By:	SMS
Title:	Antenna Mount Analysis	Page:	2

I. DESIGN INPUTS

Calculations for gravity and lateral loading on equipment and support mounts are determined as per the ANSI/TIA-222-H Code

				Reference	Equation
Wind Load Inputs Parameters					
Antenna Centerline	z	170	ft		
Ultimate Wind Speed	V_u	125	mph		
Normal Wind Speed with Ice (3 sec. Gust):	V_i	50	mph	Figure B9, p. 238	
Maintenace Wind Speed:	V_s	30	mph	Section 2.8.3	
Design Ice Thickness	t_i	1.5	in	Figure B9, p. 238	
Surface Roughness:		B		Section 2.6.5.1.1	
Exposure Category:		B		Section 2.6.5.1.2	
Risk Category:		II		Table 2-1	
Rooftop Wind Speed-Up Factor	K_s	1.0		Section 2.6.7	
Ground Elevation:		47.0	ft		
Ground Elevation Factor:	K_e	0.9983		Table 2-6	
Gust Effect Factor:	G_h	1.00		Section 2.6.9	
Wind Directionality Factor:	K_d	0.95		Table 2-2	
Topographic Category:		1		Section 2.6.6.2	
Wind Load Coefficients					
Importance Factors:					
Iced:	I_{ice}	1		Table 2-3	
Exposure Category Coefficients:					
3-s Gust-Speed Power Law Exponent:	α	7.0		Table 2-4	
Nominal Height of the Atmospheric Boundary Layer:	Z_g	1200	ft	Table 2-4	
Min. Value for k_z:	Kz_{min}	1.03		Table 2-4	
Terrain Constant:	K_e	1.10		Table 2-4	
Velocity Pressure Exposure Coefficient:	K_z	1.150		Section 2.6.5.2	$=2.01\cdot(z/z_g)^{2/\alpha'}$
Topographic Category Coefficients:					
Topographic Constant:	K_t	N/A		Table 2-5	
Height Attenuation Factor:	f	N/A		Table 2-5	
Height Reduction Factor:	K_h	N/A		Section 2.6.6.2.1	$=e^{(f\cdot z/H)}$
Topographic Factor:	K_{zt}	1.00		Section 2.6.6.2	$=[1+(K_c\cdot K_t/K_h)]^2$
Ice Accumulation:					
Ice Velocity Pressure Exposure Coefficient:	K_{iz}	1.18			$=(z/33)^{0.10}$
Factored Ice Thickness:	t_{iz}	1.77	in	Section 2.6.10	$=t_i\cdot I\cdot K_{iz}\cdot(K_{zt})^{0.35}$
Ice Density:	ρ_i	56.00	pcf		
Design Wind Pressures:					
Velocity Pressure:	q_z	43.63	psf	Section 2.6.11.6	$=0.00256\cdot K_z\cdot K_{zt\cdot Ks\cdot Ke}\cdot K_d\cdot V^2$
Velocity Pressure (With Ice):	q_{zi}	6.98	psf	Section 2.6.11.6	$=0.00256\cdot K_z\cdot K_{zt\cdot Ks\cdot Ke}\cdot K_d\cdot V_i^2$
Velocity Pressure (Maintenance):	q_{zm}	2.51	psf	Section 2.6.11.6	$=0.00256\cdot K_z\cdot K_{zt\cdot Ks\cdot Ke}\cdot K_d\cdot V_m^2$

II. CALCULATIONS

- ***Wind Load on Appurtenances***

Dimensions and Force Coefficients

Antenna/ Appurtenance	*Non-Iced Condition*								*Iced Condition*							
	Mounting Pipe			Equipment					Mounting Pipe			Equipment				
	Length (in)	Diameter (in)	Force Coefficient C_a	Height (in)	Width (in)	Depth (in)	Force Coefficient $C_{a\ Front}$	Force Coefficient $C_{a\ Side}$	Length (in)	Diameter (in)	Force Coefficient C_a	Height (in)	Width (in)	Depth (in)	Force Coefficient $C_{a\ Front}$	Force Coefficient $C_{a\ Side}$
Air 32 DB B2A B66Aa	72.0	2.375	1.200	56.60	12.90	8.70	1.28	1.38	75.5	5.9	0.928	60.13	16.43	12.23	1.25	1.31
APXVAARR24_43-U-NA20	108.0	2.875	1.200	95.90	24.00	8.70	1.27	1.53	111.5	6.4	1.031	99.43	27.53	12.23	1.25	1.44
AIR3246 B66	63.0	2.375	1.200	58.10	15.70	9.40	1.25	1.36	66.5	5.9	0.895	61.63	19.23	12.93	1.23	1.30
RADIO 4449 B12/B71	0.0	0.000	0.000	14.90	13.20	9.30	1.20	1.20	0.0	0.0	0.000	18.43	16.73	12.83	1.20	1.20
KRY 112 144/1	0.0	0.000	0.000	7.70	7.50	3.40	1.20	1.20	0.0	0.0	0.000	11.23	11.03	6.93	1.20	1.20

Antenna/ Appurtenance	# of Brackets	Non-Iced Condition			Iced Condition			Maintenance Condition		
		Wind Force (lbs.)		Gravity (lbs.)	Wind Force (lbs.)		Gravity (lbs.)	Wind Force (lbs.)		
		F_N	F_T		F_N	F_T		F_N	F_T	
Air 32 DB B2A B66Aa	2	148.6	133.9	**73.6**	32.6	33.4	**93.7**	8.6	7.7	
APXVAARR24_43-U-NA20	2	447.9	250.3	**76.7**	85.2	60.3	**244.2**	25.8	14.4	
AIR3246 B66	2	175.3	140.0	**90.0**	36.2	33.7	**111.3**	10.1	8.1	
RADIO 4449 B12/B71	1	71.5	50.4	**78.0**	17.9	13.8	**59.4**	4.1	2.9	(Shielded by antenna from front wind)
KRY 112 144/1	1	21.0	9.5	**21.0**	7.2	4.5	**20.2**	1.2	0.5	(Shielded by antenna from front wind)

**** ALL CALCULATED LOADS ARE PER MOUNTING BRACKET. TO GET THE TOTAL EQUIPMENT LOAD, MULTIPLY THE INDIVIDUAL LOADS BY THE NUMBER OF BRACKETS***

- ***Wind Load on Framing Members***

Member Category	Member Shape	Length (in)	Member Surface	Non-Iced Condition			Iced Condition						Maintenance Condition
				Exposed Wind Height (in)	Force Coefficient C_a	Wind Load (plf)	Exposed Wind Height (in)	Depth (in)	Length (in)	Force Coefficient C_a	Wind Load (plf)	Ice Weight (plf)	Wind Load (plf)
Pipe	Pipe 2.0	63	Round	2.38	1.20	10.36	5.91	5.91	66.53	1.20	4.12	8.94	0.60
Pipe	Pipe 2.5	54	Round	2.88	1.06	11.10	6.41	6.41	57.53	1.06	3.96	10.02	0.64
Equal Angle	L2.5x2.5	156	Square	2.50	2.00	18.18	6.03	6.03	159.53	2.00	7.02	11.45	1.05
Equal Angle	L2x2	84	Square	2.00	2.00	14.54	5.53	5.53	87.53	2.00	6.44	9.92	0.84
Equal Angle	L2x2	44	Square	2.00	1.90	13.81	5.53	5.53	47.53	1.90	6.11	9.92	0.80
Equal Angle	L1.75x1.75	55	Square	1.75	2.00	12.72	5.28	5.28	58.53	2.00	6.15	9.16	0.73
Equal Angle	L1.75x1.75	35.25	Square	1.75	1.84	11.69	5.28	5.28	38.78	1.84	5.65	9.16	0.67

Client:	TMobile	Computed By:	CB
Site Name:	807133 - BRG 134 943057	Date:	9/26/2018
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BASIC EQUATIONS

ANSI/TIA-222-H Reference

Force Coefficient: (Square) — Table 2-9

$$C_{f\_square}(h,w) := \begin{cases} 1.2 & \text{if } \frac{h}{w} \le 2.5 \\ \left[1.2 + \frac{0.2}{4.5}\cdot\left(\frac{h}{w} - 2.5\right)\right] & \text{if } \frac{h}{w} > 2.5 \wedge \frac{h}{w} \le 7 \\ \left[1.4 + \frac{0.6}{18}\cdot\left(\frac{h}{w} - 7\right)\right] & \text{if } \frac{h}{w} > 7 \wedge \frac{h}{w} \le 25 \\ 2.0 & \text{otherwise} \end{cases}$$

Force Coefficient: (Round) — Table 2-9

$$C_{f\_round}(h,w) := \begin{cases} 0.7 & \text{if } \frac{h}{w} \le 2.5 \\ \left[0.7 + \frac{0.1}{4.5}\cdot\left(\frac{h}{w} - 2.5\right)\right] & \text{if } \frac{h}{w} > 2.5 \wedge \frac{h}{w} \le 7 \\ \left[0.8 + \frac{0.4}{18}\cdot\left(\frac{h}{w} - 7\right)\right] & \text{if } \frac{h}{w} > 7 \wedge \frac{h}{w} \le 25 \\ 1.2 & \text{otherwise} \end{cases}$$

Terrain Exposure Constants: — Table 2-5

$$\alpha := \begin{cases} 7.0 & \text{if Exp = "B"} \\ 9.5 & \text{if Exp = "C"} \\ 11.5 & \text{if Exp = "D"} \end{cases} \quad Z_g := \begin{cases} 1200\text{ft} & \text{if Exp = "B"} \\ 900\text{ft} & \text{if Exp = "C"} \\ 700\text{ft} & \text{if Exp = "D"} \end{cases} \quad K_{zmin} := \begin{cases} 0.70 & \text{if Exp = "B"} \\ 0.85 & \text{if Exp = "C"} \\ 1.03 & \text{if Exp = "D"} \end{cases}$$

Client:	TMobile	Computed By:	CB
Site Name:	807133 - BRG 134 943057	Date:	9/26/2018
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BASIC EQUATIONS

ANSI/TIA-222-H Reference

Velocity Pressure Coefficient:

$$Kz(z) := \left| \begin{array}{l} K_z \leftarrow \max\left[2.01 \cdot \left(\frac{z}{Z_g} \right)^{\frac{2}{\alpha}}, K_{zmin} \right] \\ K_z \leftarrow \min\left(K_z, 2.01 \right) \end{array} \right.$$

Section 2.6.5.6

$$K_z := Kz(z)$$

$$Kzt(z) := K_{zt} \leftarrow \left| \begin{array}{l} 1.0 \quad \text{if Topo} = \text{"1"} \\ \text{otherwise} \\ \quad \left| \begin{array}{l} K_e \leftarrow \left| \begin{array}{l} 0.90 \quad \text{if Exp} = \text{"B"} \\ 1.00 \quad \text{if Exp} = \text{"C"} \\ 1.10 \quad \text{if Exp} = \text{"D"} \end{array} \right. \\ K_t \leftarrow \left| \begin{array}{l} 0.43 \quad \text{if Topo} = \text{"2"} \\ 0.53 \quad \text{if Topo} = \text{"3"} \\ 0.72 \quad \text{if Topo} = \text{"4"} \end{array} \right. \\ f \leftarrow \left| \begin{array}{l} 1.25 \quad \text{if Topo} = \text{"2"} \\ 2.00 \quad \text{if Topo} = \text{"3"} \\ 1.50 \quad \text{if Topo} = \text{"4"} \end{array} \right. \\ K_h \leftarrow e^{\left(\frac{f \cdot z}{CH} \right)} \\ \left(1 + \frac{K_e \cdot K_t}{K_h} \right)^2 \end{array} \right. \end{array} \right.$$

Table 2-4

$$K_{zt} := Kzt(z)$$

Velocity Pressure:

$$q_z := 0.00256 \cdot K_z \cdot K_{zt} \cdot K_s \cdot K_e \cdot K_d \cdot V^2 \cdot psf$$

Section 2.6.9.6

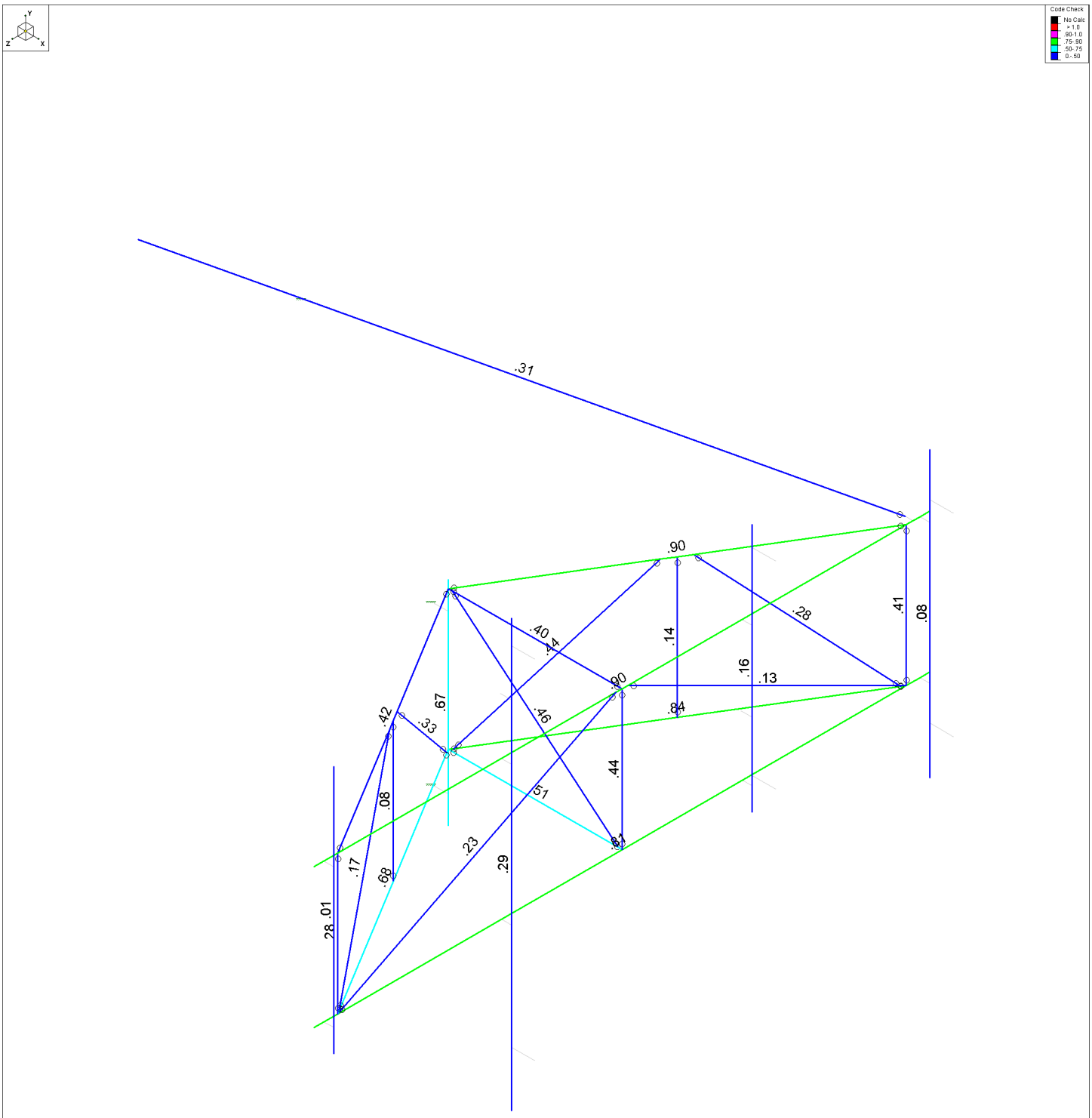
LOAD EQUATIONS

WIND LOAD

Area (Normal):	$AN_{area} = H_{ant} \cdot Want$
Area (Side):	$AT_{area} = H_{ant} \cdot Dant$
Force Coefficient (Normal):	$C_{fn} = C_{fsquare}(H_{ant}, Want)$
Force Coefficient (Side):	$C_{fs} = C_{fsquare}(H_{ant}, Dant)$
Pipe Area (Normal):	$AN_p = \max[(L_p - H_{ant}) * Dp, 0]$
Pipe Area (Side):	$AT_p = L_p \cdot Dp$
Force Coefficient (Normal):	$C_{fp} = C_{fround}(Lp, Dp)$
Normal Effective Projected Area:	$E_{pan} = (C_{fn} \cdot ANarea) + (Cfp \cdot ANp)$
Side Effective Projected Area:	$E_{pat} = (C_{fs} \cdot ATarea) + (Cfp \cdot ATp)$
Effective Projected Area:	$EPA = max(E_{pan}, Epat)$
Wind Force:	$F_{ant} = q_z \cdot Gh \cdot EPA$

APPENDIX C

SOFTWARE ANALYSIS OUTPUT



Member Code Checks Displayed
Envelope Only Solution

Maser Consulting P.A.		SK - 26
CB	Mount Analysis	Sept 26, 2018 at 5:16 PM
18922035A	Members Code Check	Sector Frame.r3d

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N2		270	Face Horizontals	Beam	Single Angle	A36 Gr.36	Typical
2	M2	N38	N3		90	V-Horizontals	Beam	Single Angle	A36 Gr.36	Typical
3	M3	N42	N3		180	V-Horizontals	Beam	Single Angle	A36 Gr.36	Typical
4	M4	N44	N3		90	V-Horizontals	Beam	Single Angle	A36 Gr.36	Typical
5	M5	N4	N5			RIGID	None	None	RIGID	Typical
6	M6	N6	N7			RIGID	None	None	RIGID	Typical
7	M7	N8	N9			RIGID	None	None	RIGID	Typical
8	M8	N10	N11			RIGID	None	None	RIGID	Typical
9	M9	N12	N13		180	Face Horizontals	Beam	Single Angle	A36 Gr.36	Typical
10	M10	N37	N14			V-Horizontals	Beam	Single Angle	A36 Gr.36	Typical
11	M11	N41	N14		270	V-Horizontals	Beam	Single Angle	A36 Gr.36	Typical
12	M12	N43	N14			V-Horizontals	Beam	Single Angle	A36 Gr.36	Typical
13	M13	N15	N16			RIGID	None	None	RIGID	Typical
14	M14	N17	N18			RIGID	None	None	RIGID	Typical
15	M15	N19	N20			RIGID	None	None	RIGID	Typical
16	M16	N21	N22			RIGID	None	None	RIGID	Typical
17	M17	N23	N24		90	Inner Bracings	Beam	Single Angle	A36 Gr.36	Typical
18	M18	N25	N26		315	Inner Bracings	Beam	Single Angle	A36 Gr.36	Typical
19	M19	N28	N27		315	Inner Bracings	Beam	Single Angle	A36 Gr.36	Typical
20	M20	N29	N30		180	Inner Bracings	Beam	Single Angle	A36 Gr.36	Typical
21	M21	N31	N32		90	Inner Bracings	Beam	Single Angle	A36 Gr.36	Typical
22	M22	N33	N34		90	Inner Bracings	Beam	Single Angle	A36 Gr.36	Typical
23	M23	N35	N36		180	Inner Bracings	Beam	Single Angle	A36 Gr.36	Typical
24	M24	N37	N38			Inner Bracings	Beam	Single Angle	A36 Gr.36	Typical
25	M25	N39	N42		180	Face Diagonal ...	Beam	Single Angle	A36 Gr.36	Typical
26	M26	N40	N44		90	Face Diagonal ...	Beam	Single Angle	A36 Gr.36	Typical
27	M27	N41	N42		270	Inner Bracings	Beam	Single Angle	A36 Gr.36	Typical
28	M28	N43	N44			Inner Bracings	Beam	Single Angle	A36 Gr.36	Typical
29	M29	N45	N46			Main Standoff ...	Beam	Pipe	A53 Gr.B	Typical
30	M30	N47	N48			RIGID	None	None	RIGID	Typical
31	M31	N49	N50			RIGID	None	None	RIGID	Typical
32	M32	N51	N52			Antenna Pipe ...	Beam	Pipe	A53 Gr.B	Typical
33	M33	N53	N54			Antenna Pipe ...	Beam	Pipe	A53 Gr.B	Typical
34	M34	N55	N56			Antenna Pipe ...	Beam	Pipe	A53 Gr.B	Typical
35	M35	N57	N58			Antenna Pipe ...	Beam	Pipe	A53 Gr.B	Typical
36	M36	N59	N60			RIGID	None	None	RIGID	Typical
37	M37	N60	N61			Stabilizer	Beam	Pipe	A53 Gr.B	Typical
38	M39	N64	N65			RIGID	None	None	RIGID	Typical
39	M40	N66	N67			RIGID	None	None	RIGID	Typical
40	M41	N68	N69			RIGID	None	None	RIGID	Typical
41	M42	N70	N71			RIGID	None	None	RIGID	Typical
42	M43	N72	N73			RIGID	None	None	RIGID	Typical
43	M44	N74	N75			RIGID	None	None	RIGID	Typical
44	M45	N76	N77			RIGID	None	None	RIGID	Typical
45	M46	N78	N79			RIGID	None	None	RIGID	Typical

Joint Loads and Enforced Displacements (BLC 1 : Dead)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N73	L	Y	-73.6

Joint Loads and Enforced Displacements (BLC 1 : Dead) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
2	N75	L	Y	-73.6
3	N69	L	Y	-90
4	N71	L	Y	-90
5	N65	L	Y	-76.7
6	N67	L	Y	-76.7
7	N77	L	Y	-78
8	N79	L	Y	-21

Joint Loads and Enforced Displacements (BLC 2 : Wx)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N73	L	X	148.6
2	N75	L	X	148.6
3	N69	L	X	175.3
4	N71	L	X	175.3
5	N65	L	X	447.9
6	N67	L	X	447.9

Joint Loads and Enforced Displacements (BLC 3 : Wz)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N73	L	Z	133.9
2	N75	L	Z	133.9
3	N69	L	Z	140
4	N71	L	Z	140
5	N65	L	Z	250.3
6	N67	L	Z	250.3
7	N77	L	Z	50.4
8	N79	L	Z	9.5

Joint Loads and Enforced Displacements (BLC 4 : Wx Ice)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N73	L	X	32.6
2	N75	L	X	32.6
3	N69	L	X	36.2
4	N71	L	X	36.2
5	N65	L	X	85.2
6	N67	L	X	85.2

Joint Loads and Enforced Displacements (BLC 5 : Wz Ice)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N73	L	Z	33.4
2	N75	L	Z	33.4
3	N69	L	Z	33.7
4	N71	L	Z	33.7
5	N65	L	Z	60.3
6	N67	L	Z	60.3
7	N77	L	Z	13.8
8	N79	L	Z	4.5

Joint Loads and Enforced Displacements (BLC 6 : Ice Weight)

Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]

Joint Loads and Enforced Displacements (BLC 6 : Ice Weight) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N73	L	Y	-93.7
2	N75	L	Y	-93.7
3	N69	L	Y	-111.3
4	N71	L	Y	-111.3
5	N65	L	Y	-244.2
6	N67	L	Y	-244.2
7	N77	L	Y	-59.4
8	N79	L	Y	-20.2

Joint Loads and Enforced Displacements (BLC 7 : Wx Service)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N73	L	X	8.6
2	N75	L	X	8.6
3	N69	L	X	10.1
4	N71	L	X	10.1
5	N65	L	X	25.8
6	N67	L	X	25.8

Joint Loads and Enforced Displacements (BLC 8 : Wz Service)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N73	L	Z	7.7
2	N75	L	Z	7.7
3	N69	L	Z	8.1
4	N71	L	Z	8.1
5	N65	L	Z	14.4
6	N67	L	Z	14.4
7	N77	L	Z	2.9
8	N79	L	Z	.5

Joint Loads and Enforced Displacements (BLC 9 : Maintenance Load LM1)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N11	L	Y	-500

Joint Loads and Enforced Displacements (BLC 10 : Maintenance Load LM2)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N9	L	Y	-500

Joint Loads and Enforced Displacements (BLC 11 : Maintenance Load LM3)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N7	L	Y	-500

Joint Loads and Enforced Displacements (BLC 12 : Maintenance Load LM4)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N5	L	Y	-500

Joint Loads and Enforced Displacements (BLC 13 : Maintenance Load LV1)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N38	L	Y	-250

Joint Loads and Enforced Displacements (BLC 14 : Maintenance Load LV2)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N2	L	Y	-250

Member Point Loads

Member Label	Direction	Magnitude[lb,k-ft]	Location[in,%]
No Data to Print ...			

Member Distributed Loads (BLC 1 : Dead)

	Member Label	Direction	Start Magnitude[lb...	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
1	M1	Y	-18.2	-18.2	0	0
2	M9	Y	-18.2	-18.2	0	0

Member Distributed Loads (BLC 2 : Wx)

	Member Label	Direction	Start Magnitude[lb...	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
1	M29	PX	11.1	11.1	0	0
2	M32	PX	10.4	10.4	0	0
3	M37	PX	10.4	10.4	0	0
4	M1	PX	18.2	18.2	0	0
5	M9	PX	18.2	18.2	0	0
6	M3	PX	14.5	14.5	0	0
7	M4	PX	14.5	14.5	0	0
8	M11	PX	14.5	14.5	0	0
9	M12	PX	14.5	14.5	0	0
10	M25	PX	14.5	14.5	0	0
11	M26	PX	14.5	14.5	0	0
12	M17	PX	12.7	12.7	0	0
13	M20	PX	12.7	12.7	0	0
14	M21	PX	12.7	12.7	0	0
15	M22	PX	12.7	12.7	0	0
16	M23	PX	12.7	12.7	0	0
17	M18	PX	11.7	11.7	0	0
18	M19	PX	11.7	11.7	0	0
19	M24	PX	11.7	11.7	0	0
20	M27	PX	11.7	11.7	0	0
21	M28	PX	11.7	11.7	0	0

Member Distributed Loads (BLC 3 : Wz)

	Member Label	Direction	Start Magnitude[lb...	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
1	M29	PZ	11.1	11.1	0	0
2	M32	PZ	10.4	10.4	0	0
3	M37	PZ	10.4	10.4	0	0
4	M3	PZ	14.5	14.5	0	0
5	M4	PZ	14.5	14.5	0	0
6	M11	PZ	14.5	14.5	0	0
7	M12	PZ	14.5	14.5	0	0
8	M25	PZ	14.5	14.5	0	0
9	M26	PZ	14.5	14.5	0	0
10	M2	PZ	13.8	13.8	0	0
11	M10	PZ	13.8	13.8	0	0

Member Distributed Loads (BLC 3 : Wz) (Continued)

	Member Label	Direction	Start Magnitude[lb...	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
12	M17	PZ	12.7	12.7	0	0
13	M20	PZ	12.7	12.7	0	0
14	M21	PZ	12.7	12.7	0	0
15	M22	PZ	12.7	12.7	0	0
16	M23	PZ	12.7	12.7	0	0
17	M18	PZ	11.7	11.7	0	0
18	M19	PZ	11.7	11.7	0	0
19	M24	PZ	11.7	11.7	0	0
20	M27	PZ	11.7	11.7	0	0
21	M28	PZ	11.7	11.7	0	0

Member Distributed Loads (BLC 4 : Wx Ice)

	Member Label	Direction	Start Magnitude[lb...	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
1	M29	PX	4	4	0	0
2	M32	PX	4.1	4.1	0	0
3	M37	PX	4.1	4.1	0	0
4	M1	PX	7	7	0	0
5	M9	PX	7	7	0	0
6	M3	PX	6.4	6.4	0	0
7	M4	PX	6.4	6.4	0	0
8	M11	PX	6.4	6.4	0	0
9	M12	PX	6.4	6.4	0	0
10	M25	PX	6.4	6.4	0	0
11	M26	PX	6.4	6.4	0	0
12	M17	PX	6.2	6.2	0	0
13	M20	PX	6.2	6.2	0	0
14	M21	PX	6.2	6.2	0	0
15	M22	PX	6.2	6.2	0	0
16	M23	PX	6.2	6.2	0	0
17	M18	PX	5.7	5.7	0	0
18	M19	PX	5.7	5.7	0	0
19	M24	PX	5.7	5.7	0	0
20	M27	PX	5.7	5.7	0	0
21	M28	PX	5.7	5.7	0	0

Member Distributed Loads (BLC 5 : Wz Ice)

	Member Label	Direction	Start Magnitude[lb...	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
1	M29	PZ	4	4	0	0
2	M32	PZ	4.1	4.1	0	0
3	M37	PZ	4.1	4.1	0	0
4	M3	PZ	6.4	6.4	0	0
5	M4	PZ	6.4	6.4	0	0
6	M11	PZ	6.4	6.4	0	0
7	M12	PZ	6.4	6.4	0	0
8	M25	PZ	6.4	6.4	0	0
9	M26	PZ	6.4	6.4	0	0
10	M2	PZ	6.1	6.1	0	0
11	M10	PZ	6.1	6.1	0	0
12	M17	PZ	6.2	6.2	0	0
13	M20	PZ	6.2	6.2	0	0
14	M21	PZ	6.2	6.2	0	0

Member Distributed Loads (BLC 5 : Wz Ice) (Continued)

	Member Label	Direction	Start Magnitude[lb...	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
15	M22	PZ	6.2	6.2	0	0
16	M23	PZ	6.2	6.2	0	0
17	M18	PZ	5.7	5.7	0	0
18	M19	PZ	5.7	5.7	0	0
19	M24	PZ	5.7	5.7	0	0
20	M27	PZ	5.7	5.7	0	0
21	M28	PZ	5.7	5.7	0	0

Member Distributed Loads (BLC 6 : Ice Weight)

	Member Label	Direction	Start Magnitude[lb...	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
1	M29	Y	-10	-10	0	0
2	M33	Y	-10	-10	0	0
3	M32	Y	-8.9	-8.9	0	0
4	M34	Y	-8.9	-8.9	0	0
5	M35	Y	-8.9	-8.9	0	0
6	M37	Y	-8.9	-8.9	0	0
7	M1	Y	-11.5	-11.5	0	0
8	M9	Y	-11.5	-11.5	0	0
9	M2	Y	-9.9	-9.9	0	0
10	M3	Y	-9.9	-9.9	0	0
11	M4	Y	-9.9	-9.9	0	0
12	M10	Y	-9.9	-9.9	0	0
13	M11	Y	-9.9	-9.9	0	0
14	M12	Y	-9.9	-9.9	0	0
15	M25	Y	-9.9	-9.9	0	0
16	M26	Y	-9.9	-9.9	0	0
17	M17	Y	-9.2	-9.2	0	0
18	M18	Y	-9.2	-9.2	0	0
19	M19	Y	-9.2	-9.2	0	0
20	M20	Y	-9.2	-9.2	0	0
21	M21	Y	-9.2	-9.2	0	0
22	M22	Y	-9.2	-9.2	0	0
23	M23	Y	-9.2	-9.2	0	0
24	M24	Y	-9.2	-9.2	0	0
25	M27	Y	-9.2	-9.2	0	0
26	M28	Y	-9.2	-9.2	0	0

Member Distributed Loads (BLC 7 : Wx Service)

	Member Label	Direction	Start Magnitude[lb...	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
1	M29	PX	.64	.64	0	0
2	M32	PX	.6	.6	0	0
3	M37	PX	.6	.6	0	0
4	M1	PX	1.05	1.05	0	0
5	M9	PX	1.05	1.05	0	0
6	M3	PX	.84	.84	0	0
7	M4	PX	.84	.84	0	0
8	M11	PX	.84	.84	0	0
9	M12	PX	.84	.84	0	0
10	M25	PX	.84	.84	0	0
11	M26	PX	.84	.84	0	0
12	M17	PX	.73	.73	0	0

Member Distributed Loads (BLC 7 : Wx Service) (Continued)

	Member Label	Direction	Start Magnitude[lb...	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
13	M20	PX	.73	.73	0	0
14	M21	PX	.73	.73	0	0
15	M22	PX	.73	.73	0	0
16	M23	PX	.73	.73	0	0
17	M18	PX	.67	.67	0	0
18	M19	PX	.67	.67	0	0
19	M24	PX	.67	.67	0	0
20	M27	PX	.67	.67	0	0
21	M28	PX	.67	.67	0	0

Member Distributed Loads (BLC 8 : Wz Service)

	Member Label	Direction	Start Magnitude[lb...	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
1	M29	PZ	.64	.64	0	0
2	M32	PZ	.6	.6	0	0
3	M37	PZ	.6	.6	0	0
4	M3	PZ	.84	.84	0	0
5	M4	PZ	.84	.84	0	0
6	M11	PZ	.84	.84	0	0
7	M12	PZ	.84	.84	0	0
8	M25	PZ	.84	.84	0	0
9	M26	PZ	.84	.84	0	0
10	M2	PZ	.8	.8	0	0
11	M10	PZ	.8	.8	0	0
12	M17	PZ	.73	.73	0	0
13	M20	PZ	.73	.73	0	0
14	M21	PZ	.73	.73	0	0
15	M22	PZ	.73	.73	0	0
16	M23	PZ	.73	.73	0	0
17	M18	PZ	.67	.67	0	0
18	M19	PZ	.67	.67	0	0
19	M24	PZ	.67	.67	0	0
20	M27	PZ	.67	.67	0	0
21	M28	PZ	.67	.67	0	0

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Dead	DL		-1.05		8		2		
2	Wx	WL				6		21		
3	Wz	WL				8		21		
4	Wx Ice	WL				6		21		
5	Wz Ice	WL				8		21		
6	Ice Weight	OL1				8		26		
7	Wx Service	WL				6		21		
8	Wz Service	WL				8		21		
9	Maintenance Load LM1	OL2				1				
10	Maintenance Load LM2	OL2				1				
11	Maintenance Load LM3	OL2				1				
12	Maintenance Load LM4	OL2				1				
13	Maintenance Load LV1	OL2				1				
14	Maintenance Load LV2	OL2				1				

Load Combinations

	Description	So...	PDelta	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	1.4D	Yes	Y		1	1.4														
2	1.2D+1.0W1	Yes	Y		1	1.2	2	1	3											
3	1.2D+1.0W2	Yes	Y		1	1.2	2	.866	3	.5										
4	1.2D+1.0W3	Yes	Y		1	1.2	2	.5	3	.866										
5	1.2D+1.0W4	Yes	Y		1	1.2	2		3	1										
6	1.2D+1.0W5	Yes	Y		1	1.2	2	-.5	3	.866										
7	1.2D+1.0W6	Yes	Y		1	1.2	2	-.866	3	.5										
8	1.2D+1.0W7	Yes	Y		1	1.2	2	-1	3											
9	1.2D+1.0W8	Yes	Y		1	1.2	2	-.866	3	-.5										
10	1.2D+1.0W9	Yes	Y		1	1.2	2	-.5	3	-.866										
11	1.2D+1.0W10	Yes	Y		1	1.2	2		3	-1										
12	1.2D+1.0W11	Yes	Y		1	1.2	2	.5	3	-.866										
13	1.2D+1.0W12	Yes	Y		1	1.2	2	.866	3	-.5										
14																				
15	1.2D+1.0 Ice	Yes	Y		1	1.2	6	1												
16	1.2D+1.0ICE+1.0W1ICE	Yes	Y		1	1.2	6	1	4	1	5									
17	1.2D+1.0ICE+1.0W2ICE	Yes	Y		1	1.2	6	1	4	.866	5	.5								
18	1.2D+1.0ICE+1.0W3ICE	Yes	Y		1	1.2	6	1	4	.5	5	.866								
19	1.2D+1.0ICE+1.0W4ICE	Yes	Y		1	1.2	6	1	4		5	1								
20	1.2D+1.0ICE+1.0W5ICE	Yes	Y		1	1.2	6	1	4	-.5	5	.866								
21	1.2D+1.0ICE+1.0W6ICE	Yes	Y		1	1.2	6	1	4	-.866	5	.5								
22	1.2D+1.0ICE+1.0W7ICE	Yes	Y		1	1.2	6	1	4	-1	5									
23	1.2D+1.0ICE+1.0W8ICE	Yes	Y		1	1.2	6	1	4	-.866	5	-.5								
24	1.2D+1.0ICE+1.0W9ICE	Yes	Y		1	1.2	6	1	4	-.5	5	-.866								
25	1.2D+1.0ICE+1.0W10ICE	Yes	Y		1	1.2	6	1	4		5	-1								
26	1.2D+1.0ICE+1.0W11ICE	Yes	Y		1	1.2	6	1	4	.5	5	-.866								
27	1.2D+1.0ICE+1.0W12ICE	Yes	Y		1	1.2	6	1	4	.866	5	-.5								
28																				
29	1.2D+1.5LM1+1.0W1SER	Yes	Y		1	1.2	9	1.5	7	1	8									
30	1.2D+1.5LM1+1.0W2SER	Yes	Y		1	1.2	9	1.5	7	.866	8	.5								
31	1.2D+1.5LM1+1.0W3SER	Yes	Y		1	1.2	9	1.5	7	.5	8	.866								
32	1.2D+1.5LM1+1.0W4SER	Yes	Y		1	1.2	9	1.5	7		8	1								
33	1.2D+1.5LM1+1.0W5SER	Yes	Y		1	1.2	9	1.5	7	-.5	8	.866								
34	1.2D+1.5LM1+1.0W6SER	Yes	Y		1	1.2	9	1.5	7	-.866	8	.5								
35	1.2D+1.5LM1+1.0W7SER	Yes	Y		1	1.2	9	1.5	7	-1	8									
36	1.2D+1.5LM1+1.0W8SER	Yes	Y		1	1.2	9	1.5	7	-.866	8	-.5								
37	1.2D+1.5LM1+1.0W9SER	Yes	Y		1	1.2	9	1.5	7	-.5	8	-.866								
38	1.2D+1.5LM1+1.0W10SER	Yes	Y		1	1.2	9	1.5	7		8	-1								
39	1.2D+1.5LM1+1.0W11SER	Yes	Y		1	1.2	9	1.5	7	.5	8	-.866								
40	1.2D+1.5LM1+1.0W12SER	Yes	Y		1	1.2	9	1.5	7	.866	8	-.5								
41																				
42	1.2D+1.5LM2+1.0W1SER	Yes	Y		1	1.2	10	1.5	7	1	8									
43	1.2D+1.5LM2+1.0W2SER	Yes	Y		1	1.2	10	1.5	7	.866	8	.5								
44	1.2D+1.5LM2+1.0W3SER	Yes	Y		1	1.2	10	1.5	7	.5	8	.866								
45	1.2D+1.5LM2+1.0W4SER	Yes	Y		1	1.2	10	1.5	7		8	1								
46	1.2D+1.5LM2+1.0W5SER	Yes	Y		1	1.2	10	1.5	7	-.5	8	.866								
47	1.2D+1.5LM2+1.0W6SER	Yes	Y		1	1.2	10	1.5	7	-.866	8	.5								
48	1.2D+1.5LM2+1.0W7SER	Yes	Y		1	1.2	10	1.5	7	-1	8									
49	1.2D+1.5LM2+1.0W8SER	Yes	Y		1	1.2	10	1.5	7	-.866	8	-.5								
50	1.2D+1.5LM2+1.0W9SER	Yes	Y		1	1.2	10	1.5	7	-.5	8	-.866								
51	1.2D+1.5LM2+1.0W10SER	Yes	Y		1	1.2	10	1.5	7		8	-1								

Load Combinations (Continued)

	Description	So...	PDelta	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
52	1.2D+1.5LM2+1.0W11SER	Yes	Y		1	1.2	10	1.5	7	.5	8	-.866								
53	1.2D+1.5LM2+1.0W12SER	Yes	Y		1	1.2	10	1.5	7	.866	8	-.5								
54																				
55	1.2D+1.5LV1	Yes	Y		1	1.2	13	1.5												
56	1.2D+1.5LV2	Yes	Y		1	1.2	14	1.5												
57			Y																	
58	1.2D+1.5LM3+1.0W1SER	Yes	Y		1	1.2	11	1.5	7	1	8									
59	1.2D+1.5LM3+1.0W2SER	Yes	Y		1	1.2	11	1.5	7	.866	8	.5								
60	1.2D+1.5LM3+1.0W3SER	Yes	Y		1	1.2	11	1.5	7	.5	8	.866								
61	1.2D+1.5LM3+1.0W4SER	Yes	Y		1	1.2	11	1.5	7		8	1								
62	1.2D+1.5LM3+1.0W5SER	Yes	Y		1	1.2	11	1.5	7	-.5	8	.866								
63	1.2D+1.5LM3+1.0W6SER	Yes	Y		1	1.2	11	1.5	7	-.866	8	.5								
64	1.2D+1.5LM3+1.0W7SER	Yes	Y		1	1.2	11	1.5	7	-1	8									
65	1.2D+1.5LM3+1.0W8SER	Yes	Y		1	1.2	11	1.5	7	-.866	8	-.5								
66	1.2D+1.5LM3+1.0W9SER	Yes	Y		1	1.2	11	1.5	7	-.5	8	-.866								
67	1.2D+1.5LM3+1.0W10SER	Yes	Y		1	1.2	11	1.5	7		8	-1								
68	1.2D+1.5LM3+1.0W11SER	Yes	Y		1	1.2	11	1.5	7	.5	8	-.866								
69	1.2D+1.5LM3+1.0W12SER	Yes	Y		1	1.2	11	1.5	7	.866	8	-.5								
70			Y																	
71	1.2D+1.5LM4+1.0W1SER	Yes	Y		1	1.2	12	1.5	7	1	8									
72	1.2D+1.5LM4+1.0W2SER	Yes	Y		1	1.2	12	1.5	7	.866	8	.5								
73	1.2D+1.5LM4+1.0W3SER	Yes	Y		1	1.2	12	1.5	7	.5	8	.866								
74	1.2D+1.5LM4+1.0W4SER	Yes	Y		1	1.2	12	1.5	7		8	1								
75	1.2D+1.5LM4+1.0W5SER	Yes	Y		1	1.2	12	1.5	7	-.5	8	.866								
76	1.2D+1.5LM4+1.0W6SER	Yes	Y		1	1.2	12	1.5	7	-.866	8	.5								
77	1.2D+1.5LM4+1.0W7SER	Yes	Y		1	1.2	12	1.5	7	-1	8									
78	1.2D+1.5LM4+1.0W8SER	Yes	Y		1	1.2	12	1.5	7	-.866	8	-.5								
79	1.2D+1.5LM4+1.0W9SER	Yes	Y		1	1.2	12	1.5	7	-.5	8	-.866								
80	1.2D+1.5LM4+1.0W10SER	Yes	Y		1	1.2	12	1.5	7		8	-1								
81	1.2D+1.5LM4+1.0W11SER	Yes	Y		1	1.2	12	1.5	7	.5	8	-.866								
82	1.2D+1.5LM4+1.0W12SER	Yes	Y		1	1.2	12	1.5	7	.866	8	-.5								

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N48	max	340.099	7	2885.23	25	1910.073	11	1.081	80	.576	5	4.174	26
2		min	-4878.235	27	1135.756	5	-1289.464	5	-.688	32	-.877	11	.995	6
3	N62	max	1258.926	11	128.452	19	200.213	5	0	4	.106	4	.16	22
4		min	-1285.393	5	41.673	38	-191.793	11	-.073	66	-.118	10	.052	29
5	N50	max	4629.307	22	1354.358	19	1104.681	38	.59	38	.604	74	-.138	2
6		min	621.4	2	431.385	11	-1734.379	74	-.919	74	-.475	38	-1.987	22
7	Totals:	max	3103.812	8	4301.42	17	2149.966	11						
8		min	-3103.825	2	1804.777	9	-2149.966	5						

Envelope AISC 13th(360-05): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Lo...	...	LC	phi*...	phi*...	phi*...	phi*...	...	Eqn
1	M9	L2.5x2.5x3	.898	78	22	.912	15...	y	73	9514...	2919...	.873	1.221	...	H2-1
2	M11	L2x2x3	.898	38.674	5	.346	44...	z	74	3466...	2339...	.558	1.092	...	H2-1
3	M3	L2x2x3	.840	83.501	76	.413	.879	y	64	3466...	2339...	.558	1.076	...	H2-1
4	M1	L2.5x2.5x3	.814	78	16	.880	15...	z	78	9514...	2919...	.873	1.221	...	H2-1

Envelope AISC 13th(360-05): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Lo...	...	LC	phi*...	phi*...	phi*...	phi*...	...	Eqn
5	M4	L2x2x3	.685	84.38	37	.243	84...	z	27	3466...	2339...	.558	1.06	...	H2-1
6	M29	PIPE_2.5	.675	7.313	22	.398	47...		26	4297...	50715	3.596	3.596	3	H1-...
7	M2	L2x2x3	.506	1.375	24	.826	.917	z	26	1192...	2339...	.558	1.215	...	H2-1
8	M17	L1.75x1.75x2	.459	49.12	19	.016	54...	z	22	3812...	1366...	.3	.597	...	H2-1
9	M21	L1.75x1.75x2	.438	0	74	.014	0	z	26	4244...	1366...	.3	.604	...	H2-1
10	M24	L1.75x1.75x2	.436	35.25	64	.024	35...	y	64	7804...	1366...	.3	.645	...	H2-1
11	M12	L2x2x3	.420	45.706	36	.234	42...	y	37	3466...	2339...	.558	1.149	...	H2-1
12	M27	L1.75x1.75x2	.414	35.25	72	.013	0	y	67	7804...	1366...	.3	.567	...	H2-1
13	M10	L2x2x3	.400	43.083	17	.632	44	y	18	1192...	2339...	.558	1.239	3	H2-1
14	M23	L1.75x1.75x2	.331	51.972	38	.018	0	y	19	4244...	1366...	.3	.509	...	H2-1
15	M37	PIPE_2.0	.314	126.563	11	.056	12...		66	5397...	32130	1.872	1.872	...	H1-...
16	M33	PIPE_2.5	.292	41.625	8	.056	91...		11	2613...	50715	3.596	3.596	...	H1-...
17	M20	L1.75x1.75x2	.284	51.972	20	.019	51...	y	60	4244...	1366...	.3	.509	...	H2-1
18	M28	L1.75x1.75x2	.280	35.25	34	.018	35...	y	48	7804...	1366...	.3	.647	...	H2-1
19	M26	L2x2x3	.229	43.516	8	.019	0	z	24	3972...	2339...	.558	.967	...	H2-1
20	M22	L1.75x1.75x2	.172	28.693	13	.015	0	z	24	4244...	1366...	.3	.503	...	H2-1
21	M34	PIPE_2.0	.162	41.344	2	.069	5....		10	2308...	32130	1.872	1.872	...	H1-...
22	M18	L1.75x1.75x2	.141	35.25	17	.010	0	y	4	7804...	1366...	.3	.605	...	H2-1
23	M25	L2x2x3	.128	45.158	4	.021	0	z	2	3972...	2339...	.558	.969	...	H2-1
24	M35	PIPE_2.0	.081	21	8	.064	21		11	2086...	32130	1.872	1.872	...	H1-...
25	M19	L1.75x1.75x2	.078	15.055	13	.009	35...	y	39	7804...	1366...	.3	.565	...	H2-1
26	M32	PIPE_2.0	.010	40.688	8	.050	40...		47	2308...	32130	1.872	1.872	...	H1-...

APPENDIX D

ADDITIONAL CALCUATIONS

Mount to Tower Connection Check:

Applied Forces:

From Risa 3D LRFD Loading

$F_x := 4878.2 \cdot lbf$

$F_y := 2885.2 lbf$

$F_z := 1910.1 \cdot lbf$

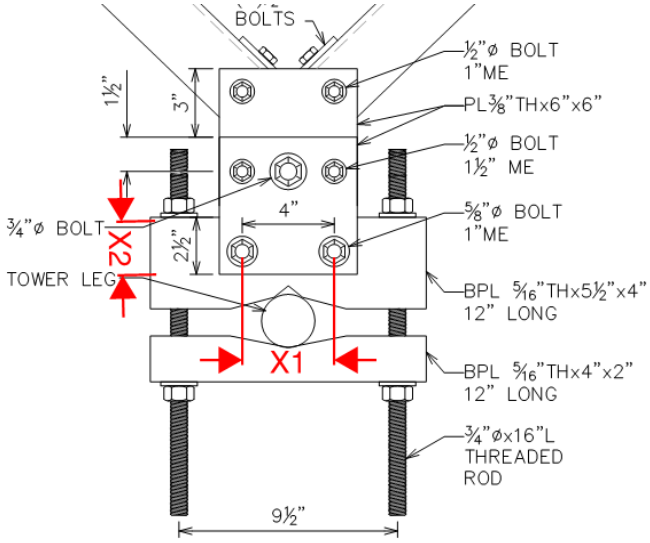
Applied Moments:

From Risa 3D LRFD Loading

$M_x := 1.081 \cdot kip \cdot ft$

$M_y := 0.877 kip \cdot ft$

$M_z := 4.174 \cdot kip \cdot ft$



Bolts Horizontal Spacing:

$x_1 := 5in$

Bolt Spacing from Edge:

$x_2 := 6.75 \cdot in$

Number of Bolts:

$n := 2$

Applied Tension at Bolt:

$$P_{a.t} := \frac{M_z}{x_2 \cdot n} + \frac{F_y \cdot (-1)}{n} + \frac{M_x}{x_1} = 4862\,lbf$$

Applied Shear at Bolt:

$$P_{a.v} := \sqrt{\left(\frac{F_x}{n} + \frac{M_y}{x_1}\right)^2 + \left(\frac{F_z}{n}\right)^2} = 4643.2\,lbf$$

Bolt Type Used: **A325N**

Nominal Tensile Stress, Fnt: $F_{n.t} := 90ksi$ AISC, Table J3-2, P. 16.1-104

Nominal Shear Stress, Fnv: $F_{n.v} := 54ksi$ AISC, Table J3-2, P. 16.1-104

Nominal Bolt Diameter: $d_b := \frac{1}{2}in$

Gross Area of the Bolt: $A_{b.g} := 0.196in^2$ AISC, Table 7-18, P. 7-83

Net Area of the Bolt: $A_{b.n} := 0.142in^2$ AISC, Table 7-18, P. 7-83

Strength Reduction Factor, ϕ: $\phi := 0.75$

Combined Tension And Shear Check

Nominal Tensile Reduced Fntr

$$F_{n.t.r} := 1.3 \cdot F_{n.t} - \frac{F_{n.t}}{\phi \cdot F_{n.v}} \cdot \frac{P_{a.v}}{A_{b.g}} = 64.4 \cdot ksi$$

AISC Eq. J3-3a, P. 16.1-109

Nominal Shear Reduced Fntv

$$F_{n.v.r} := 1.3 \cdot F_{n.v} - \frac{F_{n.v}}{\phi \cdot F_{n.t}} \cdot \frac{P_{a.t}}{A_{b.g}} = 50.4 \cdot ksi$$

AISC Eq. J3-3a, P. 16.1-109

Bolt Nominal Tensive Strength

$$R_{n.t} := F_{n.t} \cdot A_{b.g} = 17.6 \cdot kip$$

Tension Check

$$Check := \begin{cases} \text{"OK"} & \text{if } \phi \cdot R_{n.t} \geq P_{a.t} \\ \text{"NOT GOOD"} & \text{otherwise} \end{cases}$$

$$Check = \text{"OK"}$$

Tension Ratio

$$Ratio_t := \frac{P_{a.t}}{\phi \cdot R_{n.t}} \qquad Ratio_t = 36.7 \cdot \%$$

Bolt Nominal Shear Strength

$$R_{n.v} := F_{n.v} \cdot A_{b.g} = 10.6 \cdot kip$$

Shear Check

$$Check := \begin{cases} \text{"OK"} & \text{if } \phi \cdot R_{n.v} \geq P_{a.v} \\ \text{"NOT GOOD"} & \text{otherwise} \end{cases}$$

$$Check = \text{"OK"}$$

Shear Ratio

$$Ratio_v := \frac{P_{a.v}}{\phi \cdot R_{n.v}} \qquad Ratio_v = 58.5 \cdot \%$$

(APPENDIX N) MUNICIPALITY - SPECIFIC STRUCTURAL DESIGN PARAMETERS												
				Wind Design Parameters								
Municipality	**Ground Snow Load**	**MCE Spectral Accelerations** (%g)		**Ultimate Design Wind Speeds, V_{ult}** (mph)			**Nominal Design Wind Speeds, V_{asd}** (mph)			**Wind-Borne Debris Regions[1]**		**Hurricane-Prone Regions**
		S_s	S_1	Risk Cat.I	Risk Cat.II	Risk Cat III-IV	Risk Cat. I	Risk Cat. II	Risk Cat. III-IV	Risk Cat. II & III except Occup I-2	Risk Cat III Occup I-2 & Risk Cat. IV	
Enfield	35	0.176	0.065	110	125	130	85	97	101			Yes
Essex	30	0.168	0.059	120	135	145	93	105	112		Type A	Yes
Fairfield	30	0.215	0.065	115	125	135	89	97	105		Type B	Yes
Farmington	35	0.183	0.064	115	125	135	89	97	105			Yes
Franklin	30	0.171	0.061	120	130	140	93	101	108		Type A	Yes
Glastonbury	30	0.180	0.063	115	125	135	89	97	105			Yes
Goshen	40	0.181	0.065	105	115	125	81	89	97			
Granby	35	0.176	0.065	110	120	130	85	93	101			Yes
Greenwich	30	0.259	0.070	110	120	130	85	93	101			Yes
Griswold	30	0.168	0.060	125	135	145	97	105	112		Type A	Yes
Groton	30	0.160	0.058	125	135	145	97	105	112	Type B	Type A	Yes
Guilford	30	0.176	0.061	120	130	140	93	101	108		Type B	Yes
Haddam	30	0.175	0.061	120	130	140	93	101	108			Yes
Hamden	30	0.185	0.063	115	125	135	89	97	105			Yes
Hampton	35	0.172	0.062	120	130	140	93	101	108			Yes
Hartford	30	0.181	0.064	115	125	135	89	97	105			Yes
Hartland	40	0.175	0.065	110	120	125	85	93	97			Yes
Harwinton	35	0.183	0.065	110	120	130	85	93	101			Yes
Hebron	30	0.177	0.063	120	130	140	93	101	108			Yes
Kent	40	0.188	0.065	105	115	120	81	89	93			
Killingly	40	0.171	0.062	120	130	140	93	101	108			Yes
Killingworth	30	0.173	0.061	120	130	140	93	101	108			Yes
Lebanon	30	0.173	0.062	120	130	140	93	101	108			Yes
Ledyard	30	0.163	0.059	125	135	145	97	105	112		Type A	Yes
Lisbon	30	0.169	0.061	125	135	145	97	105	112		Type A	Yes
Litchfield	40	0.184	0.065	110	120	125	85	93	97			Yes
Lyme	30	0.164	0.059	125	135	145	97	105	112		Type A	Yes
Madison	30	0.173	0.060	120	130	140	93	101	108		Type B	Yes
Manchester	30	0.178	0.064	115	125	135	89	97	105			Yes
Mansfield	35	0.173	0.062	120	130	140	93	101	108			Yes
Marlborough	30	0.177	0.062	120	130	140	93	101	108			Yes
Meriden	30	0.183	0.063	115	125	135	89	97	105			Yes
Middlebury	35	0.191	0.064	110	120	130	85	93	101			Yes
Middlefield	30	0.181	0.063	115	125	135	89	97	105			Yes
Middletown	30	0.180	0.063	115	130	135	89	101	105			Yes
Milford	30	0.194	0.063	115	125	135	89	97	105		Type B	Yes
Monroe	30	0.205	0.065	110	120	130	85	93	101			Yes
Montville	30	0.165	0.059	125	135	145	97	105	112		Type A	Yes
Morris	35	0.187	0.065	110	120	125	85	93	97			Yes
Naugatuck	30	0.190	0.064	110	125	135	85	97	105			Yes
New Britain	30	0.183	0.064	115	125	135	89	97	105			Yes
New Canaan	30	0.240	0.068	110	120	130	85	93	101			Yes
New Fairfield	35	0.212	0.067	105	115	125	81	89	97			
New Hartford	40	0.180	0.065	110	120	130	85	93	101			Yes

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11114D

Norwalk/ South Norwalk
50 Rockland Road
Norwalk, CT 06854

September 14, 2018

EBI Project Number: 6218006192

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	14.62 %

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
environmental | engineering | due diligence

September 14, 2018

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CT11114D – Norwalk/ South Norwalk**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **50 Rockland Road, Norwalk, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general population may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general population would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) frequency bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **50 Rockland Road, Norwalk, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 1 GSM channels (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 15 Watts per Channel.

2) 1 UMTS channel (AWS Band – 2100 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

3) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

4) 4 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

6) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

7) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

8) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antennas used in this modeling are the **Ericsson AIR 3246 B66**, the **Ericsson AIR32 B2A/B66Aa** and the **RFS APXVAARR24_43-U-NA20** for 600 MHz, 700 MHz, 1900 MHz and 2100 MHz channels. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

10) The antenna mounting height centerline of the proposed antennas is **170 feet** above ground level (AGL).

11) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

12) All calculations were done with respect to uncontrolled / general population threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR 3246 B66	Make / Model:	Ericsson AIR 3246 B66	Make / Model:	Ericsson AIR 3246 B66
Gain:	dBd	Gain:	dBd	Gain:	dBd
Height (AGL):	170 feet	Height (AGL):	170 feet	Height (AGL):	170 feet
Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	160	Total TX Power(W):	160	Total TX Power(W):	160
ERP (W):	6,224.72	ERP (W):	6,224.72	ERP (W):	6,224.72
Antenna A1 MPE%	**0.83**	Antenna B1 MPE%	**0.83**	Antenna C1 MPE%	**0.83**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR32 B2A/B66Aa	Make / Model:	Ericsson AIR32 B2A/B66Aa	Make / Model:	Ericsson AIR32 B2A/B66Aa
Gain:	dBd	Gain:	dBd	Gain:	dBd
Height (AGL):	170 feet	Height (AGL):	170 feet	Height (AGL):	170 feet
Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)
Channel Count	3	Channel Count	3	Channel Count	3
Total TX Power(W):	95	Total TX Power(W):	95	Total TX Power(W):	95
ERP (W):	3,695.93	ERP (W):	3,695.93	ERP (W):	3,695.93
Antenna A2 MPE%	**0.49**	Antenna B2 MPE%	**0.49**	Antenna C2 MPE%	**0.49**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Gain:	16.35 / 12.95 / 13.35 dBd	Gain:	16.35 / 12.95 / 13.35 dBd	Gain:	16.35 / 12.95 / 13.35 dBd
Height (AGL):	170 feet	Height (AGL):	170 feet	Height (AGL):	170 feet
Frequency Bands	2100 MHz / 600 MHz / 700 MHz	Frequency Bands	2100 MHz / 600 MHz / 700 MHz	Frequency Bands	2100 MHz / 600 MHz / 700 MHz
Channel Count	5	Channel Count	5	Channel Count	5
Total TX Power(W):	160	Total TX Power(W):	160	Total TX Power(W):	160
ERP (W):	4,169.10	ERP (W):	4,169.10	ERP (W):	4,169.10
Antenna A3 MPE%	**1.01**	Antenna B3 MPE%	**1.01**	Antenna C3 MPE%	**1.01**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**2.33 %**
AT&T	**3.09** %
MetroPCS	**1.56** %
Verizon Wireless	**5.01** %
Sprint	**2.63** %
Site Total MPE %:	**14.62 %**

T-Mobile Sector A Total:	2.33 %
T-Mobile Sector B Total:	2.33 %
T-Mobile Sector C Total:	2.33 %
Site Total:	14.62 %

T-Mobile Maximum MPE Power Values (Per Sector)

T-Mobile _Frequency Band / Technology (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile AWS - 2100 MHz LTE	4	1,556.18	170	8.32	AWS - 2100 MHz	1000.00	0.83%
T-Mobile PCS - 1900 MHz LTE	2	1,556.18	170	4.14	PCS - 1900 MHz	1000.00	0.41%
T-Mobile PCS - 1900 MHz GSM	1	583.57	170	0.78	PCS - 1900 MHz	1000.00	0.08%
T-Mobile AWS - 2100 MHz UMTS	1	1,726.08	170	2.31	AWS - 2100 MHz	1000.00	0.23%
T-Mobile 600 MHz LTE	2	788.97	170	2.11	600 MHz	400.00	0.53%
T-Mobile 700 MHz LTE	2	432.54	170	1.16	700 MHz	467.00	0.25%
						Total:	**2.33%**

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population exposure to RF Emissions.

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	2.33 %
Sector B:	2.33 %
Sector C:	2.33 %
T-Mobile Maximum MPE % (Per Sector):	2.33 %
Site Total:	14.62 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **14.62%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.