



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

December 14, 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: 876348
T-Mobile Site ID: CTHA067A
Located at: Bright Meadow Blvd, Enfield, CT 06082
Latitude: 42° 1' 14.91"/ Longitude: -72° 35' 6.59"

Dear Ms. Bachman:

T-Mobile is requesting to file an Exempt Modification for an existing 147.5-foot Monopole located at Bright Meadow Blvd, Enfield, CT 06082. T-Mobile currently maintains nine (9) antennas at the 107-foot level of the existing 147.5-foot tower. The monopole is owned by Crown Castle. The property is owned by Connecticut Light and Power. T-Mobile now intends to replace six (6) existing antenna with six (6) proposed antennas and also add two (2) hybrid fiber lines.

This facility was approved by the Town of Enfield on July 10, 1998. This approval included the condition(s):

- 1 An engineering bond for removal of the wireless telecommunications facility including the tower and base components in an amount to be determined by the town engineer shall be submitted to the town prior to the start of construction and prior to the issuance of any building permits.
- 2 An erosion and sedimentation control passbook, pledged to the town, in an amount to be determined by the town engineer, shall be submitted to the town prior to the start of construction.
- 3 A preconstruction meeting between the applicant, site contractors, project engineer and town staff shall be held prior to the beginning of any site work.
- 4 The tower shall accommodate both the applicant's Antenna and comparable Antennas for at least two additional users.
- 5 The tower shall allow for future rearrangement of Antennas upon the tower and shall accommodate Antennas mounted at varying heights.
- 6 The wireless communications facility shall not interfere with existing or proposed public safety communications, commercial television and radio signals or other forms of communication transmissions.

- 7 The wireless communication facility shall comply with the standards promulgated by the Federal Communication Commission (FCC).
- 8 All generators installed in conjunction with the wireless communications facility shall comply with all State and local noise regulators.
- 9 On or before August 31 every year, the applicant or wireless telecommunications service provider shall submit information to the Planning Zoning Commission file in support of the provision of Section 14-8.6 of the Zoning Ordinance.
- 10 If the wireless communications facility is not in use for 12 consecutive months, it shall be removed within 90 days from the end of such 12 month period, including any towers and base components by the last service provider using the site or owner, whichever has a contractual obligation to perform the removal.
- 11 The special use permit for a commercial wireless telecommunication service shall be valid for a maximum period of 10 years with a right of reapplication under regulations in effect at that time.
- 12 The approval of an application for special use permit shall be void and of no effect unless construction of the project commences within one year from the date of the approval granted by the commission in accordance with Section 14-10.2 of the Zoning Ordinance.
- 13 Arrangements shall be made with the fire department regarding emergency access to the compound.
- 14 The plans shall be modified to show a paved apron at the driveway entrance that conforms to town paving specifications.
- 15 The plans shall be modified to include standard notes as recommended by the town engineer.
- 16 Monopole shall be maintained if becomes rusty or eye sore.

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 Christopher Bromson, Town Manager, Town of Enfield, as well as the property owner, and 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:

Christopher Bromson, Town Manager
820 Enfield Street
Enfield CT, 06082

Connecticut Light & Power Company
PO Box 650031 DBA Eversource
Energy Dallas, TX 75265-0031

Town of Enfield Planning & Zoning
820 Enfield Street
Enfield CT, 06082

ORIGIN ID:GFLA (318) 373-3523
ANNE MARIE ZSAMBA
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 17DEC18
ACTWGWT: 1.50 LB
CAD: 104924194/NET4040
BILL SENDER

TO PLANNING AND ZONING
TOWN OF ENFIELD
820 ENFIELD ST

ENFIELD CT 06082
INV: (860) 253-6350 REF: 17347880
PO: DEPT:

552J2/E4AF/DCA5



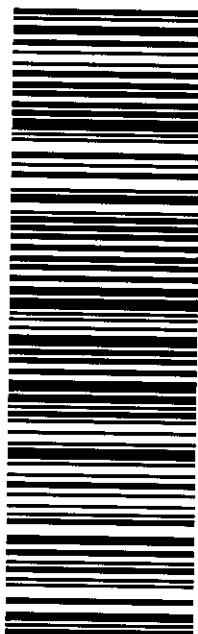
J182110081681uy

TRK# 0201
7739 9506 6529

TUE - 18 DEC 10:30A
PRIORITY OVERNIGHT

EB QCWA

DSR 06082
CT-US BDL



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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 Service Guide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

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

SHIP DATE: 17DEC18
ACTWGT: 1.50 LB
CAD: 104824794/NET/4040

BILL SENDER

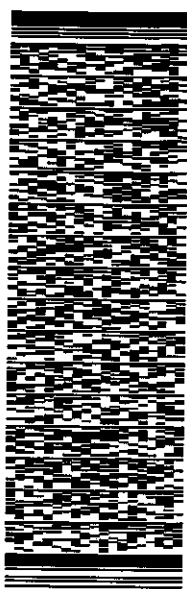
TO CONNECTICUT LIGHT AND POWER

107 SELDEN ST

BERLIN CT 06037

(800) 286-2000 REF: 17347890
INV. DEPT:
PO.

552.IZ/E4/AF/DC/5

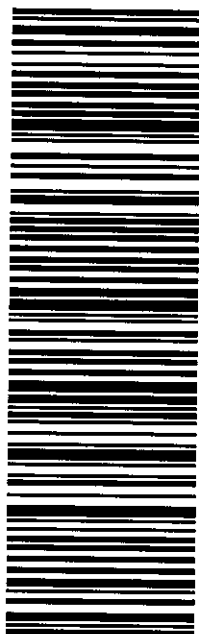


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0201

TUE - 18 DEC 10:30A
PRIORITY OVERNIGHT

EB BDLA

DSR 06037
CT-US BDL



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ANNE MARIE ZSAMBA
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 17DEC18
ACTWGT: 4.50 LB
CAD: 104924194/NET/4040

BILL SENDER

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

NEW BRITAIN CT 06051
(860) 827-2951 REF: 17658880
INV: DEPT:
PO:

552J2/E4AF/DCA5



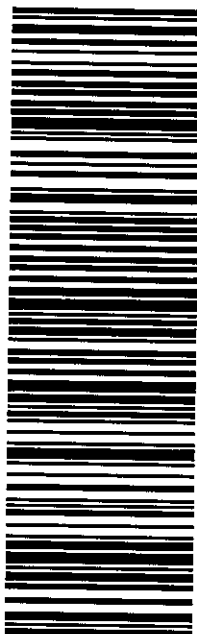
J18218881681uv

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0201

TUE - 18 DEC 10:30A
PRIORITY OVERNIGHT

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CT-US BDL
DSR 06051



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UNITED STATES US

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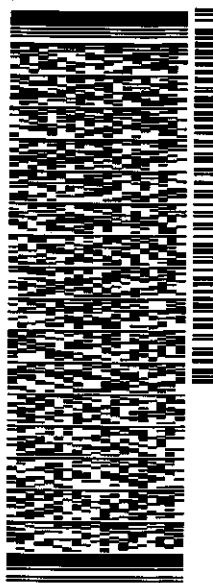
BILL SENDER

TO TOWN MANAGERS OFFICE
TOWN OF ENFIELD
820 ENFIELD ST

ENFIELD CT 06082

(860) 253-6350 REF: 1734 7890
NV. DEPT.
PO.

552J2/E4AFJDCA5



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TRK# 7739 9500 5160
0207

TUE - 18 DEC 10:30A

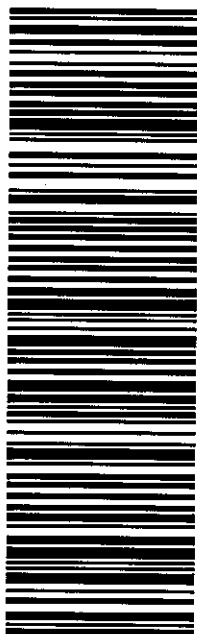
PRIORITY OVERNIGHT

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CT-US BDL

EB QCWA



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TOWN OF ENFIELD

CERTIFIED MAIL Z205 375 469



July 7, 1998

Karen Johnson
Vanasse Hangen Brustlin Inc.
54 Tuttle Place
Middletown, CT 06457

Dear Ms. Johnson:

At the July 2, 1998 Regular Meeting of the Enfield Planning & Zoning Commission the following action was taken:

PH 2053 – Special Use Permit for a Commercial Wireless Telecommunication Service including site plan review of a wireless telecommunication facility consisting of a 150-foot Monopole and associated equipment surrounded by a chain link fence located east of Bright Meadow Blvd. adjacent to the Harley Hotel (Assessor's Map 35, Lot 219 - Old Enfield St) BR zone – The Connecticut Light and Power Company, owner / Sprint Spectrum L.P. (Sprint PCS) aplct.

The Commission approved the application with the following conditions:

1. An engineering bond for removal of the wireless telecommunications facility including the tower and base components in an amount to be determined by the town engineer shall be submitted to the town prior to the start of construction and prior to the issuance of any building permits. Any need to use the bond by the town shall be binding on the site regardless of name of the bond obligee.

820 Enfield Street/Enfield, Connecticut 06082/(860) 253-6300

2. An erosion and sedimentation control passbook, pledged to the town, in an amount to be determined by the town engineer, shall be submitted to the town prior to the start of construction.
3. A preconstruction meeting between the applicant, site contractors, project engineer and town staff shall be held prior to the beginning of any site work.
4. The tower shall accommodate both the applicant's Antennas and comparable Antennas for at least two additional users.
5. The tower shall allow for future rearrangement of Antennas upon the tower and shall accommodate Antennas mounted at varying heights.
6. The wireless communication facility shall not interfere with existing or proposed public safety communications, commercial television and radio signals or other forms of communication transmissions. Penalty for subsequent interference shall void the approval of the facility.
7. The wireless communication facility shall comply with the standards promulgated by the Federal Communication Commission (FCC).
8. All generators installed in conjunction with the wireless communications facility shall comply with all State and local noise regulators.
9. On or before August 31 every year, the applicant or wireless telecommunications service provider shall submit information to the Planning Zoning Commission file in support of the provision of Section 14-8.6 of the Zoning Ordinance.
10. If the wireless communications facility is not in use for 12 consecutive months, it shall be removed within 90 days from the end of such 12 month period, including any towers and base components by the last service provider using the site or owner, whichever has a contractual obligation to perform the removal. The site shall be restored to an appearance that is compatible with the surrounding neighborhood and where appropriate, re-vegetated to blend with surrounding area.
11. The special use permit for a commercial wireless telecommunication service shall be valid for a maximum period of 10 years with a right of reapplication under regulations in effect at that time.

Karen Johnson

-3-

July 7, 1998

12. The approval of an application for special use permit shall be void and of no effect unless construction of the project commences within one year from the date of the approval granted by the commission in accordance with Section 14-10.2 of the Zoning Ordinance.
13. Arrangements shall be made with the fire department regarding emergency access to the compound.
14. The plans shall be modified to show a paved apron at the driveway entrance that conforms to town paving specifications.
15. The plans shall be modified to include standard notes as recommended by the town engineer.
16. Monopole shall be maintained if becomes rusty or eye sore.

If you have any questions regarding this action, please contact me at (860)253-6358.

Very truly yours,



Laurie P. Whitten
Acting Town Planner

LPW/vch

BRIGHT MEADOW BLVD

Location BRIGHT MEADOW BLVD **Mblu** 035/ / 0219/ /

Acct# 048700010005 **Owner** CONN LIGHT + POWER COMPANY

Assessment \$485,710 **Appraisal** \$693,860

PID 11009 **Building Count** 1

Fire District 4

Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2016	\$419,280	\$274,580	\$693,860
Assessment			
Valuation Year	Improvements	Land	Total
2016	\$293,500	\$192,210	\$485,710

Owner of Record

Owner CONN LIGHT + POWER COMPANY **Sale Price** \$0

Co-Owner **Certificate** 1

Address PO BOX 270 **Book & Page** 237/ 455

HARTFORD, CT 06140-0270 **Sale Date**

Ownership History

Ownership History				
Owner	Sale Price	Certificate	Book & Page	Sale Date
CONN LIGHT + POWER COMPANY	\$0	1	237/ 455	

Building Information

Building 1 : Section 1

Year Built:

Living Area: 0

Replacement Cost: \$0

Building Percent Good:

Replacement Cost Less Depreciation: \$0

Building Photo

Building Attributes	
Field	Description

Style	Outbuildings
Model	
Grade:	
Stories	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Full Bthrms:	
Half Baths:	
Extra Fixtures	
Total Rooms:	
Bath Style:	
Kitchen Style:	
Extra Kitchens	
Fireplace(s)	
Extra Opening(s)	
Gas Fireplace(s)	
Blocked FPL(s)	
Bsmt Garage(s)	
Fin Bsmt	
FBM Quality	
Whirlpool(s)	
Walk Out	
Solar	



(http://images.vgsi.com/photos2/EnfieldCTPhotos//\00\02\72\14.JPG)

Building Layout

Building Layout

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Land Line Valuation

Use Code	300	Size (Acres)	12.61
Description	Ind Land	Frontage	
Zone	BR	Depth	
Neighborhood		Assessed Value	\$192,210
Alt Land Appr Category	No	Appraised Value	\$274,580

Outbuildings

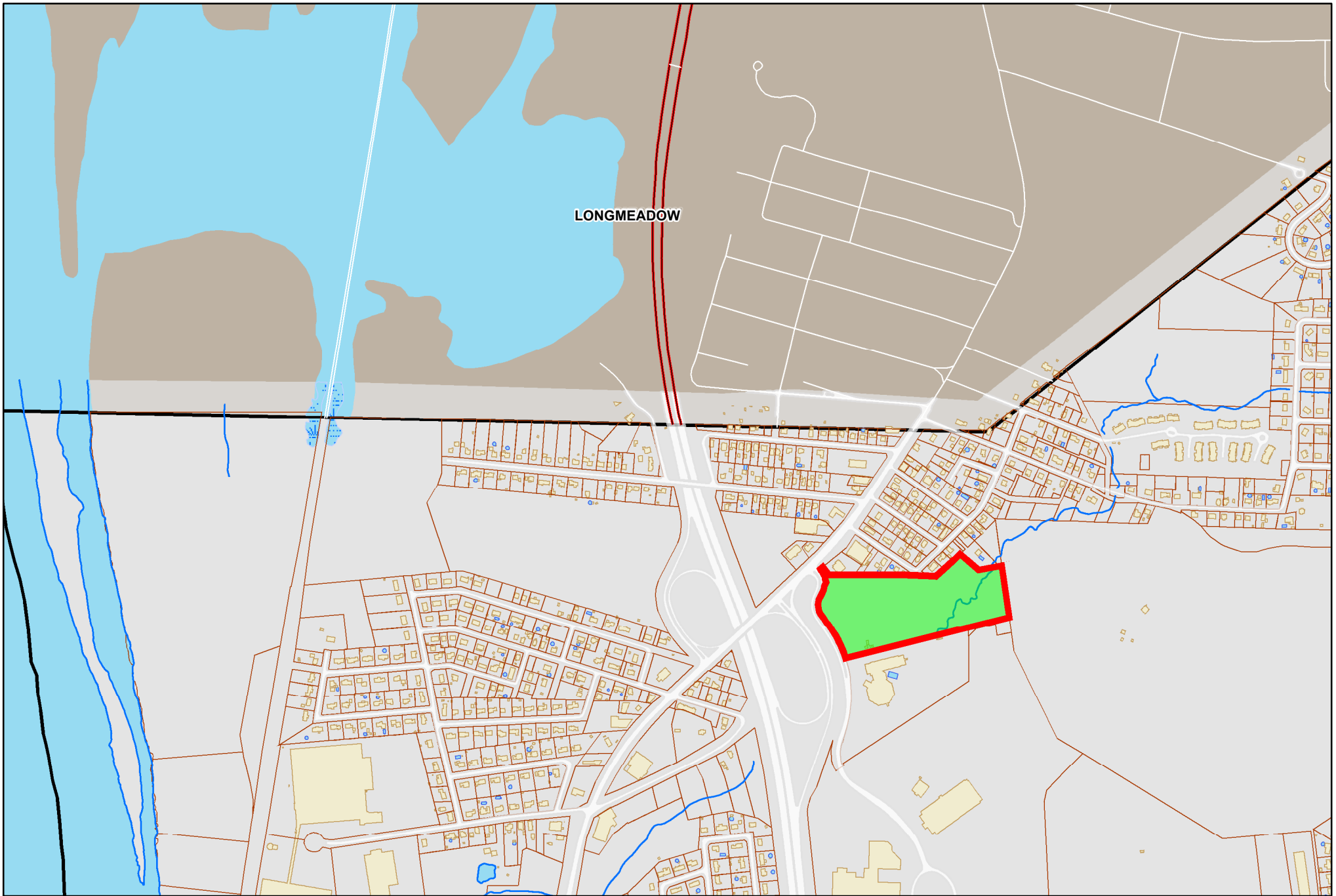
Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
FN2	FENCE-6' CHAIN			400 L.F.	\$3,400	1
	CMEQ			360	\$13,500	1
	CMEQ			240	\$9,000	1
	CMEQ			240	\$9,000	1
TWR3	Cell Twr3 Carriers			1 UNITS	\$384,380	1

Valuation History

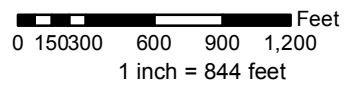
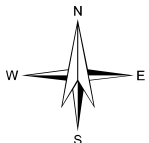
Appraisal			
Valuation Year	Improvements	Land	Total
2015	\$419,280	\$274,580	\$693,860
2014	\$419,280	\$274,580	\$693,860
2013	\$419,280	\$274,580	\$693,860

Assessment			
Valuation Year	Improvements	Land	Total
2015	\$293,500	\$192,210	\$485,710
2014	\$293,500	\$192,210	\$485,710
2013	\$293,500	\$192,210	\$485,710

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Enfield, CT



The Town of Enfield, CT shall assume no liability for any errors, omissions, or inaccuracies in the information provided regardless of how caused or any decision made or action taken or not taken by reader in reliance upon any information or data furnished hereunder.

SITE NAME: ENFIELD

55 BRIGHT MEADOW BLVD

ENFIELD, CT 06082

HARTFORD COUNTY

T-MOBILE SITE NUMBER: CTHA067A

CROWN BU NUMBER: 876348

RF DESIGN GUIDELINE: 67D92DB OUTDOOR

CONTRACTOR TO NOTIFY CROWN CM PRIOR TO CONSTRUCTION START

T-MOBILE TECHNICIAN SITE SAFETY NOTES

LOCATION	SPECIAL RESTRICTIONS
SECTOR A: ANTENNA/TMA/RRH	ACCESS NOT PERMITTED
SECTOR B: ANTENNA/TMA/RRH	ACCESS NOT PERMITTED
SECTOR C: ANTENNA/TMA/RRH	ACCESS NOT PERMITTED
GPS/LMU:	UNRESTRICTED CAUTION: OSHA-APPROVED PORTABLE 8' STEP-LADDER REQUIRED
RADIO CABINETS:	UNRESTRICTED
PPC DISCONNECT:	UNRESTRICTED
MAIN CIRCUIT D/C:	UNRESTRICTED
NIU/T DEMARC:	UNRESTRICTED
OTHER/SPECIAL:	NONE

**T-MOBILE
NORTHEAST LLC**

103 MONARCH DRIVE
LIVERPOOL, NY 13088
(315) 265-1882



CROWN CASTLE
12 GILL STREET, SUITE 5800
WOBURN, MA 01801



45 BEECHWOOD DRIVE TEL: (978) 557-5553
N. ANDOVER, MA 01845 FAX: (978) 336-5586

GENERAL NOTES

THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF T-MOBILE. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.

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

CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE T-MOBILE NORTHEAST, LLC REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

SPECIAL STRUCTURAL NOTES

CONTRACTOR SCOPE OF WORK SHALL INCLUDE ALL REQUIRED STRUCTURAL MODIFICATIONS, RE-BUNDLING OF COAXIAL CABLES OR OTHER SPECIAL MODIFICATIONS AS OUTLINED THEREIN.

STRUCTURAL DESIGNS AND DETAILS FOR ANTENNA MOUNTS AND GLOBAL STRUCTURAL STABILITY ANALYSIS COMPLETED ON BEHALF OF T-MOBILE ARE INCLUSIVE OF THE ENTIRE SUPPORT STRUCTURE, EXISTING ANTENNA MOUNTS AND ALL OTHER ASPECTS OF THE STRUCTURE THAT WILL SUPPORT THE T-MOBILE L700 EQUIPMENT DEPLOYMENT AS DEPICTED HEREIN.

HUDSON DESIGN ASSUMES THAT THE EQUIPMENT IS PROPERLY CONSTRUCTED AND MAINTAINED. ALL STRUCTURAL MEMBERS AND THEIR CONNECTION ARE ASSUMED TO BE IN GOOD CONDITION AND ARE FREE FROM DEFECTS WITH NO DETERIORATION TO ITS MEMBER CAPACITIES



PROJECT SUMMARY

SCOPE OF WORK: UNMANNED TELECOMMUNICATIONS FACILITY T-MOBILE EQUIPMENT MODERNIZATION

ZONING JURISDICTION: (TOWN OF ENFIELD) BASED ON INFORMATION PROVIDED BY T-MOBILE, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS AN ELIGIBLE FACILITY UNDER THE TAX RELIEF ACT OF 2012, 47 USC 1455(A), AND IS SUBJECT TO AN EXPEDITED ELIGIBLE FACILITIES REQUEST/REVIEW AND ZONING PRE-EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW).

SITE ADDRESS: 55 BRIGHT MEADOW BLVD
ENFIELD, CT 06082

LATITUDE: 42° 1' 14.91" N

LONGITUDE: 72° 35' 6.59" W

JURISDICTION: HARTFORD COUNTY

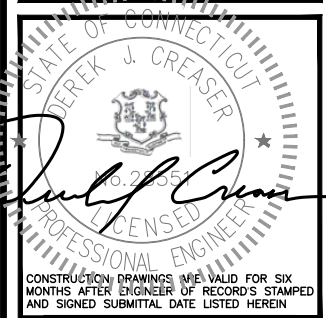
CURRENT USE: TELECOMMUNICATIONS FACILITY

PROPOSED USE: TELECOMMUNICATIONS FACILITY

CROWN CASTLE CM: CHRIS MILLER (585) 739-1780

CROWN CASTLE SITE NAME: ENFIELD

CROWN CASTLE SITE ID: 876348



CHECKED BY: BB

APPROVED BY: DJC

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	11/28/18	CONSTRUCTION REVISED	BB
0	08/22/18	ISSUED FOR CONSTRUCTION	GA

SITE NUMBER:
CTHA067A
CROWN CASTLE SITE ID:
876348
SITE NAME:
ENFIELD
SITE ADDRESS:
55 BRIGHT MEADOW BLVD
ENFIELD, CT 06082
HARTFORD COUNTY

SHEET TITLE
TITLE SHEET
(L700)

SHEET NUMBER
T-1

APPROVALS

PROJECT MANAGER	DATE
CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING / SITE ACQ.	DATE
OPERATIONS	DATE
TOWER OWNER	DATE

72 HOURS



CALL
BEFORE YOU DIG
CALL TOLL FREE 1-800-922-4455
OR CALL 811

UNDERGROUND SERVICE ALERT

DRAWING INDEX

SHEET NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	1
GN-1	GENERAL NOTES	1
A-1	COMPOUND & EQUIPMENT PLANS	1
A-2	ANTENNA LAYOUTS & ELEVATION	1
A-3	ANTENNA DETAILS	1
A-4	EQUIPMENT DETAILS	1
A-5	ANTENNA AND COAX SCHEDULE & PLUMBING DIAGRAM	1
E-1	ONE-LINE DIAGRAM AND GROUNDING DETAILS	1

GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTNING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS 2 AWG STRANDED COPPER FOR OUTDOOR BTS.
6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO GROUND BAR.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWS COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
 CONTRACTOR – CROWN CASTLE INTERNATIONAL
 SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
 OWNER – T-MOBILE
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
16. CONSTRUCTION SHALL COMPLY WITH L700 SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF T-MOBILE SITES."
17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
20. APPLICABLE BUILDING CODES:
 SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
 BUILDING CODE: IBC 2012 WITH 2016 CT STATE BUILDING CODE AMENDMENTS
 ELECTRICAL CODE: REFER TO ELECTRICAL DRAWINGS

SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

MANUAL OF STEEL CONSTRUCTION, ASD, FOURTEENTH EDITION;

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-G, STRUCTURAL STANDARDS FOR STEEL

EQUIPMENT AND ANTENNA SUPPORTING STRUCTURES; REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

ABBREVIATIONS					
AGL	ABOVE GRADE LEVEL	EQ	EQUAL	REQ	REQUIRED
AWG	AMERICAN WIRE GAUGE	GC	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
BBU	BATTERY BACKUP UNIT	GRC	GALVANIZED RIGID CONDUIT	TBD	TO BE DETERMINED
BTCW	BARE TINNED SOLID COPPER WIRE	MGB	MASTER GROUND BAR	TBR	TO BE REMOVED
BGR	BURIED GROUND RING	MIN	MINIMUM	TBRR	TO BE REMOVED AND REPLACED
BTS	BASE TRANSCEIVER STATION	P	PROPOSED	TYP	TYPICAL
E	EXISTING	NTS	NOT TO SCALE	UG	UNDER GROUND
EGB	EQUIPMENT GROUND BAR	RAD	RADIATION CENTER LINE (ANTENNA)	VIF	VERIFY IN FIELD
EGR	EQUIPMENT GROUND RING	REF	REFERENCE		

**T-MOBILE
NORTHEAST LLC**

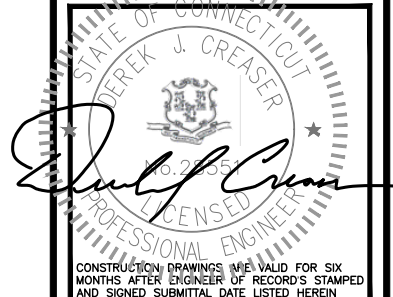
103 MONARCH DRIVE
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CROWN CASTLE
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0	08/22/18	ISSUED FOR CONSTRUCTION	GA

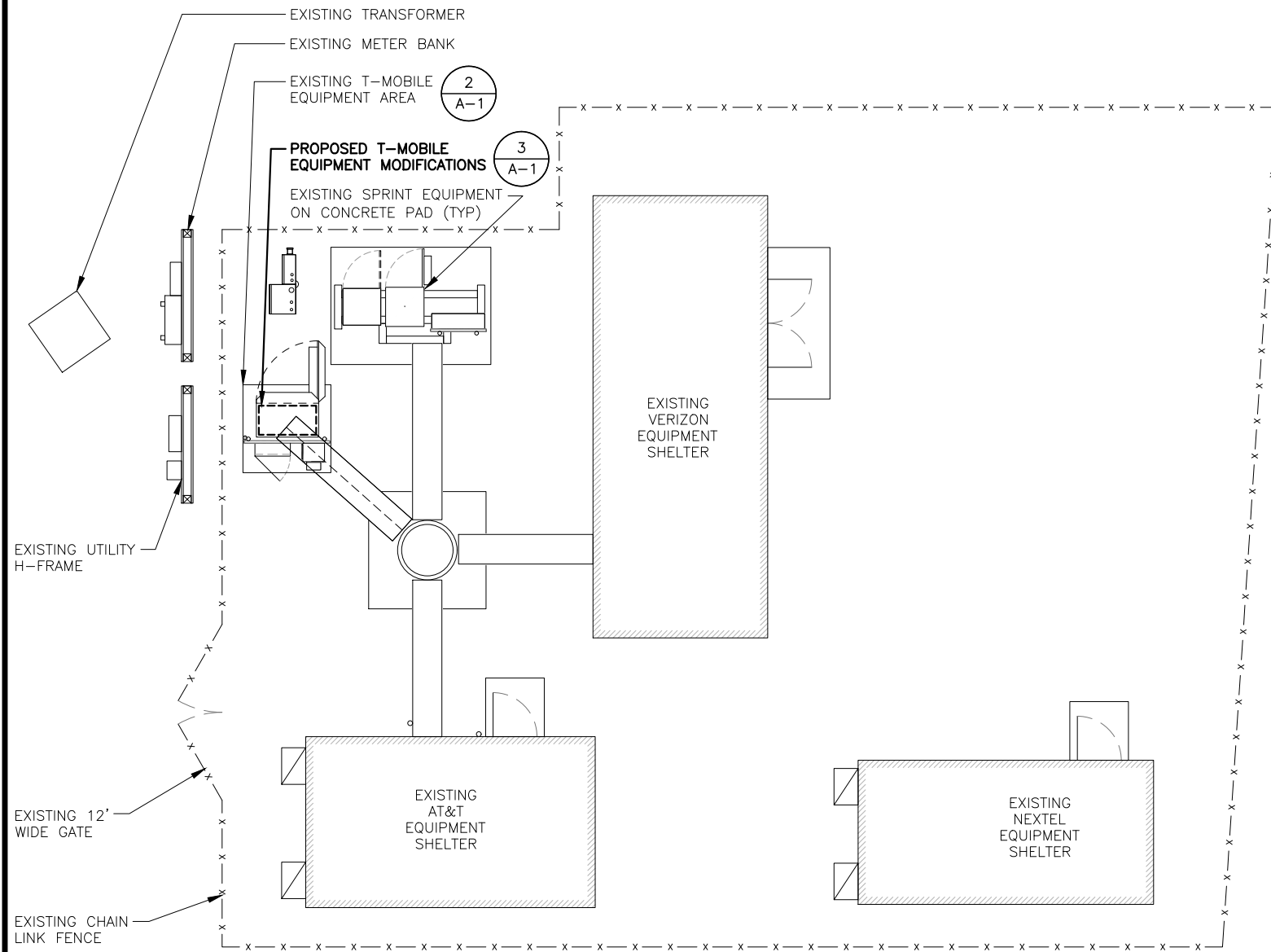
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CTHA067A
CROWN CASTLE SITE ID:
876348
SITE NAME:
ENFIELD
SITE ADDRESS:
55 BRIGHT MEADOW BLVD
ENFIELD, CT 06082
HARTFORD COUNTY

SHEET TITLE
GENERAL NOTES
(L700)

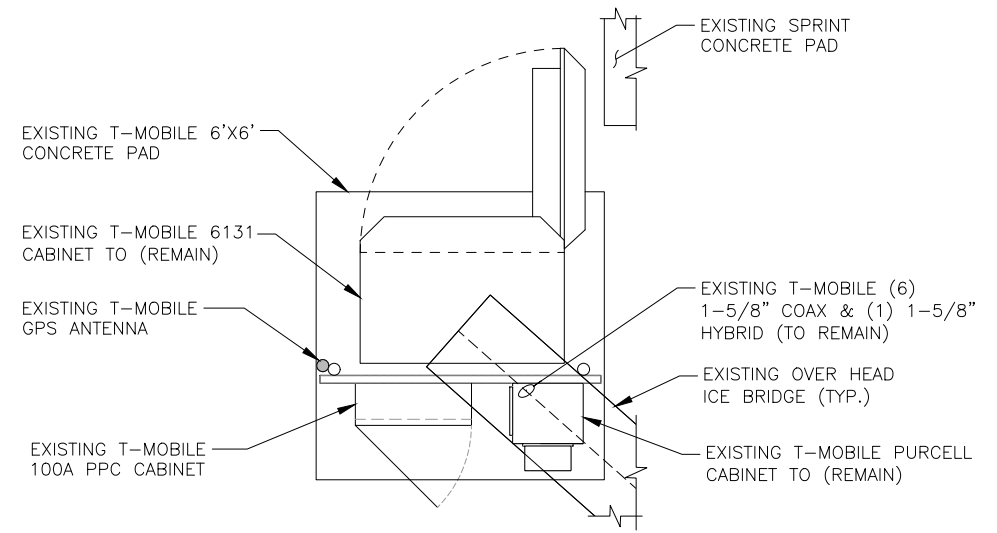
SHEET NUMBER
GN-1

STRUCTURAL NOTES:
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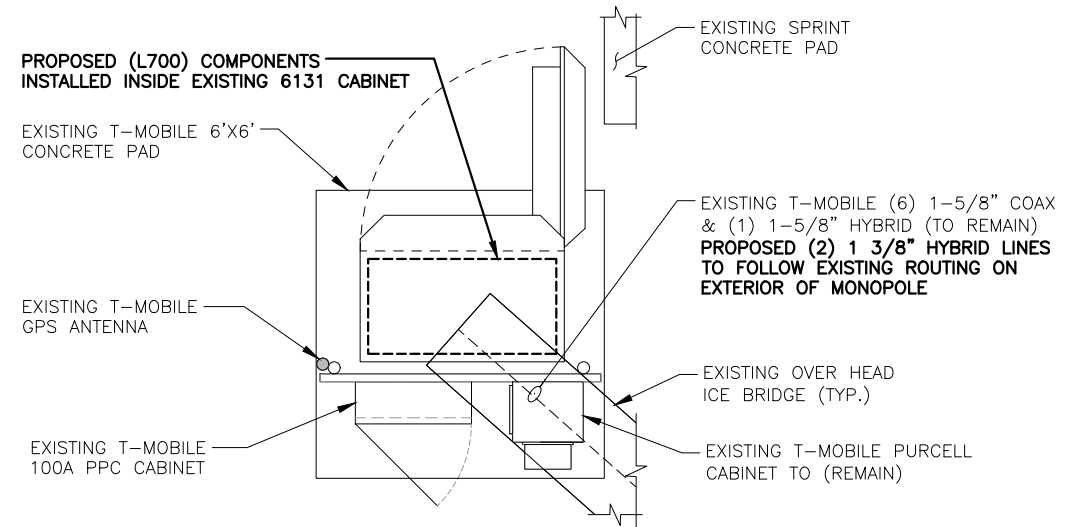
NOTE:
 REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.



COMPOUND PLAN 1
 22x34 SCALE: 3/16"=1'-0"
 11x17 SCALE: 3/32"=1'-0"
 MAGNETIC NORTH 13° 43' W
 TRUE NORTH



EXISTING EQUIPMENT PLAN 2
 22x34 SCALE: 1/2"=1'-0"
 11x17 SCALE: 1/4"=1'-0"
 MAGNETIC NORTH 13° 43' W
 TRUE NORTH



PROPOSED EQUIPMENT PLAN 3
 22x34 SCALE: 1/2"=1'-0"
 11x17 SCALE: 1/4"=1'-0"
 MAGNETIC NORTH 13° 43' W
 TRUE NORTH

T-MOBILE NORTHEAST LLC

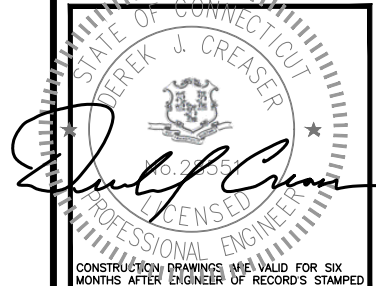
103 MONARCH DRIVE
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CROWN CASTLE

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CROWN CASTLE SITE ID:

876348

SITE NAME:

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SITE ADDRESS:

55 BRIGHT MEADOW BLVD
 ENFIELD, CT 06082
 HARTFORD COUNTY

SHEET TITLE

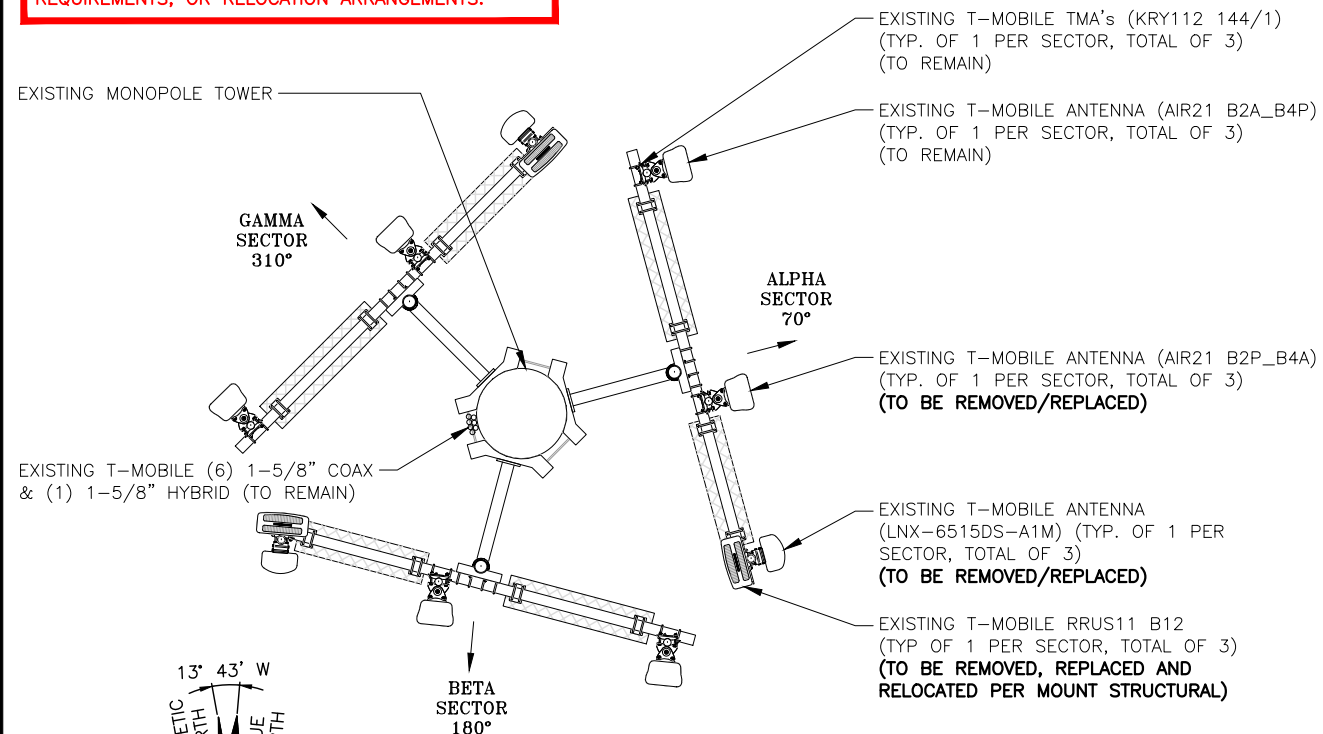
COMPOUND & EQUIPMENT PLAN
 (L700)

SHEET NUMBER

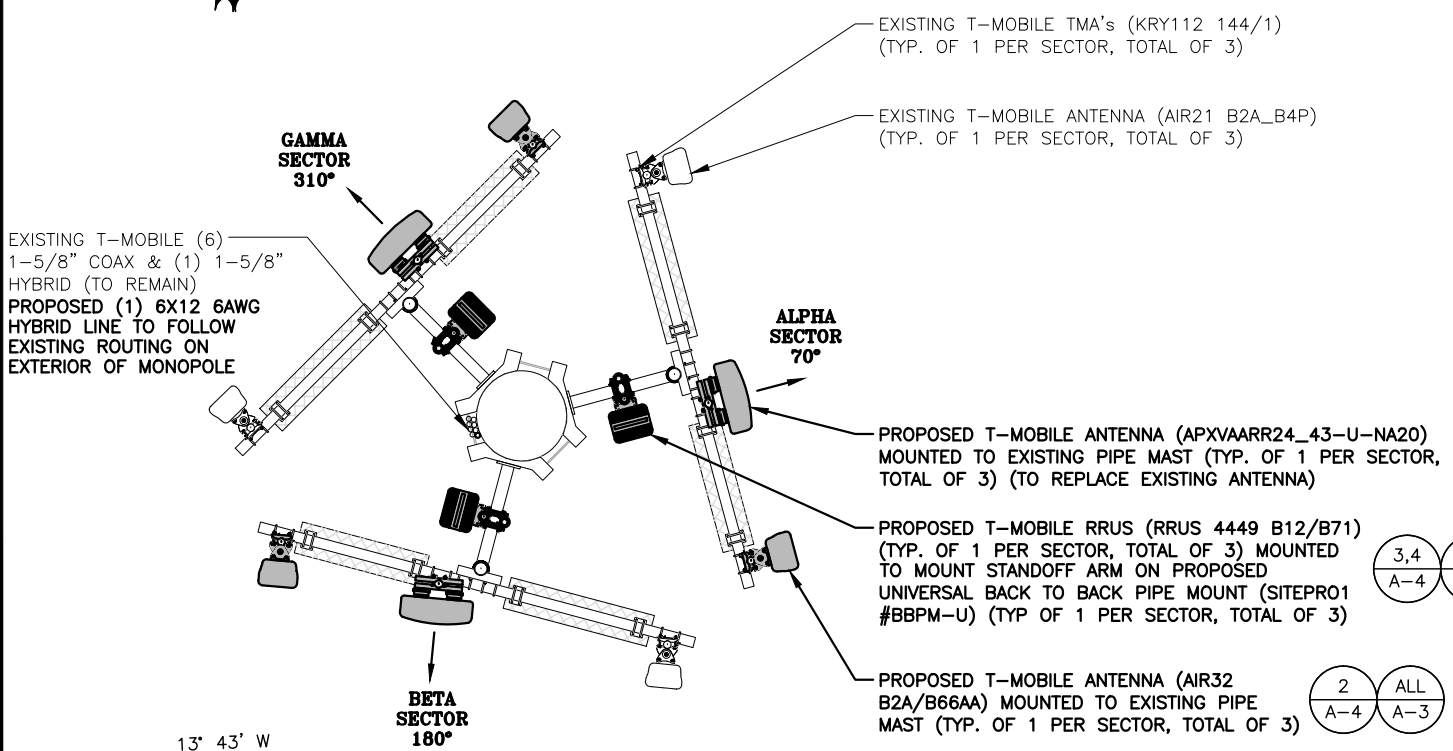
A-1

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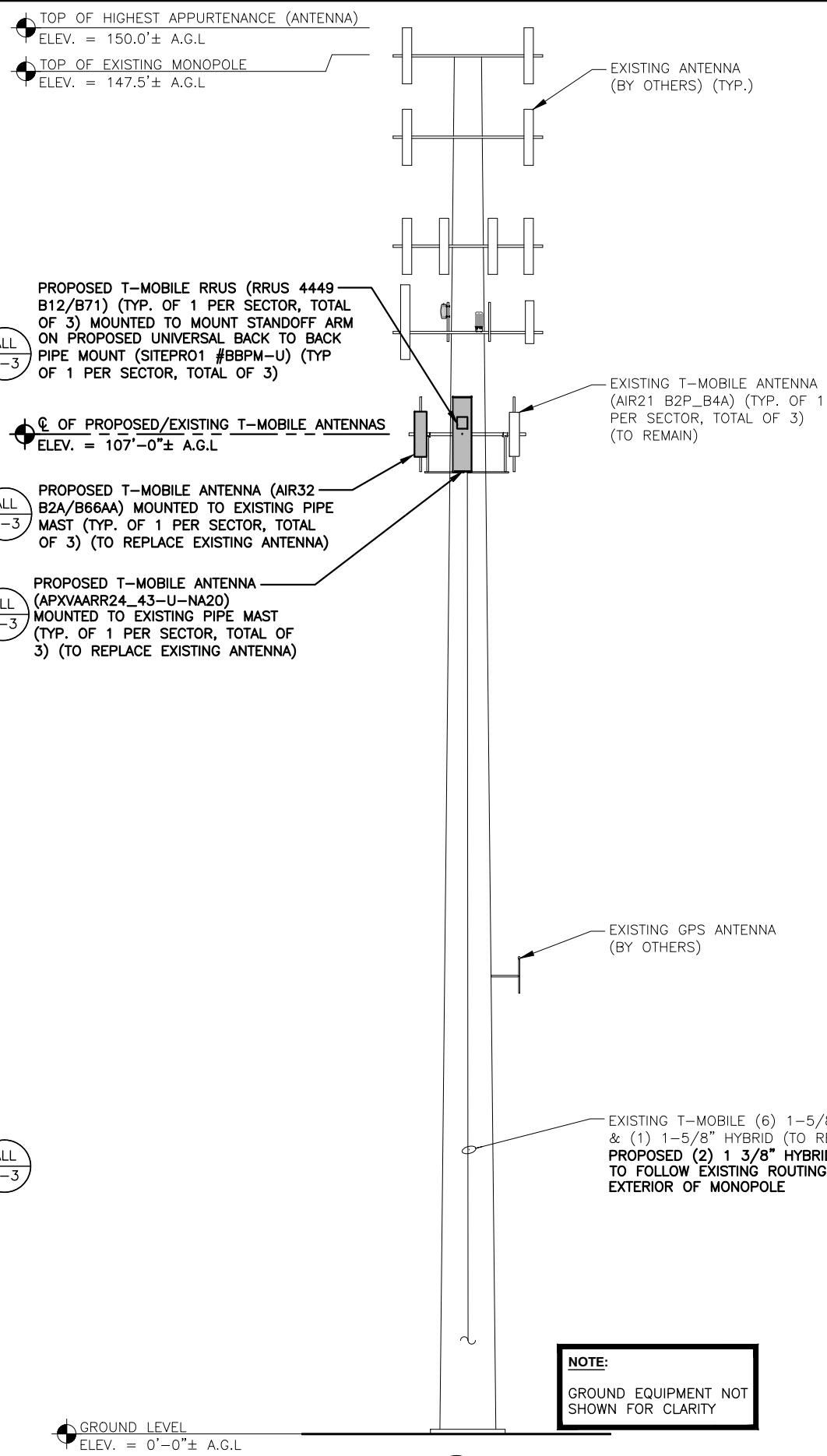
NOTE:
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EXISTING ANTENNA PLAN
 SCALE: N.T.S. (1) A-2

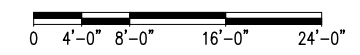


PROPOSED ANTENNA PLAN
 SCALE: N.T.S. (2) A-2



GROUND LEVEL
 ELEV. = 0'-0"± A.G.L.

ELEVATION
 22x34 SCALE: 1/8"=1'-0"
 11x17 SCALE: 1/16"=1'-0"



NOTE:
 GROUND EQUIPMENT NOT SHOWN FOR CLARITY

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STATE OF CONNECTICUT
 PETER J. CREASER
 LICENSED PROFESSIONAL ENGINEER
 16,255
 CONSTRUCTION DRAWINGS ARE VALID FOR SIX MONTHS AFTER ENGINEER OF RECORD'S STAMPED AND SIGNED SUBMITTAL DATE LISTED HEREIN

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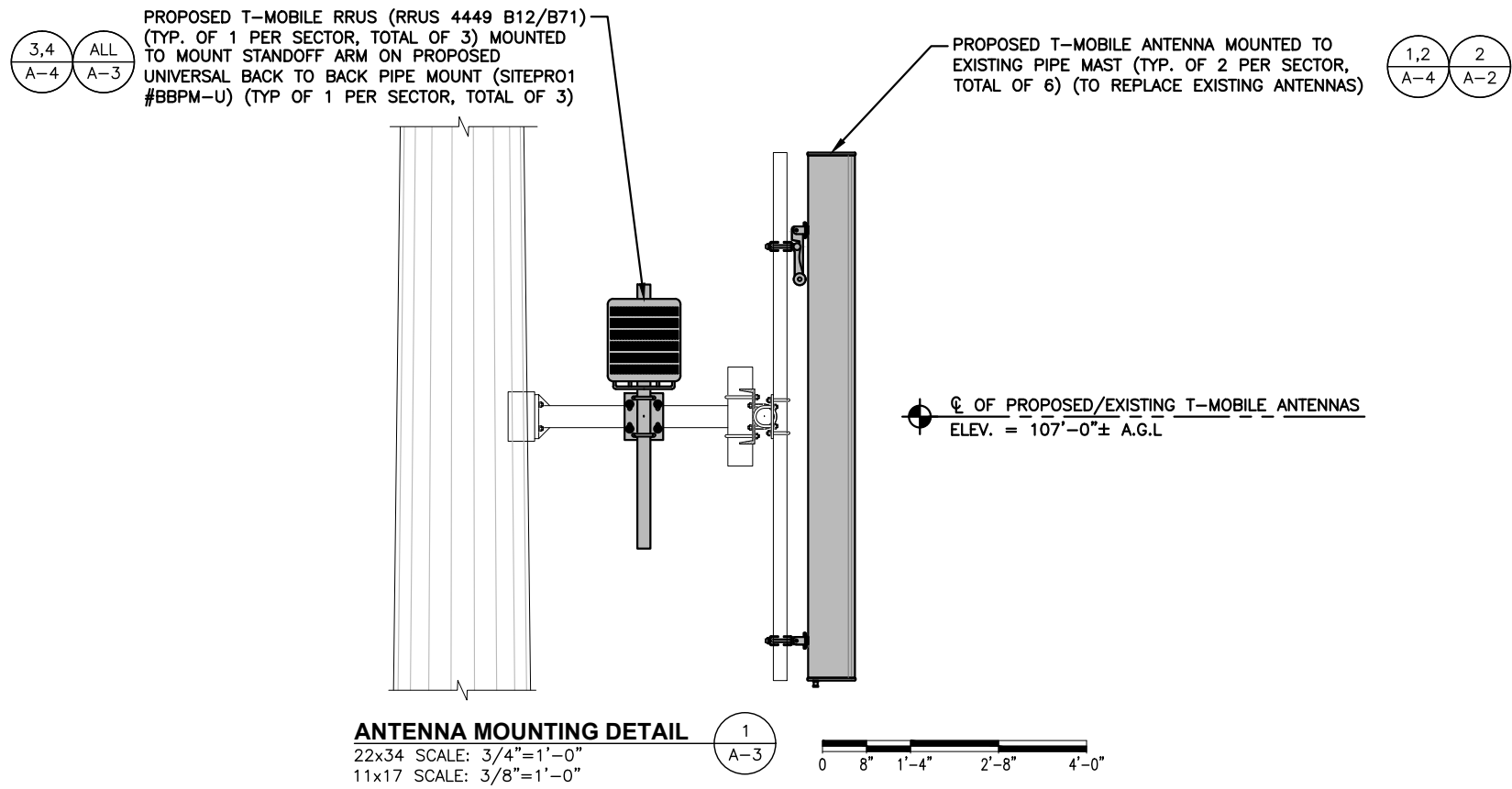
SITE NUMBER:
 CTHA067A
 CROWN CASTLE SITE ID:
 876348
 SITE NAME:
 ENFIELD
 SITE ADDRESS:
 55 BRIGHT MEADOW BLVD
 ENFIELD, CT 06082
 HARTFORD COUNTY

SHEET TITLE
 ANTENNA LAYOUTS
 & ELEVATION
 (L700)

SHEET NUMBER
A-2

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NOTE:
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- PROPOSED T-MOBILE ANTENNA (AIR32 B2A/B66AA) MOUNTED TO EXISTING PIPE MAST (TYP. OF 1 PER SECTOR, TOTAL OF 3) (TO REPLACE EXISTING ANTENNA)
- PROPOSED T-MOBILE RRUS (RRUS 4449 B12/B71) (TYP. OF 1 PER SECTOR, TOTAL OF 3) MOUNTED TO MOUNT STANDOFF ARM ON PROPOSED UNIVERSAL BACK TO BACK PIPE MOUNT (SITEPRO1 #BBPM-U) (TYP OF 1 PER SECTOR, TOTAL OF 3)
- PROPOSED T-MOBILE ANTENNA (APXVAARR24_43-U-NA20) MOUNTED TO EXISTING PIPE MAST (TYP. OF 1 PER SECTOR, TOTAL OF 3) (TO REPLACE EXISTING ANTENNA)
- EXISTING T-MOBILE TMA's (KRY112 144/1) (TYP. OF 1 PER SECTOR, TOTAL OF 3) (TO REMAIN)
- EXISTING T-MOBILE ANTENNA (AIR21 B2P_B4A) (TYP. OF 1 PER SECTOR, TOTAL OF 3) (TO REMAIN)

T-MOBILE ELEVATION PHOTO DETAIL 2
 SCALE: N.T.S

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STATE OF CONNECTICUT
 JEREMY J. CREASER
 108.22553
 LICENSED PROFESSIONAL ENGINEER
 CONSTRUCTION DRAWINGS ARE VALID FOR SIX MONTHS AFTER ENGINEER OF RECORD'S STAMPED AND SIGNED SUBMITTAL DATE LISTED HEREIN

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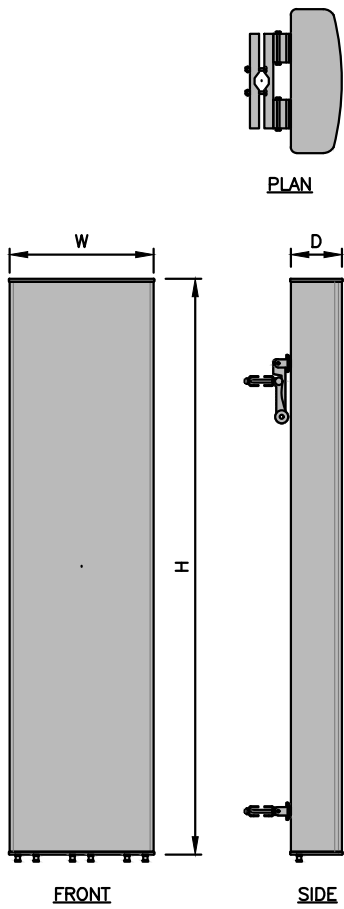
SHEET TITLE
 ANTENNA DETAILS
 (L700)

SHEET NUMBER
A-3

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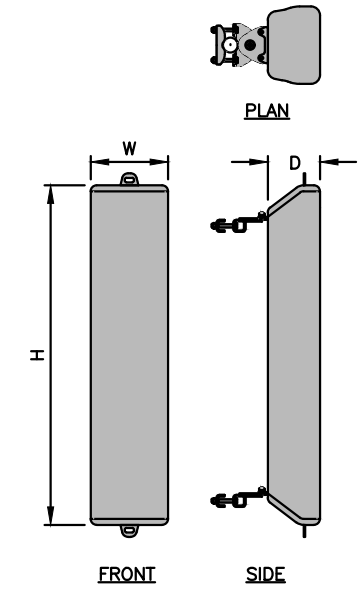
NOTE:
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L7/L6 ANTENNA DIMENSIONS	
MODEL #	APXVAARR24_43-U-NA20 (OCTA)
MANUF.	RFS
HEIGHT	95.9"
WIDTH	24"
DEPTH	8.7"
WEIGHT	128 LBS



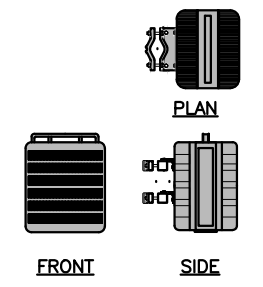
L7/L6 ANTENNA DETAIL 1
 SCALE: N.T.S. A-4

L21/L19 ANTENNA DIMENSIONS	
MODEL #	AIR32 B2A/B66AA
MANUF.	ERICSSON
HEIGHT	56.6"
WIDTH	12.9"
DEPTH	8.7"
WEIGHT	132.2 LBS

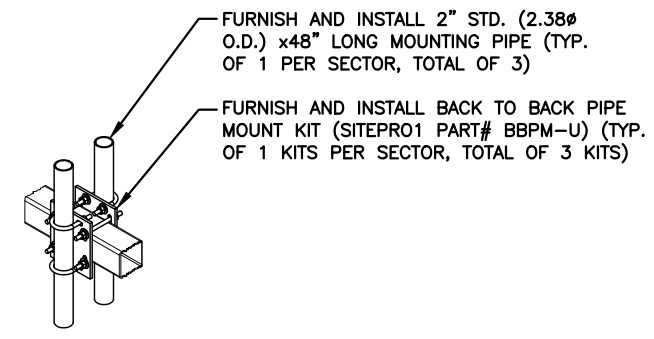


L2/L19 ANTENNA DETAIL 2
 SCALE: N.T.S. A-4

RADIO DIMENSIONS	
MODEL #	RADIO 4449 B12+B71
MANUF.	ERICSSON
HEIGHT	14.95"
WIDTH	13.19"
DEPTH	9.25"
WEIGHT	78 LBS



RADIO DETAIL 3
 SCALE: N.T.S. A-4



UNIVERSAL BACK TO BACK PIPE MOUNT KIT DETAIL 4
 SCALE: N.T.S. A-4

FURNISH AND INSTALL 2" STD. (2.38" O.D.) x48" LONG MOUNTING PIPE (TYP. OF 1 PER SECTOR, TOTAL OF 3)
 FURNISH AND INSTALL BACK TO BACK PIPE MOUNT KIT (SITEPRO1 PART# BBPM-U) (TYP. OF 1 KITS PER SECTOR, TOTAL OF 3 KITS)

**T-MOBILE
 NORTHEAST LLC**

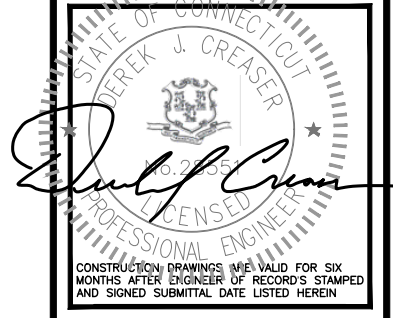
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**CROWN
 CASTLE**

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SHEET TITLE
 EQUIPMENT DETAILS
 (L700)

SHEET NUMBER
A-4

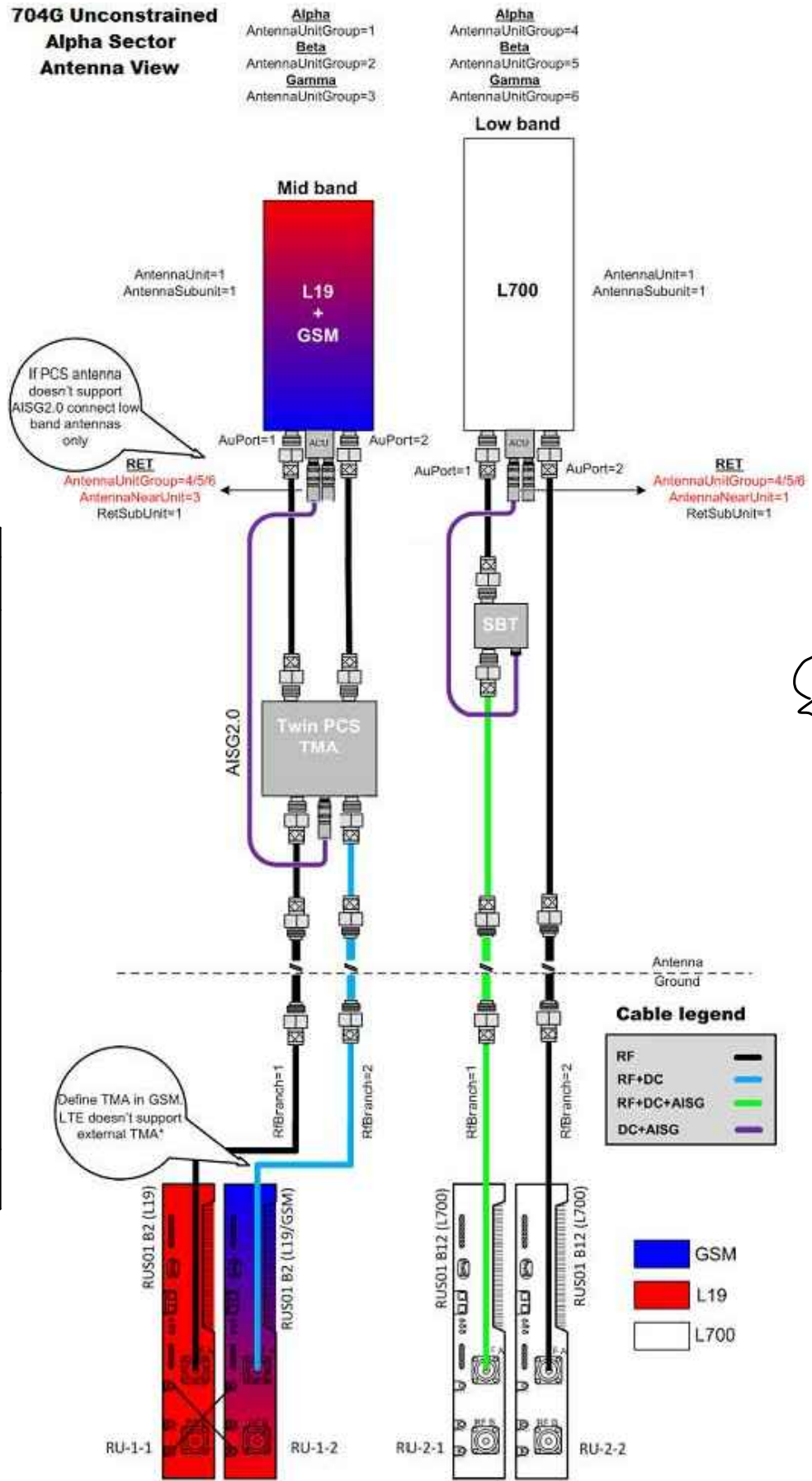
PROPOSED ANTENNA AND COAXIAL CABLE SCHEDULE											
SECTOR MARK	ANTENNA MODEL	AZIMUT H	E-TILT	M-TILT	ANTENNA CENTERLINE	SECTOR	TMA/SBiasT/RRU	TX/RX	CABLE FEED LINES	JUMPER TYPE	CABLE LENGTH
A-1 U19/U21/GSM	ERICSSON AIR21 B2A/B4P (56x12.10x7.87)	70°	2	0	107'	RIGHT ALPHA	1/0/0	TX-RX-1 TX-RX-2	-	-	-
A-2 L7/L6	RFS/CELWAVE APXVAARR24_43-U-NA20 (96.90X24X8.7)	70°	2	0	107'	CENTER ALPHA	0/0/1	TX-RX-1 TX-RX-2	(2) (E) 1-5/8" COAX (1) (E) 1-5/8" HYBRID (2) (P) 1-3/8" HYBRID	-	160'±
A-3 L21/L19	ERICSSON AIR32 B2A/B66AA (56.60X12.90X8.70)	70°	2	0	107'	LEFT ALPHA	0/0/0	TX-RX-1 TX-RX-2	-	-	-
B-1 U19/U21/GSM	ERICSSON AIR21 B2A/B4P (56x12.10x7.87)	180°	2	0	107'	RIGHT BETA	1/0/0	TX-RX-1 TX-RX-2	-	-	-
B-2 L7/L6	RFS/CELWAVE APXVAARR24_43-U-NA20 (96.90X24X8.7)	180°	2	0	107'	CENTER BETA	0/0/1	TX-RX-1 TX-RX-2	(2) (E) 1-5/8" COAX	-	160'±
B-3 L21/L19	ERICSSON AIR32 B2A/B66AA (56.60X12.90X8.70)	180°	2	0	107'	LEFT BETA	0/0/0	TX-RX-1 TX-RX-2	-	-	-
C-1 U19/U21/GSM	ERICSSON AIR21 B2A/B4P (56x12.10x7.87)	310°	2	0	107'	RIGHT GAMMA	1/0/0	TX-RX-1 TX-RX-2	-	-	-
C-2 L7/L6	RFS/CELWAVE APXVAARR24_43-U-NA20 (96.90X24X8.7)	310°	2	0	107'	CENTER GAMMA	0/0/1	TX-RX-1 TX-RX-2	(2) (E) 1-5/8" COAX	-	160'±
C-3 L21/L19	ERICSSON AIR32 B2A/B66AA (56.60X12.90X8.70)	310°	2	0	107'	LEFT GAMMA	0/0/0	TX-RX-1 TX-RX-2	-	-	-

NOTES:
INFORMATION BASED ON CCI APP. REVISION #1 DATED 07/12/18 AND RFDS REV 3.1 DATED 05/11/18. CHECK WITH RF ENGINEER FOR LATEST RFDS.

PROPOSED ANTENNA AND COAXIAL CABLE SCHEDULE
SCALE: N.T.S

1
A-5

704G Unconstrained
Alpha Sector
Antenna View



PLUMBING DIAGRAM
SCALE: N.T.S

2
A-5

T-MOBILE
NORTHEAST LLC

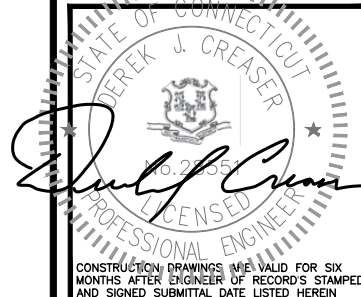
103 MONARCH DRIVE
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CHECKED BY: BB

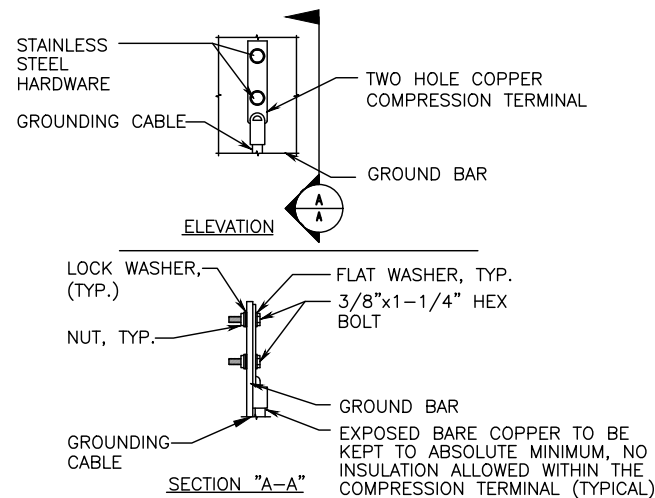
APPROVED BY: DJC

SUBMITTALS			
REV.	DATE	DESCRIPTION	BY
1	11/28/18	CONSTRUCTION REVISED	BB
0	08/22/18	ISSUED FOR CONSTRUCTION	GA

SITE NUMBER:
CTHA067A
CROWN CASTLE SITE ID:
876348
SITE NAME:
ENFIELD
SITE ADDRESS:
55 BRIGHT MEADOW BLVD
ENFIELD, CT 06082
HARTFORD COUNTY

SHEET TITLE
ANTENNA AND COAX
SCHEDULE &
PLUMBING DIAGRAM
(L700)

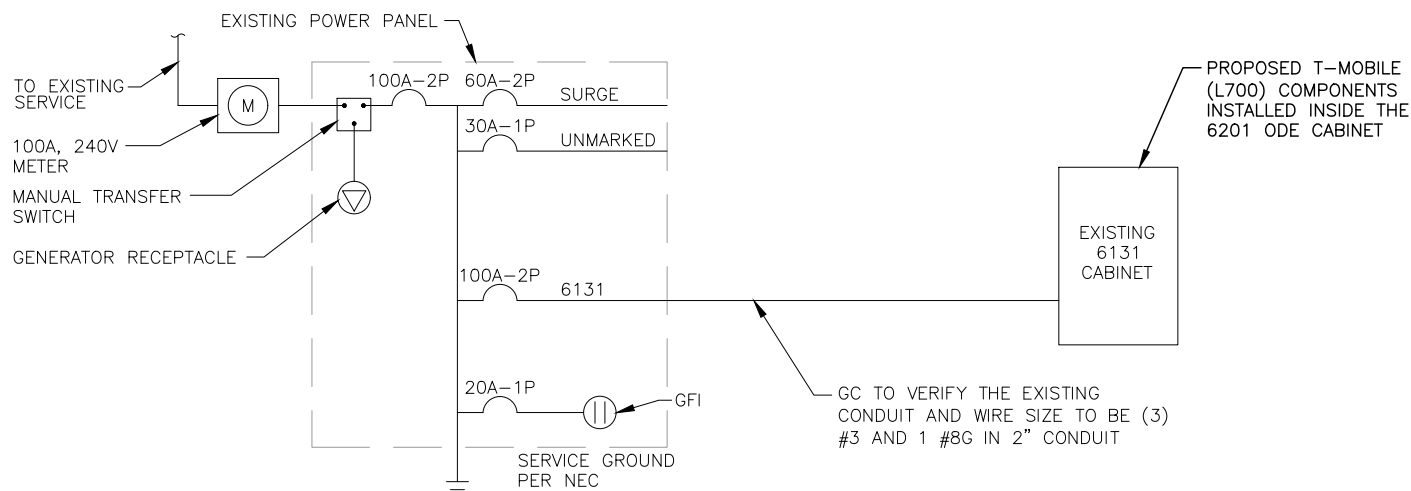
SHEET NUMBER
A-5



NOTE:
 1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
 2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
 3. CADWELD DOWNLEADS FROM UPPER AGB/EGB, LOWER EGB, AND MGB.

TYPICAL GROUND BAR CONNECTION DETAIL
 SCALE: N.T.S.

NOTE:
 G.C. TO VERIFY THAT THE EXISTING CONDUITS AND WIRE SIZES ARE ADEQUATE FOR THE PROPOSED LOADING AND INCLUDE ELECTRICAL UPGRADES IN THE SCOPE OF WORK AS REQUIRED.



ONE LINE POWER DIAGRAM
 SCALE: N.T.S.

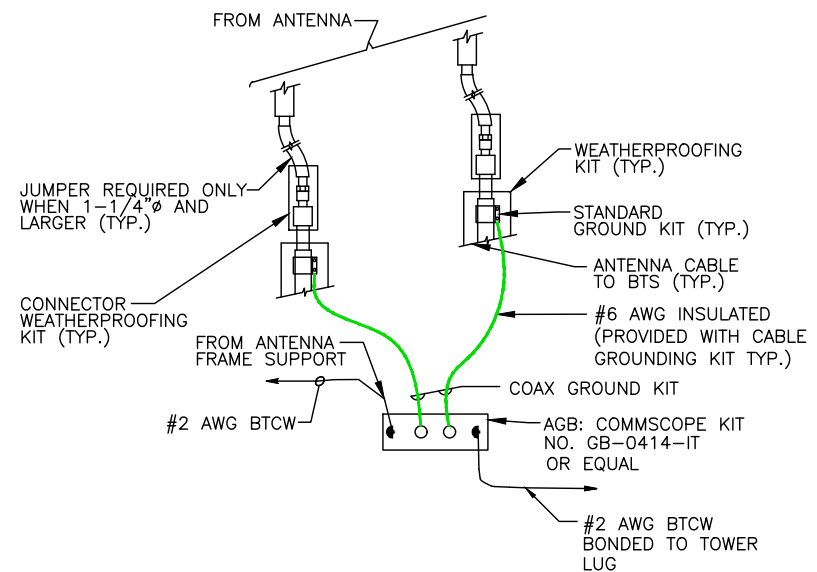
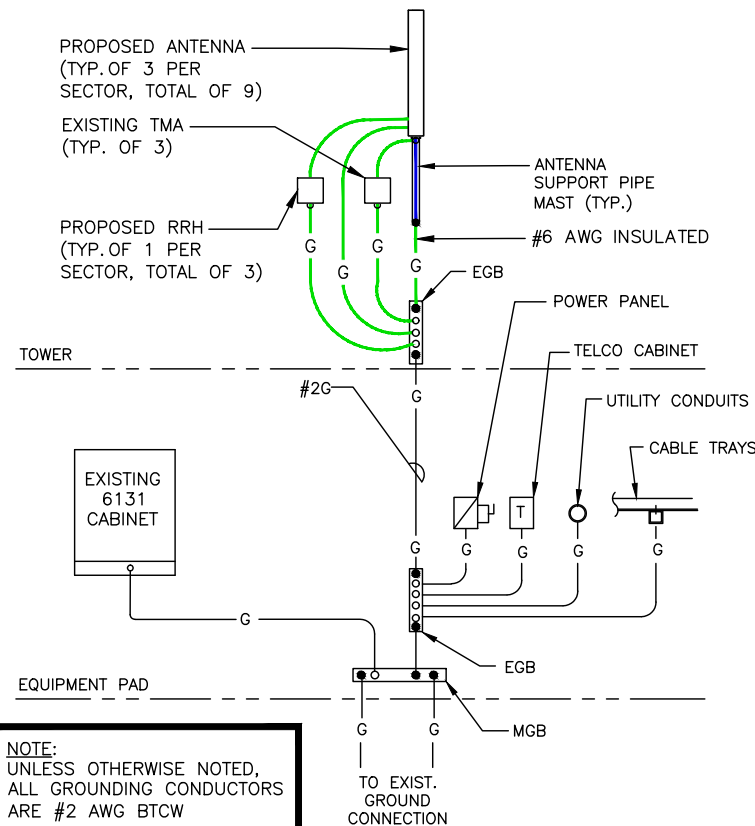
NOTE:
 EXISTING T-MOBILE ELECTRICAL PANEL NOT ACCESSIBLE, CONDITIONS SHOWN ABOVE ARE ASSUMED AND ANY DISCREPANCIES SHOULD BE RELAYED TO ENGINEER.

ELECTRICAL & GROUNDING NOTES

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATION INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
4. GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
5. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
6. RIGID STEEL CONDUITS SHALL BE GROUNDED AT BOTH ENDS.
7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THIN INSULATION.
8. RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL ROOM AND PROPOSED CELL SITE POWER PEDESTAL AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
9. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROPOSED CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON DRAWING A-1. PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
10. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
11. GROUNDING SHALL COMPLY WITH NEC ART. 250.
12. GROUND COAXIAL CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.

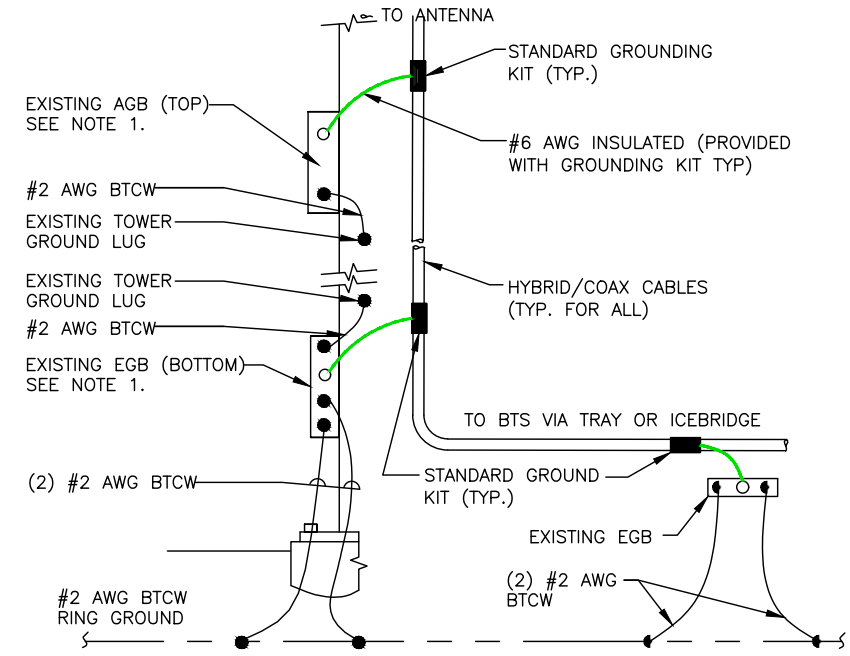
NOTE:
 UNLESS OTHERWISE NOTED, ALL GROUNDING CONDUCTORS ARE #2 AWG BTCW

GROUNDING RISER DIAGRAM
 SCALE: N.T.S.



NOTE:
 INSTALL CABLE GROUND KIT ABOVE HORIZONTAL BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO AGB/EGB.

TOWER TOP CABLE GROUNDING DETAIL
 SCALE: N.T.S.



NOTE:
 1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER. ANTENNA LOCATION AND CONNECTION ORIENTATION. PROVIDE ADDITIONAL AGB/EGB AS REQUIRED.
 2. A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED.

TOWER BOTTOM CABLE GROUNDING DETAIL
 SCALE: N.T.S.

ELECTRICAL LEGEND

A	AMPERE
V	VOLT
KWH	KILOWATT - HOUR
C	CONDUIT
GRC	GALVANIZED RIGID CONDUIT
BTCW	BARE TINNED (SOLID) COPPER WIRE (#2 AWG, UNLESS NOTES OTHERWISE)
G	GROUND
MGB	GROUND
(Symbol)	MASTER GROUND BAR
(Symbol)	MECHANICAL CONNECTION
(Symbol)	AGB/EGB
(Symbol)	CADWELD CONNECTION
(Symbol)	EQUIPMENT GROUND BAR/ANTENNA GROUND BAR
(Symbol)	GROUND COPPER WIRE, SIZE AS NOTED
(Symbol)	EXPOSED WIRING
(Symbol)	INSULATED GROUNDING CONDUCTOR (#6 AWG STRANDED, UNLESS NOTED OTHERWISE)
(Symbol)	5/8" x 8" COPPER CLAD STAINLESS STEEL GROUND ROD
(Symbol)	EXOTHERMIC (CAD WELD) OR MECHANICAL (COMPRESSION TYPE) CONNECTION
(Symbol)	POWER PROTECTION CABINET
(Symbol)	OMNI-DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALL

13. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.
14. ALL GROUND CONNECTIONS TO BE BURNDY HYGROND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
15. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
16. CONNECTIONS TO MGB SHALL BE ARRANGED IN THREE MAIN GROUPS: SURGE PRODUCERS (COAXIAL CABLE GROUND KITS, TELCO AND POWER PANEL GROUND); (GROUNDING ELECTRODE RING OR BUILDING STEEL); NON-SURGING OBJECTS (EGB GROUND IN BTS UNIT).
17. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
18. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.
19. BOND ANTENNA MOUNTING BRACKETS, COAXIAL CABLE GROUND KITS, AND ALNA TO EGB PLACED NEAR THE ANTENNA LOCATION.
20. BOND ANTENNA EGB'S AND MGB TO WATER MAIN.
21. TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION.
22. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
23. VERIFY PROPOSED SERVICE UPGRADE WITH LOCAL UTILITY COMPANY PRIOR TO CONSTRUCTION.

T-MOBILE NORTHEAST LLC
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 (315) 265-1882

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 CROWN CASTLE
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 WOBURN, MA 01801

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 45 BEECHWOOD DRIVE
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 FAX: (978) 336-5586

STATE OF CONNECTICUT
 JEROME J. CREASER
 LICENSED PROFESSIONAL ENGINEER
 CONSTRUCTION DRAWINGS ARE VALID FOR SIX MONTHS AFTER ENGINEER OF RECORD'S STAMPED AND SIGNED SUBMITTAL DATE LISTED HEREIN

CHECKED BY: BB
 APPROVED BY: DJC

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	11/28/18	CONSTRUCTION REVISED	BB
0	08/22/18	ISSUED FOR CONSTRUCTION	GA

SITE NUMBER:
 CTHA067A
 CROWN CASTLE SITE ID:
 876348
 SITE NAME:
 ENFIELD
 SITE ADDRESS:
 55 BRIGHT MEADOW BLVD
 ENFIELD, CT 06082
 HARTFORD COUNTY

SHEET TITLE
ONE-LINE DIAGRAM & GROUNDING DETAILS (L700)

SHEET NUMBER
E-1



Date: **October 19, 2018**

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

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

Subject: **Structural Analysis Report**

Carrier Designation: **Metro PCS Co-Locate**
Carrier Site Number: CTHA067A

Crown Castle Designation: **Crown Castle BU Number:** 876348
Crown Castle Site Name: ENFIELD
Crown Castle JDE Job Number: 512705
Crown Castle Work Order Number: 1647531
Crown Castle Order Number: 446209 Rev. 3

Engineering Firm Designation: **Crown Castle Project Number:** 1647531

Site Data: **Bright Meadow Blvd., ENFIELD, Hartford County, CT**
Latitude 42° 1' 14.91", Longitude -72° 35' 6.59"
147.5 Foot - Monopole Tower

Dear Denice Nicholson,

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

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

LC5: Proposed Equipment Configuration

Sufficient Capacity

This analysis utilizes an ultimate 3-second gust wind speed of 125 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Tyler Ho, E.I.T./ KB

Respectfully submitted by:

Maham Barimani, P.E.
Senior Project Engineer

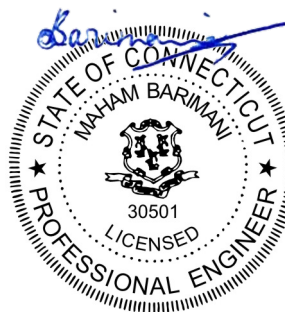


TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA

Table 1 - Proposed Equipment Configuration

Table 2 - Other Considered Equipment

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Table 5 – Tower Component Stresses vs. Capacity – LC5

4.1) Recommendations

5) APPENDIX A

tnxTower Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 147.5 ft Monopole tower designed by SUMMIT. The tower has been modified per reinforcement drawings prepared by Paul J. Ford, in February of 2013. Reinforcement consists of installation of flat plate reinforcement between elevations 39' and 49'.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	125 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	2 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
107.0	107.0	3	ericsson	AIR 32 B2A B66AA w/ Mount Pipe	7 2	1-5/8 1-3/8
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe		
		3	ericsson	KRY 112 144/1		
		3	ericsson	RADIO 4449 B12/B71		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
		1	tower mounts	T-Arm Mount [TA 701-3]		

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)
147.0	147.0	3	alcatel lucent	TD-RRH8x20-25	3 1 1	1-1/4 3/4 5/8
		3	rfs celwave	APXVSP18-C-A20 w/ Mount Pipe		
		3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe		
		1	tower mounts	Platform Mount [LP 1201-1]		
145.0	145.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz		
		1	tower mounts	Side Arm Mount [SO 102-3]		
132.0	134.0	3	alcatel lucent	B66A RRH4X45	20	1-5/8
		3	alcatel lucent	RRH2X60-PCS		
		3	alcatel lucent	RRH2x60-700		
		3	antel	BXA-70063-4CF-EDIN-X w/ Mount Pipe		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
	132.0	3	antel	BXA-70063-6CF-EDIN-2 w/ Mount Pipe		
		6	commscope	SBNHH-1D65B w/ Mount Pipe		
		2	rfs celwave	DB-T1-6Z-8AB-0Z		
		1	tower mounts	Miscellaneous [NA 510-1]		
		1	tower mounts	Platform Mount [LP 1201-1]		
117.0	119.0	1	andrew	SBNHH-1D65A w/ Mount Pipe	9 2 1 1	1-5/8 3/4 3/8 conduit
		1	cci antennas	HPA-65R-BUU-H6 w/ Mount Pipe		
		1	cci antennas	HPA-65R-BUU-H8 w/ Mount Pipe		
		3	ericsson	RRUS 32 B2		
		4	kathrein	860 10025		
	3	powerwave technologies	7770.00 w/ Mount Pipe			
	117.0		2	powerwave technologies		
1			tower mounts	Platform Mount [LP 1201-1]		
115.0	119.0	3	ericsson	RRU-11	-	-
		1	raycap	DC6-48-60-18-8F		
	115.0	1	tower mounts	Pipe Mount [PM 601-3]		
49.0	50.0	1	symmetricom	58532A	1	1/2
	49.0	1	tower mounts	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH	1532963	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	FDH (Mapping)/PJF	1613614	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Summit	1613591	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF	3667620	CCISITES
4-POST-MODIFICATION INSPECTION	TEP	3966655	CCISITES

3.1) Analysis Method

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

tnxTower was used to determine the loads on the modified structure. Additional calculations were performed to determine the stresses in the pole and in the reinforcing elements. These calculations are presented in Appendix C.

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
147.5 - 142.5	Pole	TP22.95x22x0.25	Pole	3.8%	Pass
142.5 - 137.5	Pole	TP23.9x22.95x0.25	Pole	7.5%	Pass
137.5 - 132.5	Pole	TP24.85x23.9x0.25	Pole	11.0%	Pass
132.5 - 127.5	Pole	TP25.8x24.85x0.25	Pole	18.7%	Pass
127.5 - 122.5	Pole	TP26.75x25.8x0.25	Pole	24.9%	Pass
122.5 - 117.5	Pole	TP27.7x26.75x0.25	Pole	30.5%	Pass
117.5 - 112.5	Pole	TP28.65x27.7x0.25	Pole	38.0%	Pass
112.5 - 112.25	Pole	TP29.41x28.65x0.25	Pole	38.4%	Pass
112.25 - 107.25	Pole	TP29.148x28.198x0.25	Pole	43.2%	Pass
107.25 - 102.25	Pole	TP30.098x29.148x0.25	Pole	51.2%	Pass
102.25 - 97.25	Pole	TP31.048x30.098x0.25	Pole	58.4%	Pass
97.25 - 92.25	Pole	TP31.998x31.048x0.25	Pole	64.9%	Pass
92.25 - 87.25	Pole	TP32.948x31.998x0.25	Pole	71.0%	Pass
87.25 - 82.25	Pole	TP33.898x32.948x0.25	Pole	76.6%	Pass
82.25 - 77.25	Pole	TP34.848x33.898x0.25	Pole	81.8%	Pass
77.25 - 76.75	Pole	TP35.798x34.848x0.25	Pole	82.3%	Pass
76.75 - 71.75	Pole	TP35.393x34.443x0.3125	Pole	66.3%	Pass
71.75 - 66.75	Pole	TP36.342x35.393x0.3125	Pole	69.5%	Pass
66.75 - 61.75	Pole	TP37.292x36.342x0.3125	Pole	72.5%	Pass
61.75 - 56.75	Pole	TP38.242x37.292x0.3125	Pole	75.2%	Pass
56.75 - 51.75	Pole	TP39.191x38.242x0.3125	Pole	77.8%	Pass
51.75 - 47.75	Pole	TP39.951x39.191x0.3125	Pole	79.7%	Pass
47.75 - 47.5	Pole + Reinf.	TP39.998x39.951x0.3875	Reinf. 1 Tension Rupture	89.6%	Pass
47.5 - 42.5	Pole + Reinf.	TP40.948x39.998x0.3875	Reinf. 1 Tension Rupture	91.7%	Pass
42.5 - 41	Pole + Reinf.	TP42.23x40.948x0.3875	Reinf. 1 Tension Rupture	92.4%	Pass

41 - 34.75	Pole	TP41.796x40.608x0.375	Pole	69.0%	Pass
34.75 - 29.75	Pole	TP42.746x41.796x0.375	Pole	70.4%	Pass
29.75 - 24.75	Pole	TP43.696x42.746x0.375	Pole	71.7%	Pass
24.75 - 19.75	Pole	TP44.646x43.696x0.375	Pole	72.9%	Pass
19.75 - 14.75	Pole	TP45.597x44.646x0.375	Pole	74.1%	Pass
14.75 - 9.75	Pole	TP46.547x45.597x0.375	Pole	75.2%	Pass
9.75 - 4.75	Pole	TP47.497x46.547x0.375	Pole	76.2%	Pass
4.75 - 0	Pole	TP48.4x47.497x0.375	Pole	77.1%	Pass
				Summary	
			Pole	82.3%	Pass
			Reinforcement	92.4%	Pass
			Overall	92.4%	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	81.2	Pass
1	Base Plate	0	61.9	Pass
1	Base Foundation Structure	0	77.0	Pass
1	Base Foundation Soil Interaction	0	56.5	Pass

Structure Rating (max from all components) =	92.4%
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Notes:

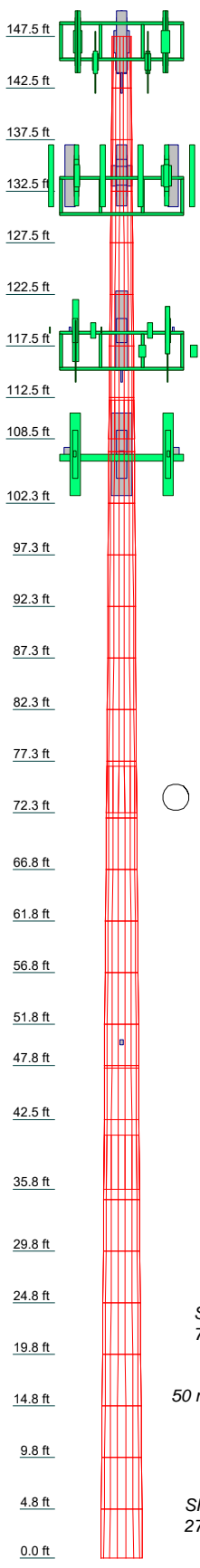
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

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

APPENDIX A
TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
2	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
3	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
4	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
5	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
6	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
7	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
8	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
9	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
10	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
11	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
12	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
13	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
14	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
15	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
16	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
17	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
18	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
19	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
20	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
21	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
22	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
23	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
24	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
25	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
26	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
27	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
28	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
29	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
30	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
31	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
32	5.0000	18	0.2500	3.7500	19.1	19.1	A607-60	0.3
33	4.7500	18	0.3750	5.2500	19.1	19.1	A607-65	0.9



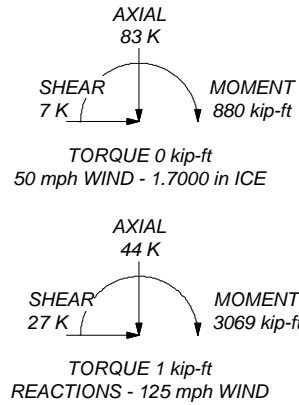
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	A607-65	65 ksi	80 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.70 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 0.0000 ft
8. TOWER RATING 92.4%

ALL REACTIONS
ARE FACTORED



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

Job: BU# 876348	Project:	
Client: Crown Castle	Drawn by: KGebremariam	App'd:
Code: TIA-222-H	Date: 10/19/18	Scale: NTS
Path: C:\Users\KGebremariam\Desktop\test\876348-MOD.eri	Dwg No. E-1	

Tower Input Data

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

- 1) Tower is located in Hartford County, Connecticut.
- 2) Tower base elevation above sea level: 110.0000 ft.
- 3) Basic wind speed of 125 mph.
- 4) Risk Category II.
- 5) Exposure Category B.
- 6) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- 7) Topographic Category: 1.
- 8) Crest Height 0.0000 ft.
- 9) Nominal ice thickness of 1.7000 in.
- 10) Ice thickness is considered to increase with height.
- 11) Ice density of 56.00 pcf.
- 12) A wind speed of 50 mph is used in combination with ice.
- 13) Deflections calculated using a wind speed of 60 mph.
- 14) TOWER RATING 92.4%.
- 15) A non-linear (P-delta) analysis was used.
- 16) Pressures are calculated at each section.
- 17) Stress ratio used in pole design is 1.05.
- 18) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt. Autocalc Torque Arm Areas Add IBC .6D+W Combination ✓ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs	Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption <div style="text-align: center; background-color: #e0e0e0; padding: 2px;">Poles</div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known
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Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	147.5000- 142.5000	5.0000	0.00	18	22.0000	22.9500	0.2500	1.0000	A607-60 (60 ksi)
L2	142.5000- 137.5000	5.0000	0.00	18	22.9500	23.9000	0.2500	1.0000	A607-60 (60 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L3	137.5000-132.5000	5.0000	0.00	18	23.9000	24.8500	0.2500	1.0000	A607-60 (60 ksi)
L4	132.5000-127.5000	5.0000	0.00	18	24.8500	25.8000	0.2500	1.0000	A607-60 (60 ksi)
L5	127.5000-122.5000	5.0000	0.00	18	25.8000	26.7500	0.2500	1.0000	A607-60 (60 ksi)
L6	122.5000-117.5000	5.0000	0.00	18	26.7500	27.7000	0.2500	1.0000	A607-60 (60 ksi)
L7	117.5000-112.5000	5.0000	0.00	18	27.7000	28.6500	0.2500	1.0000	A607-60 (60 ksi)
L8	112.5000-108.5000	4.0000	3.75	18	28.6500	29.4100	0.2500	1.0000	A607-60 (60 ksi)
L9	108.5000-107.2500	5.0000	0.00	18	28.1975	29.1476	0.2500	1.0000	A607-65 (65 ksi)
L10	107.2500-102.2500	5.0000	0.00	18	29.1476	30.0976	0.2500	1.0000	A607-65 (65 ksi)
L11	102.2500-97.2500	5.0000	0.00	18	30.0976	31.0477	0.2500	1.0000	A607-65 (65 ksi)
L12	97.2500-92.2500	5.0000	0.00	18	31.0477	31.9978	0.2500	1.0000	A607-65 (65 ksi)
L13	92.2500-87.2500	5.0000	0.00	18	31.9978	32.9478	0.2500	1.0000	A607-65 (65 ksi)
L14	87.2500-82.2500	5.0000	0.00	18	32.9478	33.8979	0.2500	1.0000	A607-65 (65 ksi)
L15	82.2500-77.2500	5.0000	0.00	18	33.8979	34.8479	0.2500	1.0000	A607-65 (65 ksi)
L16	77.2500-72.2500	5.0000	4.50	18	34.8479	35.7980	0.2500	1.0000	A607-65 (65 ksi)
L17	72.2500-71.7500	5.0000	0.00	18	34.4429	35.3926	0.3125	1.2500	A607-65 (65 ksi)
L18	71.7500-66.7500	5.0000	0.00	18	35.3926	36.3422	0.3125	1.2500	A607-65 (65 ksi)
L19	66.7500-61.7500	5.0000	0.00	18	36.3422	37.2919	0.3125	1.2500	A607-65 (65 ksi)
L20	61.7500-56.7500	5.0000	0.00	18	37.2919	38.2415	0.3125	1.2500	A607-65 (65 ksi)
L21	56.7500-51.7500	5.0000	0.00	18	38.2415	39.1911	0.3125	1.2500	A607-65 (65 ksi)
L22	51.7500-47.7500	4.0000	0.00	18	39.1911	39.9509	0.3125	1.2500	A607-65 (65 ksi)
L23	47.7500-47.5000	0.2500	0.00	18	39.9509	39.9983	0.3875	1.5500	A607-65 (65 ksi)
L24	47.5000-42.5000	5.0000	0.00	18	39.9983	40.9480	0.3875	1.5500	A607-65 (65 ksi)
L25	42.5000-35.7500	6.7500	5.25	18	40.9480	42.2300	0.3875	1.5500	A607-65 (65 ksi)
L26	35.7500-34.7500	6.2500	0.00	18	40.6079	41.7957	0.3750	1.5000	A607-65 (65 ksi)
L27	34.7500-29.7500	5.0000	0.00	18	41.7957	42.7460	0.3750	1.5000	A607-65 (65 ksi)
L28	29.7500-24.7500	5.0000	0.00	18	42.7460	43.6962	0.3750	1.5000	A607-65 (65 ksi)
L29	24.7500-19.7500	5.0000	0.00	18	43.6962	44.6465	0.3750	1.5000	A607-65 (65 ksi)
L30	19.7500-14.7500	5.0000	0.00	18	44.6465	45.5967	0.3750	1.5000	A607-65 (65 ksi)
L31	14.7500-9.7500	5.0000	0.00	18	45.5967	46.5470	0.3750	1.5000	A607-65 (65 ksi)
L32	9.7500-4.7500	5.0000	0.00	18	46.5470	47.4973	0.3750	1.5000	A607-65 (65 ksi)
L33	4.7500-0.0000	4.7500		18	47.4973	48.4000	0.3750	1.5000	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L1	22.3008	17.2586	1031.4832	7.7212	11.1760	92.2945	2064.3237	8.6310	3.4320	13.728
	23.2655	18.0125	1172.6326	8.0585	11.6586	100.5809	2346.8081	9.0079	3.5992	14.397
L2	23.2655	18.0125	1172.6326	8.0585	11.6586	100.5809	2346.8081	9.0079	3.5992	14.397
	24.2301	18.7663	1326.1047	8.3957	12.1412	109.2235	2653.9543	9.3849	3.7664	15.066
L3	24.2301	18.7663	1326.1047	8.3957	12.1412	109.2235	2653.9543	9.3849	3.7664	15.066
	25.1948	19.5201	1492.4153	8.7330	12.6238	118.2224	2986.7944	9.7619	3.9336	15.734
L4	25.1948	19.5201	1492.4153	8.7330	12.6238	118.2224	2986.7944	9.7619	3.9336	15.734
	26.1594	20.2739	1672.0802	9.0702	13.1064	127.5774	3346.3605	10.1389	4.1008	16.403
L5	26.1594	20.2739	1672.0802	9.0702	13.1064	127.5774	3346.3605	10.1389	4.1008	16.403
	27.1241	21.0278	1865.6149	9.4075	13.5890	137.2886	3733.6846	10.5159	4.2680	17.072
L6	27.1241	21.0278	1865.6149	9.4075	13.5890	137.2886	3733.6846	10.5159	4.2680	17.072
	28.0888	21.7816	2073.5353	9.7447	14.0716	147.3560	4149.7990	10.8929	4.4352	17.741
L7	28.0888	21.7816	2073.5353	9.7447	14.0716	147.3560	4149.7990	10.8929	4.4352	17.741
	29.0534	22.5354	2296.3570	10.0820	14.5542	157.7797	4595.7356	11.2698	4.6024	18.41
L8	29.0534	22.5354	2296.3570	10.0820	14.5542	157.7797	4595.7356	11.2698	4.6024	18.41
	29.8251	23.1385	2485.6899	10.3518	14.9403	166.3751	4974.6504	11.5714	4.7362	18.945
L9	29.3175	22.1763	2188.3323	9.9214	14.3243	152.7703	4379.5441	11.0903	4.5228	18.091
	29.5586	22.9302	2419.1791	10.2586	14.8070	163.3812	4841.5414	11.4673	4.6900	18.76
L10	29.5586	22.9302	2419.1791	10.2586	14.8070	163.3812	4841.5414	11.4673	4.6900	18.76
	30.5234	23.6841	2665.7150	10.5959	15.2896	174.3483	5334.9377	11.8443	4.8572	19.429
L11	30.5234	23.6841	2665.7150	10.5959	15.2896	174.3483	5334.9377	11.8443	4.8572	19.429
	31.4881	24.4380	2928.4560	10.9332	15.7722	185.6717	5860.7654	12.2213	5.0244	20.098
L12	31.4881	24.4380	2928.4560	10.9332	15.7722	185.6717	5860.7654	12.2213	5.0244	20.098
	32.4528	25.1918	3207.9178	11.2705	16.2549	197.3513	6420.0567	12.5983	5.1916	20.766
L13	32.4528	25.1918	3207.9178	11.2705	16.2549	197.3513	6420.0567	12.5983	5.1916	20.766
	33.4175	25.9457	3504.6163	11.6077	16.7375	209.3872	7013.8441	12.9753	5.3588	21.435
L14	33.4175	25.9457	3504.6163	11.6077	16.7375	209.3872	7013.8441	12.9753	5.3588	21.435
	34.3822	26.6996	3819.0673	11.9450	17.2201	221.7794	7643.1597	13.3523	5.5260	22.104
L15	34.3822	26.6996	3819.0673	11.9450	17.2201	221.7794	7643.1597	13.3523	5.5260	22.104
	35.3470	27.4535	4151.7865	12.2823	17.7028	234.5277	8309.0360	13.7293	5.6932	22.773
L16	35.3470	27.4535	4151.7865	12.2823	17.7028	234.5277	8309.0360	13.7293	5.6932	22.773
	36.3117	28.2073	4503.2898	12.6195	18.1854	247.6324	9012.5051	14.1063	5.8604	23.442
L17	35.7939	33.8531	4982.1890	12.1163	17.4970	284.7451	9970.9337	16.9298	5.5120	17.638
	35.8904	34.7951	5409.7388	12.4534	17.9794	300.8848	10826.5959	17.4008	5.6791	18.173
L18	35.8904	34.7951	5409.7388	12.4534	17.9794	300.8848	10826.5959	17.4008	5.6791	18.173
	36.8547	35.7370	5861.0748	12.7906	18.4619	317.4695	11729.8618	17.8719	5.8462	18.708
L19	36.8547	35.7370	5861.0748	12.7906	18.4619	317.4695	11729.8618	17.8719	5.8462	18.708
	37.8189	36.6789	6336.8409	13.1277	18.9443	334.4991	12682.0200	18.3429	6.0134	19.243
L20	37.8189	36.6789	6336.8409	13.1277	18.9443	334.4991	12682.0200	18.3429	6.0134	19.243
	38.7832	37.6208	6837.6811	13.4648	19.4267	351.9736	13684.3593	18.8140	6.1805	19.778
L21	38.7832	37.6208	6837.6811	13.4648	19.4267	351.9736	13684.3593	18.8140	6.1805	19.778
	39.7475	38.5628	7364.2391	13.8019	19.9091	369.8931	14738.1683	19.2850	6.3476	20.312
L22	39.7475	38.5628	7364.2391	13.8019	19.9091	369.8931	14738.1683	19.2850	6.3476	20.312
	40.5190	39.3163	7804.4352	14.0716	20.2950	384.5489	15619.1397	19.6619	6.4814	20.74
L23	40.5074	48.6600	9622.6709	14.0450	20.2950	474.1391	19258.0037	24.3346	6.3494	16.385
	40.5556	48.7184	9657.3586	14.0618	20.3192	475.2834	19327.4245	24.3638	6.3577	16.407
L24	40.5556	48.7184	9657.3586	14.0618	20.3192	475.2834	19327.4245	24.3638	6.3577	16.407
	41.5199	49.8864	10368.7281	14.3990	20.8016	498.4588	20751.0996	24.9479	6.5248	16.838
L25	41.5199	49.8864	10368.7281	14.3990	20.8016	498.4588	20751.0996	24.9479	6.5248	16.838
	42.8217	51.4631	11383.3202	14.8541	21.4528	530.6207	22781.6190	25.7365	6.7505	17.421
L26	42.1896	47.8872	9793.0711	14.2827	20.6288	474.7281	19599.0282	23.9481	6.4870	17.299
	42.3826	49.3010	10686.314	14.7043	21.2322	503.3066	21386.690	24.6552	6.6960	17.856

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L27	42.3826	49.3010	10686.314 7	14.7043	21.2322	503.3066	21386.690 8	24.6552	6.6960	17.856
	43.3475	50.4320	11438.801 7	15.0417	21.7149	526.7709	22892.655 8	25.2208	6.8633	18.302
L28	43.3475	50.4320	11438.801 8	15.0417	21.7149	526.7709	22892.655 1	25.2208	6.8633	18.302
	44.3125	51.5631	12225.809 8	15.3790	22.1977	550.7697	24467.706 1	25.7864	7.0305	18.748
L29	44.3125	51.5631	12225.809 6	15.3790	22.1977	550.7697	24467.706 2	25.7864	7.0305	18.748
	45.2774	52.6941	13048.112 6	15.7164	22.6804	575.3032	26113.393 2	26.3521	7.1978	19.194
L30	45.2774	52.6941	13048.112 2	15.7164	22.6804	575.3032	26113.393 5	26.3521	7.1978	19.194
	46.2423	53.8252	13906.483 2	16.0537	23.1631	600.3712	27831.266 5	26.9177	7.3650	19.64
L31	46.2423	53.8252	13906.483 9	16.0537	23.1631	600.3712	27831.266 3	26.9177	7.3650	19.64
	47.2072	54.9562	14801.698 9	16.3911	23.6459	625.9739	29622.874 3	27.4833	7.5323	20.086
L32	47.2072	54.9562	14801.698 8	16.3911	23.6459	625.9739	29622.874 1	27.4833	7.5323	20.086
	48.1721	56.0873	15734.531 8	16.7284	24.1286	652.1111	31489.766 1	28.0490	7.6995	20.532
L33	48.1721	56.0873	15734.531 2	16.7284	24.1286	652.1111	31489.766 4	28.0490	7.6995	20.532
	49.0888	57.1618	16656.270 2	17.0489	24.5872	677.4366	33334.457 4	28.5863	7.8584	20.956
			3				4			

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft ²	in					in	in	in
L1 147.5000- 142.5000				1	1	1			
L2 142.5000- 137.5000				1	1	1			
L3 137.5000- 132.5000				1	1	1			
L4 132.5000- 127.5000				1	1	1			
L5 127.5000- 122.5000				1	1	1			
L6 122.5000- 117.5000				1	1	1			
L7 117.5000- 112.5000				1	1	1			
L8 112.5000- 108.5000				1	1	1			
L9 108.5000- 107.2500				1	1	1			
L10 107.2500- 102.2500				1	1	1			
L11 102.2500- 97.2500				1	1	1			
L12 97.2500- 92.2500				1	1	1			
L13 92.2500- 87.2500				1	1	1			
L14 87.2500- 82.2500				1	1	1			
L15 82.2500- 77.2500				1	1	1			
L16 77.2500- 72.2500				1	1	1			

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_r	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
ft	ft ²	in							
L17 72.2500-71.7500				1	1	1			
L18 71.7500-66.7500				1	1	1			
L19 66.7500-61.7500				1	1	1			
L20 61.7500-56.7500				1	1	1			
L21 56.7500-51.7500				1	1	1			
L22 51.7500-47.7500				1	1	1			
L23 47.7500-47.5000				1	1	0.987794			
L24 47.5000-42.5000				1	1	0.983548			
L25 42.5000-35.7500				1	1	0.982313			
L26 35.7500-34.7500				1	1	1			
L27 34.7500-29.7500				1	1	1			
L28 29.7500-24.7500				1	1	1			
L29 24.7500-19.7500				1	1	1			
L30 19.7500-14.7500				1	1	1			
L31 14.7500-9.7500				1	1	1			
L32 9.7500-4.7500				1	1	1			
L33 4.7500-0.0000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
** LDF7-50A(1-5/8)	A	No	Surface Ar (CaAa)	107.0000 - 0.0000	9	9	0.090 0.380	1.9800		0.82
*** MP3-03	A	No	Surface Af (CaAa)	49.0000 - 39.0000	1	1	0.000 0.000	4.0600	11.2600	0.00
MP3-03	B	No	Surface Af (CaAa)	49.0000 - 39.0000	1	1	0.000 0.000	4.0600	11.2600	0.00
MP3-03	C	No	Surface Af (CaAa)	49.0000 - 39.0000	1	1	0.000 0.000	4.0600	11.2600	0.00

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	CAAA	Weight plf	
							ft ² /ft		
HB058-M12-XXXF(5/8)	A	No	No	Inside Pole	147.0000 - 0.0000	1	No Ice 1/2" Ice	0.0000 0.0000	0.24 0.24

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C _{AA} ft ² /ft	Weight plf
WR-VG86ST-BRD(3/4)	A	No	No	Inside Pole	147.0000 - 0.0000	1	1" Ice	0.0000	0.24
							2" Ice	0.0000	0.24
							No Ice	0.0000	0.58
							1/2" Ice	0.0000	0.58
							1" Ice	0.0000	0.58
HB114-1-08U4-M5J(1-1/4)	A	No	No	Inside Pole	147.0000 - 0.0000	3	2" Ice	0.0000	0.58
							No Ice	0.0000	1.08
							1/2" Ice	0.0000	1.08
							1" Ice	0.0000	1.08
							2" Ice	0.0000	1.08
**	LDF7-50A(1-5/8)	B	No	No	132.0000 - 0.0000	20	No Ice	0.0000	0.82
1/2" Ice							0.0000	0.82	
1" Ice							0.0000	0.82	
2" Ice							0.0000	0.82	
**	LDF7-50A(1-5/8)	C	No	No	117.0000 - 0.0000	9	No Ice	0.0000	0.82
1/2" Ice							0.0000	0.82	
1" Ice							0.0000	0.82	
2" Ice							0.0000	0.82	
FB-L98B-002-75000(3/8)	C	No	No	Inside Pole	117.0000 - 0.0000	1	No Ice	0.0000	0.06
							1/2" Ice	0.0000	0.06
							1" Ice	0.0000	0.06
							2" Ice	0.0000	0.06
							No Ice	0.0000	0.06
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	117.0000 - 0.0000	2	No Ice	0.0000	0.58
							1/2" Ice	0.0000	0.58
							1" Ice	0.0000	0.58
							2" Ice	0.0000	0.58
							No Ice	0.0000	0.58
2" Flex Conduit	C	No	No	Inside Pole	117.0000 - 0.0000	1	No Ice	0.0000	0.36
							1/2" Ice	0.0000	0.36
							1" Ice	0.0000	0.36
							2" Ice	0.0000	0.36
							No Ice	0.0000	0.36
**	LDF4-50A(1/2)	B	No	No	49.0000 - 0.0000	1	No Ice	0.0000	0.15
1/2" Ice							0.0000	0.15	
1" Ice							0.0000	0.15	
2" Ice							0.0000	0.15	

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	147.5000-142.5000	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L2	142.5000-137.5000	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L3	137.5000-132.5000	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L4	132.5000-127.5000	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.07
		C	0.000	0.000	0.000	0.000	0.00
L5	127.5000-122.5000	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.00
L6	122.5000-117.5000	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.00

Tower Sectio n	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L7	117.5000- 112.5000	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.04
L8	112.5000- 108.5000	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.07
		C	0.000	0.000	0.000	0.000	0.04
L9	108.5000- 107.2500	A	0.000	0.000	0.000	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.01
L10	107.2500- 102.2500	A	0.000	0.000	8.464	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.04
L11	102.2500- 97.2500	A	0.000	0.000	8.910	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.04
L12	97.2500-92.2500	A	0.000	0.000	8.910	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.04
L13	92.2500-87.2500	A	0.000	0.000	8.910	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.04
L14	87.2500-82.2500	A	0.000	0.000	8.910	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.04
L15	82.2500-77.2500	A	0.000	0.000	8.910	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.04
L16	77.2500-72.2500	A	0.000	0.000	8.910	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.04
L17	72.2500-71.7500	A	0.000	0.000	0.891	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.00
L18	71.7500-66.7500	A	0.000	0.000	8.910	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.04
L19	66.7500-61.7500	A	0.000	0.000	8.910	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.04
L20	61.7500-56.7500	A	0.000	0.000	8.910	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.04
L21	56.7500-51.7500	A	0.000	0.000	8.910	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.04
L22	51.7500-47.7500	A	0.000	0.000	7.974	0.000	0.05
		B	0.000	0.000	0.846	0.000	0.07
		C	0.000	0.000	0.846	0.000	0.04
L23	47.7500-47.5000	A	0.000	0.000	0.615	0.000	0.00
		B	0.000	0.000	0.169	0.000	0.00
		C	0.000	0.000	0.169	0.000	0.00
L24	47.5000-42.5000	A	0.000	0.000	12.293	0.000	0.06
		B	0.000	0.000	3.383	0.000	0.08
		C	0.000	0.000	3.383	0.000	0.04
L25	42.5000-35.7500	A	0.000	0.000	14.397	0.000	0.08
		B	0.000	0.000	2.368	0.000	0.11
		C	0.000	0.000	2.368	0.000	0.06
L26	35.7500-34.7500	A	0.000	0.000	1.782	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.01
L27	34.7500-29.7500	A	0.000	0.000	8.910	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.04
L28	29.7500-24.7500	A	0.000	0.000	8.910	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.04
L29	24.7500-19.7500	A	0.000	0.000	8.910	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.04

Tower Section	Tower Elevation	Face	A_R	A_F	C_{AA} In Face	C_{AA} Out Face	Weight
<i>n</i>	ft		ft ²	ft ²	ft ²	ft ²	K
L30	19.7500-14.7500	A	0.000	0.000	8.910	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.04
L31	14.7500-9.7500	A	0.000	0.000	8.910	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.04
L32	9.7500-4.7500	A	0.000	0.000	8.910	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.04
L33	4.7500-0.0000	A	0.000	0.000	8.464	0.000	0.05
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.04

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation	Face or Leg	Ice Thickness	A_R	A_F	C_{AA} In Face	C_{AA} Out Face	Weight
<i>n</i>	ft		in	ft ²	ft ²	ft ²	ft ²	K
L1	147.5000-142.5000	A	1.971	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L2	142.5000-137.5000	A	1.964	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L3	137.5000-132.5000	A	1.957	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L4	132.5000-127.5000	A	1.950	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.07
		C		0.000	0.000	0.000	0.000	0.00
L5	127.5000-122.5000	A	1.942	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.00
L6	122.5000-117.5000	A	1.934	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.00
L7	117.5000-112.5000	A	1.926	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.04
L8	112.5000-108.5000	A	1.918	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.07
		C		0.000	0.000	0.000	0.000	0.04
L9	108.5000-107.2500	A	1.914	0.000	0.000	0.000	0.000	0.01
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.01
L10	107.2500-102.2500	A	1.908	0.000	0.000	12.847	0.000	0.22
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.04
L11	102.2500-97.2500	A	1.899	0.000	0.000	13.511	0.000	0.23
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.04
L12	97.2500-92.2500	A	1.889	0.000	0.000	13.499	0.000	0.23
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.04
L13	92.2500-87.2500	A	1.879	0.000	0.000	13.486	0.000	0.23
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.04
L14	87.2500-82.2500	A	1.868	0.000	0.000	13.473	0.000	0.23
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.04
L15	82.2500-77.2500	A	1.857	0.000	0.000	13.458	0.000	0.23
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.04
L16	77.2500-72.2500	A	1.845	0.000	0.000	13.444	0.000	0.23
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.04

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L17	72.2500-71.7500	A	1.838	0.000	0.000	1.344	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.01
		C		0.000	0.000	0.000	0.000	0.00
L18	71.7500-66.7500	A	1.831	0.000	0.000	13.426	0.000	0.23
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.04
L19	66.7500-61.7500	A	1.817	0.000	0.000	13.409	0.000	0.22
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.04
L20	61.7500-56.7500	A	1.802	0.000	0.000	13.391	0.000	0.22
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.04
L21	56.7500-51.7500	A	1.787	0.000	0.000	13.371	0.000	0.22
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.04
L22	51.7500-47.7500	A	1.771	0.000	0.000	11.798	0.000	0.19
		B		0.000	0.000	1.116	0.000	0.08
		C		0.000	0.000	1.116	0.000	0.05
L23	47.7500-47.5000	A	1.764	0.000	0.000	0.890	0.000	0.01
		B		0.000	0.000	0.223	0.000	0.01
		C		0.000	0.000	0.223	0.000	0.01
L24	47.5000-42.5000	A	1.754	0.000	0.000	17.786	0.000	0.28
		B		0.000	0.000	4.457	0.000	0.14
		C		0.000	0.000	4.457	0.000	0.11
L25	42.5000-35.7500	A	1.729	0.000	0.000	21.064	0.000	0.33
		B		0.000	0.000	3.111	0.000	0.15
		C		0.000	0.000	3.111	0.000	0.10
L26	35.7500-34.7500	A	1.711	0.000	0.000	2.660	0.000	0.04
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.01
L27	34.7500-29.7500	A	1.696	0.000	0.000	13.258	0.000	0.21
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.04
L28	29.7500-24.7500	A	1.668	0.000	0.000	13.222	0.000	0.21
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.04
L29	24.7500-19.7500	A	1.634	0.000	0.000	13.180	0.000	0.21
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.04
L30	19.7500-14.7500	A	1.593	0.000	0.000	13.129	0.000	0.20
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.04
L31	14.7500-9.7500	A	1.540	0.000	0.000	13.062	0.000	0.20
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.04
L32	9.7500-4.7500	A	1.461	0.000	0.000	12.963	0.000	0.19
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.04
L33	4.7500-0.0000	A	1.306	0.000	0.000	12.132	0.000	0.17
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.04

Feed Line Center of Pressure

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
L1	147.5000-142.5000	0.0000	0.0000	0.0000	0.0000
L2	142.5000-137.5000	0.0000	0.0000	0.0000	0.0000
L3	137.5000-132.5000	0.0000	0.0000	0.0000	0.0000
L4	132.5000-127.5000	0.0000	0.0000	0.0000	0.0000

Section	Elevation	CP _x	CP _z	CP _x Ice	CP _z Ice
	ft	in	in	in	in
L5	127.5000-122.5000	0.0000	0.0000	0.0000	0.0000
L6	122.5000-117.5000	0.0000	0.0000	0.0000	0.0000
L7	117.5000-112.5000	0.0000	0.0000	0.0000	0.0000
L8	112.5000-108.5000	0.0000	0.0000	0.0000	0.0000
L9	108.5000-107.2500	0.0000	0.0000	0.0000	0.0000
L10	107.2500-102.2500	-4.0071	-6.4628	-3.2227	-5.1977
L11	102.2500-97.2500	-4.1667	-6.7201	-3.3566	-5.4137
L12	97.2500-92.2500	-4.2207	-6.8073	-3.4072	-5.4953
L13	92.2500-87.2500	-4.2731	-6.8919	-3.4564	-5.5746
L14	87.2500-82.2500	-4.3239	-6.9738	-3.5042	-5.6516
L15	82.2500-77.2500	-4.3732	-7.0533	-3.5506	-5.7265
L16	77.2500-72.2500	-4.4210	-7.1304	-3.5957	-5.7993
L17	72.2500-71.7500	-4.4228	-7.1332	-3.5972	-5.8017
L18	71.7500-66.7500	-4.4484	-7.1746	-3.6215	-5.8409
L19	66.7500-61.7500	-4.4941	-7.2482	-3.6646	-5.9104
L20	61.7500-56.7500	-4.5384	-7.3197	-3.7065	-5.9779
L21	56.7500-51.7500	-4.5815	-7.3891	-3.7472	-6.0435
L22	51.7500-47.7500	-4.0160	-6.4771	-3.4130	-5.5046
L23	47.7500-47.5000	-3.1379	-5.0608	-2.8254	-4.5570
L24	47.5000-42.5000	-3.1596	-5.0960	-2.8453	-4.5890
L25	42.5000-35.7500	-3.7882	-6.1098	-3.2884	-5.3036
L26	35.7500-34.7500	-4.7099	-7.5963	-3.8680	-6.2384
L27	34.7500-29.7500	-4.7331	-7.6337	-3.8892	-6.2726
L28	29.7500-24.7500	-4.7709	-7.6947	-3.9243	-6.3292
L29	24.7500-19.7500	-4.8078	-7.7542	-3.9581	-6.3837
L30	19.7500-14.7500	-4.8437	-7.8121	-3.9904	-6.4359
L31	14.7500-9.7500	-4.8787	-7.8685	-4.0211	-6.4854
L32	9.7500-4.7500	-4.9128	-7.9236	-4.0494	-6.5310
L33	4.7500-0.0000	-4.9453	-7.9759	-4.0714	-6.5665

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L10	12	LDF7-50A(1-5/8)	102.25 - 107.00	1.0000	1.0000
L11	12	LDF7-50A(1-5/8)	97.25 - 102.25	1.0000	1.0000
L12	12	LDF7-50A(1-5/8)	92.25 - 97.25	1.0000	1.0000
L13	12	LDF7-50A(1-5/8)	87.25 - 92.25	1.0000	1.0000
L14	12	LDF7-50A(1-5/8)	82.25 - 87.25	1.0000	1.0000
L15	12	LDF7-50A(1-5/8)	77.25 - 82.25	1.0000	1.0000
L16	12	LDF7-50A(1-5/8)	72.25 - 77.25	1.0000	1.0000
L18	12	LDF7-50A(1-5/8)	66.75 - 71.75	1.0000	1.0000
L19	12	LDF7-50A(1-5/8)	61.75 - 66.75	1.0000	1.0000
L20	12	LDF7-50A(1-5/8)	56.75 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L21	12	LDF7-50A(1-5/8)	61.75 51.75 - 56.75	1.0000	1.0000
L22	12	LDF7-50A(1-5/8)	47.75 - 51.75	1.0000	1.0000
L22	17	MP3-03	47.75 - 49.00	1.0000	1.0000
L22	18	MP3-03	47.75 - 49.00	1.0000	1.0000
L22	19	MP3-03	47.75 - 49.00	1.0000	1.0000
L23	12	LDF7-50A(1-5/8)	47.50 - 47.75	1.0000	1.0000
L23	17	MP3-03	47.50 - 47.75	1.0000	1.0000
L23	18	MP3-03	47.50 - 47.75	1.0000	1.0000
L23	19	MP3-03	47.50 - 47.75	1.0000	1.0000
L24	12	LDF7-50A(1-5/8)	42.50 - 47.50	1.0000	1.0000
L24	17	MP3-03	42.50 - 47.50	1.0000	1.0000
L24	18	MP3-03	42.50 - 47.50	1.0000	1.0000
L24	19	MP3-03	42.50 - 47.50	1.0000	1.0000
L25	12	LDF7-50A(1-5/8)	35.75 - 42.50	1.0000	1.0000
L25	17	MP3-03	39.00 - 42.50	1.0000	1.0000
L25	18	MP3-03	39.00 - 42.50	1.0000	1.0000
L25	19	MP3-03	39.00 - 42.50	1.0000	1.0000
L27	12	LDF7-50A(1-5/8)	29.75 - 34.75	1.0000	1.0000
L28	12	LDF7-50A(1-5/8)	24.75 - 29.75	1.0000	1.0000
L29	12	LDF7-50A(1-5/8)	19.75 - 24.75	1.0000	1.0000
L30	12	LDF7-50A(1-5/8)	14.75 - 19.75	1.0000	1.0000
L31	12	LDF7-50A(1-5/8)	9.75 - 14.75	1.0000	1.0000
L32	12	LDF7-50A(1-5/8)	4.75 - 9.75	1.0000	1.0000
L33	12	LDF7-50A(1-5/8)	0.00 - 4.75	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
Top Hat 14" Diameter x 3'-6" Tall	C	None		0.00	149.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.0870 3.1719 3.4494 4.0321 4.0321	0.20 0.24 0.28 0.37 0.37

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA}		Weight	
			Horz	Lateral			Front	Side		
			ft	ft	°	ft	ft ²	ft ²	K	
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.0000	0.00	0.00	147.0000	No Ice	8.2619	6.9458	0.08
			0.00	0.00			1/2"	8.8215	8.1266	0.15
			0.00	0.00			Ice	9.3462	9.0212	0.23
							1" Ice	10.4181	10.8440	0.41
							2" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.0000	0.00	0.00	147.0000	No Ice	8.2619	6.9458	0.08
			0.00	0.00			1/2"	8.8215	8.1266	0.15
			0.00	0.00			Ice	9.3462	9.0212	0.23
							1" Ice	10.4181	10.8440	0.41
							2" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.0000	0.00	0.00	147.0000	No Ice	8.2619	6.9458	0.08
			0.00	0.00			1/2"	8.8215	8.1266	0.15
			0.00	0.00			Ice	9.3462	9.0212	0.23
							1" Ice	10.4181	10.8440	0.41
							2" Ice			
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.0000	0.00	0.00	147.0000	No Ice	6.5799	4.9591	0.08
			0.00	0.00			1/2"	7.0306	5.7544	0.13
			0.00	0.00			Ice	7.4733	6.4723	0.19
							1" Ice	8.3846	7.9407	0.34
							2" Ice			
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Leg	4.0000	0.00	0.00	147.0000	No Ice	6.5799	4.9591	0.08
			0.00	0.00			1/2"	7.0306	5.7544	0.13
			0.00	0.00			Ice	7.4733	6.4723	0.19
							1" Ice	8.3846	7.9407	0.34
							2" Ice			
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.0000	0.00	0.00	147.0000	No Ice	6.5799	4.9591	0.08
			0.00	0.00			1/2"	7.0306	5.7544	0.13
			0.00	0.00			Ice	7.4733	6.4723	0.19
							1" Ice	8.3846	7.9407	0.34
							2" Ice			
TD-RRH8x20-25	A	From Leg	4.0000	0.00	0.00	147.0000	No Ice	4.0455	1.5345	0.07
			0.00	0.00			1/2"	4.2975	1.7142	0.10
			0.00	0.00			Ice	4.5570	1.9008	0.13
							1" Ice	5.0981	2.2951	0.20
							2" Ice			
TD-RRH8x20-25	B	From Leg	4.0000	0.00	0.00	147.0000	No Ice	4.0455	1.5345	0.07
			0.00	0.00			1/2"	4.2975	1.7142	0.10
			0.00	0.00			Ice	4.5570	1.9008	0.13
							1" Ice	5.0981	2.2951	0.20
							2" Ice			
TD-RRH8x20-25	C	From Leg	4.0000	0.00	0.00	147.0000	No Ice	4.0455	1.5345	0.07
			0.00	0.00			1/2"	4.2975	1.7142	0.10
			0.00	0.00			Ice	4.5570	1.9008	0.13
							1" Ice	5.0981	2.2951	0.20
							2" Ice			
Platform Mount [LP 1201-1]	C	None			0.00	147.0000	No Ice	23.1000	23.1000	2.10
							1/2"	26.8000	26.8000	2.50
							Ice	30.5000	30.5000	2.90
							1" Ice	37.9000	37.9000	3.70
							2" Ice			
(3) 6' x 2" Mount Pipe	A	From Leg	4.0000	0.00	0.00	147.0000	No Ice	1.4250	1.4250	0.02
			0.00	0.00			1/2"	1.9250	1.9250	0.03
			0.00	0.00			Ice	2.2939	2.2939	0.05
							1" Ice	3.0596	3.0596	0.09
							2" Ice			
(3) 6' x 2" Mount Pipe	B	From Leg	4.0000	0.00	0.00	147.0000	No Ice	1.4250	1.4250	0.02
			0.00	0.00			1/2"	1.9250	1.9250	0.03
			0.00	0.00			Ice	2.2939	2.2939	0.05
							1" Ice	3.0596	3.0596	0.09
							2" Ice			
(3) 6' x 2" Mount Pipe	C	From Leg	4.0000	0.00	0.00	147.0000	No Ice	1.4250	1.4250	0.02
			0.00	0.00			1/2"	1.9250	1.9250	0.03
			0.00	0.00			Ice	2.2939	2.2939	0.05
							1" Ice	3.0596	3.0596	0.09
							2" Ice			

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _{AA}		Weight	
			Horz	Lateral	Vert			Front	Side		
			ft	ft	ft	°	ft	ft ²	ft ²	K	
**											
PCS 1900MHz 4x45W-65MHz	A	From Leg	2.0000	0.00	0.00	0.00	145.0000	No Ice	2.3218	2.2381	0.06
								1/2"	2.5266	2.4407	0.08
								Ice	2.7388	2.6507	0.11
								1" Ice	3.1855	3.0929	0.17
								2" Ice			
PCS 1900MHz 4x45W-65MHz	B	From Leg	2.0000	0.00	0.00	0.00	145.0000	No Ice	2.3218	2.2381	0.06
								1/2"	2.5266	2.4407	0.08
								Ice	2.7388	2.6507	0.11
								1" Ice	3.1855	3.0929	0.17
								2" Ice			
PCS 1900MHz 4x45W-65MHz	C	From Leg	2.0000	0.00	0.00	0.00	145.0000	No Ice	2.3218	2.2381	0.06
								1/2"	2.5266	2.4407	0.08
								Ice	2.7388	2.6507	0.11
								1" Ice	3.1855	3.0929	0.17
								2" Ice			
800MHz 2X50W RRH W/FILTER	A	From Leg	2.0000	0.00	0.00	0.00	145.0000	No Ice	2.0583	1.9317	0.06
								1/2"	2.2398	2.1087	0.09
								Ice	2.4287	2.2931	0.11
								1" Ice	2.8287	2.6843	0.17
								2" Ice			
800MHz 2X50W RRH W/FILTER	B	From Leg	2.0000	0.00	0.00	0.00	145.0000	No Ice	2.0583	1.9317	0.06
								1/2"	2.2398	2.1087	0.09
								Ice	2.4287	2.2931	0.11
								1" Ice	2.8287	2.6843	0.17
								2" Ice			
800MHz 2X50W RRH W/FILTER	C	From Leg	2.0000	0.00	0.00	0.00	145.0000	No Ice	2.0583	1.9317	0.06
								1/2"	2.2398	2.1087	0.09
								Ice	2.4287	2.2931	0.11
								1" Ice	2.8287	2.6843	0.17
								2" Ice			
Side Arm Mount [SO 102-3]	C	None					145.0000	No Ice	3.0000	3.0000	0.08
								1/2"	3.4800	3.4800	0.11
								Ice	3.9600	3.9600	0.14
								1" Ice	4.9200	4.9200	0.20
								2" Ice			
6' x 2" Mount Pipe	A	From Leg	2.0000	0.00	0.00	0.00	145.0000	No Ice	1.4250	1.4250	0.02
								1/2"	1.9250	1.9250	0.03
								Ice	2.2939	2.2939	0.05
								1" Ice	3.0596	3.0596	0.09
								2" Ice			
6' x 2" Mount Pipe	B	From Leg	2.0000	0.00	0.00	0.00	145.0000	No Ice	1.4250	1.4250	0.02
								1/2"	1.9250	1.9250	0.03
								Ice	2.2939	2.2939	0.05
								1" Ice	3.0596	3.0596	0.09
								2" Ice			
6' x 2" Mount Pipe	C	From Leg	2.0000	0.00	0.00	0.00	145.0000	No Ice	1.4250	1.4250	0.02
								1/2"	1.9250	1.9250	0.03
								Ice	2.2939	2.2939	0.05
								1" Ice	3.0596	3.0596	0.09
								2" Ice			
**											
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.0000	0.00	0.00	2.00	132.0000	No Ice	8.3858	7.0840	0.08
								1/2"	8.9496	8.2754	0.15
								Ice	9.4797	9.1876	0.22
								1" Ice	10.5599	11.0266	0.40
								2" Ice			
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.0000	0.00	0.00	2.00	132.0000	No Ice	8.3858	7.0840	0.08
								1/2"	8.9496	8.2754	0.15
								Ice	9.4797	9.1876	0.22
								1" Ice	10.5599	11.0266	0.40
								2" Ice			
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.0000	0.00	0.00	2.00	132.0000	No Ice	8.3858	7.0840	0.08
								1/2"	8.9496	8.2754	0.15
								Ice	9.4797	9.1876	0.22
								1" Ice	10.5599	11.0266	0.40
								2" Ice			

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft	C _{AA}		Weight K	
			Horz ft	Lateral ft			Front ft ²	Side ft ²		
BXA-70063-4CF-EDIN-X w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.00	0.00	132.0000	1" Ice	10.5599	11.0266	0.40
							2" Ice			
							No Ice	4.9453	3.6927	0.03
							1/2" Ice	5.3243	4.2947	0.07
BXA-70063-4CF-EDIN-X w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.00	0.00	132.0000	1" Ice	5.7120	4.9133	0.12
							2" Ice	6.5142	6.1810	0.23
							No Ice	4.9453	3.6927	0.03
							1/2" Ice	5.3243	4.2947	0.07
BXA-70063-4CF-EDIN-X w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.00	0.00	132.0000	Ice	5.7120	4.9133	0.12
							1" Ice	6.5142	6.1810	0.23
							2" Ice			
							No Ice	4.9453	3.6927	0.03
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.00	0.00	132.0000	1/2" Ice	5.3243	4.2947	0.07
							Ice	5.7120	4.9133	0.12
							1" Ice	6.5142	6.1810	0.23
							2" Ice			
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.00	0.00	132.0000	No Ice	7.8065	5.8008	0.04
							1/2" Ice	8.3569	6.9529	0.10
							Ice	8.8720	7.8191	0.17
							1" Ice	9.9271	9.6015	0.34
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.00	0.00	132.0000	2" Ice			
							No Ice	7.8065	5.8008	0.04
							1/2" Ice	8.3569	6.9529	0.10
							Ice	8.8720	7.8191	0.17
RRH2x60-700	A	From Leg	4.0000 0.00 2.00	0.00	0.00	132.0000	1" Ice	9.9271	9.6015	0.34
							2" Ice			
							No Ice	3.5002	1.8157	0.06
							1/2" Ice	3.7609	2.0519	0.08
RRH2x60-700	B	From Leg	4.0000 0.00 2.00	0.00	0.00	132.0000	Ice	4.0285	2.2894	0.11
							1" Ice	4.5849	2.7852	0.17
							2" Ice			
							No Ice	3.5002	1.8157	0.06
RRH2x60-700	C	From Leg	4.0000 0.00 2.00	0.00	0.00	132.0000	1/2" Ice	3.7609	2.0519	0.08
							Ice	4.0285	2.2894	0.11
							1" Ice	4.5849	2.7852	0.17
							2" Ice			
RRH2X60-PCS	A	From Leg	4.0000 0.00 2.00	0.00	0.00	132.0000	No Ice	2.2000	1.7233	0.06
							1/2" Ice	2.3926	1.9015	0.08
							Ice	2.5926	2.0870	0.10
							1" Ice	3.0148	2.4804	0.16
RRH2X60-PCS	B	From Leg	4.0000 0.00 2.00	0.00	0.00	132.0000	2" Ice			
							No Ice	2.2000	1.7233	0.06
							1/2" Ice	2.3926	1.9015	0.08
							Ice	2.5926	2.0870	0.10
RRH2X60-PCS	C	From Leg	4.0000 0.00 2.00	0.00	0.00	132.0000	1" Ice	3.0148	2.4804	0.16
							2" Ice			
							No Ice	2.2000	1.7233	0.06
							1/2" Ice	2.3926	1.9015	0.08
DB-T1-6Z-8AB-0Z	A	From Leg	4.0000 0.00 2.00	0.00	0.00	132.0000	Ice	2.5926	2.0870	0.10
							1" Ice	3.0148	2.4804	0.16
							2" Ice			
							No Ice	4.8000	2.0000	0.04
							1/2" Ice	5.0704	2.1926	0.08
							Ice	5.3481	2.3926	0.12

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
DB-T1-6Z-8AB-0Z	B	From Leg	4.0000 0.00 2.00	0.00	132.0000	1" Ice	5.9259	2.8148	0.21
						2" Ice			
						No Ice	4.8000	2.0000	0.04
						1/2" Ice	5.0704	2.1926	0.08
B66A RRH4X45	A	From Leg	4.0000 0.00 2.00	0.00	132.0000	1" Ice	5.3481	2.3926	0.12
						2" Ice	5.9259	2.8148	0.21
						No Ice	2.5800	1.6296	0.07
						1/2" Ice	2.7937	1.8106	0.09
B66A RRH4X45	B	From Leg	4.0000 0.00 2.00	0.00	132.0000	Ice	3.0148	1.9986	0.11
						1" Ice	3.4793	2.3955	0.17
						No Ice	2.5800	1.6296	0.07
						1/2" Ice	2.7937	1.8106	0.09
B66A RRH4X45	C	From Leg	4.0000 0.00 2.00	0.00	132.0000	Ice	3.0148	1.9986	0.11
						1" Ice	3.4793	2.3955	0.17
						No Ice	2.5800	1.6296	0.07
						1/2" Ice	2.7937	1.8106	0.09
Platform Mount [LP 1201-1]	C	None		0.00	132.0000	Ice	3.0148	1.9986	0.11
						1" Ice	3.4793	2.3955	0.17
						No Ice	23.1000	23.1000	2.10
						1/2" Ice	26.8000	26.8000	2.50
Miscellaneous [NA 510-1]	C	None		0.00	132.0000	Ice	30.5000	30.5000	2.90
						1" Ice	37.9000	37.9000	3.70
						No Ice	6.0000	6.0000	0.26
						1/2" Ice	8.5000	8.5000	0.34
** 7770.00 w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.00	117.0000	Ice	11.0000	11.0000	0.42
						1" Ice	16.0000	16.0000	0.59
						No Ice	5.7460	4.2543	0.06
						1/2" Ice	6.1791	5.0137	0.10
7770.00 w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.00	117.0000	Ice	6.6067	5.7109	0.16
						1" Ice	7.4880	7.1553	0.29
						No Ice	5.7460	4.2543	0.06
						1/2" Ice	6.1791	5.0137	0.10
7770.00 w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.00	117.0000	Ice	6.6067	5.7109	0.16
						1" Ice	7.4880	7.1553	0.29
						No Ice	5.7460	4.2543	0.06
						1/2" Ice	6.1791	5.0137	0.10
HPA-65R-BUU-H8 w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.00	117.0000	Ice	6.6067	5.7109	0.16
						1" Ice	7.4880	7.1553	0.29
						No Ice	13.2134	9.5823	0.10
						1/2" Ice	13.8986	11.0517	0.20
SBNHH-1D65A w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.00	117.0000	Ice	14.5871	12.4963	0.30
						1" Ice	15.9095	14.7516	0.55
						No Ice	5.9539	5.1900	0.06
						1/2" Ice	6.3896	5.9608	0.11
HPA-65R-BUU-H6 w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.00	117.0000	Ice	6.8197	6.6576	0.17
						1" Ice	7.7060	8.0888	0.32
						No Ice	9.8953	8.1125	0.08
						1/2" Ice	10.4700	9.3041	0.16
RRUS 32 B2	A	From Leg	4.0000 0.00	0.00	117.0000	Ice	11.0098	10.2095	0.25
						1" Ice	12.1119	12.0135	0.46
						No Ice	2.7313	1.6681	0.05
						1/2" Ice	2.9531	1.8552	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	CAAA Front ft ²	CAAA Side ft ²	Weight K
			2.00			Ice 3.1823	2.0493	0.10
						1" Ice 3.6628	2.4585	0.16
						2" Ice		
RRUS 32 B2	B	From Leg	4.0000	0.00	117.0000	No Ice 2.7313	1.6681	0.05
			0.00			1/2" 2.9531	1.8552	0.07
			2.00			Ice 3.1823	2.0493	0.10
						1" Ice 3.6628	2.4585	0.16
						2" Ice		
RRUS 32 B2	C	From Leg	4.0000	0.00	117.0000	No Ice 2.7313	1.6681	0.05
			0.00			1/2" 2.9531	1.8552	0.07
			2.00			Ice 3.1823	2.0493	0.10
						1" Ice 3.6628	2.4585	0.16
						2" Ice		
(2) 860 10025	A	From Leg	4.0000	0.00	117.0000	No Ice 0.1422	0.1210	0.00
			0.00			1/2" 0.1959	0.1727	0.00
			2.00			Ice 0.2593	0.2315	0.01
						1" Ice 0.4081	0.3759	0.01
						2" Ice		
(2) 860 10025	C	From Leg	4.0000	0.00	117.0000	No Ice 0.1422	0.1210	0.00
			0.00			1/2" 0.1959	0.1727	0.00
			2.00			Ice 0.2593	0.2315	0.01
						1" Ice 0.4081	0.3759	0.01
						2" Ice		
(2) LGP17201	B	From Leg	4.0000	0.00	117.0000	No Ice 1.8667	0.4840	0.03
			0.00			1/2" 2.0370	0.5840	0.04
			0.00			Ice 2.2148	0.6909	0.06
						1" Ice 2.5926	0.9259	0.10
						2" Ice		
Platform Mount [LP 1201-1]	C	None		0.00	117.0000	No Ice 23.1000	23.1000	2.10
						1/2" 26.8000	26.8000	2.50
						Ice 30.5000	30.5000	2.90
						1" Ice 37.9000	37.9000	3.70
						2" Ice		
6' x 2" Mount Pipe	A	From Leg	4.0000	0.00	117.0000	No Ice 1.4250	1.4250	0.02
			0.00			1/2" 1.9250	1.9250	0.03
			0.00			Ice 2.2939	2.2939	0.05
						1" Ice 3.0596	3.0596	0.09
						2" Ice		
6' x 2" Mount Pipe	B	From Leg	4.0000	0.00	117.0000	No Ice 1.4250	1.4250	0.02
			0.00			1/2" 1.9250	1.9250	0.03
			0.00			Ice 2.2939	2.2939	0.05
						1" Ice 3.0596	3.0596	0.09
						2" Ice		
6' x 2" Mount Pipe	C	From Leg	4.0000	0.00	117.0000	No Ice 1.4250	1.4250	0.02
			0.00			1/2" 1.9250	1.9250	0.03
			0.00			Ice 2.2939	2.2939	0.05
						1" Ice 3.0596	3.0596	0.09
						2" Ice		
**								
DC6-48-60-18-8F	A	From Leg	2.0000	0.00	115.0000	No Ice 0.7915	0.7915	0.02
			0.00			1/2" 1.2743	1.2743	0.04
			4.00			Ice 1.4503	1.4503	0.05
						1" Ice 1.8314	1.8314	0.10
						2" Ice		
RRU-11	A	From Leg	2.0000	0.00	115.0000	No Ice 1.6385	1.2615	0.04
			0.00			1/2" 1.8016	1.4102	0.06
			4.00			Ice 1.9722	1.5663	0.08
						1" Ice 2.3355	1.9008	0.12
						2" Ice		
RRU-11	B	From Leg	2.0000	0.00	115.0000	No Ice 1.6385	1.2615	0.04
			0.00			1/2" 1.8016	1.4102	0.06
			4.00			Ice 1.9722	1.5663	0.08
						1" Ice 2.3355	1.9008	0.12
						2" Ice		
RRU-11	C	From Leg	2.0000	0.00	115.0000	No Ice 1.6385	1.2615	0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K	
			0.00			1/2"	1.8016	1.4102	0.06
			4.00			Ice	1.9722	1.5663	0.08
						1" Ice	2.3355	1.9008	0.12
						2" Ice			
Pipe Mount [PM 601-3]	C	None		0.00	115.0000	No Ice	4.3900	4.3900	0.20
						1/2"	5.4800	5.4800	0.24
						Ice	6.5700	6.5700	0.28
						1" Ice	8.7500	8.7500	0.36
						2" Ice			
Side Arm Mount [SO 102-3]	C	None		0.00	115.0000	No Ice	3.0000	3.0000	0.08
						1/2"	3.4800	3.4800	0.11
						Ice	3.9600	3.9600	0.14
						1" Ice	4.9200	4.9200	0.20
						2" Ice			

AIR 32 B2A B66AA w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	107.0000	No Ice	7.0872	6.3736	0.16
						1/2"	7.5606	7.2305	0.23
						Ice	8.0206	7.9731	0.30
						1" Ice	8.9662	9.5071	0.46
						2" Ice			
AIR 32 B2A B66AA w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	107.0000	No Ice	7.0872	6.3736	0.16
						1/2"	7.5606	7.2305	0.23
						Ice	8.0206	7.9731	0.30
						1" Ice	8.9662	9.5071	0.46
						2" Ice			
AIR 32 B2A B66AA w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	107.0000	No Ice	7.0872	6.3736	0.16
						1/2"	7.5606	7.2305	0.23
						Ice	8.0206	7.9731	0.30
						1" Ice	8.9662	9.5071	0.46
						2" Ice			
(2) RADIO 4449 B12/B71	A	From Leg	4.0000 0.00 0.00	0.00	107.0000	No Ice	1.6500	1.1625	0.07
						1/2"	1.8104	1.3012	0.09
						Ice	1.9781	1.4473	0.11
						1" Ice	2.3359	1.7618	0.16
						2" Ice			
RADIO 4449 B12/B71	C	From Leg	4.0000 0.00 0.00	0.00	107.0000	No Ice	1.6500	1.1625	0.07
						1/2"	1.8104	1.3012	0.09
						Ice	1.9781	1.4473	0.11
						1" Ice	2.3359	1.7618	0.16
						2" Ice			
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	107.0000	No Ice	20.4801	11.0240	0.16
						1/2"	21.2306	12.5496	0.30
						Ice	21.9900	14.0992	0.44
						1" Ice	23.4441	16.4509	0.78
						2" Ice			
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	107.0000	No Ice	20.4801	11.0240	0.16
						1/2"	21.2306	12.5496	0.30
						Ice	21.9900	14.0992	0.44
						1" Ice	23.4441	16.4509	0.78
						2" Ice			
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	107.0000	No Ice	20.4801	11.0240	0.16
						1/2"	21.2306	12.5496	0.30
						Ice	21.9900	14.0992	0.44
						1" Ice	23.4441	16.4509	0.78
						2" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	107.0000	No Ice	6.3292	5.6424	0.11
						1/2"	6.7751	6.4259	0.17
						Ice	7.2137	7.1313	0.23
						1" Ice	8.1168	8.5907	0.38
						2" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	107.0000	No Ice	6.3292	5.6424	0.11
						1/2"	6.7751	6.4259	0.17
						Ice	7.2137	7.1313	0.23
						1" Ice	8.1168	8.5907	0.38
						2" Ice			

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA}		Weight	
			Horz Lateral	Vert			Front	Side		
			ft	ft	°	ft	ft ²	ft ²	K	
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.0000	0.00	0.00	107.0000	No Ice	6.3292	5.6424	0.11
			0.00	0.00			1/2"	6.7751	6.4259	0.17
			0.00	0.00			Ice	7.2137	7.1313	0.23
							1" Ice	8.1168	8.5907	0.38
							2" Ice			
KRY 112 144/1	A	From Leg	4.0000	0.00	0.00	107.0000	No Ice	0.3500	0.1750	0.01
			0.00	0.00			1/2"	0.4259	0.2343	0.01
			0.00	0.00			Ice	0.5093	0.3009	0.02
							1" Ice	0.6981	0.4565	0.03
							2" Ice			
KRY 112 144/1	B	From Leg	4.0000	0.00	0.00	107.0000	No Ice	0.3500	0.1750	0.01
			0.00	0.00			1/2"	0.4259	0.2343	0.01
			0.00	0.00			Ice	0.5093	0.3009	0.02
							1" Ice	0.6981	0.4565	0.03
							2" Ice			
KRY 112 144/1	C	From Leg	4.0000	0.00	0.00	107.0000	No Ice	0.3500	0.1750	0.01
			0.00	0.00			1/2"	0.4259	0.2343	0.01
			0.00	0.00			Ice	0.5093	0.3009	0.02
							1" Ice	0.6981	0.4565	0.03
							2" Ice			
T-Arm Mount [TA 701-3]	A	None			0.00	107.0000	No Ice	27.9500	27.9500	1.09
							1/2"	37.2600	37.2600	1.41
							Ice	46.5700	46.5700	1.72
							1" Ice	65.1900	65.1900	2.35
							2" Ice			
Side Arm Mount [SO 102-3]	C	None			0.00	107.0000	No Ice	3.0000	3.0000	0.08
							1/2"	3.4800	3.4800	0.11
							Ice	3.9600	3.9600	0.14
							1" Ice	4.9200	4.9200	0.20
							2" Ice			
** 58532A	A	From Leg	2.0000	0.00	0.00	49.0000	No Ice	0.1893	0.1893	0.00
0.00			0.00	1/2"			0.2483	0.2483	0.00	
1.00			0.00	Ice			0.3147	0.3147	0.01	
				1" Ice			0.4698	0.4698	0.02	
				2" Ice						
Side Arm Mount [SO 701-1]	A	None			0.00	49.0000	No Ice	0.8500	1.6700	0.07
							1/2"	1.1400	2.3400	0.08
							Ice	1.4300	3.0100	0.09
							1" Ice	2.0100	4.3500	0.12
							2" Ice			
**										

Tower Pressures - No Ice

$G_H = 1.100$

Section Elevation	z	K _Z	q _Z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _{AA} In Face	C _{AA} Out Face
ft	ft		psf	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
L1 147.5000-142.5000	144.9824	1.099	39.51	9.493	A	0.000	9.493	9.493	100.00	0.000	0.000
					B	0.000	9.493	9.493	100.00	0.000	0.000
					C	0.000	9.493	9.493	100.00	0.000	0.000
L2 142.5000-137.5000	139.9831	1.088	39.12	9.895	A	0.000	9.895	9.895	100.00	0.000	0.000
					B	0.000	9.895	9.895	100.00	0.000	0.000
					C	0.000	9.895	9.895	100.00	0.000	0.000
L3 137.5000-132.5000	134.9838	1.077	38.71	10.297	A	0.000	10.297	10.297	100.00	0.000	0.000
					B	0.000	10.297	10.297	100.00	0.000	0.000

Section Elevation ft	z ft	K _z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L4 132.5000- 127.5000	129.9844	1.065	38.30	10.699	C	0.000	10.297	10.699	100.00	0.000	0.000
					A	0.000	10.699		100.00	0.000	0.000
					B	0.000	10.699		100.00	0.000	0.000
L5 127.5000- 122.5000	124.9849	1.053	37.87	11.101	C	0.000	10.699	11.101	100.00	0.000	0.000
					A	0.000	11.101		100.00	0.000	0.000
					B	0.000	11.101		100.00	0.000	0.000
L6 122.5000- 117.5000	119.9855	1.041	37.43	11.503	C	0.000	11.503	11.503	100.00	0.000	0.000
					A	0.000	11.503		100.00	0.000	0.000
					B	0.000	11.503		100.00	0.000	0.000
L7 117.5000- 112.5000	114.9860	1.028	36.98	11.905	C	0.000	11.503	11.905	100.00	0.000	0.000
					A	0.000	11.905		100.00	0.000	0.000
					B	0.000	11.905		100.00	0.000	0.000
L8 112.5000- 108.5000	110.4913	1.017	36.56	9.813	C	0.000	11.905	9.813	100.00	0.000	0.000
					A	0.000	9.813		100.00	0.000	0.000
					B	0.000	9.813		100.00	0.000	0.000
L9 108.5000- 107.2500	107.8741	1.01	36.31	3.066	C	0.000	9.813	3.066	100.00	0.000	0.000
					A	0.000	3.066		100.00	0.000	0.000
					B	0.000	3.066		100.00	0.000	0.000
L10 107.2500- 102.2500	104.7366	1.001	36.01	12.517	C	0.000	3.066	12.517	100.00	0.000	0.000
					A	0.000	12.517		100.00	8.464	0.000
					B	0.000	12.517		100.00	0.000	0.000
L11 102.2500- 97.2500	99.7371	0.987	35.51	12.919	C	0.000	12.517	12.919	100.00	0.000	0.000
					A	0.000	12.919		100.00	8.910	0.000
					B	0.000	12.919		100.00	0.000	0.000
L12 97.2500- 92.2500	94.7374	0.973	34.99	13.321	C	0.000	12.919	13.321	100.00	0.000	0.000
					A	0.000	13.321		100.00	8.910	0.000
					B	0.000	13.321		100.00	0.000	0.000
L13 92.2500- 87.2500	89.7378	0.958	34.45	13.723	C	0.000	13.321	13.723	100.00	0.000	0.000
					A	0.000	13.723		100.00	8.910	0.000
					B	0.000	13.723		100.00	0.000	0.000
L14 87.2500- 82.2500	84.7382	0.943	33.89	14.125	C	0.000	13.723	14.125	100.00	0.000	0.000
					A	0.000	14.125		100.00	8.910	0.000
					B	0.000	14.125		100.00	0.000	0.000
L15 82.2500- 77.2500	79.7385	0.926	33.31	14.527	C	0.000	14.125	14.527	100.00	0.000	0.000
					A	0.000	14.527		100.00	8.910	0.000
					B	0.000	14.527		100.00	0.000	0.000
L16 77.2500- 72.2500	74.7388	0.909	32.70	14.929	C	0.000	14.527	14.929	100.00	0.000	0.000
					A	0.000	14.929		100.00	8.910	0.000
					B	0.000	14.929		100.00	0.000	0.000
L17 72.2500- 71.7500	71.9999	0.9	32.35	1.493	C	0.000	14.929	1.493	100.00	0.000	0.000
					A	0.000	1.493		100.00	0.891	0.000
					B	0.000	1.493		100.00	0.000	0.000
L18 71.7500- 66.7500	69.2390	0.89	31.99	15.155	C	0.000	1.493	15.155	100.00	0.000	0.000
					A	0.000	15.155		100.00	8.910	0.000
					B	0.000	15.155		100.00	0.000	0.000
L19 66.7500- 61.7500	64.2393	0.871	31.31	15.557	C	0.000	15.155	15.557	100.00	0.000	0.000
					A	0.000	15.557		100.00	8.910	0.000
					B	0.000	15.557		100.00	0.000	0.000
L20 61.7500- 56.7500	59.2395	0.851	30.60	15.959	C	0.000	15.557	15.959	100.00	0.000	0.000
					A	0.000	15.959		100.00	8.910	0.000
					B	0.000	15.959		100.00	0.000	0.000
L21 56.7500- 51.7500	54.2398	0.83	29.84	16.361	C	0.000	15.959	16.361	100.00	0.000	0.000
					A	0.000	16.361		100.00	8.910	0.000
					B	0.000	16.361		100.00	0.000	0.000
L22 51.7500- 47.7500	49.7436	0.809	29.11	13.378	C	0.000	16.361	13.378	100.00	0.000	0.000
					A	0.000	13.378		100.00	7.974	0.000
					B	0.000	13.378		100.00	0.846	0.000
L23 47.7500- 47.5000	47.6250	0.799	28.75	0.844	C	0.000	13.378	0.844	100.00	0.846	0.000
					A	0.000	0.844		100.00	0.615	0.000
					B	0.000	0.844		100.00	0.169	0.000
L24 47.5000- 42.5000	44.9902	0.787	28.28	17.099	C	0.000	0.844	17.099	100.00	0.169	0.000
					A	0.000	17.099		100.00	12.293	0.000
					B	0.000	17.099		100.00	3.383	0.000
L25 42.5000- 35.7500	39.1077	0.756	27.17	23.721	C	0.000	17.099	23.721	100.00	3.383	0.000
					A	0.000	23.721		100.00	14.397	0.000
					B	0.000	23.721		100.00	2.368	0.000
L26 35.7500-	35.2496	0.734	26.38	3.524	C	0.000	23.721	3.524	100.00	2.368	0.000
					A	0.000	3.524		100.00	1.782	0.000
					B	0.000	3.524		100.00	0.000	0.000

Section Elevation ft	z ft	K _z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
34.7500					B	0.000	3.524		100.00	0.000	0.000
L27 34.7500-29.7500	32.2406	0.715	25.71	17.860	C	0.000	3.524		100.00	0.000	0.000
					A	0.000	17.860	17.860	100.00	8.910	0.000
					B	0.000	17.860		100.00	0.000	0.000
					C	0.000	17.860		100.00	0.000	0.000
L28 29.7500-24.7500	27.2408	0.7	25.17	18.262	A	0.000	18.262	18.262	100.00	8.910	0.000
					B	0.000	18.262		100.00	0.000	0.000
					C	0.000	18.262		100.00	0.000	0.000
L29 24.7500-19.7500	22.2410	0.7	25.17	18.665	A	0.000	18.665	18.665	100.00	8.910	0.000
					B	0.000	18.665		100.00	0.000	0.000
					C	0.000	18.665		100.00	0.000	0.000
L30 19.7500-14.7500	17.2412	0.7	25.17	19.067	A	0.000	19.067	19.067	100.00	8.910	0.000
					B	0.000	19.067		100.00	0.000	0.000
					C	0.000	19.067		100.00	0.000	0.000
L31 14.7500-9.7500	12.2414	0.7	25.17	19.469	A	0.000	19.469	19.469	100.00	8.910	0.000
					B	0.000	19.469		100.00	0.000	0.000
					C	0.000	19.469		100.00	0.000	0.000
L32 9.7500-4.7500	7.2416	0.7	25.17	19.871	A	0.000	19.871	19.871	100.00	8.910	0.000
					B	0.000	19.871		100.00	0.000	0.000
					C	0.000	19.871		100.00	0.000	0.000
L33 4.7500-0.0000	2.3675	0.7	25.17	19.250	A	0.000	19.250	19.250	100.00	8.464	0.000
					B	0.000	19.250		100.00	0.000	0.000
					C	0.000	19.250		100.00	0.000	0.000

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K _z	q _z psf	t _z in	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 147.5000-142.5000	144.9824	1.099	6.32	1.9712	11.136	A	0.000	11.136	11.136	100.00	0.000	0.000
						B	0.000	11.136		100.00	0.000	0.000
						C	0.000	11.136		100.00	0.000	0.000
L2 142.5000-137.5000	139.9831	1.088	6.26	1.9643	11.532	A	0.000	11.532	11.532	100.00	0.000	0.000
						B	0.000	11.532		100.00	0.000	0.000
						C	0.000	11.532		100.00	0.000	0.000
L3 137.5000-132.5000	134.9838	1.077	6.19	1.9572	11.928	A	0.000	11.928	11.928	100.00	0.000	0.000
						B	0.000	11.928		100.00	0.000	0.000
						C	0.000	11.928		100.00	0.000	0.000
L4 132.5000-127.5000	129.9844	1.065	6.13	1.9498	12.324	A	0.000	12.324	12.324	100.00	0.000	0.000
						B	0.000	12.324		100.00	0.000	0.000
						C	0.000	12.324		100.00	0.000	0.000
L5 127.5000-122.5000	124.9849	1.053	6.06	1.9422	12.719	A	0.000	12.719	12.719	100.00	0.000	0.000
						B	0.000	12.719		100.00	0.000	0.000
						C	0.000	12.719		100.00	0.000	0.000
L6 122.5000-117.5000	119.9855	1.041	5.99	1.9342	13.115	A	0.000	13.115	13.115	100.00	0.000	0.000
						B	0.000	13.115		100.00	0.000	0.000
						C	0.000	13.115		100.00	0.000	0.000
L7 117.5000-112.5000	114.9860	1.028	5.92	1.9260	13.510	A	0.000	13.510	13.510	100.00	0.000	0.000
						B	0.000	13.510		100.00	0.000	0.000
						C	0.000	13.510		100.00	0.000	0.000
L8 112.5000-108.5000	110.4913	1.017	5.85	1.9184	11.092	A	0.000	11.092	11.092	100.00	0.000	0.000
						B	0.000	11.092		100.00	0.000	0.000
						C	0.000	11.092		100.00	0.000	0.000
L9 108.5000-107.2500	107.8741	1.01	5.81	1.9138	3.466	A	0.000	3.466	3.466	100.00	0.000	0.000
						B	0.000	3.466		100.00	0.000	0.000
						C	0.000	3.466		100.00	0.000	0.000
L10 107.2500-102.2500	104.7366	1.001	5.76	1.9081	14.107	A	0.000	14.107	14.107	100.00	12.847	0.000
						B	0.000	14.107		100.00	0.000	0.000
						C	0.000	14.107		100.00	0.000	0.000
L11 102.2500-97.2500	99.7371	0.987	5.68	1.8988	14.501	A	0.000	14.501	14.501	100.00	13.511	0.000
						B	0.000	14.501		100.00	0.000	0.000
						C	0.000	14.501		100.00	0.000	0.000

Section Elevation	z	Kz	qz	tz	AG	F a c e	AF	AR	Aleg	Leg %	CAAA In Face ft²	CAAA Out Face ft²
ft	ft		psf	in	ft²		ft²	ft²	ft²			
L12 97.2500-92.2500	94.7374	0.973	5.60	1.8891	14.895	A	0.000	14.895	14.895	100.00	13.499	0.000
						B	0.000	14.895	14.895	100.00	0.000	0.000
						C	0.000	14.895	14.895	100.00	0.000	0.000
L13 92.2500-87.2500	89.7378	0.958	5.51	1.8789	15.289	A	0.000	15.289	15.289	100.00	13.486	0.000
						B	0.000	15.289	15.289	100.00	0.000	0.000
						C	0.000	15.289	15.289	100.00	0.000	0.000
L14 87.2500-82.2500	84.7382	0.943	5.42	1.8681	15.682	A	0.000	15.682	15.682	100.00	13.473	0.000
						B	0.000	15.682	15.682	100.00	0.000	0.000
						C	0.000	15.682	15.682	100.00	0.000	0.000
L15 82.2500-77.2500	79.7385	0.926	5.33	1.8568	16.074	A	0.000	16.074	16.074	100.00	13.458	0.000
						B	0.000	16.074	16.074	100.00	0.000	0.000
						C	0.000	16.074	16.074	100.00	0.000	0.000
L16 77.2500-72.2500	74.7388	0.909	5.23	1.8448	16.466	A	0.000	16.466	16.466	100.00	13.444	0.000
						B	0.000	16.466	16.466	100.00	0.000	0.000
						C	0.000	16.466	16.466	100.00	0.000	0.000
L17 72.2500-71.7500	71.9999	0.9	5.18	1.8379	1.647	A	0.000	1.647	1.647	100.00	1.344	0.000
						B	0.000	1.647	1.647	100.00	0.000	0.000
						C	0.000	1.647	1.647	100.00	0.000	0.000
L18 71.7500-66.7500	69.2390	0.89	5.12	1.8308	16.681	A	0.000	16.681	16.681	100.00	13.426	0.000
						B	0.000	16.681	16.681	100.00	0.000	0.000
						C	0.000	16.681	16.681	100.00	0.000	0.000
L19 66.7500-61.7500	64.2393	0.871	5.01	1.8171	17.071	A	0.000	17.071	17.071	100.00	13.409	0.000
						B	0.000	17.071	17.071	100.00	0.000	0.000
						C	0.000	17.071	17.071	100.00	0.000	0.000
L20 61.7500-56.7500	59.2395	0.851	4.90	1.8024	17.461	A	0.000	17.461	17.461	100.00	13.391	0.000
						B	0.000	17.461	17.461	100.00	0.000	0.000
						C	0.000	17.461	17.461	100.00	0.000	0.000
L21 56.7500-51.7500	54.2398	0.83	4.77	1.7866	17.849	A	0.000	17.849	17.849	100.00	13.371	0.000
						B	0.000	17.849	17.849	100.00	0.000	0.000
						C	0.000	17.849	17.849	100.00	0.000	0.000
L22 51.7500-47.7500	49.7436	0.809	4.66	1.7712	14.559	A	0.000	14.559	14.559	100.00	11.798	0.000
						B	0.000	14.559	14.559	100.00	1.116	0.000
						C	0.000	14.559	14.559	100.00	1.116	0.000
L23 47.7500-47.5000	47.6250	0.799	4.60	1.7635	0.918	A	0.000	0.918	0.918	100.00	0.890	0.000
						B	0.000	0.918	0.918	100.00	0.223	0.000
						C	0.000	0.918	0.918	100.00	0.223	0.000
L24 47.5000-42.5000	44.9902	0.787	4.53	1.7535	18.560	A	0.000	18.560	18.560	100.00	17.786	0.000
						B	0.000	18.560	18.560	100.00	4.457	0.000
						C	0.000	18.560	18.560	100.00	4.457	0.000
L25 42.5000-35.7500	39.1077	0.756	4.35	1.7291	25.666	A	0.000	25.666	25.666	100.00	21.064	0.000
						B	0.000	25.666	25.666	100.00	3.111	0.000
						C	0.000	25.666	25.666	100.00	3.111	0.000
L26 35.7500-34.7500	35.2496	0.734	4.22	1.7112	3.812	A	0.000	3.812	3.812	100.00	2.660	0.000
						B	0.000	3.812	3.812	100.00	0.000	0.000
						C	0.000	3.812	3.812	100.00	0.000	0.000
L27 34.7500-29.7500	32.2406	0.715	4.11	1.6960	19.274	A	0.000	19.274	19.274	100.00	13.258	0.000
						B	0.000	19.274	19.274	100.00	0.000	0.000
						C	0.000	19.274	19.274	100.00	0.000	0.000
L28 29.7500-24.7500	27.2408	0.7	4.03	1.6677	19.652	A	0.000	19.652	19.652	100.00	13.222	0.000
						B	0.000	19.652	19.652	100.00	0.000	0.000
						C	0.000	19.652	19.652	100.00	0.000	0.000
L29 24.7500-19.7500	22.2410	0.7	4.03	1.6342	20.026	A	0.000	20.026	20.026	100.00	13.180	0.000
						B	0.000	20.026	20.026	100.00	0.000	0.000
						C	0.000	20.026	20.026	100.00	0.000	0.000
L30 19.7500-14.7500	17.2412	0.7	4.03	1.5931	20.394	A	0.000	20.394	20.394	100.00	13.129	0.000
						B	0.000	20.394	20.394	100.00	0.000	0.000
						C	0.000	20.394	20.394	100.00	0.000	0.000
L31 14.7500-9.7500	12.2414	0.7	4.03	1.5395	20.752	A	0.000	20.752	20.752	100.00	13.062	0.000
						B	0.000	20.752	20.752	100.00	0.000	0.000
						C	0.000	20.752	20.752	100.00	0.000	0.000
L32 9.7500-4.7500	7.2416	0.7	4.03	1.4608	21.088	A	0.000	21.088	21.088	100.00	12.963	0.000
						B	0.000	21.088	21.088	100.00	0.000	0.000
						C	0.000	21.088	21.088	100.00	0.000	0.000
L33 4.7500-0.0000	2.3675	0.7	4.03	1.3063	20.284	A	0.000	20.284	20.284	100.00	12.132	0.000
						B	0.000	20.284	20.284	100.00	0.000	0.000
						C	0.000	20.284	20.284	100.00	0.000	0.000

Tower Pressure - Service

$G_H = 1.100$

Section Elevation	z	Kz	qz	Ag	Face	AF	AR	Aleg	Leg %	CAAA In Face	CAAA Out Face
ft	ft		psf	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
L1 147.5000- 142.5000	144.9824	1.099	8.15	9.493	A	0.000	9.493	9.493	100.00	0.000	0.000
					B	0.000	9.493		100.00	0.000	0.000
					C	0.000	9.493		100.00	0.000	0.000
L2 142.5000- 137.5000	139.9831	1.088	8.06	9.895	A	0.000	9.895	9.895	100.00	0.000	0.000
					B	0.000	9.895		100.00	0.000	0.000
					C	0.000	9.895		100.00	0.000	0.000
L3 137.5000- 132.5000	134.9838	1.077	7.98	10.297	A	0.000	10.297	10.297	100.00	0.000	0.000
					B	0.000	10.297		100.00	0.000	0.000
					C	0.000	10.297		100.00	0.000	0.000
L4 132.5000- 127.5000	129.9844	1.065	7.90	10.699	A	0.000	10.699	10.699	100.00	0.000	0.000
					B	0.000	10.699		100.00	0.000	0.000
					C	0.000	10.699		100.00	0.000	0.000
L5 127.5000- 122.5000	124.9849	1.053	7.81	11.101	A	0.000	11.101	11.101	100.00	0.000	0.000
					B	0.000	11.101		100.00	0.000	0.000
					C	0.000	11.101		100.00	0.000	0.000
L6 122.5000- 117.5000	119.9855	1.041	7.72	11.503	A	0.000	11.503	11.503	100.00	0.000	0.000
					B	0.000	11.503		100.00	0.000	0.000
					C	0.000	11.503		100.00	0.000	0.000
L7 117.5000- 112.5000	114.9860	1.028	7.62	11.905	A	0.000	11.905	11.905	100.00	0.000	0.000
					B	0.000	11.905		100.00	0.000	0.000
					C	0.000	11.905		100.00	0.000	0.000
L8 112.5000- 108.5000	110.4913	1.017	7.54	9.813	A	0.000	9.813	9.813	100.00	0.000	0.000
					B	0.000	9.813		100.00	0.000	0.000
					C	0.000	9.813		100.00	0.000	0.000
L9 108.5000- 107.2500	107.8741	1.01	7.49	3.066	A	0.000	3.066	3.066	100.00	0.000	0.000
					B	0.000	3.066		100.00	0.000	0.000
					C	0.000	3.066		100.00	0.000	0.000
L10 107.2500- 102.2500	104.7366	1.001	7.42	12.517	A	0.000	12.517	12.517	100.00	8.464	0.000
					B	0.000	12.517		100.00	0.000	0.000
					C	0.000	12.517		100.00	0.000	0.000
L11 102.2500- 97.2500	99.7371	0.987	7.32	12.919	A	0.000	12.919	12.919	100.00	8.910	0.000
					B	0.000	12.919		100.00	0.000	0.000
					C	0.000	12.919		100.00	0.000	0.000
L12 97.2500- 92.2500	94.7374	0.973	7.21	13.321	A	0.000	13.321	13.321	100.00	8.910	0.000
					B	0.000	13.321		100.00	0.000	0.000
					C	0.000	13.321		100.00	0.000	0.000
L13 92.2500- 87.2500	89.7378	0.958	7.10	13.723	A	0.000	13.723	13.723	100.00	8.910	0.000
					B	0.000	13.723		100.00	0.000	0.000
					C	0.000	13.723		100.00	0.000	0.000
L14 87.2500- 82.2500	84.7382	0.943	6.99	14.125	A	0.000	14.125	14.125	100.00	8.910	0.000
					B	0.000	14.125		100.00	0.000	0.000
					C	0.000	14.125		100.00	0.000	0.000
L15 82.2500- 77.2500	79.7385	0.926	6.87	14.527	A	0.000	14.527	14.527	100.00	8.910	0.000
					B	0.000	14.527		100.00	0.000	0.000
					C	0.000	14.527		100.00	0.000	0.000
L16 77.2500- 72.2500	74.7388	0.909	6.74	14.929	A	0.000	14.929	14.929	100.00	8.910	0.000
					B	0.000	14.929		100.00	0.000	0.000
					C	0.000	14.929		100.00	0.000	0.000
L17 72.2500- 71.7500	71.9999	0.9	6.67	1.493	A	0.000	1.493	1.493	100.00	0.891	0.000
					B	0.000	1.493		100.00	0.000	0.000
					C	0.000	1.493		100.00	0.000	0.000
L18 71.7500- 66.7500	69.2390	0.89	6.59	15.155	A	0.000	15.155	15.155	100.00	8.910	0.000
					B	0.000	15.155		100.00	0.000	0.000
					C	0.000	15.155		100.00	0.000	0.000
L19 66.7500- 61.7500	64.2393	0.871	6.46	15.557	A	0.000	15.557	15.557	100.00	8.910	0.000
					B	0.000	15.557		100.00	0.000	0.000
					C	0.000	15.557		100.00	0.000	0.000
L20 61.7500- 56.7500	59.2395	0.851	6.31	15.959	A	0.000	15.959	15.959	100.00	8.910	0.000
					B	0.000	15.959		100.00	0.000	0.000
					C	0.000	15.959		100.00	0.000	0.000

Section Elevation ft	z ft	K _z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L21 56.7500- 51.7500	54.2398	0.83	6.15	16.361	A	0.000	16.361	16.361	100.00	8.910	0.000
					B	0.000	16.361		100.00	0.000	0.000
					C	0.000	16.361		100.00	0.000	0.000
L22 51.7500- 47.7500	49.7436	0.809	6.00	13.378	A	0.000	13.378	13.378	100.00	7.974	0.000
					B	0.000	13.378		100.00	0.846	0.000
					C	0.000	13.378		100.00	0.846	0.000
L23 47.7500- 47.5000	47.6250	0.799	5.93	0.844	A	0.000	0.844	0.844	100.00	0.615	0.000
					B	0.000	0.844		100.00	0.169	0.000
					C	0.000	0.844		100.00	0.169	0.000
L24 47.5000- 42.5000	44.9902	0.787	5.83	17.099	A	0.000	17.099	17.099	100.00	12.293	0.000
					B	0.000	17.099		100.00	3.383	0.000
					C	0.000	17.099		100.00	3.383	0.000
L25 42.5000- 35.7500	39.1077	0.756	5.60	23.721	A	0.000	23.721	23.721	100.00	14.397	0.000
					B	0.000	23.721		100.00	2.368	0.000
					C	0.000	23.721		100.00	2.368	0.000
L26 35.7500- 34.7500	35.2496	0.734	5.44	3.524	A	0.000	3.524	3.524	100.00	1.782	0.000
					B	0.000	3.524		100.00	0.000	0.000
					C	0.000	3.524		100.00	0.000	0.000
L27 34.7500- 29.7500	32.2406	0.715	5.30	17.860	A	0.000	17.860	17.860	100.00	8.910	0.000
					B	0.000	17.860		100.00	0.000	0.000
					C	0.000	17.860		100.00	0.000	0.000
L28 29.7500- 24.7500	27.2408	0.7	5.19	18.262	A	0.000	18.262	18.262	100.00	8.910	0.000
					B	0.000	18.262		100.00	0.000	0.000
					C	0.000	18.262		100.00	0.000	0.000
L29 24.7500- 19.7500	22.2410	0.7	5.19	18.665	A	0.000	18.665	18.665	100.00	8.910	0.000
					B	0.000	18.665		100.00	0.000	0.000
					C	0.000	18.665		100.00	0.000	0.000
L30 19.7500- 14.7500	17.2412	0.7	5.19	19.067	A	0.000	19.067	19.067	100.00	8.910	0.000
					B	0.000	19.067		100.00	0.000	0.000
					C	0.000	19.067		100.00	0.000	0.000
L31 14.7500- 9.7500	12.2414	0.7	5.19	19.469	A	0.000	19.469	19.469	100.00	8.910	0.000
					B	0.000	19.469		100.00	0.000	0.000
					C	0.000	19.469		100.00	0.000	0.000
L32 9.7500- 4.7500	7.2416	0.7	5.19	19.871	A	0.000	19.871	19.871	100.00	8.910	0.000
					B	0.000	19.871		100.00	0.000	0.000
					C	0.000	19.871		100.00	0.000	0.000
L33 4.7500- 0.0000	2.3675	0.7	5.19	19.250	A	0.000	19.250	19.250	100.00	8.464	0.000
					B	0.000	19.250		100.00	0.000	0.000
					C	0.000	19.250		100.00	0.000	0.000

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice

Comb. No.	Description
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
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	147.5 - 142.5	Pole	Max Tension	27	0.00	-0.00	-0.00
			Max. Compression	26	-10.56	0.01	0.02
			Max. Mx	20	-4.20	20.80	0.01
			Max. My	2	-4.19	0.01	20.81
			Max. Vy	20	-5.09	20.80	0.01
			Max. Vx	2	-5.09	0.01	20.81
			Max. Torque	22			0.00
L2	142.5 - 137.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-11.26	0.01	0.04
			Max. Mx	20	-4.56	47.10	0.02
			Max. My	2	-4.56	0.02	47.13
			Max. Vy	20	-5.44	47.10	0.02
			Max. Vx	2	-5.44	0.02	47.13
			Max. Torque	22			0.00
L3	137.5 - 132.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-12.00	0.02	0.07
			Max. Mx	20	-4.94	75.20	0.04
			Max. My	2	-4.93	0.03	75.24
			Max. Vy	20	-5.80	75.20	0.04
			Max. Vx	2	-5.81	0.03	75.24
			Max. Torque	22			0.00
L4	132.5 - 127.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-23.77	-0.91	0.67
			Max. Mx	8	-9.25	-136.49	-0.18
			Max. My	2	-9.24	0.14	136.78
			Max. Vy	20	-11.51	136.08	0.44
			Max. Vx	2	-11.57	0.14	136.78
			Max. Torque	25			-0.33

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L5	127.5 - 122.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-24.65	-0.90	0.72
			Max. Mx	8	-9.78	-194.99	-0.39
			Max. My	2	-9.77	0.36	195.55
			Max. Vy	20	-11.89	194.58	0.67
			Max. Vx	2	-11.95	0.36	195.55
L6	122.5 - 117.5	Pole	Max. Torque	25			-0.33
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-25.56	-0.88	0.77
			Max. Mx	8	-10.33	-255.38	-0.60
			Max. My	2	-10.31	0.59	256.21
			Max. Vy	20	-12.27	254.97	0.91
L7	117.5 - 112.5	Pole	Max. Vx	2	-12.33	0.59	256.21
			Max. Torque	25			-0.33
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-34.91	-0.99	1.56
			Max. Mx	8	-14.43	-336.78	-0.87
			Max. My	2	-14.41	0.66	338.08
L8	112.5 - 108.5	Pole	Max. Vy	20	-16.26	335.98	1.26
			Max. Vx	2	-16.35	0.66	338.08
			Max. Torque	9			0.68
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-34.96	-0.99	1.56
			Max. Mx	8	-14.46	-340.85	-0.89
L9	108.5 - 107.25	Pole	Max. My	2	-14.44	0.69	342.17
			Max. Vy	20	-16.28	340.05	1.28
			Max. Vx	2	-16.37	0.69	342.17
			Max. Torque	9			0.68
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.58	-0.96	1.63
L10	107.25 - 102.25	Pole	Max. Mx	8	-15.44	-423.32	-1.23
			Max. My	2	-15.42	1.04	425.09
			Max. Vy	20	-16.71	422.53	1.64
			Max. Vx	2	-16.80	1.04	425.09
			Max. Torque	9			0.68
			Max Tension	1	0.00	0.00	0.00
L11	102.25 - 97.25	Pole	Max. Compression	26	-46.09	0.07	3.14
			Max. Mx	20	-18.97	528.36	2.64
			Max. My	2	-18.95	1.78	531.74
			Max. Vy	20	-21.49	528.36	2.64
			Max. Vx	2	-21.60	1.78	531.74
			Max. Torque	9			0.96
L12	97.25 - 92.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-47.36	0.37	3.37
			Max. Mx	20	-19.75	636.65	3.01
			Max. My	2	-19.73	2.16	640.57
			Max. Vy	20	-21.83	636.65	3.01
			Max. Vx	2	-21.94	2.16	640.57
L13	92.25 - 87.25	Pole	Max. Torque	9			0.96
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.65	0.67	3.60
			Max. Mx	20	-20.56	746.60	3.38
			Max. My	2	-20.54	2.54	751.07
			Max. Vy	20	-22.16	746.60	3.38
L13	92.25 - 87.25	Pole	Max. Vx	2	-22.27	2.54	751.07
			Max. Torque	9			0.96
			Max Tension	1	0.00	0.00	0.00
L13	92.25 - 87.25	Pole	Max. Compression	26	-49.96	0.98	3.83
			Max. Mx	20	-21.40	858.17	3.74
			Max. My	2	-21.38	2.92	863.19

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L14	87.25 - 82.25	Pole	Max. Vy	20	-22.48	858.17	3.74
			Max. Vx	2	-22.59	2.92	863.19
			Max. Torque	9			0.96
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-51.30	1.30	4.06
L15	82.25 - 77.25	Pole	Max. Mx	20	-22.26	971.33	4.11
			Max. My	2	-22.25	3.30	976.88
			Max. Vy	20	-22.79	971.33	4.11
			Max. Vx	2	-22.90	3.30	976.88
			Max. Torque	9			0.96
L16	77.25 - 72.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-52.66	1.62	4.28
			Max. Mx	20	-23.15	1086.01	4.47
			Max. My	2	-23.13	3.68	1092.10
			Max. Vy	20	-23.09	1086.01	4.47
L17	72.25 - 71.75	Pole	Max. Vx	2	-23.20	3.68	1092.10
			Max. Torque	9			0.96
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-52.80	1.65	4.30
			Max. Mx	20	-23.25	1097.57	4.51
L18	71.75 - 66.75	Pole	Max. My	2	-23.23	3.72	1103.71
			Max. Vy	20	-23.11	1097.57	4.51
			Max. Vx	2	-23.23	3.72	1103.71
			Max. Torque	9			0.95
			Max Tension	1	0.00	0.00	0.00
L19	66.75 - 61.75	Pole	Max. Compression	26	-55.20	1.98	4.53
			Max. Mx	20	-24.73	1214.22	4.87
			Max. My	2	-24.71	4.11	1220.90
			Max. Vy	20	-23.53	1214.22	4.87
			Max. Vx	2	-23.64	4.11	1220.90
L20	61.75 - 56.75	Pole	Max. Torque	9			0.95
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-56.74	2.31	4.75
			Max. Mx	20	-25.77	1332.66	5.23
			Max. My	2	-25.75	4.49	1339.87
L21	56.75 - 51.75	Pole	Max. Vy	20	-23.85	1332.66	5.23
			Max. Vx	2	-23.96	4.49	1339.87
			Max. Torque	9			0.95
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-58.30	2.64	4.97
L22	51.75 - 47.75	Pole	Max. Mx	20	-26.84	1452.63	5.59
			Max. My	2	-26.82	4.87	1460.38
			Max. Vy	20	-24.15	1452.63	5.59
			Max. Vx	2	-24.26	4.87	1460.38
			Max. Torque	9			0.95
L22	51.75 - 47.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-59.89	2.98	5.20
			Max. Mx	20	-27.93	1574.07	5.95
			Max. My	2	-27.92	5.25	1582.35
			Max. Vy	20	-24.44	1574.07	5.95
L22	51.75 - 47.75	Pole	Max. Vx	2	-24.55	5.25	1582.35
			Max. Torque	9			0.95
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-61.49	3.32	5.42
			Max. Mx	20	-29.05	1696.94	6.31
L22	51.75 - 47.75	Pole	Max. My	2	-29.04	5.63	1705.75
			Max. Vy	20	-24.72	1696.94	6.31
			Max. Vx	2	-24.83	5.63	1705.75
			Max. Torque	9			0.95
			Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L23	47.75 - 47.5	Pole	Max. Compression	26	-62.99	3.59	5.64
			Max. Mx	20	-30.04	1796.31	6.59
			Max. My	2	-30.03	5.94	1805.53
			Max. Vy	20	-24.99	1796.31	6.59
			Max. Vx	2	-25.10	5.94	1805.53
			Max. Torque	9			0.97
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-63.09	3.61	5.66
			Max. Mx	20	-30.11	1802.56	6.61
			Max. My	2	-30.10	5.96	1811.81
L24	47.5 - 42.5	Pole	Max. Vy	20	-25.00	1802.56	6.61
			Max. Vx	14	25.13	-4.53	-1809.07
			Max. Torque	9			0.97
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-65.10	3.95	5.87
			Max. Mx	20	-31.41	1928.32	6.97
			Max. My	2	-31.41	6.34	1938.09
			Max. Vy	20	-25.30	1928.32	6.97
			Max. Vx	14	25.42	-4.77	-1935.33
			Max. Torque	9			0.97
L25	42.5 - 35.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-65.68	4.05	5.94
			Max. Mx	20	-31.81	1966.33	7.07
			Max. My	2	-31.80	6.45	1976.26
			Max. Vy	20	-25.39	1966.33	7.07
			Max. Vx	14	25.51	-4.84	-1973.49
			Max. Torque	9			0.97
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-69.63	4.48	6.21
			Max. Mx	20	-34.47	2126.47	7.52
L26	35.75 - 34.75	Pole	Max. My	2	-34.46	6.93	2137.05
			Max. Vy	20	-25.84	2126.47	7.52
			Max. Vx	14	25.96	-5.13	-2134.25
			Max. Torque	9			0.97
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-71.48	4.82	6.41
			Max. Mx	20	-35.83	2256.24	7.87
			Max. My	2	-35.82	7.31	2267.33
			Max. Vy	20	-26.07	2256.24	7.87
			Max. Vx	14	26.19	-5.37	-2264.50
L27	34.75 - 29.75	Pole	Max. Torque	9			0.97
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-73.36	5.14	6.60
			Max. Mx	20	-37.21	2387.15	8.22
			Max. My	2	-37.20	7.69	2398.75
			Max. Vy	20	-26.30	2387.15	8.22
			Max. Vx	14	26.42	-5.60	-2395.90
			Max. Torque	9			0.97
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-75.26	5.47	6.79
L28	29.75 - 24.75	Pole	Max. Mx	20	-38.61	2519.18	8.57
			Max. My	2	-38.61	8.07	2531.28
			Max. Vy	20	-26.52	2519.18	8.57
			Max. Vx	14	26.64	-5.83	-2528.40
			Max. Torque	9			0.97
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-77.17	5.79	6.97
			Max. Mx	20	-40.04	2652.30	8.91
			Max. My	2	-40.04	8.45	2664.91
			Max. Vy	20	-26.74	2652.30	8.91
L29	24.75 - 19.75	Pole	Max. Vx	14	26.86	-6.05	-2662.00
			Max. Torque	9			0.97
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-79.10	6.11	7.16
			Max. Mx	20	-40.04	2652.30	8.91
			Max. My	2	-40.04	8.45	2664.91
			Max. Vy	20	-26.74	2652.30	8.91
			Max. Vx	14	26.86	-6.05	-2662.00
			Max. Torque	9			0.97
			Max Tension	1	0.00	0.00	0.00
L30	19.75 - 14.75	Pole	Max. Compression	26	-77.17	5.79	6.97
			Max. Mx	20	-40.04	2652.30	8.91
			Max. My	2	-40.04	8.45	2664.91
			Max. Vy	20	-26.74	2652.30	8.91
			Max. Vx	14	26.86	-6.05	-2662.00
			Max. Torque	9			0.97
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-79.10	6.11	7.16
			Max. Mx	20	-40.04	2652.30	8.91
			Max. My	2	-40.04	8.45	2664.91
L31	14.75 - 9.75	Pole	Max. Vy	20	-26.74	2652.30	8.91
			Max. Vx	14	26.86	-6.05	-2662.00
			Max. Torque	9			0.97
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-79.10	6.11	7.16
			Max. Mx	20	-40.04	2652.30	8.91
			Max. My	2	-40.04	8.45	2664.91
			Max. Vy	20	-26.74	2652.30	8.91
			Max. Vx	14	26.86	-6.05	-2662.00
			Max. Torque	9			0.97

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L32	9.75 - 4.75	Pole	Max. Mx	20	-41.50	2786.52	9.26
			Max. My	2	-41.49	8.82	2799.62
			Max. Vy	20	-26.96	2786.52	9.26
			Max. Vx	14	27.07	-6.27	-2796.69
			Max. Torque	9			0.97
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-81.02	6.43	7.34
			Max. Mx	20	-42.97	2921.81	9.60
			Max. My	2	-42.97	9.20	2935.41
			Max. Vy	20	-27.17	2921.81	9.60
L33	4.75 - 0	Pole	Max. Vx	14	27.29	-6.49	-2932.45
			Max. Torque	9			0.97
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-82.82	6.71	7.50
			Max. Mx	20	-44.40	3051.33	9.92
			Max. My	2	-44.40	9.55	3065.39
			Max. Vy	20	-27.38	3051.33	9.92
			Max. Vx	14	27.49	-6.70	-3062.40
			Max. Torque	9			0.97

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	82.82	0.01	7.28
	Max. H _x	21	33.31	27.35	0.06
	Max. H _z	2	44.41	0.06	27.46
	Max. M _x	2	3065.39	0.06	27.46
	Max. M _z	8	3048.48	-27.35	-0.06
	Max. Torsion	9	0.97	-27.35	-0.06
	Min. Vert	11	33.31	-23.72	-13.78
	Min. H _x	9	33.31	-27.35	-0.06
	Min. H _z	14	44.41	-0.06	-27.47
	Min. M _x	14	-3062.40	-0.06	-27.47
	Min. M _z	20	-3051.33	27.35	0.06
	Min. Torsion	21	-0.97	27.35	0.06

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	37.01	0.00	0.00	-1.39	1.14	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	44.41	-0.06	-27.46	-3065.39	9.55	-0.21
0.9 Dead+1.0 Wind 0 deg - No Ice	33.31	-0.06	-27.46	-3013.39	9.04	-0.20
1.2 Dead+1.0 Wind 30 deg - No Ice	44.41	13.63	-23.75	-2650.94	-1516.48	-0.66
0.9 Dead+1.0 Wind 30 deg - No Ice	33.31	13.63	-23.75	-2605.91	-1491.34	-0.66
1.2 Dead+1.0 Wind 60 deg - No Ice	44.41	23.67	-13.68	-1526.91	-2636.36	-0.94
0.9 Dead+1.0 Wind 60 deg - No Ice	33.31	23.67	-13.68	-1500.79	-2592.38	-0.94
1.2 Dead+1.0 Wind 90 deg - No Ice	44.41	27.35	0.06	6.33	-3048.48	-0.97
0.9 Dead+1.0 Wind 90 deg - No Ice	33.31	27.35	0.06	6.66	-2997.56	-0.97
1.2 Dead+1.0 Wind 120 deg	44.41	23.72	13.78	1537.05	-2643.88	-0.74

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						
0.9 Dead+1.0 Wind 120 deg - No Ice	33.31	23.72	13.78	1511.64	-2599.76	-0.74
1.2 Dead+1.0 Wind 150 deg - No Ice	44.41	13.73	23.81	2655.40	-1530.51	-0.30
0.9 Dead+1.0 Wind 150 deg - No Ice	33.31	13.73	23.81	2611.18	-1505.11	-0.31
1.2 Dead+1.0 Wind 180 deg - No Ice	44.41	0.06	27.47	3062.40	-6.70	0.21
0.9 Dead+1.0 Wind 180 deg - No Ice	33.31	0.06	27.47	3011.36	-6.92	0.21
1.2 Dead+1.0 Wind 210 deg - No Ice	44.41	-13.63	23.75	2647.34	1519.34	0.67
0.9 Dead+1.0 Wind 210 deg - No Ice	33.31	-13.63	23.75	2603.27	1493.45	0.67
1.2 Dead+1.0 Wind 240 deg - No Ice	44.41	-23.66	13.68	1523.01	2638.68	0.94
0.9 Dead+1.0 Wind 240 deg - No Ice	33.31	-23.66	13.68	1497.85	2593.96	0.95
1.2 Dead+1.0 Wind 270 deg - No Ice	44.41	-27.35	-0.06	-9.92	3051.33	0.96
0.9 Dead+1.0 Wind 270 deg - No Ice	33.31	-27.35	-0.06	-9.29	2999.67	0.97
1.2 Dead+1.0 Wind 300 deg - No Ice	44.41	-23.73	-13.79	-1540.95	2647.27	0.72
0.9 Dead+1.0 Wind 300 deg - No Ice	33.31	-23.73	-13.79	-1514.57	2602.41	0.73
1.2 Dead+1.0 Wind 330 deg - No Ice	44.41	-13.73	-23.81	-2659.00	1533.37	0.30
0.9 Dead+1.0 Wind 330 deg - No Ice	33.31	-13.73	-23.81	-2613.82	1507.23	0.30
1.2 Dead+1.0 Ice	82.82	-0.00	-0.00	-7.50	6.71	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice	82.82	-0.01	-7.28	-876.22	8.63	-0.06
1.2 Dead+1.0 Wind 30 deg+1.0 Ice	82.82	3.62	-6.30	-758.94	-425.10	-0.16
1.2 Dead+1.0 Wind 60 deg+1.0 Ice	82.82	6.29	-3.63	-440.32	-743.11	-0.23
1.2 Dead+1.0 Wind 90 deg+1.0 Ice	82.82	7.27	0.01	-5.75	-860.17	-0.23
1.2 Dead+1.0 Wind 120 deg+1.0 Ice	82.82	6.30	3.65	428.33	-744.95	-0.17
1.2 Dead+1.0 Wind 150 deg+1.0 Ice	82.82	3.65	6.31	745.60	-428.30	-0.07
1.2 Dead+1.0 Wind 180 deg+1.0 Ice	82.82	0.01	7.28	861.03	4.94	0.06
1.2 Dead+1.0 Wind 210 deg+1.0 Ice	82.82	-3.62	6.30	743.75	438.67	0.16
1.2 Dead+1.0 Wind 240 deg+1.0 Ice	82.82	-6.29	3.63	425.13	756.68	0.23
1.2 Dead+1.0 Wind 270 deg+1.0 Ice	82.82	-7.27	-0.01	-9.44	873.73	0.23
1.2 Dead+1.0 Wind 300 deg+1.0 Ice	82.82	-6.30	-3.65	-443.51	758.52	0.17
1.2 Dead+1.0 Wind 330 deg+1.0 Ice	82.82	-3.65	-6.31	-760.78	441.86	0.07
Dead+Wind 0 deg - Service	37.01	-0.01	-5.66	-627.37	2.84	-0.04
Dead+Wind 30 deg - Service	37.01	2.81	-4.90	-542.69	-308.91	-0.14
Dead+Wind 60 deg - Service	37.01	4.88	-2.82	-313.06	-537.69	-0.20
Dead+Wind 90 deg - Service	37.01	5.64	0.01	0.16	-621.88	-0.20
Dead+Wind 120 deg - Service	37.01	4.89	2.84	312.88	-539.24	-0.15
Dead+Wind 150 deg - Service	37.01	2.83	4.91	541.36	-311.79	-0.06
Dead+Wind 180 deg - Service	37.01	0.01	5.66	624.51	-0.47	0.04
Dead+Wind 210 deg - Service	37.01	-2.81	4.90	539.70	311.28	0.14
Dead+Wind 240 deg -	37.01	-4.88	2.82	310.01	539.95	0.20

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
Service						
Dead+Wind 270 deg - Service	37.01	-5.64	-0.01	-3.15	624.25	0.20
Dead+Wind 300 deg - Service	37.01	-4.89	-2.84	-315.93	541.71	0.15
Dead+Wind 330 deg - Service	37.01	-2.83	-4.91	-544.35	314.15	0.06

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-37.01	0.00	0.00	37.01	0.00	0.000%
2	-0.06	-44.41	-27.46	0.06	44.41	27.46	0.000%
3	-0.06	-33.31	-27.46	0.06	33.31	27.46	0.000%
4	13.63	-44.41	-23.75	-13.63	44.41	23.75	0.000%
5	13.63	-33.31	-23.75	-13.63	33.31	23.75	0.000%
6	23.67	-44.41	-13.68	-23.67	44.41	13.68	0.000%
7	23.67	-33.31	-13.68	-23.67	33.31	13.68	0.000%
8	27.35	-44.41	0.06	-27.35	44.41	-0.06	0.000%
9	27.35	-33.31	0.06	-27.35	33.31	-0.06	0.000%
10	23.72	-44.41	13.78	-23.72	44.41	-13.78	0.000%
11	23.72	-33.31	13.78	-23.72	33.31	-13.78	0.000%
12	13.73	-44.41	23.81	-13.73	44.41	-23.81	0.000%
13	13.73	-33.31	23.81	-13.73	33.31	-23.81	0.000%
14	0.06	-44.41	27.47	-0.06	44.41	-27.47	0.000%
15	0.06	-33.31	27.47	-0.06	33.31	-27.47	0.000%
16	-13.63	-44.41	23.75	13.63	44.41	-23.75	0.000%
17	-13.63	-33.31	23.75	13.63	33.31	-23.75	0.000%
18	-23.66	-44.41	13.68	23.66	44.41	-13.68	0.000%
19	-23.66	-33.31	13.68	23.66	33.31	-13.68	0.000%
20	-27.35	-44.41	-0.06	27.35	44.41	0.06	0.000%
21	-27.35	-33.31	-0.06	27.35	33.31	0.06	0.000%
22	-23.73	-44.41	-13.79	23.73	44.41	13.79	0.000%
23	-23.73	-33.31	-13.79	23.73	33.31	13.79	0.000%
24	-13.73	-44.41	-23.81	13.73	44.41	23.81	0.000%
25	-13.73	-33.31	-23.81	13.73	33.31	23.81	0.000%
26	0.00	-82.82	0.00	0.00	82.82	0.00	0.000%
27	-0.01	-82.82	-7.28	0.01	82.82	7.28	0.000%
28	3.62	-82.82	-6.30	-3.62	82.82	6.30	0.000%
29	6.29	-82.82	-3.63	-6.29	82.82	3.63	0.000%
30	7.27	-82.82	0.01	-7.27	82.82	-0.01	0.000%
31	6.30	-82.82	3.65	-6.30	82.82	-3.65	0.000%
32	3.65	-82.82	6.31	-3.65	82.82	-6.31	0.000%
33	0.01	-82.82	7.28	-0.01	82.82	-7.28	0.000%
34	-3.62	-82.82	6.30	3.62	82.82	-6.30	0.000%
35	-6.29	-82.82	3.63	6.29	82.82	-3.63	0.000%
36	-7.27	-82.82	-0.01	7.27	82.82	0.01	0.000%
37	-6.30	-82.82	-3.65	6.30	82.82	3.65	0.000%
38	-3.65	-82.82	-6.31	3.65	82.82	6.31	0.000%
39	-0.01	-37.01	-5.66	0.01	37.01	5.66	0.000%
40	2.81	-37.01	-4.90	-2.81	37.01	4.90	0.000%
41	4.88	-37.01	-2.82	-4.88	37.01	2.82	0.000%
42	5.64	-37.01	0.01	-5.64	37.01	-0.01	0.000%
43	4.89	-37.01	2.84	-4.89	37.01	-2.84	0.000%
44	2.83	-37.01	4.91	-2.83	37.01	-4.91	0.000%
45	0.01	-37.01	5.66	-0.01	37.01	-5.66	0.000%
46	-2.81	-37.01	4.90	2.81	37.01	-4.90	0.000%
47	-4.88	-37.01	2.82	4.88	37.01	-2.82	0.000%
48	-5.64	-37.01	-0.01	5.64	37.01	0.01	0.000%
49	-4.89	-37.01	-2.84	4.89	37.01	2.84	0.000%
50	-2.83	-37.01	-4.91	2.83	37.01	4.91	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00093777
3	Yes	5	0.00000001	0.00040155
4	Yes	7	0.00000001	0.00034741
5	Yes	7	0.00000001	0.00007940
6	Yes	7	0.00000001	0.00035615
7	Yes	7	0.00000001	0.00008180
8	Yes	6	0.00000001	0.00009528
9	Yes	5	0.00000001	0.00056115
10	Yes	7	0.00000001	0.00034937
11	Yes	7	0.00000001	0.00007967
12	Yes	7	0.00000001	0.00035537
13	Yes	7	0.00000001	0.00008128
14	Yes	5	0.00000001	0.00047377
15	Yes	5	0.00000001	0.00017083
16	Yes	7	0.00000001	0.00035457
17	Yes	7	0.00000001	0.00008139
18	Yes	7	0.00000001	0.00034531
19	Yes	7	0.00000001	0.00007893
20	Yes	6	0.00000001	0.00016194
21	Yes	5	0.00000001	0.00095651
22	Yes	7	0.00000001	0.00035862
23	Yes	7	0.00000001	0.00008205
24	Yes	7	0.00000001	0.00035313
25	Yes	7	0.00000001	0.00008049
26	Yes	4	0.00000001	0.00012298
27	Yes	6	0.00000001	0.00033180
28	Yes	7	0.00000001	0.00037944
29	Yes	7	0.00000001	0.00039815
30	Yes	6	0.00000001	0.00035066
31	Yes	7	0.00000001	0.00036724
32	Yes	7	0.00000001	0.00037691
33	Yes	6	0.00000001	0.00032063
34	Yes	7	0.00000001	0.00038604
35	Yes	7	0.00000001	0.00036695
36	Yes	6	0.00000001	0.00036379
37	Yes	7	0.00000001	0.00040870
38	Yes	7	0.00000001	0.00039952
39	Yes	5	0.00000001	0.00008992
40	Yes	5	0.00000001	0.00064556
41	Yes	5	0.00000001	0.00069609
42	Yes	5	0.00000001	0.00010907
43	Yes	5	0.00000001	0.00064472
44	Yes	5	0.00000001	0.00067728
45	Yes	5	0.00000001	0.00008788
46	Yes	5	0.00000001	0.00068160
47	Yes	5	0.00000001	0.00063082
48	Yes	5	0.00000001	0.00011441
49	Yes	5	0.00000001	0.00070378
50	Yes	5	0.00000001	0.00067149

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147.5 - 142.5	25.43	50	1.45	0.00
L2	142.5 - 137.5	23.92	50	1.44	0.00
L3	137.5 - 132.5	22.41	50	1.44	0.00
L4	132.5 - 127.5	20.91	50	1.42	0.00
L5	127.5 - 122.5	19.43	50	1.40	0.00

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L6	122.5 - 117.5	17.97	50	1.38	0.00
L7	117.5 - 112.5	16.55	50	1.34	0.00
L8	112.5 - 108.5	15.16	50	1.30	0.00
L9	112.25 - 107.25	15.09	50	1.30	0.00
L10	107.25 - 102.25	13.74	50	1.27	0.00
L11	102.25 - 97.25	12.44	50	1.22	0.00
L12	97.25 - 92.25	11.19	50	1.16	0.00
L13	92.25 - 87.25	10.02	50	1.09	0.00
L14	87.25 - 82.25	8.91	50	1.02	0.00
L15	82.25 - 77.25	7.88	50	0.95	0.00
L16	77.25 - 72.25	6.93	50	0.87	0.00
L17	76.75 - 71.75	6.84	50	0.86	0.00
L18	71.75 - 66.75	5.95	50	0.83	0.00
L19	66.75 - 61.75	5.12	50	0.76	0.00
L20	61.75 - 56.75	4.36	50	0.69	0.00
L21	56.75 - 51.75	3.67	50	0.63	0.00
L22	51.75 - 47.75	3.05	50	0.56	0.00
L23	47.75 - 47.5	2.60	50	0.50	0.00
L24	47.5 - 42.5	2.58	50	0.50	0.00
L25	42.5 - 35.75	2.08	50	0.45	0.00
L26	41 - 34.75	1.94	50	0.43	0.00
L27	34.75 - 29.75	1.40	50	0.39	0.00
L28	29.75 - 24.75	1.02	50	0.33	0.00
L29	24.75 - 19.75	0.70	50	0.27	0.00
L30	19.75 - 14.75	0.45	50	0.22	0.00
L31	14.75 - 9.75	0.25	50	0.16	0.00
L32	9.75 - 4.75	0.11	50	0.11	0.00
L33	4.75 - 0	0.03	50	0.05	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.0000	Top Hat 14" Diameter x 3'-6" Tall	50	25.43	1.45	0.00	56551
147.0000	APXVSP18-C-A20 w/ Mount Pipe	50	25.28	1.45	0.00	56551
145.0000	PCS 1900MHz 4x45W-65MHz	50	24.67	1.45	0.00	56551
132.0000	(2) SBNHH-1D65B w/ Mount Pipe	50	20.76	1.42	0.00	17448
117.0000	7770.00 w/ Mount Pipe	50	16.41	1.34	0.00	7794
115.0000	DC6-48-60-18-8F	50	15.85	1.32	0.00	7796
107.0000	AIR 32 B2A B66AA w/ Mount Pipe	50	13.67	1.27	0.00	6291
49.0000	58532A	50	2.74	0.52	0.00	4509

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147.5 - 142.5	124.11	24	7.08	0.01
L2	142.5 - 137.5	116.73	24	7.07	0.01
L3	137.5 - 132.5	109.38	24	7.03	0.01
L4	132.5 - 127.5	102.07	24	6.97	0.01
L5	127.5 - 122.5	94.85	24	6.87	0.01
L6	122.5 - 117.5	87.75	24	6.74	0.01
L7	117.5 - 112.5	80.80	24	6.58	0.01
L8	112.5 - 108.5	74.04	24	6.38	0.01
L9	112.25 - 107.25	73.70	24	6.37	0.01
L10	107.25 - 102.25	67.12	24	6.23	0.01

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L11	102.25 - 97.25	60.75	24	5.96	0.01
L12	97.25 - 92.25	54.69	24	5.66	0.00
L13	92.25 - 87.25	48.94	24	5.34	0.00
L14	87.25 - 82.25	43.54	24	4.99	0.00
L15	82.25 - 77.25	38.51	24	4.64	0.00
L16	77.25 - 72.25	33.85	24	4.27	0.00
L17	76.75 - 71.75	33.41	24	4.23	0.00
L18	71.75 - 66.75	29.08	24	4.04	0.00
L19	66.75 - 61.75	25.02	24	3.72	0.00
L20	61.75 - 56.75	21.30	24	3.39	0.00
L21	56.75 - 51.75	17.93	24	3.06	0.00
L22	51.75 - 47.75	14.89	24	2.73	0.00
L23	47.75 - 47.5	12.72	24	2.47	0.00
L24	47.5 - 42.5	12.59	24	2.45	0.00
L25	42.5 - 35.75	10.16	24	2.19	0.00
L26	41 - 34.75	9.48	24	2.11	0.00
L27	34.75 - 29.75	6.84	24	1.91	0.00
L28	29.75 - 24.75	4.99	24	1.62	0.00
L29	24.75 - 19.75	3.44	24	1.34	0.00
L30	19.75 - 14.75	2.18	24	1.06	0.00
L31	14.75 - 9.75	1.21	24	0.79	0.00
L32	9.75 - 4.75	0.53	24	0.52	0.00
L33	4.75 - 0	0.12	24	0.25	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.0000	Top Hat 14" Diameter x 3'-6" Tall	24	124.11	7.08	0.01	11835
147.0000	APXVSP18-C-A20 w/ Mount Pipe	24	123.37	7.08	0.01	11835
145.0000	PCS 1900MHz 4x45W-65MHz	24	120.42	7.08	0.01	11835
132.0000	(2) SBNHH-1D65B w/ Mount Pipe	24	101.35	6.96	0.01	3660
117.0000	7770.00 w/ Mount Pipe	24	80.12	6.56	0.01	1629
115.0000	DC6-48-60-18-8F	24	77.39	6.49	0.01	1629
107.0000	AIR 32 B2A B66AA w/ Mount Pipe	24	66.79	6.22	0.01	1314
49.0000	58532A	24	13.37	2.54	0.00	925

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	KI/r	A in ²	P _u K	φP _n K	Ratio P _u / φP _n
L1	147.5 - 142.5	TP22.95x22x0.25	5.0000	0.0000	0.0	18.012	-4.19	1235.29	0.003
	(1)					4			
L2	142.5 - 137.5	TP23.9x22.95x0.25	5.0000	0.0000	0.0	18.766	-4.55	1286.99	0.004
	(2)					3			
L3	137.5 - 132.5	TP24.85x23.9x0.25	5.0000	0.0000	0.0	19.520	-4.93	1338.69	0.004
	(3)					1			
L4	132.5 - 127.5	TP25.8x24.85x0.25	5.0000	0.0000	0.0	20.273	-9.23	1378.93	0.007
	(4)					9			
L5	127.5 - 122.5	TP26.75x25.8x0.25	5.0000	0.0000	0.0	21.027	-9.76	1417.00	0.007
	(5)					8			

Section No.	Elevation ft	Size	L ft	L _u ft	KI/r	A in ²	P _u K	φP _n K	Ratio P _u / φP _n
L6	122.5 - 117.5 (6)	TP27.7x26.75x0.25	5.0000	0.0000	0.0	21.781 6	-10.31	1454.12	0.007
L7	117.5 - 112.5 (7)	TP28.65x27.7x0.25	5.0000	0.0000	0.0	22.535 4	-14.40	1490.30	0.010
L8	112.5 - 108.5 (8)	TP29.41x28.65x0.25	4.0000	0.0000	0.0	22.573 1	-14.44	1492.08	0.010
L9	108.5 - 107.25 (9)	TP29.1476x28.1975x0.25	5.0000	0.0000	0.0	22.930 2	-15.41	1615.90	0.010
L10	107.25 - 102.25 (10)	TP30.0976x29.1476x0.25	5.0000	0.0000	0.0	23.684 1	-18.94	1652.26	0.011
L11	102.25 - 97.25 (11)	TP31.0477x30.0976x0.25	5.0000	0.0000	0.0	24.438 0	-19.72	1687.55	0.012
L12	97.25 - 92.25 (12)	TP31.9978x31.0477x0.25	5.0000	0.0000	0.0	25.191 8	-20.54	1721.78	0.012
L13	92.25 - 87.25 (13)	TP32.9478x31.9978x0.25	5.0000	0.0000	0.0	25.945 7	-21.38	1754.93	0.012
L14	87.25 - 82.25 (14)	TP33.8979x32.9478x0.25	5.0000	0.0000	0.0	26.699 6	-22.24	1787.02	0.012
L15	82.25 - 77.25 (15)	TP34.8479x33.8979x0.25	5.0000	0.0000	0.0	27.453 5	-23.13	1818.04	0.013
L16	77.25 - 72.25 (16)	TP35.798x34.8479x0.25	5.0000	0.0000	0.0	27.528 9	-23.23	1821.08	0.013
L17	72.25 - 71.75 (17)	TP35.3926x34.4429x0.31 25	5.0000	0.0000	0.0	34.795 1	-24.71	2473.64	0.010
L18	71.75 - 66.75 (18)	TP36.3422x35.3926x0.31 25	5.0000	0.0000	0.0	35.737 0	-25.75	2520.37	0.010
L19	66.75 - 61.75 (19)	TP37.2919x36.3422x0.31 25	5.0000	0.0000	0.0	36.678 9	-26.82	2566.03	0.010
L20	61.75 - 56.75 (20)	TP38.2415x37.2919x0.31 25	5.0000	0.0000	0.0	37.620 8	-27.91	2610.63	0.011
L21	56.75 - 51.75 (21)	TP39.1911x38.2415x0.31 25	5.0000	0.0000	0.0	38.562 8	-29.03	2654.16	0.011
L22	51.75 - 47.75 (22)	TP39.9509x39.1911x0.31 25	4.0000	0.0000	0.0	39.316 3	-30.02	2688.22	0.011
L23	47.75 - 47.5 (23)	TP39.9983x39.9509x0.38 75	0.2500	0.0000	0.0	48.718 4	-30.10	3554.55	0.008
L24	47.5 - 42.5 (24)	TP40.948x39.9983x0.387 5	5.0000	0.0000	0.0	49.886 4	-31.40	3616.99	0.009
L25	42.5 - 35.75 (25)	TP42.23x40.948x0.3875	6.7500	0.0000	0.0	50.236 8	-31.80	3635.51	0.009
L26	35.75 - 34.75 (26)	TP41.7957x40.6079x0.37 5	6.2500	0.0000	0.0	49.301 0	-34.46	3521.43	0.010
L27	34.75 - 29.75 (27)	TP42.746x41.7957x0.375	5.0000	0.0000	0.0	50.432 0	-35.82	3578.41	0.010
L28	29.75 - 24.75 (28)	TP43.6962x42.746x0.375	5.0000	0.0000	0.0	51.563 1	-37.20	3634.32	0.010
L29	24.75 - 19.75 (29)	TP44.6465x43.6962x0.37 5	5.0000	0.0000	0.0	52.694 1	-38.61	3689.17	0.010
L30	19.75 - 14.75 (30)	TP45.5967x44.6465x0.37 5	5.0000	0.0000	0.0	53.825 2	-40.04	3742.94	0.011
L31	14.75 - 9.75 (31)	TP46.547x45.5967x0.375	5.0000	0.0000	0.0	54.956 2	-41.49	3795.65	0.011
L32	9.75 - 4.75 (32)	TP47.4973x46.547x0.375	5.0000	0.0000	0.0	56.087 3	-42.97	3847.29	0.011
L33	4.75 - 0 (33)	TP48.4x47.4973x0.375	4.7500	0.0000	0.0	57.161 8	-44.40	3895.35	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{ux} kip-ft	φM _{nx} kip-ft	Ratio M _{ux} / φM _{nx}	M _{uy} kip-ft	φM _{ny} kip-ft	Ratio M _{uy} / φM _{ny}
L1	147.5 - 142.5 (1)	TP22.95x22x0.25	20.81	574.82	0.036	0.00	574.82	0.000
L2	142.5 - 137.5	TP23.9x22.95x0.25	47.13	624.21	0.076	0.00	624.21	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L3	(2) 137.5 - 132.5	TP24.85x23.9x0.25	75.25	675.64	0.111	0.00	675.64	0.000
L4	(3) 132.5 - 127.5	TP25.8x24.85x0.25	136.83	723.10	0.189	0.00	723.10	0.000
L5	(4) 127.5 - 122.5	TP26.75x25.8x0.25	195.73	770.96	0.254	0.00	770.96	0.000
L6	(5) 122.5 - 117.5	TP27.7x26.75x0.25	256.51	819.78	0.313	0.00	819.78	0.000
L7	(6) 117.5 - 112.5	TP28.65x27.7x0.25	338.39	869.52	0.389	0.00	869.52	0.000
L8	(7) 112.5 - 108.5	TP29.41x28.65x0.25	342.49	872.02	0.393	0.00	872.02	0.000
L9	(8) 108.5 -	TP29.1476x28.1975x0.25	425.61	959.47	0.444	0.00	959.47	0.000
L10	107.25 (9)	TP30.0976x29.1476x0.25	532.52	1013.58	0.525	0.00	1013.58	0.000
L11	102.25 (10)	TP31.0477x30.0976x0.25	641.51	1068.46	0.600	0.00	1068.46	0.000
L12	97.25 (11)	TP31.9978x31.0477x0.25	752.16	1124.03	0.669	0.00	1124.03	0.000
L13	92.25 (12)	TP32.9478x31.9978x0.25	864.44	1180.22	0.732	0.00	1180.22	0.000
L14	87.25 (13)	TP33.8979x32.9478x0.25	978.30	1236.98	0.791	0.00	1236.98	0.000
L15	82.25 (14)	TP34.8479x33.8979x0.25	1093.68	1294.25	0.845	0.00	1294.25	0.000
L16	77.25 (15)	TP35.798x34.8479x0.25	1105.30	1300.01	0.850	0.00	1300.01	0.000
L17	72.25 (16)	TP35.3926x34.4429x0.31	1222.65	1782.53	0.686	0.00	1782.53	0.000
L18	71.75 (17)	TP36.3422x35.3926x0.31	1341.79	1865.81	0.719	0.00	1865.81	0.000
L19	66.75 (18)	TP37.2919x36.3422x0.31	1462.45	1950.12	0.750	0.00	1950.12	0.000
L20	61.75 (19)	TP38.2415x37.2919x0.31	1584.59	2035.38	0.779	0.00	2035.38	0.000
L21	56.75 (20)	TP39.1911x38.2415x0.31	1708.14	2121.56	0.805	0.00	2121.56	0.000
L22	51.75 (21)	TP39.9509x39.1911x0.31	1808.06	2191.10	0.825	0.00	2191.10	0.000
L23	47.75 (22)	TP39.9983x39.9509x0.38	1814.34	2889.77	0.628	0.00	2889.77	0.000
L24	47.5 (23)	TP40.948x39.9983x0.387	1940.78	3011.71	0.644	0.00	3011.71	0.000
L25	42.5 (24)	TP42.23x40.948x0.3875	1979.00	3048.60	0.649	0.00	3048.60	0.000
L26	35.75 (25)	TP41.7957x40.6079x0.37	2139.99	2995.82	0.714	0.00	2995.82	0.000
L27	34.75 (26)	TP42.746x41.7957x0.375	2270.43	3114.76	0.729	0.00	3114.76	0.000
L28	29.75 (27)	TP43.6962x42.746x0.375	2402.02	3234.99	0.743	0.00	3234.99	0.000
L29	24.75 (28)	TP44.6465x43.6962x0.37	2534.71	3356.46	0.755	0.00	3356.46	0.000
L30	19.75 (29)	TP45.5967x44.6465x0.37	2668.49	3479.09	0.767	0.00	3479.09	0.000
L31	14.75 (30)	TP46.547x45.5967x0.375	2803.37	3602.83	0.778	0.00	3602.83	0.000
L32	9.75 (31)	TP47.4973x46.547x0.375	2939.32	3727.61	0.789	0.00	3727.61	0.000
L33	4.75 (32)	TP48.4x47.4973x0.375	3069.45	3847.06	0.798	0.00	3847.06	0.000
	0 (33)							

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio V_u ϕV_n	Actual T_u kip-ft	ϕT_n kip-ft	Ratio T_u ϕT_n
L1	147.5 - 142.5 (1)	TP22.95x22x0.25	5.09	291.80	0.017	0.00	567.38	0.000
L2	142.5 - 137.5 (2)	TP23.9x22.95x0.25	5.44	304.01	0.018	0.00	616.42	0.000
L3	137.5 - 132.5 (3)	TP24.85x23.9x0.25	5.81	316.23	0.018	0.00	667.48	0.000
L4	132.5 - 127.5 (4)	TP25.8x24.85x0.25	11.59	328.44	0.035	0.33	720.58	0.000
L5	127.5 - 122.5 (5)	TP26.75x25.8x0.25	11.97	340.65	0.035	0.33	775.71	0.000
L6	122.5 - 117.5 (6)	TP27.7x26.75x0.25	12.35	352.86	0.035	0.33	832.88	0.000
L7	117.5 - 112.5 (7)	TP28.65x27.7x0.25	16.38	365.07	0.045	0.30	892.07	0.000
L8	112.5 - 108.5 (8)	TP29.41x28.65x0.25	16.41	365.68	0.045	0.30	895.08	0.000
L9	108.5 - 107.25 (9)	TP29.1476x28.1975x0.25	16.84	402.43	0.042	0.29	1000.88	0.000
L10	107.25 - 102.25 (10)	TP30.0976x29.1476x0.25	21.63	415.66	0.052	0.29	1068.36	0.000
L11	102.25 - 97.25 (11)	TP31.0477x30.0976x0.25	21.97	428.89	0.051	0.29	1138.05	0.000
L12	97.25 - 92.25 (12)	TP31.9978x31.0477x0.25	22.30	442.12	0.050	0.29	1209.94	0.000
L13	92.25 - 87.25 (13)	TP32.9478x31.9978x0.25	22.62	455.35	0.050	0.29	1284.03	0.000
L14	87.25 - 82.25 (14)	TP33.8979x32.9478x0.25	22.93	468.58	0.049	0.29	1360.33	0.000
L15	82.25 - 77.25 (15)	TP34.8479x33.8979x0.25	23.23	481.81	0.048	0.29	1438.82	0.000
L16	77.25 - 72.25 (16)	TP35.798x34.8479x0.25	23.25	483.13	0.048	0.29	1446.78	0.000
L17	72.25 - 71.75 (17)	TP35.3926x34.4429x0.3125	23.67	610.65	0.039	0.29	1842.73	0.000
L18	71.75 - 66.75 (18)	TP36.3422x35.3926x0.3125	23.98	627.18	0.038	0.29	1944.78	0.000
L19	66.75 - 61.75 (19)	TP37.2919x36.3422x0.3125	24.29	643.72	0.038	0.29	2049.57	0.000
L20	61.75 - 56.75 (20)	TP38.2415x37.2919x0.3125	24.58	660.25	0.037	0.29	2157.10	0.000
L21	56.75 - 51.75 (21)	TP39.1911x38.2415x0.3125	24.85	676.78	0.037	0.29	2267.39	0.000
L22	51.75 - 47.75 (22)	TP39.9509x39.1911x0.3125	25.13	690.00	0.036	0.30	2357.60	0.000
L23	47.75 - 47.5 (23)	TP39.9983x39.9509x0.3875	25.13	855.01	0.029	0.30	2908.21	0.000
L24	47.5 - 42.5 (24)	TP40.948x39.9983x0.3875	25.44	875.51	0.029	0.30	3050.73	0.000
L25	42.5 - 35.75 (25)	TP42.23x40.948x0.3875	25.53	881.65	0.029	0.30	3094.15	0.000
L26	35.75 - 34.75 (26)	TP41.7957x40.6079x0.375	25.97	865.23	0.030	0.30	3081.98	0.000
L27	34.75 - 29.75 (27)	TP42.746x41.7957x0.375	26.21	885.08	0.030	0.30	3226.34	0.000
L28	29.75 - 24.75 (28)	TP43.6962x42.746x0.375	26.43	904.93	0.029	0.30	3374.00	0.000
L29	24.75 - 19.75 (29)	TP44.6465x43.6962x0.375	26.65	924.78	0.029	0.30	3524.97	0.000
L30	19.75 - 14.75 (30)	TP45.5967x44.6465x0.375	26.87	944.63	0.028	0.30	3679.23	0.000
L31	14.75 - 9.75 (31)	TP46.547x45.5967x0.375	27.09	964.48	0.028	0.30	3836.80	0.000
L32	9.75 - 4.75 (32)	TP47.4973x46.547x0.375	27.30	984.33	0.028	0.30	3997.68	0.000
L33	4.75 - 0 (33)	TP48.4x47.4973x0.375	27.51	1003.19	0.027	0.30	4153.57	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P_u	Ratio M_{ux}	Ratio M_{uy}	Ratio V_u	Ratio T_u	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		ϕP_n	ϕM_{nx}	ϕM_{ny}	ϕV_n	ϕT_n			
L1	147.5 - 142.5 (1)	0.003	0.036	0.000	0.017	0.000	0.040	1.050	4.8.2
L2	142.5 - 137.5 (2)	0.004	0.076	0.000	0.018	0.000	0.079	1.050	4.8.2
L3	137.5 - 132.5 (3)	0.004	0.111	0.000	0.018	0.000	0.115	1.050	4.8.2
L4	132.5 - 127.5 (4)	0.007	0.189	0.000	0.035	0.000	0.197	1.050	4.8.2
L5	127.5 - 122.5 (5)	0.007	0.254	0.000	0.035	0.000	0.262	1.050	4.8.2
L6	122.5 - 117.5 (6)	0.007	0.313	0.000	0.035	0.000	0.321	1.050	4.8.2
L7	117.5 - 112.5 (7)	0.010	0.389	0.000	0.045	0.000	0.401	1.050	4.8.2
L8	112.5 - 108.5 (8)	0.010	0.393	0.000	0.045	0.000	0.404	1.050	4.8.2
L9	108.5 - 107.25 (9)	0.010	0.444	0.000	0.042	0.000	0.455	1.050	4.8.2
L10	107.25 - 102.25 (10)	0.011	0.525	0.000	0.052	0.000	0.540	1.050	4.8.2
L11	102.25 - 97.25 (11)	0.012	0.600	0.000	0.051	0.000	0.615	1.050	4.8.2
L12	97.25 - 92.25 (12)	0.012	0.669	0.000	0.050	0.000	0.684	1.050	4.8.2
L13	92.25 - 87.25 (13)	0.012	0.732	0.000	0.050	0.000	0.747	1.050	4.8.2
L14	87.25 - 82.25 (14)	0.012	0.791	0.000	0.049	0.000	0.806	1.050	4.8.2
L15	82.25 - 77.25 (15)	0.013	0.845	0.000	0.048	0.000	0.860	1.050	4.8.2
L16	77.25 - 72.25 (16)	0.013	0.850	0.000	0.048	0.000	0.865	1.050	4.8.2
L17	72.25 - 71.75 (17)	0.010	0.686	0.000	0.039	0.000	0.697	1.050	4.8.2
L18	71.75 - 66.75 (18)	0.010	0.719	0.000	0.038	0.000	0.731	1.050	4.8.2
L19	66.75 - 61.75 (19)	0.010	0.750	0.000	0.038	0.000	0.762	1.050	4.8.2
L20	61.75 - 56.75 (20)	0.011	0.779	0.000	0.037	0.000	0.791	1.050	4.8.2
L21	56.75 - 51.75 (21)	0.011	0.805	0.000	0.037	0.000	0.817	1.050	4.8.2
L22	51.75 - 47.75 (22)	0.011	0.825	0.000	0.036	0.000	0.838	1.050	4.8.2
L23	47.75 - 47.5 (23)	0.008	0.628	0.000	0.029	0.000	0.637	1.050	4.8.2
L24	47.5 - 42.5 (24)	0.009	0.644	0.000	0.029	0.000	0.654	1.050	4.8.2
L25	42.5 - 35.75 (25)	0.009	0.649	0.000	0.029	0.000	0.659	1.050	4.8.2
L26	35.75 - 34.75 (26)	0.010	0.714	0.000	0.030	0.000	0.725	1.050	4.8.2
L27	34.75 - 29.75 (27)	0.010	0.729	0.000	0.030	0.000	0.740	1.050	4.8.2
L28	29.75 - 24.75 (28)	0.010	0.743	0.000	0.029	0.000	0.754	1.050	4.8.2
L29	24.75 - 19.75 (29)	0.010	0.755	0.000	0.029	0.000	0.766	1.050	4.8.2
L30	19.75 - 14.75 (30)	0.011	0.767	0.000	0.028	0.000	0.779	1.050	4.8.2
L31	14.75 - 9.75 (31)	0.011	0.778	0.000	0.028	0.000	0.790	1.050	4.8.2
L32	9.75 - 4.75 (32)	0.011	0.789	0.000	0.028	0.000	0.800	1.050	4.8.2
L33	4.75 - 0 (33)	0.011	0.798	0.000	0.027	0.000	0.810	1.050	4.8.2

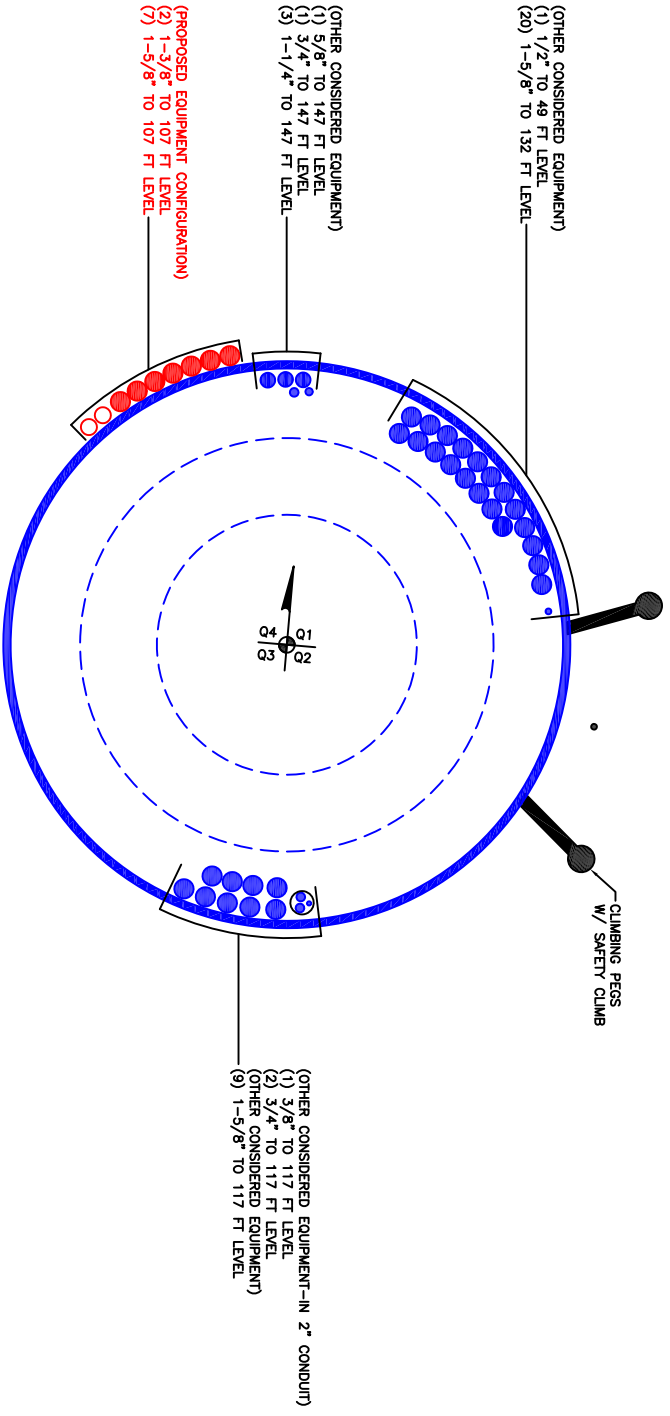
Section No.	Elevation ft	Ratio P_u ϕP_n	Ratio M_{ux} ϕM_{nx}	Ratio M_{uy} ϕM_{ny}	Ratio V_u ϕV_n	Ratio T_u ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
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Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail	
L1	147.5 - 142.5	Pole	TP22.95x22x0.25	1	-4.19	1297.05	3.8	Pass	
L2	142.5 - 137.5	Pole	TP23.9x22.95x0.25	2	-4.55	1351.34	7.6	Pass	
L3	137.5 - 132.5	Pole	TP24.85x23.9x0.25	3	-4.93	1405.62	11.0	Pass	
L4	132.5 - 127.5	Pole	TP25.8x24.85x0.25	4	-9.23	1447.88	18.8	Pass	
L5	127.5 - 122.5	Pole	TP26.75x25.8x0.25	5	-9.76	1487.85	25.0	Pass	
L6	122.5 - 117.5	Pole	TP27.7x26.75x0.25	6	-10.31	1526.83	30.6	Pass	
L7	117.5 - 112.5	Pole	TP28.65x27.7x0.25	7	-14.40	1564.81	38.2	Pass	
L8	112.5 - 108.5	Pole	TP29.41x28.65x0.25	8	-14.44	1566.68	38.5	Pass	
L9	108.5 - 107.25	Pole	TP29.1476x28.1975x0.25	9	-15.41	1696.69	43.3	Pass	
L10	107.25 - 102.25	Pole	TP30.0976x29.1476x0.25	10	-18.94	1734.87	51.4	Pass	
L11	102.25 - 97.25	Pole	TP31.0477x30.0976x0.25	11	-19.72	1771.93	58.5	Pass	
L12	97.25 - 92.25	Pole	TP31.9978x31.0477x0.25	12	-20.54	1807.87	65.1	Pass	
L13	92.25 - 87.25	Pole	TP32.9478x31.9978x0.25	13	-21.38	1842.68	71.2	Pass	
L14	87.25 - 82.25	Pole	TP33.8979x32.9478x0.25	14	-22.24	1876.37	76.7	Pass	
L15	82.25 - 77.25	Pole	TP34.8479x33.8979x0.25	15	-23.13	1908.94	81.9	Pass	
L16	77.25 - 72.25	Pole	TP35.798x34.8479x0.25	16	-23.23	1912.13	82.4	Pass	
L17	72.25 - 71.75	Pole	TP35.3926x34.4429x0.3125	17	-24.71	2597.32	66.4	Pass	
L18	71.75 - 66.75	Pole	TP36.3422x35.3926x0.3125	18	-25.75	2646.39	69.6	Pass	
L19	66.75 - 61.75	Pole	TP37.2919x36.3422x0.3125	19	-26.82	2694.33	72.6	Pass	
L20	61.75 - 56.75	Pole	TP38.2415x37.2919x0.3125	20	-27.91	2741.16	75.3	Pass	
L21	56.75 - 51.75	Pole	TP39.1911x38.2415x0.3125	21	-29.03	2786.87	77.9	Pass	
L22	51.75 - 47.75	Pole	TP39.9509x39.1911x0.3125	22	-30.02	2822.63	79.8	Pass	
L23	47.75 - 47.5	Pole	TP39.9983x39.9509x0.3875	23	-30.10	3732.28	60.7	Pass	
L24	47.5 - 42.5	Pole	TP40.948x39.9983x0.3875	24	-31.40	3797.84	62.3	Pass	
L25	42.5 - 35.75	Pole	TP42.23x40.948x0.3875	25	-31.80	3817.29	62.7	Pass	
L26	35.75 - 34.75	Pole	TP41.7957x40.6079x0.375	26	-34.46	3697.50	69.0	Pass	
L27	34.75 - 29.75	Pole	TP42.746x41.7957x0.375	27	-35.82	3757.33	70.5	Pass	
L28	29.75 - 24.75	Pole	TP43.6962x42.746x0.375	28	-37.20	3816.04	71.8	Pass	
L29	24.75 - 19.75	Pole	TP44.6465x43.6962x0.375	29	-38.61	3873.63	73.0	Pass	
L30	19.75 - 14.75	Pole	TP45.5967x44.6465x0.375	30	-40.04	3930.09	74.1	Pass	
L31	14.75 - 9.75	Pole	TP46.547x45.5967x0.375	31	-41.49	3985.43	75.2	Pass	
L32	9.75 - 4.75	Pole	TP47.4973x46.547x0.375	32	-42.97	4039.65	76.2	Pass	
L33	4.75 - 0	Pole	TP48.4x47.4973x0.375	33	-44.40	4090.12	77.1	Pass	
							Summary		
							Pole (L16)	82.4	Pass
							RATING =	82.4	Pass

***NOTE: Above stress ratios for reinforced sections are approximate. More exact calculations are presented in Appendix C.**

APPENDIX B
BASE LEVEL DRAWING



APPENDIX C
ADDITIONAL CALCULATIONS



Site BU: 876348

Work Order: 1647531



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Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	147.5	39	3.75	18	22	29.41	0.25	Auto	A607-60
2	112.25	40	4.5	18	28.20	35.798	0.25	Auto	A607-65
3	76.75	41	5.25	18	34.44	42.23	0.3125	Auto	A607-65
4	41	41	0	18	40.61	48.4	0.375	Auto	A607-65

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number																																	
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18															
1	40.25	47.75	channel	MP3-03 (1.1875in)	3				0								0										0											
2																																						
3																																						
4																																						
5																																						
6																																						
7																																						
8																																						
9																																						
10																																						

Reinforcement Details

	B (in)	H (in)	Gross Area (in ²)	Pole Face to Centroid (in)	Bottom Termination Length (in)	Top Termination Length (in)	L _u (in)	Net Area (in ²)	Bolt Hole Size (in)	Reinforcement Material
1	4.06	1.57	2.92	0.59	14.000	14.000	18.000	2.545	1.1875	A572-65

TNX Geometry Input

Increment (ft): 5

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	147.5 - 142.5	5		18	22.000	22.950	0.25	A607-60	1.000
2	142.5 - 137.5	5		18	22.950	23.900	0.25	A607-60	1.000
3	137.5 - 132.5	5		18	23.900	24.850	0.25	A607-60	1.000
4	132.5 - 127.5	5		18	24.850	25.800	0.25	A607-60	1.000
5	127.5 - 122.5	5		18	25.800	26.750	0.25	A607-60	1.000
6	122.5 - 117.5	5		18	26.750	27.700	0.25	A607-60	1.000
7	117.5 - 112.5	5		18	27.700	28.650	0.25	A607-60	1.000
8	112.5 - 112.25	4	3.75	18	28.650	29.410	0.25	A607-60	1.000
9	112.25 - 107.25	5		18	28.198	29.148	0.25	A607-65	1.000
10	107.25 - 102.25	5		18	29.148	30.098	0.25	A607-65	1.000
11	102.25 - 97.25	5		18	30.098	31.048	0.25	A607-65	1.000
12	97.25 - 92.25	5		18	31.048	31.998	0.25	A607-65	1.000
13	92.25 - 87.25	5		18	31.998	32.948	0.25	A607-65	1.000
14	87.25 - 82.25	5		18	32.948	33.898	0.25	A607-65	1.000
15	82.25 - 77.25	5		18	33.898	34.848	0.25	A607-65	1.000
16	77.25 - 76.75	5	4.5	18	34.848	35.798	0.25	A607-65	1.000
17	76.75 - 71.75	5		18	34.443	35.393	0.3125	A607-65	1.000
18	71.75 - 66.75	5		18	35.393	36.342	0.3125	A607-65	1.000
19	66.75 - 61.75	5		18	36.342	37.292	0.3125	A607-65	1.000
20	61.75 - 56.75	5		18	37.292	38.242	0.3125	A607-65	1.000
21	56.75 - 51.75	5		18	38.242	39.191	0.3125	A607-65	1.000
22	51.75 - 47.75	4		18	39.191	39.951	0.3125	A607-65	1.000
23	47.75 - 47.5	0.25		18	39.951	39.998	0.3875	A607-65	0.988
24	47.5 - 42.5	5		18	39.998	40.948	0.3875	A607-65	0.984
25	42.5 - 41	6.75	5.25	18	40.948	42.230	0.3875	A607-65	0.982
26	41 - 34.75	6.25		18	40.608	41.796	0.375	A607-65	1.000
27	34.75 - 29.75	5		18	41.796	42.746	0.375	A607-65	1.000
28	29.75 - 24.75	5		18	42.746	43.696	0.375	A607-65	1.000
29	24.75 - 19.75	5		18	43.696	44.646	0.375	A607-65	1.000
30	19.75 - 14.75	5		18	44.646	45.597	0.375	A607-65	1.000
31	14.75 - 9.75	5		18	45.597	46.547	0.375	A607-65	1.000
32	9.75 - 4.75	5		18	46.547	47.497	0.375	A607-65	1.000
33	4.75 - 0	4.75		18	47.497	48.400	0.375	A607-65	1.000

TNX Section Forces

Increment (ft):		TNX Output			
	5	Section Height (ft)	P _u (K)	M _{ux} (kip-ft)	V _u (K)
1	147.5 - 142.5	4.19	20.81	5.09	
2	142.5 - 137.5	4.55	47.13	5.44	
3	137.5 - 132.5	4.93	75.25	5.81	
4	132.5 - 127.5	9.23	136.83	11.59	
5	127.5 - 122.5	9.76	195.73	11.97	
6	122.5 - 117.5	10.31	256.51	12.35	
7	117.5 - 112.5	14.40	338.39	16.39	
8	112.5 - 112.25	14.44	342.49	16.41	
9	112.25 - 107.25	15.41	425.61	16.84	
10	107.25 - 102.25	18.94	532.52	21.63	
11	102.25 - 97.25	19.72	641.51	21.97	
12	97.25 - 92.25	20.54	752.16	22.30	
13	92.25 - 87.25	21.38	864.44	22.62	
14	87.25 - 82.25	22.24	978.30	22.93	
15	82.25 - 77.25	23.13	1093.68	23.23	
16	77.25 - 76.75	23.23	1105.30	23.25	
17	76.75 - 71.75	24.71	1222.65	23.67	
18	71.75 - 66.75	25.75	1341.79	23.98	
19	66.75 - 61.75	26.82	1462.45	24.29	
20	61.75 - 56.75	27.91	1584.59	24.58	
21	56.75 - 51.75	29.03	1708.14	24.85	
22	51.75 - 47.75	30.02	1808.06	25.13	
23	47.75 - 47.5	30.10	1814.34	25.13	
24	47.5 - 42.5	31.40	1940.79	25.44	
25	42.5 - 41	31.80	1979.00	25.53	
26	41 - 34.75	34.46	2139.99	25.97	
27	34.75 - 29.75	35.82	2270.43	26.21	
28	29.75 - 24.75	37.20	2402.01	26.43	
29	24.75 - 19.75	38.61	2534.70	26.65	
30	19.75 - 14.75	40.04	2668.49	26.87	
31	14.75 - 9.75	41.49	2803.37	27.09	
32	9.75 - 4.75	42.97	2939.31	27.30	
33	4.75 - 0	44.40	3069.45	27.51	

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
147.5 - 142.5	Pole	TP22.95x22x0.25	Pole	3.8%	Pass
142.5 - 137.5	Pole	TP23.9x22.95x0.25	Pole	7.5%	Pass
137.5 - 132.5	Pole	TP24.85x23.9x0.25	Pole	11.0%	Pass
132.5 - 127.5	Pole	TP25.8x24.85x0.25	Pole	18.7%	Pass
127.5 - 122.5	Pole	TP26.75x25.8x0.25	Pole	24.9%	Pass
122.5 - 117.5	Pole	TP27.7x26.75x0.25	Pole	30.5%	Pass
117.5 - 112.5	Pole	TP28.65x27.7x0.25	Pole	38.0%	Pass
112.5 - 112.25	Pole	TP29.41x28.65x0.25	Pole	38.4%	Pass
112.25 - 107.25	Pole	TP29.148x28.198x0.25	Pole	43.2%	Pass
107.25 - 102.25	Pole	TP30.098x29.148x0.25	Pole	51.2%	Pass
102.25 - 97.25	Pole	TP31.048x30.098x0.25	Pole	58.4%	Pass
97.25 - 92.25	Pole	TP31.998x31.048x0.25	Pole	64.9%	Pass
92.25 - 87.25	Pole	TP32.948x31.998x0.25	Pole	71.0%	Pass
87.25 - 82.25	Pole	TP33.898x32.948x0.25	Pole	76.6%	Pass
82.25 - 77.25	Pole	TP34.848x33.898x0.25	Pole	81.8%	Pass
77.25 - 76.75	Pole	TP35.798x34.848x0.25	Pole	82.3%	Pass
76.75 - 71.75	Pole	TP35.393x34.443x0.3125	Pole	66.3%	Pass
71.75 - 66.75	Pole	TP36.342x35.393x0.3125	Pole	69.5%	Pass
66.75 - 61.75	Pole	TP37.292x36.342x0.3125	Pole	72.5%	Pass
61.75 - 56.75	Pole	TP38.242x37.292x0.3125	Pole	75.2%	Pass
56.75 - 51.75	Pole	TP39.191x38.242x0.3125	Pole	77.8%	Pass
51.75 - 47.75	Pole	TP39.951x39.191x0.3125	Pole	79.7%	Pass
47.75 - 47.5	Pole + Reinf.	TP39.998x39.951x0.3875	Reinf. 1 Tension Rupture	89.6%	Pass
47.5 - 42.5	Pole + Reinf.	TP40.948x39.998x0.3875	Reinf. 1 Tension Rupture	91.7%	Pass
42.5 - 41	Pole + Reinf.	TP42.23x40.948x0.3875	Reinf. 1 Tension Rupture	92.4%	Pass
41 - 34.75	Pole	TP41.796x40.608x0.375	Pole	69.0%	Pass
34.75 - 29.75	Pole	TP42.746x41.796x0.375	Pole	70.4%	Pass
29.75 - 24.75	Pole	TP43.696x42.746x0.375	Pole	71.7%	Pass
24.75 - 19.75	Pole	TP44.646x43.696x0.375	Pole	72.9%	Pass
19.75 - 14.75	Pole	TP45.597x44.646x0.375	Pole	74.1%	Pass
14.75 - 9.75	Pole	TP46.547x45.597x0.375	Pole	75.2%	Pass
9.75 - 4.75	Pole	TP47.497x46.547x0.375	Pole	76.2%	Pass
4.75 - 0	Pole	TP48.4x47.497x0.375	Pole	77.1%	Pass
				Summary	
			Pole	82.3%	Pass
			Reinforcement	92.4%	Pass
			Overall	92.4%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in ⁴)			Area (in ²)			% Capacity*	
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1
147.5 - 142.5	1172	n/a	1172	18.01	n/a	18.01	3.8%	
142.5 - 137.5	1326	n/a	1326	18.77	n/a	18.77	7.5%	
137.5 - 132.5	1492	n/a	1492	19.52	n/a	19.52	11.0%	
132.5 - 127.5	1671	n/a	1671	20.27	n/a	20.27	18.7%	
127.5 - 122.5	1865	n/a	1865	21.03	n/a	21.03	24.9%	
122.5 - 117.5	2073	n/a	2073	21.78	n/a	21.78	30.5%	
117.5 - 112.5	2296	n/a	2296	22.53	n/a	22.53	38.0%	
112.5 - 112.25	2307	n/a	2307	22.57	n/a	22.57	38.4%	
112.25 - 107.25	2418	n/a	2418	22.93	n/a	22.93	43.2%	
107.25 - 102.25	2665	n/a	2665	23.68	n/a	23.68	51.2%	
102.25 - 97.25	2927	n/a	2927	24.44	n/a	24.44	58.4%	
97.25 - 92.25	3207	n/a	3207	25.19	n/a	25.19	64.9%	
92.25 - 87.25	3503	n/a	3503	25.94	n/a	25.94	71.0%	
87.25 - 82.25	3818	n/a	3818	26.70	n/a	26.70	76.6%	
82.25 - 77.25	4150	n/a	4150	27.45	n/a	27.45	81.8%	
77.25 - 76.75	4185	n/a	4185	27.53	n/a	27.53	82.3%	
76.75 - 71.75	5408	n/a	5408	34.79	n/a	34.79	66.3%	
71.75 - 66.75	5859	n/a	5859	35.74	n/a	35.74	69.5%	
66.75 - 61.75	6335	n/a	6335	36.68	n/a	36.68	72.5%	
61.75 - 56.75	6835	n/a	6835	37.62	n/a	37.62	75.2%	
56.75 - 51.75	7362	n/a	7362	38.56	n/a	38.56	77.8%	
51.75 - 47.75	7802	n/a	7802	39.31	n/a	39.31	79.7%	
47.75 - 47.5	7830	1859	9689	39.36	8.76	48.12	63.6%	89.6%
47.5 - 42.5	8405	1946	10351	40.30	8.76	49.06	65.7%	91.7%
42.5 - 41	8583	1972	10556	40.59	8.76	49.35	66.4%	92.4%
41 - 34.75	10683	n/a	10683	49.30	n/a	49.30	69.0%	
34.75 - 29.75	11435	n/a	11435	50.43	n/a	50.43	70.4%	
29.75 - 24.75	12221	n/a	12221	51.56	n/a	51.56	71.7%	
24.75 - 19.75	13043	n/a	13043	52.69	n/a	52.69	72.9%	
19.75 - 14.75	13902	n/a	13902	53.82	n/a	53.82	74.1%	
14.75 - 9.75	14796	n/a	14796	54.95	n/a	54.95	75.2%	
9.75 - 4.75	15729	n/a	15729	56.09	n/a	56.09	76.2%	
4.75 - 0	16650	n/a	16650	57.16	n/a	57.16	77.1%	

Note: Section capacity checked in 5 degree increments.

Rating per TIA-222-H Section 15.5.

Monopole Base Plate Connection

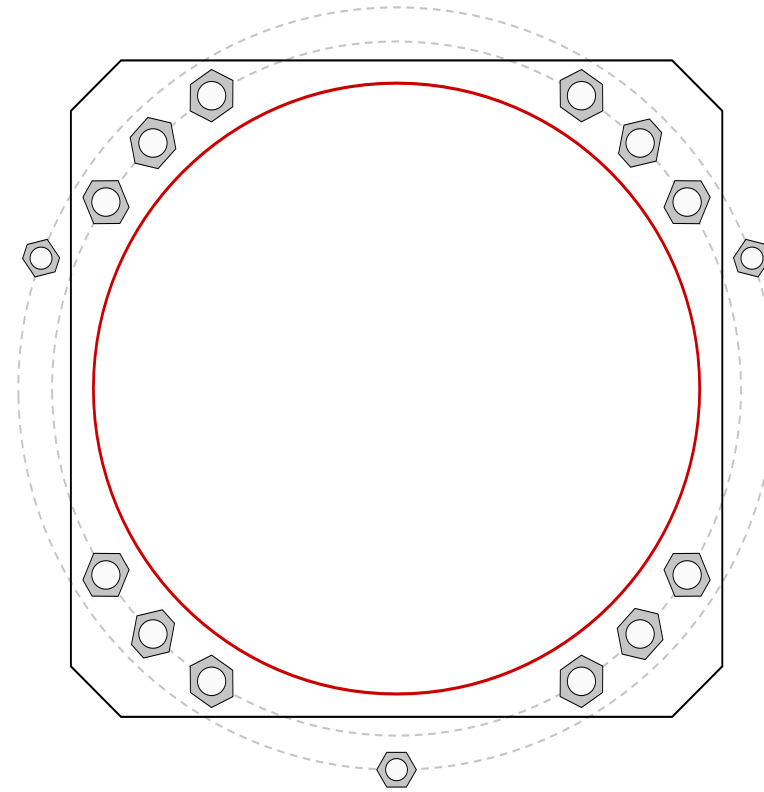


Site Info	
BU #	876348
Site Name	ENFIELD
Order #	446209 Rev. 3

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	2.5

Applied Loads	
Moment (kip-ft)	3069.00
Axial Force (kips)	44.00
Shear Force (kips)	27.00

*TIA-222-H Section 15.5 Applied



Connection Properties		Analysis Results	
Anchor Rod Data		Anchor Rod Summary <i>(units of kips, kip-in)</i>	
GROUP 1: (12) 2-1/4" ϕ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 55" BC		GROUP 1:	
GROUP 2: (3) 1-3/4" ϕ bolts (A193 Gr. B7 N; $F_y=105$ ksi, $F_u=125$ ksi) on 60.4" BC		$P_{u,c} = 198.19$	$\phi P_{n,c} = 243.75$ Stress Rating
Base Plate Data		$V_u = 2.25$	$\phi V_n = 73.13$ 81.2%
52" OD x 3" Plate (A572-50; $F_y=50$ ksi, $F_u=65$ ksi)		$M_u = 3.66$	$\phi M_n = 94.7$ Pass
Stiffener Data		GROUP 2:	
N/A		$P_{u,c} = 123.44$	$\phi P_{n,c} = 199.5$ Stress Rating
Pole Data		$V_u = 0$	$\phi V_n = 59.85$ 58.9%
48.4" x 0.375" 18-sided pole (A607-65; $F_y=65$ ksi, $F_u=80$ ksi)		$M_u = 0$	$\phi M_n = 59.26$ Pass
		Base Plate Summary	
		Max Stress (ksi):	29.24 (Flexural)
		Allowable Stress (ksi):	45
		Stress Rating:	61.9% Pass

Pier and Pad Foundation



BU #:	876348
Site Name:	ENFIELD
App. Number:	446209 Rev. 3

TIA-222 Revision:	H
Tower Type:	Monopole

Block Foundation?:	<input type="checkbox"/>
--------------------	--------------------------

Superstructure Analysis Reactions		
Compression, P_{comp} :	44	kips
Base Shear, V_{u_comp} :	27	kips
Moment, M_u :	3069	ft-kips
Tower Height, H :	147.5	ft
BP Dist. Above Fdn, bp_{dist} :	5	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	457.86	27.00	5.6%	Pass
<i>Bearing Pressure (ksf)</i>	5.46	2.19	38.5%	Pass
<i>Overturning (kip*ft)</i>	5657.66	3363.75	59.5%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	6907.72	3271.50	45.1%	Pass
<i>Pier Compression (kip)</i>	30551.04	116.02	0.4%	Pass
<i>Pad Flexure (kip*ft)</i>	3404.82	1095.17	30.6%	Pass
<i>Pad Shear - 1-way (kips)</i>	725.36	187.78	24.7%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.164	0.029	17.0%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	2427.12	1962.90	77.0%	Pass

Pier Properties		
Pier Shape:	Square	
Pier Diameter, $dpier$:	8	ft
Ext. Above Grade, E :	0.5	ft
Pier Rebar Size, Sc :	11	
Pier Rebar Quantity, mc :	24	
Pier Tie/Spiral Size, St :	5	
Pier Tie/Spiral Quantity, mt :	12	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier} :	3	in

*Rating per TIA-222-H Section 15.5

Soil Rating*:	59.5%
Structural Rating*:	77.0%

Pad Properties		
Depth, D :	10	ft
Pad Width, W :	23.5	ft
Pad Thickness, T :	3	ft
Pad Rebar Size, Sp :	9	
Pad Rebar Quantity, mp :	25	
Pad Clear Cover, cc_{pad} :	3	in

Material Properties		
Rebar Grade, F_y :	60000	psi
Concrete Compressive Strength, F'_c :	3000	psi
Dry Concrete Density, δ_c :	150	pcf

Soil Properties		
Total Soil Unit Weight, γ :	115	pcf
Ultimate Net Bearing, Q_{net} :	6.500	ksf
Cohesion, C_u :	2.000	ksf
Friction Angle, ϕ :	0	degrees
SPT Blow Count, N_{blows} :		
Base Friction, μ :	0.3	
Neglected Depth, N :	3.33	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, gw :	4	ft

--Toggle between Gross and Net

Date: **July 24, 2018**



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(732) 383-1950

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

Subject: Mount Structural Analysis Report

Carrier Designation: MetroPCS Tower Equipment
Carrier Site Number: CTHA067A
Carrier Site Name: CTHA067A

Crown Castle Designation: Crown Castle BU Number: 876348
Crown Castle Site Name: Enfield
Crown Castle JDE Job Number: 512705
Crown Castle PO Number: 1219358
Crown Castle Application Number: 446209

Engineering Firm Designation: Maser Consulting Connecticut Project Number: 18922086A

Site Data: Bright Meadow Blvd., Enfield, Hartford County, CT, 06082
Latitude 42°1'14.91" Longitude -72°35'6.59"

Structure Information: Tower Height & Type: 147.5 ft Monopole
Mount Elevation: 107 ft
Mount Type: 12.5 ft Sector Mount

Dear Charles McGuirt,

Maser Consulting Connecticut is pleased to submit this “**Mount Structural Analysis Report**” to determine the structural integrity of MetroPCS’s antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

Based upon our analysis, we have determined the adequacy of the antenna mounting system that will support the existing and proposed loading to be:

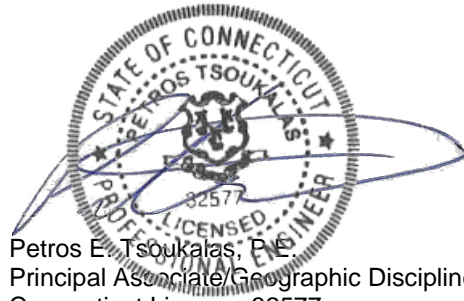
Sector Mount (Typical of 3)

Sufficient

This analysis has been performed in accordance with the 2016 Connecticut State Building Code, Incorporating the 2012 International Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per 2016 Connecticut State Building Code Appendix N. Exposure Category B with Topographic Category 1 and Risk Category II were used in this analysis.

We at Maser Consulting Connecticut appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects, please give us a call.

Mount structural analysis prepared by: Dejian Xu, P.E.
Respectfully Submitted by:



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Connecticut License: 32577
856-797-0412
Ptsoukalas@Maserconsulting.com

A handwritten signature in black ink that reads "Dejian Xu".

Dejian Xu, P.E.
Project Engineer

TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA

Table 1 - Proposed Equipment Loading Information

Table 2 - Existing and Reserved Equipment Loading Information

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 4 - Mount Component Stresses vs. Capacity

4.1) Recommendations

5) APPENDIX A

Wire Frame and Rendered Models

6) APPENDIX B

Software Input Calculations

7) APPENDIX C

Software Analysis Output

8) APPENDIX D

Additional Calculations

1) INTRODUCTION

The existing antenna mounting system can be categorized as 12.5' Sector Mount, Site Pro 1 P/N: RMV12-396, installed at 107 ft above ground level. The proposed equipment is to be supported on this antenna mounting system at a centerline of 107 ft above ground level. This report is based upon this information, as well as information from manufacturer specifications.

2) ANALYSIS CRITERIA

The structural analysis was performed in accordance with the requirements of ANSI/TIA-222-G-2-2009 Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 97 mph with no ice, 50 mph with 1.0 inch escalated ice thickness, Exposure B and Topographic Category 1. In addition, the mount has been analyzed for various live loading conditions consisting of a 250-pound man live load applied individually at the midpoint and cantilevered ends of horizontal members as well as a 500-pound man live load applied individually at mount pipe locations using a 3-second gust wind speed of 30 mph.

Table 1 - Proposed Equipment Loading Information

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Proposed Mount Type	Note
107	107	3	RFS	APXVAARR24_43-U-NA20	-	1
		3	Ericsson	AIR 32 B2A/B66AA		
		3	Ericsson	4449 B12/B71		

Notes:

- 1) To be mounted on existing sector mounts

Table 2 - Existing and Reserved Antenna and Cable Information

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Existing Mount Type	Note
107	107	3	Ericsson	AIR 21 B2A B4P	Sector Mount	1
		3	Ericsson	KRY 112 144/1		

Notes:

- 1) To be mounted on existing sector mounts

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Mount Specifications	Site Pro 1	RMV12-3XX	Dewberry CD's

3.1) Analysis Method

RISA-3D, a comprehensive structural analysis program was used for this analysis. 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.

3.2) Assumptions

- 1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with previous Mount Analysis Report as referenced.
- 2) The configuration of antennas, mounts, and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
- 4) 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

It is assumed that the antenna mount information per Mount Specifications as referenced is accurate. This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle should be notified to determine the effect on the structural integrity of the antenna mounting system.

The Standoff Arm is assumed to be Square Tube HSS4x4x1/4.

4) ANALYSIS RESULTS

Table 4(a) - Mount Component Stresses vs. Capacity (Sector Mount)

Notes	Component	Mount Centerline (ft)	% Capacity	Pass / Fail
1	Horizontal Pipe	107	97.8	Pass
1	Standoff Arm	107	61.7	Pass
1	Antenna Pipes	107	75.5	Pass
2	Mount to Tower	107	48.2	Pass

Structure Rating (max from all components) =	97.8%
---	--------------

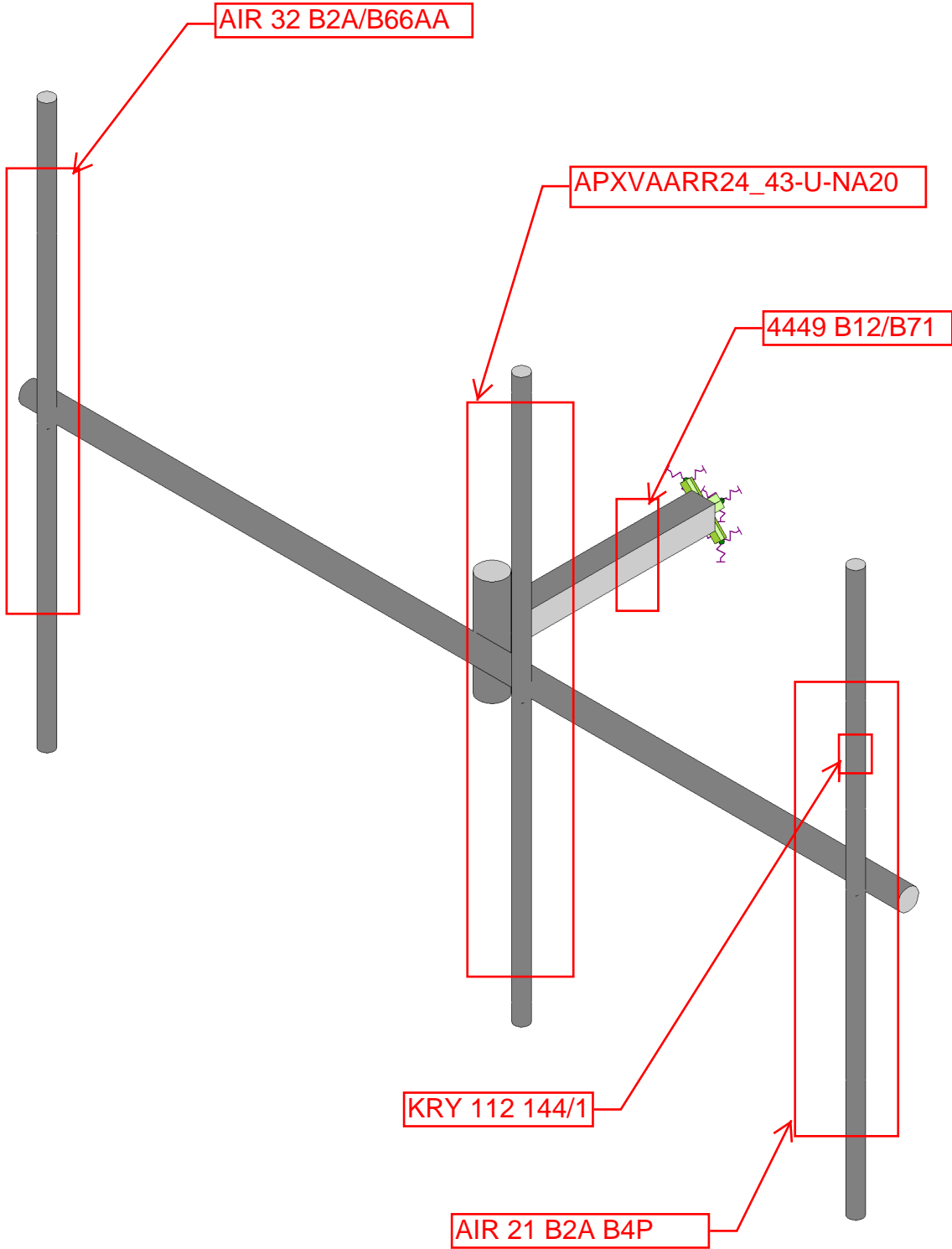
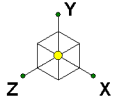
Notes:

- 1) See additional documentation in "Appendix C - Analysis Output" for calculations supporting the % capacity consumed.
- 2) See additional documentation in "Appendix D – Additional Calculations" for calculation supporting the % capacity consumed.

4.1) Recommendations

The mount has sufficient capacity to support the proposed loading, therefore, the proposed installation can be installed as intended, without modifications.

APPENDIX A
WIRE FRAME AND RENDERED MODELS



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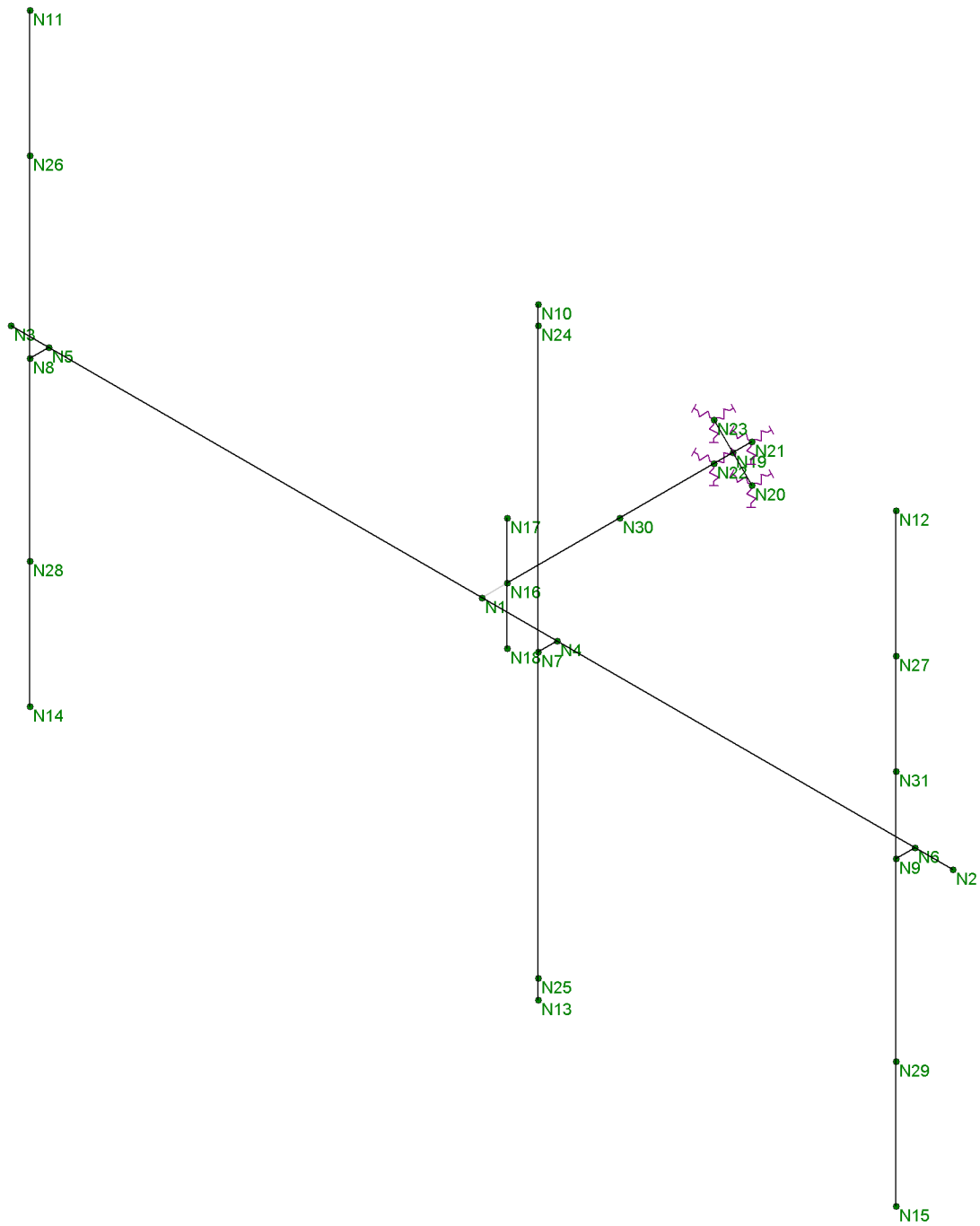
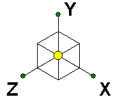
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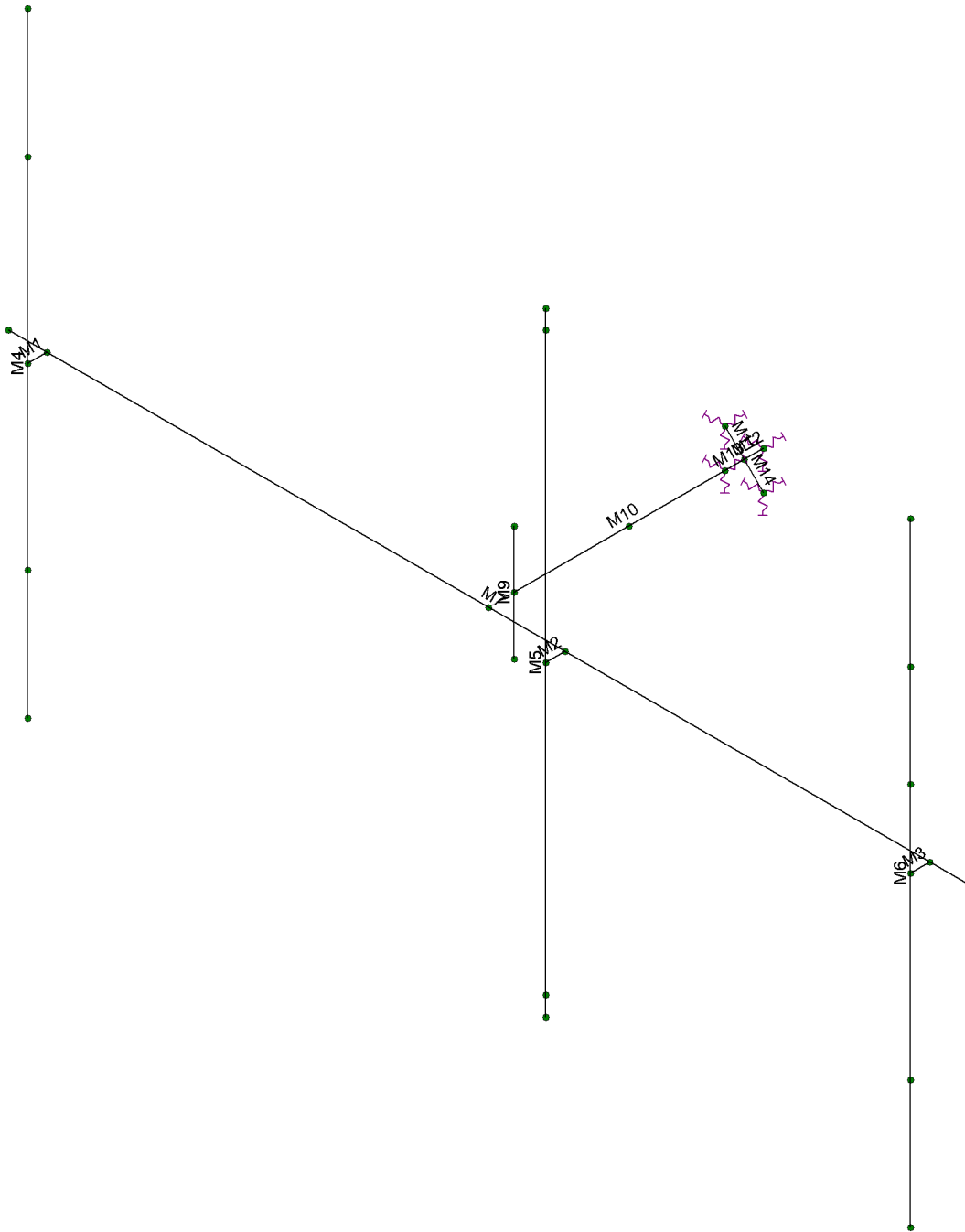
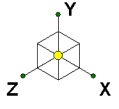
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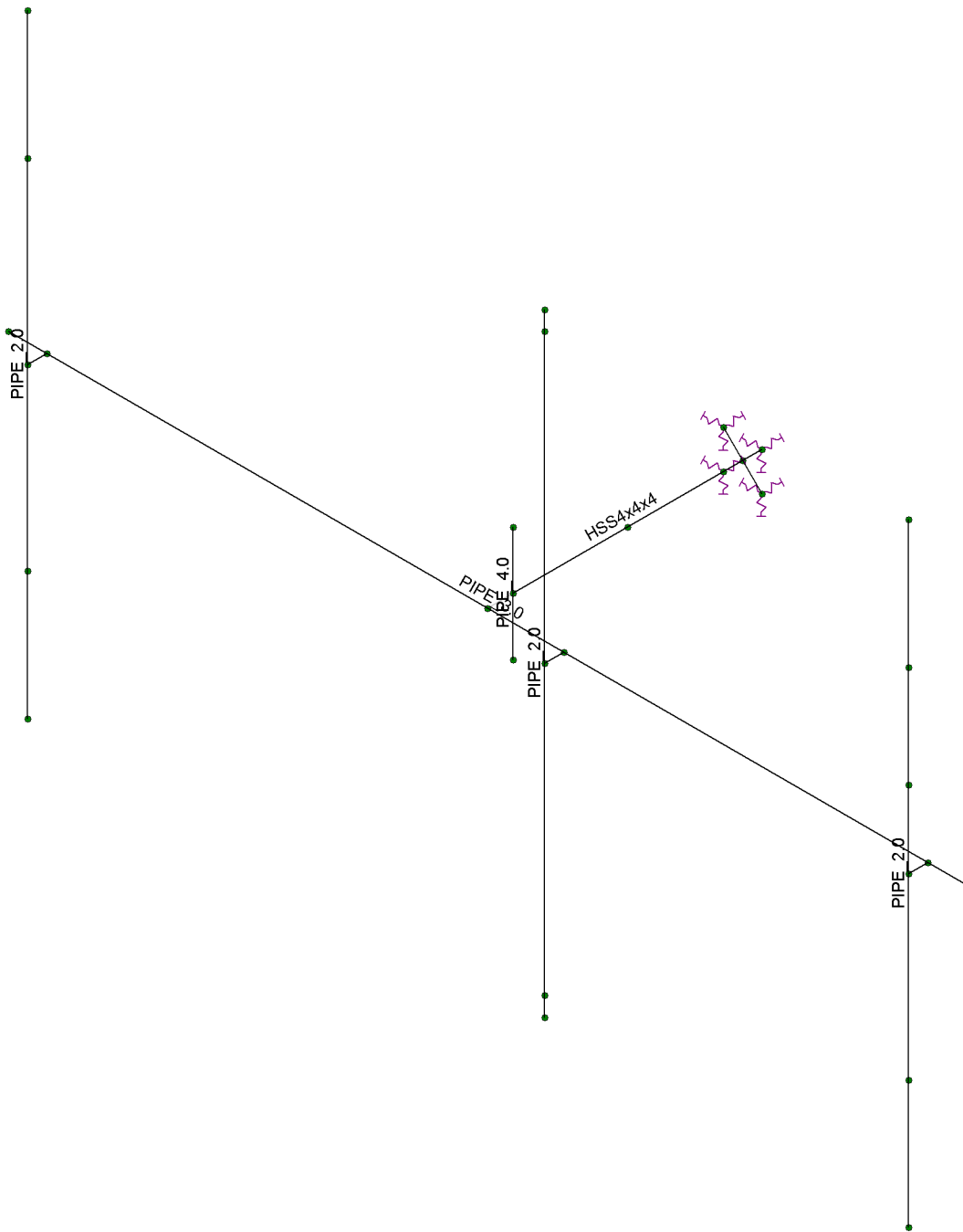
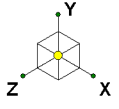
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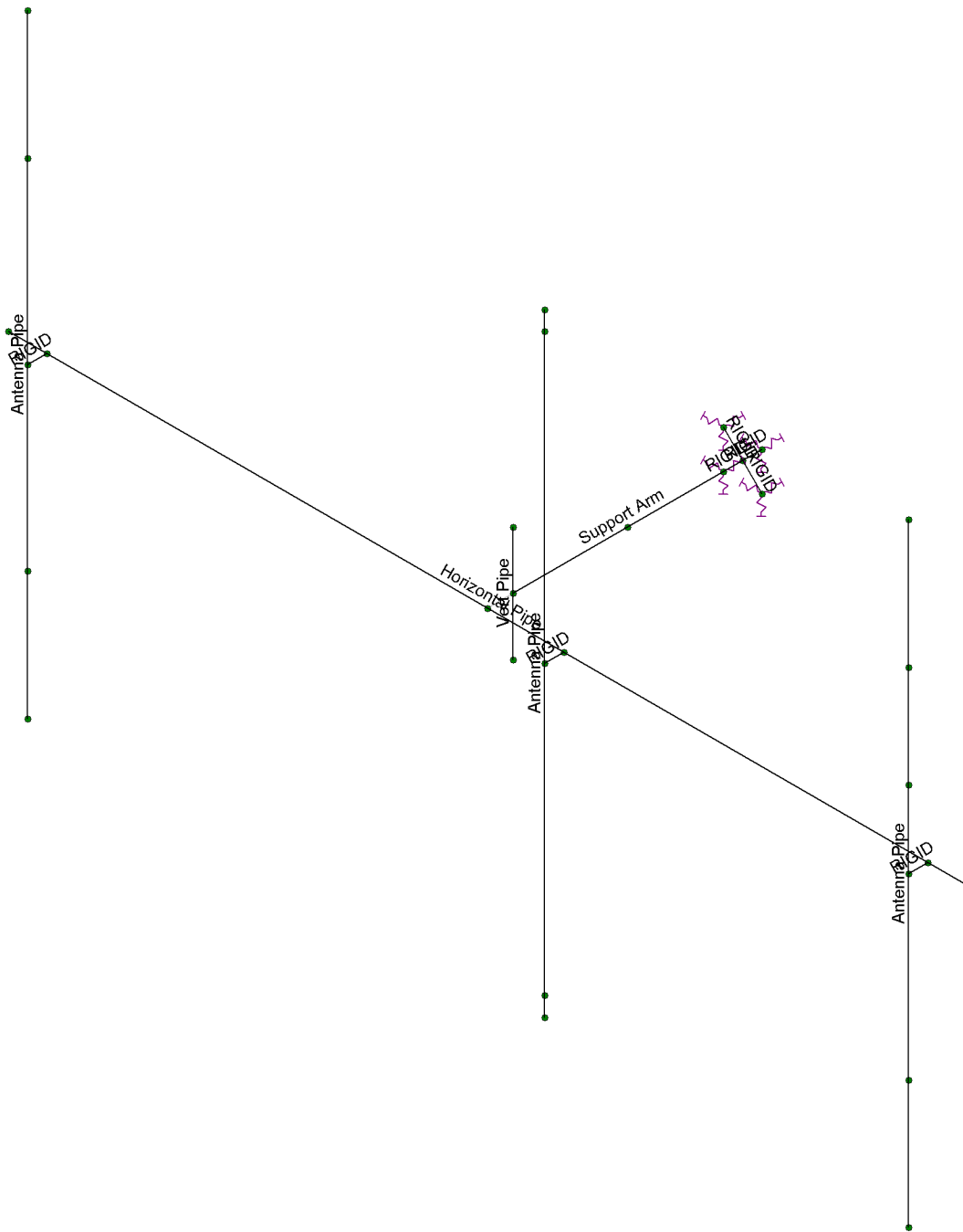
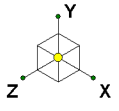
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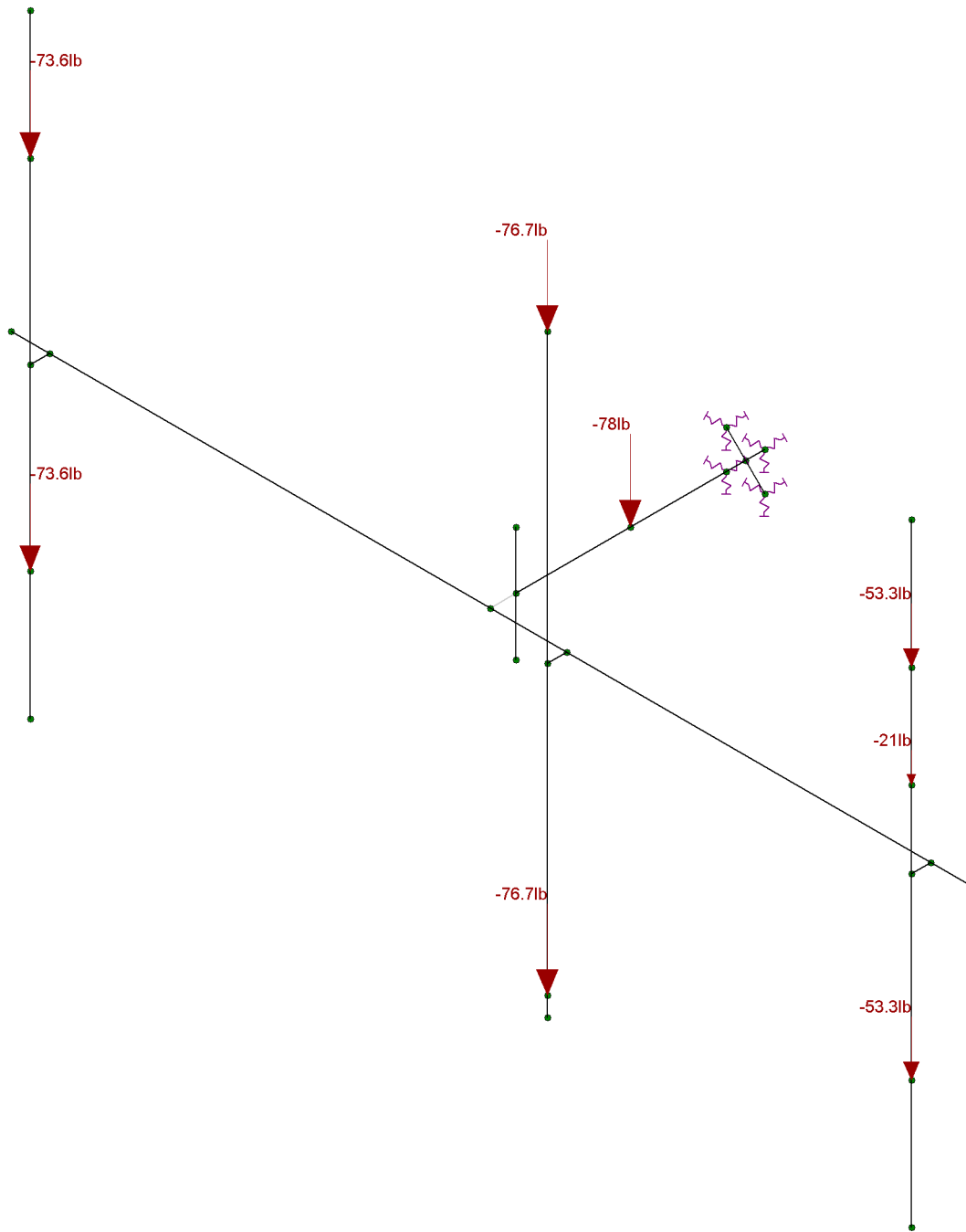
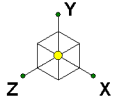
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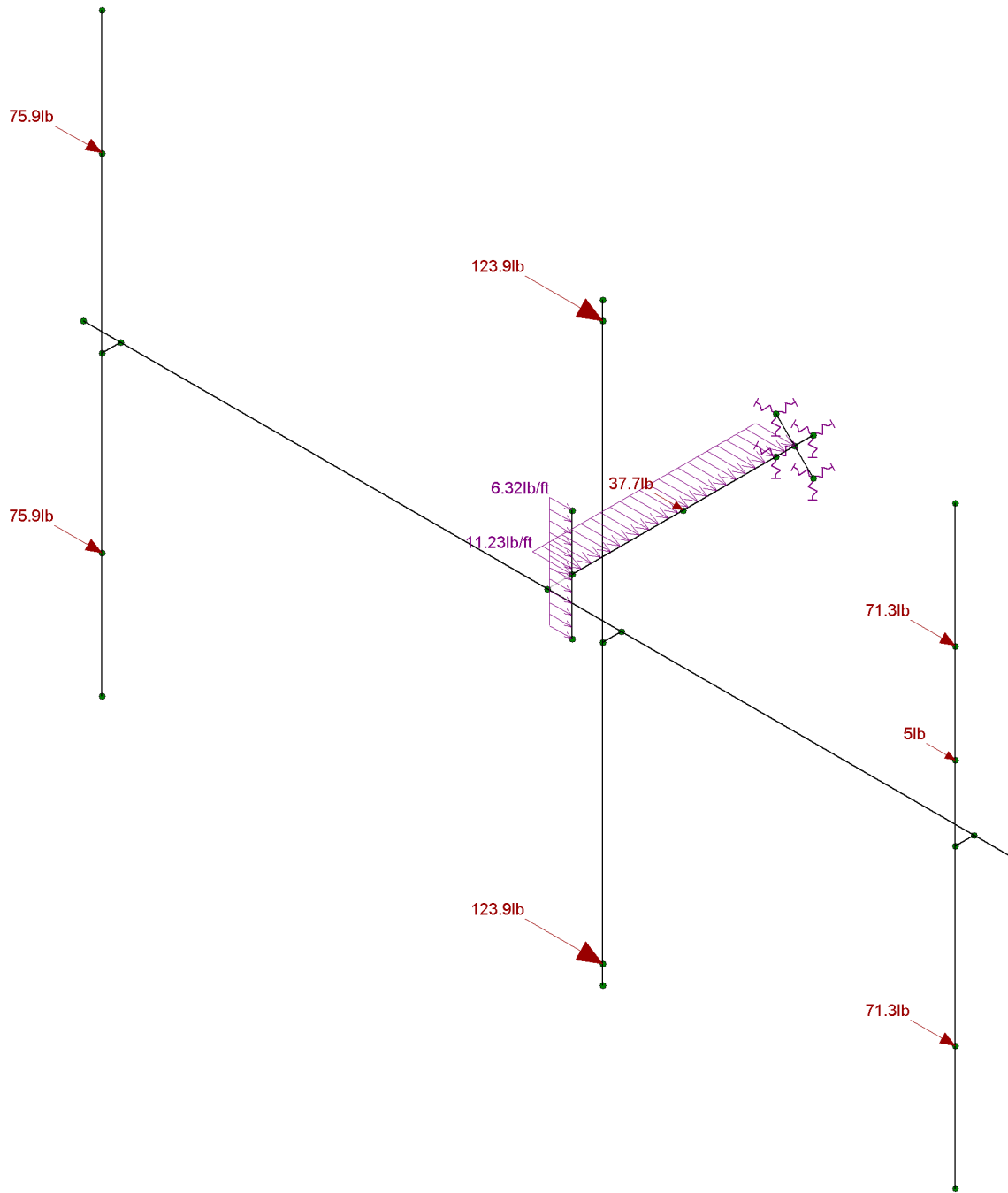
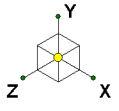
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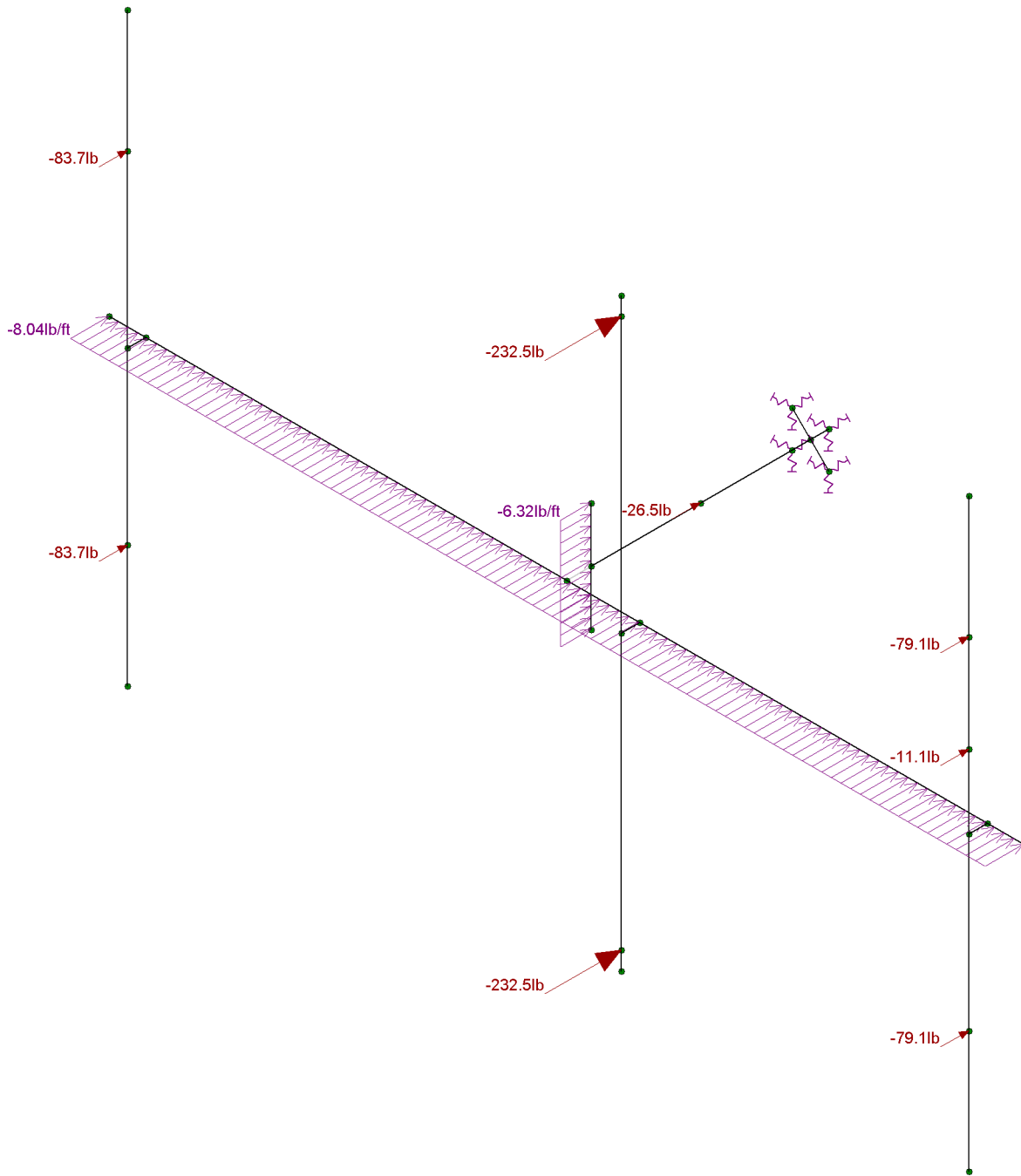
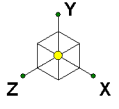
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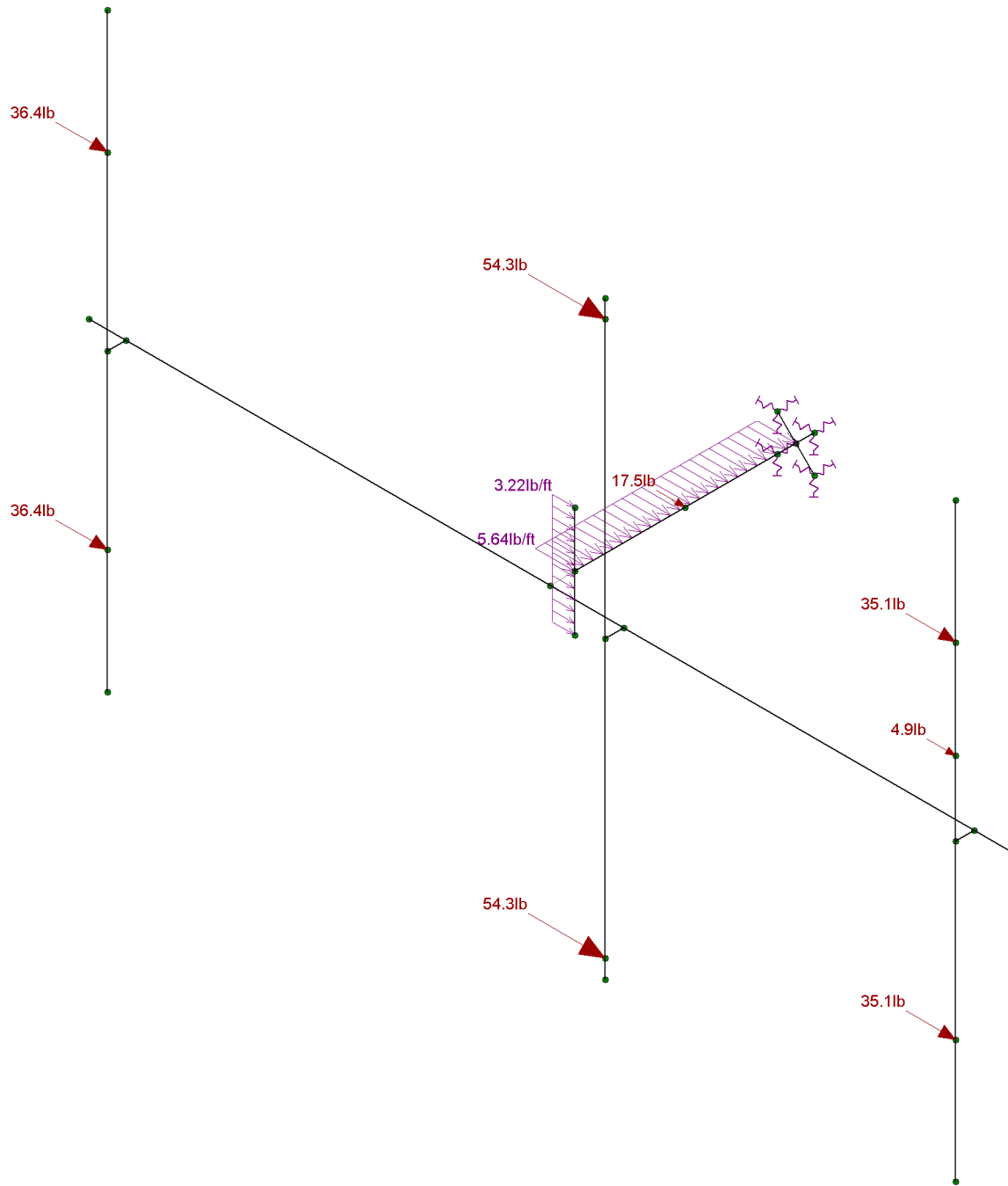
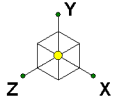


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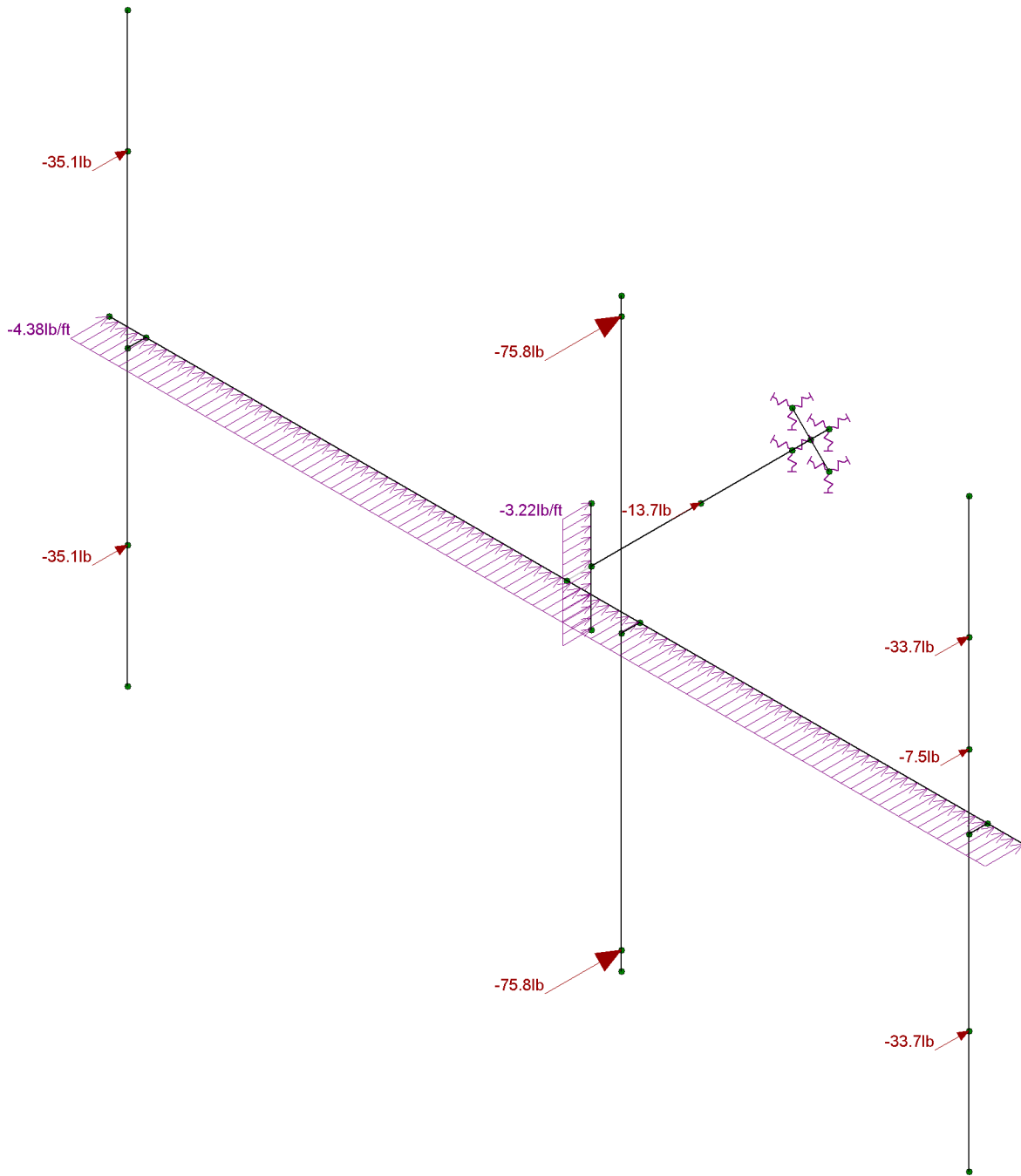
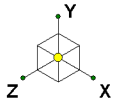


Loads: BLC 4, Wx Ice
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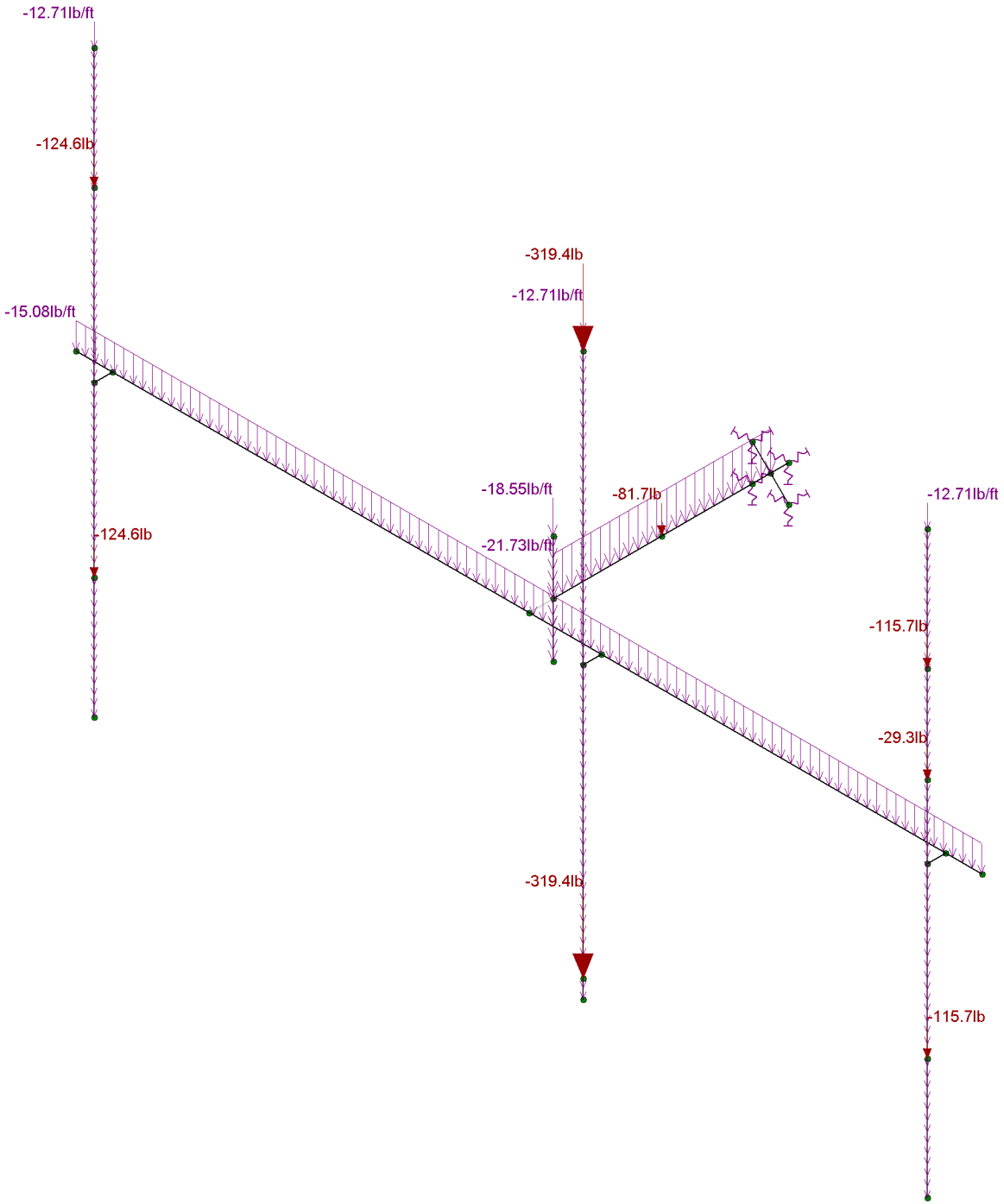
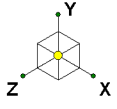


Loads: BLC 5, Wz Ice
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Loads: BLC 6, Ice Weight
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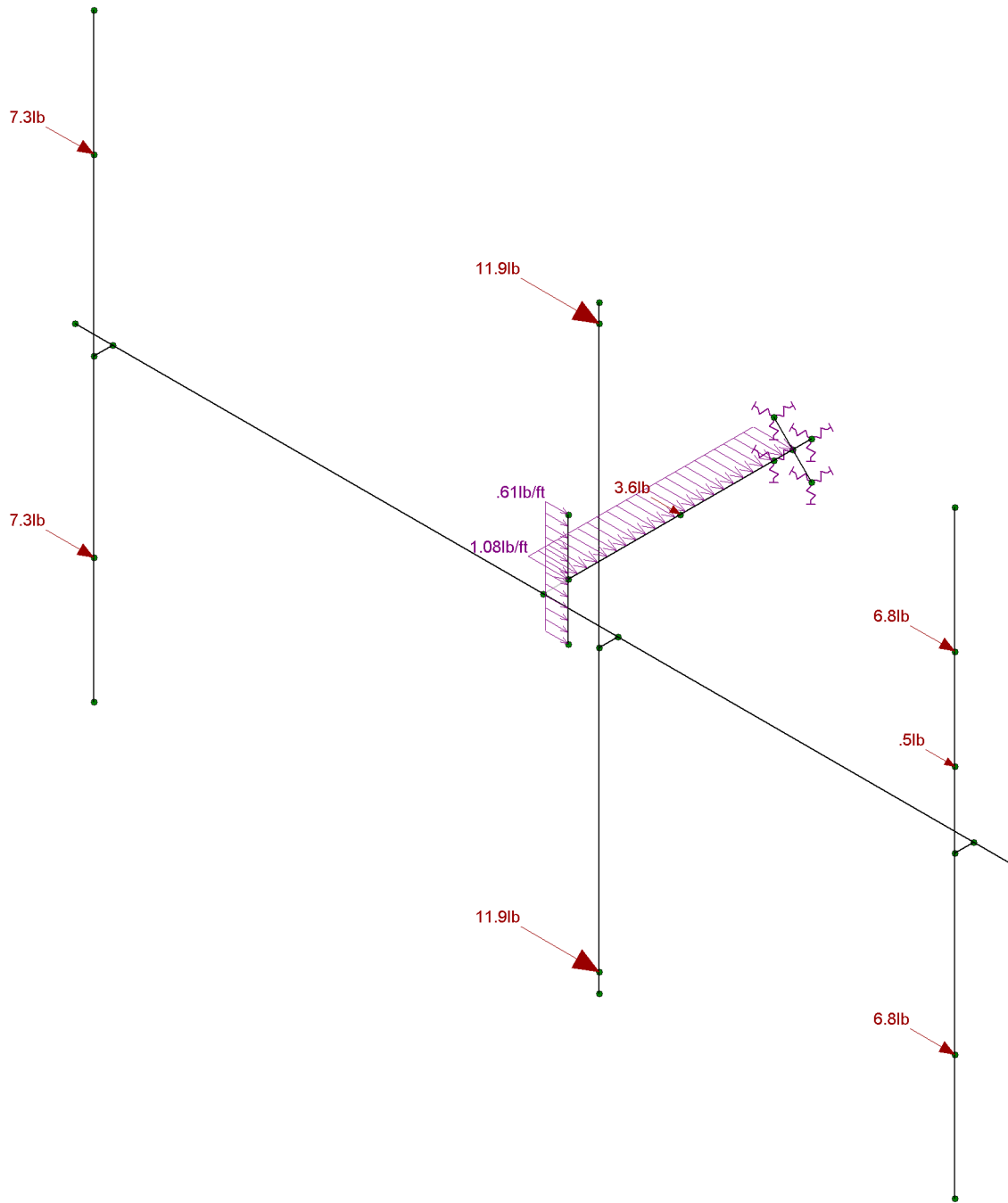
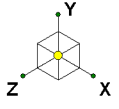
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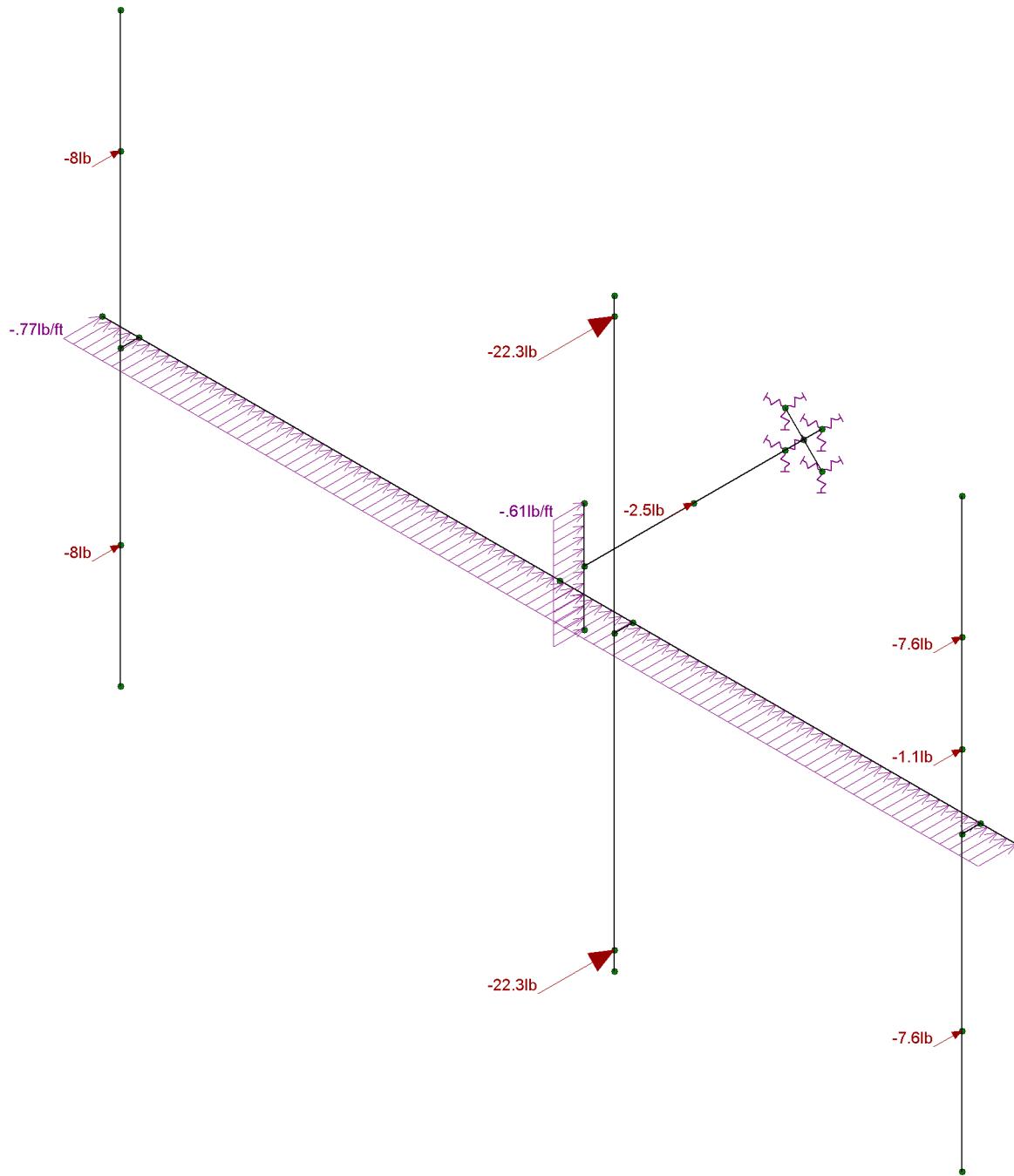
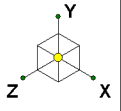


Loads: BLC 7, Wx Service
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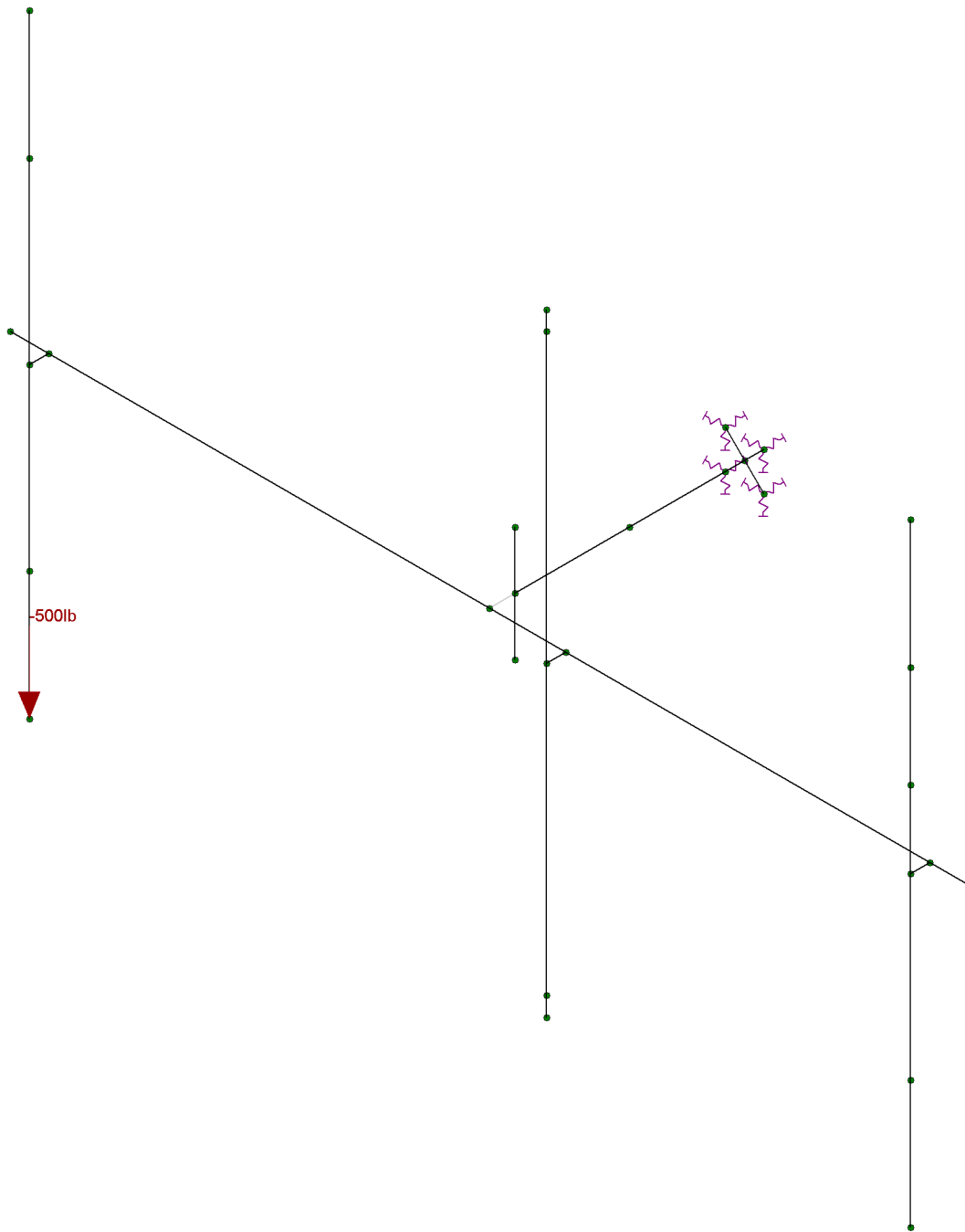
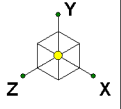
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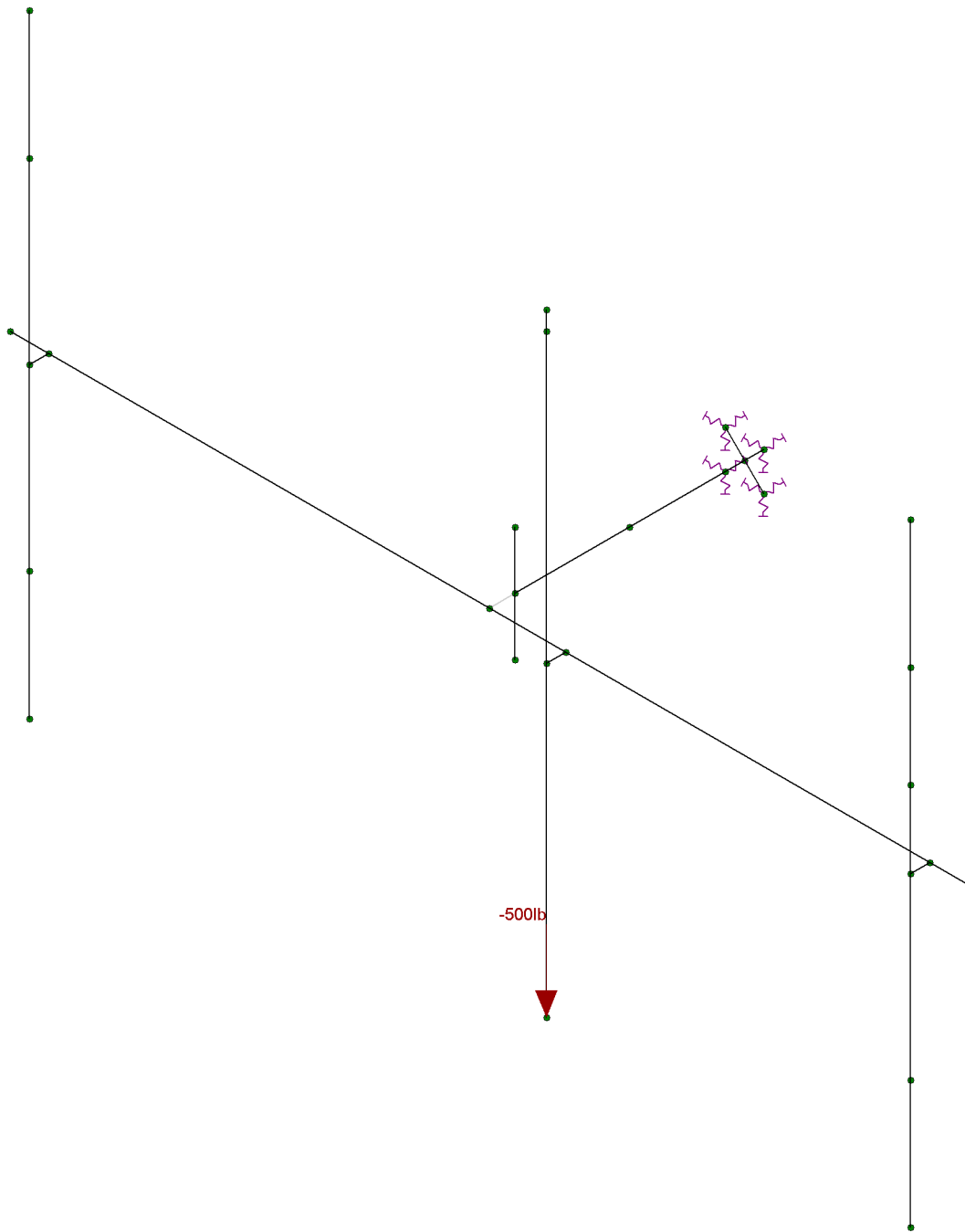
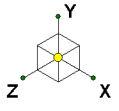


Loads: BLC 9, Maintenance Load LM1
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Loads: BLC 10, Maintenance Load LM2
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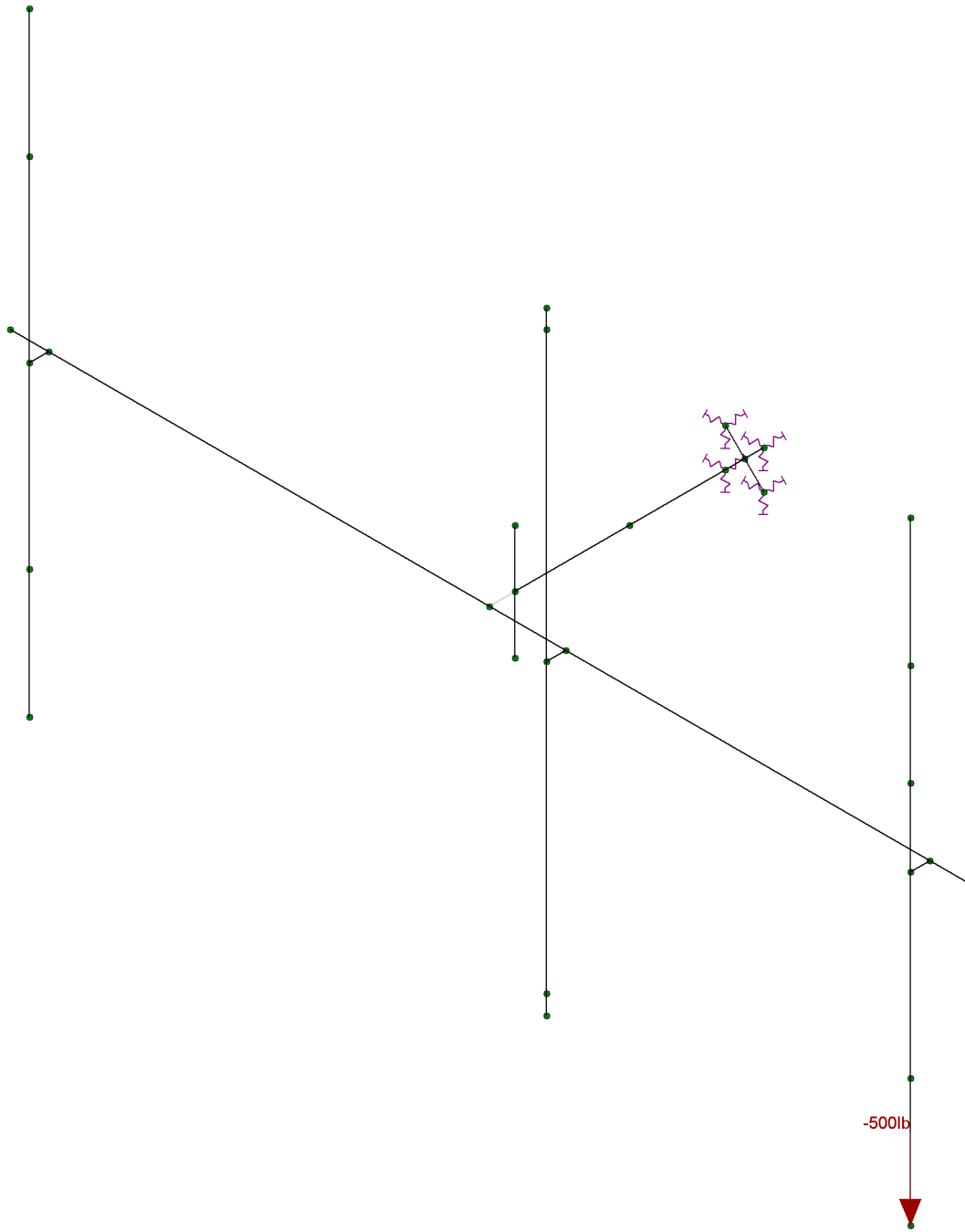
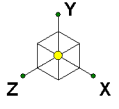
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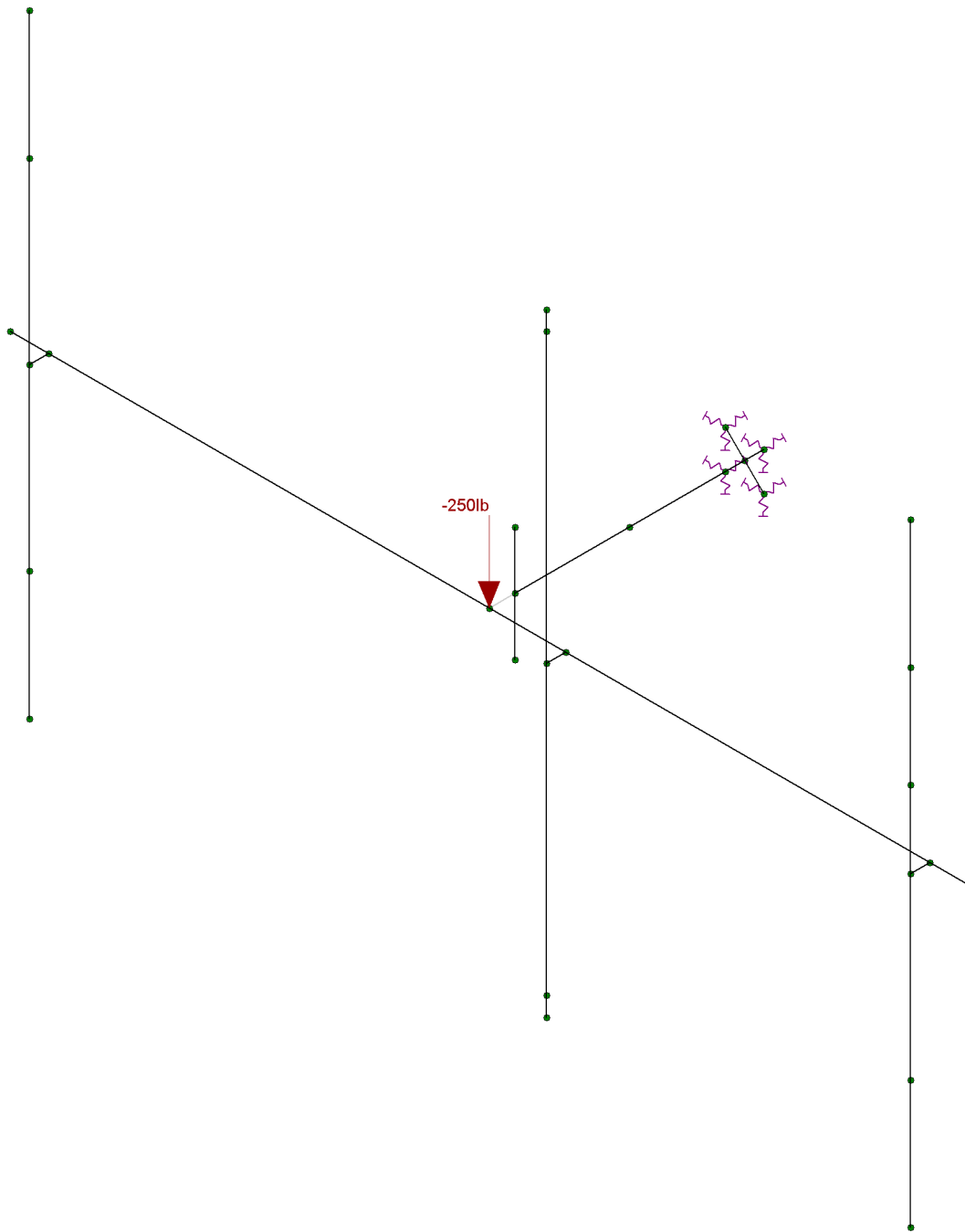
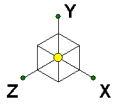
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SK - 35

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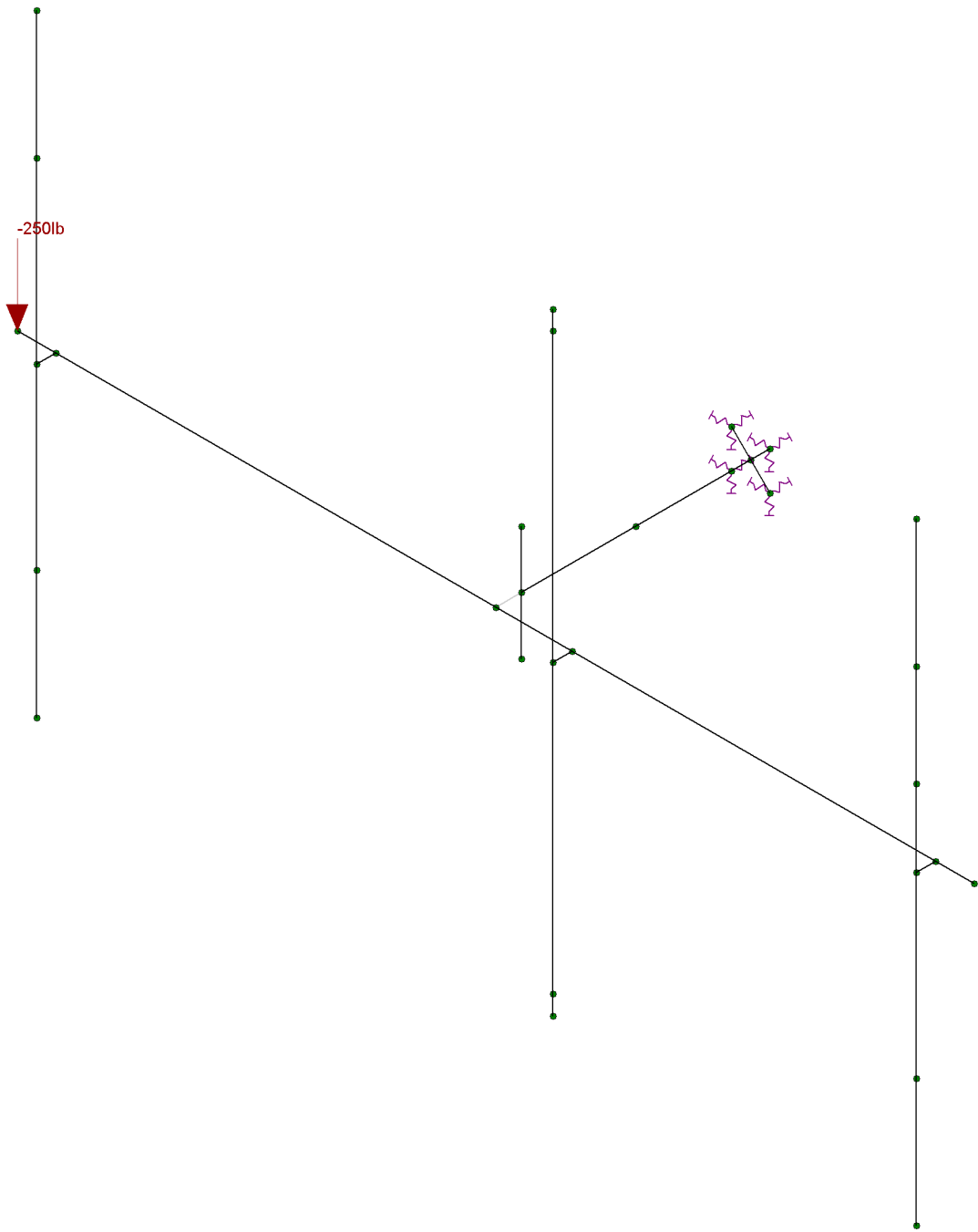
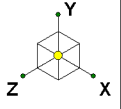
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876348 - CTHA067A

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APPENDIX B
SOFTWARE INPUT CALCULATIONS



Client:	Metro PCS	Computed By:	DX
Site Name:	876348 - CTHA067A	Date:	7/23/2018
Project No.:	18922086A	Verified By:	SMS
Title:	Antenna Mount Analysis	Page:	1

Version 4.0

LOADING SUMMARY

Quantity	Manufacturer	Antenna/ Appurtenance	Status	Sector
3	ERICSSON	AIR 21 B2A B4P	Existing	Alpha, Beta, & Gamma
3	ERICSSON	Air 32 DB B2A B66Aa	Proposed	Alpha, Beta, & Gamma
3	RFS	APXVAARR24_43-U-NA20	Proposed	Alpha, Beta, & Gamma
3	ERICSSON	KRY 112 144/1	Existing	Alpha, Beta, & Gamma
3	ERICSSON	RRU 4449 B71 + B12	Proposed	Alpha, Beta, & Gamma

The worst case loading occurs in the **Alpha Sector**

Quantity	Manufacturer	Antenna/ Appurtenance	Status
1	ERICSSON	AIR 21 B2A B4P	Existing
1	ERICSSON	Air 32 DB B2A B66Aa	Proposed
1	RFS	APXVAARR24_43-U-NA20	Proposed
1	ERICSSON	KRY 112 144/1	Existing
1	ERICSSON	RRU 4449 B71 + B12	Proposed



Client:	Metro PCS	Computed By:	DX
Site Name:	876348 - CTHA067A	Date:	7/23/2018
Project No.:	18922086A	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-G Code, Addendum 2

Wind Load Inputs Parameters

		Reference	Equation
Antenna Centerline	z 107 ft		
Ultimate Wind Speed	V _U 125 mph		
Nominal Wind Speed (3 sec. Gust):	V 97 mph	Ref. 1, Eqn. 16-33	
Nominal Wind Speed with Ice (3 sec. gust):	V _i 50.0 mph	(Figure a5-2a, p. 233)	
Maintenance Wind Speed:	V _m 30.0 mph		
Service Wind Speed:	V _s 60.0 mph	(Figure a5-2a, p. 233)	
Design Ice Thickness:	t _i 1.00 in	(Figure A1-2a, p. 233)	
Exposure Category:	B	Ref. 3, Section 2.6.5.1	
Structure Class:	II	Ref. 3, Table 2-1	
Gust Effect Factor:	G _h 1.00	Ref. 3, Section 2.6.7	
Wind Directionality Factor:	K _d 0.95	Ref. 3, Table 2-2	
Topographic Category:	1	Ref. 3, Section 2.6.6.2	

Wind Load Coefficients

Importance Factors:

Non-Iced:	I 1	Ref. 3, Table 2-3
Iced:	I _{ice} 1	(Table 2-3, P. 39)

Exposure Category Coefficients:

3-s Gust-Speed Power Law Exponent:	α 7.0	Ref. 3, Table 2-4	
Nominal Height of the Atmospheric Boundary Layer:	Z _g 1200 ft	Ref. 3, Table 2-4	
Min. Value for k _z :	K _{zmin} 0.70	Ref. 3, Table 2-4	
Terrain Constant:	K _e 0.90	Ref. 3, Table 2-4	
Velocity Pressure Exposure Coefficient:	K _z 1.008	Ref. 3, Section 2.6.5.2	=2.01 · (z/z _g) ^{2/α}

Topographic Category Coefficients:

Topographic Constant:	K _t N/A	Ref. 3, Table 2-5	
Height Attenuation Factor:	f N/A	Ref. 3, Table 2-5	
Height Reduction Factor:	K _h N/A	Ref. 3, Section 2.6.6.4	=e ^(-z/H)
Topographic Factor:	K _{zt} 1.00	Ref. 3, Section 2.6.6.4	=[1+(K _e · K _t /K _h)] ²

Ice Accumulation:

Ice Velocity Pressure Exposure Coefficient:	K _{iz} 1.12		=(z/33) ^{0.10}
Factored Ice Thickness:	t _{iz} 2.25 in	(Section 2.6.8, p. 16)	=2.0 · t _i · I · K _{iz} · K _{zt}
Ice Density:	ρ _i 56.00 pcf		

Design Wind Pressures:

Velocity Pressure:	q _z 22.97 psf	Ref. 3, Section 2.6.9.6	=0.00256 · K _z · K _{zt} · K _d · V ² · I
Velocity Pressure (With Ice):	q _{zi} 6.13 psf	(Section 2.6.9.6, P. 25)	=0.00256 · K _z · K _{zt} · K _d · V _i ² · I
Velocity Pressure (Maintenance):	q _{zm} 2.21 psf	(Section 2.6.9.6, P. 25)	=0.00256 · K _z · K _{zt} · K _d · V _m ² · I
Velocity Pressure (Service):	q _{zs} 8.82 psf	(Section 2.6.9.6, P. 25)	=0.00256 · K _z · K _{zt} · K _d · V _s ² · I



Client: Metro PCS
 Site Name: 876348 - CTHA067A
 Project No. 18922086A
 Title: Antenna Mount Analysis

Computed By: DX
 Date: 7/23/2018
 Verified By: SMS
 Page: 3

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	Height (in)	Width (in)	Depth (in)	Force Coefficient		Length (in)	Diameter (in)	Force Coefficient	Height (in)	Width (in)	Depth (in)	Force Coefficient	
			C_a				$C_{a\text{ Front}}$	$C_{a\text{ Side}}$			C_a				$C_{a\text{ Front}}$	$C_{a\text{ Side}}$
AIR 21 B2A B4P	96.0	2.375	1.200	56.00	12.10	7.90	1.29	1.40	100.5	6.9	0.969	60.50	16.60	12.40	1.25	1.31
Air 32 DB B2A B66Aa	96.0	2.375	1.200	56.60	12.90	8.70	1.28	1.38	100.5	6.9	0.969	61.10	17.40	13.20	1.24	1.29
APXVAARR24_43-U-NA20	96.0	2.375	1.200	95.90	24.00	8.70	1.27	1.53	100.5	6.9	0.969	100.40	28.50	13.20	1.25	1.42
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	12.20	12.00	7.90	1.20	1.20
RRU 4449 B71 + B12	0.0	0.000	0.000	14.90	13.20	9.30	1.20	1.20	0.0	0.0	0.000	19.40	17.70	13.80	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 21 B2A B4P	2	79.1	71.3	53.3	33.7	35.1	115.7	7.6	6.8
Air 32 DB B2A B66Aa	2	83.7	75.9	73.6	35.1	36.4	124.6	8.0	7.3
APXVAARR24_43-U-NA20	2	232.5	123.9	76.7	75.8	54.3	319.4	22.3	11.9
KRY 112 144/1	1	11.1	5.0	21.0	7.5	4.9	29.3	1.1	0.5
RRU 4449 B71 + B12	1	37.7	26.5	78.0	17.5	13.7	81.7	3.6	2.5

* 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	Wind Load (plf)	Exposed Wind Height (in)	Depth (in)	Length (in)	Force Coefficient	Wind Load (plf)	Ice Weight (plf)	Wind Load (plf)
					C_a					C_a			
Pipe	Pipe 3.0	150	Round	3.50	1.20	8.04	8.00	8.00	154.50	1.07	4.38	15.80	0.77
Pipe	Pipe 2.0	96	Round	2.38	1.20	5.46	6.87	6.87	100.50	0.97	3.40	12.71	0.52
Pipe	Pipe 4.0	18	Round	4.50	0.73	6.32	9.00	9.00	22.50	0.70	3.22	18.55	0.61
Square HSS	HSS 4X4	36	Square	4.00	1.47	11.23	8.50	8.50	40.50	1.30	5.64	21.73	1.08



Client:	Metro PCS	Computed By:	DX
Site Name:	876348 - CTHA067A	Date:	7/23/2018
Project No.	18922086A	Verified By:	SMS
Title:	Antenna Mount Analysis	Page:	4

BASIC EQUATIONS

ANSI/TIA-222-G Reference

Importance Factor: $I := \begin{cases} 1.0 & \text{if Class} = \text{"II"} \\ 1.15 & \text{if Class} = \text{"III"} \end{cases}$ Table 2-3, Pg. 39

Force Coefficient:
(Square) $C_{f_square}(h, w) := \begin{cases} 1.2 & \text{if } \frac{h}{w} \leq 2.5 \\ \left[1.2 + \frac{0.2}{4.5} \cdot \left(\frac{h}{w} - 2.5 \right) \right] & \text{if } \frac{h}{w} > 2.5 \wedge \frac{h}{w} \leq 7 \\ \left[1.4 + \frac{0.6}{18} \cdot \left(\frac{h}{w} - 7 \right) \right] & \text{if } \frac{h}{w} > 7 \wedge \frac{h}{w} \leq 25 \\ 2.0 & \text{otherwise} \end{cases}$ Table 2-8, P. 42

Force Coefficient:
(Round) $C_{f_round}(h, w) := \begin{cases} 0.7 & \text{if } \frac{h}{w} \leq 2.5 \\ \left[0.7 + \frac{0.1}{4.5} \cdot \left(\frac{h}{w} - 2.5 \right) \right] & \text{if } \frac{h}{w} > 2.5 \wedge \frac{h}{w} \leq 7 \\ \left[0.8 + \frac{0.4}{18} \cdot \left(\frac{h}{w} - 7 \right) \right] & \text{if } \frac{h}{w} > 7 \wedge \frac{h}{w} \leq 25 \\ 1.2 & \text{otherwise} \end{cases}$ Table 2-8, P. 42

Terrain Exposure Constants: Table 2-4, P. 40

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



Client:	Metro PCS	Computed By:	DX
Site Name:	876348 - CTHA067A	Date:	7/23/2018
Project No.	18922086A	Verified By:	SMS
Title:	Antenna Mount Analysis	Page:	5

BASIC EQUATIONS

ANSI/TIA-222-G Reference

Velocity Pressure Coefficient:

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

$$K_z := K_z(z) \quad \text{Section 2.6.5, P. 13}$$

$$K_{zt}(z) := K_{zt} \leftarrow \begin{cases} 1.0 & \text{if Topo} = "1" \\ \text{otherwise} \end{cases} \quad \text{Section 2.6.6.4, p. 14}$$

$$K_e \leftarrow \begin{cases} 0.90 & \text{if Exp} = "B" \\ 1.00 & \text{if Exp} = "C" \\ 1.10 & \text{if Exp} = "D" \end{cases} \quad \text{Table 2-4 p. 40}$$

$$K_t \leftarrow \begin{cases} 0.43 & \text{if Topo} = "2" \\ 0.53 & \text{if Topo} = "3" \\ 0.72 & \text{if Topo} = "4" \end{cases} \quad \text{Table 2-5 p. 40}$$

$$f \leftarrow \begin{cases} 1.25 & \text{if Topo} = "2" \\ 2.00 & \text{if Topo} = "3" \\ 1.50 & \text{if Topo} = "4" \end{cases} \quad \text{Table 2-5 p. 40}$$

$$K_h \leftarrow e^{\left(\frac{f \cdot z}{CH} \right)} \quad \text{Section 2.6.6.4, P. 14}$$

$$\left(1 + \frac{K_e \cdot K_t}{K_h} \right)^2 \quad \text{Section 2.6.6.4, P. 14}$$

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

Velocity Pressure:

Section 2.6.9.6, P. 25

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



Client:	Metro PCS	Computed By:	DX
Site Name:	876348 - CTHA067A	Date:	7/23/2018
Project No.	18922086A	Verified By:	SMS
Title:	Antenna Mount Analysis	Page:	6

LOAD EQUATIONS

WIND LOAD

Area (Normal):	$AN_{area} = H_{ant} \cdot W_{ant}$
Area (Side):	$AT_{area} = H_{ant} \cdot D_{ant}$
Force Coefficient (Normal):	$C_{fn} = C_{fsquare}(H_{ant}, W_{ant})$
Force Coefficient (Side):	$C_{fs} = C_{fsquare}(H_{ant}, D_{ant})$
Pipe Area (Normal):	$AN_p = \max[(L_p - H_{ant}) \cdot D_p, 0]$
Pipe Area (Side):	$AT_p = L_p \cdot D_p$
Force Coefficient (Normal):	$C_{fp} = C_{fround}(L_p, D_p)$
Normal Effective Projected Area:	$E_{pan} = (C_{fn} \cdot AN_{area}) + (C_{fp} \cdot AN_p)$
Side Effective Projected Area:	$E_{pat} = (C_{fs} \cdot AT_{area}) + (C_{fp} \cdot AT_p)$
Effective Projected Area:	$EPA = \max(E_{pan}, E_{pat})$
Wind Force:	$F_{ant} = q_z \cdot Gh \cdot EPA$

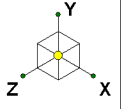
ICE DEAD LOAD

Largest Out-to-Out Dimension:	$D_{ant} = \sqrt{D_{ant}^2 + W_{ant}^2}$
Cross Sectional Area of Ice:	$A_{ice_ant} = \pi \cdot t_{iz} \cdot (D_{ant} + t_{iz})$
Total Ice Dead Load:	$DL_{ice_ant} = \rho_i \cdot (A_{ice_ant} \cdot H_{ant})$

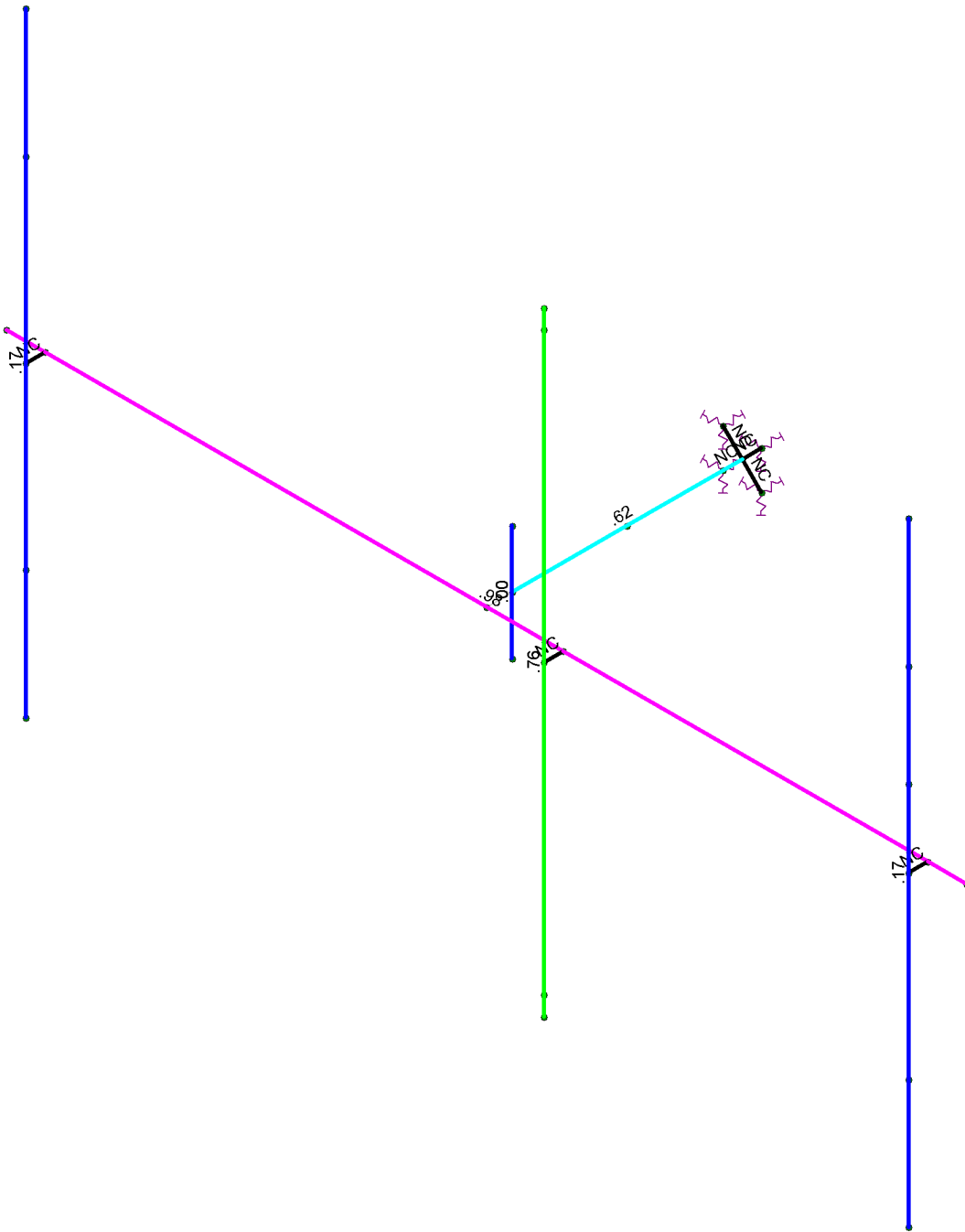
ICE WIND LOAD

Dimensions:	$H_{i_ant} = H_{ant} + 2t_{iz}$
	$W_{i_ant} = W_{ant} + 2t_{iz}$
	$D_{i_ant} = D_{ant} + 2t_{iz}$
Area (Normal):	$AIN_{area} = H_{i_ant} \cdot W_{i_ant}$
Area (Side):	$AIT_{area} = H_{i_ant} \cdot D_{i_ant}$
Force Coefficient (Normal):	$Ci_{fn} = C_{fsquare}(H_{i_ant}, W_{i_ant})$
Force Coefficient (Side):	$Ci_{fs} = C_{fsquare}(H_{i_ant}, D_{i_ant})$
Pipe Area (Normal):	$AN_p = \max[(L_{ip} - H_{i_ant}) \cdot D_{ip}, 0]$
Pipe Area (Side):	$AT_p = L_{ip} \cdot D_{ip}$
Force Coefficient (Normal):	$C_{fp} = C_{fround}(L_{ip}, D_{ip})$
Normal Effective Projected Area:	$E_{pain} = (Ci_{fn} \cdot AIN_{area}) + (C_{fp} \cdot AN_p)$
Side Effective Projected Area:	$E_{pait} = (Ci_{fs} \cdot AIT_{area}) + (C_{fp} \cdot AT_p)$
Effective Projected Area:	$EPA_i = \max(E_{pain}, E_{pait})$
Wind Force:	$F_{i_ant} = q_z \cdot Gh \cdot EPA_i$

APPENDIX C
SOFTWARE ANALYSIS OUTPUT



Code Check	
	No Calc
	> 1.0
	.90-1.0
	.75-.90
	.50-.75
	0-.50



Member Code Checks Displayed
Envelope Only Solution

Maser Consulting Connecti...

DX

18922086A

876348 - CTHA067A

SK - 38

July 24, 2018 at 9:55 AM

876348_APP#446209_MountAnalys...



Company : Maser Consulting Connecticut
 Designer : DX
 Job Number : 18922086A
 Model Name : 876348 - CTHA067A

July 24, 2018

Checked By: SMS

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotat...	Section/Shape	Type	Design ...	Material	Design Rules
1	M1	N8	N5			RIGID	None	None	RIGID	Typical
2	M2	N7	N4			RIGID	None	None	RIGID	Typical
3	M3	N9	N6			RIGID	None	None	RIGID	Typical
4	M4	N11	N14			Antenna Pipe	Column	Pipe	A53 Gr. B	Typical
5	M5	N10	N13			Antenna Pipe	Column	Pipe	A53 Gr. B	Typical
6	M6	N12	N15			Antenna Pipe	Column	Pipe	A53 Gr. B	Typical
7	M7	N3	N2			Horizontal Pipe	Beam	Pipe	A53 Gr. B	Typical
8	M8	N1	N16			RIGID	None	None	RIGID	Typical
9	M9	N17	N18			Vert Pipe	Column	Pipe	A53 Gr. B	Typical
10	M10	N16	N19			Support Arm	Beam	Tube	A500 Gr. B 46	Typical
11	M11	N23	N19			RIGID	None	None	RIGID	Typical
12	M12	N21	N19			RIGID	None	None	RIGID	Typical
13	M13	N22	N19			RIGID	None	None	RIGID	Typical
14	M14	N20	N19			RIGID	None	None	RIGID	Typical

Joint Loads and Enforced Displacements (BLC 1 : Dead)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N24	L	Y	-76.7
2	N25	L	Y	-76.7
3	N26	L	Y	-73.6
4	N28	L	Y	-73.6
5	N27	L	Y	-53.3
6	N29	L	Y	-53.3
7	N30	L	Y	-78
8	N31	L	Y	-21

Joint Loads and Enforced Displacements (BLC 2 : Wx)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N27	L	X	71.3
2	N29	L	X	71.3
3	N26	L	X	75.9
4	N28	L	X	75.9
5	N24	L	X	123.9
6	N25	L	X	123.9
7	N30	L	X	37.7
8	N31	L	X	5

Joint Loads and Enforced Displacements (BLC 3 : Wz)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N27	L	Z	-79.1
2	N29	L	Z	-79.1
3	N26	L	Z	-83.7
4	N28	L	Z	-83.7
5	N24	L	Z	-232.5
6	N25	L	Z	-232.5
7	N31	L	Z	-11.1
8	N30	L	Z	-26.5



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

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N27	L	X	35.1
2	N29	L	X	35.1
3	N26	L	X	36.4
4	N28	L	X	36.4
5	N24	L	X	54.3
6	N25	L	X	54.3
7	N30	L	X	17.5
8	N31	L	X	4.9

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

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N27	L	Z	-33.7
2	N29	L	Z	-33.7
3	N26	L	Z	-35.1
4	N28	L	Z	-35.1
5	N24	L	Z	-75.8
6	N25	L	Z	-75.8
7	N31	L	Z	-7.5
8	N30	L	Z	-13.7

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

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N24	L	Y	-319.4
2	N25	L	Y	-319.4
3	N26	L	Y	-124.6
4	N28	L	Y	-124.6
5	N27	L	Y	-115.7
6	N29	L	Y	-115.7
7	N30	L	Y	-81.7
8	N31	L	Y	-29.3

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

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N27	L	X	6.8
2	N29	L	X	6.8
3	N26	L	X	7.3
4	N28	L	X	7.3
5	N24	L	X	11.9
6	N25	L	X	11.9
7	N30	L	X	3.6
8	N31	L	X	.5

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

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N27	L	Z	-7.6
2	N29	L	Z	-7.6
3	N26	L	Z	-8
4	N28	L	Z	-8
5	N24	L	Z	-22.3
6	N25	L	Z	-22.3



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

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
7	N31	L	Z	-1.1
8	N30	L	Z	-2.5

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

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N14	L	Y	-500

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

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N13	L	Y	-500

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

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N15	L	Y	-500

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

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N1	L	Y	-250

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

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N3	L	Y	-250

Member Distributed Loads (BLC 2 : Wx)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,...]
1	M9	PX	6.32	6.32	0	0
2	M10	PX	11.23	11.23	0	0

Member Distributed Loads (BLC 3 : Wz)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,...]
1	M7	PZ	-8.04	-8.04	0	0
2	M9	PZ	-6.32	-6.32	0	0

Member Distributed Loads (BLC 4 : Wx Ice)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,...]
1	M9	PX	3.22	3.22	0	0
2	M10	PX	5.64	5.64	0	0

Member Distributed Loads (BLC 5 : Wz Ice)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,...]
1	M7	PZ	-4.38	-4.38	0	0
2	M9	PZ	-3.22	-3.22	0	0

Member Distributed Loads (BLC 6 : Ice Weight)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,...]
1	M7	Y	-15.08	-15.08	0	0



Member Distributed Loads (BLC 6 : Ice Weight) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,...]
2	M4	Y	-12.71	-12.71	0	0
3	M5	Y	-12.71	-12.71	0	0
4	M6	Y	-12.71	-12.71	0	0
5	M9	Y	-18.55	-18.55	0	0
6	M10	Y	-21.73	-21.73	0	0

Member Distributed Loads (BLC 7 : Wx Service)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,...]
1	M9	PX	.61	.61	0	0
2	M10	PX	1.08	1.08	0	0

Member Distributed Loads (BLC 8 : Wz Service)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,...]
1	M7	PZ	-.77	-.77	0	0
2	M9	PZ	-.61	-.61	0	0

Basic Load Cases

	BLC Description	Category	X Gra...Y Gra...Z Gra...	Joint	Point	Distributed	Area(... Surface(...
1	Dead	DL	-1.05	8			
2	Wx	None		8		2	
3	Wz	WL		8		2	
4	Wx Ice	WL		8		2	
5	Wz Ice	WL		8		2	
6	Ice Weight	OL1		8		6	
7	Wx Service	WL		8		2	
8	Wz Service	WL		8		2	
9	Maintenance Load LM1	OL2		1			
10	Maintenance Load LM2	OL2		1			
11	Maintenance Load LM3	None		1			
13	Maintenance Load LV1	None		1			
14	Maintenance Load LV2	None		1			

Joint Coordinates and Temperatures

	Label	X [in]	Y [in]	Z [in]	Temp [F]	Detach From Diaphragm
1	N1	0	0	0	0	
2	N2	75	0	0	0	
3	N3	-75	0	0	0	
4	N4	12	0	0	0	
5	N5	-69	0	0	0	
6	N6	69	0	0	0	
7	N7	12	0	3	0	
8	N8	-69	0	3	0	
9	N9	69	0	3	0	
10	N10	12	48	3	0	
11	N11	-69	48	3	0	
12	N12	69	48	3	0	
13	N13	12	-48	3	0	
14	N14	-69	-48	3	0	



Joint Coordinates and Temperatures (Continued)

	Label	X [in]	Y [in]	Z [in]	Temp [F]	Detach From Diaphragm
15	N15	69	-48	3	0	
16	N16	0	0	-4	0	
17	N17	0	9	-4	0	
18	N18	0	-9	-4	0	
19	N19	0	0	-40	0	
20	N20	3	-3	-40	0	
21	N21	3	3	-40	0	
22	N22	-3	-3	-40	0	
23	N23	-3	3	-40	0	
24	N24	12	45	3	0	
25	N25	12	-45	3	0	
26	N26	-69	28	3	0	
27	N27	69	28	3	0	
28	N28	-69	-28	3	0	
29	N29	69	-28	3	0	
30	N30	0	0	-22	0	
31	N31	69	12	3	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]	Footing
1	N23	S50	S50	S50				
2	N21	S50	S50	S50				
3	N20	S50	S50	S50				
4	N22	S50	S50	S50				

Member Point Loads

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

Load Combinations

Description	Solve	PDel...S...	BLC Fact...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	F.....	F.....	F.....	F.....	F.....
1	1.4D	Yes	Y	1	1.4										
2	1.2D+1.6W1	Yes	Y	1	1.2	2	1.6	3							
3	1.2D+1.6W2	Yes	Y	1	1.2	2	1.3...	3	.8						
4	1.2D+1.6W3	Yes	Y	1	1.2	2	.8	3	1.386						
5	1.2D+1.6W4	Yes	Y	1	1.2	2		3	1.6						
6	1.2D+1.6W5	Yes	Y	1	1.2	2	-.8	3	1.386						
7	1.2D+1.6W6	Yes	Y	1	1.2	2	-1....	3	.8						
8	1.2D+1.6W7	Yes	Y	1	1.2	2	-1.6	3							
9	1.2D+1.6W8	Yes	Y	1	1.2	2	-1....	3	-.8						
10	1.2D+1.6W9	Yes	Y	1	1.2	2	-.8	3	-1.3...						
11	1.2D+1.6W10	Yes	Y	1	1.2	2		3	-1.6						
12	1.2D+1.6W11	Yes	Y	1	1.2	2	.8	3	-1.3...						
13	1.2D+1.6W12	Yes	Y	1	1.2	2	1.3...	3	-.8						
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					



Company : Maser Consulting Connecticut
 Designer : DX
 Job Number : 18922086A
 Model Name : 876348 - CTHA067A

July 24, 2018

Checked By: SMS

Load Combinations (Continued)

	Description	Solve	PDel...S...	BLC Fact...	BLC	Fac...	BLC	Fac...	BLC	F.....	F.....	F.....	F.....	F.....
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	.8...			
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	.8...			
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	-.5			
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	-.5			
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	.8...			
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	.8...			
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	-.5			
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	-.5			
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	.8...			
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	.8...			
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	-.5			
51	1.2D+1.5LM2+1.0W10SER	Yes	Y	1	1.2	10	1.5	7		8	-1			
52	1.2D+1.5LM2+1.0W11SER	Yes	Y	1	1.2	10	1.5	7	.5	8	-.5			
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	.8...			
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	.8...			
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	-.5			
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	-.5			



Company : Maser Consulting Connecticut
 Designer : DX
 Job Number : 18922086A
 Model Name : 876348 - CTHA067A

July 24, 2018

Checked By: SMS

Load Combinations (Continued)

	Description	Solve	PDel...S...	BLC Fact...	BLC	Fac...	BLC	Fac...	BLC	F.....	F.....	F.....	F.....	F.....
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		Y	1	1.2	12	1.5	7	1	8				
72	1.2D+1.5LM4+1.0W2SER		Y	1	1.2	12	1.5	7	.866	8	.5			
73	1.2D+1.5LM4+1.0W3SER		Y	1	1.2	12	1.5	7	.5	8	.8...			
74	1.2D+1.5LM4+1.0W4SER		Y	1	1.2	12	1.5	7		8	1			
75	1.2D+1.5LM4+1.0W5SER		Y	1	1.2	12	1.5	7	-.5	8	.8...			
76	1.2D+1.5LM4+1.0W6SER		Y	1	1.2	12	1.5	7	-.866	8	.5			
77	1.2D+1.5LM4+1.0W7SER		Y	1	1.2	12	1.5	7	-1	8				
78	1.2D+1.5LM4+1.0W8SER		Y	1	1.2	12	1.5	7	-.866	8	-.5			
79	1.2D+1.5LM4+1.0W9SER		Y	1	1.2	12	1.5	7	-.5	8	-.5			
80	1.2D+1.5LM4+1.0W10SER		Y	1	1.2	12	1.5	7		8	-1			
81	1.2D+1.5LM4+1.0W11SER		Y	1	1.2	12	1.5	7	.5	8	-.5			
82	1.2D+1.5LM4+1.0W12SER		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 [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC	
1	N22	max	2129.208	64	2438.593	29	9986.671	22	0	1	0	1	0	1
2		min	-2044.744	29	-1705.213	64	-492.606	2	0	1	0	1	0	1
3	N20	max	2129.208	64	2523.076	64	10025.924	17	0	1	0	1	0	1
4		min	-2044.744	29	-1620.768	29	-614.329	9	0	1	0	1	0	1
5	N23	max	2044.46	35	2438.593	29	512.439	8	0	1	0	1	0	1
6		min	-2127.839	58	-1705.213	64	-9984.67	16	0	1	0	1	0	1
7	N21	max	2044.46	35	2523.076	64	629.874	3	0	1	0	1	0	1
8		min	-2127.839	58	-1620.768	29	-9986.663	22	0	1	0	1	0	1
9	Totals:	max	1004.882	8	2702.629	25	1500.99	5						
10		min	-1004.882	2	885.703	5	-1500.991	11						

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

Memb...	Shape	Code Check	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*...	phi*...	phi*...	phi*...	Eqn
1	M4 PIPE_2.0	.174	48	11	.014	20		11	149...	321...	187...	187...	H1...
2	M5 PIPE_2.0	.755	48	11	.039	3		11	149...	321...	187...	187...	H1...
3	M6 PIPE_2.0	.174	48	11	.015	36		11	149...	321...	187...	187...	H1...
4	M7 PIPE_3.0	.978	75	64	.165	75		25	282...	652...	574...	574...	H1...
5	M9 PIPE_4.0	.000	9	11	.000	9		11	925...	932...	106...	106...	H1...
6	M10 HSS4x4x4	.617	36	17	.352	36	y	63	134...	139...	161...	161...	H1...

Masonry Properties

Label	E [ksi]	G [ksi]	Nu	Them (\1...	Self Weight[k/ft^3]	f'm[ksi]	Flex Steel[...]	Shear Ste...
1 Concrete Matl	1350	540	.25	.6	Custom	1.5	60	60
2 Clay Matl	1050	420	.25	.6	Custom	1.5	60	60
3 Gen Masonry	1050	420	.25	.6	.08	1.5	60	60



Company : Maser Consulting Connecticut
Designer : DX
Job Number : 18922086A
Model Name : 876348 - CTHA067A

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APPENDIX D
ADDITIONAL CALCUATIONS

Mount to Tower Connection Check:

Applied Tension: $R_z := 9987 \cdot \text{lbf}$ From Risa 3D LRFD Loading
Applied Shear: $R_y := 2523 \cdot \text{lbf}$ From Risa 3D LRFD Loading
Applied Shear: $R_x := 2129 \cdot \text{lbf}$ From Risa 3D LRFD Loading

Applied Tension at Bolt: $P_{a,t} := R_z = 9987 \text{ lbf}$

Applied Shear at Bolt: $P_{a,v} := \sqrt{R_y^2 + R_x^2} = 3301.2 \text{ lbf}$

Bolt Type Used: **A325N**

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

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

Nominal Bolt Diameter: $d_b := \frac{5}{8} \text{ in}$ Per Specifications

Gross Area of the Bolt: $A_{b,g} := 0.307 \text{ in}^2$ AISC, Table 7-18, P. 7-83

Net Area of the Bolt: $A_{b,n} := 0.226 \text{ in}^2$ AISC, Table 7-18, P. 7-83

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

Combined Tension And Shear Check

Nominal Tensile Reduced Fntr $F_{n.t.r} := 1.3 \cdot F_{n.t} - \frac{F_{n.t}}{\phi \cdot F_{n.v}} \cdot \frac{P_{a.v}}{A_{b.g}} = 93.1 \cdot \text{ksi}$ AISC Eq. J3-3a, P. 16.1-109

Nominal Shear Reduced Fntv $F_{n.v.r} := 1.3 \cdot F_{n.v} - \frac{F_{n.v}}{\phi \cdot F_{n.t}} \cdot \frac{P_{a.t}}{A_{b.g}} = 44.2 \cdot \text{ksi}$ AISC Eq. J3-3a, P. 16.1-109

Bolt Nominal Tensile Strength $R_{n.t} := F_{n.t} \cdot A_{b.g} = 27.6 \cdot \text{kip}$

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

Tension Ratio $\text{Ratio}_t := \frac{P_{a.t}}{\phi \cdot R_{n.t}}$ Ratio_t = 48.2%

Bolt Nominal Shear Strength $R_{n.v} := F_{n.v} \cdot A_{b.g} = 16.6 \cdot \text{kip}$

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

Shear Ratio $\text{Ratio}_v := \frac{P_{a.v}}{\phi \cdot R_{n.v}}$ Ratio_v = 26.6%



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

T-Mobile Existing Facility

Site ID: CTHA067A

Crown Castle Enfield
55 Bright Meadow Boulevard
Enfield, CT 06082

August 15, 2018

EBI Project Number: 6218005571

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	14.39 %



August 15, 2018

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

Emissions Analysis for Site: **CTHA067A – Crown Castle Enfield**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **55 Bright Meadow Boulevard, Enfield, 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ 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 ($\mu\text{W}/\text{cm}^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately $400 \mu\text{W}/\text{cm}^2$ and $467 \mu\text{W}/\text{cm}^2$ respectively. The general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) frequency bands is $1000 \mu\text{W}/\text{cm}^2$. 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 **55 Bright Meadow Boulevard, Enfield, 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 channel (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) 2 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 AIR32 B66AA/B2A & Ericsson AIR21 B2A/B4P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **RFS APXVAARR24_43-U-NA20** for 600 MHz and 700 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 **107 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 AIR32 B66AA/B2A	Make / Model:	Ericsson AIR32 B66AA/B2A	Make / Model:	Ericsson AIR32 B66AA/B2A
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	107 feet	Height (AGL):	107 feet	Height (AGL):	107 feet
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	200	Total TX Power(W):	200	Total TX Power(W):	200
ERP (W):	7,780.90	ERP (W):	7,780.90	ERP (W):	7,780.90
Antenna A1 MPE%	2.74	Antenna B1 MPE%	2.74	Antenna C1 MPE%	2.74
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	107 feet	Height (AGL):	107 feet	Height (AGL):	107 feet
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	2	Channel Count	2	Channel Count	2
Total TX Power(W):	55	Total TX Power(W):	55	Total TX Power(W):	55
ERP (W):	2,139.75	ERP (W):	2,139.75	ERP (W):	2,139.75
Antenna A2 MPE%	0.76	Antenna B2 MPE%	0.76	Antenna C2 MPE%	0.76
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:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd
Height (AGL):	107 feet	Height (AGL):	107 feet	Height (AGL):	107 feet
Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,443.03	ERP (W):	2,443.03	ERP (W):	2,443.03
Antenna A3 MPE%	2.04	Antenna B3 MPE%	2.04	Antenna C3 MPE%	2.04

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Per Sector Max)	5.54 %
AT&T	3.88
Clearwire	0.09
Sprint	0.32
Verizon Wireless	4.05
Nextel	0.39
XM Satellite Radio	0.12
Site Total MPE %:	14.39 %

T-Mobile Sector A Total:	5.54 %
T-Mobile Sector B Total:	5.54 %
T-Mobile Sector C Total:	5.54 %
Site Total:	14.39 %



T-Mobile Max Power Values (Per Sector)

T-Mobile Frequency Band / Technology (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
T-Mobile PCS - 1900 MHz LTE	2	1,556.18	107	10.97	PCS - 1900 MHz	1000.00	1.10%
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	107	16.45	AWS - 2100 MHz	1000.00	1.65%
T-Mobile PCS - 1900 MHz GSM	1	583.57	107	2.06	PCS - 1900 MHz	1000.00	0.21%
T-Mobile AWS - 2100 MHz UMTS	1	1,556.18	107	5.48	AWS - 2100 MHz	1000.00	0.55%
T-Mobile 600 MHz LTE	2	788.97	107	5.56	600 MHz	400.00	1.39%
T-Mobile 700 MHz LTE	2	432.54	107	3.05	700 MHz	467.00	0.65%
						Total:	5.54%



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:	5.54 %
Sector B:	5.54 %
Sector C:	5.54 %
T-Mobile Maximum MPE % (Per Sector):	5.54 %
Site Total:	14.39 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **14.39%** 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.