Transcend Wireless

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March 29, 2018

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

T-Mobile Northeast LLC – CTNH550A
Tower Share Application
38 Lower Road, North Canaan, CT 06024
Latitude- 42.01472200
Longitude- -73.32639000

Dear Ms. Bachman,

This letter and attachments are submitted on behalf of T-Mobile Northeast LLC ("T-Mobile"). T-Mobile plans to install antennas and related equipment at the tower site located at 38 Lower Road, North Canaan, Connecticut (also known as 36 Lower Road). This tower was originally approved by the Town of North Canaan by issuance of building permit.

T-Mobile will install twelve (12) 600/700/1900/2100 MHz panel antennas, one (1) microwave dish antenna, and eight (8) RRHs at the 125' level of the existing 195' lattice tower. Four (4) hybrid cables and one (1) coax cable will also be installed. T-Mobile's equipment cabinets will be placed in an existing shelter within the existing ground facility. Included are plans by Centek Engineering, dated March 28, 2018, depicting the planned changes and attached as **Exhibit A**. Also included is a structural analysis prepared by Centek Engineering, dated February 27, 2018, confirming that the existing tower is structurally capable of supporting the proposed equipment. This is attached and detailed in **Exhibit B**.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies 16-50aa, of T-Mobile's intent to share a telecommunications facility pursuant to R.C.S.A. 16-50j-88. In accordance with R.C.S.A., a copy of this letter is being sent to Charles P. Perotti, First Selectman of the Town of North Canaan, as well as the tower and property owner, Litchfield County Dispatch. Please see the attached letter from the Litchfield County Dispatch authorizing the proposed shared use of this facility attached as **Exhibit C**. A copy of this submission is also being sent to Ruth Mulcahy, Zoning Enforcement Officer for the Town of North Canaan.

The planned modifications of the facility fall squarely within those activities explicitly provided for in R.C.S.A. 16-50j-89.

1. The proposed modification will not result in an increase in the height of the existing structure. The top of the lattice tower is 195'; T-Mobile's proposed antennas will be located at a center line height of 125'.

2. The proposed modifications will not result in the increase of the site boundary as depicted on the attached site plan.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed local and state criteria. T-Mobile's plans include the installation of an emergency back-up generator; noise associated with this installation is exempt from State and local noise standards. The incremental effect of the proposed changes will be negligible.

4. The operation of the proposed antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard. As indicated in the attached power density calculations, the combined site operations will result in a total power density of 15.11%, as evidenced by **Exhibit D**.

Connecticut General Statutes 16-50aa indicates that the Council must approve the shared use of a telecommunications facility provided it finds the shared use is technically, legally, environmentally, and economically feasible and meets public safety concerns. As demonstrated in this letter, T-Mobile respectfully submits that the shared use of this facility satisfies these criteria.

A. Technical Feasibility. The existing lattice tower has been deemed structurally capable of supporting T-Mobile's proposed loading. The structural analysis is included as **Exhibit B**.
B. Legal Feasibility. As referenced above, C.G.S. 16-50aa has been authorized to issue orders approving the shared use of an existing tower such as this lattice tower in North Canaan. Under the authority granted to the Council, an order of the Council approving the requested shared use would permit T-Mobile to obtain a building permit for the proposed installation. Further, a Letter of Authorization is included as **Exhibit C**, authorizing T-Mobile to file this application for shared use.
C. Environmental Feasibility. The proposed shared use of this facility would have minimal environmental impact. The installation of T-Mobile equipment at the 125' level of the existing 195' tower would have an insignificant visual impact on the area around the tower. T-Mobile's ground equipment would be installed within an existing shelter within the existing facility compound. T-Mobile's shared use would therefore not cause any significant alteration in the physical or environmental characteristics of the existing site. Additionally, as evidenced by **Exhibit D**, the proposed antennas would not increase radio frequency emissions to a level at or above the Federal Communications Commission safety standard.
D. Economic Feasibility. T-Mobile will be entering into an agreement with the owner of this facility to mutually agreeable terms. As previously mentioned, the Letter of Authorization has been provided by the owner to assist T-Mobile with this tower sharing application.
E. Public Safety Concerns. As discussed above, the lattice tower is structurally capable of supporting T-Mobile's proposed loading. T-Mobile is not aware of any public safety concerns relative to the proposed sharing of the existing tower. T-Mobile's intentions of providing new and improved wireless service through the shared use of this facility is expected to enhance the safety and welfare of local residents and individuals traveling through North Canaan and nearby the facility.

Sincerely,

Kyle Richers

Kyle Richers
Transcend Wireless
10 Industrial Ave., Suite 3
Mahwah, New Jersey
krichers@transcendwireless.com
908-447-4716

CC: Charles Perotti- First Selectmen
Litchfield County Dispatch- Owner
Ruth Mulcahy- Zoning Officer

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

NORTH CANAAN
SITE ID: CTNH550A
38 LOWER ROAD
NORTH CANAAN, CT 06024

PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF THE INSTALLATION OF A PROPOSED UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:

   A. THE INSTALLATION OF TWELVE (12) NEW T-MOBILE PANEL ANTENNAS, THREE (3) PER SECTOR.

   B. THE INSTALLATION OF EIGHT (8) NEW T-MOBILE REMOTE RADIO UNITS, TWO (2) PER SECTOR.

   C. THE INSTALLATION OF FOUR (4) NEW T-MOBILE FIBER CABLES FROM EQUIPMENT SHELTER AT GRADE TO ANTENNA SECTORS.

   D. THE INSTALLATION OF A NEW T-MOBILE 7.5kW PROPANE FUELED GENERATOR WITH A CORRESPONDING 120 GALLON PROPANE STORAGE TANK.

   E. THE INSTALLATION OF T-MOBILE WIRELESS EQUIPMENT IN AN EXISTING EQUIPMENT SHELTER.

PROJECT INFORMATION

SITE NAME:	NORTH CANAAN
SITE ID:	CTNH550A
SITE ADDRESS:	38 LOWER ROAD NORTH CANAAN, CT 06024
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	DAN REID (PROJECT MANAGER) TRANSCEND WIRELESS, LLC (203) 592-8291
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 42°-00'-52.78" N LONGITUDE: 73°-19'-34.68" W GROUND ELEVATION: 962.8'± AMSL COORDINATES AND GROUND ELEVATION BASED ON FAA 2-C SURVEY CERTIFICATION PREPARED BY CENTEK ENGINEERING, INC. DATED MARCH 10, 2018

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2016 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T-MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

FROM: 35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

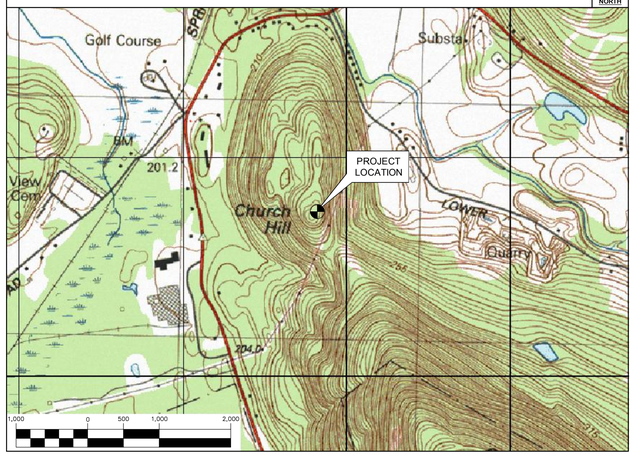
TO: 38 LOWER ROAD
NORTH CANAAN, CT 06024

1.	HEAD SOUTHEAST ON W NEWBERRY RD TOWARD GRIFFIN RD S.	233 FT.
2.	TURN LEFT ONTO GRIFFIN RD S.	0.70 MI.
3.	TURN LEFT ONTO CT-187 N.	1.30 MI.
4.	TAKE THE CT-189 N RAMP TO TARIFFVILLE/GRANBY.	0.70 MI.
5.	CONTINUE ONTO CT-189 N.	4.40 MI.
6.	TURN RIGHT ONTO SALMON BROOKE ST.	463 FT.
7.	SLIGHT LEFT ONTO N GRANBY RD.	0.20 MI.
8.	SLIGHT LEFT ONTO CT-20 W/W GRANBY RD.	3.40 MI.
9.	TURN LEFT ONTO CT-219 S.	3.80 MI.
10.	TURN LEFT ONTO CT-179 S/CT-219 S.	2.50 MI.
11.	TURN RIGHT ONTO CT-318 W.	1.70 MI.
12.	TURN LEFT ONTO CT-181 S/CT-318 W.	1.40 MI.
13.	TURN RIGHT ONTO US-44 W.	18.60 MI.
14.	TURN LEFT ONTO FURNACE HILL RD.	0.30 MI.
15.	TURN RIGHT ONTO LOWER RD.	1.60 MI.

VICINITY MAP

SCALE: 1" = 1000'

NORTH



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REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
B	03/28/18			CONSTRUCTION DRAWINGS - REVISED PER CLIENT COMMENTS
A	03/28/18			CONSTRUCTION DRAWINGS - ISSUED FOR CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

T-Mobile

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CTNH550A
38 LOWER ROAD
NORTH CANNAN, CT 06024

DATE: 03/21/18
SCALE: AS NOTED
JOB NO. 18025.00

TITLE SHEET

T-1

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SITE AND FOUNDATION SPECIFICATIONS

DESIGN BASIS:

GOVERNING CODE: 2012 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2016 CT STATE BUILDING CODE AND AMENDMENTS.

1. DESIGN CRITERIA:

- WIND LOAD: PER TIA 222 G (ANTENNA MOUNTS): 100–110 MPH (3 SECOND GUST)
- RISK CATEGORY: III (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 101 MPH (Vasd) (EXPOSURE C/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7–10) PER 2012 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7–10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES

1. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.
2. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST THE PRE MANUFACTURED EQUIPMENT BUILDING SHOP DRAWINGS.
3. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
4. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

CONCRETE CONSTRUCTION NOTES

1. CONCRETE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING STANDARDS:

   ACI 211 – STANDARD PRACTICE FOR SELECTING PROPORTIONS FOR NORMAL AND HEAVYWEIGHT CONCRETE.

   ACI 301 – SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS.

   ACI 302 – GUIDE FOR CONCRETE FLOOR AND SLAB CONSTRUCTION

   ACI 304 – RECOMMENDED PRACTICE FOR MEASURING, MIXING, TRANSPORTING, AND PLACING CONCRETE.

   ACI 306.1 STANDARD SPECIFICATION FOR COLD WEATHER CONCRETING

   ACI 318 – BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.

2. CONCRETE SHALL DEVELOP COMPRESSIVE STRENGTH IN 28 DAYS AS FOLLOWS:

SLABS ON GRADE	4,000 PSI
ALL OTHER CONCRETE	3,000 PSI

   – PORTLAND CEMENT: ASTM C150, TYPE II, (540 LBS/CUBIC YARD)
   – AGGREGATE: ASTM C33, No. 67, TYPICAL
   – WATER: POTABLE WITH MAXIMUM WATER CEMENT RATIO OF .55
   – SLUMP: 3" TO 4"
   – ADMIXTURES: USE AIR ENTRAINING ADGENT CONFORMING TO ASTM C260 WITH 4 TO 6% TOTAL AIR. USE WATER REDUCING AGENT CONFORMING TO ASTM C494, TYPE A, IN ALL CONCRETE. CALCIUM CHLORIDE MAY NOT BE USED TO ACCELERATE THE CONCRETE SETTING TIME.

3. REINFORCING STEEL SHALL BE 60,000 PSI YIELD STRENGTH.
4. WELDED WIRE FABRIC SHALL CONFORM TO ASTM– A–185.
5. ALL DETAILING, FABRICATION, AND ERECTION OF REINFORCING BARS, UNLESS OTHERWISE NOTED, MUST FOLLOW THE LATEST ACI CODE AND LATEST ACI "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES".
6. CONCRETE COVER OVER REINFORCING SHALL CONFORM TO THE FOLLOWING, UNLESS OTHERWISE SHOWN:

BOTTOM OF FOOTINGS	3 INCHES
SURFACES NOT EXPOSED TO EARTH OR WEATHER	1–1/2 INCHES

7. NO STEEL WIRE, METAL FORM TIES, OR ANY OTHER METAL SHALL REMAIN WITHIN THE REQUIRED COVER OF ANY CONCRETE SURFACE.
8. ALL REINFORCEMENT SHALL BE CONTINUOUS UNLESS OTHERWISE NOTED. SPLICES SHALL BE WELL STAGGERED. ADDITIONAL BARS AND SPECIAL BENDING DETAILS ARE REQUIRED AT INTERSECTING WALLS AND AT JOINTS. SUCH DETAILS SHALL COMPLY WITH ACI 315 RECOMMENDATIONS UNLESS OTHERWISE SHOWN.
9. NO TACK WELDING OF REINFORCING WILL BE PERMITTED.
10. NO CALCIUM CHLORIDE OR ADMIXTURES CONTAINING MORE THAN 1% CHLORIDE BY WEIGHT OF ADMIXTURE SHALL BE USED IN THE CONCRETE.
11. UNLESS OTHERWISE NOTED, ALL LAP SPLICES SHALL BE 48 BAR DIAMETERS.
12. SLAB ON GRADE FINISHES:

    EXTERIOR SLAB: NON–SLIP BROOM FINISH
    INTERIOR SLAB: STEEL TROWEL FINISH

13. INSPECTION AND TESTING OF CONCRETE WORK SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY, PAID BY THE OWNER, AND APPROVED BY THE ENGINEER. THE INSPECTOR SHALL OBSERVE CONDITION OF SOILS AND FORMWORK BEFORE FOOTINGS ARE PLACED, SIZE, SPACING AND LOCATION OF REINFORCEMENT, AND PLACEMENT OF CONCRETE.
14. THE TESTING COMPANY SHALL ALSO OBTAIN A MINIMUM OF THREE (3) COMPRESSIVE STRENGTH TEST SPECIMENS FOR EACH CONCRETE MIX DESIGN. ONE SPECIMEN TESTED AT 7 DAYS, ONE AT 28 DAYS, AND ONE HELD IN RESERVE FOR FUTURE TESTING, IF NEEDED.
15. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)–––ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)–––ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)–––ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)–––ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE–––ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS–––ASTM A325–N
   G. U–BOLTS–––ASTM A36
   H. ANCHOR RODS–––ASTM F 1554
   I. WELDING ELECTRODE–––ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON–GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT–DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
B	03/28/18			CONSTRUCTION DRAWINGS – REVISED PER CLIENT COMMENTS
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PROFESSIONAL ENGINEER SEAL

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CTNH550A

38 LOWER ROAD
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DATE: 03/21/18
SCALE: AS NOTED
JOB NO. 18025.00

DESIGN BASIS AND STRUCTURAL SPECIFICATIONS

N–1

1 / C-1 SITE LOCATION PLAN
SCALE: 1" = 100'

APPROX. NORTH

GRAPHIC SCALE
100 0 50 100 200 400
(IN FEET)
1 inch = 100 ft.

PROFESSIONAL ENGINEER SEAL

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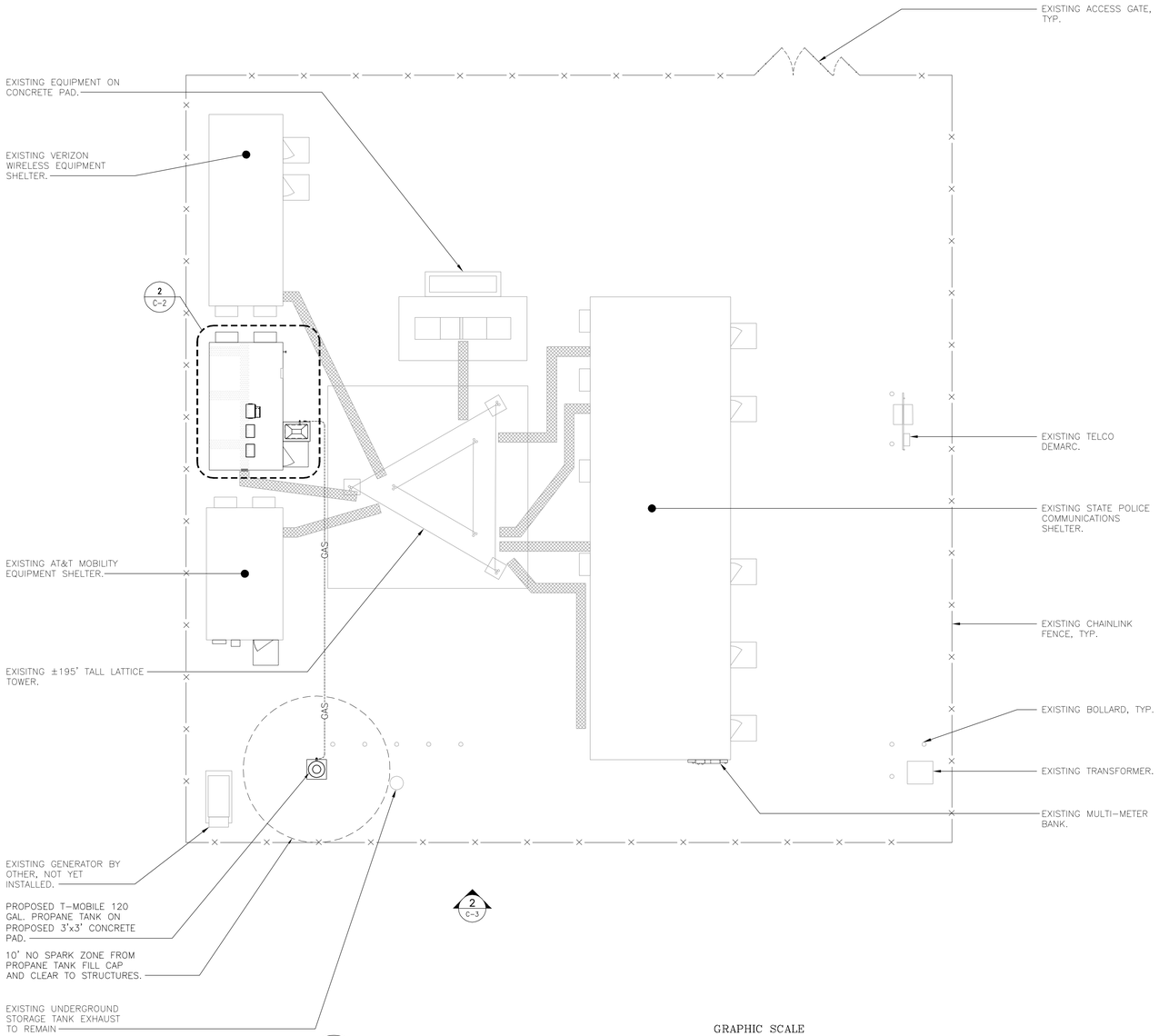
JOB NO. 18025.00

SITE LOCATION PLAN

C-1

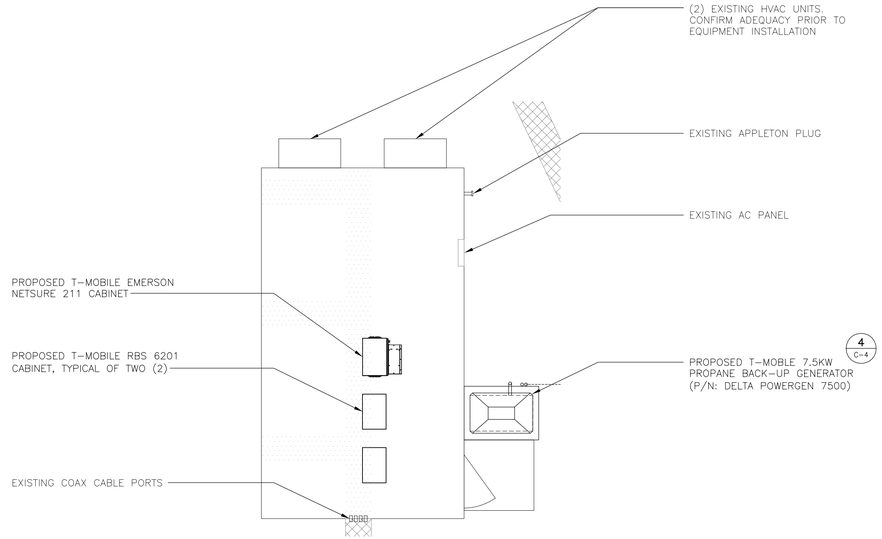
Sheet No. 3 of 13



1 C-2 **COMPOUND PLAN**
SCALE: 1" = 10'

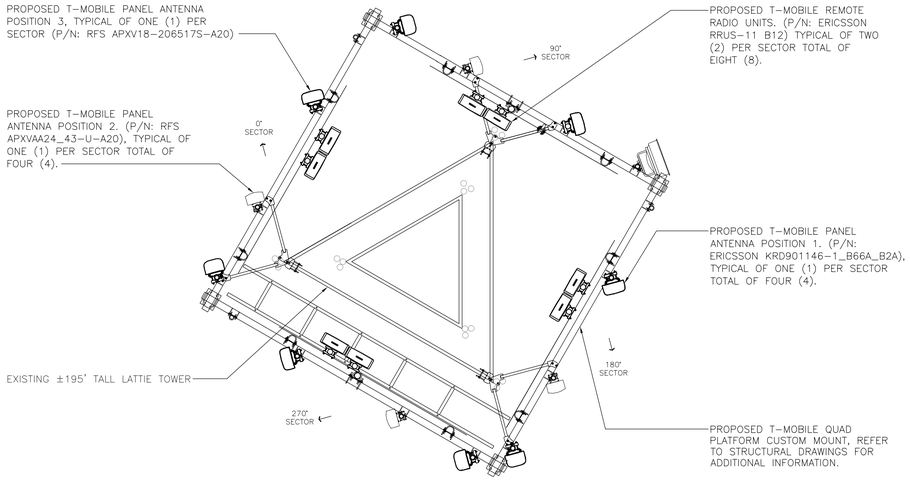
TRUE NORTH

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.



3 C-2 **EQUIPMENT LAYOUT PLAN**
SCALE: 1/4" = 1'

TRUE NORTH



3 C-2 **ANTENNA MOUNTING CONFIGURATION PLAN**
SCALE: 1/4" = 1'

TRUE NORTH

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COMPOUND PLAN, EQUIP. LAYOUT AND ANTENNA MOUNTING CONFIG.

C-2

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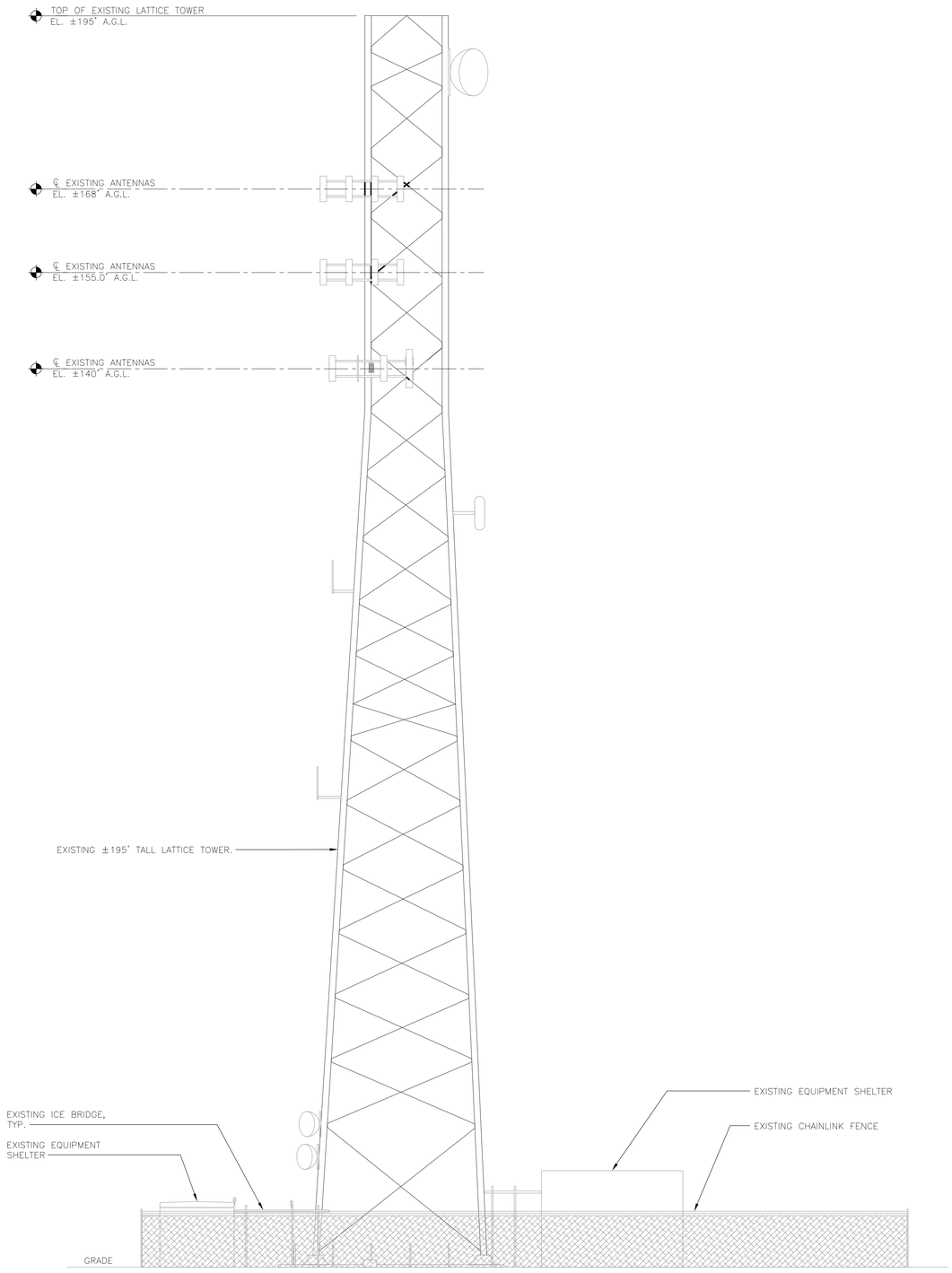
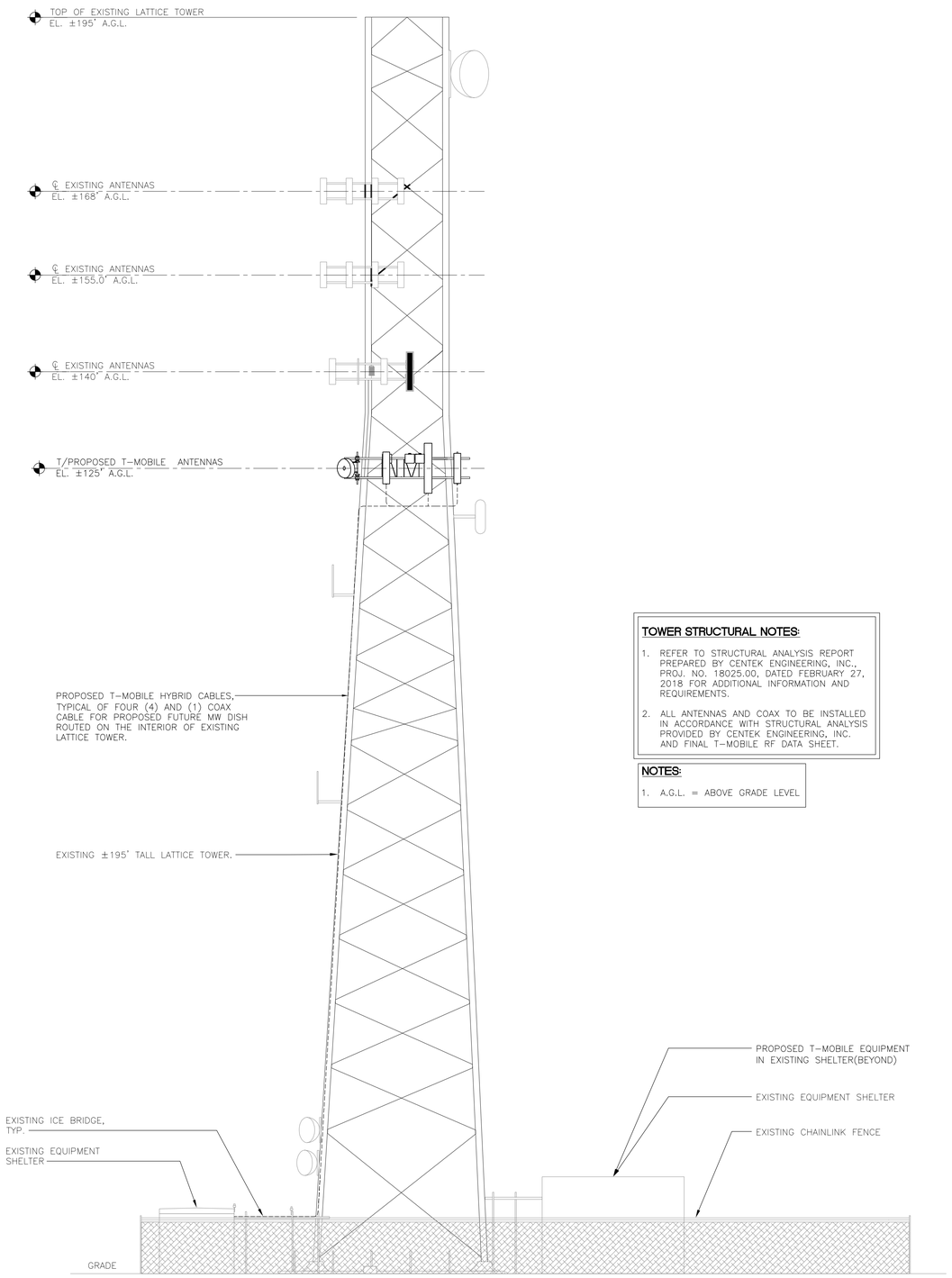


1 C-3 **EXISTING ELEVATION**
SCALE: 1" = 10'



2 C-3 **PROPOSED ELEVATION**
SCALE: 1" = 10'

TOWER STRUCTURAL NOTES:

1. REFER TO STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, INC., PROJ. NO. 18025.00, DATED FEBRUARY 27, 2018 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
2. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CENTEK ENGINEERING, INC. AND FINAL T-MOBILE RF DATA SHEET.

NOTES:

1. A.G.L. = ABOVE GRADE LEVEL

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ELEVATIONS

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EQUIPMENT CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: 6201	56.50"H x 23.62"W x 15.75"D	154.32–LBS

3 C–4 ERICSSON RADIO CABINET DETAIL

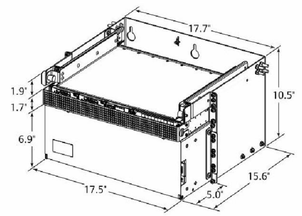
SCALE: NTS

Electrical	Indoor Solution	Outdoor Solution
System Voltage, Nominal	120 VAC single phase	
Output Voltage	-42 VDC to -58 VDC	
System Capacity	19" 1 RU up to 10 A	19" 1 RU up to 8 A
Rectifier Capacity	0.5 kW @ 120 VAC	0.4 kW @ 120 VAC
DC Distribution	(1) wallmount 10 position GMT type fuse panel with (10) GMT fuses, up to 15 A	
Controller	SCU+ controller	

Physical Characteristics		
Framework Type	Relay rack	NetXtend™ Compact Enclosure
Available Space	1 RU 19" W	Up to 14 RU, 19" W
Dimensions (H x W x D)	DC power system: 1.7" x 19" x 12" Solution: 10.5" x 19" x 15.6"	Enclosure: 24" x 24" x 16" Battery tray: 22" W x 13" D
Mounting	Rack or wall mount	Wall or H-frame, pole mount (wall-mount kit included)
Weight, Equipped	System: 35.5 lb., w/out batteries Four (4) batteries: 36 lb. total	Enclosure: 64 lb., w/out batteries Four (4) batteries: 36 lb. total
Access	Front for batteries, control and distribution, rear for AC	Front

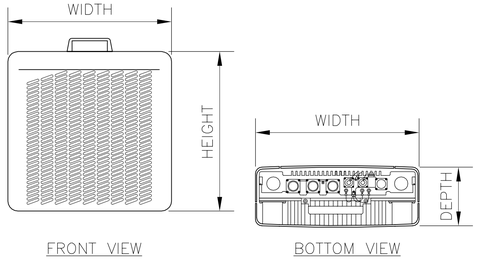
Environmental		
Climate System	Fan-cooled front to rear	Heat Exchanger
Operating Temp.	-40 °C to +75 °C *	-40 °C to +52 °C
Storage Temp.	-40 °C to +75 °C	-40 °C to +75 °C
Relative Humidity	0% to 95% non-condensing	100%
EMI/RFI	Conforms to FCC rules Part 15, Subpart B, Class B and EN55022 Class B, radiated and conducted	
Safety Compliance	cULus 60950 recognized NEBS Level 3 Compliance	cULus 60950 Recognized NEBS Level 3 Compliance Enclosure: cULus Listed GR-487

Indoor Solution



6 C–4 EMERSON NETSURE POWER SYSTEM (582136600SK010)

SCALE: NTS



FRONT VIEW BOTTOM VIEW

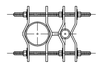
RRH (REMOTE RADIO HEAD)		
EQUIPMENT	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRU 11 B12	50.0 LBS	ABOVE: 12" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T–MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.

2 C–4 REMOTE RADIO HEAD (RRH) DETAIL

SCALE: NTS

BILL OF MATERIALS		
ITEM	DESCRIPTION	QUANTITY
1	2–1/2"ø SCH. 40 x 8'–0" LG. MAX SS OR GALV. PIPE	1
2	UNIVERSAL CLAMP SET.	2

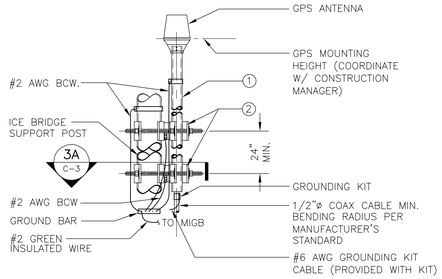


5A C–4 PLAN VIEW

NOT TO SCALE

NOTES:

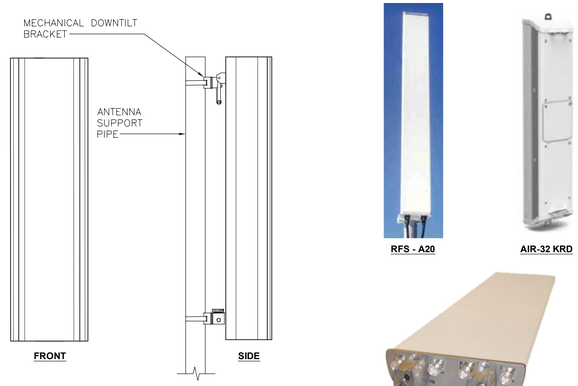
1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT AND COORDINATED WITH VERIZON WIRELESS CONSTRUCTION MANAGER.
2. THE GPS ANTENNA MOUNT IS DESIGNED TO FASTEN TO A STANDARD 2–1/2" DIAMETER, SCHEDULE 40, GALVANIZED STEEL OR STAINLESS STEEL PIPE. THE PIPE MUST NOT BE THREADED AT THE ANTENNA MOUNT END. THE PIPE SHALL BE CUT TO THE REQUIRED LENGTH (MINIMUM OF 24 INCHES) USING A HAND OR ROTARY PIPE CUTTER TO ASSURE A SMOOTH AND PERPENDICULAR CUT. A HACK SAW SHALL NOT BE USED. THE CUT PIPE END SHALL BE DEBURRED AND SMOOTH IN ORDER TO SEAL AGAINST THE NEOPRENE GASKET ATTACHED TO THE ANTENNA MOUNT.
3. PRIOR TO INSTALLATION CONTRACTOR SHALL TEST GPS LOCATION WITH HAND HELD AND MOVE GPS ANTENNA TO OTHER ICE BRIDGE POSTS AS REQUIRED TO ACHIEVE ADEQUATE SIGNAL. FAILURE TO ACHIEVE ADEQUATE SIGNAL WITH A HAND HELD GPS SHALL BE REPORTED TO CONSTRUCTION MANAGER AND ENGINEER TO DETERMINE ALTERNATE INSTALLATION LOCATION FOR GPS ANTENNA.



GPS ANTENNA MOUNTING BRACKET

5 C–4 GPS GROUNDING/MOUNTING BRACKET DETAILS

NOT TO SCALE



ALPHA/BETA/GAMMA/DELTA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: KRD901146–1_B66A_B2A	56.6"H x 12.9"W x 8.7"D	132.2–LBS
MAKE: RFS MODEL: APXVAA24_43–U–A20	95.9"H x 24"W x 8.5"D	99–LBS
MAKE: RFS MODEL: APXV18–206517S–A20	72.0"H x 6.8"W x 3.15"D	26.4–LBS

RFS - A20

AIR-32 KRD

RFS-C-A20

RFS-U-A20

1 C–4 PROPOSED ANTENNA DETAIL

SCALE: NTS

NOTES:
1. INSTALL ANTENNA TO PIPE MAST USING MANUFACTURERS SUPPLIED BRACKETS AND MOUNTING HARDWARE
2. SET MECHANICAL DOWNTILT TO VALUE SPECIFIED IN LATEST RFDS

ISOMETRIC VIEW

PROPANE FUELED BACKUP POWER GENERATOR		
EQUIPMENT	FUEL TYPE	DIMENSIONS
MAKE: DELTA MODEL: POWERGEN 7500	PROPANE	40"H x 27"W x 42"D

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T–MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.

4 C–4 BACK–UP GENERATOR DETAIL

SCALE: NOT TO SCALE

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EQUIPMENT DETAILS

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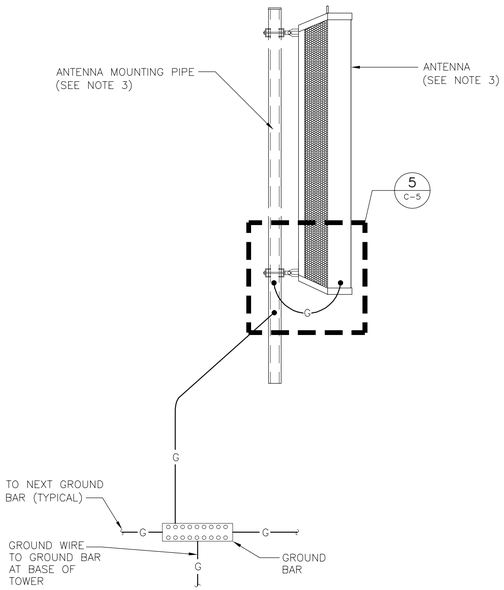
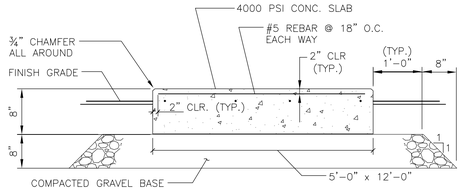


NOTES:

1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

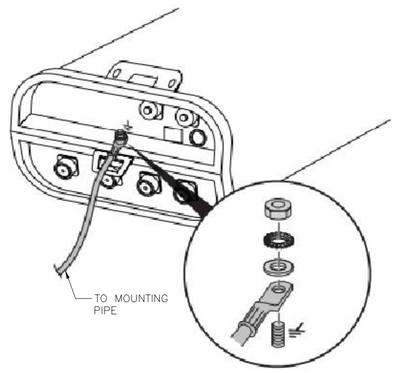
2 C-5 TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NONE



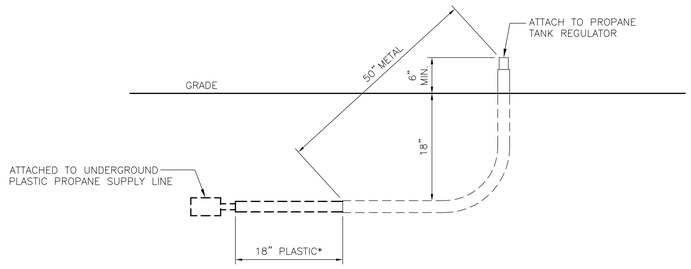
1 C-5 TYPICAL CONCRETE PAD DETAIL

NOT TO SCALE



4 C-5 TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NONE



NOTES:

1. *PLASTIC PROPANE SUPPLY LINE MUST BE PROTECTED WITH CONDUIT IF IT CAN NOT BE BURIED 18" OR MORE DEEP WITH SAND TO PROTECT IT (AT LEAST 1" OF SAND AROUND THE PIPE REQUIRED FOR PLASTIC)
2. POLYETHYLENE PIPE AND TUBING AND THERMOPLASTIC COMPRESSION-TYPE MECHANICAL FITTINGS SHALL BE INSTALLED OUTSIDE UNDERGROUND WITH A MINIMUM 18 IN. (460mm) OF COVER. THE COVER SHALL BE PERMITTED TO BE REDUCED TO 12 IN. (300mm) IF EXTERNAL DAMAGE TO THE PIPE OR TUBING IS NOT LIKELY TO RESULT. IF A MINIMUM OF 12 IN. (300mm) OF COVER CANNOT BE MAINTAINED, THE PIPING SHALL BE INSTALLED IN CONDUIT OR BRIDGED (SHIELDED). UNDERGROUND POLYETHYLENE PIPING SYSTEMS SHALL REQUIRE ASSEMBLED ANODELESS RISERS TO TERMINATE ABOVE GROUND. THE HORIZONTAL PORTION OF RISERS SHALL BE BURIED AT LEAST 12 IN. (300mm) BELOW GRADE AND THE CASING MATERIAL USED FOR THE RISERS SHALL BE PROTECTED AGAINST CORROSION.

3 C-5 PROPANE SUPPLY LINE DETAIL

SCALE: 1" = 1'- 0"

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TYPICAL
DETAILS

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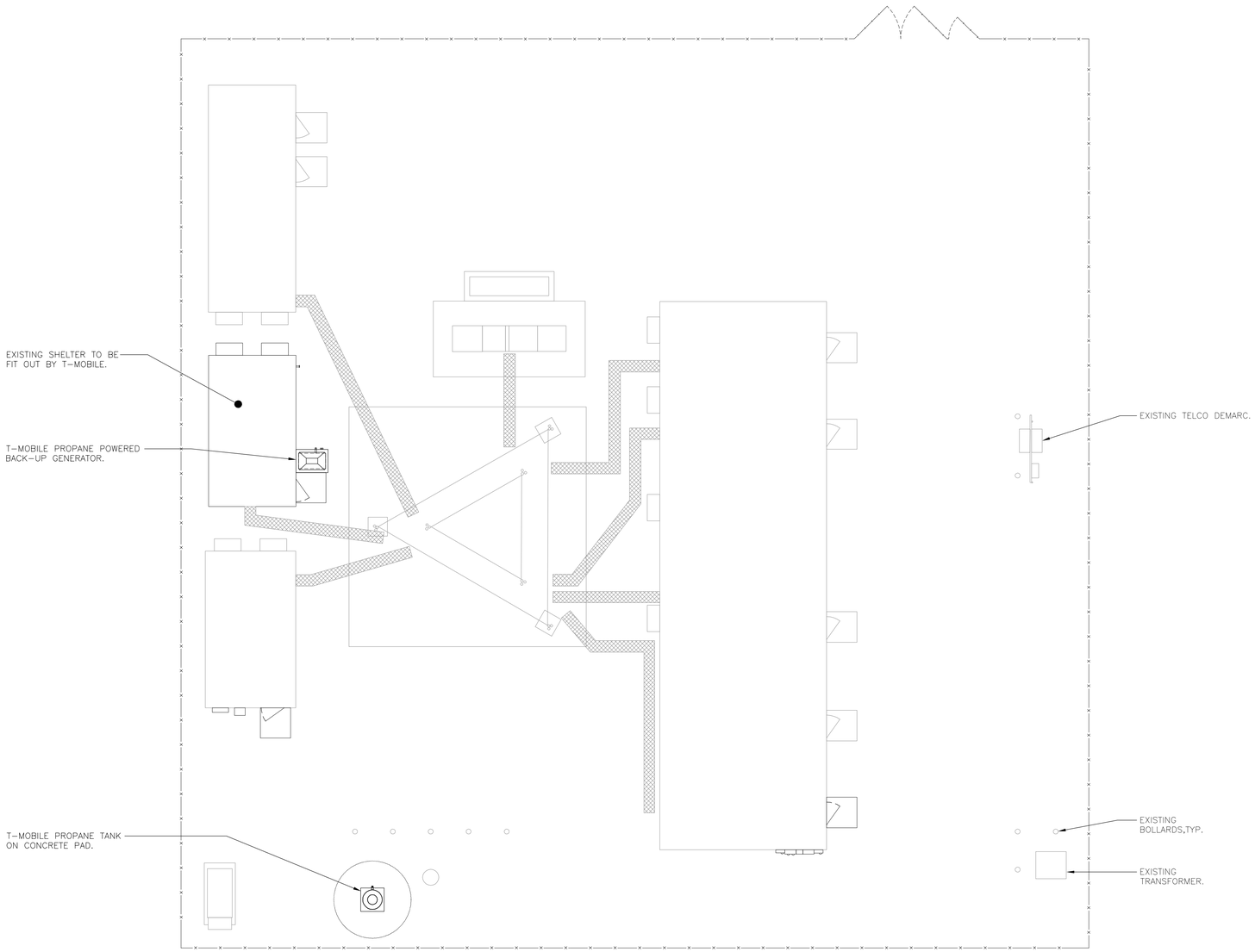
GENERAL NOTES

1. REFER TO CIVIL DRAWINGS FOR ACTUAL LOCATIONS OF STRUCTURES ON SITE.
2. COORDINATION, LAYOUT AND FURNISHING OF CONDUIT, CABLE AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL / TELECOMMUNICATIONS SERVICES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
3. THE EXACT BUILDING FOUNDATION SIZE AND BUILDING WALL PENETRATIONS FOR UTILITIES SHALL BE CONFIRMED WITH THE BUILDING SPECIFICATIONS AND PLANS PRIOR TO LAYOUT.
4. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
5. PROVIDE CADWELD CONNECTION STYLES: THROUGH (CABLE TO CABLE) TYPE "TA"
   (CABLE TO SURFACE) TYPE "LA" OR "VS" (PIPE)
   (CABLE TO ROD) TYPE "GT" OR "NC"
   (CABLE TO CABLE) TYPE "SS"

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
——— – – ———	GROUND RING
— T ——— T —	UNDERGROUND COMMUNICATION CONDUIT
— E ——— E —	UNDERGROUND ELECTRICAL CONDUIT AS INDICATED
◇◇	GROUND BAR
—— X ——— X ——	PERIMETER CHAIN LINK FENCE
⊗	5/8" DIAMETER x 10'–0" COPPER GROUND ROD OR 24"x24" GROUND PLATE ABOVE MATT FOUNDATION.
⊠	5/8" DIAMETER x 10'–0" COPPER GROUND ROD WITH ACCESS.
■	EXOTHERMIC WELD TYPE "TA"
●	MECHANICAL CONNECTION



1 / E–1 COMPOUND PLAN
SCALE: 1/8" = 1'

APPROXIMATE NORTH

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COMPOUND PLAN AND NOTES

E–1

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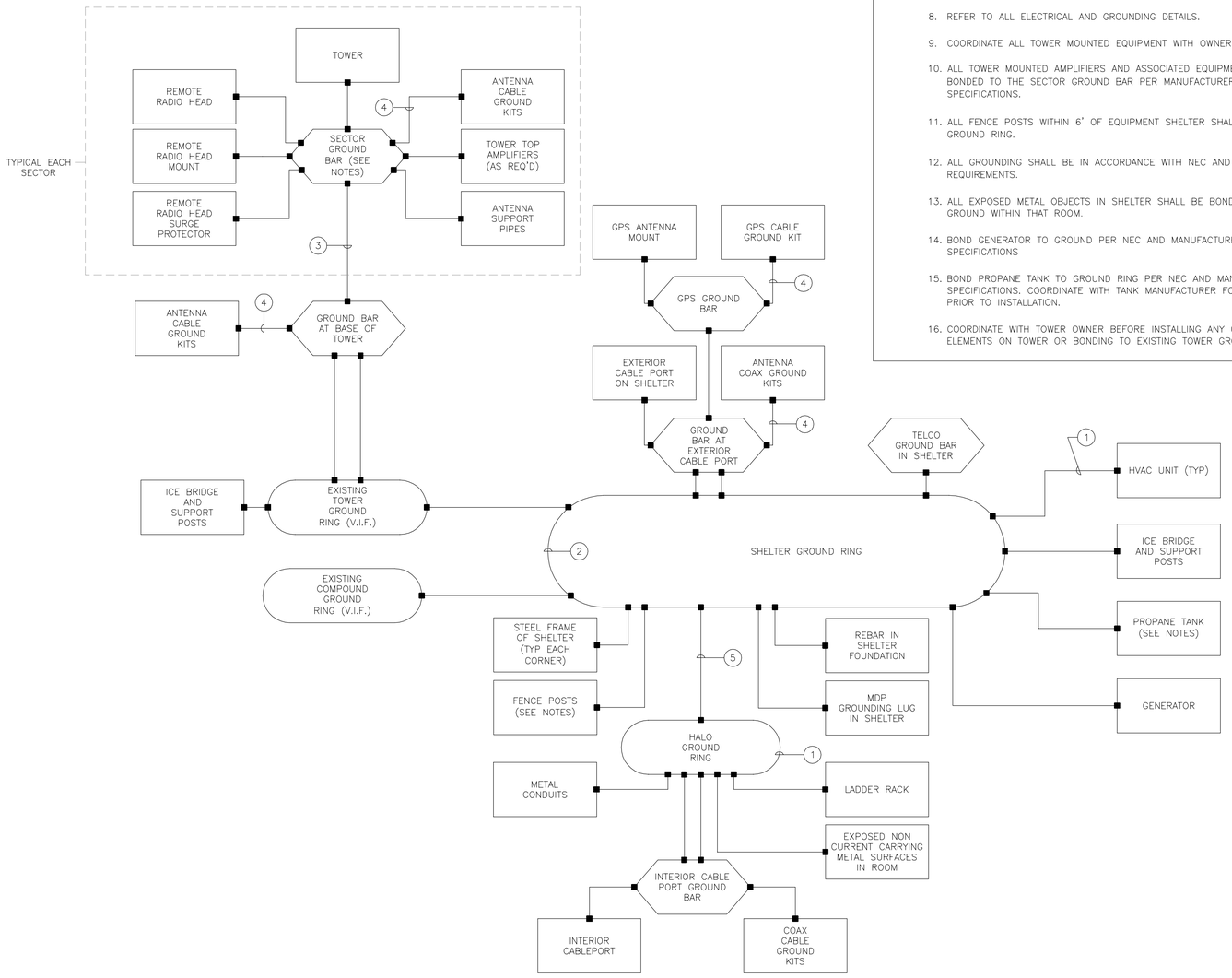

GROUNDING SCHEMATIC NOTES

1. #2 AWG GREEN INSULATED.
2. GROUND RING, #2 AWG BCW.
3. #2/0 GREEN INSULATED.
4. #6 AWG.
5. BOND ALL HALO GROUND RING TAILS TO GROUND RING. COORDINATE LOCATION AND QUANTITY WITH EQUIPMENT ROOM/SHELTER DRAWINGS.

GENERAL NOTES:

1. ALL SURGE SUPPRESSION EQUIPMENT SHALL BE BONDED TO GROUND PER MANUFACTURER'S SPECIFICATIONS
2. UNLESS OTHERWISE NOTED OR REQUIRED BY CODE, GROUND CONDUCTORS SHOWN SHALL BE #2 AWG (SOLID TINNED BCW – EXTERIOR; STRANDED GREEN INSULATED – INTERIOR).
3. BOND ICE BRIDGE SECTIONS TOGETHER WITH #6 AWG STRANDED GREEN INSULATED JUMPERS.
4. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.
5. BOND ALL EQUIPMENT CABINETS AND BATTERY CABINETS TO GROUND PER MANUFACTURER'S SPECIFICATIONS.
6. ALL BONDS TO TOWER SHALL BE MADE IN STRICT ACCORDANCE WITH SPECIFICATIONS OF TOWER MANUFACTURER OR STRUCTURAL ENGINEER.
7. REFER TO GROUNDING PLAN FOR LOCATION OF GROUNDING DEVICES.
8. REFER TO ALL ELECTRICAL AND GROUNDING DETAILS.
9. COORDINATE ALL TOWER MOUNTED EQUIPMENT WITH OWNER.
10. ALL TOWER MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
11. ALL FENCE POSTS WITHIN 6' OF EQUIPMENT SHELTER SHALL BE BONDED TO GROUND RING.
12. ALL GROUNDING SHALL BE IN ACCORDANCE WITH NEC AND OWNER'S REQUIREMENTS.
13. ALL EXPOSED METAL OBJECTS IN SHELTER SHALL BE BONDED TO THE HALO GROUND WITHIN THAT ROOM.
14. BOND GENERATOR TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS
15. BOND PROPANE TANK TO GROUND RING PER NEC AND MANUFACTURERS SPECIFICATIONS. COORDINATE WITH TANK MANUFACTURER FOR REQUIREMENTS PRIOR TO INSTALLATION.
16. COORDINATE WITH TOWER OWNER BEFORE INSTALLING ANY GROUNDING ELEMENTS ON TOWER OR BONDING TO EXISTING TOWER GROUND RING.

CELLULAR GROUNDING NOTES

OBJECTIVE

PROVIDE A CELLULAR GROUNDING SYSTEM WITH MAXIMUM ALTERNATING CURRENT RESISTANCE OF 5 OHMS BETWEEN ANY POINT ON THE GROUNDING SYSTEM AND REFERENCE GROUND. PROVIDE EXTERIOR GROUNDING SCHEME WITH OWNER'S ENGINEER APPROVAL AS REQUIRED TO ACHIEVE DESIRED MAXIMUM AC RESISTANCE TO GROUND.

TESTING

CONTRACTOR TO PROVIDE AN INDEPENDENT TESTING CONTRACTOR TO DETERMINE THE GROUNDING SYSTEM RESISTANCE BY USE OF THE THREE POINT TEST AND AN AEMC MODEL 4500, OR APPROVED EQUAL. TEST TO BE PERFORMED PRIOR TO CONNECTION OF POWER SUPPLY TO THE CELL SITE AND CONNECTION OF THE GROUNDING SYSTEM TO THE WATER MAIN OR AC SUPPLY AS APPLICABLE. IF 5 OHM LIMIT IS EXCEEDED, CONTACT ENGINEER FOR ADDITIONAL INSTRUCTIONS TO ACHIEVE 5 OHMS OR LESS.

CONDUCTOR USED FOR CELLULAR GROUNDING SYSTEM

EGR – #2 AWG ANNEALED SOLID TINNED BARE COPPER
IGR – #2 AWG ANNEALED STRANDED (7 STRAND) 'THW' GREEN COLORED INSULATION
INTER–BUS EXTENSION (FROM IGR TO EGR) – SEE DETAILS
EXTERNAL BOND CONNECTIONS TO EGR – #2 ANNEALED SOLID TINNED BARE COPPER
INTERIOR BOND CONNECTIONS TO IGR – #6 ANNEALED STRANDED (7 STRAND) 'THW' GREEN COLORED INSULATION

MINIMUM BENDING RADIUS

IGR #2 : 1'–0" NOMINAL AND 8" MINIMUM
EGR #2 : 2'–0" NOMINAL AND 8" MINIMUM
CELLULAR GROUNDING CONDUCTOR SHALL BE AS STRAIGHT AS POSSIBLE WITH MINIMUM 6" BENDING RADIUS.

FASTENER FOR CELLULAR GROUNDING CONDUCTOR

USE NON–METALLIC FASTENER AND STANDOFF 'CLIC' (AVAIL. FROM NEFCO 800–969–0285) TO SURFACE SUPPORT CONDUCTOR 3" AWAY FROM SURFACES.

SPACING OF FASTENERS: 2'–0" O.C. OUTSIDE BUILDING
3'–0" O.C. INSIDE BUILDING

GROUNDING ELECTRODE

GROUNDING ELECTRODE SHALL BE 5/8" DIA. x 10'–0" l. COPPER CLAD STEEL ROD. ADJUST LOCATION OF GROUNDING ELECTRODE IF SOIL CONDITION IS NOT CONDUCTIVE (GRAVEL, SANDY SOIL, ROCKS). SPACE GROUNDING ELECTRODES 20'–0" APART (SPACING MAY BE REDUCED WHERE REQUIRED TO ACCOMMODATE FIELD CONDITIONS BUT SHALL NOT BE LESS THAN 10'–0"). ELECTRODES SHALL BE DRIVEN ONLY WITH PROPER DRIVER SLEEVE TO PREVENT MUSHROOMING TOP OF ROD. WHEN ROCK BOTTOM IS ENCOUNTERED, THE ELECTRODE SHALL BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45° FROM THE VERTICAL AWAY FROM STRUCTURES. TOP OF GROUNDING ELECTRODE SHALL BE MIN. 3'–6" BELOW FINISH GRADE.

CONNECTIONS ABOVE GRADE (MECHANICAL)

COMPRESSION LUG CONNECTOR – 15 TON COMPRESSION, 2 HOLE, LONG BARREL, ELECTRO TINNED PLATED, HIGH CONDUCTIVITY, COPPER 600V RATED. USE 1/4" ø BOLT, 3/4" SPACING LUGS TO BOND OBJECTS FROM THE IGR. (CONNECTOR SHALL BE BURNDY HYLUG SERIES OR EQUAL.)

EXOTHERMIC WELD LUG CONNECTOR – 2 HOLE, OFFSET, ELECTRO TINNED PLATED, HIGH CONDUCTIVITY, COPPER 600V. USE 1/2"ø BOLT, 1–3/4" SPACING LUGS. CONNECTOR SHALL BE CADWELD CONNECTION STYLE (CABLE TO SURFACE) TYPE LA, LUG SIZE 1/8 x 1. EXOTHERMIC WELD TO LUG AS REQUIRED.

C–TAP COMPRESSION CONNECTOR – HIGH CONDUCTIVITY COPPER FOR MAIN TO BRANCH LINE TAPPING. (CONNECTOR SHALL BE BURNDY HYTAP SERIES OR EQUAL.)

MECHANICAL CONNECTIONS

USE MATCHING MANUFACTURER TOOL AND DIE FOR COMPRESSION CONNECTION.

APPLY ANTI–OXIDANT CONDUCTIVITY ENHANCER COMPOUND ON SURFACES THAT ARE COMPRESSED.

SURFACES INTENDED TO BE CONNECTED WITH MECHANICAL CONNECTORS SHALL BE BARE METAL TO BARE METAL. PRIME AND PAINT OVER BONDED AREA TO PREVENT CORROSION.

WHEN BONDING #2 TO #2

EXTERIOR OF BUILDING – USE EXOTHERMIC WELD CONNECTION
INTERIOR OF BUILDING – USE COMPRESSION CONNECTION ON STRANDED CONDUCTORS ONLY.
– USE EXOTHERMIC WELD CONNECTION ON SOLID CONDUCTOR.

WHEN BONDING #2 TO FENCE POST

USE EXOTHERMIC WELD (CADWELD TYPE 'VS') CONNECTION TO FENCE POST STEEL SURFACE. TEST WELD FOR POSSIBLE BURN THRU. PATCH WELDED AREA WITH GALVANIZED COATING AS REQUIRED FOR PROPER WELDED PERMANENT BOND. REFER TO MANUFACTURER'S REQUIREMENTS FOR DETAILS

GROUNDING SYSTEM INTERCONNECTION

BOND THE EGR DOWN CONDUCTORS, AND/OR BURIED GROUND RING TO ANY METALLIC OBJECT OR EXISTING GROUNDING SYSTEM WITHIN 6'.

WHEN BONDING #2 TO TOWER GROUND PLATE

TOWER GROUND PLATE SHALL BE 6" x 8" x 1/4" COPPER AND BE MADE AVAILABLE TO TOWER CONTRACTOR TO BE INSTALLED DURING TOWER CONSTRUCTION. USE EXOTHERMIC WELD (CADWELD TYPE 'HS') TO TOWER GROUND PLATE TEST WELD FOR POSSIBLE BURN THRU. COORDINATE THE SIZE OF THE MOUNTING HOLE WITH TOWER CONTRACTOR.

METALLIC CONDUITS

BOND ALL STEEL CONDUITS TO PANELS AT POINT OF CONTACT WITH APPROVED GROUNDING BUSHING.

GENERAL NOTE

EXISTING GROUNDING ELEMENTS MAY BE REUSED PROVIDED THEY MEET NEC REQUIREMENTS, T–MOBILE SPECIFICATIONS, AND HAVE BEEN TESTED FOR PROPER OPERATION.

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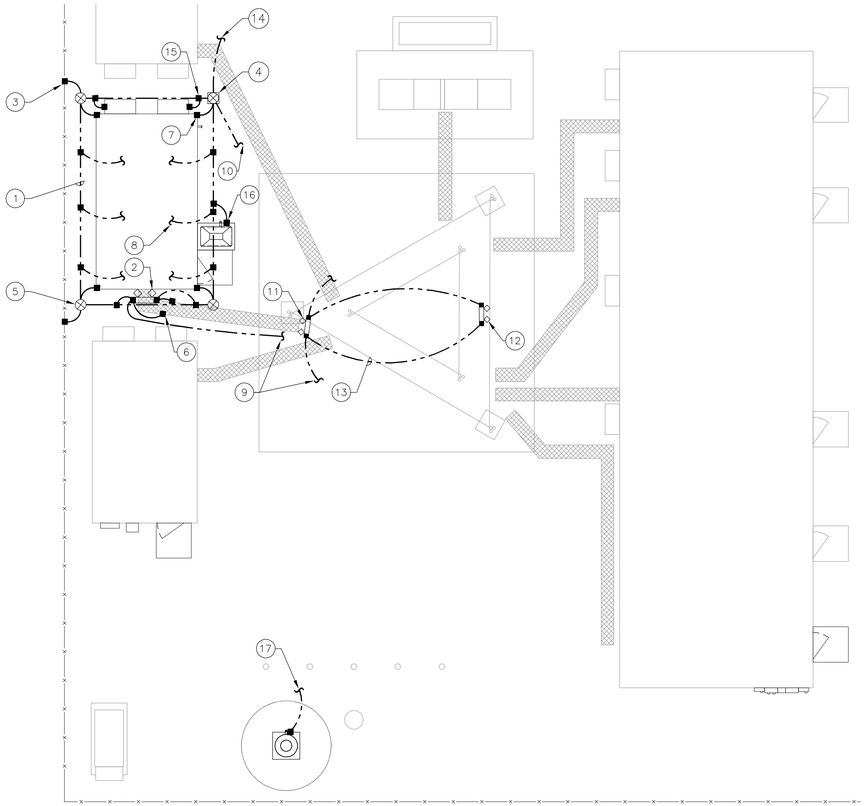
SCHEMATIC RISER DIAGRAM AND NOTES

E-2

Sheet No. 9 of 13

GROUNDING NOTES

1. #2 SOLID TINNED BCW GROUND RING (2'-0" FROM OUTSIDE EDGE OF EQUIPMENT SHELTER FOUNDATION) (TYP.).
2. WAVEPORT GROUND BAR PER DETAILS.
3. CONNECT FENCE TO GROUNDING RING (TYP. 3 PLACES).
4. GROUNDING ROD WITH ACCESS (TYP.) PER DETAILS.
5. GROUNDING ROD (TYP.) PER DETAILS.
6. ICE BRIDGE POST AND COVER. BOND EACH SECTION AND SUPPORT TO GROUND RING PER DETAILS.
7. CADWELD EQUIPMENT BUILDING TO GROUND RING (TYP. EACH CORNER).
8. EXTEND GROUND RING PIGTAIL THROUGH SHELTER AND BOND TO HALO GROUND DOWNLEAD. (TYP. 6 PLACES)
9. BOND GROUND BAR TO EXISTING TOWER GROUND RING (TYP OF 2). CONTRACTOR TO VERIFY LOCATION IN FIELD.
10. BOND SHELTER GND RING TO EXISTING TOWER GROUND RING WITH #2 AWG BCW.
11. UPPER TOWER MOUNTED GROUND BAR PER DETAILS.
12. LOWER TOWER MOUNTED GROUND BAR PER DETAILS.
13. BOND UPPER TOWER MOUNTED GROUND BAR TO LOWER TOWER MOUNTED GROUND BAR (2 GROUND LEADS) PER DETAILS.
14. BOND SHELTER GROUND RING TO EXISTING COMPOUND GROUND RING. (MINIMUM TWO PLACES.)
15. BOND HVAC UNIT TO GROUND RING (TYPICAL).
16. BOND GENERATOR TO GROUND RING PER MANUFACTURERS SPECIFICATIONS.
17. BOND PROPANE TANK PER MANUFACTURERS SPECIFICATIONS.



1 / E-3 GROUNDING PLAN
SCALE: 1/8" = 1'

APPROXIMATE NORTH

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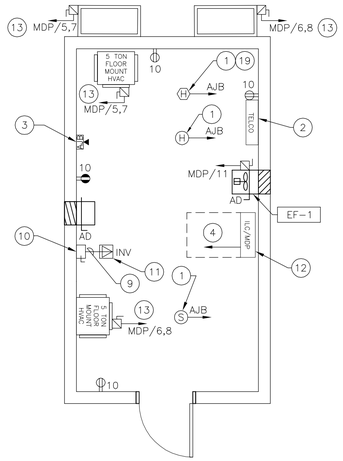
COMPOUND GROUNDING PLAN

E-3

Sheet No. 10 of 13



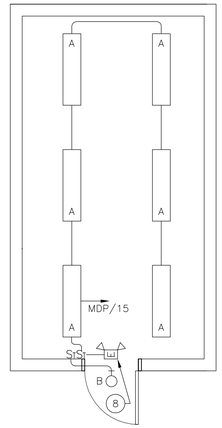
NOTE:
ROOM LAYOUT AND EQUIPMENT ARRANGEMENT ARE SHOWN TYPICAL. REFER TO CIVIL DRAWINGS FOR EXACT ROOM LAYOUT. ADJUST EQUIPMENT LOCATIONS AS REQUIRED FOR BEST FIT, CODE COMPLIANCE, AND TO AVOID OBSTRUCTIONS. FINAL EQUIPMENT LAYOUT MUST BE VERIFIED AND APPROVED BY WIRELESS CARRIER'S CONSTRUCTION MANAGER PRIOR TO INSTALLATION.

GRAPHIC SCALE

4 0 2 4 8 16

(IN FEET)
1/4 inch = 1 ft.

1 POWER PLAN
E-4 SCALE: 1/4" = 1'-0"



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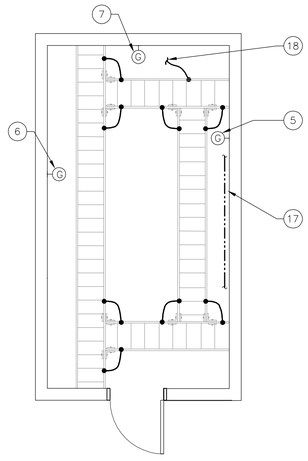
GRAPHIC SCALE

4 0 2 4 8 16

(IN FEET)
1/4 inch = 1 ft.

2 LIGHTING PLAN
E-4 SCALE: 1/4" = 1'-0"



NOTE:
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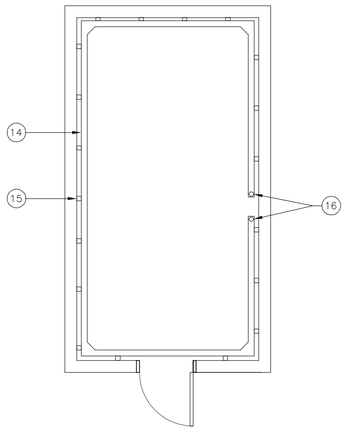
GRAPHIC SCALE

4 0 2 4 8 16

(IN FEET)
1/4 inch = 1 ft.

3 CABLE TRAY GROUNDING PLAN
E-4 SCALE: 1/4" = 1'-0"



NOTE:
ROOM LAYOUT AND EQUIPMENT ARRANGEMENT ARE SHOWN TYPICAL. REFER TO CIVIL DRAWINGS FOR EXACT ROOM LAYOUT. ADJUST EQUIPMENT LOCATIONS AS REQUIRED FOR BEST FIT, CODE COMPLIANCE, AND TO AVOID OBSTRUCTIONS. FINAL EQUIPMENT LAYOUT MUST BE VERIFIED AND APPROVED BY WIRELESS CARRIER'S CONSTRUCTION MANAGER PRIOR TO INSTALLATION.

GRAPHIC SCALE

4 0 2 4 8 16

(IN FEET)
1/4 inch = 1 ft.

4 WIREWAY LAYOUT PLAN
E-4 SCALE: 1/4" = 1'-0"

ELECTRICAL WORK NOTES

1. ALL SMOKE, HEAT AND HYDROGEN DETECTORS SHALL BE OPERATE AT 48 VDC AND BE POWERED FROM THE 48 VDC POWER PLANT WITHIN THE EQUIPMENT ROOM. DO NOT MOUNT ABOVE CABLE TRAY.
2. TELEPHONE BACKBOARD AREA.
3. ALARM JUNCTION BOX.
4. PROVIDE CONDUCTORS FROM PANELBOARD MDP ROUTED THROUGH THE PERIMETER WIREWAY FOR RECTIFIER BRANCH CIRCUITS. PROVIDE 20' OF ADDITIONAL WIRING IN 1" FLEXIBLE METAL CONDUIT FOR FINAL TERMINATION BY OWNER.
5. TELCO GROUND BAR. (COORDINATE LOCATION WITH WIRELESS CARRIER'S CONSTRUCTION MANAGER.)
6. MAIN GROUND BAR. (COORDINATE LOCATION WITH WIRELESS CARRIER'S CONSTRUCTION MANAGER.)
7. GROUND BAR AT CABLE PORT. (COORDINATE LOCATION WITH WIRELESS CARRIER'S CONSTRUCTION MANAGER.)
8. CONNECT EMERGENCY LIGHT BRANCH CIRCUIT WIRING TO LINE SIDE OF LIGHTING CIRCUIT.
9. (2) #8 AWG WHIP CABLE TO POWER BOARD.
10. BATTERY DISCONNECT.
11. 2400 WATT INVERTER (24VDC/120VAC) MANUFACTURED BY TRIPP-LITE MODEL #PV2400FC OR APPROVED EQUAL (TELCO, CARDS AND EXHAUST FAN).
12. INTEGRATED LOAD CENTER "MDP".
13. VERIFY ELECTRICAL REQUIREMENT WITH AHU MANUFACTURER AND MECHANICAL DRAWINGS.
14. 4" x 4", TYPE 1 CONTINUOUS SCREW COVER WIREWAY MOUNTED ALONG PERIMETER OF ROOM AGAINST CEILING.
15. SUPPORT BRACKET/SPACER (TYPICAL) (INSTALL AS REQUIRED).
16. (2) 3" CONDUITS CONNECTED TO PANELBOARD, MDP FROM WIREWAYS.
17. INSTALL HALO GROUND NEAR CEILING ALONG PERIMETER OF ROOM. INSTALL PER T-MOBILE SPECIFICATIONS AND THE DETAILS ON THESE PLANS.
18. BOND TO MAIN GROUND BAR.
19. HYDROGEN DETECTOR TO INTERFACE WITH EXHAUST FAN CONTROLS. REFER TO MECHANICAL PLANS.

GENERAL NOTES:

1. EXISTING EQUIPMENT, FIXTURES, DEVICES, CONDUITS, CONDUCTORS, AND GROUNDING ELEMENTS MAY BE REUSED PROVIDED THEY MEET NEC REQUIREMENTS, T-MOBILE SPECIFICATIONS, AND HAVE BEEN TESTED FOR PROPER OPERATION.
2. INSTALL ALL ALARM WIRING FOR PROPER OPERATION. COORDINATE ALL REQUIREMENTS WITH WIRELESS CARRIER'S CONSTRUCTION MANAGER.
3. COORDINATE ALL CONDUITS AND CEILING MOUNTED DEVICES WITH STRUCTURAL OBSTRUCTIONS.

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ELECTRICAL EQUIPMENT ROOM LAYOUT

E-4

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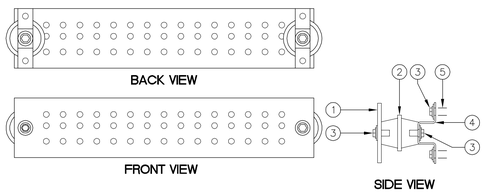
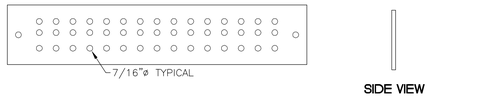


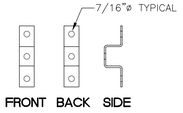
TYPICAL GROUND BAR ASSEMBLY
N.T.S.



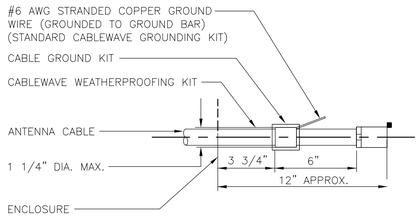
TYPICAL GROUND BAR - DIMENSIONS
N.T.S.

NOTES

1. HIGH CONDUCTIVITY TINNED COPPER BAR 1'-8"Lx4"Wx1/4"D.
2. RED COLORED STANDOFF INSULATOR PLASTIC #1872-1A.
3. STAINLESS STEEL TRUSS SPANNER MACHINE SCREWS, SPLIT LOCKWASHER AND FLAT WASHER.
4. 1"Wx1/8"T STAINLESS STEEL TYPE 304 BRACKET.
5. STAINLESS STEEL TYPE 304 HARDWARE – 3/8"ø EXPANSION BOLT FOR CONCRETE.



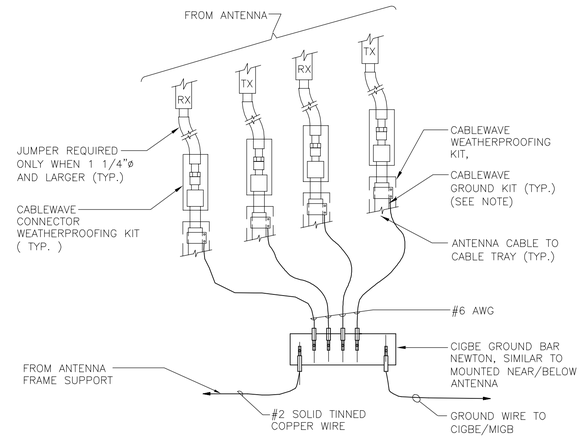
BRACKET FOR GROUND BAR-DIMENSIONS
N.T.S.



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

2 E-5 ANTENNA CABLE GROUNDING DETAIL
NOT TO SCALE

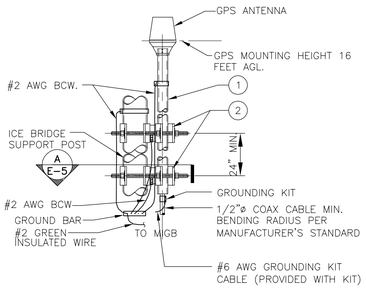


NOTES:

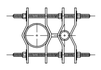
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE

3 E-5 CONNECTION OF GROUND WIRES TO GROUND BAR
NOT TO SCALE

1 E-5 MASTER/EQUIPMENT GROUND BAR DETAILS
N.T.S.



GPS ANTENNA MOUNTING BRACKET



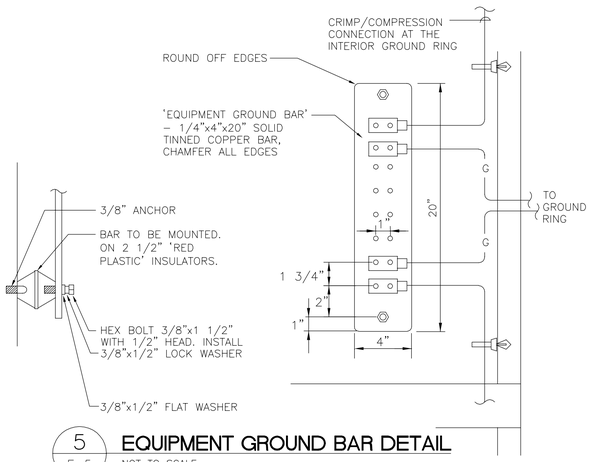
A E-5 SECTION
NOT TO SCALE

NOTES

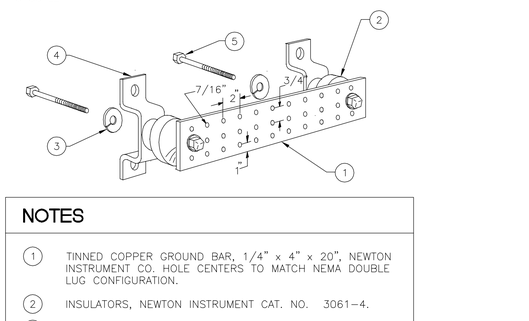
1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT.
2. THE GPS ANTENNA MOUNT IS DESIGNED TO FASTEN TO A STANDARD 2-1/2" DIAMETER, SCHEDULE 40, GALVANIZED STEEL OR STAINLESS STEEL PIPE. THE PIPE MUST NOT BE THREADED AT THE ANTENNA MOUNT END. THE PIPE SHALL BE CUT TO THE REQUIRED LENGTH (MINIMUM OF 24 INCHES) USING A HAND OR ROTARY PIPE CUTTER TO ASSURE A SMOOTH AND PERPENDICULAR CUT. A HACK SAW SHALL NOT BE USED. THE CUT PIPE END SHALL BE DEBURRED AND SMOOTH IN ORDER TO SEAL AGAINST THE NEOPRENE GASKET ATTACHED TO THE ANTENNA MOUNT.

BILL OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	2-1/2"ø SCH. 40 x 8'-0" LG. MAX SS OR GALV. PIPE	1
2	UNIVERSAL CLAMP SET.	2



5 E-5 EQUIPMENT GROUND BAR DETAIL
NOT TO SCALE

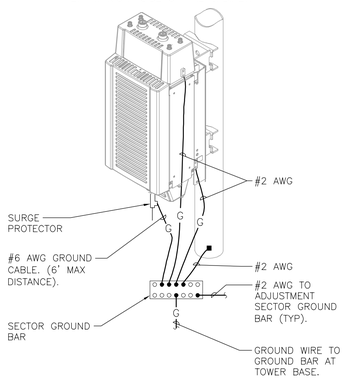


NOTES

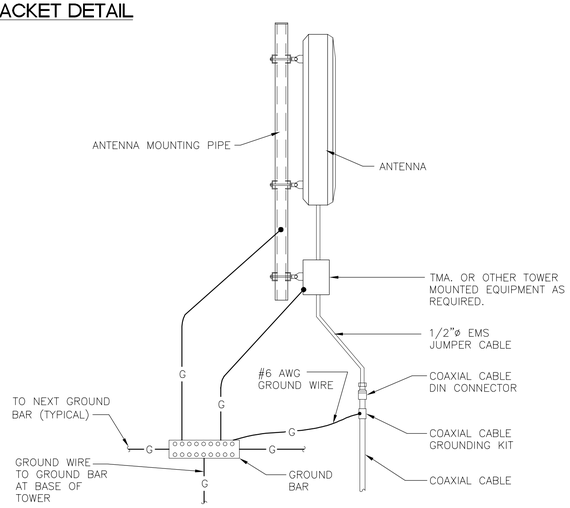
1. TINNED COPPER GROUND BAR, 1/4" x 4" x 20", NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION.
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4.
3. 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056.
5. 5/8-11 x 1" STAINLESS STEEL TRUSS SPANNER MACHINE SCREWS.

4 E-5 GPS GROUNDING/MOUNTING BRACKET DETAIL
NOT TO SCALE

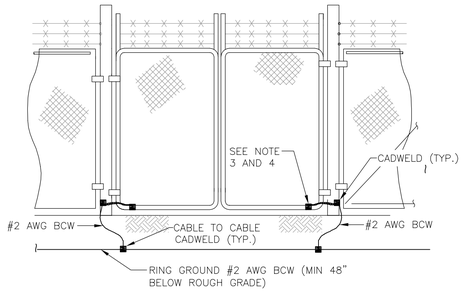
EACH RRH CABINET SHALL BE GROUNDED IN THE FOLLOWING MANNER:
1. AT TOP OF THE CABINET
2. AT RIGHT SIDE OF THE CABINET.



7 E-5 RRH POLE MOUNT GROUNDING
NOT TO SCALE



8 E-5 TYPICAL ANTENNA GROUNDING DETAIL
NOT TO SCALE

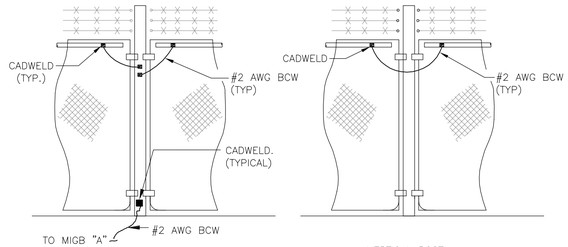


NOTES:

1. THE #2 AWG, BCW, FROM THE RING GROUND SHALL BE CADWELDED TO THE POST, ABOVE GRADE.
2. BOND EACH HORIZONTAL POLE/BRACE TO EACH OTHER AND TO EACH VERTICAL POLE BONDED TO THE EXTERIOR GROUND RING.
3. GATE JUMPER SHALL BE #4/0 AWG WELDING CABLE OR FLEXIBLE COPPER BRAID BURNDY TYPE B WITH SLEEVES ON EACH END DESIGNED FOR EXOTHERMIC WELDING.
4. GATE JUMPER SHALL BE INSTALLED SO THAT IT WILL NOT BE SUBJECTED TO DAMAGING STRAIN WHEN GATE IS FULLY OPEN IN EITHER DIRECTION.

9 E-5 FENCE GATE GROUNDING
NOT TO SCALE

6 E-5 GROUND BAR DETAIL
NOT TO SCALE



NOTES:

1. VERTICAL POSTS SHALL BE BONDED TO THE RING AT EACH CORNER AND AT EACH GATE POST. AS A MINIMUM ONE VERTICAL POST SHALL BE BONDED TO THE GROUND RING IN EVERY 100 FOOT STRAIGHT RUN OF FENCE.
2. HORIZONTAL POLES SHALL BE BONDED TO EACH OTHER.
3. BOND EACH HORIZONTAL POLE / BRACE TO EACH OTHER AND TO EACH VERTICAL POST THAT IS BONDED TO THE EXTERIOR GROUND RING.

10 E-5 GROUND-STD. DETAIL FENCE GROUNDING
NOT TO SCALE

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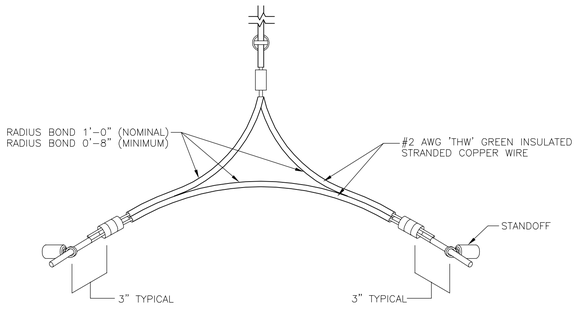
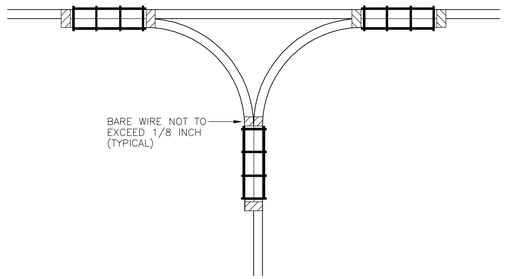
ELECTRICAL DETAILS

E-5



1 E-6 ISOMETRIC VIEW OF VERTICAL NONDIRECTIONAL SPLICE FOR CORNER INSTALLATION

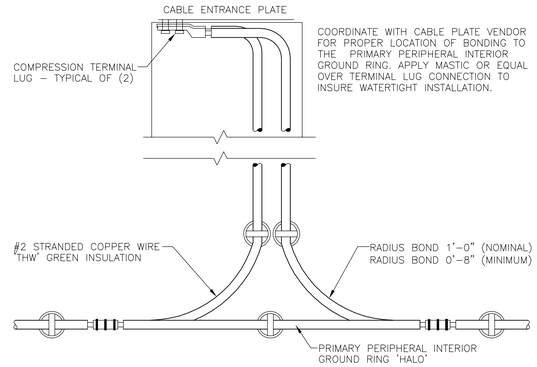
N.T.S.



HORIZONTAL OMNI-DIRECTIONAL SPLICE FOR CONNECTING:
1. SUPPLEMENTARY BUS TO SUPPLEMENTAL BUS.
2. SUPPLEMENTARY BUS TO PRIMARY PERIPHERAL INTERIOR GROUND RING.

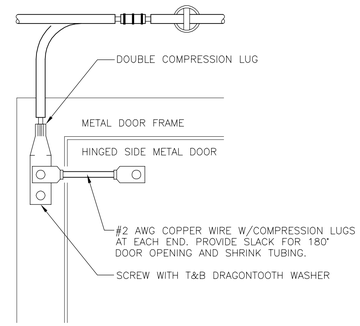
2 E-6 HORIZONTAL NONDIRECTIONAL SPLICE

N.T.S.



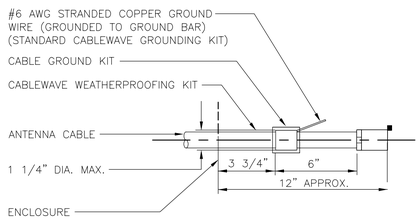
3 E-6 BONDING CABLE ENTRANCE PLATE TO PRIMARY PERIPHERAL INTERIOR GROUND RING

N.T.S.



4 E-6 BONDING METAL DOOR FRAME AND DOOR TO INTERIOR GROUNDING RING

N.T.S.

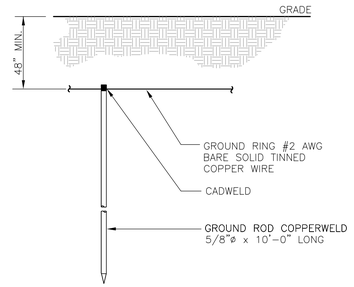


NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

5 E-6 ANTENNA CABLE GROUNDING DETAIL

NOT TO SCALE

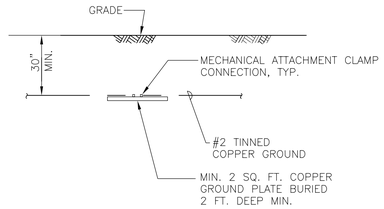


NOTES:

1. USE GROUND PLATE DETAIL IF 10 FT. GROUND ROD DEPTH CANNOT BE ACHIEVED DUE TO LEDGE CONDITION OR IF EXISTING TOWER FOUNDATION IS ENCOUNTERED.

6 E-6 GROUND ROD DETAIL

NOT TO SCALE

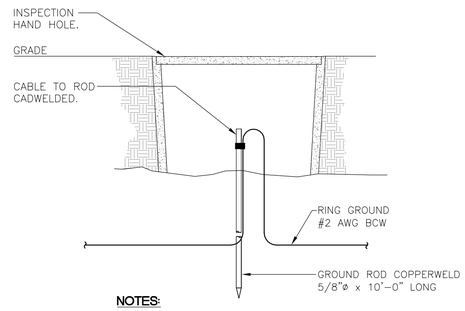


NOTES:

1. GROUND PLATE DETAIL TO BE USED ONLY IF 10 FT. GROUND ROD DEPTH CANNOT BE ACHIEVED DUE TO LEDGE CONDITION OR IF EXISTING TOWER FOUNDATION IS ENCOUNTERED.

6A E-6 GROUND PLATE DETAIL

NOT TO SCALE

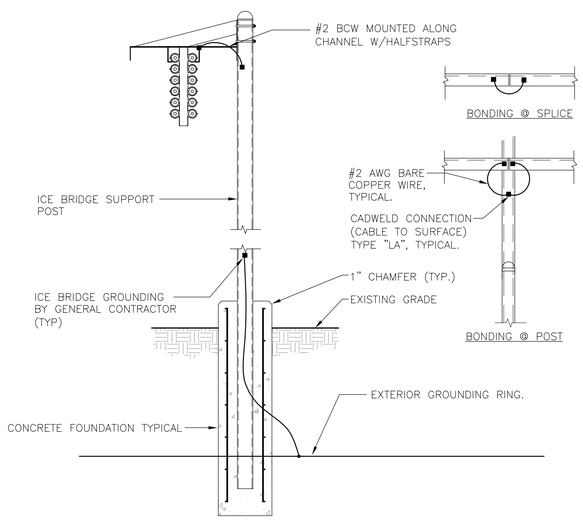


NOTES:

1. INSPECTION HAND HOLE MAY BE CONCRETE OR PVC AND SHALL BE A MINIMUM OF 12" DIA x 18" DEEP.

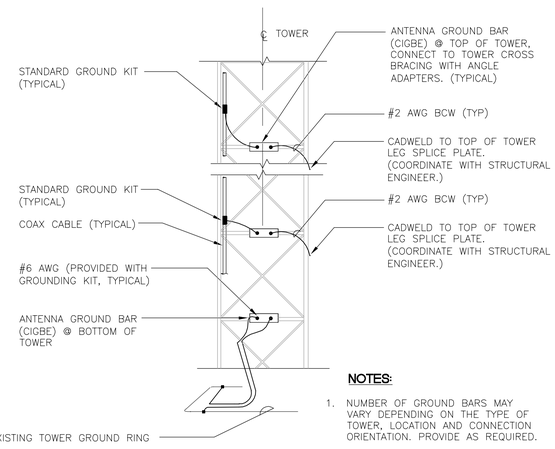
7 E-6 GROUND ROD WITH ACCESS DETAIL

NOT TO SCALE



8 E-6 ICE BRIDGE BONDING DETAIL

NOT TO SCALE

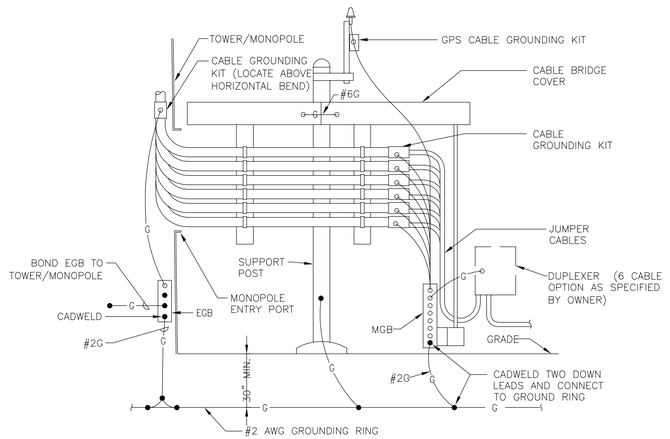


NOTES:

1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.

9 E-6 ANTENNA CABLE GROUNDING - LATTICE TOWER

NOT TO SCALE



10 E-6 CABLE BRIDGE GROUNDING DIAGRAM

NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
B	03/28/18	TJB	TCK	CONSTRUCTION DRAWINGS - REVISED PER CLIENT COMMENTS
A	03/28/18			CONSTRUCTION DRAWINGS - ISSUED FOR CLIENT REVIEW

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NORTH CANNAN, CT 06024

DATE: 03/21/18
SCALE: AS NOTED
JOB NO. 18025.00

ELECTRICAL DETAILS

E-6

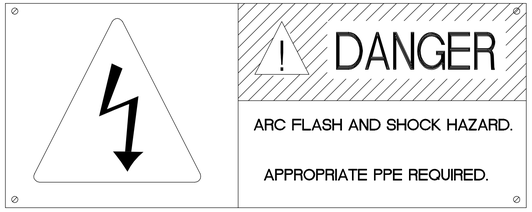
Sheet No. 11 of 13

NOTES:

1. REFER TO SPECIFICATIONS FOR FOR ADDITIONAL NAMEPLATE REQUIREMENTS.
2. PROVIDE WARNING LABEL ON ALL SERVICE EQUIPMENT IN ACCORDANCE WITH CURRENT NEC REQUIREMENTS.
3. PROVIDE FAULT SHORT CIRCUIT AND COORDINATION STUDY TO ENSURE COMPLIANCE WITH NEC REQUIREMENTS.

1 E-7 DETAIL OF TYPICAL FAULT CURRENT SIGN

NOT TO SCALE

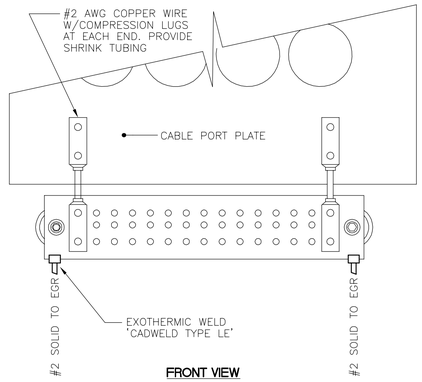


NOTES:

1. REFER TO SPECIFICATIONS FOR FOR ADDITIONAL NAMEPLATE REQUIREMENTS.
2. PROVIDE WARNING LABEL ON ALL SWITCHBOARDS, DISTRIBUTION PANELS, PANELBOARDS IN ACCORDANCE WITH NEC REQUIREMENTS.

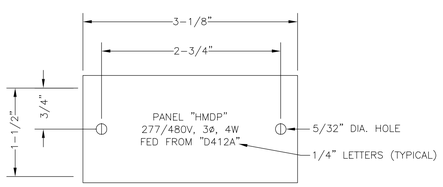
2 E-7 DETAIL OF TYPICAL FLASH PROTECTION WARNING SIGN

NOT TO SCALE



3 E-7 CABLEPORT GROUND BAR LUG CONNECTION

NOT TO SCALE



NOTES:

1. REFER TO SPECIFICATIONS FOR ADDITIONAL NAMEPLATE REQUIREMENTS.
2. NAMEPLATE TO BE 1/16" WHITE PLASTIC WITH BLACK CENTER LAMINATION. FACE TO BE WHITE, ENGRAVED LETTERS TO BE BLACK.
3. SECURE NAMEPLATE TO SURFACES WITH (2) FLAT HEAD BRASS SCREWS.

4 E-7 DETAIL OF TYPICAL NAMEPLATE

NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
B	03/28/18	TJB	TCK	CONSTRUCTION DRAWINGS – REVISED PER CLIENT COMMENTS
A	03/28/18			CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW

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NORTH CANNAN, CT 06024

DATE: 03/21/18
SCALE: AS NOTED
JOB NO. 18025.00

ELECTRICAL DETAILS

E-7

ELECTRICAL SPECIFICATIONS

SECTION 16010

1.01. SCOPE OF WORK

A. WORK SHALL INCLUDE ALL LABOR, EQUIPMENT AND SERVICES REQUIRED TO COMPLETE (MAKE READY FOR OPERATION) ALL THE ELECTRICAL WORK INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING:

1. CONNECT TO EXISTING 200A, 240V SERVICE PREVIOUSLY SERVING EXISTING SHELTER.
2. GENERATOR/TRANSFER SWITCH.
3. FEEDERS AND BRANCH CIRCUIT WIRING TO PANELS, RECEPTACLES, EQUIPMENT, LIGHTING FIXTURES, ETC. AS INDICATED OR NOTED ON PLANS.
4. POWER AND TEMPERATURE CONTROL WIRING FOR HVAC EQUIPMENT.
   a. FURNISH AND INSTALL ALL POWER WIRING FOR ALL HEATING, VENTILATING, AIR CONDITIONING, MOTORS AND DEVICES, AND FIRE PROTECTION EQUIPMENT INDICATED ON THE PLANS OR CALLED FOR IN THIS SPECIFICATION, EITHER ELECTRICAL OR MECHANICAL INCLUDING ALL CONTROL WIRING. ALL MAGNETIC STARTERS SHALL BE FURNISHED UNDER DIVISION 15 AND HAVE INSTALLED THEREIN A PROPER OVERLOAD HEATER FOR EACH MOTOR.
   b. ALL WIRING, BOTH POWER AND CONTROL, FOR SUCH ITEMS AS UNIT HEATERS, EXHAUST FANS, ETC., NOT SPECIFICALLY CALLED FOR IN THE TEMPERATURE CONTROL SPECIFICATIONS, SHALL BE WIRED UNDER DIVISION 16.
   c. ALL CONTROLS WHICH ARE TO BE WIRED BY THIS CONTRACTOR SHALL BE DELIVERED TO HIM BY THE CONTRACTOR/VENDOR FURNISHING THEM.
6. CELLULAR SITE ALARMS, ASSOCIATED WIRING AND DEVICES.
7. CELLULAR GROUNDING SYSTEMS, CONSISTING OF ANTENNA GROUNDING, INTERIOR GROUNDING RING, GROUND BARS, ETC.
8. FURNISH AND INSTALL 3/4" PLYWOOD BACKBOARD OF SIZE INDICATED ON DRAWINGS FOR MOUNTING OF POWER/SERVICE EQUIPMENT AND TELEPHONE/ALARM EQUIPMENT. BACKBOARDS SHALL BE PAINTED WITH TWO (2) COATS OF SEMI-GLOSS GRAY FIRE RETARDANT PAINT.
9. FIELD MEASURE EXISTING ELECTRICAL SERVICES TO CONFIRM AVAILABLE EXISTING POWER.
10. COORDINATE ALL WORK SHOWN, ON THESE PLANS WITH LOCAL UTILITY COMPANIES.

B. LOCAL UTILITY COMPANIES SHALL PROVIDE THE FOLLOWING:

1. TELEPHONE CABLES.
2. SHUTDOWN OF SERVICE (COORDINATE WITH OWNER).

C. CONTRACTOR SHALL CONFER WITH LOCAL UTILITY COMPANIES TO ASCERTAIN THE LIMITS OF THEIR WORK AND SHALL INCLUDE IN BID ANY CHARGES OR FEES MADE BY THE UTILITY COMPANIES FOR THEIR PORTION OF THE WORK AND SHALL PROVIDE AND INSTALL ALL ITEMS REQUIRED, BUT NOT PROVIDED BY UTILITY COMPANY.

D. ELECTRICAL CONTRACTOR SHALL COORDINATE ELECTRICAL INSTALLATION WITH ELECTRIC UTILITY CO. PRIOR TO INSTALLATION.

E. CONTRACTOR SHALL COORDINATE WITH TELEPHONE UTILITY COMPANY FOR LOCATION OF TELEPHONE SERVICE AND TO DETERMINE ANY REQUIRED EQUIPMENT TO BE INSTALLED BY CONTRACTOR.

1.02. GENERAL REQUIREMENTS

A. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.

B. THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNERS REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES THAT MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR SCHEDULING OF ALL INSPECTIONS THAT MAY BE REQUIRED BY THE LOCAL AUTHORITY.

D. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.

E. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH LOCAL TELEPHONE COMPANY THAT MAY BE REQUIRED FOR THE INSTALLATION OF TELEPHONE SERVICE TO THE PROPOSED CELLULAR SITE.

F. NO MATERIAL OTHER THAN THAT CONTAINED IN THE "LATEST LIST OF ELECTRICAL FITTINGS" APPROVED BY THE UNDERWRITERS' LABORATORIES, SHALL BE USED IN ANY PART OF THE WORK. ALL MATERIAL FOR WHICH LABEL SERVICE HAS BEEN ESTABLISHED SHALL BEAR THE U.L. LABEL.

G. THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.

H. DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL, WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE, PRIOR TO SUBMITTAL OF BID.

I. THE ELECTRICAL CONTRACTOR SHALL SUPPLY THREE (3) COMPLETE SETS OF APPROVED DRAWINGS, ENGINEERING DATA SHEETS, MAINTENANCE AND OPERATING INSTRUCTION MANUALS FOR ALL SYSTEMS AND THEIR RESPECTIVE EQUIPMENT. THESE MANUALS SHALL BE INSERTED IN VINYL COVERED 3-RING BINDERS AND TURNED OVER TO OWNER'S REPRESENTATIVE ONE (1) WEEK PRIOR TO FINAL PUNCH LIST.

J. ALL WORK SHALL BE INSTALLED IN A NEAT AND WORKMAN LIKE MANNER AND WILL BE SUBJECT TO THE APPROVAL OF THE OWNER'S REPRESENTATIVE.

K. ALL EQUIPMENT AND MATERIALS TO BE INSTALLED SHALL BE NEW, UNLESS OTHERWISE NOTED.

L. BEFORE FINAL PAYMENT, THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF PRINTS (AS-BUILTS), LEGIBLY MARKED IN RED PENCIL TO SHOW ALL CHANGES FROM THE ORIGINAL PLANS.

M. PROVIDE TEMPORARY POWER AND LIGHTING IN WORK AREAS AS REQUIRED.

N. SHOP DRAWINGS:

1. CONTRACTOR SHALL SUBMIT SIX (6) COPIES OF SHOP DRAWINGS ON ALL EQUIPMENT AND MATERIALS PROPOSED FOR USE ON THIS PROJECT, GIVING ALL DETAILS, WHICH INCLUDE DIMENSIONS, CAPACITIES, ETC.
2. CONTRACTOR SHALL SUBMIT SIX (6) COPIES OF ALL TEST REPORTS CALLED FOR IN THE SPECIFICATIONS AND DRAWINGS.

O. ENTIRE ELECTRICAL INSTALLATION SHALL BE IN ACCORDANCE WITH OWNER'S SPECIFICATIONS, AND REQUIREMENTS OF ALL LOCAL AUTHORITIES HAVING JURISDICTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH APPROPRIATE INDIVIDUALS TO OBTAIN ALL SUCH SPECIFICATIONS AND REQUIREMENTS. NOTHING CONTAINED IN, OR OMITTED FROM, THESE DOCUMENTS SHALL RELIEVE CONTRACTOR FROM THIS OBLIGATION.

SECTION 16111

1.01. CONDUIT

A. MINIMUM CONDUIT SIZE FOR BRANCH CIRCUITS, LOW VOLTAGE CONTROL AND ALARM CIRCUITS SHALL BE 3/4". ALL CONDUIT RUNS LOCATED WITHIN THE OWNER'S EQUIPMENT ROOM SHALL ORIGINATE FROM THE WIREWAY AND RUN VERTICALLY TO ITS DESTINATION. NO BENDS WILL BE ACCEPTED. CONDUITS SHALL BE PROPERLY FASTENED TO THE WALLS AND CEILINGS AS REQUIRED BY THE N.E.C.

CONDUIT MATERIAL SHALL BE AS FOLLOWS:

1. ELECTRIC METALLIC TUBING (EMT) – BRANCH CIRCUITS INSIDE WIRELESS ROOM
2. GALVANIZED RIGID CONDUIT (GRC) – FEEDERS AND CIRCUITS EXPOSED TO EXTERIOR & UNDERGROUND.
3. LIQUID TIGHT FLEXIBLE METAL CONDUIT – FOR SHORT LENGTHS (MAX. 3'-0") WIRING TO VIBRATING EQUIPMENT (HVAC UNITS, MOTORS, ETC.) IN WET LOCATIONS.
4. FLEXIBLE METAL CONDUIT – FOR SHORT LENGTHS (MAX. 3'-0") WIRING TO VIBRATING EQUIPMENT IN DRY LOCATIONS.
5. PVC CONDUIT – WHERE SHOWN ON GROUNDING DETAILS.

SECTION 16113

1.01. WIREWAYS

A. THE 4" X 4" WIREWAY LOCATED IN THE OWNER'S EQUIPMENT ROOM SHALL BE INSTALLED ALONG THE TOP OF THE INTERIOR WALL AND SHALL HAVE ONE VERTICAL DROP CONNECTED TO PANELBOARD. MANUFACTURER SHALL BE HOFFMAN ENGINEERING COMPANY OR APPROVED EQUAL.

SECTION 16123

1.01. CONDUCTORS

A. ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT-BOLT TYPE CONNECTORS. #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION:

LINE	120/208/240V COLOR	277/480V COLOR
A	BLACK	BROWN
B	RED	ORANGE
C	BLUE	YELLOW
N	CONTINUOUS WHITE	GREY
G	CONTINUOUS GREEN	GREEN WITH YELLOW STRIPE

B. MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.

SECTION 16130

1.01. BOXES

A. FURNISH AND INSTALL OUTLET BOXES FOR ALL DEVICES, SWITCHES, RECEPTACLES, ETC.. BOXES TO BE ZINC COATED STEEL.

B. FURNISH AND INSTALL PULL BOXES IN MAIN FEEDERS RUNS WHERE REQUIRED. PULL BOXES SHALL BE GALVANIZED STEEL WITH SCREW REMOVABLE COVERS, SIZE AND QUANTITY AS REQUIRED. PROVIDE WEATHERPROOF CONSTRUCTION IN WET LOCATIONS.

SECTION 16140

1.01. WIRING DEVICES

A. THE FOLLOWING LIST IS PROVIDED TO CONVEY THE QUALITY AND RATING OF WIRING DEVICES WHICH ARE TO BE INSTALLED. A COMPLETE LIST OF ALL DEVICES MUST BE SUBMITTED BEFORE INSTALLATION FOR APPROVAL.

1. 15 MINUTE TIMER SWITCH – INTERMATIC #FF15M (INTERIOR LIGHTS)
2. DUPLEX RECEPTACLE – P&S #2095 (GFCI) SPECIFICATION GRADE
3. SINGLE POLE SWITCH – P&S #CSB20AC2 (20A-120V HARD USE) SPECIFICATION GRADE
4. DUPLEX RECEPTACLE – P&S #5362 (20A-120V HARD USE) SPECIFICATION GRADE

B. PLATES – ALL PLATES USED SHALL BE CORROSION RESISTANT TYPE 304 STAINLESS STEEL. PLATES SHALL BE FROM SAME MANUFACTURER AS SWITCHES AND RECEPTACLES. PROVIDE WEATHERPROOF HOUSING FOR DEVICES LOCATED IN WET LOCATIONS.

C. OTHER MANUFACTURERS OF THE SWITCHES, RECEPTACLES AND PLATES MAY BE SUBMITTED FOR APPROVAL BY THE ENGINEER.

SECTION 16170

1.01. DISCONNECT SWITCHES

A. FUSIBLE AND NON-FUSIBLE, 600V, HEAVY DUTY DISCONNECT SWITCHES SHALL BE AS MANUFACTURED BY SQUARE "D". PROVIDE FUSES AS CALLED FOR ON THE CONTRACT DRAWINGS. AMPERE RATING SHALL BE CONSISTENT WITH LOAD BEING SERVED. DISCONNECT SWITCH COVER SHALL BE MECHANICALLY INTERLOCKED TO PREVENT COVER FROM OPENING WHEN THE SWITCH IS IN THE "ON" POSITION. EXTERIOR APPLICATIONS SHALL BE NEMA 3R CONSTRUCTION WITH PADLOCK FEATURE.

SECTION 16190

1.01. SEISMIC RESTRAINT

A. ALL DEVICES SHALL BE INSTALLED IN ACCORDANCE WITH ZONE 2 SEISMIC REQUIREMENTS.

SECTION 16195

1.01. LABELING AND IDENTIFICATION NOMENCLATURE FOR ELECTRICAL EQUIPMENT

A. CONTRACTOR SHALL FURNISH AND INSTALL NON-METALLIC ENGRAVED BACK-LIT NAMEPLATES ON ALL PANELS AND MAJOR ITEMS OF ELECTRICAL EQUIPMENT.

B. LETTERS TO BE WHITE ON BLACK BACKGROUND WITH LETTERS 1-1/2 INCH HIGH WITH 1/4 INCH MARGIN.

C. IDENTIFICATION NOMENCLATURE SHALL BE IN ACCORDANCE WITH OWNER'S STANDARDS.

D. PROVIDE NAMEPLATE FOR PORTABLE ENGINE/GENERATOR CONNECTION SHOWING VOLTAGE KVA/KW RATING, # PHASE, AND # OF WIRES. PLATE TO BE PLASTIC ENGRAVED, RED WITH WHITE LETTERS.

E. ALL RECEPTACLES, SWITCHES, DISCONNECT SWITCHES, ETC. SHALL BE LABELED WITH THE CORRECT BRANCH CIRCUIT NUMBER SERVED BY MEANS OF PERMANENT PRESSED TYPE BLACK 1/4" TRANSFER LETTERING. (FOR EXAMPLE: "MDP-5", ETC.).

F. PROVIDE A NAMEPLATE AT THE SERVICE EQUIPMENT INDICATING THE TYPE AND LOCATION OF THE ON SITE GENERATOR.

SECTION 16450

1.01. GROUNDING

A. ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.

B. GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.

C. GROUNDING OF PANELBOARDS:

1. PANELBOARD SHALL BE GROUNDED BY TERMINATING THE PANELBOARD FEEDER'S EQUIPMENT GROUND CONDUCTOR TO THE EQUIPMENT GROUND BAR KIT(S) LUGGED TO THE CABINET. ENSURE THAT THE SURFACE BETWEEN THE KIT AND CABINET ARE BARE METAL TO BARE METAL. PRIME AND PAINT OVER TO PREVENT CORROSION.
2. CONDUIT(S) TERMINATING INTO THE PANELBOARD SHALL HAVE GROUNDING TYPE BUSHINGS. THE BUSHINGS SHALL BE BONDED TOGETHER WITH BARE #10 AWG COPPER CONDUCTOR WHICH IN TURN IS TERMINATED INTO THE PANELBOARD'S EQUIPMENT GROUND BAR KIT(S).

D. EQUIPMENT GROUNDING CONDUCTOR:

1. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122.
2. THE MINIMUM SIZE OF EQUIPMENT GROUND CONDUCTOR SHALL BE #12 AWG COPPER.
3. REFER TO PANEL SCHEDULE "BRANCH CIRCUIT" DATA FOR EQUIPMENT GROUND CONDUCTOR SIZE FOR EACH BRANCH CIRCUIT.
4. EACH FEEDER OR BRANCH CIRCUIT SHALL HAVE EQUIPMENT GROUND CONDUCTOR(S) INSTALLED IN THE SAME RACEWAY(S).

E. CELLULAR GROUNDING SYSTEM:

CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 5 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16960).

PROVIDE THE CELLULAR GROUNDING SYSTEM AS SPECIFIED ON DRAWINGS, INCLUDING, BUT NOT LIMITED TO:

1. GROUND BARS
2. INTERIOR GROUND RING
3. EXTERIOR GROUNDING (WHERE REQUIRED DUE TO MEASURED AC RESISTANCE GREATER THAN SPECIFIED).
4. ANTENNA GROUND CONNECTIONS AND PLATES.

F. CONTRACTOR, AFTER COMPLETION OF THE COMPLETE GROUNDING SYSTEM BUT PRIOR TO CONCEALMENT/BURIAL OF SAME, SHALL NOTIFY OWNER'S WIRELESS PROJECT ENGINEER WHO WILL HAVE A DESIGN ENGINEER VISIT SITE AND MAKE A VISUAL INSPECTION OF THE GROUNDING GRID AND CONNECTIONS OF THE SYSTEM.

G. ALL EQUIPMENT SHALL BE BONDED TO GROUND AS REQUIRED BY N.E.C., MFG. SPECIFICATIONS, AND OWNER'S SPECIFICATIONS.

SECTION 16470

1.01. DISTRIBUTION EQUIPMENT

A. REFER TO CONTRACT DRAWINGS FOR DETAILS AND SCHEDULES.

SECTION 16477

1.01. FUSES

A. FUSES SHALL BE NONRENEWABLE TYPE AS MANUFACTURED BY "BUSSMAN" OR APPROVED EQUAL. FUSES RATED TO 1/10 AMPERE UP TO 600 AMPERES SHALL BE EQUIVALENT TO BUSSMAN TYPE LPN-RK (250V) UL CLASS RK1, LOW PEAK, DUAL ELEMENT, TIME-DELAY FUSES. FUSES SHALL HAVE SEPARATE SHORT CIRCUIT AND OVERLOAD ELEMENTS AND HAVE AN INTERRUPTING RATING OF 200 KAIC. UPON COMPLETION OF WORK, PROVIDE ONE SPARE SET OF FUSES FOR EACH TYPE INSTALLED.

SECTION 16620
(SUPPLIED BY OWNER, INSTALLED BY CONTRACTOR)

1.01. GENERATOR SET

A. REFER TO CONTRACT DRAWINGS FOR DETAILS AND SCHEDULES.

SECTION 16960

1.01. TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

A. CONTRACTOR SHALL RETAIN THE SERVICES OF A LOCAL INDEPENDENT ELECTRICAL TESTING FIRM (WITH MINIMUM 5 YEARS COMMERCIAL EXPERIENCE IN THE ELECTRICAL TESTING INDUSTRY) AS SPECIFIED BY OWNER TO PERFORM:

TEST 1: THERMAL OVERLOAD AND MAGNETIC TRIP TEST, AND CABLE INSULATION TEST FOR ALL CIRCUIT BREAKERS RATED 100 AMPS OR GREATER.

TEST 2: RESISTANCE TO GROUND TEST ON THE CELLULAR GROUNDING SYSTEM.

THE TESTING FIRM SHALL INCLUDE THE FOLLOWING INFORMATION WITH THE REPORT:

1. TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.
2. CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.
3. GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.

B. THESE TESTS SHALL BE PERFORMED IN THE PRESENCE AND TO THE SATISFACTION OF OWNER'S CONSTRUCTION REPRESENTATIVE. TESTING DATA SHALL BE INITIALED AND DATED BY THE CONSTRUCTION REPRESENTATIVE AND INCLUDED WITH THE WRITTEN REPORT/ANALYSIS.

C. THE CONTRACTOR SHALL FORWARD SIX (6) COPIES OF THE INDEPENDENT ELECTRICAL TESTING FIRM'S REPORT/ANALYSIS TO ENGINEER A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO THE JOB TURNOVER.

D. CONTRACTOR TO PROVIDE A MINIMUM OF ONE (1) WEEK NOTICE TO OWNER AND ENGINEER FOR ALL TESTS REQUIRING WITNESSING.

SECTION 16961

1.01. TESTS BY CONTRACTOR

A. ALL TESTS AS REQUIRED UPON COMPLETION OF WORK, SHALL BE MADE BY THIS CONTRACTOR. THESE SHALL BE CONTINUITY AND INSULATION TESTS; TEST TO DETERMINE THE QUALITY OF MATERIALS, ETC. AND SHALL BE MADE IN ACCORDANCE WITH N.E.C. RECOMMENDATIONS. ALL FEEDERS AND BRANCH CIRCUIT WIRING (EXCEPT CLASS 2 SIGNAL CIRCUITS) MUST BE TESTED FREE FROM SHORT CIRCUIT AND GROUND FAULT CONDITIONS AT 500V IN A REASONABLY DRY AMBIENT OF APPROXIMATELY 70 DEGREES F.

B. CONTRACTOR SHALL PERFORM LOAD PHASE BALANCING TESTS. CIRCUITS SHALL BE SO CONNECTED TO THE PANELBOARDS SUCH THAT THE NEW LOAD IS DISTRIBUTED AS EQUALLY AS POSSIBLE BETWEEN EACH LOAD AND NEUTRAL. 10% SHALL BE CONSIDERED AS A REASONABLE AND ACCEPTABLE ALLOWANCE. BRANCH CIRCUITS SHALL BE BALANCED ON THEIR OWN PANELBOARDS; FEEDER LOADS SHALL, IN TURN, BE BALANCED ON THE SERVICE EQUIPMENT. REASONABLE LOAD TEST SHALL BE ARRANGED TO VERIFY LOAD BALANCE IF REQUESTED BY THE ENGINEER.

C. ALL TESTS, UPON REQUEST, SHALL BE REPEATED IN THE PRESENCE OF OWNER'S REPRESENTATIVE. ALL TESTS SHALL BE DOCUMENTED AND TURNED OVER TO OWNER. OWNER SHALL HAVE THE AUTHORITY TO STOP ANY OF THE WORK NOT BEING PROPERLY INSTALLED. ALL SUCH DETECTED WORK SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL EXPENSE TO THE OWNER AND THE TESTS SHALL BE REPEATED.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
B	03/28/18	TJB	TCK	CONSTRUCTION DRAWINGS – REVISED PER CLIENT COMMENTS
A	03/28/18			CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

T-Mobile

CENTEK engineering
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T-MOBILE
WIRELESS COMMUNICATIONS FACILITY
CTNH550A
38 LOWER ROAD
NORTH CANNAN, CT 06024

DATE: 03/21/18
SCALE: AS NOTED
JOB NO. 18025.00

ELECTRICAL SPECIFICATIONS

E-8

Sheet No. 12 of 13

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

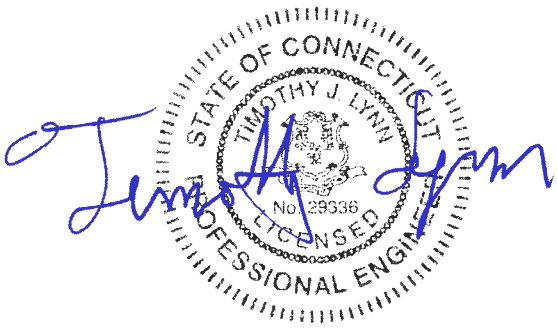
195-ft Existing Pirod Lattice Tower

Site Ref: CTNH550A

38 Lower Road
North Canaan, CT

CENTEK Project No. 18025.00

Date: February 27, 2018



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

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Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna installation proposed by T-Mobile on the existing lattice tower located in North Canaan, Connecticut.

The host tower is a 195-ft, three legged, steel lattice tower originally designed and manufactured by PiROD Inc., Job No. A-117388 dated 2/13/2001. The tower geometry, structure member sizes and foundation information were taken from the original design documents.

Antenna and appurtenance information were obtained from a previous structural analysis prepared by Destek Engineering project no. 1729058, dated December 13, 2017 and visual verification from grade conducted by Centek personnel on February 12, 2018.

The tower consists of eleven (11) vertical sections consisting of truss legs conforming to ASTM A572 Gr. 50. Horizontal and diagonal lateral support bracing consists of steel angles conforming to ASTM A36. The vertical tower sections are connected by bolted flange plates while the legs and bracing are connected by bolted and welded gusset connections. The tower face width is 12.00-ft at the top and 26.00-ft at the bottom.

Antenna and Appurtenance Summary

The existing, proposed and future loads considered in this analysis consist of the following:

- Unknown (Existing):
  Antennas: One (1) 6-ft Microwave dish leg mounted with a RAD center elevation of ±188-ft above grade level.
  Coax Cable: One (1) WE-65 elliptical coax cable running on the leg of the existing tower as specified in Section 3 of this report. (coax on inner tower)
- Unknown (Existing):
  Antennas: Four (4) Kathrein OGT9-840 Omni-directional whip antennas and one (1) Telewave ANT150D3 dipole mounted on three (3) 6-ft PiROD Rigid Side arms with an elevation of 184-ft above grade level.
  Coax Cables: One (1) 1-5/8" ∅ and four (4) 7/8" ∅ coax cables running on the leg of the existing tower as specified in Section 3 of this report. (coax on inner tower)
- Unknown (Existing):
  Antennas: One (1) Telewave ANT150F2 Omni-directional whip antenna mounted on a 3-ft side arm with an elevation of 183-ft above grade level.
  Coax Cables: One (1) 1-5/8" ∅ coax cable running on the leg/face of the existing tower as specified in Section 3 of this report. (coax on inner tower)
- Verizon (Existing):
  Antennas: Four (4) Antel LPA80090-4CF, two (2) Antel LPA80080-4CF, three (3) Antel BXA-70063-6CF, three (3) Antel BXA-171085-8BF panel antennas and six (6) diplexers mounted on three (3) existing 12-ft T-Frames with a RAD center elevation of ±168-ft above grade level.
  Coax Cable: Twelve (12) 1-5/8" ∅ and one (1) 7/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report. (coax on exterior tower)

- Sprint (Existing):
  Antenna: Three (3) RFS APXV9ERR18-C-A20 panel antennas, three (3) Commscope DT465B-2XR panel antennas, six (6) 800mhz remote radio head, three (3) 1900mhz remote radio heads and three (3) Alcatel-Lucent TD-RRH8x20-25 remote radio heads mounted on three (3) existing 12-ft T-Frames with a RAD center elevation of ±154-ft above grade level.
  Coax Cable: Four (4) fiber cables running on a leg/face of the existing tower as specified in Section 3 of this report. (coax on inner tower)
- AT&T (Existing):
  Antenna: Six (6) Powerwave 7770 panel antennas, two (2) CCI HPA-65R-BUU-H6 panel antennas, one (1) Andrew SBNHH-1D65A panel antenna, six (6) Powerwave TT19-08BP111-001 TMAs, six (6) Ericsson RRUS-11 remote radio heads and one (1) Raycap DC6-48-60-18-8F surge arrestor mounted on three (3) existing 12-ft T-Frames with a RAD center elevation of ±140-ft above grade level.
  Coax Cable: Twelve (12) 1-5/8" ∅ coax cables, one (1) fiber cable and two (2) dc control cables running on a leg/face of the existing tower as specified in Section 3 of this report. (coax on inner tower)
- Unknown (Existing):
  Equipment: One (1) vacant 6-ft PiROD Rigid Side arm face mounted to the existing tower with an elevation of 118-ft above grade level.
- Unknown (Existing):
  Antennas: One (1) Telewave ANT150D3 dipole mounted on one (1) 6-ft PiROD Rigid Side arms with an elevation of 105-ft above grade level.
  Coax Cables: One (1) 7/8" ∅ coax cable running on the leg of the existing tower as specified in Section 3 of this report. (coax on inner tower)
- Unknown (Existing):
  Equipment: One (1) vacant 6-ft PiROD Rigid Side arm face mounted to the existing tower with an elevation of 98-ft above grade level.
- Unknown (Existing):
  Antennas: One (1) Celwave PD458-2 Omni-directional whip antenna mounted on one (1) 6-ft PiROD Rigid Side arm with an elevation of 98-ft above grade level.
  Coax Cables: One (1) 7/8" ∅ coax cable running on the leg of the existing tower as specified in Section 3 of this report. (coax on inner tower)
- Unknown (Existing):
  Antennas: One (1) 6-ft Microwave dish with ice shield leg mounted with a RAD center elevation of ±97-ft above grade level.
  Coax Cable: One (1) WE-65 elliptical coax cable running on the leg of the existing tower as specified in Section 3 of this report. (coax on inner tower)

- Unknown (Existing):
  Antennas: One (1) Antel BCD-80609 Omni-directional whip antenna, one (1) yagi, one (1) DB222-A 2-Bay Dipole antenna, one (1) Celwave PD220 Omni-directional whip antenna and one (1) Celwave PD1142 Omni-directional whip mounted on three (3) 6-ft PiROD Rigid Side arms with an elevation of 78-ft above grade level.
  Coax Cables: One (1) 1-5/8" ∅, one (1) 7/8" ∅ and three (3) 1/2" ∅ coax cables running on the leg of the existing tower as specified in Section 3 of this report. (coax on inner tower)
- Unknown (Existing):
  Antennas: One (1) GPS mounted on one (1) 2-ft side arm with an elevation of 32-ft above grade level.
  Coax Cables: One (1) 1/2" ∅ coax cable running on the leg of the existing tower as specified in Section 3 of this report. (coax on inner tower)
- **T-MOBILE (PROPOSED):**
  Antennas: Four (4) Ericsson AIR32 panel antennas, four (4) RFS APXV18-206517 panel antennas, four (4) RFS APXVAA24-43 panel antennas, twelve (12) Ericsson RRUS-11 remote radio heads and one (1) Commscope SC2-W100AB microwave dish mounted on one (1) custom 4-sided sector frame with a RAD center elevation of 125-ft AGL.
  Coax Cables: Four (4) 1-5/8" ∅ fiber cables and one (1) 1/2" ∅ coax cable running on a leg/face of the existing tower. (coax on exterior tower)

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower, and the model assumes that the tower members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-G-2005 entitled "Structural Standard for Antenna Support Structures and Antennas", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1] and the wind speed data available in the TIA-222-G-2005 Standard.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 1.00" radial ice on the tower structure and its components.

Basic Wind Speed:	North Canaan; v = 89 mph (3 second gust)	*[Appendix N of the 2016 CT Building Code]*
Load Cases:	Load Case 1; 89 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2016 CT Building Code]*
	Load Case 2; = 40 mph wind speed w/ 1.00" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

[1] The 2012 International Building Code as amended by the 2016 Connecticut State Building Code (CSBC).

Tower Capacity

- Calculated stresses were found to be within allowable limits. In Load Case 2, per tnxTower "Section Capacity Table", this tower was found to be at **65.5%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T12)	20'-0"- 40'-0"	65.5%	**PASS**
Diagonal (T6)	120'-0"- 140'-0"	65.2%	**PASS**

Foundation and Anchors

The existing foundation consists of one (1) 31.5' square x 4' thick reinforced concrete mat with (12) rock anchors. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned manufacturers original design documents. The tower legs are connected to the foundation by means of six (6) 2"∅, ASTM 687 Grade 105 anchor bolts per leg, embedded into the concrete foundation structure.

- The tower reactions developed from the governing Load Case 1 of the proposed reinforced tower condition were used in the verification of the foundation and anchor bolts:

Leg Reactions	Vector	Proposed Tower Reactions
Leg	Shear	**50 kips**
	Compression	**364 kips**
	Uplift	**307 kips**
Base	Shear	**72 kips**
	Compression	**77 kips**
	Moment	**7625 kip-ft**

- The anchor bolts were found to be within allowable limits.

Tower Section	Component	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	19.2%	**PASS**

- The foundation was found to be within allowable limits.

Foundation Type	Design Limit	Allowable Limit/FS	Proposed Loading	Result
Rock Anchored Mat	Ultimate Bearing Pressure	20.00 ksf	1.46ksf	**PASS**
	Uplift Resistance	1.00 (1)	1.73	**PASS**

Note 1: Minimum required Factor of Safety (FS) of 1.0 required per TIA-222-G section 9.4

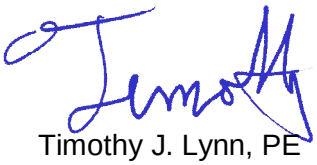
Conclusion

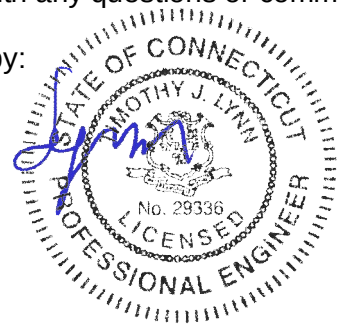
This analysis shows that the subject tower **is adequate** to support the proposed antenna configuration.

The analysis is based, in part, on the information provided to this office by T-Mobile. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:





Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

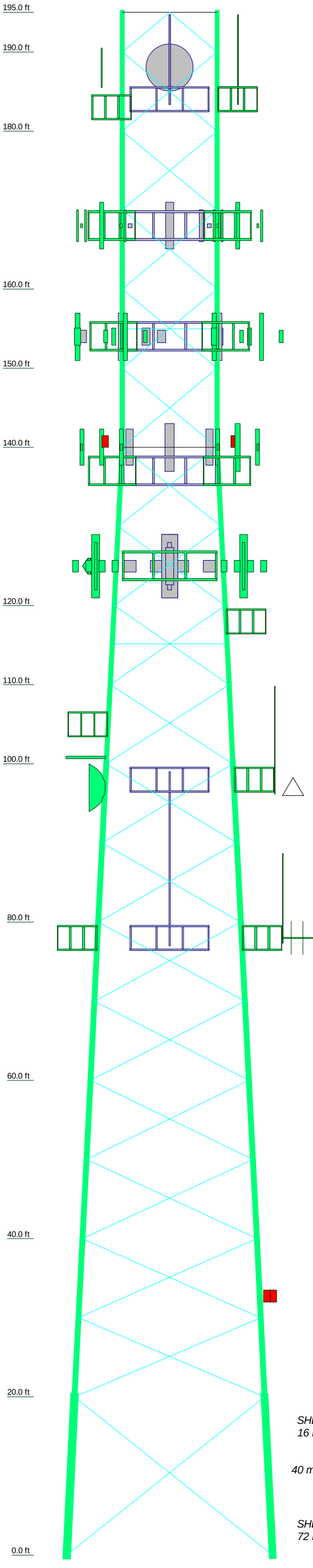
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly RISA Tower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13
Section		Pirod 105244	Pirod 105216	Pirod 105217		Pirod 105218			Pirod 105219			Pirod 105220	
Legs													Pirod 112738
Leg Grade						A572-50							
Diagonals	A	L2 1/2x2 1/2x3/16	L3x3x3/16	L3x3x5/16			L3 1/2x3 1/2x5/16		L4x4x1/4	L4x4x3/8		L5x5x3/8	2L3 1/2x3 1/2x5/16
Diagonal Grade						A36							
Top Girts	A		N.A.			L3x3x5/16					N.A.		
Sec. Horizontals		N.A.		L3x3x5/16		N.A.	L3 1/2x3 1/2x5/16	N.A.					
Face Width (ft)	12					14		15	16	18	20	22	24
# Panels @ (ft)	1 @ 5		17 @ 10										1 @ 20
Weight (K)	0.9	1.1	2.0	1.6	1.4	3.5	2.1	1.8	4.7	5.6	7.0	7.3	7.8



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
6' Dish	188	HPA-65R-BUU-H6 (AT&I)	140
OGT9-840	184	(2) 7770.00 (AT&I)	140
OGT9-840	184	HPA-65R-BUU-H6 (AT&I)	140
Pirod 6-8' Box Arm (1)	184	(2) 7770.00 (AT&I)	140
OGT9-840	184	SBNHH-1D65A (AT&I)	140
OGT9-840	184	(2) TT19-08BP111-001 TMA (AT&I)	140
Pirod 6-8' Box Arm (1)	184	(2) TT19-08BP111-001 TMA (AT&I)	140
ANT150D3	184	(2) TT19-08BP111-001 TMA (AT&I)	140
Pirod 6-8' Box Arm (1)	184	(2) RRUS-11 (AT&I)	140
ANT150F2	183	(2) RRUS-11 (AT&I)	140
3' Side Mount Standoff	183	Pirod 12' T-Frame Sector Mount (1) (AT&I)	137
LPA-80090-4CF (Verizon)	168	Pirod 12' T-Frame Sector Mount (1) (AT&I)	137
(2) FD9R6004/2C-3L Diplexer (Verizon)	168	Pirod 12' T-Frame Sector Mount (1) (AT&I)	137
(2) FD9R6004/2C-3L Diplexer (Verizon)	168	APXV18-206517S (T-Mobile Proposed)	125
(2) FD9R6004/2C-3L Diplexer (Verizon)	168	(4) RRUS-11 (T-Mobile Proposed)	125
Pirod 12' T-Frame Sector Mount (1) (Verizon)	168	(4) RRUS-11 (T-Mobile Proposed)	125
Pirod 12' T-Frame Sector Mount (1) (Verizon)	168	(4) RRUS-11 (T-Mobile Proposed)	125
Pirod 12' T-Frame Sector Mount (1) (Verizon)	168	Custom 4-Sided Sector Mount (T-Mobile Proposed)	125
BXA-171085-8BF (Verizon)	168	APXV18-206517S (T-Mobile Proposed)	125
BXA-70063/6CF (Verizon)	168	AIR32 (T-Mobile Proposed)	125
LPA-80080-4CF (Verizon)	168	APXVAA24_43 (T-Mobile Proposed)	125
LPA-80090-4CF (Verizon)	168	AIR32 (T-Mobile Proposed)	125
BXA-171085-8BF (Verizon)	168	APXVAA24_43 (T-Mobile Proposed)	125
BXA-70063/6CF (Verizon)	168	APXV18-206517S (T-Mobile Proposed)	125
LPA-80090-4CF (Verizon)	168	AIR32 (T-Mobile Proposed)	125
LPA-80090-4CF (Verizon)	168	APXVAA24_43 (T-Mobile Proposed)	125
BXA-171085-8BF (Verizon)	168	APXV18-206517S (T-Mobile Proposed)	125
BXA-70063/6CF (Verizon)	168	AIR32 (T-Mobile Proposed)	125
LPA-80080-4CF (Verizon)	168	SC2-W100AB (T-Mobile Proposed)	125
FD-RRH 4x45 1900 (Sprint)	154	APXVAA24_43 (T-Mobile Proposed)	125
TD-RRH8x20-25 (Sprint)	154	Pirod 6-8' Box Arm (1) (Vacant)	118
TD-RRH8x20-25 (Sprint)	154	Pirod 6-8' Box Arm (1)	105
TD-RRH8x20-25 (Sprint)	154	ANT150D3	105
Pirod 12' T-Frame Sector Mount (1) (Sprint)	154	6' Dish Ice Shield	101
Pirod 12' T-Frame Sector Mount (1) (Sprint)	154	Pirod 6-8' Box Arm (1)	98
Pirod 12' T-Frame Sector Mount (1) (Sprint)	154	PD458-2	98
APXV9ERR18-C-A20 (Sprint)	154	Pirod 6-8' Box Arm (1) (Vacant)	98
APXV9ERR18-C-A20 (Sprint)	154	6' Dish	97
APXV9ERR18-C-A20 (Sprint)	154	BCD-80609-NE	78
DT465B-2XR (Sprint)	154	6' Yagi	78
DT465B-2XR (Sprint)	154	Pirod 6-8' Box Arm (1)	78
DT465B-2XR (Sprint)	154	DB222	78
(2) FD-RRH 2x50 800 (Sprint)	154	Pirod 6-8' Box Arm (1)	78
(2) FD-RRH 2x50 800 (Sprint)	154	PD220	78
(2) FD-RRH 2x50 800 (Sprint)	154	Pirod 6-8' Box Arm (1)	78
FD-RRH 4x45 1900 (Sprint)	154	PD1142-1	78
FD-RRH 4x45 1900 (Sprint)	154	2-ft Stand Off	32
(2) RRUS-11 (AT&I)	140	GPS	32
DC6-48-60-18-8F Surge Arrestor (AT&I)	140		
(2) 7770.00 (AT&I)	140		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	2L2 1/2x2 1/2x3/16		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 89 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class III.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 65.5%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 364 K
SHEAR: 50 K

UPLIFT: -307 K
SHEAR: 42 K

AXIAL 286 K
SHEAR 16 K *MOMENT 1943 kip-ft*
TORQUE 4 kip-ft
40 mph WIND - 1.0000 in ICE

AXIAL 77 K
SHEAR 72 K *MOMENT 7625 kip-ft*
TORQUE 47 kip-ft
REACTIONS - 89 mph WIND

Centek Engineering Inc.
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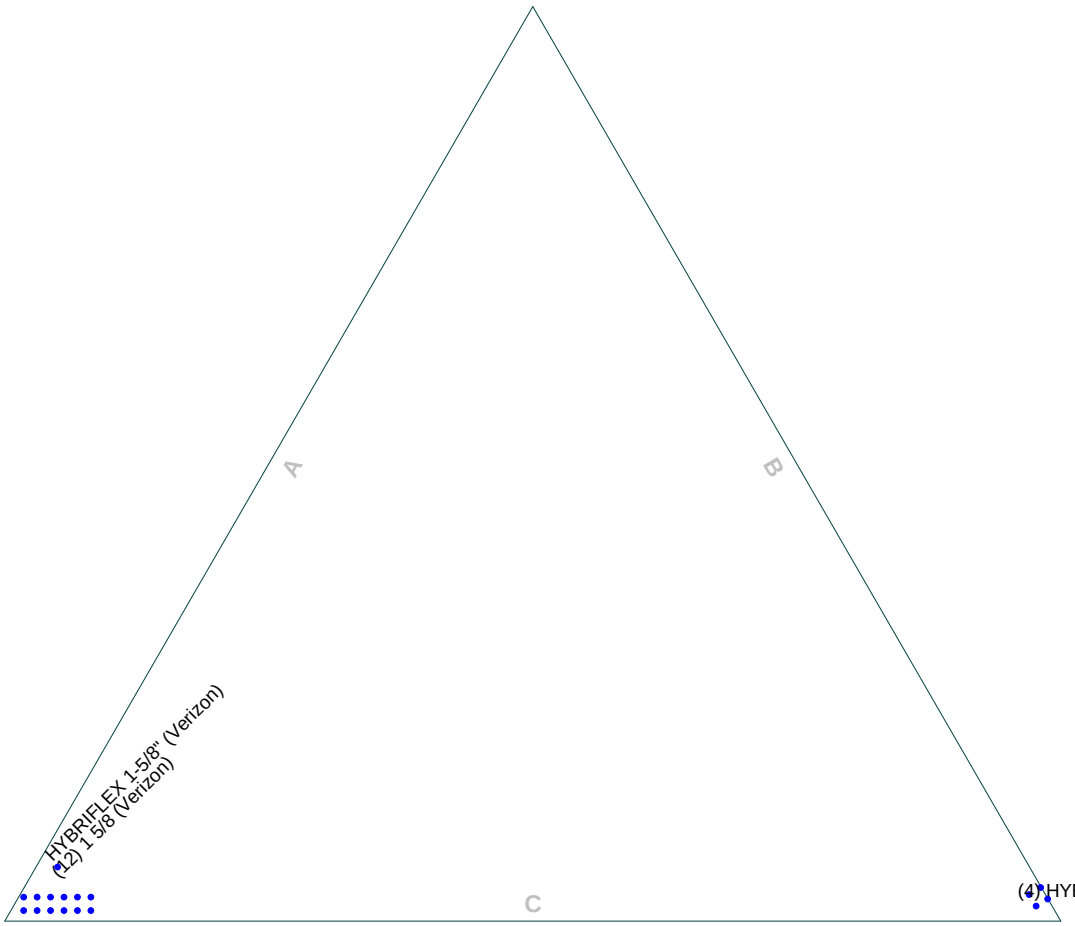
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job:	***18025.00 - CTNH550A***		
Project:	***38 Lower Road, North Canaan, CT***		
Client: T-Mobile	Drawn by: TJL		App'd:
Code: TIA-222-G	Date: 02/27/18		Scale: NTS
Path: J:\Jobs\180500\W05_Structural\Backup Documentation\ER Files\Outter Tower\195' Pirod Lattice Tower.eri			Dwg No. E-1

Feed Line Plan

Round Flat App In Face App Out Face Truss-Leg

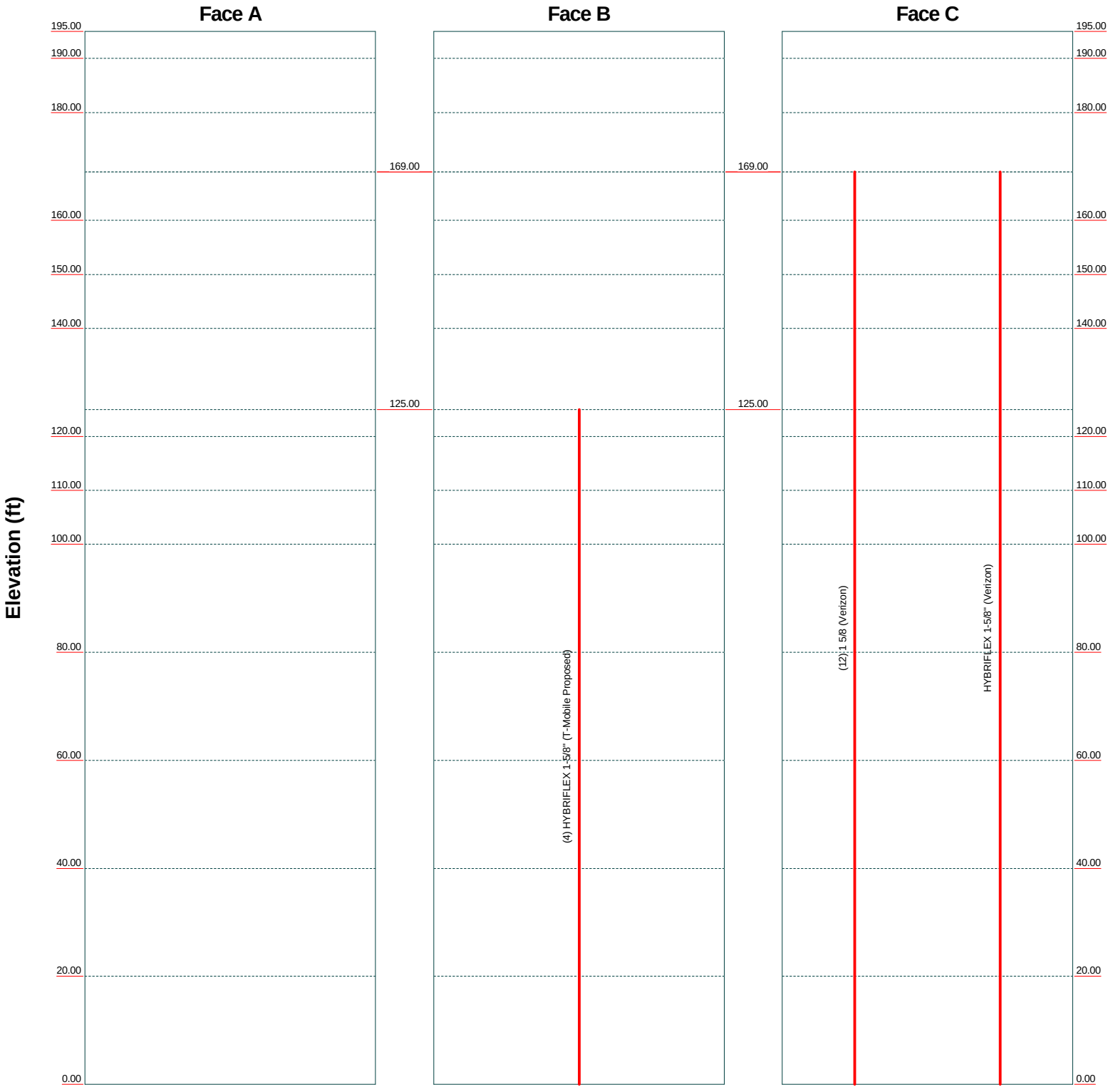


Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job:	***18025.00 - CTNH550A***		
Project:	***38 Lower Road, North Canaan, CT***		
Client: T-Mobile		Drawn by: TJL	App'd:
Code: TIA-222-G		Date: 02/27/18	Scale: NTS
Path: J:\Jobs\1802500.WI\05_Structural\Backup Documentation\ER\ Files\Cutler Town\195' Pinod Lattice Tower.eri			Dwg No. E-7

Feed Line Distribution Chart
0' - 195'

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



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Path: J:\Jobs\1802500.W05_Structural\Backup Documentation\ER\ Files\Cutter Tower\195' Piped Lattice Tower.eri		Dwg No. E-7	

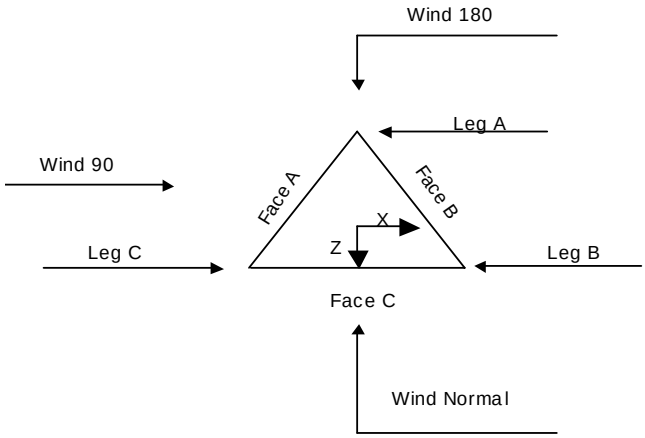
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 195.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 12.00 ft at the top and 26.00 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Basic wind speed of 89 mph.
Structure Class III.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 40 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

√ Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	√ Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	√ SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	√ All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
√ Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
√ Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
√ SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric		



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	195.00-190.00			12.00	1	5.00
T2	190.00-180.00			12.00	1	10.00
T3	180.00-160.00			12.00	1	20.00
T4	160.00-150.00			12.00	1	10.00
T5	150.00-140.00			12.00	1	10.00
T6	140.00-120.00			12.00	1	20.00
T7	120.00-110.00			14.00	1	10.00
T8	110.00-100.00			15.00	1	10.00
T9	100.00-80.00			16.00	1	20.00
T10	80.00-60.00			18.00	1	20.00
T11	60.00-40.00			20.00	1	20.00
T12	40.00-20.00			22.00	1	20.00
T13	20.00-0.00			24.00	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	195.00-190.00	5.00	K Brace Down	No	Yes	0.0000	0.0000
T2	190.00-180.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T3	180.00-160.00	10.00	X Brace	No	No	0.0000	0.0000
T4	160.00-150.00	10.00	X Brace	No	Yes	0.0000	0.0000
T5	150.00-140.00	10.00	X Brace	No	No	0.0000	0.0000
T6	140.00-120.00	10.00	X Brace	No	No	0.0000	0.0000
T7	120.00-110.00	10.00	X Brace	No	Yes	0.0000	0.0000
T8	110.00-100.00	10.00	X Brace	No	No	0.0000	0.0000
T9	100.00-80.00	10.00	X Brace	No	No	0.0000	0.0000
T10	80.00-60.00	10.00	X Brace	No	No	0.0000	0.0000
T11	60.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T12	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T13	20.00-0.00	20.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 195.00-190.00	Truss Leg	Pirod 105244	A572-50 (50 ksi)	Double Equal Angle	2L2 1/2x2 1/2x3/16	A36 (36 ksi)
T2 190.00-180.00	Truss Leg	Pirod 105244	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T3 180.00-160.00	Truss Leg	Pirod 105216	A572-50 (50 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T4 160.00-150.00	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T5 150.00-140.00	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T6 140.00-120.00	Truss Leg	Pirod 105218	A572-50 (50 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T7 120.00-110.00	Truss Leg	Pirod 105218	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T8 110.00-100.00	Truss Leg	Pirod 105218	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T9 100.00-80.00	Truss Leg	Pirod 105219	A572-50 (50 ksi)	Single Angle	L4x4x1/4	A36 (36 ksi)
T10 80.00-60.00	Truss Leg	Pirod 105219	A572-50 (50 ksi)	Single Angle	L4x4x3/8	A36 (36 ksi)
T11 60.00-40.00	Truss Leg	Pirod 105220	A572-50 (50 ksi)	Single Angle	L5x5x3/8	A36 (36 ksi)
T12 40.00-20.00	Truss Leg	Pirod 105220	A572-50 (50 ksi)	Single Angle	L5x5x3/8	A36 (36 ksi)
T13 20.00-0.00	Truss Leg	Pirod 112738	A572-50 (50 ksi)	Double Equal Angle	2L3 1/2x3 1/2x5/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T6 140.00-120.00	Single Angle	L3x3x5/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 195.00-190.00	None	Solid Round		A572-50 (50 ksi)	Double Equal Angle	2L2 1/2x2 1/2x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T4 160.00-150.00	Single Angle	L3x3x5/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T7 120.00-110.00	Single Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 195.00-190.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	Mid-Pt	36.0000
T2 190.00-180.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 160.00-150.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 150.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 120.00-110.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T8 110.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T9 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T10 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T11 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T12 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T13 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 195.00-190.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 190.00-180.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 180.00-160.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 160.00-150.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 150.00-140.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 140.00-120.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 120.00-110.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 110.00-100.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 100.00-80.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T10 80.00-60.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T11 60.00-40.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T12 40.00-20.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T13 20.00-0.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Truss-Leg K Factors: Truss-Legs Used As Leg Members — Leg Panels	X Brace Diagonals	Z Brace Diagonals	Truss-Legs Used As Inner Members — Leg Panels	X Brace Diagonals	Z Brace Diagonals
T1 195.00-190.00	1	0.5	0.85	1	0.5	0.85

	Truss-Leg K Factors					
	Truss-Legs Used As Leg Members			Truss-Legs Used As Inner Members		
Tower Elevation ft	Leg Panels	X Brace Diagonals	Z Brace Diagonals	Leg Panels	X Brace Diagonals	Z Brace Diagonals
T2 190.00-180.00	1	0.5	0.85	1	0.5	0.85
T3 180.00-160.00	1	0.5	0.85	1	0.5	0.85
T4 160.00-150.00	1	0.5	0.85	1	0.5	0.85
T5 150.00-140.00	1	0.5	0.85	1	0.5	0.85
T6 140.00-120.00	1	0.5	0.85	1	0.5	0.85
T7 120.00-110.00	1	0.5	0.85	1	0.5	0.85
T8 110.00-100.00	1	0.5	0.85	1	0.5	0.85
T9 100.00-80.00	1	0.5	0.85	1	0.5	0.85
T10 80.00-60.00	1	0.5	0.85	1	0.5	0.85
T11 60.00-40.00	1	0.5	0.85	1	0.5	0.85
T12 40.00-20.00	1	0.5	0.85	1	0.5	0.85
T13 20.00-0.00	1	0.5	0.85	1	0.5	0.85

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 195.00-190.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T2 190.00-180.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T3 180.00-160.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T4 160.00-150.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T5 150.00-140.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T6 140.00-120.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T7 120.00-110.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T8 110.00-100.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T9 100.00-80.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T10 80.00-60.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T11 60.00-40.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T12 40.00-20.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T13 20.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 195.00-190.00	Flange	1.0000 A325N	6	1.0000 A325N	1	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A615M	0
T2 190.00-180.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 180.00-160.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 160.00-150.00	Flange	0.0000 A325N	0	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	1.0000 A325N	1
T5 150.00-140.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 140.00-120.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	1.0000 A325N	1	0.6250 A325N	0
T7 120.00-110.00	Flange	0.0000 A325N	0	1.0000 A325N	1	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	1.0000 A325N	1
T8 110.00-100.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325N	0
T9 100.00-80.00	Flange	1.2500 A325N	6	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325N	0
T10 80.00-60.00	Flange	1.2500 A325N	6	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325N	0
T11 60.00-40.00	Flange	1.2500 A325N	6	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325N	0
T12 40.00-20.00	Flange	1.2500 A325N	6	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325N	0
T13 20.00-0.00	Flange	2.0000 A687	6	1.0000 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
HYBRIFLEX 1-5/8" (T-Mobile	B	No	Ar (CaAa)	125.00 - 0.00	-3.0000	0.47	4	2	1.9800	1.9800		1.90

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Proposed) 1 5/8 (Verizon)	C	No	Ar (CaAa)	169.00 - 0.00	-6.0000	0.45	12	6	1.9800	1.9800		1.04
HYBRIFLEX 1-5/8" (Verizon)	C	No	Ar (CaAa)	169.00 - 0.00	-15.0000	0.45	1	1	1.9800	1.9800		1.90

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	195.00-190.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	190.00-180.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T3	180.00-160.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	23.166	0.000	0.13
T4	160.00-150.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	25.740	0.000	0.14
T5	150.00-140.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	25.740	0.000	0.14
T6	140.00-120.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	3.960	0.000	0.04
		C	0.000	0.000	51.480	0.000	0.29
T7	120.00-110.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	7.920	0.000	0.08
		C	0.000	0.000	25.740	0.000	0.14
T8	110.00-100.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	7.920	0.000	0.08
		C	0.000	0.000	25.740	0.000	0.14
T9	100.00-80.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	15.840	0.000	0.15
		C	0.000	0.000	51.480	0.000	0.29
T10	80.00-60.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	15.840	0.000	0.15
		C	0.000	0.000	51.480	0.000	0.29
T11	60.00-40.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	15.840	0.000	0.15
		C	0.000	0.000	51.480	0.000	0.29
T12	40.00-20.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	15.840	0.000	0.15
		C	0.000	0.000	51.480	0.000	0.29
T13	20.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	15.840	0.000	0.15
		C	0.000	0.000	51.480	0.000	0.29

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	195.00-190.00	A	2.982	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	190.00-180.00	A	2.970	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T3	180.00-160.00	A	2.945	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	40.939	0.000	1.26
T4	160.00-150.00	A	2.918	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	45.345	0.000	1.39
T5	150.00-140.00	A	2.899	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	45.242	0.000	1.38
T6	140.00-120.00	A	2.867	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	10.319	0.000	0.25
		C		0.000	0.000	90.152	0.000	2.74
T7	120.00-110.00	A	2.832	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	20.515	0.000	0.50
		C		0.000	0.000	44.892	0.000	1.36
T8	110.00-100.00	A	2.807	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	20.424	0.000	0.50
		C		0.000	0.000	44.756	0.000	1.35
T9	100.00-80.00	A	2.764	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	40.544	0.000	0.98
		C		0.000	0.000	89.060	0.000	2.66
T10	80.00-60.00	A	2.695	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	40.059	0.000	0.96
		C		0.000	0.000	88.337	0.000	2.61
T11	60.00-40.00	A	2.606	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	39.429	0.000	0.94
		C		0.000	0.000	87.397	0.000	2.55
T12	40.00-20.00	A	2.476	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	38.511	0.000	0.90
		C		0.000	0.000	86.032	0.000	2.45
T13	20.00-0.00	A	2.219	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	36.689	0.000	0.83
		C		0.000	0.000	83.326	0.000	2.28

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	195.00-190.00	0.0000	0.0000	0.0000	0.0000
T2	190.00-180.00	0.0000	0.0000	0.0000	0.0000
T3	180.00-160.00	-7.1167	3.9224	-3.6772	1.9265
T4	160.00-150.00	-9.6663	5.3276	-5.6164	2.9437
T5	150.00-140.00	-10.1517	5.5951	-6.0062	3.1489
T6	140.00-120.00	-9.1827	6.0939	-5.6017	3.3765
T7	120.00-110.00	-6.2621	6.9584	-4.2936	3.7210
T8	110.00-100.00	-7.0224	7.8559	-4.8770	4.2706
T9	100.00-80.00	-7.3432	8.2854	-5.2168	4.6300
T10	80.00-60.00	-8.0675	9.1870	-5.7403	5.1726
T11	60.00-40.00	-8.2694	9.4872	-6.0904	5.5616
T12	40.00-20.00	-8.8798	10.2497	-6.5841	6.0903

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T13	20.00-0.00	-10.6101	12.3097	-7.5469	7.0939

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T3	2	1 5/8	160.00 - 169.00	1.0000	1.0000
T3	3	HYBRIFLEX 1-5/8"	160.00 - 169.00	1.0000	1.0000
T4	2	1 5/8	150.00 - 160.00	1.0000	1.0000
T4	3	HYBRIFLEX 1-5/8"	150.00 - 160.00	1.0000	1.0000
T5	2	1 5/8	140.00 - 150.00	1.0000	1.0000
T5	3	HYBRIFLEX 1-5/8"	140.00 - 150.00	1.0000	1.0000
T6	1	HYBRIFLEX 1-5/8"	120.00 - 125.00	1.0000	1.0000
T6	2	1 5/8	120.00 - 140.00	1.0000	1.0000
T6	3	HYBRIFLEX 1-5/8"	120.00 - 140.00	1.0000	1.0000
T7	1	HYBRIFLEX 1-5/8"	110.00 - 120.00	1.0000	1.0000
T7	2	1 5/8	110.00 - 120.00	1.0000	1.0000
T7	3	HYBRIFLEX 1-5/8"	110.00 - 120.00	1.0000	1.0000
T8	1	HYBRIFLEX 1-5/8"	100.00 - 110.00	1.0000	1.0000
T8	2	1 5/8	100.00 - 110.00	1.0000	1.0000
T8	3	HYBRIFLEX 1-5/8"	100.00 - 110.00	1.0000	1.0000
T9	1	HYBRIFLEX 1-5/8"	80.00 - 100.00	1.0000	1.0000
T9	2	1 5/8	80.00 - 100.00	1.0000	1.0000
T9	3	HYBRIFLEX 1-5/8"	80.00 - 100.00	1.0000	1.0000
T10	1	HYBRIFLEX 1-5/8"	60.00 - 80.00	1.0000	1.0000
T10	2	1 5/8	60.00 - 80.00	1.0000	1.0000
T10	3	HYBRIFLEX 1-5/8"	60.00 - 80.00	1.0000	1.0000
T11	1	HYBRIFLEX 1-5/8"	40.00 - 60.00	1.0000	1.0000
T11	2	1 5/8	40.00 - 60.00	1.0000	1.0000
T11	3	HYBRIFLEX 1-5/8"	40.00 - 60.00	1.0000	1.0000
T12	1	HYBRIFLEX 1-5/8"	20.00 - 40.00	1.0000	1.0000
T12	2	1 5/8	20.00 - 40.00	1.0000	1.0000
T12	3	HYBRIFLEX 1-5/8"	20.00 - 40.00	1.0000	1.0000
T13	1	HYBRIFLEX 1-5/8"	0.00 - 20.00	1.0000	1.0000
T13	2	1 5/8	0.00 - 20.00	1.0000	1.0000
T13	3	HYBRIFLEX 1-5/8"	0.00 - 20.00	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
LPA-80080-4CF	A	From Leg	3.00	0.0000	168.00	No Ice	2.62	5.40	0.01
(Verizon)			6.00			1/2" Ice	2.92	5.73	0.05
			0.00			1" Ice	3.23	6.06	0.08
BXA-171085-8BF	A	From Leg	3.00	0.0000	168.00	No Ice	2.94	2.16	0.01
(Verizon)			4.00			1/2" Ice	3.26	2.46	0.03
			0.00			1" Ice	3.57	2.77	0.05
BXA-70063/6CF	A	From Leg	3.00	0.0000	168.00	No Ice	7.57	4.16	0.01
(Verizon)			0.00			1/2" Ice	8.02	4.60	0.05
			0.00			1" Ice	8.47	5.04	0.10
LPA-80080-4CF	A	From Leg	3.00	0.0000	168.00	No Ice	2.62	5.40	0.01
(Verizon)			-6.00			1/2" Ice	2.92	5.73	0.05
			0.00			1" Ice	3.23	6.06	0.08
LPA-80090-4CF	B	From Leg	3.00	0.0000	168.00	No Ice	2.71	4.06	0.01
(Verizon)			6.00			1/2" Ice	3.01	4.37	0.04
			0.00			1" Ice	3.32	4.69	0.07
BXA-171085-8BF	B	From Leg	3.00	0.0000	168.00	No Ice	2.94	2.16	0.01
(Verizon)			4.00			1/2" Ice	3.26	2.46	0.03
			0.00			1" Ice	3.57	2.77	0.05
BXA-70063/6CF	B	From Leg	3.00	0.0000	168.00	No Ice	7.57	4.16	0.01
(Verizon)			0.00			1/2" Ice	8.02	4.60	0.05
			0.00			1" Ice	8.47	5.04	0.10
LPA-80090-4CF	B	From Leg	3.00	0.0000	168.00	No Ice	2.71	4.06	0.01
(Verizon)			-6.00			1/2" Ice	3.01	4.37	0.04
			0.00			1" Ice	3.32	4.69	0.07
LPA-80090-4CF	C	From Leg	3.00	0.0000	168.00	No Ice	2.71	4.06	0.01
(Verizon)			6.00			1/2" Ice	3.01	4.37	0.04
			0.00			1" Ice	3.32	4.69	0.07
BXA-171085-8BF	C	From Leg	3.00	0.0000	168.00	No Ice	2.94	2.16	0.01
(Verizon)			4.00			1/2" Ice	3.26	2.46	0.03
			0.00			1" Ice	3.57	2.77	0.05
BXA-70063/6CF	C	From Leg	3.00	0.0000	168.00	No Ice	7.57	4.16	0.01
(Verizon)			0.00			1/2" Ice	8.02	4.60	0.05
			0.00			1" Ice	8.47	5.04	0.10
LPA-80090-4CF	C	From Leg	3.00	0.0000	168.00	No Ice	2.71	4.06	0.01
(Verizon)			-6.00			1/2" Ice	3.01	4.37	0.04
			0.00			1" Ice	3.32	4.69	0.07
(2) FD9R6004/2C-3L	A	From Leg	3.00	0.0000	168.00	No Ice	0.31	0.08	0.00
Diplexer			0.00			1/2" Ice	0.39	0.12	0.01
(Verizon)			0.00			1" Ice	0.47	0.17	0.01
(2) FD9R6004/2C-3L	B	From Leg	3.00	0.0000	168.00	No Ice	0.31	0.08	0.00
Diplexer			0.00			1/2" Ice	0.39	0.12	0.01
(Verizon)			0.00			1" Ice	0.47	0.17	0.01
(2) FD9R6004/2C-3L	C	From Leg	3.00	0.0000	168.00	No Ice	0.31	0.08	0.00
Diplexer			0.00			1/2" Ice	0.39	0.12	0.01
(Verizon)			0.00			1" Ice	0.47	0.17	0.01
Pirod 12' T-Frame Sector	A	From Leg	1.50	0.0000	168.00	No Ice	13.60	13.60	0.47
Mount (1)			0.00			1/2" Ice	18.40	18.40	0.60
(Verizon)			0.00			1" Ice	23.20	23.20	0.73
Pirod 12' T-Frame Sector	B	From Leg	1.50	0.0000	168.00	No Ice	13.60	13.60	0.47
Mount (1)			0.00			1/2" Ice	18.40	18.40	0.60
(Verizon)			0.00			1" Ice	23.20	23.20	0.73

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pirod 12' T-Frame Sector Mount (1) (Verizon)	C	From Leg	1.50 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	13.60 18.40 23.20	13.60 18.40 23.20	0.47 0.60 0.73
APXV9ERR18-C-A20 (Sprint)	A	From Leg	3.00 -6.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	8.02 8.48 8.94	5.81 6.27 6.73	0.06 0.11 0.17
APXV9ERR18-C-A20 (Sprint)	B	From Leg	3.00 -6.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	8.02 8.48 8.94	5.81 6.27 6.73	0.06 0.11 0.17
APXV9ERR18-C-A20 (Sprint)	C	From Leg	3.00 -6.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	8.02 8.48 8.94	5.81 6.27 6.73	0.06 0.11 0.17
DT465B-2XR (Sprint)	A	From Leg	3.00 6.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	9.10 9.56 10.04	5.97 6.43 6.90	0.06 0.12 0.18
DT465B-2XR (Sprint)	B	From Leg	3.00 6.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	9.10 9.56 10.04	5.97 6.43 6.90	0.06 0.12 0.18
DT465B-2XR (Sprint)	C	From Leg	3.00 6.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	9.10 9.56 10.04	5.97 6.43 6.90	0.06 0.12 0.18
(2) FD-RRH 2x50 800 (Sprint)	A	From Leg	3.00 -6.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
(2) FD-RRH 2x50 800 (Sprint)	B	From Leg	3.00 -6.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
(2) FD-RRH 2x50 800 (Sprint)	C	From Leg	3.00 -6.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
FD-RRH 4x45 1900 (Sprint)	A	From Leg	3.00 -3.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	2.32 2.52 2.74	2.38 2.59 2.80	0.06 0.08 0.11
FD-RRH 4x45 1900 (Sprint)	B	From Leg	3.00 -3.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	2.32 2.52 2.74	2.38 2.59 2.80	0.06 0.08 0.11
FD-RRH 4x45 1900 (Sprint)	C	From Leg	3.00 -3.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	2.32 2.52 2.74	2.38 2.59 2.80	0.06 0.08 0.11
TD-RRH8x20-25 (Sprint)	A	From Leg	3.00 6.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
TD-RRH8x20-25 (Sprint)	B	From Leg	3.00 6.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
TD-RRH8x20-25 (Sprint)	C	From Leg	3.00 6.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
Pirod 12' T-Frame Sector Mount (1) (Sprint)	A	From Leg	1.25 0.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	13.60 18.40 23.20	13.60 18.40 23.20	0.47 0.60 0.73
Pirod 12' T-Frame Sector Mount (1) (Sprint)	B	From Leg	1.25 0.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	13.60 18.40 23.20	13.60 18.40 23.20	0.47 0.60 0.73
Pirod 12' T-Frame Sector Mount (1) (Sprint)	C	From Leg	1.25 0.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	13.60 18.40 23.20	13.60 18.40 23.20	0.47 0.60 0.73

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) 7770.00	A	From Leg	3.00	0.0000	140.00	No Ice	5.51	2.93	0.04
(AT&T)			0.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
HPA-65R-BUU-H6	A	From Leg	3.00	0.0000	140.00	No Ice	9.66	6.45	0.05
(AT&T)			0.00			1/2" Ice	10.13	6.91	0.11
			0.00			1" Ice	10.61	7.38	0.18
(2) 7770.00	B	From Leg	3.00	0.0000	140.00	No Ice	5.51	2.93	0.04
(AT&T)			0.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
HPA-65R-BUU-H6	B	From Leg	3.00	0.0000	140.00	No Ice	9.66	6.45	0.05
(AT&T)			0.00			1/2" Ice	10.13	6.91	0.11
			0.00			1" Ice	10.61	7.38	0.18
(2) 7770.00	C	From Leg	3.00	0.0000	140.00	No Ice	5.51	2.93	0.04
(AT&T)			0.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
SBNHH-1D65A	C	From Leg	3.00	0.0000	140.00	No Ice	5.88	3.86	0.04
(AT&T)			0.00			1/2" Ice	6.25	4.22	0.08
			0.00			1" Ice	6.62	4.57	0.12
(2) TT19-08BP111-001 TMA	A	From Leg	3.00	0.0000	140.00	No Ice	0.55	0.45	0.02
(AT&T)			0.00			1/2" Ice	0.65	0.53	0.02
			0.00			1" Ice	0.75	0.63	0.03
(2) TT19-08BP111-001 TMA	B	From Leg	3.00	0.0000	140.00	No Ice	0.55	0.45	0.02
(AT&T)			0.00			1/2" Ice	0.65	0.53	0.02
			0.00			1" Ice	0.75	0.63	0.03
(2) TT19-08BP111-001 TMA	C	From Leg	3.00	0.0000	140.00	No Ice	0.55	0.45	0.02
(AT&T)			0.00			1/2" Ice	0.65	0.53	0.02
			0.00			1" Ice	0.75	0.63	0.03
(2) RRUS-11	A	From Leg	2.50	0.0000	140.00	No Ice	2.57	1.07	0.05
(AT&T)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
(2) RRUS-11	B	From Leg	2.50	0.0000	140.00	No Ice	2.57	1.07	0.05
(AT&T)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
(2) RRUS-11	C	From Leg	2.50	0.0000	140.00	No Ice	2.57	1.07	0.05
(AT&T)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
DC6-48-60-18-8F Surge	B	From Leg	2.50	0.0000	140.00	No Ice	1.91	1.91	0.02
Arrestor			0.00			1/2" Ice	2.10	2.10	0.04
(AT&T)			0.00			1" Ice	2.29	2.29	0.06
Pirod 12' T-Frame Sector	A	From Leg	1.25	0.0000	137.00	No Ice	13.60	13.60	0.47
Mount (1)			0.00			1/2" Ice	18.40	18.40	0.60
(AT&T)			0.00			1" Ice	23.20	23.20	0.73
Pirod 12' T-Frame Sector	B	From Leg	1.25	0.0000	137.00	No Ice	13.60	13.60	0.47
Mount (1)			0.00			1/2" Ice	18.40	18.40	0.60
(AT&T)			0.00			1" Ice	23.20	23.20	0.73
Pirod 12' T-Frame Sector	C	From Leg	1.25	0.0000	137.00	No Ice	13.60	13.60	0.47
Mount (1)			0.00			1/2" Ice	18.40	18.40	0.60
(AT&T)			0.00			1" Ice	23.20	23.20	0.73
AIR32	A	From Leg	3.00	0.0000	125.00	No Ice	6.51	4.71	0.13
(T-Mobile Proposed)			0.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
APXVAA24_43	A	From Leg	3.00	0.0000	125.00	No Ice	20.24	8.73	0.13
(T-Mobile Proposed)			0.00			1/2" Ice	20.89	9.33	0.24
			0.00			1" Ice	21.54	9.93	0.36
APXV18-206517S	A	From Leg	3.00	0.0000	125.00	No Ice	5.17	3.04	0.03
(T-Mobile Proposed)			0.00			1/2" Ice	5.62	3.47	0.05
			0.00			1" Ice	6.08	3.91	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
AIR32	B	From Leg	3.00	0.0000	125.00	No Ice	6.51	4.71	0.13
(T-Mobile Proposed)			0.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
APXVAA24_43	B	From Leg	3.00	0.0000	125.00	No Ice	20.24	8.73	0.13
(T-Mobile Proposed)			0.00			1/2" Ice	20.89	9.33	0.24
			0.00			1" Ice	21.54	9.93	0.36
APXV18-206517S	B	From Leg	3.00	0.0000	125.00	No Ice	5.17	3.04	0.03
(T-Mobile Proposed)			0.00			1/2" Ice	5.62	3.47	0.05
			0.00			1" Ice	6.08	3.91	0.09
AIR32	C	From Leg	3.00	0.0000	125.00	No Ice	6.51	4.71	0.13
(T-Mobile Proposed)			0.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
APXVAA24_43	C	From Leg	3.00	0.0000	125.00	No Ice	20.24	8.73	0.13
(T-Mobile Proposed)			0.00			1/2" Ice	20.89	9.33	0.24
			0.00			1" Ice	21.54	9.93	0.36
APXV18-206517S	C	From Leg	3.00	0.0000	125.00	No Ice	5.17	3.04	0.03
(T-Mobile Proposed)			0.00			1/2" Ice	5.62	3.47	0.05
			0.00			1" Ice	6.08	3.91	0.09
AIR32	A	From Leg	3.00	0.0000	125.00	No Ice	6.51	4.71	0.13
(T-Mobile Proposed)			0.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
APXVAA24_43	A	From Leg	3.00	0.0000	125.00	No Ice	20.24	8.73	0.13
(T-Mobile Proposed)			0.00			1/2" Ice	20.89	9.33	0.24
			0.00			1" Ice	21.54	9.93	0.36
APXV18-206517S	A	From Leg	3.00	0.0000	125.00	No Ice	5.17	3.04	0.03
(T-Mobile Proposed)			0.00			1/2" Ice	5.62	3.47	0.05
			0.00			1" Ice	6.08	3.91	0.09
(4) RRUS-11	A	From Leg	3.00	0.0000	125.00	No Ice	2.57	1.07	0.05
(T-Mobile Proposed)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
(4) RRUS-11	B	From Leg	3.00	0.0000	125.00	No Ice	2.57	1.07	0.05
(T-Mobile Proposed)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
(4) RRUS-11	C	From Leg	3.00	0.0000	125.00	No Ice	2.57	1.07	0.05
(T-Mobile Proposed)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
Custom 4-Sided Sector Mount	A	None		0.0000	125.00	No Ice	36.00	36.00	3.00
(T-Mobile Proposed)						1/2" Ice	42.00	42.00	3.30
						1" Ice	48.00	48.00	3.60
OGT9-840	A	From Leg	3.00	0.0000	184.00	No Ice	2.27	2.27	0.02
			0.00			1/2" Ice	3.44	3.44	0.04
			5.00			1" Ice	4.61	4.61	0.06
OGT9-840	A	From Leg	3.00	0.0000	184.00	No Ice	2.27	2.27	0.02
			0.00			1/2" Ice	3.44	3.44	0.04
			5.00			1" Ice	4.61	4.61	0.06
Pirod 6-8' Box Arm (1)	A	From Leg	3.00	0.0000	184.00	No Ice	4.50	4.50	0.21
			0.00			1/2" Ice	9.87	9.87	0.28
			0.00			1" Ice	15.24	15.24	0.34
OGT9-840	B	From Leg	3.00	0.0000	184.00	No Ice	2.27	2.27	0.02
			0.00			1/2" Ice	3.44	3.44	0.04
			5.00			1" Ice	4.61	4.61	0.06
OGT9-840	B	From Leg	3.00	0.0000	184.00	No Ice	2.27	2.27	0.02
			0.00			1/2" Ice	3.44	3.44	0.04
			5.00			1" Ice	4.61	4.61	0.06
Pirod 6-8' Box Arm (1)	B	From Leg	3.00	0.0000	184.00	No Ice	4.50	4.50	0.21
			0.00			1/2" Ice	9.87	9.87	0.28
			0.00			1" Ice	15.24	15.24	0.34

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
ANT150D3	C	From Leg	3.00	0.0000	184.00	No Ice	4.50	4.50	0.02
			0.00			1/2" Ice	6.00	6.00	0.04
			5.00			1" Ice	7.50	7.50	0.07
Pirod 6-8' Box Arm (1)	B	From Leg	3.00	0.0000	184.00	No Ice	4.50	4.50	0.21
			0.00			1/2" Ice	9.87	9.87	0.28
			0.00			1" Ice	15.24	15.24	0.34
ANT150F2	C	From Leg	3.00	0.0000	183.00	No Ice	1.29	1.29	0.02
			0.00			1/2" Ice	1.60	1.60	0.03
			5.00			1" Ice	1.91	1.91	0.04
3' Side Mount Standoff	C	From Leg	1.50	0.0000	183.00	No Ice	2.00	2.00	0.04
			0.00			1/2" Ice	3.69	3.69	0.05
			0.00			1" Ice	4.74	4.74	0.06
Pirod 6-8' Box Arm (1) (Vacant)	B	From Leg	3.00	0.0000	118.00	No Ice	4.50	4.50	0.21
			0.00			1/2" Ice	9.87	9.87	0.28
			0.00			1" Ice	15.24	15.24	0.34
ANT150D3	C	From Leg	6.00	0.0000	105.00	No Ice	4.50	4.50	0.02
			0.00			1/2" Ice	6.00	6.00	0.04
			5.00			1" Ice	7.50	7.50	0.07
Pirod 6-8' Box Arm (1)	C	From Leg	3.00	0.0000	105.00	No Ice	4.50	4.50	0.21
			0.00			1/2" Ice	9.87	9.87	0.28
			0.00			1" Ice	15.24	15.24	0.34
6' Dish Ice Shield	C	From Leg	3.00	0.0000	101.00	No Ice	5.00	5.00	0.03
			0.00			1/2" Ice	7.00	7.00	0.05
			0.00			1" Ice	9.00	9.00	0.07
Pirod 6-8' Box Arm (1) (Vacant)	A	From Leg	3.00	0.0000	98.00	No Ice	4.50	4.50	0.21
			0.00			1/2" Ice	9.87	9.87	0.28
			0.00			1" Ice	15.24	15.24	0.34
PD458-2	B	From Leg	6.00	0.0000	98.00	No Ice	3.40	3.40	0.02
			0.00			1/2" Ice	4.79	4.79	0.05
			5.00			1" Ice	6.20	6.20	0.08
Pirod 6-8' Box Arm (1)	B	From Leg	3.00	0.0000	98.00	No Ice	4.50	4.50	0.21
			0.00			1/2" Ice	9.87	9.87	0.28
			0.00			1" Ice	15.24	15.24	0.34
PD220	A	From Leg	6.00	0.0000	78.00	No Ice	3.08	3.08	0.02
			0.00			1/2" Ice	5.30	5.30	0.05
			10.00			1" Ice	7.54	7.54	0.09
PD1142-1	A	From Leg	6.00	0.0000	78.00	No Ice	1.32	1.32	0.01
			0.00			1/2" Ice	3.21	3.21	0.02
			-5.00			1" Ice	5.12	5.12	0.05
Pirod 6-8' Box Arm (1)	A	From Leg	3.00	0.0000	78.00	No Ice	4.50	4.50	0.21
			0.00			1/2" Ice	9.87	9.87	0.28
			0.00			1" Ice	15.24	15.24	0.34
BCD-80609-NE	B	From Leg	6.00	0.0000	78.00	No Ice	2.95	2.95	0.03
			0.00			1/2" Ice	4.11	4.11	0.05
			5.00			1" Ice	5.29	5.29	0.08
6' Yagi	B	From Leg	6.00	0.0000	78.00	No Ice	5.00	5.00	0.04
			0.00			1/2" Ice	6.50	6.50	0.06
			0.00			1" Ice	8.00	8.00	0.08
Pirod 6-8' Box Arm (1)	B	From Leg	3.00	0.0000	78.00	No Ice	4.50	4.50	0.21
			0.00			1/2" Ice	9.87	9.87	0.28
			0.00			1" Ice	15.24	15.24	0.34
DB222	C	From Leg	6.00	0.0000	78.00	No Ice	1.60	1.60	0.02
			0.00			1/2" Ice	2.88	2.88	0.02
			7.00			1" Ice	4.16	4.16	0.03
Pirod 6-8' Box Arm (1)	C	From Leg	3.00	0.0000	78.00	No Ice	4.50	4.50	0.21
			0.00			1/2" Ice	9.87	9.87	0.28
			0.00			1" Ice	15.24	15.24	0.34

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
GPS	B	From Leg	2.00	0.0000	32.00	No Ice	1.00	1.00	0.01
			0.00			1/2" Ice	1.50	1.50	0.01
			0.00			1" Ice	2.00	2.00	0.02
2-ft Stand Off	B	From Leg	1.00	0.0000	32.00	No Ice	1.07	1.07	0.02
			0.00			1/2" Ice	1.62	1.62	0.03
			0.00			1" Ice	2.17	2.17	0.04

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
SC2-W100AB (T-Mobile Proposed)	C	Paraboloid w/Radome	From Leg	3.00	0.0000		125.00	2.00	No Ice	3.14	0.02
				0.00					1/2" Ice	3.41	0.04
				0.00					1" Ice	3.68	0.06
6' Dish	C	Paraboloid w/o Radome	From Leg	0.00	0.0000		97.00	6.00	No Ice	28.27	0.08
				0.00					1/2" Ice	29.07	0.10
				0.00					1" Ice	29.87	0.12
6' Dish	A	Paraboloid w/o Radome	From Leg	0.00	0.0000		188.00	6.00	No Ice	28.27	0.08
				0.00					1/2" Ice	29.07	0.10
				0.00					1" Ice	29.87	0.12

Truss-Leg Interaction Properties

Section Designation	Area in^2	Area Ice in^2	Self Weight K	Ice Weight K	Equiv. Diameter in	Equiv. Diameter Ice in	Section Modulus S_x in^3	Section Modulus S_y in^3	Leg Area in^2
Pirod 105244	1026.8606	3703.4895	0.54	1.38	7.1310	25.7187	12.8052	14.7861	3.6816
Pirod 105244	1026.8606	3698.2947	0.54	1.38	7.1310	25.6826	12.8052	14.7861	3.6816
Pirod 105216	2169.0308	7004.3543	0.45	2.85	7.5314	24.3207	12.8052	14.7861	3.6816
Pirod 105217	2296.2363	7057.0902	0.56	2.89	7.9730	24.5038	18.4723	21.3300	5.3014
Pirod 105217	2296.2363	7043.2921	0.56	2.88	7.9730	24.4559	18.4723	21.3300	5.3014
Pirod 105218	2425.3141	7092.8972	0.69	2.91	8.4212	24.6281	25.1958	29.0936	7.2158
Pirod 105218	2425.3141	7068.0433	0.69	2.89	8.4212	24.5418	25.1958	29.0936	7.2158
Pirod 105218	2425.3141	7049.7974	0.69	2.87	8.4212	24.4785	25.1958	29.0936	7.2158
Pirod 105219	2597.9095	7091.2564	1.03	2.90	9.0205	24.6224	32.9885	38.0918	9.4248
Pirod 105219	2597.9095	7042.4634	1.03	2.86	9.0205	24.4530	32.9885	38.0918	9.4248
Pirod 105220	2735.0688	7051.0275	1.20	2.85	9.4968	24.4827	41.8654	48.3420	11.9282
Pirod 105220	2735.0688	6958.7096	1.20	2.78	9.4968	24.1622	41.8654	48.3420	11.9282
Pirod 112738	3389.3479	8842.7666	1.68	4.72	11.7686	30.7041	77.0732	88.9965	14.7262

Tower Pressures - No Ice

G_H = 0.850

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	192.50	1.453	29	65.521	A	5.275	5.942	5.942	52.98	0.000	0.000
195.00-190.00					B	5.275	5.942		52.98	0.000	0.000
					C	5.275	5.942		52.98	0.000	0.000
T2	185.00	1.441	29	131.042	A	5.966	11.885	11.885	66.58	0.000	0.000
190.00-180.00					B	5.966	11.885		66.58	0.000	0.000
					C	5.966	11.885		66.58	0.000	0.000
T3	170.00	1.415	28	262.083	A	14.319	25.105	25.105	63.68	0.000	0.000
180.00-160.00					B	14.319	25.105		63.68	0.000	0.000
					C	14.319	25.105		63.68	23.166	0.000
T4	155.00	1.388	28	131.250	A	9.909	13.288	13.288	57.28	0.000	0.000
160.00-150.00					B	9.909	13.288		57.28	0.000	0.000
					C	9.909	13.288		57.28	25.740	0.000
T5	145.00	1.369	27	131.250	A	7.159	13.288	13.288	64.99	0.000	0.000
150.00-140.00					B	7.159	13.288		64.99	0.000	0.000
					C	7.159	13.288		64.99	25.740	0.000
T6	130.00	1.337	27	282.945	A	17.894	28.118	28.118	61.11	0.000	0.000
140.00-120.00					B	17.894	28.118		61.11	3.960	0.000
					C	17.894	28.118		61.11	51.480	0.000
T7	115.00	1.303	26	156.473	A	13.500	14.059	14.059	51.01	0.000	0.000
120.00-110.00					B	13.500	14.059		51.01	7.920	0.000
					C	13.500	14.059		51.01	25.740	0.000
T8	105.00	1.279	25	166.473	A	10.067	14.059	14.059	58.27	0.000	0.000
110.00-100.00					B	10.067	14.059		58.27	7.920	0.000
					C	10.067	14.059		58.27	25.740	0.000
T9	90.00	1.238	25	363.362	A	24.755	30.118	30.118	54.89	0.000	0.000
100.00-80.00					B	24.755	30.118		54.89	15.840	0.000
					C	24.755	30.118		54.89	51.480	0.000
T10	70.00	1.174	23	403.362	A	27.125	30.118	30.118	52.61	0.000	0.000
80.00-60.00					B	27.125	30.118		52.61	15.840	0.000
					C	27.125	30.118		52.61	51.480	0.000
T11	50.00	1.094	22	443.780	A	36.924	31.709	31.709	46.20	0.000	0.000
60.00-40.00					B	36.924	31.709		46.20	15.840	0.000
					C	36.924	31.709		46.20	51.480	0.000
T12	30.00	0.982	19	483.780	A	39.986	31.709	31.709	44.23	0.000	0.000
40.00-20.00					B	39.986	31.709		44.23	15.840	0.000
					C	39.986	31.709		44.23	51.480	0.000
T13 20.00-0.00	10.00	0.85	17	534.209	A	17.745	39.294	39.294	68.89	0.000	0.000
					B	17.745	39.294		68.89	15.840	0.000
					C	17.745	39.294		68.89	51.480	0.000

Tower Pressure - With Ice

G_H = 0.850

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	192.50	1.453	5	2.9822	68.006	A	5.275	34.016	21.432	54.55	0.000	0.000
195.00-190.00						B	5.275	34.016		54.55	0.000	0.000
						C	5.275	34.016		54.55	0.000	0.000
T2	185.00	1.441	5	2.9703	135.992	A	5.966	56.982	42.804	68.00	0.000	0.000
190.00-180.00						B	5.966	56.982		68.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						C	5.966	56.982		68.00	0.000	0.000
T3	170.00	1.415	5	2.9453	271.901	A	14.319	109.185	81.069	65.64	0.000	0.000
180.00-160.00						B	14.319	109.185		65.64	0.000	0.000
						C	14.319	109.185		65.64	40.939	0.000
T4	155.00	1.388	5	2.9182	136.114	A	9.909	60.118	40.840	58.32	0.000	0.000
160.00-150.00						B	9.909	60.118		58.32	0.000	0.000
						C	9.909	60.118		58.32	45.345	0.000
T5	145.00	1.369	5	2.8988	136.081	A	7.159	54.596	40.760	66.00	0.000	0.000
150.00-140.00						B	7.159	54.596		66.00	0.000	0.000
						C	7.159	54.596		66.00	45.242	0.000
T6	130.00	1.337	5	2.8674	292.515	A	17.894	116.436	82.230	61.21	0.000	0.000
140.00-120.00						B	17.894	116.436		61.21	10.319	0.000
						C	17.894	116.436		61.21	90.152	0.000
T7	115.00	1.303	5	2.8324	161.199	A	13.500	62.821	40.971	53.68	0.000	0.000
120.00-110.00						B	13.500	62.821		53.68	20.515	0.000
						C	13.500	62.821		53.68	44.892	0.000
T8	105.00	1.279	4	2.8068	171.156	A	10.067	57.012	40.865	60.92	0.000	0.000
110.00-100.00						B	10.067	57.012		60.92	20.424	0.000
						C	10.067	57.012		60.92	44.756	0.000
T9 100.00-80.00	90.00	1.238	4	2.7638	372.587	A	24.755	116.421	82.211	58.23	0.000	0.000
						B	24.755	116.421		58.23	40.544	0.000
						C	24.755	116.421		58.23	89.060	0.000
T10 80.00-60.00	70.00	1.174	4	2.6952	412.358	A	27.125	118.200	81.646	56.18	0.000	0.000
						B	27.125	118.200		56.18	40.059	0.000
						C	27.125	118.200		56.18	88.337	0.000
T11 60.00-40.00	50.00	1.094	4	2.6061	452.477	A	36.924	120.236	81.745	52.01	0.000	0.000
						B	36.924	120.236		52.01	39.429	0.000
						C	36.924	120.236		52.01	87.397	0.000
T12 40.00-20.00	30.00	0.982	3	2.4763	492.044	A	39.986	120.282	80.675	50.34	0.000	0.000
						B	39.986	120.282		50.34	38.511	0.000
						C	39.986	120.282		50.34	86.032	0.000
T13 20.00-0.00	10.00	0.85	3	2.2186	541.614	A	17.745	125.015	102.517	71.81	0.000	0.000
						B	17.745	125.015		71.81	36.689	0.000
						C	17.745	125.015		71.81	83.326	0.000

Tower Pressure - Service

G_H = 0.850

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	192.50	1.453	11	65.521	A	5.275	5.942	5.942	52.98	0.000	0.000
195.00-190.00					B	5.275	5.942		52.98	0.000	0.000
					C	5.275	5.942		52.98	0.000	0.000
T2	185.00	1.441	11	131.042	A	5.966	11.885	11.885	66.58	0.000	0.000
190.00-180.00					B	5.966	11.885		66.58	0.000	0.000
					C	5.966	11.885		66.58	0.000	0.000
T3	170.00	1.415	11	262.083	A	14.319	25.105	25.105	63.68	0.000	0.000
180.00-160.00					B	14.319	25.105		63.68	0.000	0.000
					C	14.319	25.105		63.68	23.166	0.000
T4	155.00	1.388	11	131.250	A	9.909	13.288	13.288	57.28	0.000	0.000
160.00-150.00					B	9.909	13.288		57.28	0.000	0.000
					C	9.909	13.288		57.28	25.740	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T5	145.00	1.369	11	131.250	A	7.159	13.288	13.288	64.99	0.000	0.000
150.00-140.00					B	7.159	13.288		64.99	0.000	0.000
					C	7.159	13.288		64.99	25.740	0.000
T6	130.00	1.337	10	282.945	A	17.894	28.118	28.118	61.11	0.000	0.000
140.00-120.00					B	17.894	28.118		61.11	3.960	0.000
					C	17.894	28.118		61.11	51.480	0.000
T7	115.00	1.303	10	156.473	A	13.500	14.059	14.059	51.01	0.000	0.000
120.00-110.00					B	13.500	14.059		51.01	7.920	0.000
					C	13.500	14.059		51.01	25.740	0.000
T8	105.00	1.279	10	166.473	A	10.067	14.059	14.059	58.27	0.000	0.000
110.00-100.00					B	10.067	14.059		58.27	7.920	0.000
					C	10.067	14.059		58.27	25.740	0.000
T9	90.00	1.238	10	363.362	A	24.755	30.118	30.118	54.89	0.000	0.000
100.00-80.00					B	24.755	30.118		54.89	15.840	0.000
					C	24.755	30.118		54.89	51.480	0.000
T10	70.00	1.174	9	403.362	A	27.125	30.118	30.118	52.61	0.000	0.000
80.00-60.00					B	27.125	30.118		52.61	15.840	0.000
					C	27.125	30.118		52.61	51.480	0.000
T11	50.00	1.094	9	443.780	A	36.924	31.709	31.709	46.20	0.000	0.000
60.00-40.00					B	36.924	31.709		46.20	15.840	0.000
					C	36.924	31.709		46.20	51.480	0.000
T12	30.00	0.982	8	483.780	A	39.986	31.709	31.709	44.23	0.000	0.000
40.00-20.00					B	39.986	31.709		44.23	15.840	0.000
					C	39.986	31.709		44.23	51.480	0.000
T13 20.00-0.00	10.00	0.85	7	534.209	A	17.745	39.294	39.294	68.89	0.000	0.000
					B	17.745	39.294		68.89	15.840	0.000
					C	17.745	39.294		68.89	51.480	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.91	A	0.171	2.695	29	1	1	8.662	0.57	114.28	C
195.00-190.00			B	0.171	2.695		1	1	8.662			
			C	0.171	2.695		1	1	8.662			
T2	0.00	1.09	A	0.136	2.823	29	1	1	12.696	0.87	86.99	C
190.00-180.00			B	0.136	2.823		1	1	12.696			
			C	0.136	2.823		1	1	12.696			
T3	0.13	2.05	A	0.15	2.77	28	1	1	28.568	2.44	121.96	C
180.00-160.00			B	0.15	2.77		1	1	28.568			
			C	0.15	2.77		1	1	28.568			
T4	0.14	1.62	A	0.177	2.676	28	1	1	17.494	1.70	169.65	C
160.00-150.00			B	0.177	2.676		1	1	17.494			
			C	0.177	2.676		1	1	17.494			
T5	0.14	1.41	A	0.156	2.75	27	1	1	14.709	1.53	152.64	C
150.00-140.00			B	0.156	2.75		1	1	14.709			
			C	0.156	2.75		1	1	14.709			
T6	0.33	3.48	A	0.163	2.726	27	1	1	33.891	3.33	166.55	C
140.00-120.00			B	0.163	2.726		1	1	33.891			
			C	0.163	2.726		1	1	33.891			
T7	0.22	2.09	A	0.176	2.678	26	1	1	21.524	2.00	200.48	C
120.00-110.00			B	0.176	2.678		1	1	21.524			
			C	0.176	2.678		1	1	21.524			
T8	0.22	1.82	A	0.145	2.79	25	1	1	18.039	1.81	180.95	C
110.00-100.00			B	0.145	2.79		1	1	18.039			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.145	2.79		1	1	18.039			
T9	0.44	4.67	A	0.151	2.768	25	1	1	41.852	3.82	190.99	C
100.00-80.00			B	0.151	2.768		1	1	41.852			
			C	0.151	2.768		1	1	41.852			
T10	0.44	5.61	A	0.142	2.801	23	1	1	44.195	3.78	189.04	C
80.00-60.00			B	0.142	2.801		1	1	44.195			
			C	0.142	2.801		1	1	44.195			
T11	0.44	7.04	A	0.155	2.754	22	1	1	54.936	4.03	201.45	C
60.00-40.00			B	0.155	2.754		1	1	54.936			
			C	0.155	2.754		1	1	54.936			
T12	0.44	7.31	A	0.148	2.778	19	1	1	57.976	3.78	188.98	C
40.00-20.00			B	0.148	2.778		1	1	57.976			
			C	0.148	2.778		1	1	57.976			
T13	0.44	7.78	A	0.107	2.937	17	1	1	39.929	2.64	132.18	C
20.00-0.00			B	0.107	2.937		1	1	39.929			
			C	0.107	2.937		1	1	39.929			
Sum Weight:	3.38	46.88						OTM	2973.14 kip-ft	32.30		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.91	A	0.171	2.695	29	0.825	1	7.739	0.51	102.10	C
195.00-190.00			B	0.171	2.695		0.825	1	7.739			
			C	0.171	2.695		0.825	1	7.739			
T2	0.00	1.09	A	0.136	2.823	29	0.825	1	11.652	0.80	79.84	C
190.00-180.00			B	0.136	2.823		0.825	1	11.652			
			C	0.136	2.823		0.825	1	11.652			
T3	0.13	2.05	A	0.15	2.77	28	0.825	1	26.062	2.27	113.68	C
180.00-160.00			B	0.15	2.77		0.825	1	26.062			
			C	0.15	2.77		0.825	1	26.062			
T4	0.14	1.62	A	0.177	2.676	28	0.825	1	15.760	1.59	158.80	C
160.00-150.00			B	0.177	2.676		0.825	1	15.760			
			C	0.177	2.676		0.825	1	15.760			
T5	0.14	1.41	A	0.156	2.75	27	0.825	1	13.456	1.45	144.69	C
150.00-140.00			B	0.156	2.75		0.825	1	13.456			
			C	0.156	2.75		0.825	1	13.456			
T6	0.33	3.48	A	0.163	2.726	27	0.825	1	30.760	3.14	156.93	C
140.00-120.00			B	0.163	2.726		0.825	1	30.760			
			C	0.163	2.726		0.825	1	30.760			
T7	0.22	2.09	A	0.176	2.678	26	0.825	1	19.161	1.87	186.59	C
120.00-110.00			B	0.176	2.678		0.825	1	19.161			
			C	0.176	2.678		0.825	1	19.161			
T8	0.22	1.82	A	0.145	2.79	25	0.825	1	16.277	1.70	170.36	C
110.00-100.00			B	0.145	2.79		0.825	1	16.277			
			C	0.145	2.79		0.825	1	16.277			
T9	0.44	4.67	A	0.151	2.768	25	0.825	1	37.520	3.57	178.49	C
100.00-80.00			B	0.151	2.768		0.825	1	37.520			
			C	0.151	2.768		0.825	1	37.520			
T10	0.44	5.61	A	0.142	2.801	23	0.825	1	39.448	3.52	175.89	C
80.00-60.00			B	0.142	2.801		0.825	1	39.448			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.142	2.801		0.825	1	39.448			
T11	0.44	7.04	A	0.155	2.754	22	0.825	1	48.474	3.70	185.05	C
60.00-40.00			B	0.155	2.754		0.825	1	48.474			
			C	0.155	2.754		0.825	1	48.474			
T12	0.44	7.31	A	0.148	2.778	19	0.825	1	50.979	3.46	172.90	C
40.00-20.00			B	0.148	2.778		0.825	1	50.979			
			C	0.148	2.778		0.825	1	50.979			
T13	0.44	7.78	A	0.107	2.937	17	0.825	1	36.824	2.51	125.64	C
20.00-0.00			B	0.107	2.937		0.825	1	36.824			
			C	0.107	2.937		0.825	1	36.824			
Sum Weight:	3.38	46.88						OTM	2771.34 kip-ft	30.08		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.91	A	0.171	2.695	29	0.8	1	7.607	0.50	100.36	C
195.00-190.00			B	0.171	2.695		0.8	1	7.607			
			C	0.171	2.695		0.8	1	7.607			
T2	0.00	1.09	A	0.136	2.823	29	0.8	1	11.503	0.79	78.81	C
190.00-180.00			B	0.136	2.823		0.8	1	11.503			
			C	0.136	2.823		0.8	1	11.503			
T3	0.13	2.05	A	0.15	2.77	28	0.8	1	25.704	2.25	112.50	C
180.00-160.00			B	0.15	2.77		0.8	1	25.704			
			C	0.15	2.77		0.8	1	25.704			
T4	0.14	1.62	A	0.177	2.676	28	0.8	1	15.512	1.57	157.25	C
160.00-150.00			B	0.177	2.676		0.8	1	15.512			
			C	0.177	2.676		0.8	1	15.512			
T5	0.14	1.41	A	0.156	2.75	27	0.8	1	13.277	1.44	143.55	C
150.00-140.00			B	0.156	2.75		0.8	1	13.277			
			C	0.156	2.75		0.8	1	13.277			
T6	0.33	3.48	A	0.163	2.726	27	0.8	1	30.313	3.11	155.56	C
140.00-120.00			B	0.163	2.726		0.8	1	30.313			
			C	0.163	2.726		0.8	1	30.313			
T7	0.22	2.09	A	0.176	2.678	26	0.8	1	18.824	1.85	184.61	C
120.00-110.00			B	0.176	2.678		0.8	1	18.824			
			C	0.176	2.678		0.8	1	18.824			
T8	0.22	1.82	A	0.145	2.79	25	0.8	1	16.026	1.69	168.85	C
110.00-100.00			B	0.145	2.79		0.8	1	16.026			
			C	0.145	2.79		0.8	1	16.026			
T9	0.44	4.67	A	0.151	2.768	25	0.8	1	36.901	3.53	176.70	C
100.00-80.00			B	0.151	2.768		0.8	1	36.901			
			C	0.151	2.768		0.8	1	36.901			
T10	0.44	5.61	A	0.142	2.801	23	0.8	1	38.770	3.48	174.01	C
80.00-60.00			B	0.142	2.801		0.8	1	38.770			
			C	0.142	2.801		0.8	1	38.770			
T11	0.44	7.04	A	0.155	2.754	22	0.8	1	47.551	3.65	182.71	C
60.00-40.00			B	0.155	2.754		0.8	1	47.551			
			C	0.155	2.754		0.8	1	47.551			
T12	0.44	7.31	A	0.148	2.778	19	0.8	1	49.979	3.41	170.60	C
40.00-20.00			B	0.148	2.778		0.8	1	49.979			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	0.148	2.778		0.8	1	49.979			
T13	0.44	7.78	A	0.107	2.937	17	0.8	1	36.380	2.49	124.71	C
20.00-0.00			B	0.107	2.937		0.8	1	36.380			
			C	0.107	2.937		0.8	1	36.380			
Sum Weight:	3.38	46.88						OTM	2742.51 kip-ft	29.77		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.00	0.91	A	0.171	2.695	29	0.85	1	7.871	0.52	103.84	C
195.00-190.00			B	0.171	2.695		0.85	1	7.871			
			C	0.171	2.695		0.85	1	7.871			
T2	0.00	1.09	A	0.136	2.823	29	0.85	1	11.801	0.81	80.86	C
190.00-180.00			B	0.136	2.823		0.85	1	11.801			
			C	0.136	2.823		0.85	1	11.801			
T3	0.13	2.05	A	0.15	2.77	28	0.85	1	26.420	2.30	114.86	C
180.00-160.00			B	0.15	2.77		0.85	1	26.420			
			C	0.15	2.77		0.85	1	26.420			
T4	0.14	1.62	A	0.177	2.676	28	0.85	1	16.008	1.60	160.35	C
160.00-150.00			B	0.177	2.676		0.85	1	16.008			
			C	0.177	2.676		0.85	1	16.008			
T5	0.14	1.41	A	0.156	2.75	27	0.85	1	13.635	1.46	145.82	C
150.00-140.00			B	0.156	2.75		0.85	1	13.635			
			C	0.156	2.75		0.85	1	13.635			
T6	0.33	3.48	A	0.163	2.726	27	0.85	1	31.207	3.17	158.30	C
140.00-120.00			B	0.163	2.726		0.85	1	31.207			
			C	0.163	2.726		0.85	1	31.207			
T7	0.22	2.09	A	0.176	2.678	26	0.85	1	19.499	1.89	188.57	C
120.00-110.00			B	0.176	2.678		0.85	1	19.499			
			C	0.176	2.678		0.85	1	19.499			
T8	0.22	1.82	A	0.145	2.79	25	0.85	1	16.529	1.72	171.88	C
110.00-100.00			B	0.145	2.79		0.85	1	16.529			
			C	0.145	2.79		0.85	1	16.529			
T9	0.44	4.67	A	0.151	2.768	25	0.85	1	38.138	3.61	180.28	C
100.00-80.00			B	0.151	2.768		0.85	1	38.138			
			C	0.151	2.768		0.85	1	38.138			
T10	0.44	5.61	A	0.142	2.801	23	0.85	1	40.127	3.56	177.76	C
80.00-60.00			B	0.142	2.801		0.85	1	40.127			
			C	0.142	2.801		0.85	1	40.127			
T11	0.44	7.04	A	0.155	2.754	22	0.85	1	49.397	3.75	187.40	C
60.00-40.00			B	0.155	2.754		0.85	1	49.397			
			C	0.155	2.754		0.85	1	49.397			
T12	0.44	7.31	A	0.148	2.778	19	0.85	1	51.979	3.50	175.19	C
40.00-20.00			B	0.148	2.778		0.85	1	51.979			
			C	0.148	2.778		0.85	1	51.979			
T13	0.44	7.78	A	0.107	2.937	17	0.85	1	37.267	2.53	126.58	C
20.00-0.00			B	0.107	2.937		0.85	1	37.267			
			C	0.107	2.937		0.85	1	37.267			
Sum Weight:	3.38	46.88						OTM	2800.17 kip-ft	30.40		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.00	4.36	A	0.578	1.819	5	1	1	30.103	0.24	47.09	C
195.00-190.00			B	0.578	1.819		1	1	30.103			
			C	0.578	1.819		1	1	30.103			
T2	0.00	5.37	A	0.463	1.953	5	1	1	43.896	0.37	36.55	C
190.00-180.00			B	0.463	1.953		1	1	43.896			
			C	0.463	1.953		1	1	43.896			
T3	1.26	15.45	A	0.454	1.967	5	1	1	86.528	0.88	44.21	C
180.00-160.00			B	0.454	1.967		1	1	86.528			
			C	0.454	1.967		1	1	86.528			
T4	1.39	9.27	A	0.514	1.882	5	1	1	51.567	0.58	58.48	C
160.00-150.00			B	0.514	1.882		1	1	51.567			
			C	0.514	1.882		1	1	51.567			
T5	1.38	8.09	A	0.454	1.967	5	1	1	43.255	0.53	52.79	C
150.00-140.00			B	0.454	1.967		1	1	43.255			
			C	0.454	1.967		1	1	43.255			
T6	2.99	18.02	A	0.459	1.959	5	1	1	95.188	1.14	56.78	C
140.00-120.00			B	0.459	1.959		1	1	95.188			
			C	0.459	1.959		1	1	95.188			
T7	1.86	10.45	A	0.473	1.937	5	1	1	55.655	0.67	66.81	C
120.00-110.00			B	0.473	1.937		1	1	55.655			
			C	0.473	1.937		1	1	55.655			
T8	1.85	9.08	A	0.392	2.08	4	1	1	46.143	0.61	60.99	C
110.00-100.00			B	0.392	2.08		1	1	46.143			
			C	0.392	2.08		1	1	46.143			
T9	3.65	20.11	A	0.379	2.107	4	1	1	97.794	1.23	61.48	C
100.00-80.00			B	0.379	2.107		1	1	97.794			
			C	0.379	2.107		1	1	97.794			
T10	3.58	21.29	A	0.352	2.166	4	1	1	100.051	1.20	59.95	C
80.00-60.00			B	0.352	2.166		1	1	100.051			
			C	0.352	2.166		1	1	100.051			
T11	3.48	24.21	A	0.347	2.178	4	1	1	110.877	1.19	59.60	C
60.00-40.00			B	0.347	2.178		1	1	110.877			
			C	0.347	2.178		1	1	110.877			
T12	3.35	24.34	A	0.326	2.23	3	1	1	113.039	1.09	54.74	C
40.00-20.00			B	0.326	2.23		1	1	113.039			
			C	0.326	2.23		1	1	113.039			
T13	3.10	26.77	A	0.264	2.397	3	1	1	91.310	0.85	42.63	C
20.00-0.00			B	0.264	2.397		1	1	91.310			
			C	0.264	2.397		1	1	91.310			
Sum Weight:	27.89	196.82						OTM	1014.52 kip-ft	10.58		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	4.36	A	0.578	1.819	5	0.825	1	29.180	0.23	45.65	C
195.00-190.00			B	0.578	1.819		0.825	1	29.180			
			C	0.578	1.819		0.825	1	29.180			
T2	0.00	5.37	A	0.463	1.953	5	0.825	1	42.852	0.36	35.68	C
190.00-180.00			B	0.463	1.953		0.825	1	42.852			
			C	0.463	1.953		0.825	1	42.852			
T3	1.26	15.45	A	0.454	1.967	5	0.825	1	84.022	0.86	43.18	C
180.00-160.00			B	0.454	1.967		0.825	1	84.022			
			C	0.454	1.967		0.825	1	84.022			
T4	1.39	9.27	A	0.514	1.882	5	0.825	1	49.833	0.57	57.14	C
160.00-150.00			B	0.514	1.882		0.825	1	49.833			
			C	0.514	1.882		0.825	1	49.833			
T5	1.38	8.09	A	0.454	1.967	5	0.825	1	42.002	0.52	51.79	C
150.00-140.00			B	0.454	1.967		0.825	1	42.002			
			C	0.454	1.967		0.825	1	42.002			
T6	2.99	18.02	A	0.459	1.959	5	0.825	1	92.057	1.11	55.57	C
140.00-120.00			B	0.459	1.959		0.825	1	92.057			
			C	0.459	1.959		0.825	1	92.057			
T7	1.86	10.45	A	0.473	1.937	5	0.825	1	53.292	0.65	65.04	C
120.00-110.00			B	0.473	1.937		0.825	1	53.292			
			C	0.473	1.937		0.825	1	53.292			
T8	1.85	9.08	A	0.392	2.08	4	0.825	1	44.381	0.60	59.60	C
110.00-100.00			B	0.392	2.08		0.825	1	44.381			
			C	0.392	2.08		0.825	1	44.381			
T9	3.65	20.11	A	0.379	2.107	4	0.825	1	93.462	1.20	59.81	C
100.00-80.00			B	0.379	2.107		0.825	1	93.462			
			C	0.379	2.107		0.825	1	93.462			
T10	3.58	21.29	A	0.352	2.166	4	0.825	1	95.304	1.16	58.17	C
80.00-60.00			B	0.352	2.166		0.825	1	95.304			
			C	0.352	2.166		0.825	1	95.304			
T11	3.48	24.21	A	0.347	2.178	4	0.825	1	104.415	1.15	57.33	C
60.00-40.00			B	0.347	2.178		0.825	1	104.415			
			C	0.347	2.178		0.825	1	104.415			
T12	3.35	24.34	A	0.326	2.23	3	0.825	1	106.041	1.05	52.47	C
40.00-20.00			B	0.326	2.23		0.825	1	106.041			
			C	0.326	2.23		0.825	1	106.041			
T13	3.10	26.77	A	0.264	2.397	3	0.825	1	88.205	0.83	41.69	C
20.00-0.00			B	0.264	2.397		0.825	1	88.205			
			C	0.264	2.397		0.825	1	88.205			
Sum Weight:	27.89	196.82						OTM	988.51 kip-ft	10.28		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	4.36	A	0.578	1.819	5	0.8	1	29.048	0.23	45.44	C
195.00-190.00			B	0.578	1.819		0.8	1	29.048			
			C	0.578	1.819		0.8	1	29.048			
T2	0.00	5.37	A	0.463	1.953	5	0.8	1	42.703	0.36	35.55	C
190.00-180.00			B	0.463	1.953		0.8	1	42.703			
			C	0.463	1.953		0.8	1	42.703			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T3	1.26	15.45	A	0.454	1.967	5	0.8	1	83.664	0.86	43.03	C
180.00-160.00			B	0.454	1.967		0.8	1	83.664			
			C	0.454	1.967		0.8	1	83.664			
T4	1.39	9.27	A	0.514	1.882	5	0.8	1	49.585	0.57	56.95	C
160.00-150.00			B	0.514	1.882		0.8	1	49.585			
			C	0.514	1.882		0.8	1	49.585			
T5	1.38	8.09	A	0.454	1.967	5	0.8	1	41.823	0.52	51.65	C
150.00-140.00			B	0.454	1.967		0.8	1	41.823			
			C	0.454	1.967		0.8	1	41.823			
T6	2.99	18.02	A	0.459	1.959	5	0.8	1	91.609	1.11	55.39	C
140.00-120.00			B	0.459	1.959		0.8	1	91.609			
			C	0.459	1.959		0.8	1	91.609			
T7	1.86	10.45	A	0.473	1.937	5	0.8	1	52.955	0.65	64.79	C
120.00-110.00			B	0.473	1.937		0.8	1	52.955			
			C	0.473	1.937		0.8	1	52.955			
T8	1.85	9.08	A	0.392	2.08	4	0.8	1	44.130	0.59	59.40	C
110.00-100.00			B	0.392	2.08		0.8	1	44.130			
			C	0.392	2.08		0.8	1	44.130			
T9	3.65	20.11	A	0.379	2.107	4	0.8	1	92.843	1.19	59.57	C
100.00-80.00			B	0.379	2.107		0.8	1	92.843			
			C	0.379	2.107		0.8	1	92.843			
T10	3.58	21.29	A	0.352	2.166	4	0.8	1	94.626	1.16	57.91	C
80.00-60.00			B	0.352	2.166		0.8	1	94.626			
			C	0.352	2.166		0.8	1	94.626			
T11	3.48	24.21	A	0.347	2.178	4	0.8	1	103.492	1.14	57.00	C
60.00-40.00			B	0.347	2.178		0.8	1	103.492			
			C	0.347	2.178		0.8	1	103.492			
T12	3.35	24.34	A	0.326	2.23	3	0.8	1	105.042	1.04	52.14	C
40.00-20.00			B	0.326	2.23		0.8	1	105.042			
			C	0.326	2.23		0.8	1	105.042			
T13	3.10	26.77	A	0.264	2.397	3	0.8	1	87.761	0.83	41.56	C
20.00-0.00			B	0.264	2.397		0.8	1	87.761			
			C	0.264	2.397		0.8	1	87.761			
Sum Weight:	27.89	196.82						OTM	984.79 kip-ft	10.24		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	4.36	A	0.578	1.819	5	0.85	1	29.312	0.23	45.86	C
195.00-190.00			B	0.578	1.819		0.85	1	29.312			
			C	0.578	1.819		0.85	1	29.312			
T2	0.00	5.37	A	0.463	1.953	5	0.85	1	43.001	0.36	35.80	C
190.00-180.00			B	0.463	1.953		0.85	1	43.001			
			C	0.463	1.953		0.85	1	43.001			
T3	1.26	15.45	A	0.454	1.967	5	0.85	1	84.380	0.87	43.32	C
180.00-160.00			B	0.454	1.967		0.85	1	84.380			
			C	0.454	1.967		0.85	1	84.380			
T4	1.39	9.27	A	0.514	1.882	5	0.85	1	50.080	0.57	57.34	C
160.00-150.00			B	0.514	1.882		0.85	1	50.080			
			C	0.514	1.882		0.85	1	50.080			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T5	1.38	8.09	A	0.454	1.967	5	0.85	1	42.181	0.52	51.93	C
150.00-140.00			B	0.454	1.967		0.85	1	42.181			
			C	0.454	1.967		0.85	1	42.181			
T6	2.99	18.02	A	0.459	1.959	5	0.85	1	92.504	1.11	55.74	C
140.00-120.00			B	0.459	1.959		0.85	1	92.504			
			C	0.459	1.959		0.85	1	92.504			
T7	1.86	10.45	A	0.473	1.937	5	0.85	1	53.630	0.65	65.30	C
120.00-110.00			B	0.473	1.937		0.85	1	53.630			
			C	0.473	1.937		0.85	1	53.630			
T8	1.85	9.08	A	0.392	2.08	4	0.85	1	44.633	0.60	59.80	C
110.00-100.00			B	0.392	2.08		0.85	1	44.633			
			C	0.392	2.08		0.85	1	44.633			
T9	3.65	20.11	A	0.379	2.107	4	0.85	1	94.081	1.20	60.05	C
100.00-80.00			B	0.379	2.107		0.85	1	94.081			
			C	0.379	2.107		0.85	1	94.081			
T10	3.58	21.29	A	0.352	2.166	4	0.85	1	95.982	1.17	58.42	C
80.00-60.00			B	0.352	2.166		0.85	1	95.982			
			C	0.352	2.166		0.85	1	95.982			
T11	3.48	24.21	A	0.347	2.178	4	0.85	1	105.338	1.15	57.65	C
60.00-40.00			B	0.347	2.178		0.85	1	105.338			
			C	0.347	2.178		0.85	1	105.338			
T12	3.35	24.34	A	0.326	2.23	3	0.85	1	107.041	1.06	52.79	C
40.00-20.00			B	0.326	2.23		0.85	1	107.041			
			C	0.326	2.23		0.85	1	107.041			
T13	3.10	26.77	A	0.264	2.397	3	0.85	1	88.648	0.84	41.82	C
20.00-0.00			B	0.264	2.397		0.85	1	88.648			
			C	0.264	2.397		0.85	1	88.648			
Sum Weight:	27.89	196.82						OTM	992.22 kip-ft	10.33		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.91	A	0.171	2.695	11	1	1	8.662	0.23	45.16	C
195.00-190.00			B	0.171	2.695		1	1	8.662			
			C	0.171	2.695		1	1	8.662			
T2	0.00	1.09	A	0.136	2.823	11	1	1	12.696	0.34	34.38	C
190.00-180.00			B	0.136	2.823		1	1	12.696			
			C	0.136	2.823		1	1	12.696			
T3	0.13	2.05	A	0.15	2.77	11	1	1	28.568	0.96	48.20	C
180.00-160.00			B	0.15	2.77		1	1	28.568			
			C	0.15	2.77		1	1	28.568			
T4	0.14	1.62	A	0.177	2.676	11	1	1	17.494	0.67	67.05	C
160.00-150.00			B	0.177	2.676		1	1	17.494			
			C	0.177	2.676		1	1	17.494			
T5	0.14	1.41	A	0.156	2.75	11	1	1	14.709	0.60	60.32	C
150.00-140.00			B	0.156	2.75		1	1	14.709			
			C	0.156	2.75		1	1	14.709			
T6	0.33	3.48	A	0.163	2.726	10	1	1	33.891	1.32	65.82	C
140.00-120.00			B	0.163	2.726		1	1	33.891			
			C	0.163	2.726		1	1	33.891			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T7	0.22	2.09	A	0.176	2.678	10	1	1	21.524	0.79	79.23	C
120.00-110.00			B	0.176	2.678		1	1	21.524			
			C	0.176	2.678		1	1	21.524			
T8	0.22	1.82	A	0.145	2.79	10	1	1	18.039	0.72	71.51	C
110.00-100.00			B	0.145	2.79		1	1	18.039			
			C	0.145	2.79		1	1	18.039			
T9	0.44	4.67	A	0.151	2.768	10	1	1	41.852	1.51	75.48	C
100.00-80.00			B	0.151	2.768		1	1	41.852			
			C	0.151	2.768		1	1	41.852			
T10	0.44	5.61	A	0.142	2.801	9	1	1	44.195	1.49	74.71	C
80.00-60.00			B	0.142	2.801		1	1	44.195			
			C	0.142	2.801		1	1	44.195			
T11	0.44	7.04	A	0.155	2.754	9	1	1	54.936	1.59	79.62	C
60.00-40.00			B	0.155	2.754		1	1	54.936			
			C	0.155	2.754		1	1	54.936			
T12	0.44	7.31	A	0.148	2.778	8	1	1	57.976	1.49	74.69	C
40.00-20.00			B	0.148	2.778		1	1	57.976			
			C	0.148	2.778		1	1	57.976			
T13	0.44	7.78	A	0.107	2.937	7	1	1	39.929	1.04	52.24	C
20.00-0.00			B	0.107	2.937		1	1	39.929			
			C	0.107	2.937		1	1	39.929			
Sum Weight:	3.38	46.88						OTM	1175.01 kip-ft	12.77		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.91	A	0.171	2.695	11	0.825	1	7.739	0.20	40.35	C
195.00-190.00			B	0.171	2.695		0.825	1	7.739			
			C	0.171	2.695		0.825	1	7.739			
T2	0.00	1.09	A	0.136	2.823	11	0.825	1	11.652	0.32	31.55	C
190.00-180.00			B	0.136	2.823		0.825	1	11.652			
			C	0.136	2.823		0.825	1	11.652			
T3	0.13	2.05	A	0.15	2.77	11	0.825	1	26.062	0.90	44.93	C
180.00-160.00			B	0.15	2.77		0.825	1	26.062			
			C	0.15	2.77		0.825	1	26.062			
T4	0.14	1.62	A	0.177	2.676	11	0.825	1	15.760	0.63	62.76	C
160.00-150.00			B	0.177	2.676		0.825	1	15.760			
			C	0.177	2.676		0.825	1	15.760			
T5	0.14	1.41	A	0.156	2.75	11	0.825	1	13.456	0.57	57.18	C
150.00-140.00			B	0.156	2.75		0.825	1	13.456			
			C	0.156	2.75		0.825	1	13.456			
T6	0.33	3.48	A	0.163	2.726	10	0.825	1	30.760	1.24	62.02	C
140.00-120.00			B	0.163	2.726		0.825	1	30.760			
			C	0.163	2.726		0.825	1	30.760			
T7	0.22	2.09	A	0.176	2.678	10	0.825	1	19.161	0.74	73.74	C
120.00-110.00			B	0.176	2.678		0.825	1	19.161			
			C	0.176	2.678		0.825	1	19.161			
T8	0.22	1.82	A	0.145	2.79	10	0.825	1	16.277	0.67	67.33	C
110.00-100.00			B	0.145	2.79		0.825	1	16.277			
			C	0.145	2.79		0.825	1	16.277			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T9	0.44	4.67	A	0.151	2.768	10	0.825	1	37.520	1.41	70.54	C
100.00-80.00			B	0.151	2.768		0.825	1	37.520			
			C	0.151	2.768		0.825	1	37.520			
T10	0.44	5.61	A	0.142	2.801	9	0.825	1	39.448	1.39	69.51	C
80.00-60.00			B	0.142	2.801		0.825	1	39.448			
			C	0.142	2.801		0.825	1	39.448			
T11	0.44	7.04	A	0.155	2.754	9	0.825	1	48.474	1.46	73.13	C
60.00-40.00			B	0.155	2.754		0.825	1	48.474			
			C	0.155	2.754		0.825	1	48.474			
T12	0.44	7.31	A	0.148	2.778	8	0.825	1	50.979	1.37	68.33	C
40.00-20.00			B	0.148	2.778		0.825	1	50.979			
			C	0.148	2.778		0.825	1	50.979			
T13	0.44	7.78	A	0.107	2.937	7	0.825	1	36.824	0.99	49.66	C
20.00-0.00			B	0.107	2.937		0.825	1	36.824			
			C	0.107	2.937		0.825	1	36.824			
Sum Weight:	3.38	46.88						OTM	1095.25 kip-ft	11.89		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.91	A	0.171	2.695	11	0.8	1	7.607	0.20	39.66	C
195.00-190.00			B	0.171	2.695		0.8	1	7.607			
			C	0.171	2.695		0.8	1	7.607			
T2	0.00	1.09	A	0.136	2.823	11	0.8	1	11.503	0.31	31.15	C
190.00-180.00			B	0.136	2.823		0.8	1	11.503			
			C	0.136	2.823		0.8	1	11.503			
T3	0.13	2.05	A	0.15	2.77	11	0.8	1	25.704	0.89	44.46	C
180.00-160.00			B	0.15	2.77		0.8	1	25.704			
			C	0.15	2.77		0.8	1	25.704			
T4	0.14	1.62	A	0.177	2.676	11	0.8	1	15.512	0.62	62.14	C
160.00-150.00			B	0.177	2.676		0.8	1	15.512			
			C	0.177	2.676		0.8	1	15.512			
T5	0.14	1.41	A	0.156	2.75	11	0.8	1	13.277	0.57	56.73	C
150.00-140.00			B	0.156	2.75		0.8	1	13.277			
			C	0.156	2.75		0.8	1	13.277			
T6	0.33	3.48	A	0.163	2.726	10	0.8	1	30.313	1.23	61.48	C
140.00-120.00			B	0.163	2.726		0.8	1	30.313			
			C	0.163	2.726		0.8	1	30.313			
T7	0.22	2.09	A	0.176	2.678	10	0.8	1	18.824	0.73	72.96	C
120.00-110.00			B	0.176	2.678		0.8	1	18.824			
			C	0.176	2.678		0.8	1	18.824			
T8	0.22	1.82	A	0.145	2.79	10	0.8	1	16.026	0.67	66.73	C
110.00-100.00			B	0.145	2.79		0.8	1	16.026			
			C	0.145	2.79		0.8	1	16.026			
T9	0.44	4.67	A	0.151	2.768	10	0.8	1	36.901	1.40	69.83	C
100.00-80.00			B	0.151	2.768		0.8	1	36.901			
			C	0.151	2.768		0.8	1	36.901			
T10	0.44	5.61	A	0.142	2.801	9	0.8	1	38.770	1.38	68.77	C
80.00-60.00			B	0.142	2.801		0.8	1	38.770			
			C	0.142	2.801		0.8	1	38.770			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T11	0.44	7.04	A	0.155	2.754	9	0.8	1	47.551	1.44	72.21	C
60.00-40.00			B	0.155	2.754		0.8	1	47.551			
			C	0.155	2.754		0.8	1	47.551			
T12	0.44	7.31	A	0.148	2.778	8	0.8	1	49.979	1.35	67.42	C
40.00-20.00			B	0.148	2.778		0.8	1	49.979			
			C	0.148	2.778		0.8	1	49.979			
T13	0.44	7.78	A	0.107	2.937	7	0.8	1	36.380	0.99	49.29	C
20.00-0.00			B	0.107	2.937		0.8	1	36.380			
			C	0.107	2.937		0.8	1	36.380			
Sum Weight:	3.38	46.88						OTM	1083.86 kip-ft	11.76		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.00	0.91	A	0.171	2.695	11	0.85	1	7.871	0.21	41.04	C
195.00-190.00			B	0.171	2.695		0.85	1	7.871			
			C	0.171	2.695		0.85	1	7.871			
T2	0.00	1.09	A	0.136	2.823	11	0.85	1	11.801	0.32	31.96	C
190.00-180.00			B	0.136	2.823		0.85	1	11.801			
			C	0.136	2.823		0.85	1	11.801			
T3	0.13	2.05	A	0.15	2.77	11	0.85	1	26.420	0.91	45.40	C
180.00-160.00			B	0.15	2.77		0.85	1	26.420			
			C	0.15	2.77		0.85	1	26.420			
T4	0.14	1.62	A	0.177	2.676	11	0.85	1	16.008	0.63	63.37	C
160.00-150.00			B	0.177	2.676		0.85	1	16.008			
			C	0.177	2.676		0.85	1	16.008			
T5	0.14	1.41	A	0.156	2.75	11	0.85	1	13.635	0.58	57.63	C
150.00-140.00			B	0.156	2.75		0.85	1	13.635			
			C	0.156	2.75		0.85	1	13.635			
T6	0.33	3.48	A	0.163	2.726	10	0.85	1	31.207	1.25	62.56	C
140.00-120.00			B	0.163	2.726		0.85	1	31.207			
			C	0.163	2.726		0.85	1	31.207			
T7	0.22	2.09	A	0.176	2.678	10	0.85	1	19.499	0.75	74.53	C
120.00-110.00			B	0.176	2.678		0.85	1	19.499			
			C	0.176	2.678		0.85	1	19.499			
T8	0.22	1.82	A	0.145	2.79	10	0.85	1	16.529	0.68	67.93	C
110.00-100.00			B	0.145	2.79		0.85	1	16.529			
			C	0.145	2.79		0.85	1	16.529			
T9	0.44	4.67	A	0.151	2.768	10	0.85	1	38.138	1.42	71.25	C
100.00-80.00			B	0.151	2.768		0.85	1	38.138			
			C	0.151	2.768		0.85	1	38.138			
T10	0.44	5.61	A	0.142	2.801	9	0.85	1	40.127	1.41	70.25	C
80.00-60.00			B	0.142	2.801		0.85	1	40.127			
			C	0.142	2.801		0.85	1	40.127			
T11	0.44	7.04	A	0.155	2.754	9	0.85	1	49.397	1.48	74.06	C
60.00-40.00			B	0.155	2.754		0.85	1	49.397			
			C	0.155	2.754		0.85	1	49.397			
T12	0.44	7.31	A	0.148	2.778	8	0.85	1	51.979	1.38	69.24	C
40.00-20.00			B	0.148	2.778		0.85	1	51.979			
			C	0.148	2.778		0.85	1	51.979			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T13	0.44	7.78	A	0.107	2.937	7	0.85	1	37.267	1.00	50.02	C
20.00-0.00			B	0.107	2.937		0.85	1	37.267			
			C	0.107	2.937		0.85	1	37.267			
Sum Weight:	3.38	46.88						OTM	1106.65 kip-ft	12.01		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	26.85					
Bracing Weight	20.03					
Total Member Self-Weight	46.88			15.27	4.71	
Total Weight	63.97			15.27	4.71	
Wind 0 deg - No Ice		0.78	-44.95	-4745.41	-70.85	-19.19
Wind 30 deg - No Ice		21.82	-37.11	-3932.17	-2307.12	-6.99
Wind 45 deg - No Ice		30.24	-30.07	-3179.66	-3199.57	-0.63
Wind 60 deg - No Ice		36.50	-21.32	-2255.49	-3863.08	5.44
Wind 90 deg - No Ice		42.53	-0.48	-31.89	-4483.27	16.98
Wind 120 deg - No Ice		38.67	22.57	2475.28	-4047.09	27.19
Wind 135 deg - No Ice		31.12	31.58	3418.24	-3252.09	29.54
Wind 150 deg - No Ice		20.82	37.36	4035.25	-2183.86	26.96
Wind 180 deg - No Ice		-0.09	42.50	4583.46	12.84	19.48
Wind 210 deg - No Ice		-20.99	37.62	4060.27	2209.14	7.19
Wind 225 deg - No Ice		-29.54	30.77	3347.32	3114.90	-0.29
Wind 240 deg - No Ice		-38.28	23.25	2540.40	4018.17	-8.01
Wind 270 deg - No Ice		-42.23	0.01	15.45	4463.20	-19.82
Wind 300 deg - No Ice		-36.05	-20.95	-2220.58	3828.29	-24.92
Wind 315 deg - No Ice		-31.05	-31.00	-3262.34	3279.74	-26.93
Wind 330 deg - No Ice		-21.11	-36.82	-3904.07	2247.06	-24.33
Member Ice	149.94					
Total Weight Ice	273.70			112.83	95.32	
Wind 0 deg - Ice		0.16	-16.07	-1664.30	80.30	-0.93
Wind 30 deg - Ice		7.97	-13.67	-1401.90	-785.98	1.15
Wind 45 deg - Ice		11.17	-11.13	-1119.77	-1139.50	2.04
Wind 60 deg - Ice		13.59	-7.89	-762.06	-1407.50	2.75
Wind 90 deg - Ice		15.72	-0.10	103.46	-1640.28	3.70
Wind 120 deg - Ice		13.87	8.06	1017.31	-1430.01	4.11
Wind 135 deg - Ice		11.25	11.34	1378.47	-1141.55	3.99
Wind 150 deg - Ice		7.77	13.72	1641.85	-761.41	3.13
Wind 180 deg - Ice		-0.02	15.75	1867.78	96.94	1.16
Wind 210 deg - Ice		-7.81	13.77	1646.91	955.23	-1.12
Wind 225 deg - Ice		-11.03	11.27	1372.72	1311.37	-2.23
Wind 240 deg - Ice		-13.79	8.19	1030.29	1613.08	-3.18
Wind 270 deg - Ice		-15.66	0.00	112.90	1824.97	-4.25
Wind 300 deg - Ice		-13.50	-7.82	-755.02	1589.18	-3.91
Wind 315 deg - Ice		-11.24	-11.23	-1127.82	1335.77	-3.46
Wind 330 deg - Ice		-7.83	-13.61	-1396.18	962.67	-2.60
Total Weight	63.97			15.27	4.71	
Wind 0 deg - Service		0.31	-17.77	-1882.37	-35.65	-7.58
Wind 30 deg - Service		8.63	-14.67	-1560.97	-919.44	-2.76
Wind 45 deg - Service		11.95	-11.88	-1263.57	-1272.14	-0.25

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 60 deg - Service		14.42	-8.42	-898.34	-1534.37	2.15
Wind 90 deg - Service		16.81	-0.19	-19.55	-1779.47	6.71
Wind 120 deg - Service		15.28	8.92	971.30	-1607.09	10.75
Wind 135 deg - Service		12.30	12.48	1343.96	-1292.90	11.67
Wind 150 deg - Service		8.23	14.76	1587.81	-870.73	10.66
Wind 180 deg - Service		-0.03	16.80	1804.47	-2.58	7.70
Wind 210 deg - Service		-8.30	14.87	1597.70	865.41	2.84
Wind 225 deg - Service		-11.67	12.16	1315.93	1223.38	-0.12
Wind 240 deg - Service		-15.13	9.19	997.03	1580.36	-3.16
Wind 270 deg - Service		-16.69	0.01	-0.84	1756.24	-7.83
Wind 300 deg - Service		-14.25	-8.28	-884.54	1505.31	-9.85
Wind 315 deg - Service		-12.27	-12.25	-1296.25	1288.52	-10.64
Wind 330 deg - Service		-8.34	-14.55	-1549.87	880.40	-9.61

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 45 deg - No Ice
7	0.9 Dead+1.6 Wind 45 deg - No Ice
8	1.2 Dead+1.6 Wind 60 deg - No Ice
9	0.9 Dead+1.6 Wind 60 deg - No Ice
10	1.2 Dead+1.6 Wind 90 deg - No Ice
11	0.9 Dead+1.6 Wind 90 deg - No Ice
12	1.2 Dead+1.6 Wind 120 deg - No Ice
13	0.9 Dead+1.6 Wind 120 deg - No Ice
14	1.2 Dead+1.6 Wind 135 deg - No Ice
15	0.9 Dead+1.6 Wind 135 deg - No Ice
16	1.2 Dead+1.6 Wind 150 deg - No Ice
17	0.9 Dead+1.6 Wind 150 deg - No Ice
18	1.2 Dead+1.6 Wind 180 deg - No Ice
19	0.9 Dead+1.6 Wind 180 deg - No Ice
20	1.2 Dead+1.6 Wind 210 deg - No Ice
21	0.9 Dead+1.6 Wind 210 deg - No Ice
22	1.2 Dead+1.6 Wind 225 deg - No Ice
23	0.9 Dead+1.6 Wind 225 deg - No Ice
24	1.2 Dead+1.6 Wind 240 deg - No Ice
25	0.9 Dead+1.6 Wind 240 deg - No Ice
26	1.2 Dead+1.6 Wind 270 deg - No Ice
27	0.9 Dead+1.6 Wind 270 deg - No Ice
28	1.2 Dead+1.6 Wind 300 deg - No Ice
29	0.9 Dead+1.6 Wind 300 deg - No Ice
30	1.2 Dead+1.6 Wind 315 deg - No Ice
31	0.9 Dead+1.6 Wind 315 deg - No Ice
32	1.2 Dead+1.6 Wind 330 deg - No Ice
33	0.9 Dead+1.6 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	195 - 190	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	43	-0.67	-0.87	0.07
			Max. Mx	18	-0.19	-1.06	0.06
			Max. My	32	-0.19	-0.16	-0.17
			Max. Vy	18	0.28	-1.06	0.06
			Max. Vx	32	0.10	0.00	0.00
		Diagonal	Max Tension	1	0.00	0.00	0.00
			Max. Compression	43	-0.56	0.00	0.00
			Max. Mx	44	-0.34	0.21	0.00
			Max. My	46	-0.36	0.00	0.00
			Max. Vy	44	-0.11	0.00	0.00
			Max. Vx	46	-0.00	0.00	0.00
		Top Girt	Max Tension	24	0.16	0.00	0.00
			Max. Compression	17	-0.11	-0.03	0.00
			Max. Mx	43	0.06	-0.16	0.00
			Max. My	46	0.08	-0.15	-0.00
			Max. Vy	43	0.14	-0.16	0.00
			Max. Vx	46	0.00	0.00	0.00
T2	190 - 180	Leg	Max Tension	19	0.83	-1.02	0.06
			Max. Compression	40	-5.41	0.83	0.05
			Max. Mx	18	0.72	-1.06	0.06
			Max. My	20	-1.65	0.24	-1.38
			Max. Vy	18	-0.82	-1.06	0.06
			Max. Vx	20	0.66	0.08	0.00
		Diagonal	Max Tension	18	1.58	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
			Max. Compression	12	-1.52	0.00	0.00
			Max. Mx	35	0.39	0.16	0.00
			Max. My	43	0.07	0.16	0.00
			Max. Vy	42	-0.10	0.16	0.00
			Max. Vx	43	0.00	0.00	0.00
T3	180 - 160	Leg	Max Tension	19	12.13	-0.75	-0.03
			Max. Compression	40	-16.05	0.57	0.01
			Max. Mx	12	-15.51	1.30	0.09
			Max. My	16	-4.12	0.13	-1.41
			Max. Vy	8	-0.93	-0.80	-0.01
			Max. Vx	10	0.91	-0.13	0.58
		Diagonal	Max Tension	32	4.23	0.00	0.00
			Max. Compression	12	-4.48	0.00	0.00
			Max. Mx	40	0.73	0.19	-0.00
			Max. My	43	-0.15	0.19	0.00
			Max. Vy	41	-0.12	0.19	0.00
			Max. Vx	43	0.00	0.00	0.00
T4	160 - 150	Leg	Max Tension	19	22.41	-1.17	-0.02
			Max. Compression	12	-28.33	-0.60	0.33
			Max. Mx	40	-21.67	2.24	-0.01
			Max. My	16	-6.70	-0.50	-2.40
			Max. Vy	12	1.59	2.06	0.01
			Max. Vx	16	0.92	-0.50	-2.40
		Diagonal	Max Tension	5	6.77	0.04	0.00
			Max. Compression	4	-6.94	0.00	0.00
			Max. Mx	42	1.84	0.20	-0.00
			Max. My	4	-6.90	0.03	0.01
			Max. Vy	42	-0.12	0.20	-0.00
			Max. Vx	4	0.00	0.03	0.01
		Secondary Horizontal	Max Tension	12	1.18	0.00	0.00
			Max. Compression	21	-0.91	0.03	0.00
			Max. Mx	43	-0.20	0.14	0.00
			Max. My	43	0.72	0.13	-0.01
			Max. Vy	43	-0.12	0.14	0.00
			Max. Vx	43	0.00	0.00	0.00
T5	150 - 140	Leg	Max Tension	19	37.36	-0.18	-0.00
			Max. Compression	12	-45.02	2.67	-0.20
			Max. Mx	12	-45.02	2.67	-0.20
			Max. My	16	-7.63	-0.50	-2.40
			Max. Vy	12	-0.49	2.67	-0.20
			Max. Vx	16	-0.39	-0.50	-2.40
		Diagonal	Max Tension	21	8.25	0.00	0.00
			Max. Compression	4	-8.50	0.00	0.00
			Max. Mx	46	1.08	0.22	0.00
			Max. My	14	-8.05	0.03	-0.01
			Max. Vy	46	-0.13	0.22	0.00
			Max. Vx	14	-0.00	0.00	0.00
T6	140 - 120	Leg	Max Tension	19	72.16	-2.93	-0.02
			Max. Compression	2	-86.82	2.09	0.04
			Max. Mx	18	70.61	-3.02	-0.02
			Max. My	16	-10.51	-0.26	-3.86
			Max. Vy	18	-1.12	-3.02	-0.02
			Max. Vx	10	1.07	-0.37	3.70
		Diagonal	Max Tension	4	9.93	0.00	0.00
			Max. Compression	4	-10.07	0.00	0.00
			Max. Mx	43	1.69	0.24	0.03
			Max. My	46	0.14	0.22	0.04
			Max. Vy	43	0.14	0.24	0.03
			Max. Vx	46	0.01	0.00	0.00
		Top Girt	Max Tension	18	0.71	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
			Max. Compression	3	-0.54	0.00	0.00
			Max. Mx	34	0.42	-0.58	0.00
			Max. My	46	0.52	0.00	0.02
			Max. Vy	34	0.19	0.00	0.00
			Max. Vx	46	-0.01	0.00	0.00
T7	120 - 110	Leg	Max Tension	19	90.17	-2.37	-0.06
			Max. Compression	12	-108.04	-0.14	0.02
			Max. Mx	12	-107.81	6.38	0.08
			Max. My	16	-14.85	-0.43	-3.41
			Max. Vy	24	1.34	6.37	-0.06
			Max. Vx	16	0.68	-0.43	-3.41
		Diagonal	Max Tension	5	11.22	0.08	0.00
			Max. Compression	4	-11.81	0.00	0.00
			Max. Mx	46	1.56	0.29	0.03
			Max. My	43	-3.33	0.27	0.03
			Max. Vy	43	0.16	0.29	0.03
			Max. Vx	43	0.01	0.00	0.00
		Secondary Horizontal	Max Tension	12	1.87	0.04	0.00
			Max. Compression	12	-1.87	0.00	0.00
			Max. Mx	38	0.51	0.23	0.05
			Max. My	45	-0.38	0.23	0.05
			Max. Vy	38	0.16	0.23	0.05
			Max. Vx	45	-0.01	0.00	0.00
T8	110 - 100	Leg	Max Tension	19	110.97	-0.61	-0.12
			Max. Compression	24	-131.38	3.20	-0.16
			Max. Mx	2	-131.18	3.22	0.17
			Max. My	16	-15.99	-0.43	-3.41
			Max. Vy	2	-0.60	3.22	0.17
			Max. Vx	16	-0.44	-0.43	-3.41
		Diagonal	Max Tension	4	11.40	0.00	0.00
			Max. Compression	4	-11.42	0.00	0.00
			Max. Mx	46	2.19	0.33	0.04
			Max. My	45	-0.42	0.31	0.05
			Max. Vy	43	0.18	0.33	0.04
			Max. Vx	46	0.01	0.00	0.00
T9	100 - 80	Leg	Max Tension	19	150.96	-2.45	-0.06
			Max. Compression	2	-176.50	4.49	0.17
			Max. Mx	2	-176.50	4.49	0.17
			Max. My	16	-19.75	0.14	-3.88
			Max. Vy	8	-0.69	-2.97	-0.01
			Max. Vx	4	-0.63	0.24	-2.31
		Diagonal	Max Tension	4	12.38	0.00	0.00
			Max. Compression	4	-12.62	0.00	0.00
			Max. Mx	43	1.79	0.42	0.06
			Max. My	46	0.16	0.39	0.06
			Max. Vy	43	0.20	0.42	0.06
			Max. Vx	46	0.01	0.00	0.00
T10	80 - 60	Leg	Max Tension	19	190.02	-2.54	0.03
			Max. Compression	2	-222.24	4.01	0.16
			Max. Mx	2	-198.72	4.49	0.17
			Max. My	16	-20.60	0.14	-3.88
			Max. Vy	28	-0.59	-4.16	0.11
			Max. Vx	4	-0.47	0.01	-3.61
		Diagonal	Max Tension	4	13.31	0.00	0.00
			Max. Compression	4	-13.49	0.00	0.00
			Max. Mx	46	2.84	0.55	-0.07
			Max. My	46	0.26	0.51	0.07
			Max. Vy	43	0.24	0.55	0.07
			Max. Vx	46	0.01	0.00	0.00
T11	60 - 40	Leg	Max Tension	19	227.67	-3.15	-0.02

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	2	-267.32	1.86	0.12
			Max. Mx	18	205.51	-4.04	-0.11
			Max. My	16	-26.75	-0.79	-6.35
			Max. Vy	2	0.35	3.82	0.04
			Max. Vx	16	0.58	-0.79	-6.35
		Diagonal	Max Tension	10	14.18	0.00	0.00
			Max. Compression	10	-14.13	0.00	0.00
			Max. Mx	46	2.85	0.77	0.09
			Max. My	45	-0.52	0.70	0.10
			Max. Vy	43	0.31	0.75	0.09
			Max. Vx	45	0.02	0.00	0.00
T12	40 - 20	Leg	Max Tension	19	265.16	-4.07	0.02
			Max. Compression	2	-313.17	4.39	0.45
			Max. Mx	18	259.56	-6.99	-0.21
			Max. My	16	-30.76	-1.41	-17.16
			Max. Vy	38	-0.64	-3.27	0.02
			Max. Vx	16	2.34	-1.41	-17.16
		Diagonal	Max Tension	12	16.01	0.00	0.00
			Max. Compression	12	-15.79	0.00	0.00
			Max. Mx	44	-1.44	0.89	-0.11
			Max. My	43	-3.23	0.82	-0.12
			Max. Vy	44	0.33	0.89	-0.11
			Max. Vx	43	-0.02	0.00	0.00
T13	20 - 0	Leg	Max Tension	19	285.69	-6.62	-0.21
			Max. Compression	2	-336.67	-0.00	-0.00
			Max. Mx	18	280.69	-6.99	-0.21
			Max. My	16	-30.20	-1.41	-17.16
			Max. Vy	8	-0.69	-6.92	0.03
			Max. Vx	16	-1.20	-1.41	-17.16
		Diagonal	Max Tension	19	19.88	0.00	0.00
			Max. Compression	12	-23.62	0.00	0.00
			Max. Mx	44	5.10	-1.09	-0.15
			Max. My	43	-1.02	-1.06	0.16
			Max. Vy	44	-0.34	-1.09	-0.15
			Max. Vx	44	0.02	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	24	363.96	43.32	-24.47
	Max. H_x	24	363.96	43.32	-24.47
	Max. H_z	9	-299.77	-36.45	20.81
	Min. Vert	9	-299.77	-36.45	20.81
	Min. H_x	9	-299.77	-36.45	20.81
	Min. H_z	24	363.96	43.32	-24.47
Leg B	Max. Vert	12	363.57	-43.67	-23.85
	Max. H_x	29	-296.13	36.29	19.92
	Max. H_z	29	-296.13	36.29	19.92
	Min. Vert	29	-296.13	36.29	19.92
	Min. H_x	12	363.57	-43.67	-23.85
	Min. H_z	12	363.57	-43.67	-23.85
Leg A	Max. Vert	2	364.11	-0.71	49.90
	Max. H_x	21	-269.52	0.79	-37.26
	Max. H_z	2	364.11	-0.71	49.90
	Min. Vert	19	-306.79	0.70	-42.39

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. H_x	2	364.11	-0.71	49.90
	Min. H_z	19	-306.79	0.70	-42.39

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	63.97	0.00	0.00	15.27	4.72	-0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	76.77	1.25	-71.93	-7622.45	-115.48	-30.72
0.9 Dead+1.6 Wind 0 deg - No Ice	57.57	1.25	-71.93	-7620.79	-116.82	-30.72
1.2 Dead+1.6 Wind 30 deg - No Ice	76.77	34.92	-59.38	-6317.34	-3704.76	-11.16
0.9 Dead+1.6 Wind 30 deg - No Ice	57.58	34.92	-59.38	-6316.75	-3703.16	-11.19
1.2 Dead+1.6 Wind 45 deg - No Ice	76.77	48.38	-48.11	-5109.53	-5137.17	-0.97
0.9 Dead+1.6 Wind 45 deg - No Ice	57.57	48.38	-48.11	-5109.93	-5134.40	-0.98
1.2 Dead+1.6 Wind 60 deg - No Ice	76.77	58.40	-34.11	-3626.25	-6202.13	8.75
0.9 Dead+1.6 Wind 60 deg - No Ice	57.57	58.40	-34.11	-3627.86	-6198.49	8.74
1.2 Dead+1.6 Wind 90 deg - No Ice	76.77	68.04	-0.77	-57.23	-7197.46	27.22
0.9 Dead+1.6 Wind 90 deg - No Ice	57.57	68.04	-0.77	-61.79	-7193.00	27.20
1.2 Dead+1.6 Wind 120 deg - No Ice	76.77	61.87	36.12	3967.07	-6497.17	43.57
0.9 Dead+1.6 Wind 120 deg - No Ice	57.57	61.87	36.12	3959.15	-6493.30	43.56
1.2 Dead+1.6 Wind 135 deg - No Ice	76.77	47.72	48.45	5290.79	-5031.55	47.32
0.9 Dead+1.6 Wind 135 deg - No Ice	57.57	47.72	48.45	5281.76	-5028.87	47.28
1.2 Dead+1.6 Wind 150 deg - No Ice	76.77	33.31	59.77	6470.75	-3506.85	43.18
0.9 Dead+1.6 Wind 150 deg - No Ice	57.58	33.31	59.77	6460.80	-3505.42	43.15
1.2 Dead+1.6 Wind 180 deg - No Ice	76.77	-0.14	68.00	7350.60	18.74	31.18
0.9 Dead+1.6 Wind 180 deg - No Ice	57.57	-0.14	68.00	7339.95	17.33	31.18
1.2 Dead+1.6 Wind 210 deg - No Ice	76.77	-33.59	60.19	6510.83	3543.70	11.49
0.9 Dead+1.6 Wind 210 deg - No Ice	57.58	-33.59	60.19	6500.87	3539.41	11.52
1.2 Dead+1.6 Wind 225 deg - No Ice	76.77	-47.26	49.23	5366.61	4997.42	-0.50
0.9 Dead+1.6 Wind 225 deg - No Ice	57.57	-47.26	49.23	5357.53	4991.93	-0.47
1.2 Dead+1.6 Wind 240 deg - No Ice	76.77	-61.24	37.20	4071.47	6447.03	-12.85
0.9 Dead+1.6 Wind 240 deg - No Ice	57.57	-61.24	37.20	4063.48	6440.36	-12.84

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.6 Wind 270 deg - No Ice	76.77	-67.56	0.02	18.71	7161.48	-31.75
0.9 Dead+1.6 Wind 270 deg - No Ice	57.58	-67.56	0.02	14.10	7154.23	-31.76
1.2 Dead+1.6 Wind 300 deg - No Ice	76.77	-57.68	-33.53	-3570.20	6142.56	-39.93
0.9 Dead+1.6 Wind 300 deg - No Ice	57.57	-57.68	-33.53	-3571.84	6136.13	-39.92
1.2 Dead+1.6 Wind 315 deg - No Ice	76.77	-47.60	-47.52	-5052.44	5072.39	-43.13
0.9 Dead+1.6 Wind 315 deg - No Ice	57.57	-47.60	-47.52	-5052.88	5066.83	-43.12
1.2 Dead+1.6 Wind 330 deg - No Ice	76.77	-33.77	-58.92	-6272.21	3604.73	-38.97
0.9 Dead+1.6 Wind 330 deg - No Ice	57.58	-33.77	-58.92	-6271.64	3600.34	-38.94
1.2 Dead+1.0 Ice+1.0 Temp	286.50	0.00	-0.00	116.73	97.14	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	286.50	0.16	-16.07	-1684.38	82.40	-1.02
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	286.50	7.97	-13.67	-1418.18	-795.73	1.12
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	286.50	11.17	-11.13	-1132.19	-1154.08	2.04
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	286.50	13.59	-7.89	-769.60	-1425.75	2.79
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	286.50	15.72	-0.10	107.78	-1661.67	3.79
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	286.50	13.87	8.06	1034.37	-1448.66	4.24
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	286.50	11.08	11.17	1384.92	-1140.94	4.11
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	286.50	7.77	13.72	1667.27	-770.82	3.26
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	286.50	-0.02	15.75	1896.28	99.21	1.25
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	286.50	-7.81	13.77	1672.39	969.18	-1.08
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	286.50	-11.03	11.27	1394.49	1330.44	-2.22
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	286.50	-13.79	8.19	1047.47	1636.16	-3.21
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	286.50	-15.66	0.00	117.31	1850.81	-4.35
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	286.50	-13.50	-7.82	-762.49	1611.85	-4.04
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	286.50	-11.07	-11.05	-1124.92	1339.52	-3.59
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	286.50	-7.83	-13.61	-1412.41	976.79	-2.73
Dead+Wind 0 deg - Service	63.97	0.31	-17.77	-1871.01	-25.20	-7.59
Dead+Wind 30 deg - Service	63.97	8.63	-14.67	-1548.80	-911.29	-2.76
Dead+Wind 45 deg - Service	63.97	11.95	-11.88	-1250.62	-1264.90	-0.24
Dead+Wind 60 deg - Service	63.97	14.42	-8.42	-884.44	-1527.81	2.16
Dead+Wind 90 deg - Service	63.97	16.81	-0.19	-3.37	-1773.53	6.72
Dead+Wind 120 deg - Service	63.97	15.28	8.92	990.10	-1600.67	10.76
Dead+Wind 135 deg - Service	63.97	11.79	11.97	1316.89	-1238.85	11.68
Dead+Wind 150 deg - Service	63.97	8.23	14.76	1608.20	-862.44	10.66
Dead+Wind 180 deg - Service	63.97	-0.03	16.80	1825.42	7.94	7.70
Dead+Wind 210 deg - Service	63.97	-8.30	14.87	1618.11	878.16	2.84
Dead+Wind 225 deg - Service	63.97	-11.67	12.16	1335.63	1237.05	-0.12
Dead+Wind 240 deg - Service	63.97	-15.13	9.19	1015.89	1594.93	-3.17

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 270 deg - Service	63.97	-16.69	0.01	15.38	1771.29	-7.84
Dead+Wind 300 deg - Service	63.97	-14.25	-8.28	-870.62	1519.74	-9.86
Dead+Wind 315 deg - Service	63.97	-11.76	-11.74	-1236.54	1255.54	-10.65
Dead+Wind 330 deg - Service	63.97	-8.34	-14.55	-1537.66	893.22	-9.62

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-63.97	0.00	0.00	63.97	0.00	0.000%
2	1.25	-76.77	-71.93	-1.25	76.77	71.93	0.000%
3	1.25	-57.57	-71.93	-1.25	57.57	71.93	0.000%
4	34.92	-76.77	-59.38	-34.92	76.77	59.38	0.000%
5	34.92	-57.57	-59.38	-34.92	57.58	59.38	0.002%
6	48.38	-76.77	-48.11	-48.38	76.77	48.11	0.000%
7	48.38	-57.57	-48.11	-48.38	57.57	48.11	0.000%
8	58.40	-76.77	-34.11	-58.40	76.77	34.11	0.000%
9	58.40	-57.57	-34.11	-58.40	57.57	34.11	0.000%
10	68.04	-76.77	-0.77	-68.04	76.77	0.77	0.000%
11	68.04	-57.57	-0.77	-68.04	57.57	0.77	0.000%
12	61.87	-76.77	36.12	-61.87	76.77	-36.12	0.000%
13	61.87	-57.57	36.12	-61.87	57.57	-36.12	0.000%
14	47.72	-76.77	48.45	-47.72	76.77	-48.45	0.000%
15	47.72	-57.57	48.45	-47.72	57.57	-48.45	0.000%
16	33.31	-76.77	59.77	-33.31	76.77	-59.77	0.000%
17	33.31	-57.57	59.77	-33.31	57.58	-59.77	0.000%
18	-0.14	-76.77	68.00	0.14	76.77	-68.00	0.000%
19	-0.14	-57.57	68.00	0.14	57.57	-68.00	0.000%
20	-33.59	-76.77	60.19	33.59	76.77	-60.19	0.000%
21	-33.59	-57.57	60.19	33.59	57.58	-60.19	0.002%
22	-47.26	-76.77	49.23	47.26	76.77	-49.23	0.000%
23	-47.26	-57.57	49.23	47.26	57.57	-49.23	0.000%
24	-61.24	-76.77	37.20	61.24	76.77	-37.20	0.000%
25	-61.24	-57.57	37.20	61.24	57.57	-37.20	0.000%
26	-67.56	-76.77	0.02	67.56	76.77	-0.02	0.000%
27	-67.56	-57.57	0.02	67.56	57.58	-0.02	0.002%
28	-57.68	-76.77	-33.53	57.68	76.77	33.53	0.000%
29	-57.68	-57.57	-33.53	57.68	57.57	33.53	0.000%
30	-47.60	-76.77	-47.52	47.60	76.77	47.52	0.000%
31	-47.60	-57.57	-47.52	47.60	57.57	47.52	0.000%
32	-33.77	-76.77	-58.92	33.77	76.77	58.92	0.000%
33	-33.77	-57.57	-58.92	33.77	57.58	58.92	0.000%
34	0.00	-286.50	0.00	-0.00	286.50	0.00	0.000%
35	0.16	-286.50	-16.07	-0.16	286.50	16.07	0.000%
36	7.97	-286.50	-13.67	-7.97	286.50	13.67	0.000%
37	11.17	-286.50	-11.13	-11.17	286.50	11.13	0.000%
38	13.59	-286.50	-7.89	-13.59	286.50	7.89	0.000%
39	15.72	-286.50	-0.10	-15.72	286.50	0.10	0.000%
40	13.87	-286.50	8.06	-13.87	286.50	-8.06	0.000%
41	11.08	-286.50	11.17	-11.08	286.50	-11.17	0.000%
42	7.77	-286.50	13.72	-7.77	286.50	-13.72	0.000%
43	-0.02	-286.50	15.75	0.02	286.50	-15.75	0.000%
44	-7.81	-286.50	13.77	7.81	286.50	-13.77	0.000%
45	-11.03	-286.50	11.27	11.03	286.50	-11.27	0.000%
46	-13.79	-286.50	8.19	13.79	286.50	-8.19	0.000%
47	-15.66	-286.50	0.00	15.66	286.50	-0.00	0.000%
48	-13.50	-286.50	-7.82	13.50	286.50	7.82	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
49	-11.07	-286.50	-11.05	11.07	286.50	11.05	0.000%
50	-7.83	-286.50	-13.61	7.83	286.50	13.61	0.000%
51	0.31	-63.97	-17.77	-0.31	63.97	17.77	0.000%
52	8.63	-63.97	-14.67	-8.63	63.97	14.67	0.000%
53	11.95	-63.97	-11.88	-11.95	63.97	11.88	0.000%
54	14.42	-63.97	-8.42	-14.42	63.97	8.42	0.000%
55	16.81	-63.97	-0.19	-16.81	63.97	0.19	0.000%
56	15.28	-63.97	8.92	-15.28	63.97	-8.92	0.000%
57	11.79	-63.97	11.97	-11.79	63.97	-11.97	0.000%
58	8.23	-63.97	14.76	-8.23	63.97	-14.76	0.000%
59	-0.03	-63.97	16.80	0.03	63.97	-16.80	0.000%
60	-8.30	-63.97	14.87	8.30	63.97	-14.87	0.000%
61	-11.67	-63.97	12.16	11.67	63.97	-12.16	0.000%
62	-15.13	-63.97	9.19	15.13	63.97	-9.19	0.000%
63	-16.69	-63.97	0.01	16.69	63.97	-0.01	0.000%
64	-14.25	-63.97	-8.28	14.25	63.97	8.28	0.000%
65	-11.76	-63.97	-11.74	11.76	63.97	11.74	0.000%
66	-8.34	-63.97	-14.55	8.34	63.97	14.55	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000196
5	Yes	4	0.00000001	0.00000133
6	Yes	4	0.00000001	0.00000180
7	Yes	4	0.00000001	0.00000125
8	Yes	4	0.00000001	0.00000217
9	Yes	4	0.00000001	0.00000105
10	Yes	4	0.00000001	0.00000181
11	Yes	4	0.00000001	0.00000124
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000117
15	Yes	4	0.00000001	0.00000216
16	Yes	4	0.00000001	0.00000223
17	Yes	4	0.00000001	0.00000289
18	Yes	4	0.00000001	0.00000225
19	Yes	4	0.00000001	0.00000110
20	Yes	4	0.00000001	0.00000197
21	Yes	4	0.00000001	0.00000134
22	Yes	4	0.00000001	0.00000134
23	Yes	4	0.00000001	0.00000210
24	Yes	4	0.00000001	0.00000001
25	Yes	4	0.00000001	0.00000001
26	Yes	4	0.00000001	0.00000174
27	Yes	4	0.00000001	0.00000120
28	Yes	4	0.00000001	0.00000214
29	Yes	4	0.00000001	0.00000104
30	Yes	4	0.00000001	0.00000188
31	Yes	4	0.00000001	0.00000132
32	Yes	4	0.00000001	0.00000214
33	Yes	4	0.00000001	0.00000279

34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00000375
36	Yes	4	0.00000001	0.00000365
37	Yes	4	0.00000001	0.00000363
38	Yes	4	0.00000001	0.00000363
39	Yes	4	0.00000001	0.00000368
40	Yes	4	0.00000001	0.00000387
41	Yes	4	0.00000001	0.00000391
42	Yes	4	0.00000001	0.00000399
43	Yes	4	0.00000001	0.00000410
44	Yes	4	0.00000001	0.00000415
45	Yes	4	0.00000001	0.00000413
46	Yes	4	0.00000001	0.00000415
47	Yes	4	0.00000001	0.00000403
48	Yes	4	0.00000001	0.00000394
49	Yes	4	0.00000001	0.00000388
50	Yes	4	0.00000001	0.00000383
51	Yes	4	0.00000001	0.00000001
52	Yes	4	0.00000001	0.00000001
53	Yes	4	0.00000001	0.00000001
54	Yes	4	0.00000001	0.00000001
55	Yes	4	0.00000001	0.00000001
56	Yes	4	0.00000001	0.00000001
57	Yes	4	0.00000001	0.00000001
58	Yes	4	0.00000001	0.00000001
59	Yes	4	0.00000001	0.00000001
60	Yes	4	0.00000001	0.00000001
61	Yes	4	0.00000001	0.00000001
62	Yes	4	0.00000001	0.00000001
63	Yes	4	0.00000001	0.00000001
64	Yes	4	0.00000001	0.00000001
65	Yes	4	0.00000001	0.00000001
66	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	195 - 190	3.162	56	0.1210	0.0090
T2	190 - 180	3.035	62	0.1210	0.0090
T3	180 - 160	2.781	62	0.1207	0.0091
T4	160 - 150	2.272	62	0.1168	0.0091
T5	150 - 140	2.023	62	0.1135	0.0089
T6	140 - 120	1.782	62	0.1081	0.0085
T7	120 - 110	1.330	62	0.0965	0.0074
T8	110 - 100	1.124	62	0.0889	0.0070
T9	100 - 80	0.935	62	0.0801	0.0064
T10	80 - 60	0.602	62	0.0648	0.0045
T11	60 - 40	0.346	62	0.0467	0.0032
T12	40 - 20	0.162	62	0.0310	0.0020
T13	20 - 0	0.042	62	0.0141	0.0009

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
188.00	6' Dish	62	2.985	0.1210	0.0090	169115
184.00	OGT9-840	62	2.883	0.1209	0.0091	330635
183.00	ANT150F2	62	2.858	0.1209	0.0091	424569
168.00	LPA-80080-4CF	62	2.474	0.1188	0.0092	378559
154.00	APXV9ERR18-C-A20	62	2.121	0.1150	0.0090	164690
140.00	(2) 7770.00	62	1.782	0.1081	0.0085	121540
137.00	Pirod 12' T-Frame Sector Mount (1)	62	1.711	0.1064	0.0084	116611
125.00	SC2-W100AB	62	1.439	0.0997	0.0077	98693
118.00	Pirod 6-8' Box Arm (1)	62	1.288	0.0952	0.0073	83144
105.00	ANT150D3	62	1.028	0.0845	0.0068	75018
101.00	6' Dish Ice Shield	62	0.953	0.0810	0.0065	88496
98.00	Pirod 6-8' Box Arm (1)	62	0.899	0.0785	0.0063	89808
97.00	6' Dish	62	0.881	0.0777	0.0062	88114
78.00	PD220	62	0.573	0.0631	0.0043	58237
32.00	GPS	62	0.105	0.0242	0.0016	67175

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	195 - 190	12.772	24	0.4875	0.0366
T2	190 - 180	12.265	24	0.4875	0.0366
T3	180 - 160	11.234	24	0.4864	0.0370
T4	160 - 150	9.172	24	0.4715	0.0371
T5	150 - 140	8.166	24	0.4584	0.0362
T6	140 - 120	7.192	2	0.4366	0.0346
T7	120 - 110	5.372	2	0.3897	0.0301
T8	110 - 100	4.539	2	0.3589	0.0285
T9	100 - 80	3.777	2	0.3234	0.0261
T10	80 - 60	2.432	2	0.2612	0.0182
T11	60 - 40	1.396	2	0.1885	0.0128
T12	40 - 20	0.657	2	0.1251	0.0083
T13	20 - 0	0.172	2	0.0567	0.0036

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
188.00	6' Dish	24	12.061	0.4874	0.0366	41966
184.00	OGT9-840	24	11.648	0.4872	0.0368	84272
183.00	ANT150F2	24	11.545	0.4871	0.0369	113803
168.00	LPA-80080-4CF	24	9.992	0.4792	0.0373	95048
154.00	APXV9ERR18-C-A20	24	8.565	0.4646	0.0366	41141
140.00	(2) 7770.00	2	7.192	0.4366	0.0346	30203
137.00	Pirod 12' T-Frame Sector Mount (1)	2	6.908	0.4298	0.0339	29021
125.00	SC2-W100AB	2	5.809	0.4026	0.0311	24412
118.00	Pirod 6-8' Box Arm (1)	2	5.200	0.3841	0.0298	20547
105.00	ANT150D3	2	4.150	0.3411	0.0275	18594
101.00	6' Dish Ice Shield	2	3.851	0.3268	0.0264	21948
98.00	Pirod 6-8' Box Arm (1)	2	3.631	0.3167	0.0254	22275

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
97.00	6' Dish	2	3.559	0.3135	0.0250	21854
78.00	PD220	2	2.314	0.2544	0.0175	14396
32.00	GPS	2	0.427	0.0977	0.0063	16661

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	195	Leg	A325N	1.0000	6	0.04	53.01	0.001 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	1	0.56	41.76	0.013 ✓	1	Member Bearing
		Top Girt	A325N	1.0000	1	0.16	25.45	0.006 ✓	1	Member Bearing
T2	190	Leg	A325N	1.0000	6	0.30	53.01	0.006 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	1	1.58	12.72	0.124 ✓	1	Member Bearing
T3	180	Leg	A325N	1.0000	6	2.02	53.01	0.038 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	1	4.23	12.72	0.333 ✓	1	Member Bearing
T4	160	Diagonal	A325N	1.0000	1	6.77	21.21	0.319 ✓	1	Member Bearing
		Secondary Horizontal	A325N	1.0000	1	1.18	21.21	0.056 ✓	1	Member Bearing
T5	150	Leg	A325N	1.0000	6	6.23	53.01	0.117 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	1	8.25	21.21	0.389 ✓	1	Member Bearing
T6	140	Leg	A325N	1.0000	6	12.03	53.01	0.227 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	1	9.93	21.21	0.468 ✓	1	Member Bearing
T7	120	Diagonal	A325N	1.0000	1	11.22	21.21	0.529 ✓	1	Member Bearing
		Secondary Horizontal	A325N	1.0000	1	1.87	21.21	0.088 ✓	1	Member Bearing
T8	110	Leg	A325N	1.0000	6	18.50	53.01	0.349 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	1	11.40	21.21	0.538 ✓	1	Member Bearing
T9	100	Leg	A325N	1.2500	6	25.16	82.83	0.304 ✓	1	Bolt Tension
		Diagonal	A325N	1.2500	1	12.39	21.32	0.581 ✓	1	Member Bearing
T10	80	Leg	A325N	1.2500	6	31.67	82.83	0.382 ✓	1	Bolt Tension
		Diagonal	A325N	1.2500	1	13.31	31.97	0.416 ✓	1	Member Bearing
T11	60	Leg	A325N	1.2500	6	37.95	82.83	0.458 ✓	1	Bolt Tension
		Diagonal	A325N	1.2500	1	14.18	31.97	0.443 ✓	1	Member Bearing
T12	40	Leg	A325N	1.2500	6	44.19	82.83	0.534 ✓	1	Bolt Tension
		Diagonal	A325N	1.2500	1	16.01	31.97	0.501 ✓	1	Member Bearing
T13	20	Leg	A687	2.0000	6	47.62	247.40	0.192 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	2	11.81	63.62	0.186 ✓	1	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 190	Pirod 105244	5.00	5.00	45.4 K=1.00	3.6816	-0.19	142.49	0.001
T2	190 - 180	Pirod 105244	10.00	10.00	45.4 K=1.00	3.6816	-5.36	142.49	0.038
T3	180 - 160	Pirod 105216	20.00	10.00	45.4 K=1.00	3.6816	-15.51	142.49	0.109
T4	160 - 150	Pirod 105217	10.00	5.00	37.8 K=1.00	5.3014	-27.77	214.86	0.129
T5	150 - 140	Pirod 105217	10.00	10.00	37.8 K=1.00	5.3014	-45.02	214.86	0.210
T6	140 - 120	Pirod 105218	20.03	10.02	32.4 K=1.00	7.2158	-86.73	300.68	0.288
T7	120 - 110	Pirod 105218	10.02	5.18	32.4 K=1.00	7.2158	-107.93	300.68	0.359
T8	110 - 100	Pirod 105218	10.02	10.02	32.4 K=1.00	7.2158	-131.38	300.68	0.437
T9	100 - 80	Pirod 105219	20.03	10.02	28.4 K=1.00	9.4248	-176.50	399.87	0.441
T10	80 - 60	Pirod 105219	20.03	10.02	28.4 K=1.00	9.4248	-222.24	399.87	0.556
T11	60 - 40	Pirod 105220	20.03	10.02	25.2 K=1.00	11.9282	-266.99	512.38	0.521
T12	40 - 20	Pirod 105220	20.03	10.02	25.2 K=1.00	11.9282	-312.62	512.38	0.610
T13	20 - 0	Pirod 112738	20.03	20.03	32.6 K=1.00	14.7262	-335.55	613.14	0.547

Leg Bending Design Data (Compression)

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 $\frac{M_{uy}}{\phi M_{ny}}$
T1	195 - 190	Pirod 105244	-1.06	41.30	0.026	0.06	47.69	0.000
T2	190 - 180	Pirod 105244	0.79	41.30	0.019	0.19	47.69	0.004
T3	180 - 160	Pirod 105216	1.30	41.30	0.032	0.09	47.69	0.002
T4	160 - 150	Pirod 105217	2.06	62.39	0.033	0.01	72.04	0.000
T5	150 - 140	Pirod 105217	2.67	62.39	0.043	-0.20	72.04	0.003
T6	140 - 120	Pirod 105218	2.01	87.49	0.023	-0.32	101.03	0.003
T7	120 - 110	Pirod 105218	6.38	87.49	0.073	0.08	101.03	0.001
T8	110 - 100	Pirod 105218	3.20	87.49	0.037	-0.16	101.03	0.002
T9	100 - 80	Pirod 105219	4.49	116.63	0.039	0.17	134.68	0.001
T10	80 - 60	Pirod 105219	4.01	116.63	0.034	0.16	134.68	0.001
T11	60 - 40	Pirod 105220	3.82	149.86	0.025	0.04	173.04	0.000
T12	40 - 20	Pirod 105220	6.51	149.86	0.043	0.20	173.04	0.001
T13	20 - 0	Pirod 112738	4.35	267.42	0.016	-0.62	308.79	0.002

Leg Interaction Design Data (Compression)

Section No.	Elevation ft	Size	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	195 - 190	Pirod 105244	0.001	0.026	0.000	0.027 ✔	1.000	4.8.1 ✔
T2	190 - 180	Pirod 105244	0.038	0.019	0.004	0.061 ✔	1.000	4.8.1 ✔
T3	180 - 160	Pirod 105216	0.109	0.032	0.002	0.142 ✔	1.000	4.8.1 ✔
T4	160 - 150	Pirod 105217	0.129	0.033	0.000	0.162 ✔	1.000	4.8.1 ✔
T5	150 - 140	Pirod 105217	0.210	0.043	0.003	0.255 ✔	1.000	4.8.1 ✔
T6	140 - 120	Pirod 105218	0.288	0.023	0.003	0.315 ✔	1.000	4.8.1 ✔
T7	120 - 110	Pirod 105218	0.359	0.073	0.001	0.433 ✔	1.000	4.8.1 ✔
T8	110 - 100	Pirod 105218	0.437	0.037	0.002	0.475 ✔	1.000	4.8.1 ✔
T9	100 - 80	Pirod 105219	0.441	0.039	0.001	0.481 ✔	1.000	4.8.1 ✔
T10	80 - 60	Pirod 105219	0.556	0.034	0.001	0.591 ✔	1.000	4.8.1 ✔
T11	60 - 40	Pirod 105220	0.521	0.025	0.000	0.547 ✔	1.000	4.8.1 ✔
T12	40 - 20	Pirod 105220	0.610	0.043	0.001	0.655 ✔	1.000	4.8.1 ✔
T13	20 - 0	Pirod 112738	0.547	0.016	0.002	0.566 ✔	1.000	4.8.1 ✔

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T1	195 - 190	0.5	1.48	121.0	165.67	0.1963	0.28	3.39	0.084 ✔
T2	190 - 180	0.5	1.48	121.0	165.67	0.1963	0.83	3.39	0.245 ✔
T3	180 - 160	0.5	1.48	121.0	165.67	0.1963	0.94	3.29	0.284 ✔
T4	160 - 150	0.5	1.47	120.0	238.57	0.1963	1.60	3.34	0.478 ✔
T5	150 - 140	0.5	1.47	120.0	238.57	0.1963	0.50	3.34	0.150 ✔
T6	140 - 120	0.5	1.46	119.0	324.71	0.1963	1.17	3.38	0.346 ✔
T7	120 - 110	0.5	1.46	119.0	324.71	0.1963	1.34	3.38	0.398 ✔
T8	110 - 100	0.5	1.46	119.0	324.71	0.1963	0.62	3.38	0.184 ✔

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T9	100 - 80	0.625	1.45	94.4	424.12	0.3068	0.69	6.96	0.099 ✔
T10	80 - 60	0.625	1.45	94.4	424.12	0.3068	0.59	6.96	0.085 ✔
T11	60 - 40	0.625	1.43	93.6	536.77	0.3068	0.60	7.01	0.085 ✔
T12	40 - 20	0.625	1.43	93.6	536.77	0.3068	2.36	7.01	0.338 ✔
T13	20 - 0	0.75	1.73	93.9	662.68	0.4418	1.21	14.36	0.085 ✔

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 190	2L2 1/2x2 1/2x3/16	7.81	6.83	105.3 K=1.00	1.8000	-0.56	32.54	0.017 [1] ✔
T2	190 - 180	L2 1/2x2 1/2x3/16	15.62	6.99	169.5 K=1.00	0.9020	-1.52	7.09	0.214 [1] ✔
T3	180 - 160	L3x3x3/16	15.62	6.99	140.8 K=1.00	1.0900	-4.48	12.42	0.361 [1] ✔
T4	160 - 150	L3x3x5/16	15.62	6.99	142.5 K=1.00	1.7800	-6.94	19.81	0.350 [1] ✔
T5	150 - 140	L3x3x5/16	15.62	6.99	142.5 K=1.00	1.7800	-8.50	19.81	0.429 [1] ✔
T6	140 - 120	L3x3x5/16	16.80	7.92	161.4 K=1.00	1.7800	-10.07	15.43	0.652 [1] ✔
T7	120 - 110	L3 1/2x3 1/2x5/16	17.62	8.34	145.0 K=1.00	2.0900	-11.81	22.45	0.526 [1] ✔
T8	110 - 100	L3 1/2x3 1/2x5/16	18.45	8.76	152.3 K=1.00	2.0900	-11.42	20.34	0.561 [1] ✔
T9	100 - 80	L4x4x1/4	20.16	9.59	144.8 K=1.00	1.9400	-12.62	20.90	0.604 [1] ✔
T10	80 - 60	L4x4x3/8	21.92	10.48	159.6 K=1.00	2.8600	-13.49	25.37	0.532 [1] ✔
T11	60 - 40	L5x5x3/8	23.71	11.38	138.0 K=1.00	3.6100	-14.07	42.84	0.328 [1] ✔
T12	40 - 20	L5x5x3/8	24.62	11.84	143.6 K=1.00	3.6100	-15.79	39.57	0.399 [1] ✔
T13	20 - 0	2L3 1/2x3 1/2x5/16	32.02	15.40	159.0 K=0.93	4.1800	-23.62	37.36	0.632 [1] ✔

[1] P_u / ϕP_n controls

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T4	160 - 150	L3x3x5/16	12.00	10.67	138.8 K=1.00	1.7800	-0.91	20.86	0.043 [1] ✔
T7	120 - 110	L3 1/2x3 1/2x5/16	14.48	13.15	146.1 K=1.00	2.0900	-1.87	22.12	0.085 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 190	2L2 1/2x2 1/2x3/16	12.00	8.08	93.3 K=1.00	1.8000	-0.11	36.89	0.003 [1] ✔
T6	140 - 120	L3x3x5/16	12.00	11.00	184.0 K=0.82	1.7800	-0.54	11.87	0.046 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	190 - 180	Pirod 105244	10.00	10.00	45.4	3.6816	0.04	165.67	0.000
T3	180 - 160	Pirod 105216	20.00	10.00	45.4	3.6816	10.37	165.67	0.063
T4	160 - 150	Pirod 105217	10.00	5.00	37.8	5.3014	22.30	238.57	0.093
T5	150 - 140	Pirod 105217	10.00	10.00	37.8	5.3014	37.26	238.57	0.156
T6	140 - 120	Pirod 105218	20.03	10.02	32.4	7.2158	72.16	324.71	0.222
T7	120 - 110	Pirod 105218	10.02	5.18	32.4	7.2158	90.13	324.71	0.278
T8	110 - 100	Pirod 105218	10.02	10.02	32.4	7.2158	110.91	324.71	0.342
T9	100 - 80	Pirod 105219	20.03	10.02	28.4	9.4248	150.76	424.12	0.355
T10	80 - 60	Pirod 105219	20.03	10.02	28.4	9.4248	189.64	424.12	0.447
T11	60 - 40	Pirod 105220	20.03	10.02	25.2	11.9282	227.67	536.77	0.424
T12	40 - 20	Pirod 105220	20.03	10.02	25.2	11.9282	264.93	536.77	0.494
T13	20 - 0	Pirod 112738	20.03	20.03	32.6	14.7262	285.69	662.68	0.431

Leg Bending Design Data (Tension)

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 $\frac{M_{uy}}{\phi M_{ny}}$

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 $\frac{M_{uy}}{\phi M_{ny}}$
T2	190 - 180	Pirod 105244	0.85	48.02	0.018	0.76	55.45	0.014
T3	180 - 160	Pirod 105216	-1.03	48.02	0.021	-0.64	55.45	0.012
T4	160 - 150	Pirod 105217	-1.46	69.27	0.021	0.03	79.99	0.000
T5	150 - 140	Pirod 105217	-2.03	69.27	0.029	-0.18	79.99	0.002
T6	140 - 120	Pirod 105218	-2.93	94.48	0.031	-0.02	109.10	0.000
T7	120 - 110	Pirod 105218	-5.17	94.48	0.055	0.01	109.10	0.000
T8	110 - 100	Pirod 105218	-2.92	94.48	0.031	-0.15	109.10	0.001
T9	100 - 80	Pirod 105219	-4.31	123.71	0.035	-0.12	142.84	0.001
T10	80 - 60	Pirod 105219	-4.01	123.71	0.032	-0.11	142.84	0.001
T11	60 - 40	Pirod 105220	-3.15	157.00	0.020	-0.02	181.28	0.000
T12	40 - 20	Pirod 105220	-6.62	157.00	0.042	-0.21	181.28	0.001
T13	20 - 0	Pirod 112738	-6.62	289.02	0.023	-0.21	333.74	0.001

Leg Interaction Design Data (Tension)

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T2	190 - 180	Pirod 105244	0.000	0.018	0.014	0.031 ✔	1.000	4.8.1 ✔
T3	180 - 160	Pirod 105216	0.063	0.021	0.012	0.096 ✔	1.000	4.8.1 ✔
T4	160 - 150	Pirod 105217	0.093	0.021	0.000	0.115 ✔	1.000	4.8.1 ✔
T5	150 - 140	Pirod 105217	0.156	0.029	0.002	0.188 ✔	1.000	4.8.1 ✔
T6	140 - 120	Pirod 105218	0.222	0.031	0.000	0.253 ✔	1.000	4.8.1 ✔
T7	120 - 110	Pirod 105218	0.278	0.055	0.000	0.332 ✔	1.000	4.8.1 ✔
T8	110 - 100	Pirod 105218	0.342	0.031	0.001	0.374 ✔	1.000	4.8.1 ✔
T9	100 - 80	Pirod 105219	0.355	0.035	0.001	0.391 ✔	1.000	4.8.1 ✔
T10	80 - 60	Pirod 105219	0.447	0.032	0.001	0.480 ✔	1.000	4.8.1 ✔
T11	60 - 40	Pirod 105220	0.424	0.020	0.000	0.444 ✔	1.000	4.8.1 ✔
T12	40 - 20	Pirod 105220	0.494	0.042	0.001	0.537 ✔	1.000	4.8.1 ✔
T13	20 - 0	Pirod 112738	0.431	0.023	0.001	0.455 ✔	1.000	4.8.1 ✔

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T1	195 - 190	0.5	1.48	121.0	165.67	0.1963	0.28	3.39	0.084

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T2	190 - 180	0.5	1.48	121.0	165.67	0.1963	0.83	3.39	0.245 ✔
T3	180 - 160	0.5	1.48	121.0	165.67	0.1963	0.94	3.29	0.284 ✔
T4	160 - 150	0.5	1.47	120.0	238.57	0.1963	1.60	3.34	0.478 ✔
T5	150 - 140	0.5	1.47	120.0	238.57	0.1963	0.50	3.34	0.150 ✔
T6	140 - 120	0.5	1.46	119.0	324.71	0.1963	1.17	3.38	0.346 ✔
T7	120 - 110	0.5	1.46	119.0	324.71	0.1963	1.34	3.38	0.398 ✔
T8	110 - 100	0.5	1.46	119.0	324.71	0.1963	0.62	3.38	0.184 ✔
T9	100 - 80	0.625	1.45	94.4	424.12	0.3068	0.69	6.96	0.099 ✔
T10	80 - 60	0.625	1.45	94.4	424.12	0.3068	0.59	6.96	0.085 ✔
T11	60 - 40	0.625	1.43	93.6	536.77	0.3068	0.60	7.01	0.085 ✔
T12	40 - 20	0.625	1.43	93.6	536.77	0.3068	2.36	7.01	0.338 ✔
T13	20 - 0	0.75	1.73	93.9	662.68	0.4418	1.21	14.36	0.085 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	190 - 180	L2 1/2x2 1/2x3/16	15.62	6.99	110.4	0.9020	1.58	29.22	0.054 [1] ✔
T3	180 - 160	L3x3x3/16	15.62	6.99	91.5	1.0900	4.23	35.32	0.120 [1] ✔
T4	160 - 150	L3x3x5/16	15.62	6.99	93.2	1.7800	6.77	57.67	0.117 [1] ✔
T5	150 - 140	L3x3x5/16	15.62	6.99	93.2	1.7800	8.25	57.67	0.143 [1] ✔
T6	140 - 120	L3x3x5/16	16.80	7.92	105.3	1.7800	9.93	57.67	0.172 [1] ✔
T7	120 - 110	L3 1/2x3 1/2x5/16	17.62	8.34	94.5	2.0900	11.22	67.72	0.166 [1] ✔
T8	110 - 100	L3 1/2x3 1/2x5/16	18.45	8.76	99.2	2.0900	11.40	67.72	0.168 [1] ✔
T9	100 - 80	L4x4x1/4	20.16	9.59	94.0	1.9400	12.39	62.86	0.197 [1] ✔
T10	80 - 60	L4x4x3/8	21.92	10.48	104.2	2.8600	13.31	92.66	0.144 [1] ✔
T11	60 - 40	L5x5x3/8	23.71	11.38	89.1	3.6100	14.18	116.96	0.121 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T12	40 - 20	L5x5x3/8	25.54	12.30	96.1	3.6100	16.01	116.96	0.137 [1]
T13	20 - 0	2L3 1/2x3 1/2x5/16	32.02	15.40	174.3	4.1800	19.88	135.43	0.147 [1]

[1] P_u / ϕP_n controls

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T4	160 - 150	L3x3x5/16	12.00	10.67	143.2	1.7800	1.18	57.67	0.021 [1]
T7	120 - 110	L3 1/2x3 1/2x5/16	14.48	13.15	149.8	2.0900	1.87	67.72	0.028 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 190	2L2 1/2x2 1/2x3/16	12.00	8.08	95.2	1.8000	0.16	58.32	0.003 [1]
T6	140 - 120	L3x3x5/16	12.00	11.00	143.2	1.7800	0.71	57.67	0.012 [1]

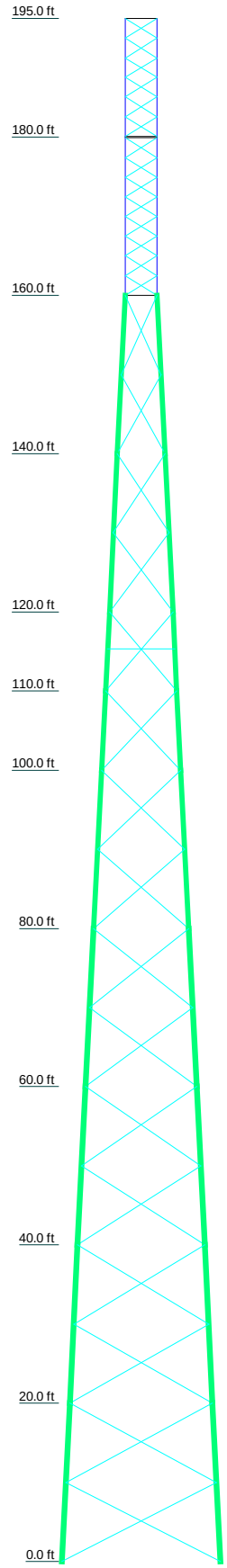
[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	195 - 190	Leg	Pirod 105244	3	-0.19	142.49	8.4	Pass
T2	190 - 180	Leg	Pirod 105244	15	-4.66	142.49	24.5	Pass
T3	180 - 160	Leg	Pirod 105216	24	-15.28	142.49	28.4	Pass
T4	160 - 150	Leg	Pirod 105217	38	-27.77	214.86	47.8	Pass
T5	150 - 140	Leg	Pirod 105217	50	-45.02	214.86	25.5	Pass
T6	140 - 120	Leg	Pirod 105218	58	-86.73	300.68	34.6	Pass
T7	120 - 110	Leg	Pirod 105218	77	-107.93	300.68	43.3	Pass
T8	110 - 100	Leg	Pirod 105218	88	-131.38	300.68	47.5	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T9	100 - 80	Leg	Pirod 105219	99	-176.50	399.87	48.1	Pass
T10	80 - 60	Leg	Pirod 105219	114	-222.24	399.87	59.1	Pass
T11	60 - 40	Leg	Pirod 105220	129	-266.99	512.38	54.7	Pass
T12	40 - 20	Leg	Pirod 105220	142	-312.62	512.38	65.5	Pass
T13	20 - 0	Leg	Pirod 112738	157	-335.55	613.14	56.6	Pass
T1	195 - 190	Diagonal	2L2 1/2x2 1/2x3/16	10	-0.56	32.54	1.7	Pass
T2	190 - 180	Diagonal	L2 1/2x2 1/2x3/16	18	-1.52	7.09	21.4	Pass
T3	180 - 160	Diagonal	L3x3x3/16	27	-4.48	12.42	36.1	Pass
T4	160 - 150	Diagonal	L3x3x5/16	44	-6.94	19.81	35.0	Pass
T5	150 - 140	Diagonal	L3x3x5/16	56	-8.50	19.81	42.9	Pass
T6	140 - 120	Diagonal	L3x3x5/16	68	-10.07	15.43	65.2	Pass
T7	120 - 110	Diagonal	L3 1/2x3 1/2x5/16	83	-11.81	22.45	52.6 52.9 (b)	Pass
T8	110 - 100	Diagonal	L3 1/2x3 1/2x5/16	95	-11.42	20.34	56.1	Pass
T9	100 - 80	Diagonal	L4x4x1/4	104	-12.62	20.90	60.4	Pass
T10	80 - 60	Diagonal	L4x4x3/8	119	-13.49	25.37	53.2	Pass
T11	60 - 40	Diagonal	L5x5x3/8	131	-14.07	42.84	32.8 44.3 (b)	Pass
T12	40 - 20	Diagonal	L5x5x3/8	152	-15.79	39.57	39.9 50.1 (b)	Pass
T13	20 - 0	Diagonal	2L3 1/2x3 1/2x5/16	161	-23.62	37.36	63.2	Pass
T4	160 - 150	Secondary Horizontal	L3x3x5/16	48	-0.91	20.86	4.3 5.6 (b)	Pass
T7	120 - 110	Secondary Horizontal	L3 1/2x3 1/2x5/16	85	-1.87	22.12	8.5 8.8 (b)	Pass
T1	195 - 190	Top Girt	2L2 1/2x2 1/2x3/16	6	0.14	58.32	0.7	Pass
T6	140 - 120	Top Girt	L3x3x5/16	61	-0.54	11.87	4.6	Pass
							Summary	
						Leg (T12)	65.5	Pass
						Diagonal (T6)	65.2	Pass
						Secondary Horizontal (T7)	8.8	Pass
						Top Girt (T6)	4.6	Pass
						Bolt Checks	58.1	Pass
						RATING =	**65.5**	**Pass**

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	
Legs	SR 1 3/4	SR 1 3/4	Pirod 105216		Pirod 105217		Pirod 105218	Pirod 105219		Pirod 105220		
Leg Grade	A572-50											
Diagonals	SR 3/4		L2 1/2x2 1/2x3/16		L3x3x3/16		L3x3x5/16		L3 1/2x3 1/2x5/16		L4x4x1/4	
Diagonal Grade	A572-50						A36					
Top Girts	SR 1 3/4	SR 3/4					N.A.					
Bottom Girts	SR 1 3/4	SR 3/4					N.A.					
Sec. Horizontals	N.A.				L3x3x3/16				N.A.			
Face Width (ft)	4	6			8	9	10	12	14	16	18	20
# Panels @ (ft)	6 @ 2.48611	8 @ 2.48958					16 @ 10					
Weight (K)	0.8	0.9	1.8	1.8	1.2	1.1	3.1	4.3	4.6	5.3	5.3	30.3



MATERIAL STRENGTH

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

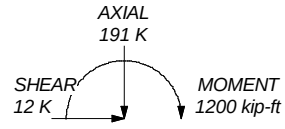
TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 89 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class III.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 55.5%

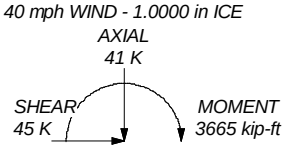
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 225 K
SHEAR: 28 K

UPLIFT: -193 K
SHEAR: 25 K



TORQUE 3 kip-ft
40 mph WIND - 1.0000 in ICE



TORQUE 13 kip-ft
REACTIONS - 89 mph WIND

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: 18025.00 - CTNH550A			
Project: 38 Lower Road, North Canaan, CT			
Client: T-Mobile	Drawn by: TJL	App'd:	
Code: TIA-222-G	Date: 02/27/18	Scale: NTS	
Path: J:\Jobs\1802500.WI\05_Structural\Backup Documentation\ER Files\Inner Tower\195' Pirod Lattice Tower.eri		Dwg No. E-1	

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: FOUNDATION WITH ROCK ANCHORS

Location: North Canaan, CT

Rev. 0: 2/27/18

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 18025.00

Foundation Analysis:

Input Data:

Max Pier Reactions:	Inner Tower		
Overturning =	$Overturning_{In} := 3665 \cdot ft \cdot kips$		*user input*
Base Shear =	$Shear_{In} := 45 \cdot kips$		*user input*
Base Compression =	$Axial_{In} := 41 \cdot kips$		*user input*
Max Pier Reactions:	Outter Tower		
Overturning =	$Overturning_{Out} := 7625 \cdot ft \cdot kips$		*user input*
Shear =	$Shear_{Out} := 72 \cdot kips$		*user input*
Compression =	$Axial_{Out} := 77 \cdot kips$		*user input*
Leg Compression =	$Uplift_{leg} := 307 \cdot kips$		*user input*
Leg Uplift =	$Comp_{leg} := 364 \cdot kips$		*user input*
Concrete Mat:			
Footing Width =	$B_{ftg} := 31.5ft$		*user input*
Footing Length =	$L_{ftg} := 31.5ft$		*user input*
Footing Thickness =	$T_{ftg} := 4.00ft$		*user input*
Internal Friction Angle =	$\phi := 35deg$		*user input*
Unit Weight of Earth =	$\gamma_{earth} := 120pcf$		*user input*
Unit Weight of Rock =	$\gamma_{rock} := 165pcf$		*user input*
Unit Weight of Conc =	$\gamma_{conc} := 150pcf$		*user input*
Ultimate Bearing =	$q_u := 20000 \cdot psf$		*user input*
Rock Anchor Properties:			
Number of Anchors =	$N_{anchor} := 4$	*user input*	Per Leg
Rock Anchor Ultimate Strength =	$Fu_{anchor} := 150.0ksi$	*user input*	Williams R71-11 1-3/8" dia. 150ksi
Rock Anchor Diameter =	$d_{ra} := 1.375in$	*user input*	
Required Factor of Safety =	$F_S := 1.0$	*user input*	
Rock Anchor Lockoff Load =	$Anchor_{LL} := 133 \cdot kips$		

Stability of Footing:

Concrete Mat:

Total Volume of Concrete = $V_{conc} := B_{ftg} \cdot L_{ftg} \cdot T_{ftg} = 3969 \cdot ft^3$

Total Weight of Concrete = $W_{conc} := V_{conc} \cdot \gamma_{conc} = 595.4 \cdot kips$

Resisting Moment = $M_r := \left(0.9 \cdot W_{conc} + 0.75 Axial_{In}\right) \cdot \frac{L_{ftg}}{2} = 8923 \cdot kip \cdot ft$

Overturning Moment = $M_{ot} := Overturning_{In} + Shear_{In} \cdot T_{ftg} = 3845 \cdot kip \cdot ft$

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 2.32$

Factor of Safety Required = $FS_{req} := 1$

$OverTurning_Moment_Check := if\left(FS \geq FS_{req}, "Okay", "No Good"\right)$

OverTurning_Moment_Check = "Okay"

RockAnchor:

Factor of Safety Actual = $FS := \frac{N_{anchor} \cdot Anchor_{LL}}{Uplift_{leg}} = 1.73$

Factor of Safety Required = $FS_{req} := 1$

$OverTurning_Moment_Check := if\left(FS \geq FS_{req}, "Okay", "No Good"\right)$

OverTurning_Moment_Check = "Okay"

Bearing Pressure Caused by Footing:

Total Load = $Load_{tot} := W_{conc} + Axial_{In} + Axial_{Out} = 713 \cdot kip$

Area of the Mat = $A_{mat} := B_{ftg}^{2} = 992.25 ft^{2}$

Section Modulus of Mat = $S := \frac{B_{ftg}^{3}}{6} = 5209.31 \cdot ft^{3}$

Maximum Pressure in Mat = $P_{max} := \frac{Load_{tot}}{A_{mat}} + \frac{M_{ot}}{S} = 1.457 \cdot ksf$

$Max_Pressure_Check := if\left(P_{max} < 0.75 \cdot q_u, "Okay", "No Good"\right)$

Max_Pressure_Check = "Okay"

Minimum Pressure in Mat = $P_{min} := \frac{Load_{tot}}{A_{mat}} - \frac{M_{ot}}{S} = -0.019 \cdot ksf$

$Min_Pressure_Check := if\left[\left(P_{min} \geq 0\right) \cdot \left(P_{min} < 0.75 \cdot q_u\right), "Okay", "No Good"\right]$

Min_Pressure_Check = "No Good"

Distance to Resultant of Pressure Distribution = $X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{B_{ftg}}} \cdot \frac{1}{3} = 10.364 ft$

Distance to Kern = $X_k := \frac{B_{ftg}}{6} = 5.25 ft$

Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity = $e := \frac{M_{ot}}{Load_{tot}} = 5.39 ft$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot Load_{tot}}{3 \cdot B_{ftg} \cdot \left(\frac{L_{ftg}}{2} - e\right)} = 1.457 \cdot ksf$

$q_{adj} := if\left(P_{min} < 0, P_a, P_{max}\right) = 1.457 \cdot ksf$

$Pressure_Check := if\left(q_{adj} < 0.75 \cdot q_u, "Okay", "No Good"\right)$

Pressure_Check = "Okay"

RAN Template:	A&L Template:	Power System Template:
4Sec-797DB2	4Sec-797DB2_1xAIR+1QP+1DP	Custom

CTNH550A_Infill/ROB/Greenfield_C0.1_draft

Section 1 - Site Information

Site ID: CTNH550A
Status: Draft
Version: C0.1
Project Type: Infill/ROB/Greenfield
Approved: Not Approved
Approved By: Not Approved
Last Modified: 2/16/2018 2:51:24 PM
Last Modified By: GSM1900\BAlter

Site Name: CTNH550A
Site Class: <undefined>
Site Type: Building
Solution Type:
Plan Year:
Market: CONNECTICUT
Vendor: Ericsson
Landlord: Litchfield County Dispatch

Latitude: 42.01472200
Longitude: -73.32639000
Address: 38 Lower Rd
City, State: East Canaan, CT
Region: NORTHEAST

RAN Template: 4Sec-797DB2			AL Template: 4Sec-797DB2_1xAIR+1QP+1DP	
Sector Count: 4	Antenna Count: 12	Coax Line Count: 0	TMA Count: 0	RRU Count: 8

Section 2 - Existing Template Images

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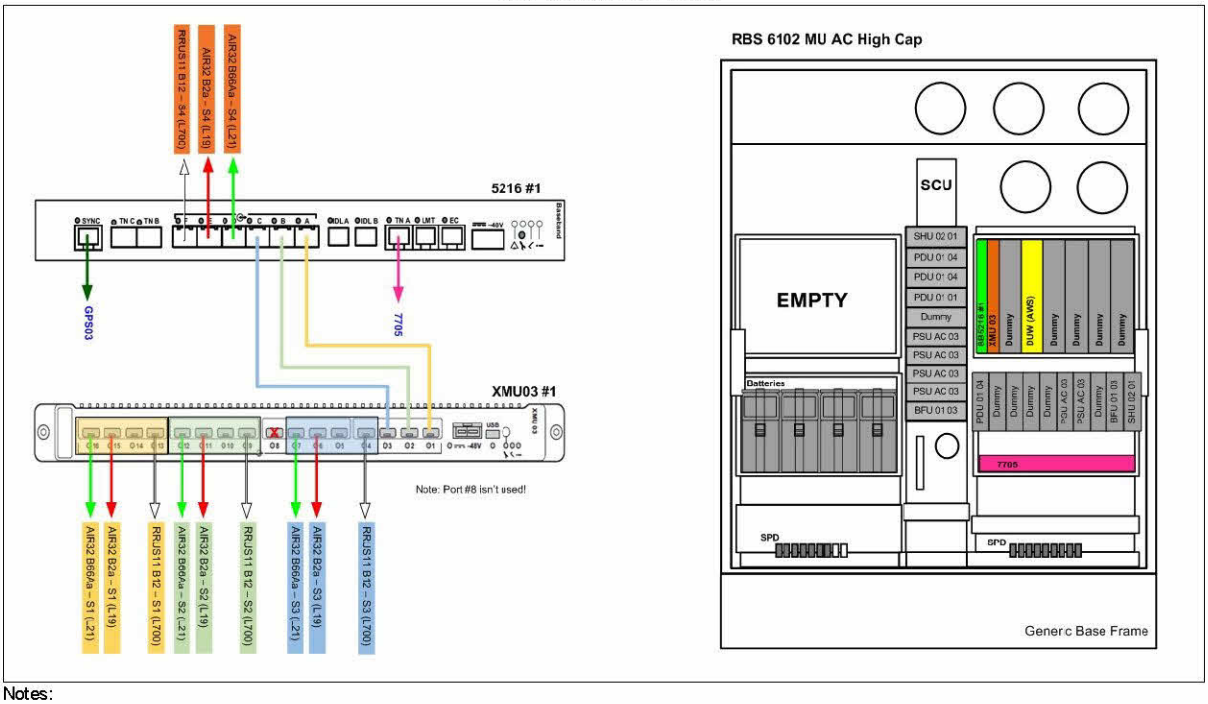
DRAFT DRAFT

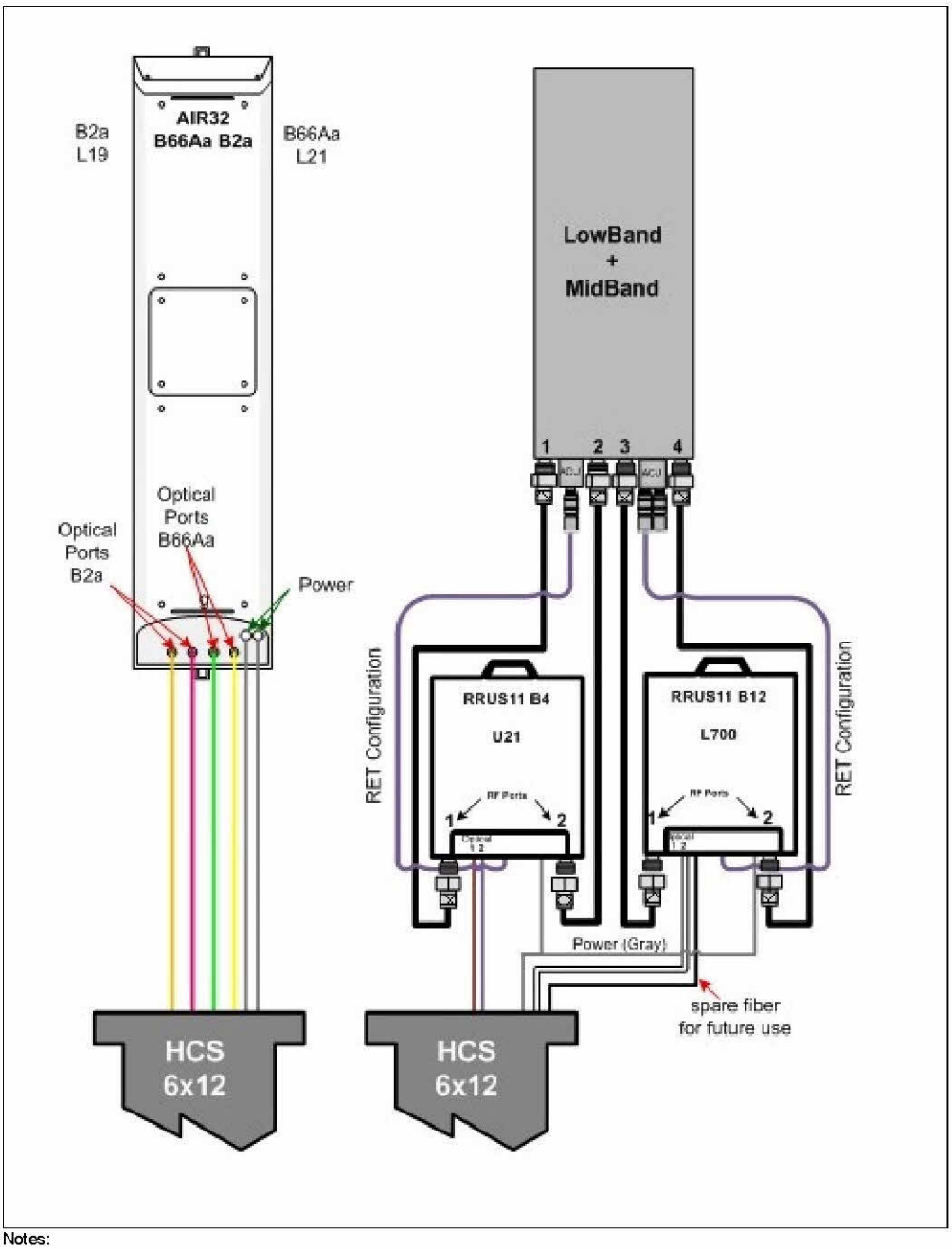
Section 3 - Proposed Template Images

4Sec-797DB2 Cabinet.jpg



Notes:

4Sec-797DB2 Antenna.jpg


AIR32
B66Aa B2a
B2a
L19
B66Aa
L21
LowBand
+
MidBand
1 2 3 4
Optical
Ports
B66Aa
Optical
Ports
B2a
Power
RET Configuration
RRUS11 B4
U21
RRUS11 B12
L700
RF Ports
1
2
RET Configuration
Power (Gray)
spare fiber
for future use
HCS
6x12
HCS
6x12

Notes:

Section 4 - Siteplan Images

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RAN Template:	A&L Template:	Power System Template:
4Sec-797DB2	4Sec-797DB2_1xAIR+1QP+1DP	Custom

CTNH550A_Infill/ROB/Greenfield_C0.1_draft

Section 5 - RAN Equipment

Existing RAN Equipment
----- This section is intentionally blank. -----

Proposed RAN Equipment		
Template: 4Sec-797DB2		
Enclosure	1	2
Enclosure Type	RBS 6102 MU AC	Ancillary Equipment
Baseband	DUW30 (U1900); BB 5216 (L2100, L1900, L700)	
Hybrid Cable System		Ericsson 6x12 HCS *Select Length & AWG* (x4)
Multiplexer	XMU (L2100, L1900, L700)	
RAN Scope of Work:		

RAN Template:	A&L Template:	Power System Template:
4Sec-797DB2	4Sec-797DB2_1xAIR+1QP+1DP	Custom

CTNH550A_Infill/ROB/Greenfield_C0.1_draft

Section 6 - A&L Equipment

Existing Template: Custom
Proposed Template: 4Sec-797DB2_1xAIR+1QP+1DP

Sector 1 (Proposed) view from behind							
Coverage Type	A - Outdoor Macro						
Antenna	1				2		3
Antenna Model	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octa)				RFS - APXVAA24_43-U-A20 (Quad)		RFS - APXV18-206513-C-A20 (Dual)
Azimuth	0				0		0
M. Tilt							
Height	130				130		130
Ports	P1	P2	P3	P4	P5	P6	P7
Active Tech.	L2100	L2100	L1900	L1900	L700		U1900
Dark Tech.							
Restricted Tech.							
Decomm. Tech.							
E. Tilt	2	0	2	0			
Cables	MLA Fiber Pair - 15 ft.		MLA Fiber Pair - 15 ft.		Coax Jumper - 6 ft. (x2)		Coax Jumper - 6 ft. (x2)
TMAs							
Diplexers / Combiners							
Radio					RRUS11 B12 (At Antenna)		RRUS11 B2 (At Antenna)
Sector Equipment							

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
4Sec-797DB2	4Sec-797DB2_1xAIR+1QP+1DP	Custom

CTNH550A_Infill/ROB/Greenfield_C0.1_draft

Sector 2 (Proposed) view from behind							
Coverage Type	A - Outdoor Macro						
Antenna	1				2		3
Antenna Model	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octa)				RFS - APXVAA24_43-U-A20 (Quad)		RFS - APXV18-206517S-A20 (Dual)
Azimuth	90				90		90
M. Tilt							
Height	130				130		130
Ports	P1	P2	P3	P4	P5	P6	P7
Active Tech.	L2100	L2100	L1900	L1900	L700		U1900
Dark Tech.							
Restricted Tech.							
Decomm. Tech.							
E. Tilt	2	0	2	0			
Cables	MLA Fiber Pair - 15 ft.		MLA Fiber Pair - 15 ft.		Coax Jumper - 6 ft. (x2)		Coax Jumper - 6 ft. (x2)
TMAs							
Diplexers / Combiners							
Radio					RRUS11 B12 (At Antenna)		RRUS11 B2 (At Antenna)
Sector Equipment							

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
4Sec-797DB2	4Sec-797DB2_1xAIR+1QP+1DP	Custom

CTNH550A_Infill/ROB/Greenfield_C0.1_draft

Sector 3 (Proposed) view from behind							
Coverage Type	A - Outdoor Macro						
Antenna	1				2		3
Antenna Model	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octa)				RFS - APXVAA24_43-U-A20 (Quad)		RFS - APXV18-206517S-A20 (Dual)
Azimuth	180				180		180
M. Tilt							
Height	130				130		130
Ports	P1	P2	P3	P4	P5	P6	P7
Active Tech.	L2100	L2100	L1900	L1900	L700		U1900
Dark Tech.							
Restricted Tech.							
Decomm. Tech.							
E. Tilt	2	0	2	0			
Cables	MLA Fiber Pair - 15 ft.		MLA Fiber Pair - 15 ft.		Coax Jumper - 6 ft. (x2)		Coax Jumper - 6 ft. (x2)
TMAs							
Diplexers / Combiners							
Radio					RRUS11 B12 (At Antenna)		RRUS11 B2 (At Antenna)
Sector Equipment							

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
4Sec-797DB2	4Sec-797DB2_1xAIR+1QP+1DP	Custom

CTNH550A_Infill/ROB/Greenfield_C0.1_draft

Sector 4 (Proposed) view from behind							
Coverage Type	A - Outdoor Macro						
Antenna	1				2		3
Antenna Model	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octa)				RFS - APXVAA24_43-U-A20 (Quad)		RFS - APXV18-206517S-A20 (Dual)
Azimuth	270				270		270
M. Tilt							
Height	130				130		130
Ports	P1	P2	P3	P4	P5	P6	P7
Active Tech.	L2100	L2100	L1900	L1900	L700		U1900
Dark Tech.							
Restricted Tech.							
Decomm. Tech.							
E. Tilt	2	0	2	0			
Cables	MLA Fiber Pair - 15 ft.		MLA Fiber Pair - 15 ft.		Coax Jumper - 6 ft. (x2)		Coax Jumper - 6 ft. (x2)
TMAs							
Diplexers / Combiners							
Radio					RRUS11 B12 (At Antenna)		RRUS11 B2 (At Antenna)
Sector Equipment							

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
4Sec-797DB2	4Sec-797DB2_1xAIR+1QP+1DP	Custom

CTNH550A_Infill/ROB/Greenfield_C0.1_draft

Section 7 - Power Systems Equipment

Existing Power Systems Equipment
----- This section is intentionally blank. -----

Proposed Power Systems Equipment

AIR-32 B4A/B2P & B2A/B66AA

ERICSSON ANTENNA INTEGRATED RADIO AIR-32

Radio		
	Single Band (B4a/B2p)	**Dual Band (B2a/B66Aa)**
Band 2 (1850-1910 / 1930-1990 MHz)	Passive frequency band	Active frequency band
Band 4 (1710-1755 / 2110-2155 MHz)	Active frequency band	Subset of Band 66A (AWS 1+3)
Band 66A (1710-1780 / 2110-2180 MHz)	N/A	Active frequency band
PA Output Power	4 x 30W	2 x (4 x 30) W
Downlink EIRP in bore-sight direction for each active band	4 x 62.5 dBmi	4 x 62.5 dBmi
Instantaneous bandwidth	45 MHz (W, L)	B2: 40 MHz (W, L) B2: 20 MHz (G) B66A: 70 MHz (W, L)
Capacity (single standard per unit)	6 GSM 6 WCDMA 2 x 20 MHz LTE	6 GSM (B2 only) 6 WCDMA per Active frequency band 2 x 20 MHz LTE per band
Multi-RAT capability	WCDMA and LTE on both PAs	WCDMA and GSM on both PAs (B2 only) WCDMA and LTE on both PAs (B2 and B4) GSM and LTE (B2 only)

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Interfaces		
Optical CPRI	2 x 10 Gbps	2 x 10 Gbps per Active frequency band
DC Power	-48 VDC 3-wire or 2-wire	-48 VDC 3-wire or 2-wire (separate input for both radios)
AC power (Optional)	PSU-AC 08	PSU-AC 08
Passive antenna	4 RF connectors (7/16 female)	N/A
Environmental		
Operating Temperature Range	-40 to +55 °C	-40 to +55 °C
Solar Radiation	≤ 1,120 W/m²	≤ 1,120 W/m²
Relative Humidity	5 to 100%	5 to 100%
Absolute Humidity	0.26 to 40 g/m^3	0.26 to 40 g/m^3
Maximum temperature change	1.0°C/min	1.0°C/min
Antenna		
Electrical Tilt	2º – 12º (B4) 2º – 12º (B2)	2º – 12º (B66A) 2º – 12º (B2)
Bore-sight antenna gain	18 dBi (B4) 17.5 dBi (B2)	18 dBi (B66A) 17.5 dBi (B2)
Nominal beam-width, azimuth	65º (B4) 63º (B2)	65º (B66A) 63º (B2)
Nominal beam-width, elevation	6º (B4) 6º (B2)	6º (B66A) 6º (B2)
Mechanical		
Weight	48 Kg (105.8 lbs)	60 Kg (132.2 lbs)
Dimensions (H x W x D)	1439 x 327 x 220 mm (56.6” x 12.9” x 8.7”)	1439 x 327 x 220 mm (56.6” x 12.9” x 8.7”)
Wind load at 42 m/s (150 km/h) Front / Lateral / Rear	640N / 300N / 660N	640N / 300N / 660N

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RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Dual Band (4 Port) Antenna, 617-746MHz, 65 deg, 15.6dBi, 2.4m(8ft), VET, RET, 0-11° Tilt Range

FEATURES / BENEFITS

This antenna provides a four port platform for advanced use in 600MHz and 700MHz deployment scenarios in a high quality package design built to withstand harsh environments.

- **24-Inch Width for Easier Zoning**
- **Field Replaceable (Integrated) AISG RET platform for reduced environmental exposure and long lasting quality.**
- **Superior elevation performance across the entire electrical down tilt range.**
- **High Gain performance for optimum site coverage, reduced power and signal integrity.**
- **Excellent Front-to-Back Ratio for less interference from neighboring cells.**
- **Manual Override feature for electrical downtilt adjustment.**
- **Both arrays driven by one RET**

Technical Features

ANTENNA PERFORMANCE - LEFT R1

Frequency Range	MHz	617-698MHz	698-746MHz
Gain	dBi	15.3	15.7
Horizontal Beamwidth	deg	68	65
Vertical Beamwidth	deg	10.6	9.8
Electrical Downtilt Range	deg	0-11	0-11
Upper Side Lobe Suppression Peak to +20	dB	21	21
Upper Side Lobe Suppression 0 to +20	dB	20	21
Front to Back Ratio +/-30 Copolar	dB	27	28
Cross Polar Isolation Between Ports	dB	26	26
Cross Polarization (XPD) @ Boresight	dB	27	27
Cross Polarization (XPD) @ +/-60	dB	10	7
VSWR		1.5:1	1.5:1
3rd Order IMP 2 x 43dBm	dBc		153
Maximum Power Input	Watts	250	250

All information contained in the present datasheet is subject to confirmation at time of ordering

RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Dual Band (4 Port) Antenna, 617-746MHz, 65 deg, 15.6dBi, 2.4m(8ft), VET, RET, 0-11° Tilt Range

ANTENNA PERFORMANCE - RIGHT R2

Frequency Range	MHz	617-698	698-746
Gain	dBi	15.2	15.5
Horizontal Beamwidth	deg	68	64
Vertical Beamwidth	deg	10.6	9.8
Electrical Downtilt Range	deg	0-11	0-11
Upper Side Lobe Suppression Peak to +20	dB	21	23
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front to Back Ratio +/-30 Copolar	dB	27	28
Cross Polar Isolation Between Ports	dB	26	26
Cross Polar Discrimination (XPD) @ Boresight	dB	24	24
Cross Polar Discrimination (XPD) @ +/- 60	dB	10	7
VSWR		1.5:1	1.5:1
3rd Order IMP 2 x 43dBm	dBc		153
Maximum Power Input	Watts	250	250

ELECTRICAL SPECIFICATIONS

Impedance	Ohm	50.0
Polarization	Deg	±45°

MECHANICAL SPECIFICATIONS

Dimensions - H x W x D	mm (in)	2435 x 609 x 222 (95.9 x 24 x 8.7)
Weight (Antenna Only)	kg (lb)	45 (99)
Weight (Mounting Hardware only)	kg (lb)	12 (26.4)
Shipping Weight	kg (lb)	67 (147.4)
Connector type		4 x 4.3-10 Long Neck Female/Bottom + 2 AISG connectors (1 male, 1 female)
Adjustment mechanism		Integrated RET solution AISG compliant (Field Replaceable) + Manual Override + External Tilt Indicator
Mounting Hardware Material		Galvanized steel
Radome Material / Color		Fiber Glass/ Light Grey RAL7035

TESTING AND ENVIRONMENTAL

Temperature Range	°C (°F)	-40 to 60 (-40 to 140)
Lightning protection		Direct Ground
Survival/Rated Wind Velocity	km/h	241 (150)

All information contained in the present datasheet is subject to confirmation at time of ordering

Product Data Sheet APXV18-206517S-C

Optimizer® Panel Dual Polarized Antenna

Product Description

This X-Polarized variable tilt antenna provides exceptional suppression of all upper sidelobes at all downtilt angles. It also features null fill and a wide downtilt range with optional remote tilt. This antenna is optimized for performance across the entire frequency band (1710-2200 MHz).

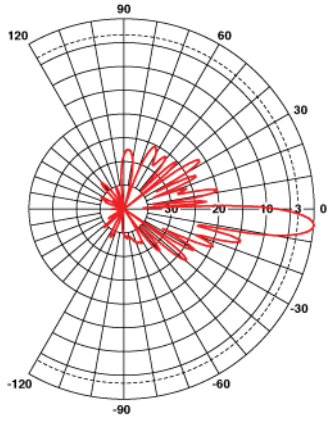
Features/Benefits

- **Variable electrical downtilt - provides enhanced precision in controlling intercell interference. The tilt is infield adjustable 0-10 deg.**
- **High Suppression of all Upper Sidelobes (Typically <-20dB).**
- **Gain difference between UL and DL <1dB.**
- **Azimuth horizontal beamwidth difference <7deg between UL and DL (1710-1755 & 2110-2155).**
- **Dual polarization; Broadband design.**
- **Low profile for low visual impact.**

Technical Specifications

Electrical Specifications

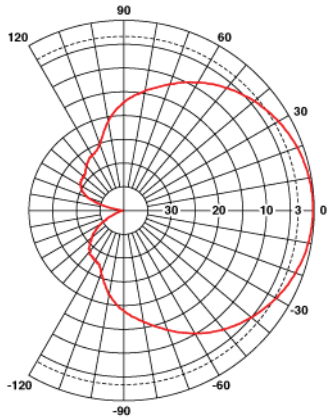
Frequency Range, MHz	1710-2200
Antenna Type	Panel Dual Polarized
Electrical Down Tilt Option	Variable
Gain, dBi (dBd)	18.8 (16.7) Avg. across band
Electrical Downtilt, deg	0-10
Horizontal Beamwidth, deg	65 ±5 (65.1 average across band)
VSWR	< 1.5:1
Vertical Beamwidth, deg	4.5 to 5.5
Upper Sidelobe Suppression, dB	Typically >20
Polarization	Dual pol +/-45°
Front-To-Back Ratio, dB	> 26 (Typically 29)
Maximum Power Input, W	300
Isolation between Ports, dB	> 30
Lightning Protection	Direct Ground
3rd Order IMP @ 2 x 43 dBm, dBc	> 150 (155 Typical)
7th Order IMP @ 2x38 dBm, dBc	> 170



Vertical Pattern

Mechanical Specifications

Rated Wind Speed, km/h (mph)	160 (100)
Survival Wind Speed, km/h (mph)	200 (125)
Max Wind Loading Area, m² (ft²)	0.31 (3.3)
Maximum Thrust @ Rated Wind, N (lbf)	558 (125)
Front Thrust @ Rated Wind, N (lbf)	558 (125)
Reflector Material	Aluminum
Radiating Element Material	Brass
Radome Material	Fiberglass
Connector Type	(2) 7-16 DIN Female
Connector Location	Bottom
Mount Type	Downtilt
Mounting Hardware	APM40-2
Weight w/o Mtg Hardware, kg (lb)	12 (26.4)
Packing Dimensions, HxWxD, mm (in)	2021 x 260 x 200 (79.5 x 10.2 x 7.8)
Overall Length, m (ft)	1.85 (6.0)
Dimensions - HxWxD, mm (in)	1850 x 175 x 80 (72.0 x 6.8 x 3.15)
Shipping Weight without mounting hardware, kg (lb)	12 (26.4)



Horizontal Pattern

All information contained in the present datasheet is subject to confirmation at time of ordering.

Technical Data Sheet **SC2-W100AB**

CompactLine Easy Antenna, Single Polarized, 2 ft
10.0 - 11.7 GHz

Product Description

RFS CompactLine® Easy Antennas are designed for short-haul microwave systems in all common frequency ranges from 7 GHz to 42 GHz. The antennas are cost-effective products for microwave point-to-point transmission links in cellular and private user networks. Antennas are available in 2ft (0.6m) diameters. The modified cassegrain feed system with the deep dish reflector design results in an antenna with reduced environmental impact, weight and tower load. The antennas are available in single polarised (SC) as well as in dual polarised versions (SCX). All antennas include a solid broadband radome which minimises its impact on the antenna's electrical characteristics. The antennas meet the ultra high performance radiation characteristic.

Antenna

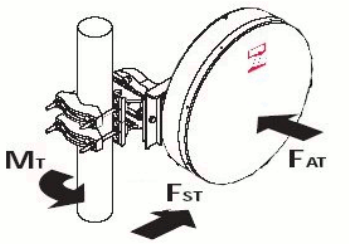
Technical Features

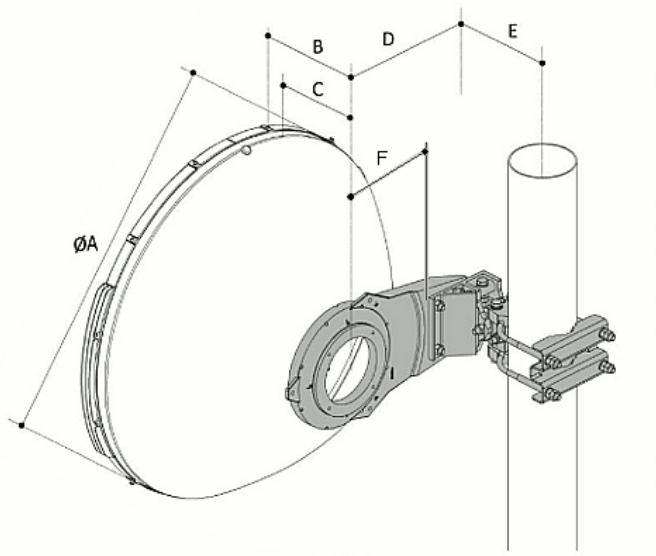
Product Type	Point to point antennas
Frequency, GHz	10.0 - 11.7
Diameter, ft (m)	2 (0.6)
Profile	CompactLineEasy
Performance	Ultra High
Polarization	Single
Regulatory Compliance	Standard, EN 302217, FCC
3dB beamwidth, (degrees)	3.2
Antenna Input	PBR100
Low Band Gain, dBi	33.8
Mid Band Gain, dBi	34.5
High Band Gain, dBi	35.2
F/B Ratio, dB	61
XPD, dB	30
Max VSWR / R L, dB	1.38 / 16.0
FCC Standard	A @ 10.55-10.68 and B @ 10.7 - 11.7
ETSI Standard	Range 1, class 3
Elevation Adjustment, degrees	± 20
Azimuth Adjustment, degrees	± 10
Polarization Adjustment, degrees	± 5
Pressure, bar (psi)	0.3 (4.3)
Radome	Included
Antenna color	White
Mounting Pipe Diameter minimum, mm (in)	48 (1.9)
Mounting Pipe Diameter maximum, mm (in)	114 (4.5)
Approximate Weight, kg (lb)	10 (22.0)
Survival Windspeed, km/h (mph)	252 (156)
Operational Windspeed, km/h (mph)	164 (102)

All information contained in the present datasheet is subject to confirmation at time of ordering

CompactLine Easy Antenna, Single Polarized, 2 ft
10.0 - 11.7 GHz

F_{ST} Side force max. at 110 km/h (68 mph), N (lb)	136 (31)
F_{AT} Axial force max. at 110 km/h (68 mph), N (lb)	274 (62)
M Torque max. at 110 km/h (68 mph), Nm (ft lb)	79 (58)
F_{ST} Side force max. at 200 km/h (125 mph), N (lb)	448 (101)
F_{AT} Axial force max. at 200 km/h (125 mph), N (lb)	905 (203)
M Torque max. at 200 km/h (125 mph), Nm (ft lb)	262 (193)





All dimensions in mm (in)

ØA	B	C	ØD for mounting pipe diam. 219 (8.5)	114 (4.5)	89 (3.5)	51 (2.0)	E	F
670 (26.4)	293 (11.5)	254 (10)		293 (11.4)	293 (11.4)	293 (11.4)	123 (4.8)	100 (3.9)

Notes

no notes

Documentation

RPE (10.55-10.68 GHz) (NSMA format)
SC2-W100A (10.55-10.68 GHz), 110805.txt
RPE (10.55-10.68 GHz) (PDF format)
SC2-W100A (10.55-10.68 GHz), 110805.pdf

Radiation pattern: (NSMA format)
SC2-W100A (10.0-11.7 GHz), 110803.txt
Radiation pattern: (PDF Format)
SC2-W100A (10.0-11.7 GHz), 110803.pdf

All information contained in the present datasheet is subject to confirmation at time of ordering

RRUS 11

Frequency (AT&T)
- ✓ Band 12 (Lower 700 MHz)
- ✓ Band 4 (AWS, 17/2100 MHz) — 2Q2011

RF Characteristics
- ✓ Output power: 2x30 Watts
- ✓ 2x2 MIMO Capable
- ✓ IBW of 20 MHz
- ✓ Rx Sens.: Better than -105 dBm (5 MHz)

RET/TMA Support
- ✓ AISG 2.0 Compatible
- ✓ Via RET Port and Centre Conductor
- ✓ Cascading
- ✓ 30 VDC Bias

Environmental
- ✓ Self Convection
- ✓ Temperature -40 to 131 F

Power
- ✓ Input voltage: -48 VDC or AC (exemption)
- ✓ Fuse size: 13 – 32 A
  - Recommended: 25 A
- ✓ Power Consumption:
  - Typical 200 Watts
  - Max 310 Watts
  - Excl. RET and TMA load

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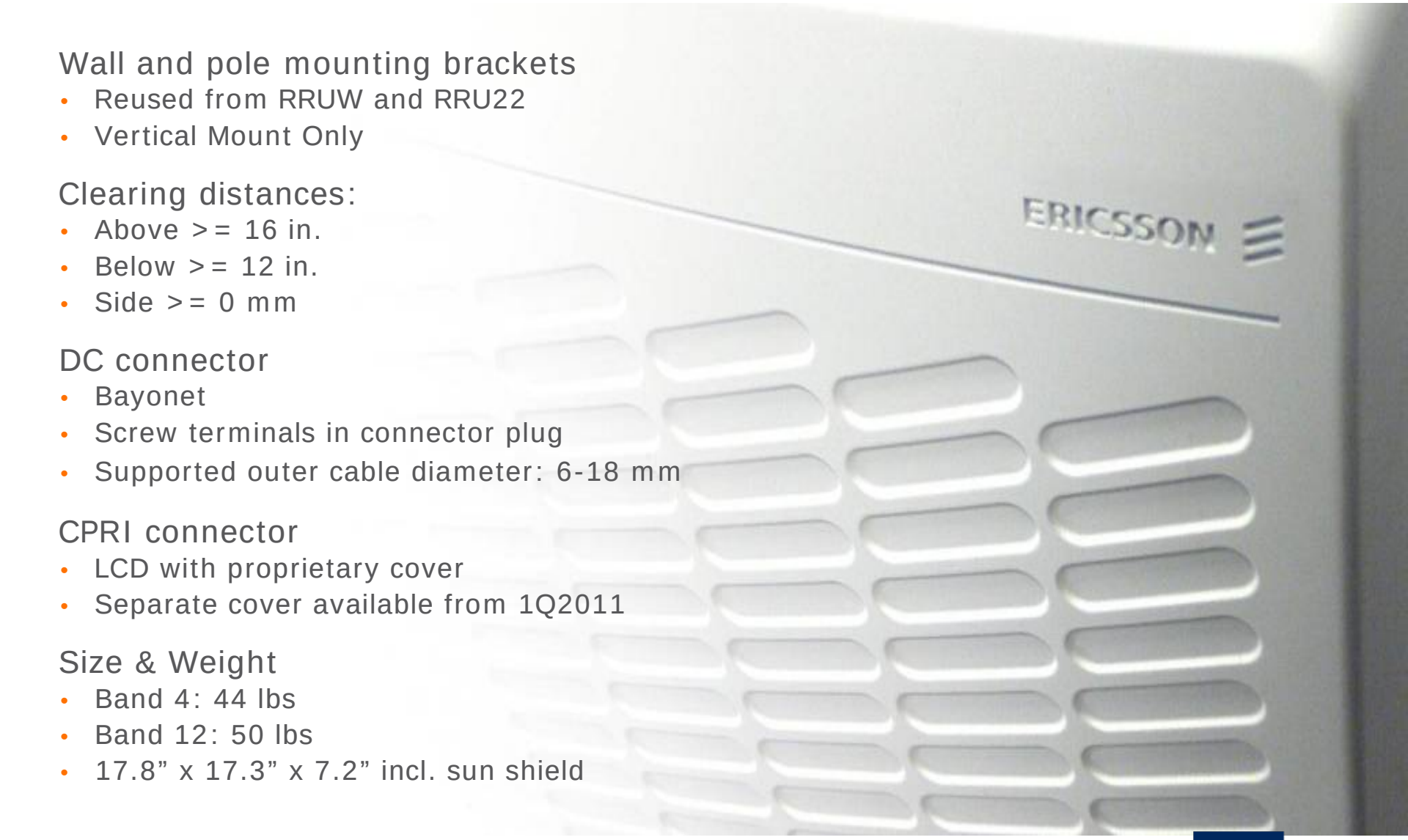
RRUS 11 Mechanics



Wall and pole mounting brackets
- Reused from RRUW and RRU22
- Vertical Mount Only

Clearing distances:
- Above >= 16 in.
- Below >= 12 in.
- Side >= 0 mm

DC connector
- Bayonet
- Screw terminals in connector plug
- Supported outer cable diameter: 6-18 mm

CPRI connector
- LCD with proprietary cover
- Separate cover available from 1Q2011

Size & Weight
- Band 4: 44 lbs
- Band 12: 50 lbs
- 17.8” x 17.3” x 7.2” incl. sun shield

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Transcend Wireless

10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

Letter of Authorization

Site: Tower at 36 Lower Road, North Canaan, CT 06024

Owner: Litchfield County Dispatch, Inc.

Lessee: T-Mobile Northeast LLC

Litchfield County Dispatch, Inc., owner of the tower facility located at the address identified above (the "Tower Facility"), do hereby authorize T-Mobile Northeast LLC, its successors and assigns, and/or its agent, (collectively, the "Lessee") to act as our non-exclusive agent for the sole purpose of filing and consummating any land-use, zoning, or building permit application(s) as may be required by the applicable permitting authorities for Lessee's telecommunications' installations.

We understand that this application may be denied, modified or approved with conditions. The above authorization is limited to the acceptance by Lessee only of conditions related to Lessee's installation and any such conditions of approval or modifications will be Lessee's sole responsibility.

Signature: _____

Print Name: Daniel Soule

Date: 3/22/18

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CTNH550A

CTNH550A
38 Lower Road
North Canaan, CT 06024

March 28, 2018

EBI Project Number: 6218001819

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	15.11 %

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

EBI Consulting
environmental | engineering | due diligence

March 28, 2018

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

Emissions Analysis for Site: **CTNH550A – CTNH550A**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **38 Lower Road, North Canaan, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 700 MHz Band is approximately 467 $\mu W/cm^2$, and the general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz microwave bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **38 Lower Road, North Canaan, 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 and 20 dB for highly focused parabolic microwave dishes, 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) 2 UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

3) 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

4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

5) 1 microwave backhaul channel (11 GHz) was considered for the proposed facility. This channel has a transmit power of 1 Watt.

6) 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.

7) 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 and 20 dB for highly focused parabolic microwave dishes, 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.

8) The antennas used in this modeling are the **Ericsson AIR32 B66A/B2A** & **RFS APXV18-206517S-C-A20** for 1900 MHz (PCS) and 2100 MHz (AWS) channels, the **RFS APXVAA24-43-U-A20** for 700 MHz channels and the **RFS SC2-W100AB** for the 11 GHz microwave backhaul. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR32 B66A/B2A** has a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **RFS APXV18-206517S-C-A20** has a maximum gain of **16.69 dBd** at its main lobe at 1900 MHz. The **RFS APXVAA24-43-U-A20** has a maximum gain of **13.55 dBd** at its main lobe at 700 MHz. The **RFS SC2-W100AB** has a maximum gain of **32.35 dBd** at its main lobe at 11 GHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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.

9) The antenna mounting height centerline of the proposed panel and microwave antennas is **125 feet** above ground level (AGL).

10) 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.

11) 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	Sector:	D
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR32 B66A/B2A	Make / Model:	Ericsson AIR32 B66A/B2A	Make / Model:	Ericsson AIR32 B66A/B2A	Make / Model:	Ericsson AIR32 B66A/B2A
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	125	Height (AGL):	125	Height (AGL):	125	Height (AGL):	125
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	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	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	9,337.08
Antenna A1 MPE%	**2.37**	Antenna B1 MPE%	**2.37**	Antenna C1 MPE%	**2.37**	Antenna D1 MPE%	**2.37**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXV18-206517S-C-A20	Make / Model:	RFS APXV18-206517S-C-A20	Make / Model:	RFS APXV18-206517S-C-A20	Make / Model:	RFS APXV18-206517S-C-A20
Gain:	16.69 dBd	Gain:	16.69 dBd	Gain:	16.69 dBd	Gain:	16.69 dBd
Height (AGL):	125	Height (AGL):	125	Height (AGL):	125	Height (AGL):	125
Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)
Channel Count	2	Channel Count	2	Channel Count	2	Channel Count	2
Total TX Power(W):	60	Total TX Power(W):	60	Total TX Power(W):	60	Total TX Power(W):	60
ERP (W):	2,806.41	ERP (W):	2,806.41	ERP (W):	2,806.41	ERP (W):	2,806.41
Antenna A2 MPE%	**0.71**	Antenna B2 MPE%	**0.71**	Antenna C2 MPE%	**0.71**	Antenna D2 MPE%	**0.71**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVAA24-43-U-A20	Make / Model:	RFS APXVAA24-43-U-A20	Make / Model:	RFS APXVAA24-43-U-A20	Make / Model:	RFS APXVAA24-43-U-A20
Gain:	13.55 dBd	Gain:	13.55 dBd	Gain:	13.55 dBd	Gain:	13.55 dBd
Height (AGL):	125	Height (AGL):	125	Height (AGL):	125	Height (AGL):	125
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power(W):	30	Total TX Power(W):	30	Total TX Power(W):	30	Total TX Power(W):	30
ERP (W):	679.39	ERP (W):	679.39	ERP (W):	679.39	ERP (W):	679.39
Antenna A3 MPE%	**0.37**	Antenna B3 MPE%	**0.37**	Antenna C3 MPE%	**0.37**	Antenna D3 MPE%	**0.37**

Microwave Backhaul Data

Make / Model:	Gain	Height (AGL):	Frequency Bands	Channel Count	Total TX Power(W)	ERP (W)	MPE %	Sector
RFS SC2-W100AB	32.35 dBd	125	11 GHz	1	1	1,717.91	**0.04**	A

Site Summary Tables

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Sector A)	**3.49%**
CT State Police	2.48 %
LCD	1.65 %
CL&P	2.17 %
Arch	0.45 %
Town of No. Canaan	0.49 %
Sprint	0.38 %
AT&T	2.42 %
Verizon Wireless	1.18 %
Nextel	0.40%
Site Total MPE %:	**15.11%**

T-Mobile Sector A Total:	3.49 %
T-Mobile Sector B Total:	3.45 %
T-Mobile Sector C Total:	3.45 %
T-Mobile Sector D Total:	3.45 %
Site Total:	15.11%

T-Mobile Max Power Values - Sector A

T-Mobile _Max Power Values (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	125	11.85	AWS - 2100 MHz	1000	1.19%
T-Mobile PCS - 1900 MHz LTE	2	2,334.27	125	11.85	PCS - 1900 MHz	1000	1.19%
T-Mobile PCS - 1900 MHz UMTS	2	1,403.21	125	7.12	PCS - 1900 MHz	1000	0.71%
T-Mobile 700 MHz LTE	1	679.39	125	1.72	700 MHz	467	0.37%
T-Mobile 11 GHz Microwave	1	1,717.91	125	0.44	11 GHz	1000	0.04%
						Total:	**3.49%**

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:	3.49%
Sector B:	3.45%
Sector C:	3.45%
Sector D:	3.45%
T-Mobile Per Sector Maximum (Sector A):	3.49%
Site Total:	15.11%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **15.11%** 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.

UPS Internet Shipping: View/Print Label

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.

2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.

3. **GETTING YOUR SHIPMENT TO UPS**
   Customers with a Daily Pickup
   Your driver will pickup your shipment(s) as usual.

   Customers without a Daily Pickup
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the 'Find Locations' Quick link at ups.com.
   Schedule a same day or future day Pickup to have a UPS driver pickup all of your Internet Shipping packages. Hand the package to any UPS driver in your area.

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RAMSEY ,NJ 07446

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74 LAFAYETTE AVE
SUFFERN ,NY 10901

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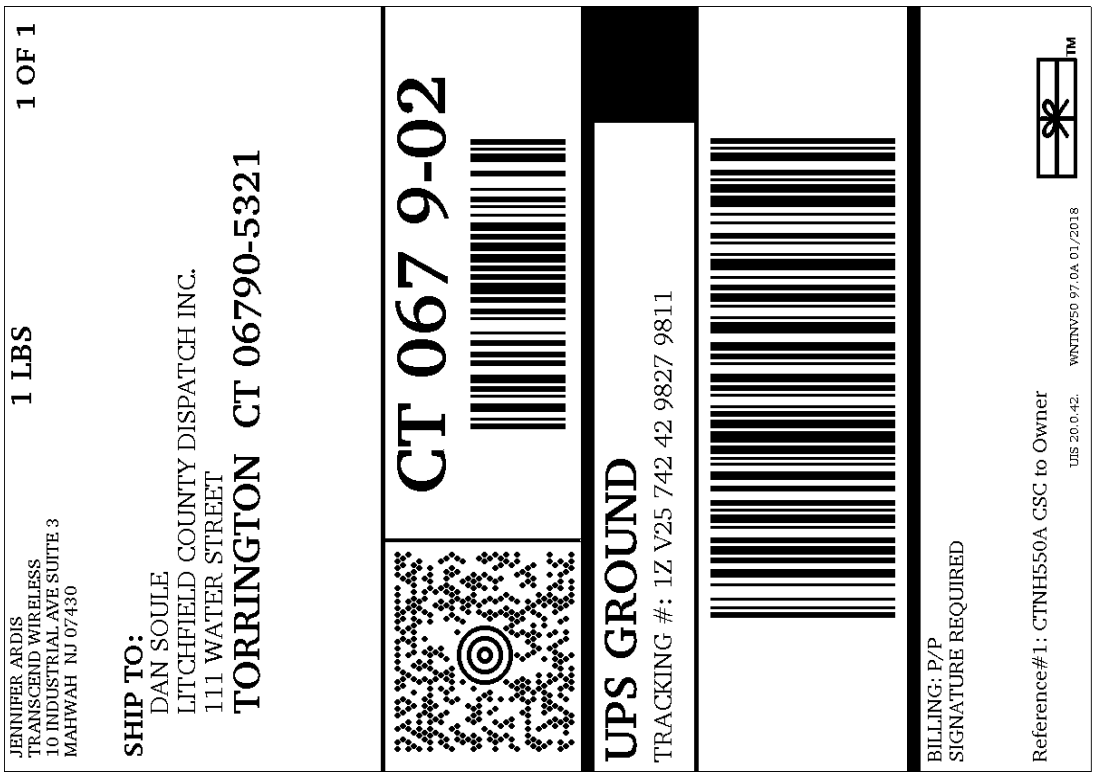

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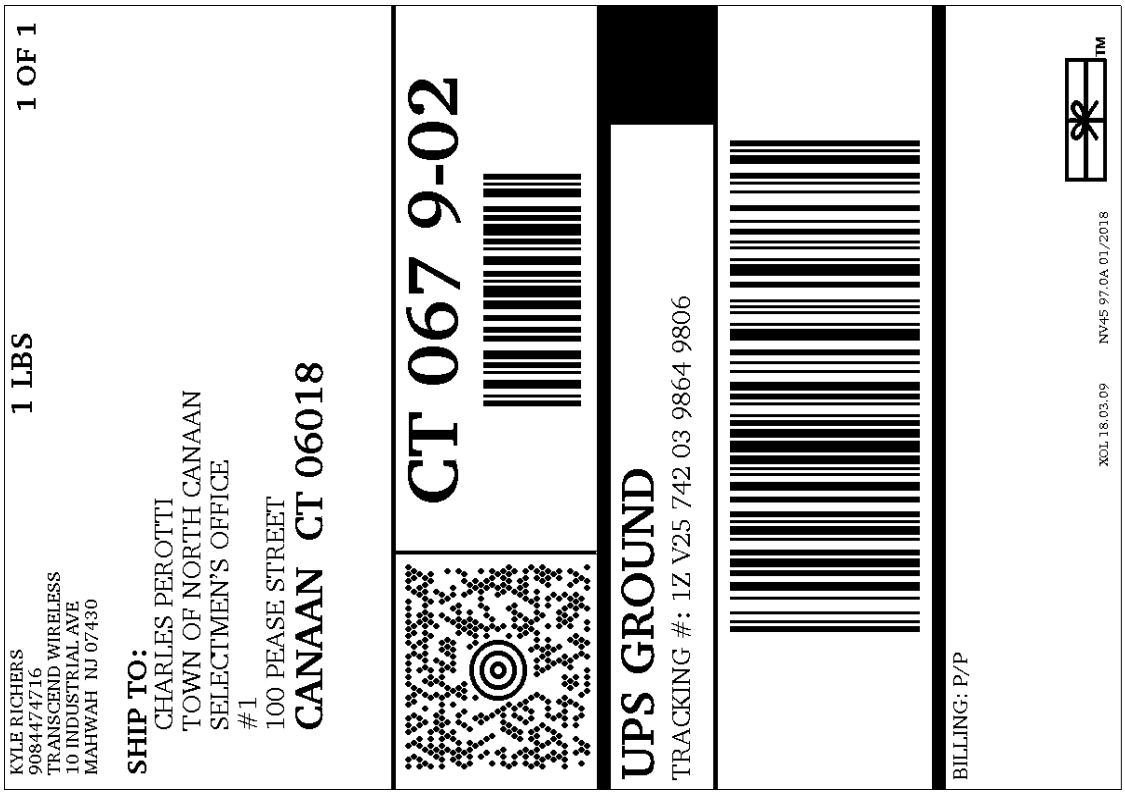

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   Customers without a scheduled Pickup
   - Schedule a Pickup on ups.com to have a UPS driver pickup all of your packages.
   - Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. To find the location nearest you, please visit the 'Locations' Quick link at ups.com.

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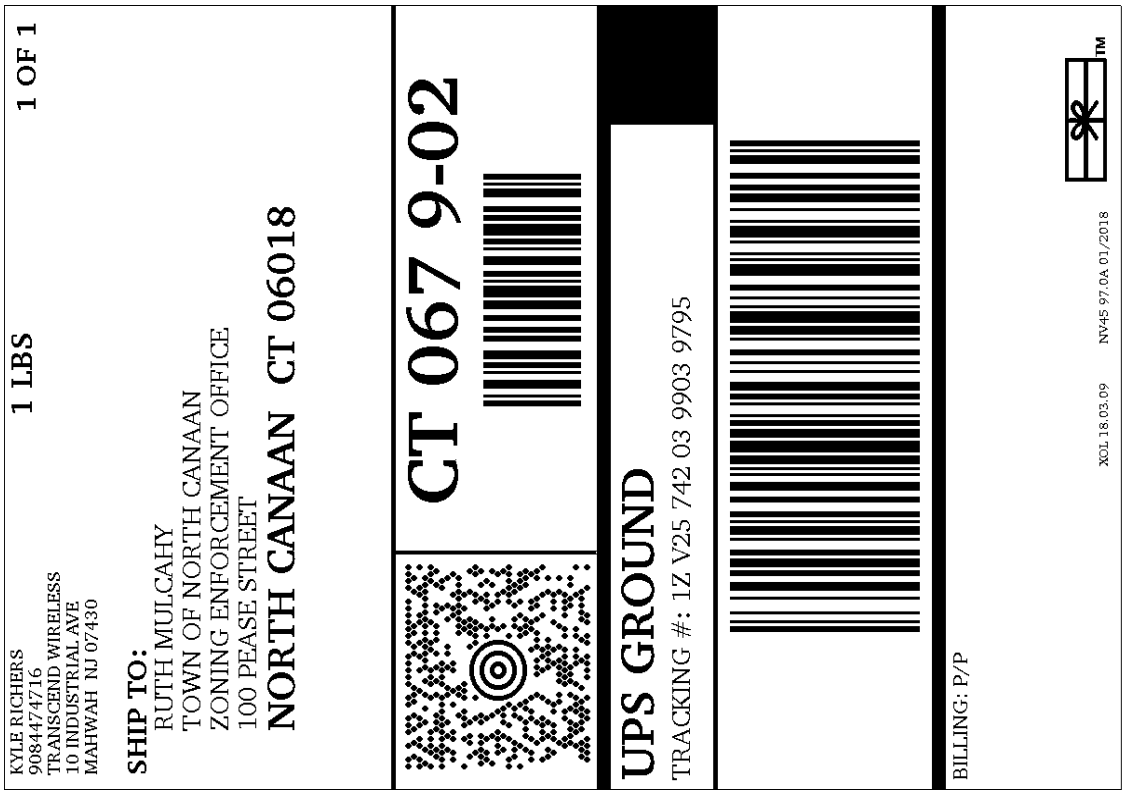

Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Monday, April 9, 2018 2:03 PM
To: krichers@transcendwireless.com
Subject: UPS Delivery Notification, Tracking Number 1ZV257420399039795

Your package has been delivered.

Delivery Date: Monday, 04/09/2018
Delivery Time: 01:59 PM

At the request of TRANSCEND WIRELESS this notice alerts you that the status of the shipment listed below has changed.

Shipment Detail

Tracking Number:	1ZV257420399039795
Ship To:	Ruth Mulcahy Town of North Canaan 100 PEASE ST CANAAN, CT 06018 US
UPS Service:	UPS GROUND
Number of Packages:	1
Weight:	1.0 LBS
Delivery Location:	RECEIVER DUNTS

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Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Monday, April 9, 2018 12:33 PM
To: krichers@transcendwireless.com
Subject: UPS Delivery Notification, Reference Number 1: CTNH550A CSC to Owner

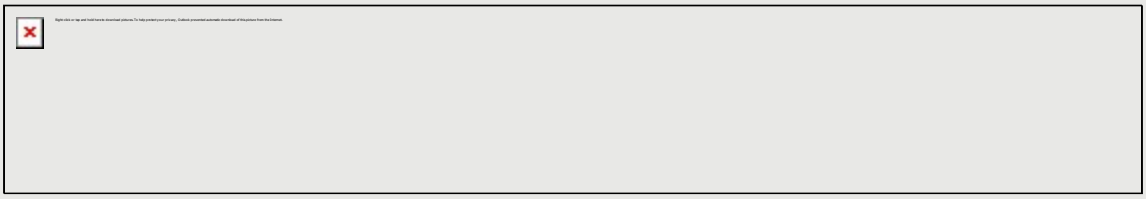
Your package has been delivered.

Delivery Date: Monday, 04/09/2018
Delivery Time: 12:26 PM

At the request of TRANSCEND WIRELESS this notice alerts you that the status of the shipment listed below has changed.

Shipment Detail

Tracking Number:	1ZV257424298279811
Ship To:	Dan Soule Litchfield County Dispatch Inc. 111 WATER ST TORRINGTON, CT 06790 US
UPS Service:	UPS GROUND
Number of Packages:	1
Weight:	1.0 LBS
Delivery Location:	RECEIVER ZAVIKAI
Signature Required:	A signature is required for package delivery
Reference Number 1:	CTNH550A CSC to Owner



Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Monday, April 9, 2018 2:03 PM
To: krichers@transcendwireless.com
Subject: UPS Delivery Notification, Tracking Number 1ZV257420398649806

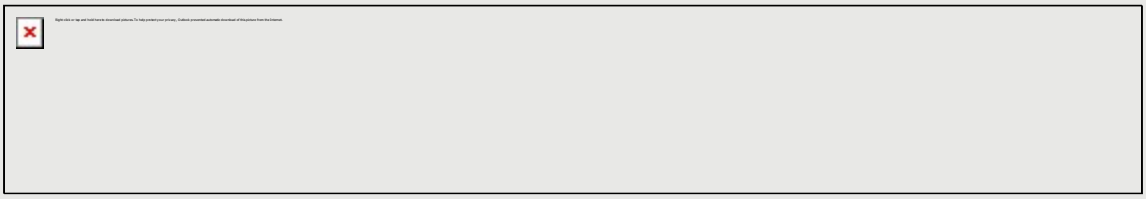
Your package has been delivered.

Delivery Date: Monday, 04/09/2018
Delivery Time: 01:59 PM

At the request of TRANSCEND WIRELESS this notice alerts you that the status of the shipment listed below has changed.

Shipment Detail

Tracking Number:	1ZV257420398649806
Ship To:	Charles Perotti Town of North Canaan 100 PEASE ST CANAAN, CT 06018 US
UPS Service:	UPS GROUND
Number of Packages:	1
Weight:	1.0 LBS
Delivery Location:	RECEIVER DUNTS



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