COHEN and WOLF P.C.
ATTORNEYS AT LAW

JULIE D. KOHLER

PLEASE REPLY TO: Bridgeport
WRITER'S DIRECT DIAL: (203) 337-4157
E-Mail Address: jkohler@cohenandwolf.com

June 11, 2015

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

Re: Notice of Exempt Modification
Connecticut State Police/T-Mobile equipment upgrade
Site ID CT11033E
315 Spencer Plains Road, Westbrook. CT

Dear Attorney Bachman:

This office represents T-Mobile Northeast LLC ("T-Mobile") and has been retained to file exempt modification filings with the Connecticut Siting Council on its behalf.

In this case, the Connecticut State Police ("State Police") owns the 180 foot self supporting lattice tower and related facility at 315 Spencer Plains Road, Connecticut (latitude 41.29244 / longitude -72.430454). T-Mobile intends to replace three (3) antennas and add related equipment at this existing telecommunications facility in Westbrook ("Westbrook Facility"). Please accept this letter as notification, pursuant to R.C.S.A. § 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the First Selectman, Noel Bishop and the property owner, the State of Connecticut.

The existing Westbrook Facility consists of a 180 foot self supporting lattice tower.[1] The Facility currently supports the equipment of T-Mobile at a centerline of 130 feet.

T-Mobile plans to add replace three (3) antennas and three bias-T units at a centerline of 130 feet. It also proposes to remove six (6) existing 1-1/4" coax cable and replace with twelve (12) 7/8" coax cable. Finally, T-Mobile proposes to mount three (3) RRUs (remote radio units) on an existing H-frame at ground level. (See the plans revised to June 8, 2015 attached

[1] The online Connecticut Siting Council database does not include a Petition of Docket approval for this Facility. It does however indicate several notices of intent, the most captioned EM-SPRINT-154-131011, TS-CL&P-154-121022 and EM-T-MOBILE-154-110726.

hereto as Exhibit A). The existing Facility is structurally capable of supporting T-Mobile's proposed modifications, as indicated in the structural analysis dated May 22, 2015 and attached hereto as Exhibit B.[2]

The planned modifications to the Westbrook Facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modification will not increase the height of the tower. T-Mobile's replacement and additional equipment will be installed at the 130 foot level. The enclosed tower drawing confirms that the proposed modification will not increase the height of the tower.

2. The proposed modifications will not require an extension of the site boundaries. T-Mobile's equipment will be located entirely within the existing compound and equipment pad as shown on Sheet A-1 of Exhibit A.

3. The proposed modification to the Facility will not increase the noise levels at the existing facility by six decibels or more.

4. The operation of the replacement antennas will not increase the total radio frequency (RF) power density, measured at the base of the tower, to a level at or above the applicable standard. According to a Radio Frequency Emissions Analysis Report prepared by EBI dated May 29, 2015 T-Mobile's operations would add 8.57% of the FCC Standard. Therefore, the calculated "worst case" power density for the planned combined operation at the site including all of the proposed antennas would be 75.91% of the FCC Standard as calculated for a mixed frequency site as evidenced by the engineering exhibit attached hereto as Exhibit C.

For the foregoing reasons, T-Mobile respectfully submits that the proposed replacement and equipment at the Westbrook Facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Upon acknowledgement by the Council of this proposed exempt modification, T-Mobile shall commence construction approximately sixty days from the date of the Council's notice of acknowledgement.

Sincerely,

Julie D. Kohler, Esq.

[2] Modifications to the structure are necessary for the Facility to support T-Mobile's proposed equipment upgrades. Those structural modifications will be implemented as set forth in SK-1 through Sk-4 of the Structural Analysis, prior to the installation of new equipment.

cc: Town of Westbrook, First Selectman Noel Bishop
Connecticut State Police
State of Connecticut
Sheldon Freincle, NSS

EXHIBIT A

T-MOBILE NORTHEAST LLC

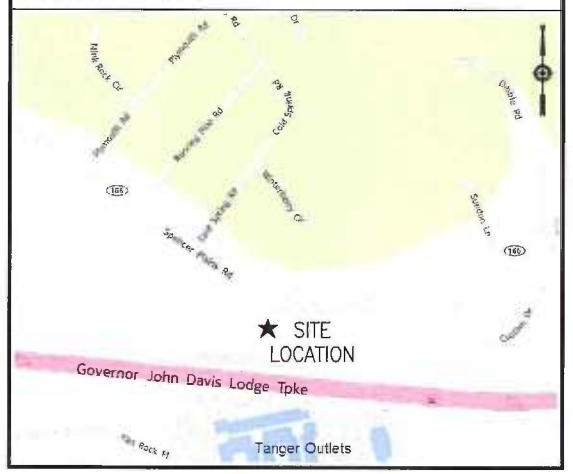
SITE #: CT11033E

SITE NAME: CT STATE POLICE_1

SITE ADDRESS:
315 SPENCER PLAINS RD
WESTBROOK, CT 06498

WIRELESS BROADBAND FACILITY
CONSTRUCTION DRAWINGS
(704BU CONFIGURATION)

VICINITY MAP



★ SITE LOCATION

DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

CALL BEFORE YOU DIG:

WWW.CBYD.COM

CALL 800 922 4455, OR 811

CALL THREE WORKING DAYS PRIOR TO DIGGING

SAFETY PRECAUTIONS SHALL BE IMPLEMENTED BY CONTRACTOR(S) AT ALL TRENCHING IN ACCORDANCE WITH CURRENT OSHA STANDARDS.

COLOR CODE FOR UTILITY LOCATIONS

ELECTRIC	– RED	SEWER	– GREEN
GAS/OIL	– YELLOW	SURVEY	– PINK
TEL/CATV	– ORANGE	PROPOSED EXCAVATION	– WHITE
WATER	– BLUE	RECLAIMED WATER	– PURPLE

GENERAL NOTES

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES. RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES.
2. THE ARCHITECT/ENGINEER HAVE MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONSTRUCT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.
3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE T–MOBILE REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF THE CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK. IN THE EVENT OF DISCREPANCIES, THE CONTRACTOR SHALL PRICE THE MORE COSTLY OR EXPENSIVE WORK, UNLESS DIRECTED IN WRITING OTHERWISE.
4. THE SCOPE OF WORK SHALL INCLUDE FURNISHING OF ALL MATERIALS, EQUIPMENT, LABOR AND ALL OTHER MATERIALS AND LABOR DEEMED NECESSARY TO COMPLETE THE WORK/PROJECT AS DESCRIBED HEREIN.
5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
6. THE CONTRACTOR SHALL OBTAIN AUTHORIZATION TO PROCEED WITH CONSTRUCTION PRIOR TO STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED BY THE CONSTRUCTION DRAWINGS/CONTRACT DOCUMENTS.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S/VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.
8. THE CONTRACTOR SHALL PROVIDE A FULL SET OF CONSTRUCTION DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS AND ADDENDUM OR CLARIFICATIONS AVAILABLE FOR THE USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT.
9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER CONTRACT.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY PERMITS AND INSPECTIONS WHICH ARE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY, OR LOCAL GOVERNMENT AUTHORITY.
11. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING, ETC., DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.
12. THE CONTRACTOR SHALL KEEP THE GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT, DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON PROPERTY. PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.
13. THE CONTRACTOR SHALL COMPLY WITH ALL OSHA REQUIREMENTS, AS WELL AS THE LATEST EDITIONS OF ANY PERTINENT STATE SAFETY REGULATIONS.
14. THE CONTRACTOR SHALL NOTIFY THE T–MOBILE REPRESENTATIVE WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE T–MOBILE REPRESENTATIVE.
15. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC., ON THE JOB.
16. THE CONTRACTOR SHALL RETURN ALL DISTURBED AREAS TO THEIR ORIGINAL CONDITION AT THE COMPLETION OF WORK.
17. ATLANTIS GROUP, INC. HAS NOT CONDUCTED A STRUCTURAL ANALYSIS FOR THIS PROJECT AND DOES NOT ASSUME ANY LIABILITY FOR THE ADEQUACY OF THE STRUCTURE AND COMPONENTS.
18. REFER TO STRUCTURAL ANALYSIS DOCUMENT ENTITLED, "DETAILED STRUCTURAL ANALYSIS AND MODIFICATION OF AN EXISTING 180' SELF SUPPORTING LATTICE TOWER AND FOUNDATION FOR PROPOSED ANTENNA ARRANGEMENT " PREPARED BY AECOM, "T–MOBILE SITE ID CT11033E", DATED MAY 22, 2015.

SITE INFORMATION

SITE NUMBER:	CT11033E
SITE NAME:	CT STATE POLICE_1
SITE ADDRESS:	315 SPENCER PLAINS RD WESTBROOK, CT 06498
LAT./LONG.:	N 41.6708/ W –72.8711
JURISDICTION:	MIDDLESEX COUNTY, CT
PROPERTY OWNER:	JURISDICTION STATE OF CT PAUL ZITO PUBLIC SAFETY DIRECTOR OF TELECOMMUNICATIONS CT DEPARTMENT OF EMERGENCY SERVICES AND PUBLIC PROTECTION DIVISION OF STATE POLICE 1111 COUNTRY CLUB ROAD MIDDLETOWN, CT 06457 860–685–8280 – OFFICE 860–685–8345 – FAX 860–305–5275 – CELL 860–685–8008 24/7 EMERGENCIES

CODE COMPLIANCE

CONNECTICUT STATE BUILDING CODE

2005 CONNECTICUT BUILDING CODE WITH 2013 AMENDMENT
2011 NATIONAL ELECTRICAL CODE

CONSTRUCTION TYPE: 2B USE GROUP: N/A

PROJECT SUB–CONTRACTORS

APPLICANT:	T–MOBILE NORTHEAST, LLC. 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 (860) 692–7100
PROJECT MANAGER	LISA LIN ALLEN NORTHEAST SITE SOLUTIONS 54 MAIN STREET STURBRIDGE, MA 01566 (508) 434–5237
ARCHITECT/ENGINEER:	ATLANTIS GROUP INC. 1340 CENTRE STREET SUITE 212 NEWTON CENTER, MA 02459 (617) 965–0789

SHEET INDEX

SHEET	DESCRIPTION
T–1	TITLE SHEET
N–1	GENERAL AND ELECTRICAL NOTES
A–1	SITE PLAN AND ELEVATION
A–2	DETAILS
E–1	GROUNDING AND COAX/FIBER DIAGRAM
E–2	GROUNDING DETAILS
SK1–4	TOWER REINFORCEMENT DRAWINGS (BY OTHERS)

T-MOBILE NORTHEAST, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 692-7100
FAX:(860) 692-7159

ATLANTIS GROUP
1340 Centre Street, Suite 212
Newton Center, MA 02459
Office: 617–965–0789
Fax: 617–213–5056

SUBMITTALS

DATE	DESCRIPTION	REVISION
05/03/15	ISSUED FOR REVIEW	A
05/06/15	REVISION	0

DEPT.	DATE	APP'D	REVISIONS
RFE			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO:	CT11033E
DRAWN BY:	FG
CHECKED BY:	SM

PROFESSIONAL SEAL

SITE NUMBER
CT11033E
SITE NAME
CT STATE POLICE_1
SITE ADDRESS
315 SPENCER PLAINS RD
WESTBROOK, CT 06498

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

ELECTRICAL NOTES:

WORK INCLUDED

1. INCLUDE ALL LABOR, MATERIALS, EQUIPMENT, PLANT SERVICES AND ADMINISTRATIVE TASKS REQUIRED TO COMPLETE AND MAKE OPERABLE THE ELECTRICAL WORK SHOWN ON THE DRAWINGS AND SPECIFIED HEREIN, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
   A. PREPARE AND SUBMIT SHOP DRAWINGS, DIAGRAMS AND ILLUSTRATIONS.
   B. PROCURE ALL NECESSARY PERMITS AND APPROVALS AND PAY ALL REQUIRED FEES AND CHARGES IN CONNECTION WITH THE WORK OF THIS CONTRACT.
   C. SUBMIT AS-BUILT DRAWINGS, OPERATING AND MAINTENANCE INSTRUCTIONS AND MANUALS.
   D. EXECUTE ALL CUTTING, DRILLING, ROUGH AND FINISH PATCHING OF EXISTING OR NEWLY INSTALLED CONSTRUCTION REQUIRED FOR THE WORK OF THIS CONTRACT. FOR SLAB PENETRATIONS THROUGH POST TENSION SLABS, X-RAY EXACT AREA OF PENETRATION PRIOR TO PERFORMING WORK. COORDINATE ALL X-RAY WORK WITH BUILDING ENGINEER.
   E. PROVIDE HANGERS, SUPPORTS, FOUNDATIONS, STRUCTURAL FRAMING SUPPORTS, AND BASES FOR CONDUIT AND EQUIPMENT PROVIDED OR INSTALLED UNDER THE WORK OF HIS CONTRACT. PROVIDE COUNTER FLASHING, SLEEVES AND SEALS FOR FLOOR AND WALL PENETRATIONS.
   F. MAINTAIN ALL EXISTING ELECTRICAL SERVICES IN THE BUILDING AREAS NOT AFFECTED BY THE ALTERATION DURING THE PROGRESS OF THE WORK INCLUDING PROVIDING ALL TEMPORARY JUMPERS, CONDUITS, CAPS, PROTECTIVE DEVICES, CONNECTIONS AND EQUIPMENT REQUIRED. PROVIDE TEMPORARY LIGHT AND POWER FOR CONSTRUCTION PURPOSES.
2. IT IS THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS TO CALL FOR AN INSTALLATION THAT IS COMPLETE IN EVERY RESPECT. IT IS NOT THE INTENT TO GIVE EVERY DETAIL ON THE DRAWINGS AND IN THE SPECIFICATIONS. IF AN ITEM OF WORK IS INDICATED IN THE DRAWINGS, IT IS CONSIDERED SUFFICIENT FOR INCLUSION IN THE CONTRACT. FURNISH AND INSTALL ALL MATERIAL AND EQUIPMENT USUALLY FURNISHED OR NEEDED TO MAKE A COMPLETE INSTALLATION WHETHER OR NOT SPECIFICALLY MENTIONED IN THE CONTRACT DOCUMENTS.

GENERAL REQUIREMENTS

1. PROVIDE ALL WORK IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) AND LOCAL AND STATE ELECTRICAL CODES.
2. THE ELECTRICAL PLANS ARE DIAGRAMMATIC ONLY. REFER TO THE ARCHITECTURAL PLANS FOR THE EXACT DIMENSIONS OF THE BUILDING.
3. LOAD CALCULATIONS ARE BASED ON EXISTING BUILDING INFORMATION/DRAWINGS PROVIDED TO ENGINEERING. CONTRACTOR IS TO VERIFY ALL EXISTING RATINGS AND LOADS PRIOR TO PURCHASING OF SPECIFIED EQUIPMENT FOR COMPLIANCE TO NEC. CONTRACTOR TO NOTIFY ENGINEER OF ANY DISCREPANCIES AND REQUEST FURTHER DIRECTION BY ENGINEER.
4. EXISTING BUILDING EQUIPMENT IS NOTED ON THE DRAWINGS. NEW OR RELOCATED EQUIPMENT IS SHOWN WITH SOLID LINES. FUTURE EQUIPMENT (NOT IN THIS CONTRACT) IS DEPICTED WITH SHADED LINES. REQUEST CLARIFICATION OF DRAWINGS OR OF SPECIFICATIONS PRIOR TO PRICING OR INSTALLATION.
5. GENERAL
   A. AFTER CAREFULLY STUDYING THE DRAWINGS AND SPECIFICATIONS, AND BEFORE SUBMITTING THE PROPOSAL, MAKE A MANDATORY SITE VISIT TO ASCERTAIN CONDITIONS OF THE SITE, AND THE NATURE AND EXACT QUANTITY OF WORK TO BE PERFORMED. NO EXTRA COMPENSATION WILL BE ALLOWED FOR FAILURE TO NOTIFY THE OWNER, IN WRITING, OF ANY DISCREPANCIES THAT MAY HAVE BEEN NOTED BETWEEN THE EXISTING CONDITIONS AND THE DRAWINGS AND SPECIFICATIONS.
   B. VERIFY ALL MEASUREMENTS AT THE SITE AND BE RESPONSIBLE FOR CORRECTNESS OF SAME.
6. QUALITY, WORKMANSHIP, MATERIALS AND SAFETY
   A. PROVIDE NEW MATERIALS AND EQUIPMENT OF A DOMESTIC MANUFACTURER BY THOSE REGULARLY ENGAGED IN THE PRODUCTION AND MANUFACTURE OF SPECIFIED MATERIALS AND EQUIPMENT. WHERE UL, OR OTHER AGENCY, HAS ESTABLISHED STANDARDS FOR MATERIALS, PROVIDE MATERIALS WHICH ARE LISTED AND LABELED ACCORDINGLY. THE COMMERCIALLY STANDARD ITEMS OF EQUIPMENT AND THE SPECIFIC NAMES MENTIONED HEREIN ARE INTENDED FOR THE PROPER FUNCTIONING OF THE WORK.
   B. WORK SHALL BE PERFORMED BY WORKMEN SKILLED IN THE TRADE REQUIRED FOR THE WORK. INSTALL MATERIALS AND EQUIPMENT TO PRESENT A NEAT APPEARANCE WHEN COMPLETED AND IN ACCORDANCE WITH THE APPROVED RECOMMENDATIONS OF THE MANUFACTURER AND IN ACCORDANCE WITH CONTRACT DOCUMENTS.
   C. PROVIDE LABOR, MATERIALS, APPARATUS AND APPLIANCES ESSENTIAL TO THE FUNCTIONING OF THE SYSTEMS DESCRIBED OR INDICATED HEREIN, OR WHICH MAY BE REASONABLY IMPLIED AS ESSENTIAL WHENEVER MENTIONED IN THE CONTRACT DOCUMENT OR NOT.
   D. MAKE WRITTEN REQUESTS FOR SUPPLEMENTARY INSTRUCTIONS TO ARCHITECT/ENGINEER IN CASE OF DOUBT AS TO WORK INTENDED OR IN EVENT OF NEED FOR EXPLANATION THEREOF.
   E. PERFORMANCE AND MATERIAL REQUIREMENTS SCHEDULED OR SPECIFIED ARE MINIMUM STANDARD ACCEPTABLE. THE RIGHT TO JUDGE THE QUALITY OF EQUIPMENT THAT DEVIATES FROM THE CONTRACT DOCUMENT REMAINS SOLELY WITH ARCHITECT/ENGINEER. CONTRACT DOCUMENT OR NOT.

GUARANTEE

1. GUARANTEE MATERIALS, PARTS AND LABOR FOR WORK FOR ONE YEAR FROM THE DATE OF ISSUANCE OF OCCUPANCY PERMIT. DURING THAT PERIOD, MAKE GOOD FAULTS OR IMPERFECTIONS THAT MAY ARISE DUE TO DEFECTS OR OMISSIONS IN MATERIALS OR WORKMANSHIP WITH NO ADDITIONAL COMPENSATION AND AS DIRECTED BY ARCHITECT.

CLEANING

1. REMOVE ALL CONSTRUCTION DEBRIS RESULTING FROM THE WORK.
2. CLEAN EQUIPMENT AND SYSTEMS FOLLOWING THE COMPLETION OF THE PROJECT TO THE SATISFACTION OF THE ENGINEER.

COORDINATION AND SUPERVISION

1. CAREFULLY LAY OUT ALL WORK IN ADVANCE TO AVOID UNNECESSARY CUTTING, CHANNELING, CHASING OR DRILLING OF FLOORS, WALLS, PARTITIONS, CEILINGS OR OTHER SURFACES. WHERE SUCH WORK IS NECESSARY, HOWEVER, PATCH AND REPAIR THE WORK IN AN APPROVED MANNER BY SKILLED MECHANICS AT NO ADDITIONAL COST TO THE OWNER. RENDER FULL COOPERATION TO OTHER TRADES WHERE WORK WILL BE INSTALLED IN CLOSE PROXIMITY TO WORK OF OTHER TRADES. ASSIST IN WORKING OUT SPACE CONDITIONS. IF WORK IS INSTALLED BEFORE COORDINATION WITH OTHER TRADES, OR CAUSES INTERFERENCE, MAKE CHANGES NECESSARY TO CORRECT CONDITIONS WITHOUT EXTRA CHARGE.

SUBMITTALS

1. AS-BUILT DRAWINGS:
   A. UPON COMPLETION OF THE WORK, FURNISH TO THE OWNER "AS-BUILT" DRAWINGS.
2. SERVICE MANUALS:
   A. UPON COMPLETION OF THE WORK, FULLY INSTRUCT T-MOBILE AS TO THE OPERATION AND MAINTENANCE OF ALL MATERIAL, EQUIPMENT AND SYSTEMS.
   B. PROVIDE 3 COMPLETE BOUND SETS OF INSTRUCTIONS FOR OPERATING AND MAINTAINING ALL SYSTEMS AND EQUIPMENT.

CUTTING AND PATCHING

1. PROVIDE ALL CUTTING, DRILLING, ROUGH AND FINISH PATCHING REQUIRED TO COMPLETE THE WORK.
2. OBTAIN OWNER APPROVAL PRIOR TO CUTTING THROUGH FLOORS OR WALLS FOR PIPING OR CONDUIT.

TESTS, INSPECTION AND APPROVAL

1. BEFORE ENERGIZING ANY ELECTRICAL INSTALLATION, INSPECT EACH UNIT IN DETAIL. TIGHTEN ALL BOLTS AND CONNECTIONS (TORQUE-TIGHTEN WHERE REQUIRED) AND DETERMINE THAT ALL COMPONENTS ARE ALIGNED, AND THE EQUIPMENT IS IN SAFE, OPERATIONAL CONDITION.
2. PROVIDE THE COMPLETE ELECTRICAL SYSTEM FREE OF GROUND FAULTS AND SHORT CIRCUITS SUCH THAT THE SYSTEM WILL OPERATE SATISFACTORILY UNDER FULL LOAD CONDITIONS, WITHOUT EXCESSIVE HEATING AT ANY POINT IN THE SYSTEM.

SPECIAL REQUIREMENTS

1. DO NOT LEAVE ANY WORK INCOMPLETE NOR ANY HAZARDOUS SITUATIONS CREATED WHICH WILL AFFECT THE LIFE OR SAFETY OF THE PUBLIC AND/OR BUILDING OCCUPANTS. DO NOT INTERFERE WITH OR CUTOFF ANY OF THE EXISTING SERVICES WITHOUT THE OWNER'S WRITTEN PERMISSION.
2. WHEN NECESSARY TO TEMPORARILY DISCONNECT ANY EXISTING BUILDING UTILITIES AND SERVICE SYSTEMS, INCLUDING FEEDER OR BRANCH CIRCUITING SUPPLYING EXISTING FACILITIES, CONFER WITH THE OWNER AND ARRANGE THE PERIOD OF INTERRUPTION FOR A TIME MUTUALLY AGREED UPON. SHUTDOWN NOTE: SCHEDULE AND NOTIFY OWNER 48 HOURS PRIOR TO SHUTDOWN. ALL SHUTDOWN WORK TO BE SCHEDULED AT A TIME CONVENIENT TO OWNER.

GROUNDING

1. ROUTE ALL GROUNDING CONDUCTORS AS SHOWN ON CONDUIT/GROUNDING RISER.
2. ROUTE 500 KCMIL CU. THHN CONDUCTOR FROM THE MGB LOCATION TO BUILDING STEEL. VERIFY BUILDING STEEL IS EFFECTIVELY GROUNDED PER NEC TO THE MAIN SERVICE GROUNDING ELECTRODE CONDUCTOR (GEC).
3. MAKE ALL GROUND CONNECTIONS FROM MGB TO ELECTRICAL EQUIPMENT WITH 2 HOLE, CRIMP TYPE, BURNDY COMPRESSION TERMINATIONS, SIZED AS REQUIRED.
4. USE 1 HOLE, CRIMP TYPE, BURNDY COMPRESSIONS TERMINATIONS, SIZED AS REQUIRED, AT EQUIPMENT GROUND CONNECTIONS.
5. HIRE AN INDEPENDENT LAB TO PERFORM THE SPECIFIED OHMS TESTING. PROVIDE 4 SETS OF THE CERTIFIED DOCUMENTS TO THE OWNER FOR VERIFICATION PRIOR TO THE PROJECT COMPLETION.

RACEWAYS

1. ALL WIRING TO BE INSTALLED IN CONDUIT SYSTEMS IN ACCORDANCE WITH THE FOLLOWING:
   A. EXTERIOR FEEDERS AND CONTROL, WHERE UNDERGROUND, TO BE IN SCH 40 PVC.
   B. EXTERIOR, ABOVE GROUND POWER CONDUITS TO BE GALVANIZED RIGID STEEL (RGS).
   C. ALL TELECOMMUNICATION CONDUITS, INTERIOR/EXTERIOR, TO BE EMT.
   D. INSTALL PULL ROPES IN ALL NEW EMPTY CONDUITS INSTALLED ON THIS PROJECT.
   E. ALL TELECOM CONDUITS AND PULL BOXES INSTALLED ON THIS PROJECT TO BE LABELED "T-MOBILE". OWNER WILL PROVIDE LABELS FOR CONTRACTOR TO INSTALL.
   F. INTERIOR FEEDERS TO BE INSTALLED IN E.M.T. WITH STEEL COMPRESSION FITTINGS.
   G. MINIMUM SIZE CONDUIT TO BE ¾" TRADE SIZE UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
   H. FINAL CONNECTIONS TO MOTORS AND VIBRATING EQUIPMENT TO BE INSTALLED IN LIQUID-TIGHT FLEXIBLE METAL CONDUIT.
   I. CONDUIT TO BE RUN CONCEALED IN CEILINGS, FINISHED AREAS OR DRYWALL PARTITIONS, UNLESS OTHERWISE NOTED.
   J. THE ROUTING OF CONDUITS INDICATED ON THE DRAWINGS IS DIAGRAMMATIC. BEFORE INSTALLING ANY WORK, EXAMINE THE WORKING LAYOUTS AND SHOP DRAWINGS OF THE OTHER TRADES TO DETERMINE THE EXACT LOCATIONS AND CLEARANCES.
   K. ALL EXTERIOR MOUNTING HARDWARE TO BE GALVANIZED STEEL. COORDINATE WITH BUILDING ENGINEER PRIOR TO ATTACHING TO BUILDING STRUCTURE.

RACEWAYS CONT'D

   L. PENETRATIONS OF WALLS, FLOORS AND ROOFS, FOR THE PASSAGE OF ELECTRICAL RACEWAYS, TO BE PROPERLY SEALED AFTER INSTALLATION OF RACEWAYS SO AS TO MAINTAIN THE STRUCTURAL OR WATERPROOF INTEGRITY OF THE WALL, FLOOR OR ROOF SYSTEM TO BE PENETRATED. SEAL ALL CONDUIT PENETRATIONS THROUGH FIRE OR SMOKE RATED WALLS, CEILINGS OR SMOKE TIGHT CORRIDOR PARTITIONS TO MAINTAIN PROPER RATING OF WALL OR CEILING.
   M. PROVIDE ALL CONDUIT ENDS WITH INSULATED METALLIC GROUNDING BUSHINGS.
   N. CONDUIT TO BE SUPPORTED AT MAXIMUM DISTANCE OF 8'-0", OR AS REQUIRED BY NEC, IN HORIZONTAL AND VERTICAL DIRECTIONS.
   O. PROVIDE STAINLESS STEEL BLANK COVER PLATES FOR ALL JUNCTION BOXES AND/OR OUTLET BOXES NOT USED IN EXPOSED AREAS. PROVIDE ALL OTHER UNUSED BOXES WITH STANDARD STEEL COVER PLATES.
   P. WHERE APPLICABLE, PROVIDE ROOFTOP CONDUIT SUPPORT SYSTEM, CONFORMING TO ROOFTOP WARRANTY REQUIREMENTS, PER BUILDING.

WIRES AND CABLES

1. CONTRACTOR TO COORDINATE WITH EQUIPMENT SUPPLIER AND VENDOR FOR EXACT EQUIPMENT OVER-CURRENT PROTECTION VOLTAGE, WIRE SIZE AND PLUG CONFIGURATION, IF APPLICABLE, PRIOR TO BID.
2. ALL EQUIPMENT/DEVICES TO BE PROVIDED WITH INSULATED GROUND CONDUCTOR.
3. ALL WIRE AND CABLE TO BE 600VOLT, COPPER, WITH THWN/THHN INSULATION, EXCEPT AS NOTED.
4. WIRE FOR POWER AND LIGHTING WILL NOT BE LESS THAN NO. 12AWG. ALL WIRE NO. 8 AND LARGER TO BE STRANDED.
5. CONTROL WIRING IS NOT TO BE LESS THAN NO. 14AWG, FLEXIBLE IN SINGLE CONDUCTORS OR MULTI-CONDUCTOR CABLES. CONTROL WIRING WILL CONSIST OF MULTI-CONDUCTOR CABLES WHEREVER POSSIBLE. CABLES TO BE PROVIDED WITH AN OVERALL FLAME-RETARDANT, EXTRUDED JACKET AND RATED FOR PLENUM USE. ALL CONTROL WIRE TO BE 600VOLT RATED.
6. WIRE PREVIOUSLY PULLED INTO CONDUIT IS CONSIDERED USED AND IS NOT TO BE RE-PULLED.
7. HOME RUNS AND BRANCH CIRCUIT WIRING FOR 20A, 120V CIRCUITS:

LENGTH (FT.)	HOME RUN WIRE SIZE
0 TO 50	NO. 12
51 TO 100	NO. 10
101 TO 150	NO. 8

8. VOLTAGE DROP IS NOT TO EXCEED 3%.
9. MAKE ALL CONNECTIONS WITH UL APPROVED, SOLDERLESS, PRESSURE TYPE INSULATED CONNECTORS: SCOTCHLOK OR AND APPROVED EQUAL.

WIRING DEVICES

1. ALL RECEPTACLES INSTALLED IN THIS PROJECT TO BE GROUNDING TYPE, WITH GROUNDING PIN SLOT CONNECTED TO DEVICE GROUND SCREW FOR GROUND WIRE CONNECTION.

DISCONNECT SWITCHES AND FUSES

1. DISCONNECT SWITCHES TO BE VOLTAGE-RATED TO SUIT THE CHARACTERISTICS OF THE SYSTEM FROM WHICH THEY ARE SUPPLIED.
2. PROVIDE HEAVY-DUTY, METAL-ENCLOSED, EXTERNALLY-OPERATED DISCONNECT SWITCHES, FUSED OR UNFUSED, OF SUCH TYPE AND SIZE AS REQUIRED TO PROPERLY PROTECT OR DISCONNECT THE LOAD FOR WHICH THEY ARE INTENDED.
3. PROVIDE NEMA 1 DISCONNECT SWITCHES FOR INTERIOR INSTALLATION, NEMA 3R FOR EXTERIOR INSTALLATION.
4. DISCONNECT SWITCHES TO BE MANUFACTURED BY:
   A. GENERAL ELECTRIC COMPANY
   B. SQUARE-D
5. PROVIDE RK-1 TYPE FUSES, UNLESS NOTED OTHERWISE.

INSTALLATION

1. INSTALL DISCONNECT SWITCHES WHERE INDICATED ON DRAWINGS.
2. INSTALL FUSES IN FUSIBLE DISCONNECT SWITCHES. FUSES MUST MATCH IN TYPE AND RATING.
3. FUSES TO BE MOUNTED SO THAT THE LABELS SHOWING THEIR RATINGS CAN BE READ WITHOUT REQUIRING FUSE REMOVAL.
4. FURNISH AND DEPOSIT SPARE FUSES AT THE JOB SITE AS FOLLOWS:
   A. THREE SPARES FOR EACH TYPE AND SIZE, IN EXCESS OF 60A, USED FOR INITIAL FUSING.
   B. TEN PERCENT SPARES FOR EACH TYPE AND SIZE, UP TO AND INCLUDING 60A, USED FOR INITIAL FUSING. IN NO CASE WILL LESS THAN THREE FUSES OF ONE PARTICULAR TYPE AND SIZE BE FURNISHED.

GENERAL NOTES:

INTENT

1. THESE SPECIFICATIONS AND CONSTRUCTION DRAWINGS ACCOMPANYING THEM DESCRIBE THE WORK TO BE DONE AND THE MATERIALS TO BE FURNISHED FOR CONSTRUCTION.
2. THE DRAWINGS AND SPECIFICATIONS ARE INTENDED TO BE FULLY EXPLANATORY AND SUPPLEMENTARY. HOWEVER, SHOULD ANYTHING BE SHOWN, INDICATED, OR SPECIFIED ON ONE AND NOT THE OTHER, IT SHALL BE DONE THE SAME AS IF SHOWN, INDICATED OR SPECIFIED IN BOTH
3. THE INTENTION OF THE DOCUMENTS IS TO INCLUDE ALL LABOR AND MATERIALS REASONABLY NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK AS STIPULATED IN THE CONTRACT.
4. THE PURPOSE OF THE SPECIFICATIONS IS TO INTERPRET THE INTENT OF THE DRAWINGS AND TO DESIGNATE THE METHOD OF THE PROCEDURE, TYPE AND QUALITY OF MATERIALS REQUIRED TO COMPLETE THE WORK.
5. MINOR DEVIATIONS FROM THE DESIGN LAYOUT ARE ANTICIPATED AND SHALL BE CONSIDERED AS PART OF THE WORK. NO CHANGES THAT ALTER THE CHARACTER OF THE WORK WILL BE MADE OR PERMITTED BY THE OWNER WITHOUT ISSUING A CHANGE ORDER.

CONFLICTS

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATIONS OF ALL MEASUREMENTS AT THE SITE BEFORE ORDERING ANY MATERIALS OR DOING ANY WORK. NO EXTRA CHARGE OR COMPENSATION SHALL BE ALLOWED DUE TO DIFFERENCE BETWEEN ACTUAL DIMENSIONS AND DIMENSIONS INDICATED ON THE CONSTRUCTION DRAWINGS. ANY SUCH DISCREPANCY IN DIMENSION WHICH MAY BE FOUND SHALL BE SUBMITTED TO THE OWNER FOR CONSIDERATION BEFORE THE CONTRACTOR PROCEEDS WITH THE WORK IN THE AFFECTED AREAS.
2. THE BIDDER, IF AWARDED THE CONTRACT, WILL NOT BE ALLOWED ANY EXTRA COMPENSATION BY REASON OF ANY MATTER OR THING CONCERNING SUCH BIDDER MIGHT HAVE FULLY INFORMED THEMSELVES PRIOR TO THE BIDDING.
3. NO PLEA OF IGNORANCE OF CONDITIONS THAT EXIST, OR OF DIFFICULTIES OR CONDITIONS THAT MAY BE ENCOUNTERED, OR OF ANY OTHER RELEVANT MATTER CONCERNING THE WORK TO BE PERFORMED IN THE EXECUTION OF THE WORK WILL BE ACCEPTED AS AN EXCUSE FOR ANY FAILURE OR OMISSION ON THE PART OF THE CONTRACTOR TO FULFILL EVERY DETAIL OF ALL THE REQUIREMENTS OF THE CONTRACT DOCUMENTS GOVERNING THE WORK.

CONTRACTS AND WARRANTIES

1. CONTRACTOR IS RESPONSIBLE FOR APPLICATION AND PAYMENT OF CONTRACTOR LICENSES AND BONDS.
2. SEE MASTER CONTRACTION SERVICES AGREEMENT FOR ADDITIONAL DETAILS.

STORAGE

1. ALL MATERIALS MUST BE STORED IN A LEVEL AND DRY FASHION AND IN A MANNER THAT DOES NOT NECESSARILY OBSTRUCT THE FLOW OF OTHER WORK. ANY STORAGE METHOD MUST MEET ALL RECOMMENDATIONS OF THE ASSOCIATED MANUFACTURER.

CLEANUP

1. THE CONTRACTORS SHALL, AT ALL TIMES, KEEP THE SITE FREE FROM ACCUMULATION OF WASTE MATERIALS OR RUBBISH CAUSED BY THEIR EMPLOYEES AT WORK AND AT THE COMPLETION OF THE WORK. THEY SHALL REMOVE ALL RUBBISH FROM AND ABOUT THE BUILDING AREA, INCLUDING ALL THEIR TOOLS, SCAFFOLDING AND SURPLUS MATERIALS AND SHALL LEAVE THEIR WORK CLEAN AND READY TO USE.
2. EXTERIOR
   A. VISUALLY INSPECT EXTERIOR SURFACES AND REMOVE ALL TRACES OF SOIL, WASTE MATERIALS, SMUDGES AND OTHER FOREIGN MATTER.
   B. REMOVE ALL TRACES OF SPLASHED MATERIALS FROM ADJACENT SURFACES.
   C. IF NECESSARY, TO ACHIEVE A UNIFORM DEGREE OF CLEANLINESS, HOSE DOWN THE EXTERIOR OF THE STRUCTURE.
3. INTERIOR
   A. VISUALLY INSPECT INTERIOR SURFACE AND REMOVE ALL TRACES OF SOIL, WASTE MATERIALS, SMUDGES AND OTHER FOREIGN MATTER FROM WALLS, FLOOR, AND CEILING.
   B. REMOVE ALL TRACES OF SPLASHED MATERIALS FROM ADJACENT SURFACES.
   C. REMOVE PAINT DROPPINGS, SPOTS, STAINS, AND DIRT FROM FINISHED SURFACES.

CHANGE ORDER PROCEDURE:

1. REFER TO SECTION 17 OF SIGNED MCSA: SEE PROFESSIONAL SERVICE AGREEMENT FOR MCSA.

RELATED DOCUMENTS AND COORDINATION

1. GENERAL CARPENTRY, ELECTRICAL AND ANTENNA DRAWINGS ARE INTERRELATED. IN PERFORMANCE OF THE WORK, THE CONTRACTOR MUST REFER TO ALL DRAWINGS. ALL COORDINATION TO BE THE RESPONSIBILITY OF THE CONTRACTOR.

SHOP DRAWINGS

1. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AS REQUIRED AND LISTED IN THESE SPECIFICATIONS TO THE OWNER FOR APPROVAL.
2. ALL SHOP DRAWINGS SHALL BE REVIEWED, CHECKED AND CORRECTED BY CONTRACTOR PRIOR TO SUBMITTAL TO THE OWNER.

PRODUCTS AND SUBSTITUTIONS

1. SUBMIT 3 COPIES OF EACH REQUEST FOR SUBSTITUTION. IN EACH REQUEST, IDENTIFY THE PRODUCT OR FABRICATION OR INSTALLATION METHOD TO BE REPLACED BY THE SUBSTITUTION. INCLUDE RELATED SPECIFICATION SECTION AND DRAWING NUMBERS AND COMPLETE DOCUMENTATION SHOWING COMPLIANCE WITH THE REQUIREMENTS FOR SUBSTITUTIONS.
2. SUBMIT ALL NECESSARY PRODUCT DATA AND CUT SHEETS WHICH PROPERLY INDICATE AND DESCRIBE THE ITEMS, PRODUCTS AND MATERIALS BEING INSTALLED. THE CONTRACTOR SHALL, IF DEEMED NECESSARY BY THE OWNER, SUBMIT ACTUAL SAMPLES TO THE OWNER FOR APPROVAL IN LIEU OF CUT SHEETS.

QUALITY ASSURANCE

1. ALL WORK SHALL BE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS. THESE SHALL INCLUDE, BUT NOT BE LIMITED TO THE APPLICABLE CODES SET FORTH BY THE LOCAL GOVERNING BODY. SEE "CODE COMPLIANCE" T-1.

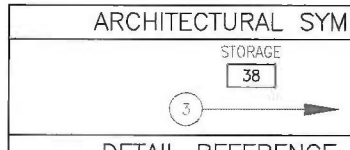
ADMINISTRATION

1. BEFORE THE COMMENCEMENT OF ANY WORK, THE CONTRACTOR WILL ASSIGN A PROJECT MANAGER WHO WILL ACT AS A SINGLE POINT OF CONTACT FOR ALL PERSONNEL INVOLVED IN THIS PROJECT. THIS PROJECT MANAGER WILL DEVELOP A MASTER SCHEDULE FOR THE PROJECT WHICH WILL BE SUBMITTED TO THE OWNER PRIOR TO THE COMMENCEMENT OF ANY WORK.
2. SUBMIT A BAR TYPE PROGRESS CHART, NOT MORE THAN 3 DAYS AFTER THE DATE ESTABLISHED FOR COMMENCEMENT OF THE WORK ON THE SCHEDULE, INDICATING A TIME BAR FOR EACH MAJOR CATEGORY OR UNIT OF WORK TO BE PERFORMED AT THE SITE, PROPERLY SEQUENCED AND COORDINATED WITH OTHER ELEMENTS OF WORK AND SHOWING COMPLETION OF THE WORK SUFFICIENTLY IN ADVANCE OF THE DATE ESTABLISHED FOR SUBSTANTIAL COMPLETION OF THE WORK.
3. PRIOR TO COMMENCING CONSTRUCTION, THE OWNER SHALL SCHEDULE AN ON-SITE MEETING WITH ALL MAJOR PARTIES. THIS WOULD INCLUDE, BUT NOT LIMITED TO, THE OWNER, PROJECT MANAGER, CONTRACTOR, LAND OWNER REPRESENTATIVE, LOCAL TELEPHONE COMPANY, TOWER ERECTION FOREMAN (IF SUBCONTRACTED).
4. CONTRACTOR SHALL BE EQUIPPED WITH SOME MEANS OF CONSTANT COMMUNICATIONS, SUCH AS A MOBILE PHONE OR A BEEPER. THIS EQUIPMENT WILL NOT BE SUPPLIED BY THE OWNER, NOR WILL WIRELESS SERVICE BE ARRANGED.
5. DURING CONSTRUCTION, CONTRACTOR MUST ENSURE THAT EMPLOYEES AND SUBCONTRACTORS WEAR HARD HATS AT ALL TIMES. CONTRACTOR WILL COMPLY WITH ALL WPCS SAFETY REQUIREMENTS IN THEIR AGREEMENT.
6. PROVIDE WRITTEN DAILY UPDATES ON SITE PROGRESS TO THE OWNER.
7. COMPLETE INVENTORY OF CONSTRUCTION MATERIALS AND EQUIPMENT IS REQUIRED PRIOR TO START OF CONSTRUCTION.
8. NOTIFY THE OWNER/PROJECT MANAGER IN WRITING NO LESS THAN 48 HOURS IN ADVANCE OF CONCRETE POURS, TOWER ERECTIONS, AND EQUIPMENT CABINET PLACEMENTS.

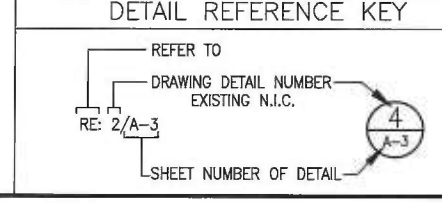
INSURANCE AND BONDS

1. CONTRACTOR, AT THEIR OWN EXPENSE, SHALL CARRY AND MAINTAIN, FOR THE DURATION OF THE PROJECT, ALL INSURANCE, AS REQUIRED AND LISTED, AND SHALL NOT COMMENCE WITH THEIR WORK UNTIL THEY HAVE PRESENTED AN ORIGINAL CERTIFICATE OF INSURANCE STATING ALL COVERAGES TO THE OWNER. REFER TO THE MASTER AGREEMENT FOR REQUIRED INSURANCE LIMITS.
2. THE OWNER SHALL BE NAMED AS AN ADDITIONAL INSURED ON ALL POLICIES.
3. CONTRACTOR MUST PROVIDE PROOF OF INSURANCE.

ARCHITECTURAL SYMBOLS



DETAIL REFERENCE KEY



ABBREVIATIONS

ADJ	ADJUSTABLE
AGL	ABOVE GROUND LINE
&	AND
APPROX	APPROXIMATE
@	AT
BTS	BASE TRANSMISSION STATION
CAB	CABINET
CLG	CEILING
CONC	CONCRETE
CONT	CONTINUOUS
DIA OR ø	DIAMETER
DWG	DRAWING
EA	EACH
ELEC	ELECTRICAL
ELEV	ELEVATION
EQ	EQUAL
EQUIP	EQUIPMENT
EGB	EQUIPMENT GROUND BAR
(E)	EXISTING
EXT	EXTERIOR
FF	FINISHED FLOOR
GA	GAUGE
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GRND	GROUND
LG	LONG
MAX	MAXIMUM
MECH	MECHANICAL
MW	MICROWAVE DISH
MFR	MANUFACTURER
MGB	MASTER GROUND BAR
MIN	MINIMUM
MTL	METAL
(N)	NEW
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
OC	ON CENTER
OPP	OPPOSITE
(P)	PROPOSED
PCS	PERSONAL COMMUNICATION SYSTEM
PPC	POWER PROTECTION CABINET
SF	SQUARE FOOT
SHT	SHEET
SIM	SIMILAR
SS	STAINLESS STEEL
STL	STEEL
TOC	TOP OF CONCRETE
TOM	TOP OF MASONRY
TYP	TYPICAL
VIF	VERIFY IN FIELD
UON	UNLESS OTHERWISE NOTED
WWF	WELDED WIRE FABRIC
W/	WITH

T-MOBILE NORTHEAST, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 692-7100
FAX:(860) 692-7159

ATLANTIS GROUP
1340 Centre Street, Suite 212
Newton Center, MA 02459
Office: 617-965-0789
Fax: 617-213-5056

SUBMITTALS

DATE	DESCRIPTION	REVISION
06/03/15	ISSUED FOR REVIEW	A
06/08/15	REVISION	0

DEPT.	DATE	APP'D	REVISIONS
RFE			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

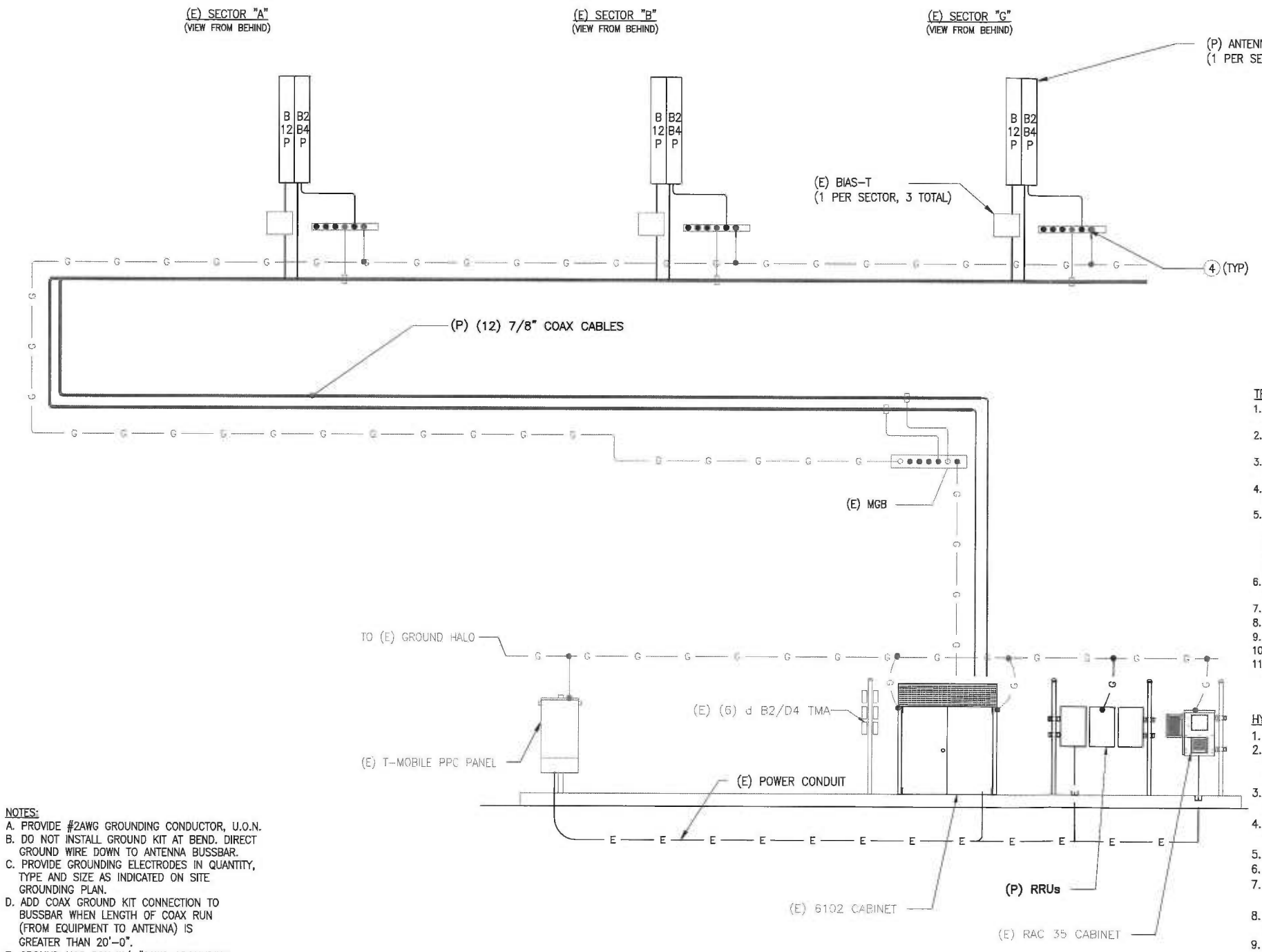
PROJECT NO:	CT11033E
DRAWN BY:	FG
CHECKED BY:	SM

PROFESSIONAL SEAL

SITE NUMBER
CT11033E
SITE NAME
CT STATE POLICE_1
SITE ADDRESS
315 SPENCER PLAINS RD
WESTBROOK, CT 06498

SHEET TITLE
GENERAL AND ELECTRICAL NOTES

SHEET NUMBER
N-1

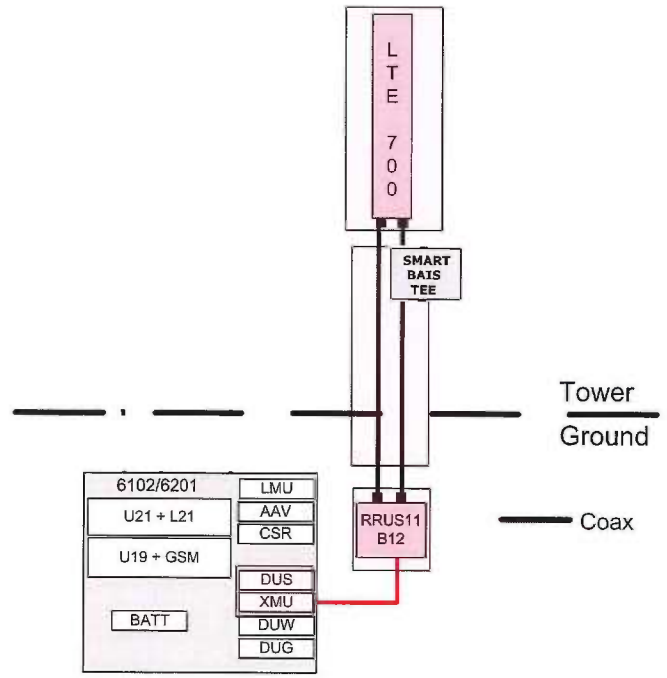


NOTES:
A. PROVIDE #2AWG GROUNDING CONDUCTOR, U.O.N.
B. DO NOT INSTALL GROUND KIT AT BEND. DIRECT GROUND WIRE DOWN TO ANTENNA BUSSBAR.
C. PROVIDE GROUNDING ELECTRODES IN QUANTITY, TYPE AND SIZE AS INDICATED ON SITE GROUNDING PLAN.
D. ADD COAX GROUND KIT CONNECTION TO BUSSBAR WHEN LENGTH OF COAX RUN (FROM EQUIPMENT TO ANTENNA) IS GREATER THAN 20'-0".
E. GROUND HCS BOX W/ #2AWG GROUNDING CONDUCTOR ATTACHED TO GOOD GROUND AS DIRECT AND SHORT AS POSSIBLE. USE GREEN STRANDED INSULATED CONDUCTOR TO CONNECT TO BUSSBAR/GROUND HALO OR BARE TINNED SOLID COPPER CONDUCTOR TO CONNECT TO GROUND RING.

GROUNDING AND ONE LINE DIAGRAM

1 E-1

SCALE: N.T.S



TRUNK FIBER NOTES:
1. IN GENERAL THIS CABLE WILL HANDLE SIMILARLY TO 7/8" COAXIAL CABLE, AND SIMILAR INSTALLATION TECHNIQUES APPLY. ALL CABLES ARE INDIVIDUALLY SERIALIZED, BE SURE TO WRITE DOWN THE CABLE SERIAL NUMBER FOR FUTURE REFERENCE.
2. THE TERMINATED FIBER ENDS (THE BROKEN OUT FIBERS PLUS CONNECTORS) HOWEVER ARE FRAGILE, AND THESE MUST BE PROTECTED DURING THE INSTALLATION PROCESS.
3. LEAVE THE PROTECTIVE TUBE AND SOCK AROUND THE FIBER TAILS AND CONNECTORS IN PLACE DURING HOISTING AND SECURING THE CABLE. REMOVE THIS ONLY JUST PRIOR TO MAKING THE FINAL CONNECTIONS TO THE OVP BOX.
4. DO NOT BEND THE FIBER ENDS (IN THE ORANGE FURCATION TUBES) TIGHTER THAN 3/4" (19MM) BEND RADIUS, ELSE THERE IS A RISK OF BREAKING THE GLASS FIBERS.
5. BE SURE THAT THE LACE UP ENDS AND FIBER CONNECTORS ARE NOT DAMAGED BY ATTACHMENT OF A HOISTING GRIP OR DURING THE HOISTING PROCESS. ATTACH A HOISTING GRIP ON THE JACKETED CABLE NO LESS THAN 6 INCHES BELOW THE FIBER BREAKOUT POINT. IF A HOISTING GRIP IS NOT EASILY ATTACHED, USE A SIMPLE LINE ATTACHED BELOW THE FIBER BREAK-OUT POINT (I.E. AT THE CABLE OUTER JACKET). PREVENT THE FIBER TAILS (IN PROTECTIVE TUBE) AT THE CABLE END FROM UNDUE MOVEMENT DURING HOISTING BY SECURING THE PROTECTIVE TUBE (WITH OUTER SOCK) TO THE HOISTING LINE.
6. DURING HOISTING ENSURE THAT THERE IS A FREE PATH AND THAT THE CABLE, AND ESPECIALLY THE FIBER ENDS, WILL NOT BE SNAGGED ON TOWER MEMBERS OR OTHER OBSTACLES.
7. INSTALLATION TEMPERATURE RANGE IS -22F TO 158F (-30C TO +70C).
8. MINIMUM CABLE BEND RADII ARE 22.2" (565MM) LOADED (WITH TENSION ON THE CABLE) AND 11.1" (280MM) UNLOADED.
9. MAXIMUM CABLE TENSILE LOAD IS 3560 N (800 LB) SHORT TERM (DURING INSTALLATION) AND 1070 N (240 LB) LONG TERM.
10. COMMSCOPE NON LACE UP GRIP RECOMMENDED FOR MONOPOLE INSTALLATIONS.
11. MAXIMUM HANGER SPACING 3FT (0.9 M).

HYBRID FIBER/POWER JUMPER NOTES:
1. IN GENERAL THIS CABLE WILL HANDLE SIMILARLY TO A 3/8" COAXIAL CABLE.
2. THE TERMINATED FIBER ENDS HOWEVER ARE FRAGILE AND MUST BE PROTECTED DURING INSTALLATION. LEAVE THE PACKAGING AROUND THE FIBER ENDS IN PLACE UNTIL READY TO CONNECT THE JUMPER BETWEEN OVP AND RRU OR BBU.
3. DO NOT BEND THE FIBER BREAKOUT CABLE (BETWEEN THE MAIN CABLE AND THE FIBER CONNECTOR) TIGHTER THAN 3/4" (19MM) RADIUS, ELSE THERE IS A RISK OF BREAKING THE GLASS.
4. ATTACH THE MAIN CABLE SECURELY TO THE STRUCTURE OR EQUIPMENT USING HANGERS AND/OR CABLE TIES TO PREVENT STRAIN ON CONNECTIONS FROM MOVEMENT IN WIND OR SNOW/ICE CONDITIONS.
5. ENSURE THE LC FIBER CONNECTORS ARE SEATED FIRMLY IN PANEL IN OVP OR IN EQUIPMENT.
6. INSTALLATION TEMPERATURE RANGE IS -22F TO 158F (-30C TO 70C).
7. MINIMUM CABLE BEND RADII ARE 10.3 INCH (265MM) LOADED (WITH TENSION ON THE CABLE) AND 5.2 INCH (130MM) UNLOADED.
8. MAXIMUM CABLE TENSILE LOAD IS 350 LB (1560N) SHORT TERM (DURING INSTALLATION) AND 105 LB (470N) LONG TERM.
9. STANDARD LENGTHS AVAILABLE ARE 6 FEET, 15 FEET AND 20 FEET

704BU CONFIGURATION COAX/FIBER PLUMBING DIAGRAM

2 E-1

SCALE: N.T.S

T-MOBILE NORTHEAST, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 692-7100
FAX:(860) 692-7159

ATLANTIS GROUP
1340 Centre Street, Suite 212
Newton Center, MA 02459
Office: 617-965-0789
Fax: 617-213-5056

SUBMITTALS		
DATE	DESCRIPTION	REVISION
05/03/15	ISSUED FOR REVIEW	A
05/06/15	REVISION	0

DEPT.	DATE	APP'D	REVISIONS
RFE			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

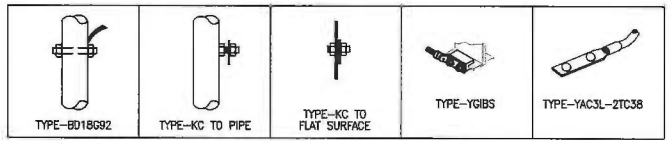
PROJECT NO:	CT11033E
DRAWN BY:	FG
CHECKED BY:	SM

PROFESSIONAL SEAL

SITE NUMBER
CT11033E
SITE NAME
CT STATE POLICE_1
SITE ADDRESS
315 SPENCER PLAINS RD
WESTBROOK, CT 06498

SHEET TITLE
GROUNDING AND ONE LINE DIAGRAM
COAX/FIBER DIAGRAM

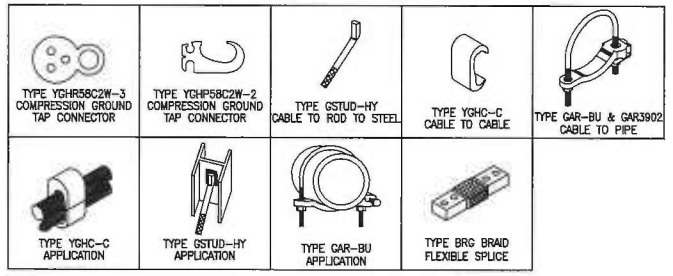
SHEET NUMBER
E-1



BURNDY GROUNDING DETAILS

1 E-2

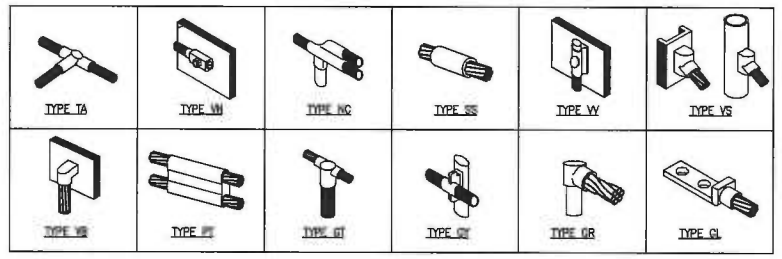
SCALE: N.T.S



BURNDY GROUNDING PRODUCTS

2 E-2

SCALE: N.T.S



CADWELD GROUNDING CONNECTION PRODUCTS

3 E-2

SCALE: N.T.S

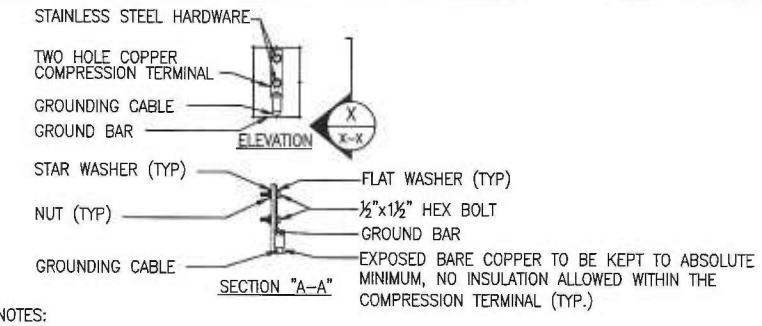
TERMINATION TYPES:
A. MECHANICAL COMPRESSION LUG
B. DOUBLE BARRELL COMPRESSION CONNECTOR
C. EXOTHERMIC TERMINATION
D. BEAM CLAMP

	SOLID #2 TINNED COPPER	#6 GROUND LEAD	#2/0 STRANDED MAIN DOWN CONDUCTOR	MASTER GRND BAR	STRUCTURAL OR TOWER STEEL	BLDG. SERVICE ENTR OR GRND RING	GROUND ROD
SOLID #2 TINNED COPPER	B OR C	B OR C		C	A, C, OR D		C
#6 GROUND LEAD	B OR C			A	A, C, OR D		
#2/0 STRANDED GRNDG ELECTRODE CONDUCTOR				A	A, C, OR D	A	
MASTER GROUND BAR	C	A	A				
STRUCTURAL OR TOWER STEEL	A, C, OR D	A, C, OR D	A, C, OR D				
GROUND RING	C		C				C

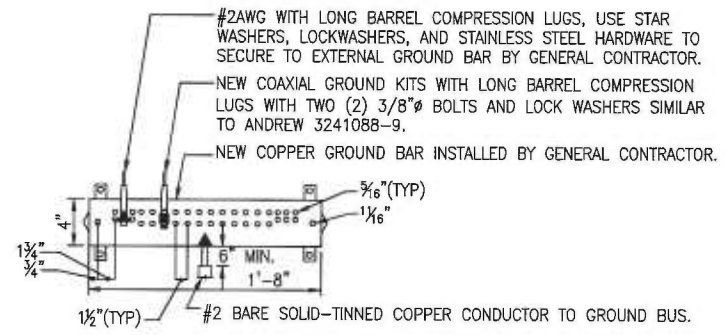
GROUNDING TERMINATION MATRIX

7 E-2

SCALE: N.T.S



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

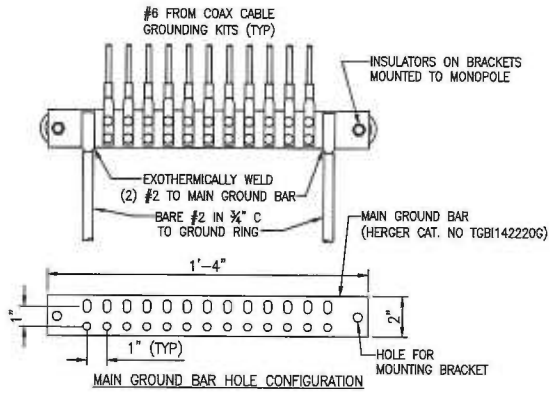


NOTES:
1. ALL HARDWARE STAINLESS STEEL COAT ALL SURFACES WITH KOPR-SHIELD BEFORE MATING.
2. FOR GROUND BOND TO STEEL ONLY: INSERT A TOOTH WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH KOPR-SHIELD.
3. ALL HOLES ARE COUNTERSUNK 1/16".

TYPICAL GROUND BAR CONNECTIONS DETAIL

4 E-2

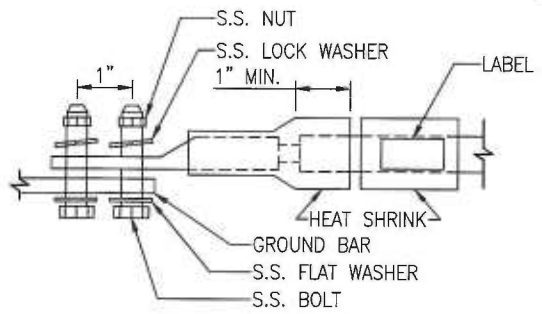
SCALE: N.T.S



GROUND BAR DETAIL

5 E-2

SCALE: N.T.S



LUG NOTES:
1. ALL HARDWARE IS 18-8 STAINLESS STEEL, INCLUDING LOCK WASHERS.
2. ALL HARDWARE SHALL BE S.S. ⅜"ø OR LARGER.
3. FOR GROUND BOND TO STEEL ONLY: INSERT A DRAGON TOOTH WASHER BETWEEN LUG AND STEEL. COAT ALL SURFACES WITH ANTI-OXIDIZATION COMPOUND PRIOR TO MATING.

GROUND BAR DETAIL

6 E-2

SCALE: N.T.S

T-MOBILE NORTHEAST, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 692-7100
FAX:(860) 692-7159

ATLANTIS GROUP
1340 Centre Street, Suite 212
Newton Center, MA 02459
Office: 617-965-0789
Fax: 617-213-5056

SUBMITTALS

DATE	DESCRIPTION	REVISION
05/03/15	ISSUED FOR REVIEW	A
05/08/15	REVISION	B

DEPT.	DATE	APP'D	REVISIONS
RFE.			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO:	CT11033E
DRAWN BY:	FG
CHECKED BY:	SM

PROFESSIONAL SEAL

SITE NUMBER
CT11033E
SITE NAME
CT STATE POLICE_1
SITE ADDRESS
315 SPENCER PLAINS RD
WESTBROOK, CT 06498

SHEET TITLE
GROUNDING DETAILS

SHEET NUMBER
E-2

EXHIBIT B

AECOM

Submitted to
Northeast Site Solutions
199 Brickyard Road
Farmington, CT 06032

Submitted by
AECOM
500 Enterprise Drive,
Suite 3B
Rocky Hill, CT 06067
May 22, 2015

DETAILED STRUCTURAL ANALYSIS AND MODIFICATION OF AN EXISTING 180' SELF SUPPORTING LATTICE TOWER AND FOUNDATION FOR PROPOSED ANTENNA ARRANGEMENT

T-Mobile

Site ID : CT11033E
Site Name: Connecticut State Police Tower #36
Site Address: 315 Spencer Plains Road
Westbrook, Connecticut

36931360.00000
NSS-015 Rev. 2

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis and modification of the 180' lattice tower located at 315 Spencer Plains Road in Westbrook, Connecticut. The analysis was conducted in accordance with the 2005 Connecticut State Building Code, the TIA/EIA-222-F standard, and the Connecticut State Police Requirements for a wind velocity of 95 mph (fastest mile) and 90 mph (fastest mile) concurrent with ½" ice. Twist (rotation) and sway (deflection) were determined in accordance with Connecticut State Police Requirements for a wind velocity of 90 mph (fastest mile) concurrent with ½" ice. The antenna loading considered in the analysis consists of all existing, future, and proposed antennas, transmission lines, and ancillary items as outlined in the Introduction of this report.

The proposed T-Mobile antenna modifications are listed below:

Proposed Antenna and Mount	Carrier	Antenna Center Elevation
Remove: **(3) EMS RR90-17-00DP Panel Antennas** **(6) 1-5/8" Coaxial Cables**	**T-Mobile (Existing)**	**@ 130'-0"**
Install: **(3) Commscope DBXNH-6565B-A2M Panel Antennas** **(3) Bias-T Units** **(12) 7/8" Coaxial Cables**	**T-Mobile (Proposed)**	**@ 130'-0"**

The results of an initial analysis indicated the existing tower and anchor bolts did not have enough capacity for the proposed loading conditions. The tower structure and anchor bolts require modifications shown on SK-1 through SK-4. **Once the modifications indicated on sheets SK-1 through SK-4 are performed, the modified structure is considered structurally adequate with the wind load classification specified above with the existing and proposed antenna loading. No installation of proposed antennas shall occur without the required modification being completed.**

The tower deflection (sway) is 0.6656 degrees, and the tower rotation (twist) is 0.0746 degrees. **These figures combined are within the Connecticut State Police Requirement of 0.75 degrees for twist and sway.**

1. EXECUTIVE SUMMARY *(continued)*:

This analysis is based on:

1) The tower structure's theoretical capacity not including any assessment of the condition of the tower.
2) Tower geometry, member sizes and foundation taken from manufacturers original design documents prepared by Stainless, Inc. project number 358811 signed and sealed June 14, 1994.
3) Antenna inventory as specified in section 2 and 6 of this report.
4) Previous tower reinforcement and structural analysis performed by URS Corporation on behalf of T-Mobile, Northeast Utilities and AT&T, project number SAI-063 / 36924430, signed and sealed June 16, 2011.
5) Coax cable orientation as specified in section 6 of this report.
6) Antenna inventory provided by Connecticut State Police via e-mail on February 8, 2014.
7) Previous structural analysis performed by URS Corporation on behalf of T-Mobile, project number NSS-015 / 36931360, signed and sealed November 26, 2014.
8) Geotechnical Study for Evaluation of tower site report performed by Dr. Clarence Welti, P.E., P.C., signed on March 24, 2015.
9) Previous structural analysis and modification performed by AECOM on behalf of T-Mobile, project number NSS-015 Rev. 1 / 36931360, signed and sealed April 8, 2015.
10) Proposed T-Mobile antenna inventory obtained from RFDS obtained via e-mail, dated May 6, 2015.
11) Antenna inventory as specified in Sections 2 and 6 of this report

This report is only valid as per the assumptions and data utilized in this report for antenna inventory, mounts and associated cables. The user of this report shall field verify the antenna, cabling and mount configuration used, as well as the physical condition of the tower members, connections and foundations. Notify the engineer in writing immediately if any of the information in this report is found to be other than specified.

If you should have any questions, please call.

Sincerely,

AECOM, legacy URS Corporation AES,

Richard A. Sambor, P.E.
Senior Structural Engineer

RAS/mcd

2. INTRODUCTION

The subject tower is located at 315 Spencer Plains Road in Westbrook, Connecticut. The structure is a self-supporting three-legged 180' steel tapered lattice tower manufactured by Stainless Incorporated. The existing structure supports numerous communication antennas. The inventory together with the new T-Mobile antenna arrangement is summarized in the table below:

Antenna Type	*Carrier*	*Mount*	*Centerline Elevation*	*Cable*
(1) Telewave ANT150D6-9 4-Bay Dipole Antenna	CSP-12 (existing)	(1) Dish mount	193'	(1) 7/8" coax cable
(1) 2' Lightning Rod	Tower (existing)	(1) Pipe mount (noted below)	189'	---
(1) 10'x3" Omni	VSC-32 (existing)	(1) 6' Stand-off (shared with below)	185'	(1) 7/8" coax cable
(2) Scala OGT9-806 antennas	CSP 15 & 17 (existing)	(1) 6' Stand-off	185'-6"	(2) 1 5/8 coax cables
(1) 8'x3" Omni antenna and (1) control box	CSP-14 (existing)	(1) 6' Stand-off	185'	(2) 1 5/8" coax cables
(1) 8' Lightning Rod Mounting Pipe	Tower (existing)	None	184'	---
(3) Sinclair SC479-HFILDFCD00-E5765 (1) 432-83H-01T TTA	CSP – 57, 58, 59 & 64 (existing)	(1) T-Boom Mount	183'	(3) 1 5/8" coax cables (1) 1/2" coax cable
(1) 10' Whip	VSC-54 (existing)	(1) Pipe Mount	183'	(1) 7/8" coax cable
(1) 2' Yagi	VSC-1 (existing)	(1) Clamp Mount	182'	(1) 7/8" coax cable
(1) 2' Dipole	CSP-2 (existing)	Pipe Mount (listed above)	182'	(1) 7/8" coax cable
(1) 2' Omni	VSC-10 (existing)	Pipe Mount	180'	(1) 7/8" coax cable
(3) Microwave Dish antennas	CSP – 65, 66, 67 (future)	Dish Mounts	180'	---
(1) RFS 6' Microwave Dish w/ Radome	CSP-11 (existing)	(1) Dish Mount (listed above)	177'	(1) 2" elliptical coax cable (WEP65)
(2) Decibel DB586-Y	NU (existing)	(1) Dish Mount (*existing*)	177'	(2) 7/8" coax cable
(1) RFS 6' Microwave Dish w/ Radome	VSC-4 (existing)	(1) Dish Mount	174'	(1) 7/8" coax cable
(1) 10' Dipole	CSP-33 (existing)	Stand-offs (listed above)	172'	(1) 7/8" coax cable
(1) Andrew 6' Microwave Dish w/ Radome	CSP-13 (existing)	(1) Dish Mount	170'	(1) 2" elliptical coax cable (WEP65)
(2) 12' Sinclair antennas	(existing)	(2) 4' Stand-off	167'	(2) 1 5/8" coax cables
(1) 10' Whip	VSC-5 (existing)	(1) 1' Side Arm mount	167'	(1) 7/8" coax cable
(1) 10' Dipole	(existing)	(1) Pipe Mount	166'	(1) 7/8" coax cable
(1) SC479-HF1LDF antenna	CSP-56 (existing)	(1) 1' Stand-off	160'	(1) 7/8" coax cable
(1) 12' x 1" Omni antenna	(existing)	(1) 4' Stand-off	160'	(1) 7/8" coax cable

Antenna Type	*Carrier*	*Mount*	*Centerline Elevation*	*Cable*
(1) Sinclair SD110SFXPASNM(F0 460)	(existing)	(1) Pipe Mount	156'	(1) 7/8" coax cable
(1) 4' Paraflector PRF-900	(existing)	(1) Pipe Mount (same as above)	156'	(1) 7/8" coax cable
(1) Decibel DB 225 Dipole antenna	VSC-51 (existing)	(1) Leg Mount	155'	(1) 7/8" coax cable
(1) BCD-80609 Omni	(existing)	Stand-off (listed above)	149'	(1) 1-5/8" coax cable
(3) Powerwave 7770 (6) KMW AM-X-CD-14-65 (6) TMA (6) Ericsson RRus-11 RRH (1) Raycap Surge Supressor	AT&T (existing)	(3) T-frames	145'	(12) 1 1/4" coax cables (1) Fiber Cable (10mm) (2) DC Cables (0.645")
(2) DB950F40T2E-M (2) DB950F85E-M (2) DB950F65E-M Panel Antennas	Sprint (existing)	(3) 13' Lightweight T-Frames (existing)	137'	(6) 1 5/8 coax cables
(1) Decibel DB 225 Dipole Antenna	(existing)	(1) Leg Mount	135'	(1) 7/8" coax cable
(3) Commscope DBXNH-6565B-A2M Panel Antennas (3) Bias-T Units	**T-Mobile (Proposed)**	*See Below Mounrs*	**130'**	**(12) 7/8" Coaxial Cables (Proposed)**
(6) TMA Units (6) Combiner/Filter untis	T-Mobile (Existing)	(3) Antenna Mounts	130'	*See Above Cables*
(1) Celwave PD-10054-3 antenna	CSP-7 (existing)	(1) 1' Stand-off Mount	122'	(1) 7/8" coax cable
(1) Decibel DB-212-2-A Single Dipole	VSC-27 (existing)	(1) Leg Mount	120'	(1) 7/8" coax cable
(1) Parabolic Grid Dish antenna	VSC-31 (existing)	(1) 1' Stand-off Mount	115'	(1) 7/8" coax cable
None	(existing)	(1) 1' Stand-off (*vacant*)	110'	None
(1) 2-Bay Dipole antenna	CSP-8 (existing)	(1) 2' Stand-off	91'	(1) 7/8" coax cable
(1) 4-Bay Dipole Antenna	VSC-9 (existing)	(1) 2' Stand-off (same as above)	81'-6"	(1) 7/8" coax cable
(1) GPS	Sprint (existing)	Leg Mount	75'	(1) 1/2" coax cable
(1) DB803M-XC Omni Whip antenna (up)	CSP-45 (existing)	(1) 3' Stand-off	33'-3"	(1) 1/2" coax cable

Antenna Type	*Carrier*	*Mount*	*Centerline Elevation*	*Cable*
(1) DB803M-XC Omni Whip antenna (down)	CSP-46 (existing)	(1) 3' Stand-off (same as above)	26'-9"	(1) 1/2" coax cable
(1) DB580-XC Omni Whip antenna (up)	(existing)	(1) 2' Stand-off	17'-3"	(1) 1/2" coax cable
3' Yagi	(existing)	(1) 2' Stand-off (same as above)	14'	(1) 1/2" coax cable

This structural analysis of the communications tower was performed by AECOM, for T-Mobile. The purpose of this analysis was to investigate the structural integrity of the modified tower with its existing and proposed antenna loads. The analysis was conducted to evaluate twist (rotation), sway (deflection), and stress on the tower and the effect of forces to the foundation of the tower resulting from existing and proposed antenna arrangements.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was done in accordance with the 2005 Connecticut State Building Code, TIA/EIA-222-F—Structural Standard for Steel Antenna Towers and Antenna Supporting Structures, the Connecticut State Police Requirements, and the American Institute of Steel Construction (AISC) Manual of Steel Construction—Allowable Stress Design (ASD).

The analysis was conducted using TNX Tower 6.1.3.1. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Load Condition 1 = 95 mph (fastest mile) Wind Load (without ice) + Tower Dead Load
Load Condition 2 = 90 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

The TIA/EIA standard permits one-third increase in allowable stresses for towers and monopoles less than 700 feet tall. For purposes of this analysis, in computing the load capacity the allowable stresses of the tower members were increased by one-third.

4. FINDINGS AND EVALUATION

Stresses on the tower structure were evaluated to compare with the allowable stress in accordance with AISC. The results an initial analysis indicated that the existing tower structure and anchor bolts did not have enough capacity to support the proposed loading conditions. The tower structure requires modifications shown on SK-1 through SK-4. **Once the modifications indicated on SK-1 through SK-4 are performed, the modified structure is considered structurally adequate with the wind load classification specified with the existing and proposed antenna loading noted herein.**

The tower deflection (sway) is 0.6656 degrees, and the tower rotation (twist) is 0.0746 degrees. These figures are within the Connecticut State Police specification of 0.75 degrees for deflection (sway) and rotation (twist).

Proposed Tower Component Stress vs. Capacity Summary

Component / (Section No.)	Controlling Component/ Elevation	Stress (% capacity)	Pass/Fail
Leg (T14)	P6.875x0.5 / 0' – 12.5'	98.5	Pass
Diagonal (T12)	2L3-1/2x3x5/16 / 25' – 37.5'	97.4	Pass
Horizontal (T13)	L4x4x5/16 / 12.5' – 25'	94.1	Pass
Top Grit (T4)	L 2-1/2x2-1/2x3/16 / 150' – 158.333'	87.6	Pass
Red Horizontal (T14)	L 2-1/2x2-1/2x3/16 / 0' – 12.5'	77.0	Pass
Red Diagonal (T12)	L2-1/2x2-1/2x3/16 / 25' – 37.5'	86.2	Pass
Inner Bracing (T12)	L 2-1/2x2-1/2x3/16 / 25' – 37.5'	12.7	Pass
Bolt Checks(T10)	@ diagonal / 50'-75'	96.7	Pass

Foundation Summary

Foundation	Component	Stress (% capacity/FOS)	Pass/Fail	Comments:
Tower Leg Anchor	Anchor Bolt w/ additional modified anchors	83	Pass	Modified anchor (See Section 6 for calcs.)
Pier and Square Mat	Punching Shear	93.5	Pass	
Pier and Square Mat	Uplift Resistance	91.3 / 2.19	Pass	Min FOS = 2.0
Pier and Square Mat	OTM	84.0 / 2.38	Pass	Min FOS = 2.0

Tower Base Reactions:

Description	Current	Allowable
Tower Twist (degrees)	0.0746	---
Tower Sway (degrees)	0.6656	
Total Deflection (degrees)	0.7402	0.75

5. CONCLUSIONS

The results of an initial analysis indicated the existing tower and anchor bolts did not have enough capacity for the proposed loading conditions. The tower structure and anchor bolts require modifications shown on SK-1 through SK-4. **Once the modifications indicated on sheets SK-1 through SK-4 are performed, the modified structure is considered structurally adequate with the wind load classification specified above with the existing and proposed antenna loading. No installation of proposed antennas shall occur without the required modification being completed.**

The tower deflection (sway) is 0.6656 degrees, and the tower rotation (twist) is 0.075 degrees. **These figures combined are within the Connecticut State Police Requirement of 0.75 degrees for twist and sway.**

Limitations/Assumptions:

This report is based on the following:

1) Tower inventory as listed in this report.
2) Tower is properly installed and maintained.
3) All members are as specified in the original design documents and are in good condition.
4) All required members are in place.
5) All bolts are in place and are properly tightened.
6) Tower is in plumb condition.
7) All member protective coatings are in good condition.
8) All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
9) Foundations are in good condition without defects and were properly constructed to support original design loads as specified in the original design documents.

AECOM is not responsible for any modifications completed prior to or hereafter in which AECOM is not or was not directly involved. Modifications include but are not limited to:

A. Adding antennas
B. Removing/replacing antennas
C. Adding coaxial cables

AECOM hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact AECOM. AECOM disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

Ongoing and Periodic Inspection and Maintenance:

After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

The owner shall refer to TIA/EIA-222-F for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. According to TIA/EIA-222-F section 14.1, Note 1; it is recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading conditions.

6. DRAWINGS AND DATA

REINFORCEMENT DRAWINGS SK-1 THROUGH SK-4

GENERAL CONSTRUCTION NOTES

1. ALL WORK SHALL COMPLY WITH THE CONNECTICUT STATE BUILDING, SUPPLEMENTS AND AMENDMENTS AND LIFE SAFETY CODES
2. CONTRACTOR IS TO REVIEW ALL DRAWINGS AND NOTES 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 SUB-CONTRACTORS AND ALL RELATED PARTIES. THE SUB-CONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND NOTES 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 DRAWINGS.
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 AND ELECTRICAL SUB-CONTRACTORS SHALL PAY FOR THEIR PERMITS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS ON SITE AT ALL TIMES AND ENSURE THE DISTRIBUTION OF NEW DRAWINGS TO SUB-CONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. CONTRACTOR SHALL FURNISH "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT
7. INSTALLATION OF THIS WIRELESS COMMUNICATIONS EQUIPMENT SITE REQUIRES WORK IN THE IMMEDIATE VICINITY OF EXISTING OPERATING TELECOMMUNICATION SYSTEMS. THE CONTRACTOR SHALL PROVIDE AND COORDINATE THE METHODS OF PROTECTION WITH THE CONNECTICUT STATE POLICE AND THE VARIOUS TELECOMMUNICATION OPERATORS. THERE SHALL BE NO INTERRUPTION OF OPERATION WITHOUT TIMELY COORDINATION WITH AND APPROVAL BY THE VARIOUS COMMUNICATIONS OPERATORS.
8. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER MFR'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR ARCHITECT.
9. 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
10. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ARCHITECT FOR REVIEW. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTAL TO THE ARCHITECT FOR REVIEW
11. 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. SHOP DRAWINGS SHALL REFLECT FIELD VERIFIED DIMENSIONS.
12. EXISTING DIMENSIONS OF STRUCTURE SHOWN ON THESE DOCUMENTS ARE BASED ON ORIGINAL TOWER CONSTRUCTION DRAWINGS BY STAINLESS INC., DATED JUNE 1994, AND ARE NOT GUARANTEED. CONTRACTOR SHALL TAKE FIELD DIMENSIONS AS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK AND SHALL ASSUME FULL RESPONSIBILITY FOR THEIR ACCURACY. SHOP DRAWINGS SHALL CONTAIN FIELD VERIFIED DIMENSIONS
13. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURE AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY
14. CONTRACTOR TO CONTACT "CALL BEFORE YOU DIG" AT 1-800-922-4455 TO VERIFY AND IDENTIFY THE EXACT LOCATIONS OF ALL UNDERGROUND UTILITIES AND OBSTRUCTIONS IDENTIFIED PRIOR TO COMMENCING WORK IN THE CONTRACT AREA

STRUCTURAL NOTES

STRUCTURAL STEEL MATERIAL:

STRUCTURAL STEEL BEAMS, CHANNELS, PLATES A36
STRUCTURAL ANGLES A36
EXISTING TOWER LEG ..... A 572-Gr 50 & Gr 60

STRUCTURAL STEEL SHALL CONFORM TO ALL THE REQUIREMENTS OF THE ASTM SPECIFICATION, AS REFERENCED IN THE CODE.

UNLESS OTHERWISE NOTED, ALL STEEL WILL BE GALVANIZED IN ACCORDANCE WITH ASTM 123 AFTER FABRICATION. TOUCH UP ALL DAMAGED GALVANIZED STEEL WITH APPROVED COLD ZINC, "GALVANOX", "DRY GALV", "ZINC-IT", OR APPROVED EQUIVALENT, IN ACCORDANCE WITH MANUFACTURERS GUIDELINES. TOUCH-UP DAMAGED NON GALVANIZED STEEL WITH SAME PAINT APPLIED IN SHOP OR FIELD.

SHOP AND ERECTION DRAWINGS SHALL BE SUBMITTED FOR ALL STRUCTURAL STEEL WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. SUBMIT 2 SETS OF PRINTS FOR THE ENGINEER REVIEW.

MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION

THE OMISSION OF ANY MATERIAL THAT WAS SHOWN ON THE CONTRACT DRAWINGS SHALL NOT RELIEVE THE CONTRACTOR OF PROVIDING THE SAME

CONNECTIONS / FIELD ASSEMBLY:

BOLTED CONNECTIONS: UNLESS OTHERWISE NOTED, ALL JOINTS ARE SLIP CRITICAL TYPE, REQUIRING 5/8" DIA A325-N BOLTS, A563 NUTS AND F436 WASHERS, ALL GALVANIZED. BEVELED WASHERS SHALL BE USED ON BEAM FLANGES HAVING A SLOPE GREATER THAN 1:20

STRUCTURE IS DESIGNED TO BE LEVEL AND PLUMB, SELF-SUPPORTING AND STABLE AFTER WORK IS COMPLETED.

COMMENCEMENT OF WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK

THE CONTRACTOR IS RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION. NO MEMBER OF THE TOWER SHALL BE LEFT DISCONNECTED FOR THE NEXT WORKING DAY. THE CONTRACTOR SHALL BE AWARE OF WEATHER AND WIND CONDITIONS AND NOT PERFORM MEMBER REPLACEMENT IN A WIND

INSPECTIONS:

SPECIAL INSPECTIONS ARE REQUIRED PER THE CODE FOR STRUCTURAL STEEL WORK.

OWNER WILL SUPPLY THE SERVICES OF A SPECIAL INSPECTOR AND TESTING AGENTS AS REQUIRED. CONTRACTOR SHALL COORDINATE INSPECTIONS OF FABRICATOR'S AND ERECTOR'S WORK AND MATERIALS TO MEET THE REQUIREMENTS OF THE STATEMENT OF SPECIAL INSPECTIONS FOR THIS PROJECT.

COPIES OF TESTING AND INSPECTION REPORTS WILL BE PROVIDED TO THE OWNER, BUILDING OFFICIAL, ENGINEER OF RECORD AND CONTRACTOR

PROJECT NO. 36931389
Designed by: MCD
Drawn by: KAP
Checked by: KAB
Approved by: RAS

AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
(860)-529-8882

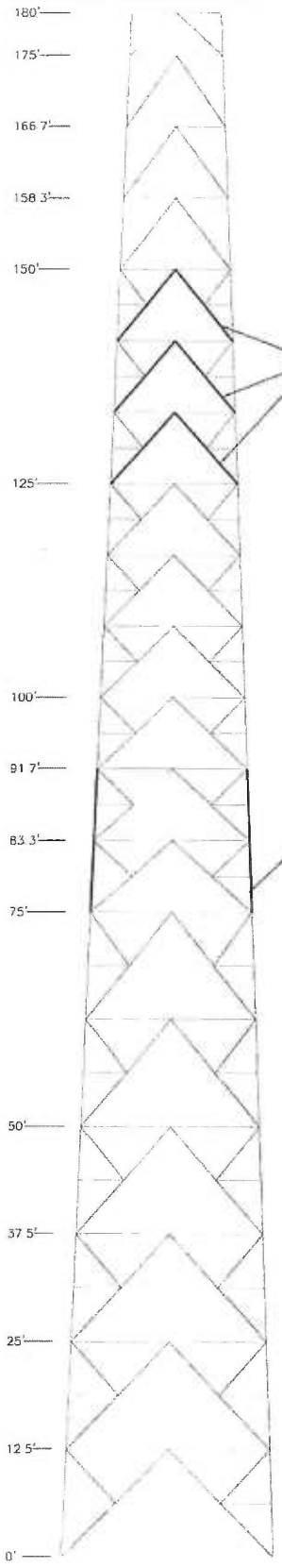
T-Mobile

SITE ADDRESS: T-MOBILE SITE: CT11033E
CSP #36, 315 SPENCER PLAINS ROAD
WESTBROOK, CONNECTICUT 06498

REV.	DATE:	DESCRIPTION

Scale: AS NOTED | Date: 05/22/15
Job No. NSS-015 | File No.

Dwg. No. SK-1
Dwg. 1 of 4



NOTE:
INSTALLATION OF 1/3 PIPE BETWEEN ELEVATIONS 75' AND 91.7' WILL REQUIRE COORDINATION WITH EXISTING U-BOLT CONNECTIONS. THE 1/3 PIPE IS REQUIRED TO BE INSTALLED DIRECTLY IN CONTACT WITH TOWER LEGS. EXISTING U-BOLTS WILL BE REQUIRED TO BE ADJUSTED TO PERMIT INSERTION OF THE 1/3 PIPE. EXISTING U-BOLTS MAY BE REQUIRED TO BE REPLACED IF U-BOLT THREADS ARE NOT LONG ENOUGH TO PERMIT THE INSERTION OF 1/3 PIPE. SEE SK-3 FOR ADDITIONAL DETAIL AND NOTES.

1 / SK-2 **TOWER ELEVATION**
SCALE: 1" = 20'-0"

PROJECT NO. 36931389
Designed by: MCD
Drawn by: KAP
Checked by: KAB
Approved by: RAS

AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
(860)-529-8882

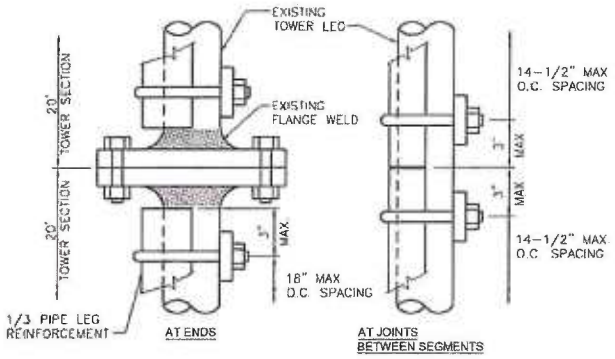
T-Mobile

T-MOBILE SITE: CT11033E
SITE ADDRESS: CSP #36, 315 SPENCER PLAINS ROAD
WESTBROOK, CONNECTICUT 06498

REV.	DATE:	DESCRIPTION

Scale: AS NOTED
Date: 05/22/15
Job No. NSS-015
File No.

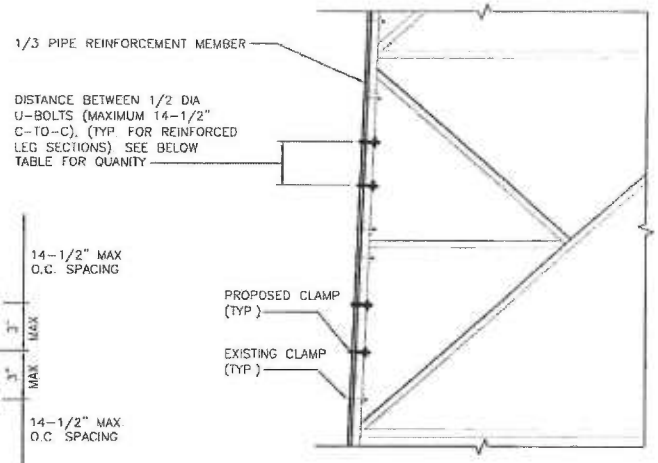
Dwg. No. SK-2
Dwg. 2 of 4



2 SK-3 REINFORCEMENT DETAIL

SCALE: N.T.S.

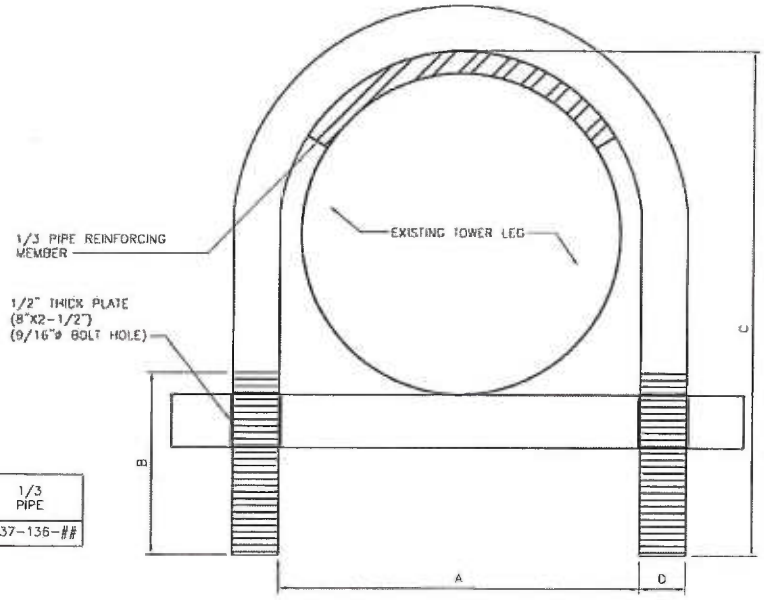
NOTE: 1/3 PIPE LEG REINFORCING SHALL BE PLACED AS CLOSE TO EXISTING FLANGE WELD AS POSSIBLE.



1 SK-3 1/3 PIPE LEG REINFORCEMENT AT TOWER SECTION

SCALE: 1/2" = 1'-0"

ELEVATION	CLAMP QTY	DIM A	DIM B	DIM C	DIM D	LEG ø	1/3 PIPE
91 7'-75.0'	24	5"	2"	7-1/2"	1/2"	5"	P637-136-##



3 SK-3 U-BOLT FOR LEG REINFORCEMENT

SCALE: N.T.S.

NOTE:
U-BOLTS SHOWN DENOTE MINIMUM QUANTITY REQUIREMENTS. LOCATIONS ARE APPROXIMATE

NOTES:
U-BOLT DISTANCE FROM END OF 1/3 PIPE SHALL BE 3" (MAX.) U.N.O. U-BOLT MATERIAL SHALL BE (AT MINIMUM) GRADE 2 ASTM J429 HOT DIPPED GALVANIZED

1/3 PIPE LEG REINFORCEMENT SHALL HAVE ENDS BUTTED TIGHT AGAINST EACH OTHER TO MINIMIZE GAPS BETWEEN THE REINFORCEMENT DURING INSTALLATION. PART NUMBERS LISTED FROM PRIMUS ELECTRONICS CORPORATION ARE FOR DESCRIPTION PURPOSES. NEW LEG BRACING SHALL BE, AT MINIMUM, EQUIVALENT TO THE DETAILS SHOWN

PROJECT NO. 36931389
Designed by: MCD
Drawn by: KAP
Checked by: KAB
Approved by: RAS

AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
(860)-529-8882

T-Mobile

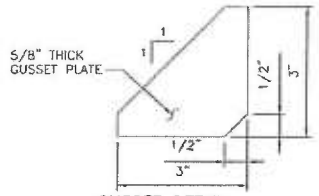
T-MOBILE SITE: CT11033E
SITE ADDRESS: CSP #36, 315 SPENCER PLAINS ROAD
WESTBROOK, CONNECTICUT 06498

REV.	DATE:	DESCRIPTION

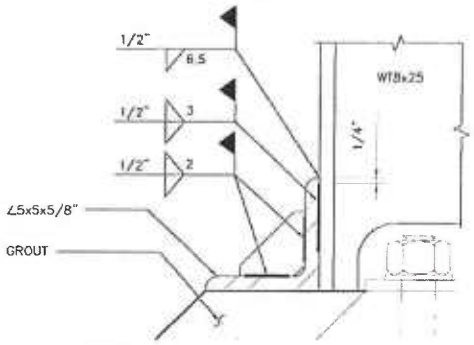
Scale: AS NOTED | Date: 05/22/15
Job No. NSS-015 | File No.

Dwg. No. SK-3

Dwg. 3 of 4

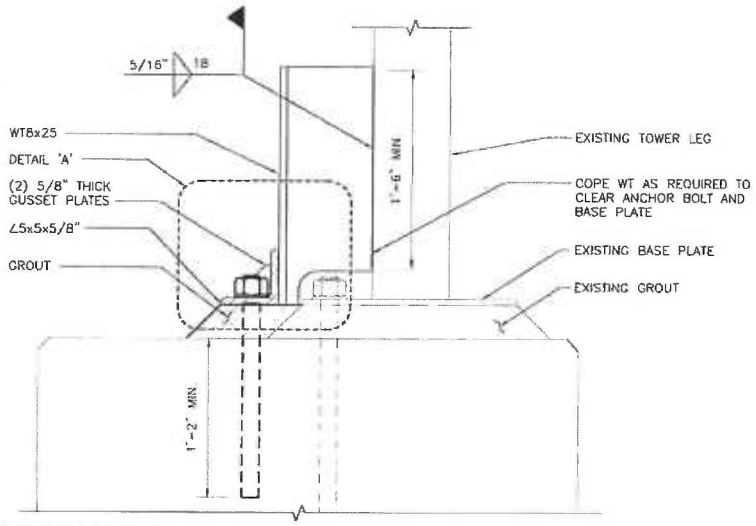


GUSSET DETAIL
SCALE: 3"=1'-0"

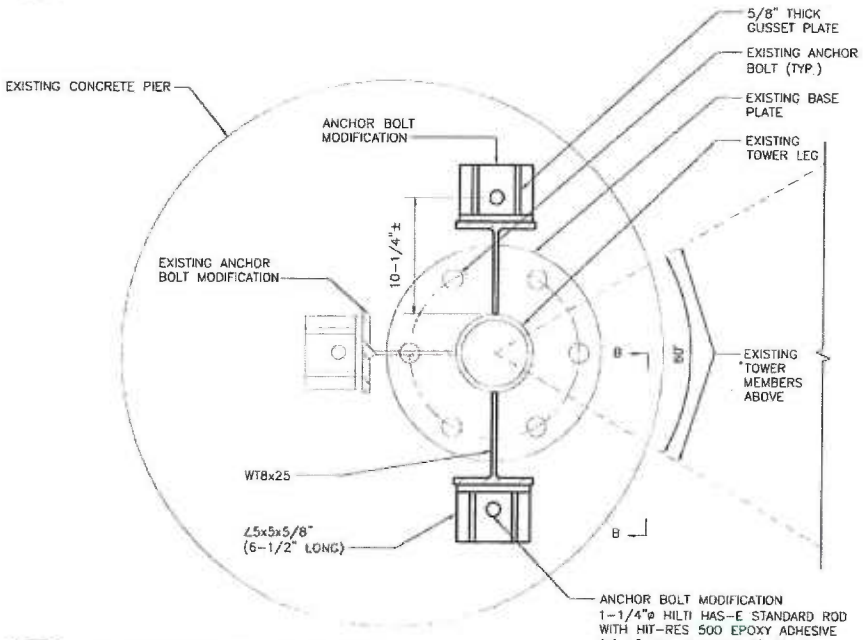


DETAIL "A"
SCALE: 1 1/2"=1'-0"

NOTE:
ANCHOR BOLT NOT SHOWN FOR CLARITY



2 / SK-4 SECTION B-B
SCALE: 3/4" = 1'-0"



1 / SK-4 ANCHOR BOLT MODIFICATION PLAN
SCALE: 3/4" = 1'-0"

PROJECT NO. 36931389	AECOM	T-Mobile
Designed by: MCD	500 ENTERPRISE DRIVE	
Drawn by: KAP	ROCKY HILL, CONNECTICUT	T-MOBILE SITE: CT11033E
Checked by: KAB	(860)-529-8882	SITE ADDRESS: CSP #36, 315 SPENCER PLAINS ROAD
Approved by: RAS		WESTBROOK, CONNECTICUT 06498

REV.	DATE:	DESCRIPTION

Dwg. No. SK-4

Scale: AS NOTED | Date: 05/22/15

Job No. NSS-015 | File No. | Dwg 4 of 4

AECOM

Job Westbrook, CT MCD Application
Description Effective Clamp Spacing for Reinforced Leg
Project No. N55-015R2
Computed by MCD
Checked by
Page ____ of ____
Sheet ____ of ____
Date 5/2015
Date ____
Reference

Calculate Effective distance of Clamp for reinforced leg:

- For the regions of 75' to 79.2'; 79.2' to 83.3'; 83.3' to 87.5'; 87.5' to 91.7'

- Use 1/3 Pipe (Previous Part # P657-136-##)
  - Properties:
    - Material = 50 ksi (min) [ASTM A500-C]
    - Area = 2.0573 in²
    - Ix = 0.3309 in⁴ → $r_x = \sqrt{\frac{I_x}{A}}$ = 0.4030 in ← (governs)
    - Iy = 4.0411 in⁴ → $r_y = \sqrt{\frac{I_y}{A}}$ = 1.4084 in

- Consider Leg Effective length = 4'-2" = 50 in

- Compare property of existing leg against the reinforcing pipe:
  - Leg Properties
    - Stainless Pipe x0.5 → O.D → 5"
      K = 1.0
      L = 50 in
      r = 1.6008 in
      $\frac{KL}{r} = \frac{(1.0)(50\text{ in})}{(1.6008\text{ in})} = 31.2544$

- Consider weaker radius of gyration for analysis:

$$\#\text{Clamps} = \frac{KL/(\#\text{Clamp}-1)}{r_{weak}} = \frac{(1.0)(50\text{ in})/(4-1)}{.4030\text{ in}} = 31.0174$$

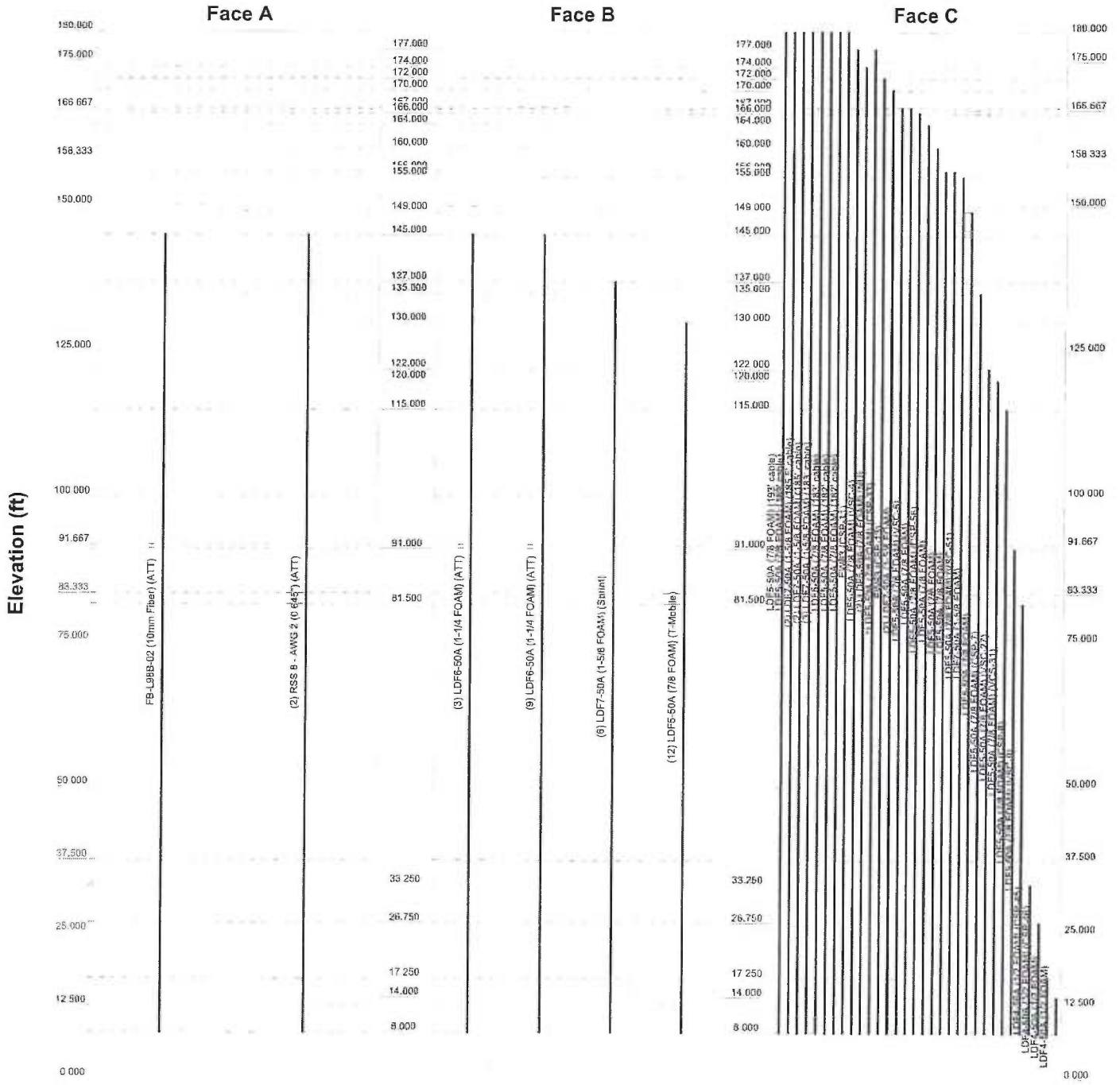
- Use 4 clamps per 4'-2" segment using (2) existing & (2) new clamps.

TNX TOWER INPUT / OUTPUT SUMMARY

TNX TOWER FEEDLINE DISTRIBUTION CHART

Feed Line Distribution Chart
0' - 180'

Round Flat App In Face App Out Face Truss Leg

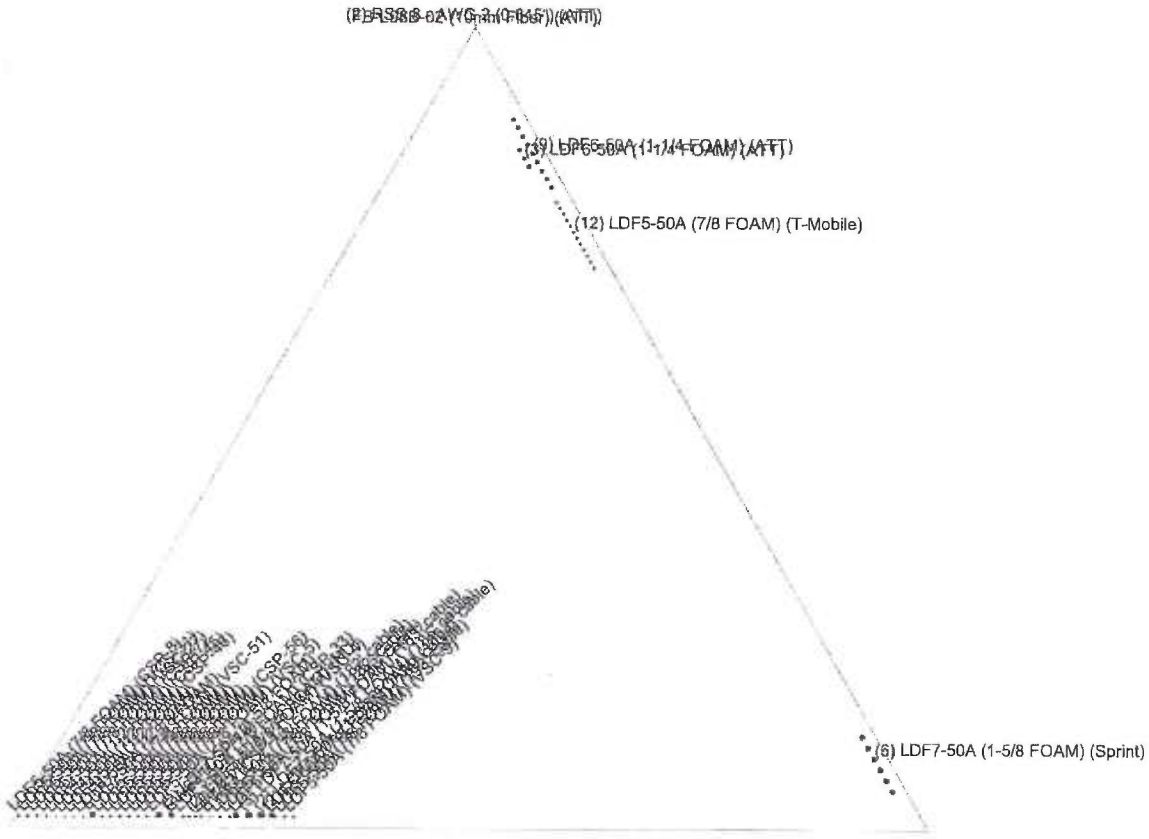


AECOM	Job: MODification - 180' Lattice Tower (CSP #36		
500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-529-8882 FAX: 860-529-3991	Project: Westbrook, Connecticut		
	Client: T-Mobile	Drawn by: MCD	App'd:
	Code: TIA/EIA-222-F	Date: 05/21/15	Scale: NTS
	Path:		Dwg No. E-7

TNX TOWER FEEDLINE PLAN

Feed Line Plan

Round _____ Flat _____ App In Face _____ App Out Face _____



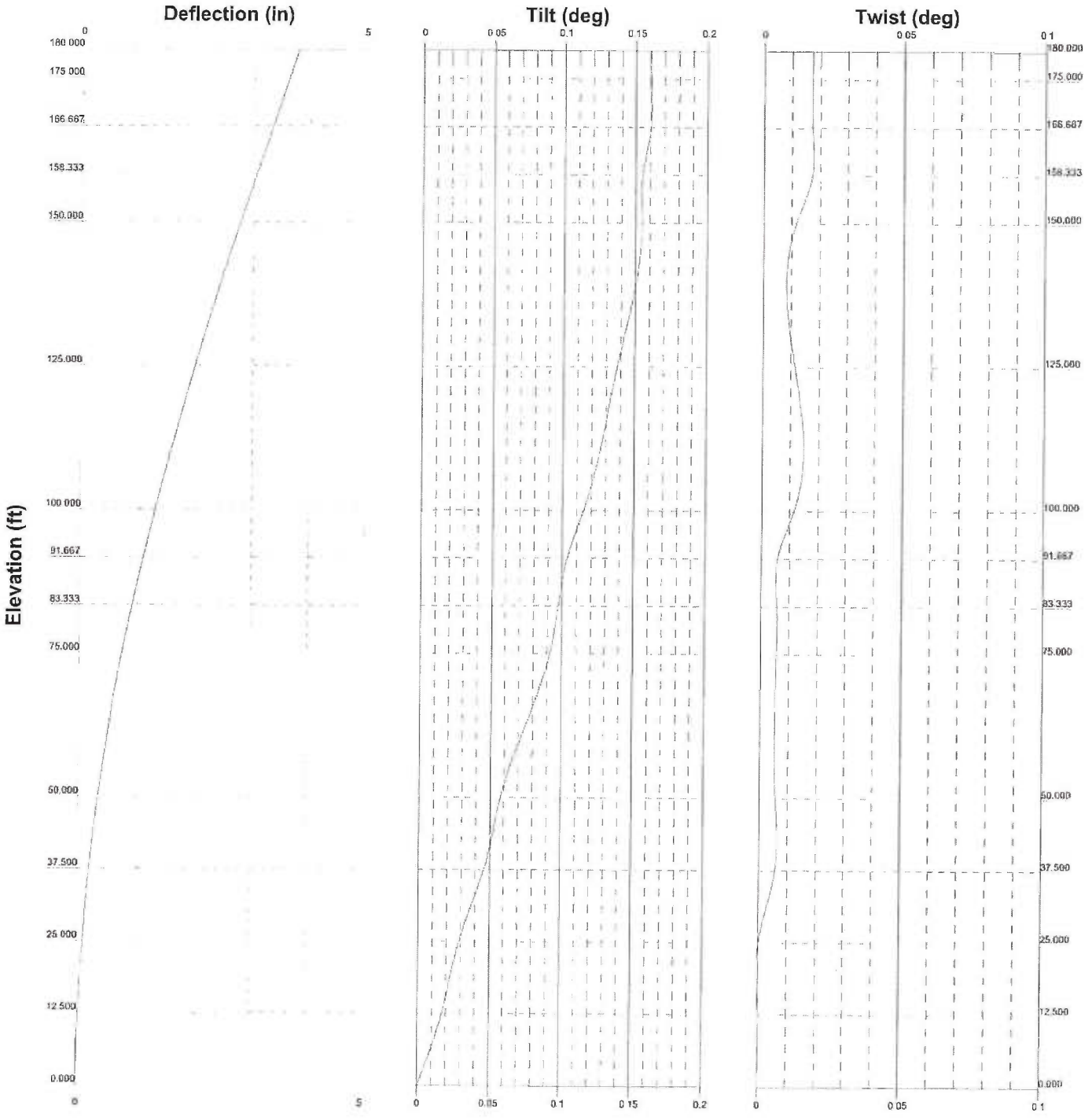
AECOM
500 Enterprise Drive, Suite 3B
Rocky Hill, CT
Phone: 860-529-8882
FAX: 860-529-3991

Job:	MODification - 180' Lattice Tower (CSP #36		
Project:	Westbrook, Connecticut		
Client:	T-Mobile	Drawn by: MCD	App'd
Code:	TIA/EIA-222-F	Date: 05/21/15	Scale: NTS
Path:			Dwg No E-7

TNX TOWER DEFLECTION, TILT, AND TWIST

TIA/EIA-222-F - Service - 50 mph

Maximum Values



AECOM
500 Enterprise Drive, Suite 3B
Rocky Hill, CT
Phone: 860-529-8882
FAX: 860-529-3991

Job: *MODification - 180' Lattice Tower (CSP #36*			
Project: *Westbrook, Connecticut*			
Client: T-Mobile	Drawn by: MCD		App'd
Code: TIA/EIA-222-F	Date: 05/21/15		Scale: NTS
Path:			Dwg No. E-5

TNX TOWER DETAILED OUTPUT

tnxTower	Job	Page
	MODification - 180' Lattice Tower (CSP #36)	1 of 56
AECOM 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-529-8882 FAX: 860-529-3991	Project Westbrook, Connecticut	Date 11:57:55 05/21/15
	Client T-Mobile	Designed by MCD

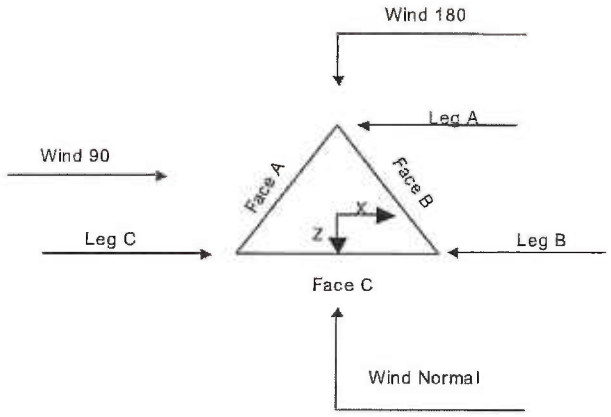
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.000 ft above the ground line.
The base of the tower is set at an elevation of 0.000 ft above the ground line.
The face width of the tower is 10.599 ft at the top and 25.000 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 95 mph.
Nominal ice thickness of 0.500 in.
Ice density of 56 pcf.
A wind speed of 90 mph is used in combination with ice.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
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	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	Assume Rigid Index Plate	√ Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	All Leg Panels Have Same Allowable
Escalate Ice	Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
√ Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Poles
√ Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	√ Include Shear-Torsion Interaction
√ Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	√ Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination	Use TIA-222-G Tension Splice Capacity Exemption	



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	180.000-175.000			10.599	1	5.000
T2	175.000-166.667			11.000	1	8.333
T3	166.667-158.333			11.667	1	8.333
T4	158.333-150.000			12.333	1	8.333
T5	150.000-125.000			13.000	1	25.000
T6	125.000-100.000			15.000	1	25.000
T7	100.000-91.667			17.000	1	8.333
T8	91.667-83.333			17.667	1	8.333
T9	83.333-75.000			18.333	1	8.333
T10	75.000-50.000			19.000	1	25.000
T11	50.000-37.500			21.000	1	12.500
T12	37.500-25.000			22.000	1	12.500
T13	25.000-12.500			23.000	1	12.500
T14	12.500-0.000			24.000	1	12.500

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	180.000-175.000	5.000	K Brace Down	No	Yes	0.000	0.000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T2	175.000-166.667	8.333	K Brace Down	No	Yes	0.000	0.000
T3	166.667-158.333	8.333	K Brace Down	No	Yes	0.000	0.000
T4	158.333-150.000	8.333	K Brace Down	No	Yes	0.000	0.000
T5	150.000-125.000	8.333	K1 Down	No	Yes	0.000	0.000
T6	125.000-100.000	8.333	K1 Down	No	Yes	0.000	0.000
T7	100.000-91.667	8.333	K1 Down	No	Yes	0.000	0.000
T8	91.667-83.333	8.333	K1 Down	No	Yes	0.000	0.000
T9	83.333-75.000	8.333	K1 Down	No	Yes	0.000	0.000
T10	75.000-50.000	12.500	K1 Down	No	Yes	0.000	0.000
T11	50.000-37.500	12.500	K1 Down	No	Yes	0.000	0.000
T12	37.500-25.000	12.500	K1 Down	No	Yes	0.000	0.000
T13	25.000-12.500	12.500	K1 Down	No	Yes	0.000	0.000
T14	12.500-0.000	12.500	K1 Down	No	Yes	0.000	0.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180.000-175.000	Pipe	Stainless P5x0.250	A513-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T2 175.000-166.667	Pipe	Stainless P5x0.250	A513-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T3 166.667-158.333	Pipe	Stainless P5x0.250	A513-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T4 158.333-150.000	Pipe	Stainless P5x0.250	A513-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T5 150.000-125.000	Pipe	Stainless P5x0.300	A513-50 (50 ksi)	Double Angle	2L2 1/2x2x5/16	A36 (36 ksi)
T6 125.000-100.000	Pipe	Stainless P5x0.400	A513-50 (50 ksi)	Double Angle	2L3x2 1/2x1/4	A36 (36 ksi)
T7 100.000-91.667	Pipe	Stainless P5x0.500	A513-50 (50 ksi)	Double Angle	2L3x2 1/2x1/4	A36 (36 ksi)
T8 91.667-83.333	Arbitrary Shape	1/3 Pipe w/ 5"x0.5 Stainless	A500-50 (50 ksi)	Double Angle	2L3x2 1/2x1/4	A36 (36 ksi)
T9 83.333-75.000	Arbitrary Shape	1/3 Pipe w/ 5"x0.5 Stainless	A500-50 (50 ksi)	Double Angle	2L3x2 1/2x1/4	A36 (36 ksi)
T10 75.000-50.000	Pipe	Stainless P6.875x0.400	A572-60 (60 ksi)	Double Angle	2L3 1/2x3x3/8	A36 (36 ksi)
T11 50.000-37.500	Pipe	Stainless P6.875x0.500	A572-60 (60 ksi)	Double Angle	2L3 1/2x3x5/16	A36 (36 ksi)
T12 37.500-25.000	Pipe	Stainless P6.875x0.500	A572-60 (60 ksi)	Double Angle	2L3 1/2x3x5/16	A36 (36 ksi)
T13 25.000-12.500	Pipe	Stainless P6.875x0.500	A572-60 (60 ksi)	Double Angle	2L3x3 1/2x1/4	A36 (36 ksi)
T14 12.500-0.000	Pipe	Stainless P6.875x0.500	A572-60 (60 ksi)	Double Angle	2L3x3 1/2x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 180.000-175.000	Single Angle	L3x3x1/4	A36 (36 ksi)	Pipe		A36 (36 ksi)
T3 166.667-158.333	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Pipe		A36 (36 ksi)
T4 158.333-150.000	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Pipe		A36 (36 ksi)
T12 37.500-25.000	Double Equal Angle	2L4x4x1/4	A36 (36 ksi)	Pipe		A36 (36 ksi)
T14 12.500-0.000	Double Equal Angle	2L4x4x5/16	A36 (36 ksi)	Pipe		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 180.000-175.000	None	Pipe		A36 (36 ksi)	Single Angle	L1x1x1/8	A36 (36 ksi)
T2 175.000-166.667	None	Pipe		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T3 166.667-158.333	None	Pipe		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T4 158.333-150.000	None	Pipe		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 150.000-125.000	None	Pipe		A36 (36 ksi)	Single Angle	L3x2 1/2x1/4	A36 (36 ksi)
T6 125.000-100.000	None	Pipe		A36 (36 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T7 100.000-91.667	None	Pipe		A36 (36 ksi)	Double Equal Angle	2L3x3x1/4	A36 (36 ksi)
T8 91.667-83.333	None	Pipe		A36 (36 ksi)	Double Angle	2L3x3x1/4	A36 (36 ksi)
T9 83.333-75.000	None	Pipe		A36 (36 ksi)	Double Angle	2L3x3x1/4	A36 (36 ksi)
T10 75.000-50.000	None	Pipe		A36 (36 ksi)	Single Angle	L4x4x1/4	A36 (36 ksi)
T11 50.000-37.500	None	Pipe		A36 (36 ksi)	Single Angle	L4x4x1/4	A36 (36 ksi)
T12 37.500-25.000	None	Pipe		A36 (36 ksi)	Single Angle	L4x4x1/4	A36 (36 ksi)
T13 25.000-12.500	None	Pipe		A36 (36 ksi)	Single Angle	L4x4x5/16	A36 (36 ksi)
T14 12.500-0.000	None	Pipe		A36 (36 ksi)	Single Angle	L4x4x5/16	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
T5 150.000-125.000	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T6 125.000-100.000	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T7 100.000-91.667	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T8 91.667-83.333	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T9 83.333-75.000	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T10 75.000-50.000	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T11 50.000-37.500	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T12 37.500-25.000	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T13 25.000-12.500	Solid Round		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T14 12.500-0.000	Solid Round		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
T5 150.000-125.000	A36 (36 ksi)	Horizontal (1)	Single Angle	L2x2x3/16	1
		Diagonal (1)	Single Angle	L2x2x3/16	1
T6 125.000-100.000	A36 (36 ksi)	Horizontal (1)	Single Angle	L2x2x3/16	1
		Diagonal (1)	Single Angle	L2x2x3/16	1
T7 100.000-91.667	A36 (36 ksi)	Horizontal (1)	Single Angle	L2x2x3/16	1
		Diagonal (1)	Single Angle	L2x2x3/16	1
T8 91.667-83.333	A36 (36 ksi)	Horizontal (1)	Single Angle	L2x2x3/16	1
		Diagonal (1)	Single Angle	L2x2x3/16	1
T9 83.333-75.000	A36 (36 ksi)	Horizontal (1)	Single Angle	L2x2x3/16	1
		Diagonal (1)	Single Angle	L2x2x3/16	1
T10 75.000-50.000	A36 (36 ksi)	Horizontal (1)	Single Angle	L2 1/2x2 1/2x3/16	1
		Diagonal (1)	Single Angle	L2 1/2x2 1/2x3/16	1
T11 50.000-37.500	A36 (36 ksi)	Horizontal (1)	Single Angle	L2 1/2x2 1/2x3/16	1
		Diagonal (1)	Single Angle	L2 1/2x2 1/2x3/16	1
T12 37.500-25.000	A36 (36 ksi)	Horizontal (1)	Single Angle	L2 1/2x2 1/2x3/16	1
		Diagonal (1)	Single Angle	L2 1/2x2 1/2x3/16	1
T13 25.000-12.500	A36 (36 ksi)	Horizontal (1)	Single Angle	L2 1/2x2 1/2x3/16	1
		Diagonal (1)	Single Angle	L3x3x1/4	1
T14 12.500-0.000	A36 (36 ksi)	Horizontal (1)	Single Angle	L2 1/2x2 1/2x3/16	1
		Diagonal (1)	Single Angle	L3x3x1/4	1

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_l	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 180.000-175.000	0.000	0.000	A36 (36 ksi)	1	1	1	36.000	36.000
T2 175.000-166.667	0.000	0.000	A36 (36 ksi)	1	1	1	36.000	36.000
T3 166.667-158.333	0.000	0.000	A36 (36 ksi)	1	1	1	36.000	36.000
T4 158.333-150.000	0.000	0.000	A36 (36 ksi)	1	1	1	36.000	36.000
T5 150.000-125.000	0.000	0.000	A36 (36 ksi)	1	1	1	36.000	36.000
T6 125.000-100.000	0.000	0.000	A36 (36 ksi)	1	1	1	36.000	36.000
T7 100.000-91.667	0.000	0.000	A36 (36 ksi)	1	1	1	36.000	36.000
T8 91.667-83.333	0.000	0.000	A36 (36 ksi)	1	1	1	36.000	36.000
T9 83.333-75.000	0.000	0.000	A36 (36 ksi)	1	1	1	36.000	36.000
T10 75.000-50.000	0.000	0.000	A36 (36 ksi)	1	1	1	36.000	36.000
T11 50.000-37.500	0.000	0.000	A36 (36 ksi)	1	1	1	36.000	36.000
T12 37.500-25.000	0.000	0.000	A36 (36 ksi)	1	1	1	36.000	36.000
T13 25.000-12.500	0.000	0.000	A36 (36 ksi)	1	1	1	36.000	36.000
T14 12.500-0.000	0.000	0.000	A36 (36 ksi)	1	1	1	36.000	36.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 180.000-175.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 175.000-166.667	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 166.667-158.333	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 158.333-150.0	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec Horiz X Y	Inner Brace X Y
00										
T5	Yes	No	1	1	1	1	1	1	1	1
150.000-125.000				1	1	1	1	1	1	1
T6	Yes	No	1	1	1	1	1	1	1	1
125.000-100.000				1	1	1	1	1	1	1
T7	Yes	No	1	1	1	1	1	1	1	1
100.000-91.667				1	1	1	1	1	1	1
T8	Yes	No	1	1	1	1	1	1	1	1
91.667-83.333				1	1	1	1	1	1	1
T9	Yes	No	1	1	1	1	1	1	1	1
83.333-75.000				1	1	1	1	1	1	1
T10	Yes	No	1	1	1	1	1	1	1	1
75.000-50.000				1	1	1	1	1	1	1
T11	Yes	No	1	1	1	1	1	1	1	1
50.000-37.500				1	1	1	1	1	1	1
T12	Yes	No	1	1	1	1	1	1	1	1
37.500-25.000				1	1	1	1	1	1	1
T13	Yes	No	1	1	1	1	1	1	1	1
25.000-12.500				1	1	1	1	1	1	1
T14	Yes	No	1	1	1	1	1	1	1	1
12.500-0.000				1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		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	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
180.000-175.000														
T2	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
175.000-166.667														
T3	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
166.667-158.333														
T4	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
158.333-150.000														
T5	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
150.000-125.000														
T6	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
125.000-100.000														

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
T7 100.000-91.667	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 91.667-83.333	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T9 83.333-75.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T10 75.000-50.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T11 50.000-37.500	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T12 37.500-25.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T13 25.000-12.500	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T14 12.500-0.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No	Bolt Size in	No.	Bolt Size in	No
T1 180.000-175.000	Flange	0.750 A325X	0	0.750 A325X	1	0.625 A325X	2	0.625 A325N	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0
T2 175.000-166.667	Flange	0.750 A325X	6	0.750 A325X	1	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325X	2	0.625 A325N	0
T3 166.667-158.333	Flange	0.750 A325X	0	0.750 A325X	1	0.625 A325X	2	0.000 A325N	0	0.625 A325N	0	0.625 A325X	2	0.625 A325N	0
T4 158.333-150.000	Flange	0.750 A325X	0	0.750 A325X	1	0.625 A325X	2	0.625 A325N	0	0.625 A325N	0	0.625 A325X	2	0.625 A325N	0
T5 150.000-125.000	Flange	0.750 A325X	6	0.750 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325X	2	0.625 A325N	0
T6 125.000-100.000	Flange	0.750 A325X	6	0.750 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325X	2	0.625 A325N	0
T7 100.000-91.667	Flange	1.000 A325X	6	0.750 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325X	2	0.625 A325N	0
T8 91.667-83.333	Flange	0.750 A325X	0	0.750 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325X	2	0.625 A325N	0
T9 83.333-75.000	Flange	0.750 A325X	0	0.750 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325X	2	0.625 A325N	0
T10 75.000-50.000	Flange	1.000 A325X	8	0.750 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325X	2	0.625 A325N	0

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No	Long Horizontal Bolt Size in	Long Horizontal No	Short Horizontal Bolt Size in	Short Horizontal No.
T11	Flange	1.000	8	1.000	1	0.625	0	0.000	0	0.625	0	0.625	2	0.625	0
50.000-37.500		A325X		A325X		A325N		A325N		A325N		A325X		A325N	
T12	Flange	1.000	0	1.000	1	0.625	2	0.625	0	0.625	0	0.625	2	0.625	0
37.500-25.000		A325X		A325X		A325X		A325N		A325N		A325X		A325N	
T13	Flange	1.000	8	1.000	1	0.625	0	0.000	0	0.625	0	0.625	2	0.625	0
25.000-12.500		A325X		A325X		A325N		A325N		A325N		A325X		A325N	
T14	Flange	1.000	0	1.000	1	0.625	2	0.625	0	0.625	0	0.625	2	0.625	0
12.500-0.000		A325X		A325X		A325X		A325N		A325N		A325X		A325N	

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 klf
LDF5-50A (7/8 FOAM) (193' cable)	C	Yes	Ar (CfAe)	180.000 - 8.000	-3.000	0.2	1	1	1.090	1.090		0.000
LDF5-50A (7/8 FOAM) (189' cable)	C	Yes	Ar (CfAe)	180.000 - 8.000	-3.000	0.21	1	1	1.090	1.090		0.000
LDF7-50A (1-5/8 FOAM) (185.5' cable)	C	Yes	Ar (CfAe)	180.000 - 8.000	-3.000	0.22	2	2	1.980	1.980		0.001
LDF7-50A (1-5/8 FOAM) (185' cable)	C	Yes	Ar (CfAe)	180.000 - 8.000	-3.000	0.23	2	2	1.980	1.980		0.001
LDF7-50A (1-5/8 FOAM) (183' cable)	C	Yes	Ar (CfAe)	180.000 - 8.000	-3.000	0.24	3	3	1.980	1.980		0.001
LDF5-50A (7/8 FOAM) (183' cable)	C	Yes	Ar (CfAe)	180.000 - 8.000	-3.000	0.25	1	1	1.090	1.090		0.000
LDF5-50A (7/8 FOAM) (182' cable)	C	Yes	Ar (CfAe)	180.000 - 8.000	-3.000	0.26	1	1	1.090	1.090		0.000
LDF5-50A (7/8 FOAM) (182' cable)	C	Yes	Ar (CfAe)	180.000 - 8.000	-3.000	0.27	1	1	1.090	1.090		0.000
EW63 (CSP-11)	C	Yes	Af (CfAe)	177.000 - 8.000	-3.000	0.28	1	1	1.574	1.574	5.067	0.001
LDF5-50A (7/8 FOAM) (VSC-4)	C	Yes	Ar (CfAe)	174.000 - 8.000	-3.000	0.29	1	1	1.090	1.090		0.000
LDF5-50A (7/8 FOAM) (NU)	C	Yes	Ar (CfAe)	177.000 - 8.000	-3.000	0.3	2	2	1.090	1.090		0.000
LDF5-50A (7/8 FOAM) (CSP-33)	C	Yes	Ar (CfAe)	172.000 - 8.000	-3.000	0.31	1	1	1.090	1.090		0.000
EW63 (CSP-13)	C	Yes	Af (CfAe)	170.000 - 8.000	-3.000	0.32	1	1	1.574	1.574	5.067	0.001
LDF7-50A (1-5/8 FOAM)	C	Yes	Ar (CfAe)	167.000 - 8.000	-3.000	0.33	2	2	1.980	1.980		0.001
LDF5-50A	C	Yes	Ar (CfAe)	167.000 - 8.000	-3.000	0.34	1	1	1.090	1.090		0.000

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 klf
(7/8 FOAM) (VSC-5)												
LDF5-50A (7/8 FOAM)	C	Yes	Ar (CfAe)	166.000 - 8.000	-3.000	0.35	1	1	1.090	1.090		0.000
LDF5-50A (7/8 FOAM) (CSP-56)	C	Yes	Ar (CfAe)	164.000 - 8.000	-3.000	0.36	1	1	1.090	1.090		0.000
LDF5-50A (7/8 FOAM)	C	Yes	Ar (CfAe)	160.000 - 8.000	-3.000	0.37	1	1	1.090	1.090		0.000
LDF5-50A (7/8 FOAM)	C	Yes	Ar (CfAe)	156.000 - 8.000	-3.000	0.38	1	1	1.090	1.090		0.000
LDF5-50A (7/8 FOAM)	C	Yes	Ar (CfAe)	156.000 - 8.000	-3.000	0.39	1	1	1.090	1.090		0.000
LDF5-50A (7/8 FOAM) (VSC-51)	C	Yes	Ar (CfAe)	155.000 - 8.000	-3.000	0.4	1	1	1.090	1.090		0.000
LDF7-50A (1-5/8 FOAM)	C	Yes	Ar (CfAe)	149.000 - 8.000	-3.000	0.41	1	1	1.980	1.980		0.001
FB-L98B-02 (10mm Fiber) (ATT)	A	No	Ar (Leg)	145.000 - 8.000	0.000	0	1	1	0.394	0.394		0.000
RSS 8 - AWG 2 (0.645") (ATT)	A	No	Ar (Leg)	145.000 - 8.000	0.000	0	2	2	0.645	0.645		0.000
LDF6-50A (1-1/4 FOAM) (ATT)	B	Yes	Ar (CfAe)	145.000 - 8.000	-6.000	-0.35	3	3	1.550	1.550		0.001
LDF6-50A (1-1/4 FOAM) (ATT)	B	Yes	Ar (CfAe)	145.000 - 8.000	-3.000	-0.35	9	9	1.550	1.550		0.001
LDF7-50A (1-5/8 FOAM) (Sprint)	B	Yes	Ar (CfAe)	137.000 - 8.000	-3.000	0.41	6	6	1.980	1.980		0.001
LDF5-50A (7/8 FOAM)	C	Yes	Ar (CfAe)	135.000 - 8.000	-3.000	0.19	1	1	1.090	1.090		0.000
LDF5-50A (7/8 FOAM) (CSP-7)	C	Yes	Ar (CfAe)	122.000 - 8.000	-3.000	0.46	1	1	1.090	1.090		0.000
LDF5-50A (7/8 FOAM) (VSC-27)	C	Yes	Ar (CfAe)	120.000 - 8.000	-3.000	0.47	1	1	1.090	1.090		0.000
LDF5-50A (7/8 FOAM) (VCS-31)	C	Yes	Ar (CfAe)	115.000 - 8.000	-3.000	0.48	1	1	1.090	1.090		0.000
LDF5-50A (7/8 FOAM) (CSP-8)	C	Yes	Ar (CfAe)	91.000 - 8.000	-3.000	0.49	1	1	1.090	1.090		0.000
LDF5-50A (7/8 FOAM) (VSC-9)	C	Yes	Ar (CfAe)	81.500 - 8.000	-3.000	0.19	1	1	1.090	1.090		0.000
LDF4-50A (1/2 FOAM) (CSP-45)	C	Yes	Ar (CfAe)	33.250 - 8.000	-3.000	0.45	1	1	0.630	0.630		0.000
LDF4-50A (1/2 FOAM) (CSP-46)	C	Yes	Ar (CfAe)	26.750 - 8.000	-3.000	0.44	1	1	0.630	0.630		0.000
LDF4-50A (1/2 FOAM)	C	Yes	Ar (CfAe)	17.250 - 8.000	-3.000	0.43	1	1	0.630	0.630		0.000
LDF4-50A (1/2 FOAM)	C	Yes	Ar (CfAe)	14.000 - 8.000	-3.000	0.42	1	1	0.630	0.630		0.000
LDF5-50A	B	Yes	Ar (CfAe)	130.000 - 8.000	-4.000	-0.25	12	12	1.090	1.090		0.000

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 klf
(7/8 FOAM) (T-Mobile)												

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 lb
T1	180.000-175.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	8.409	0.262	0.000	0.000	39.290
T2	175.000-166.667	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	16.214	1.530	0.000	0.000	77.870
T3	166.667-158.333	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	21.307	2.186	0.000	0.000	102.450
T4	158.333-150.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	23.759	2.186	0.000	0.000	111.360
T5	150.000-125.000	A	2.806	0.000	0.000	0.000	18.000
		B	51.136	0.000	0.000	0.000	237.240
		C	78.327	6.559	0.000	0.000	364.980
T6	125.000-100.000	A	3.508	0.000	0.000	0.000	22.500
		B	94.258	0.000	0.000	0.000	420.000
		C	85.032	6.559	0.000	0.000	389.560
T7	100.000-91.667	A	1.169	0.000	0.000	0.000	7.500
		B	31.419	0.000	0.000	0.000	140.000
		C	28.889	2.186	0.000	0.000	131.833
T8	91.667-83.333	A	1.169	0.000	0.000	0.000	7.500
		B	31.419	0.000	0.000	0.000	140.000
		C	29.585	2.186	0.000	0.000	134.363
T9	83.333-75.000	A	1.169	0.000	0.000	0.000	7.500
		B	31.419	0.000	0.000	0.000	140.000
		C	30.236	2.186	0.000	0.000	136.728
T10	75.000-50.000	A	3.508	0.000	0.000	0.000	22.500
		B	94.258	0.000	0.000	0.000	420.000
		C	91.208	6.559	0.000	0.000	412.000
T11	50.000-37.500	A	1.754	0.000	0.000	0.000	11.250
		B	47.129	0.000	0.000	0.000	210.000
		C	45.604	3.280	0.000	0.000	206.000
T12	37.500-25.000	A	1.754	0.000	0.000	0.000	11.250
		B	47.129	0.000	0.000	0.000	210.000
		C	46.129	3.280	0.000	0.000	207.500
T13	25.000-12.500	A	1.754	0.000	0.000	0.000	11.250
		B	47.129	0.000	0.000	0.000	210.000
		C	47.245	3.280	0.000	0.000	210.688
T14	12.500-0.000	A	0.631	0.000	0.000	0.000	4.050
		B	16.966	0.000	0.000	0.000	75.600
		C	17.363	1.181	0.000	0.000	76.860

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 lb
T1	180.000-175.000	A	0.500	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		13.743	0.373	0.000	0.000	123.187
T2	175.000-166.667	A	0.500	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		27.076	2.179	0.000	0.000	252.324
T3	166.667-158.333	A	0.500	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		35.751	3.112	0.000	0.000	334.134
T4	158.333-150.000	A	0.500	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		40.454	3.112	0.000	0.000	369.268
T5	150.000-125.000	A	0.500	5.064	2.150	0.000	0.000	56.871
		B		84.394	2.150	0.000	0.000	705.138
		C		133.243	9.337	0.000	0.000	1208.086
T6	125.000-100.000	A	0.500	6.331	2.688	0.000	0.000	71.089
		B		159.581	2.688	0.000	0.000	1314.307
		C		146.032	9.337	0.000	0.000	1304.113
T7	100.000-91.667	A	0.500	2.110	0.896	0.000	0.000	23.696
		B		53.194	0.896	0.000	0.000	438.102
		C		49.722	3.112	0.000	0.000	442.512
T8	91.667-83.333	A	0.500	2.110	0.896	0.000	0.000	23.696
		B		53.194	0.896	0.000	0.000	438.102
		C		51.057	3.112	0.000	0.000	452.488
T9	83.333-75.000	A	0.500	2.110	0.896	0.000	0.000	23.696
		B		53.194	0.896	0.000	0.000	438.102
		C		52.306	3.112	0.000	0.000	461.814
T10	75.000-50.000	A	0.500	6.331	2.688	0.000	0.000	71.089
		B		159.581	2.688	0.000	0.000	1314.307
		C		157.875	9.337	0.000	0.000	1392.600
T11	50.000-37.500	A	0.500	3.165	1.344	0.000	0.000	35.544
		B		79.790	1.344	0.000	0.000	657.153
		C		78.938	4.668	0.000	0.000	696.300
T12	37.500-25.000	A	0.500	3.165	1.344	0.000	0.000	35.544
		B		79.790	1.344	0.000	0.000	657.153
		C		80.296	4.668	0.000	0.000	704.703
T13	25.000-12.500	A	0.500	3.165	1.344	0.000	0.000	35.544
		B		79.790	1.344	0.000	0.000	657.153
		C		83.182	4.668	0.000	0.000	722.558
T14	12.500-0.000	A	0.500	1.140	0.484	0.000	0.000	12.796
		B		28.725	0.484	0.000	0.000	236.575
		C		30.863	1.681	0.000	0.000	265.793

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	180.000-175.000	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.555	0.922	1.507
T2	175.000-166.667	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.811	1.217	2.028
T3	166.667-158.333	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	1.054	1.574	2.635

Section	Elevation	Face	A_R	A_R Ice	A_F	A_F Ice
	ft		ft^2	ft^2	ft^2	ft^2
T4	158.333-150.000	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	1.156	1.703	2.890
T5	150.000-125.000	A	0.000	0.000	0.000	0.000
		B	0.000	4.095	5.844	9.593
		C	0.000	7.432	10.265	17.409
T6	125.000-100.000	A	0.000	0.000	0.000	0.000
		B	0.000	7.548	11.144	18.820
		C	0.000	7.721	11.248	19.250
T7	100.000-91.667	A	0.000	0.000	0.000	0.000
		B	0.000	2.454	3.624	6.120
		C	0.000	2.560	3.723	6.386
T8	91.667-83.333	A	0.000	0.000	0.000	0.000
		B	0.000	2.427	3.586	6.056
		C	0.000	2.596	3.766	6.476
T9	83.333-75.000	A	0.000	0.000	0.000	0.000
		B	0.000	2.403	3.551	5.997
		C	0.000	2.629	3.806	6.560
T10	75.000-50.000	A	0.000	0.000	0.000	0.000
		B	0.000	5.373	9.816	16.576
		C	0.000	5.911	10.575	18.237
T11	50.000-37.500	A	0.000	0.000	0.000	0.000
		B	0.000	2.612	4.779	8.070
		C	0.000	2.874	5.148	8.878
T12	37.500-25.000	A	0.000	0.000	0.000	0.000
		B	0.000	2.570	4.705	7.946
		C	0.000	2.873	5.124	8.883
T13	25.000-12.500	A	0.000	0.000	0.000	0.000
		B	0.000	2.532	4.650	7.852
		C	0.000	2.926	5.178	9.074
T14	12.500-0.000	A	0.000	0.000	0.000	0.000
		B	0.000	0.899	1.652	2.790
		C	0.000	1.069	1.876	3.317

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	180.000-175.000	-6.481	7.068	-7.481	8.144
T2	175.000-166.667	-9.962	10.434	-11.554	12.055
T3	166.667-158.333	-13.678	13.297	-15.700	15.196
T4	158.333-150.000	-15.827	14.897	-18.325	17.093
T5	150.000-125.000	-8.927	4.137	-10.100	4.317
T6	125.000-100.000	-5.656	0.713	-6.773	0.042
T7	100.000-91.667	-6.307	1.010	-7.581	0.356
T8	91.667-83.333	-6.881	1.337	-8.390	0.757
T9	83.333-75.000	-7.237	1.671	-8.832	1.151
T10	75.000-50.000	-7.475	1.843	-9.410	1.393
T11	50.000-37.500	-7.867	1.987	-9.931	1.520
T12	37.500-25.000	-8.387	2.253	-10.725	1.905
T13	25.000-12.500	-9.314	2.756	-12.129	2.671
T14	12.500-0.000	-5.029	1.595	-7.142	1.802

Discrete Tower Loads

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 lb
4 Bay Dipole	A	From Leg	2.000	0.0000	193.000	No Ice	3.150	3.150	32.000
(CSP-12)			0.000			1/2" Ice	5.670	5.670	41.600
			0.000						
Lightning Rod	C	From Leg	0.000	0.0000	189.000	No Ice	0.125	0.125	15.000
			0.000			1/2" Ice	0.330	0.330	17.000
			0.000						
DB212-1	B	From Leg	4.000	0.0000	185.000	No Ice	4.400	4.400	31.000
(VSC - 32)			0.000			1/2" Ice	8.418	8.418	70.208
			0.000						
DB806D-A	B	From Leg	3.500	0.0000	185.000	No Ice	3.375	3.375	27.000
(CSP - 14)			0.000			1/2" Ice	4.533	4.533	51.460
			0.000						
8"x2.5" Pipe Mount	C	From Leg	0.000	0.0000	184.000	No Ice	2.000	2.000	46.320
			0.000			1/2" Ice	2.400	2.400	47.265
			0.000						
DB404	A	From Leg	1.000	0.0000	183.000	No Ice	1.140	1.140	14.000
(VSC - 54)			0.000			1/2" Ice	2.052	2.052	18.200
			0.000						
2' Dipole	B	From Leg	3.500	0.0000	182.000	No Ice	0.411	0.411	20.000
(CSP - 2)			0.000			1/2" Ice	0.556	0.556	24.683
			0.000						
3' Yagi	B	From Leg	1.000	0.0000	182.000	No Ice	2.083	2.083	30.950
(VSC-1)			0.000			1/2" Ice	3.787	3.787	52.866
			0.000						
TTA 432-83H-01T	B	From Leg	1.000	0.0000	180.000	No Ice	1.633	0.953	25.000
(CSP - 59)			0.000			1/2" Ice	1.806	1.093	37.444
			0.000						
6'x3" Pipe Mount	B	From Leg	1.000	0.0000	179.000	No Ice	1.767	1.767	35.000
			0.000			1/2" Ice	2.129	2.129	47.975
			0.000						
6' Side-Arm	B	From Leg	3.000	0.0000	178.000	No Ice	13.040	14.600	140.000
			0.000			1/2" Ice	18.070	19.400	152.000
			0.000						
6' Side-Arm	B	From Leg	3.000	0.0000	178.000	No Ice	13.040	14.600	140.000
			0.000			1/2" Ice	18.070	19.400	152.000
			0.000						
4'x4" Pipe Mount - vacant	B	From Leg	0.500	0.0000	177.000	No Ice	1.322	1.322	44.000
			0.000			1/2" Ice	1.577	1.577	56.987
			0.000						
4'x4" Pipe Mount	A	From Leg	3.000	0.0000	177.000	No Ice	1.322	1.322	44.000
(Eversource)			0.000			1/2" Ice	1.577	1.577	56.987
			0.000						
(2) DB586-Y	B	From Leg	1.000	0.0000	177.000	No Ice	1.014	1.014	8.250
(Eversource)			0.000			1/2" Ice	1.282	1.282	16.589
			0.000						
4'x4" Pipe Mount	C	From Leg	0.500	0.0000	177.000	No Ice	1.322	1.322	44.000
			0.000			1/2" Ice	1.577	1.577	56.987
			0.000						
10' Dipole	A	From Leg	3.500	0.0000	172.000	No Ice	4.000	4.000	50.000
(CSP-33)			0.000			1/2" Ice	6.000	6.000	71.000
			0.000						
4'x4" Pipe Mount	C	From Leg	0.500	0.0000	170.000	No Ice	1.322	1.322	44.000

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 lb
			0.000 0.000			1/2" Ice	1.577	1.577	56.987
(2) SC479-HF1LDF (Existing)	C	From Leg	2.000 0.000 0.000	0.0000	167.000	No Ice 1/2" Ice	5.058 6.540	5.058 6.540	34.000 69.823
(2) Pirod 4' Side Mount Standoff (1)	C	From Leg	0.500 0.000 0.000	0.0000	167.000	No Ice 1/2" Ice	2.720 4.910	2.720 4.910	50.000 89.000
DB225-A (VSC-5)	A	From Face	2.000 0.000 0.000	0.0000	167.000	No Ice 1/2" Ice	3.210 5.778	3.210 5.778	37.000 48.100
1' Side Arm	A	From Leg	0.500 0.000 0.000	0.0000	167.000	No Ice 1/2" Ice	2.500 3.363	2.500 3.363	55.000 73.000
10' Dipole (Existing)	B	From Leg	3.000 0.000 0.000	0.0000	166.000	No Ice 1/2" Ice	4.000 6.000	4.000 6.000	50.000 71.000
4'x4" Pipe Mount	B	From Leg	3.000 0.000 0.000	0.0000	166.000	No Ice 1/2" Ice	1.322 1.577	1.322 1.577	44.000 56.987
SC479-HF1LDF (CSP-56)	C	From Leg	2.000 0.000 0.000	0.0000	164.000	No Ice 1/2" Ice	5.058 6.540	5.058 6.540	34.000 69.823
1' Side Arm	A	From Leg	0.500 0.000 0.000	0.0000	164.000	No Ice 1/2" Ice	2.500 3.363	2.500 3.363	55.000 73.000
10' x 1" Omni (Existing)	B	From Leg	3.500 0.000 0.000	0.0000	160.000	No Ice 1/2" Ice	1.000 2.017	1.000 2.017	40.000 49.265
Pirod 4' Side Mount Standoff (1)	B	From Face	3.500 0.000 0.000	0.0000	160.000	No Ice 1/2" Ice	2.720 4.910	2.720 4.910	50.000 89.000
SD-110 (Existing)	A	From Face	2.000 0.000 0.000	0.0000	156.000	No Ice 1/2" Ice	3.610 5.100	3.600 5.100	37.000 48.900
4'x4" Pipe Mount	A	From Leg	3.000 0.000 0.000	0.0000	156.000	No Ice 1/2" Ice	1.322 1.577	1.322 1.577	44.000 56.987
Decibel DB 225 Dipole (VSC-51)	C	From Leg	0.500 0.000 0.000	0.0000	155.000	No Ice 1/2" Ice	1.300 1.975	1.300 1.975	27.000 37.156
4' Side Mount Standoff (1)	B	From Leg	2.000 0.000 0.000	0.0000	154.000	No Ice 1/2" Ice	2.720 4.910	2.720 4.910	50.000 89.000
BCD-80609 (Existing)	B	From Leg	3.500 0.000 0.000	0.0000	149.000	No Ice 1/2" Ice	2.400 3.500	2.400 3.500	30.000 48.792
13' Sector Mount (1) (ATT)	A	From Leg	4.000 0.000 0.000	0.0000	145.000	No Ice 1/2" Ice	12.000 16.100	12.000 16.100	220.000 420.000
13' Sector Mount (1) (ATT)	B	From Leg	4.000 0.000 0.000	0.0000	145.000	No Ice 1/2" Ice	12.000 16.100	12.000 16.100	220.000 420.000
13' Sector Mount (1) (ATT)	C	From Leg	4.000 0.000 0.000	0.0000	145.000	No Ice 1/2" Ice	12.000 16.100	12.000 16.100	220.000 420.000
7770 w mount pipe	A	From Leg	4.000	0.0000	145.000	No Ice	5.882	3.980	52.000

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 lb
(ATT)			-6.000 0.000			1/2" Ice	6.314	4.603	94.698
7770 w mount pipe	B	From Leg	4.000	0.0000	145.000	No Ice	5.882	3.980	52.000
(ATT)			-6.000 0.000			1/2" Ice	6.314	4.603	94.698
7770 w mount pipe	C	From Leg	4.000	0.0000	145.000	No Ice	5.882	3.980	52.000
(ATT)			-6.000 0.000			1/2" Ice	6.314	4.603	94.698
(2) TMA (shielded)	A	From Leg	4.000	0.0000	145.000	No Ice	0.000	0.000	7.300
(ATT)			0.000 0.000			1/2" Ice	0.000	0.000	11.643
(2) TMA (shielded)	B	From Leg	4.000	0.0000	145.000	No Ice	0.000	0.000	7.300
(ATT)			0.000 0.000			1/2" Ice	0.000	0.000	11.643
(2) TMA (shielded)	C	From Leg	4.000	0.0000	145.000	No Ice	0.000	0.000	7.300
(ATT)			0.000 0.000			1/2" Ice	0.000	0.000	11.643
(2) RRUS 11 - Dual PA RRU	A	None		0.0000	145.000	No Ice	2.942	1.246	55.000
(ATT)						1/2" Ice	3.172	1.412	74.320
(2) RRUS 11 - Dual PA RRU	B	None		0.0000	145.000	No Ice	2.942	1.246	55.000
(ATT)						1/2" Ice	3.172	1.412	74.320
(2) RRUS 11 - Dual PA RRU	C	None		0.0000	145.000	No Ice	2.942	1.246	55.000
(ATT)						1/2" Ice	3.172	1.412	74.320
AM-X-CD-14-65-00T-RET	A	From Leg	4.000	0.0000	145.000	No Ice	5.507	2.828	4.000
(ATT)			6.000 0.000			1/2" Ice	5.899	3.137	35.591
AM-X-CD-14-65-00T-RET	B	From Leg	4.000	0.0000	145.000	No Ice	5.507	2.828	4.000
(ATT)			6.000 0.000			1/2" Ice	5.899	3.137	35.591
AM-X-CD-14-65-00T-RET	C	From Leg	4.000	0.0000	145.000	No Ice	5.507	2.828	4.000
(ATT)			6.000 0.000			1/2" Ice	5.899	3.137	35.591
AM-X-CD-14-65-00T-RET	A	From Leg	4.000	0.0000	145.000	No Ice	5.507	2.828	4.000
(ATT)			-2.000 0.000			1/2" Ice	5.899	3.137	35.591
AM-X-CD-14-65-00T-RET	B	From Leg	4.000	0.0000	145.000	No Ice	5.507	2.828	4.000
(ATT)			-2.000 0.000			1/2" Ice	5.899	3.137	35.591
AM-X-CD-14-65-00T-RET	C	From Leg	4.000	0.0000	145.000	No Ice	5.507	2.828	4.000
(ATT)			-2.000 0.000			1/2" Ice	5.899	3.137	35.591
Raycap Surge Suppressor	A	From Leg	0.000	0.0000	145.000	No Ice	1.266	1.266	20.000
(ATT)			0.000 0.000			1/2" Ice	1.456	1.456	35.116
Lightweight PCS Frame (3)	A	From Leg	1.500	0.0000	137.000	No Ice	29.400	29.400	790.000
(Sprint)			0.000 0.000			1/2" Ice	50.700	50.700	1290.000
(2) DB950F65E-M	A	From Leg	3.500	0.0000	137.000	No Ice	6.125	4.236	15.000
(Sprint/Nextell)			0.000 0.000			1/2" Ice	6.586	4.620	53.954
(2) DB950F85E-M	B	From Leg	3.500	0.0000	137.000	No Ice	2.535	4.188	10.500
(Sprint/Nextell)			0.000 0.000			1/2" Ice	2.900	4.571	33.819
(2) DB950F40T2E-M	C	From Leg	3.500	0.0000	137.000	No Ice	6.417	4.625	20.000
(Sprint/Nextell)			0.000 0.000			1/2" Ice	6.881	5.013	61.922
Decibel DB 225 Dipole	C	From Leg	0.500	0.0000	135.000	No Ice	1.300	1.300	27.000

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 lb
(Existing)			0.000 0.000			1/2" Ice	1.975	1.975	37.156
Celwave PD100543 (CSP-7)	B	From Leg	1.500 0.000 0.000	0.0000	122.000	No Ice 1/2" Ice	3.889 4.152	1.944 2.143	18.000 45.558
1' Side Arm	B	From Leg	0.500 0.000 0.000	0.0000	122.000	No Ice 1/2" Ice	2.500 3.363	2.500 3.363	55.000 73.000
DB212-2-A (VSC-27)	C	From Leg	1.000 0.000 0.000	0.0000	120.000	No Ice 1/2" Ice	4.400 8.418	4.400 8.418	31.000 70.208
Sidearm	A	From Leg	0.500 0.000 0.000	0.0000	115.000	No Ice 1/2" Ice	3.900 4.400	3.900 4.400	87.000 97.000
Sidearm - vacant	C	From Leg	0.000 0.000 0.000	0.0000	110.000	No Ice 1/2" Ice	2.500 3.363	2.500 3.363	55.000 73.000
4 Bay Dipole (CSP-8)	C	From Leg	2.000 0.000 0.000	0.0000	91.000	No Ice 1/2" Ice	3.150 5.670	3.150 5.670	32.000 41.600
4' Yagi (VSC-9)	C	From Leg	2.000 0.000 0.000	0.0000	81.500	No Ice 1/2" Ice	0.080 0.140	0.080 0.140	12.000 13.020
2' Sidearm	C	From Leg	1.000 0.000 0.000	0.0000	81.000	No Ice 1/2" Ice	3.900 4.400	3.900 4.400	87.000 97.000
2' GPS Mount (Sprint/Nextel)	B	From Leg	0.500 0.000 0.000	0.0000	76.000	No Ice 1/2" Ice	0.780 1.100	0.680 1.100	25.000 32.500
GPS (Sprint/Nextel)	B	From Leg	1.000 0.000 0.000	0.0000	76.000	No Ice 1/2" Ice	1.000 1.500	1.000 1.500	10.000 15.000
DB803M-XC (CSP-45)	C	From Leg	3.000 0.000 0.000	0.0000	33.250	No Ice 1/2" Ice	0.502 0.683	0.502 0.683	4.300 8.983
3' Sidearm	C	From Leg	1.500 0.000 0.000	0.0000	30.000	No Ice 1/2" Ice	5.900 6.600	5.900 6.600	130.000 145.600
DB803M-XC (CSP-46)	C	From Leg	3.000 0.000 0.000	0.0000	26.750	No Ice 1/2" Ice	0.502 0.683	0.502 0.683	4.300 8.983
DB580-XC (Existing)	C	From Leg	2.000 0.000 0.000	0.0000	17.250	No Ice 1/2" Ice	0.465 0.622	0.465 0.622	3.800 8.620
2' Sidearm	C	From Leg	1.000 0.000 0.000	0.0000	15.000	No Ice 1/2" Ice	3.900 4.400	3.900 4.400	87.000 97.000
3' Yagi (Existing)	C	From Leg	3.500 0.000 0.000	0.0000	14.000	No Ice 1/2" Ice	2.083 3.787	2.083 3.787	30.950 52.866
OGT9-840 (CSP - 15)	A	From Leg	3.000 0.000 0.000	0.0000	185.500	No Ice 1/2" Ice	2.273 3.435	2.273 3.435	18.500 36.088
OGT9-840 (CSP - 17)	B	From Leg	3.000 0.000 0.000	0.0000	185.500	No Ice 1/2" Ice	2.273 3.435	2.273 3.435	18.500 36.088
SC479-HF1LDF	A	From Leg	1.000	0.0000	183.000	No Ice	5.058	5.058	34.000

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 lb
(CSP - 57)			0.000 0.000			1/2" Ice	6.540	6.540	69.823
SC479-HF1LDF	B	From Leg	1.000	0.0000	183.000	No Ice	5.058	5.058	34.000
(CSP - 58)			0.000 0.000			1/2" Ice	6.540	6.540	69.823
SC479-HF1LDF	C	From Leg	1.000	0.0000	183.000	No Ice	5.058	5.058	34.000
(CSP - 64)			0.000 0.000			1/2" Ice	6.540	6.540	69.823
2' Sidearm	A	From Leg	1.000	0.0000	130.000	No Ice	3.900	3.900	87.000
(T-Mobile)			0.000 0.000			1/2" Ice	4.400	4.400	97.000
2' Sidearm	B	From Leg	1.000	0.0000	130.000	No Ice	3.900	3.900	87.000
(T-Mobile)			0.000 0.000			1/2" Ice	4.400	4.400	97.000
2' Sidearm	C	From Leg	1.000	0.0000	130.000	No Ice	3.900	3.900	87.000
(T-Mobile)			0.000 0.000			1/2" Ice	4.400	4.400	97.000
(2) Ericsson TMA Unit	A	From Leg	1.000	0.0000	130.000	No Ice	0.689	0.657	19.473
(T-Mobile)			0.000 0.000			1/2" Ice	0.814	0.860	28.287
(2) Ericsson TMA Unit	B	From Leg	1.000	0.0000	130.000	No Ice	0.689	0.657	19.473
(T-Mobile)			0.000 0.000			1/2" Ice	0.814	0.860	28.287
(2) Ericsson TMA Unit	C	From Leg	1.000	0.0000	130.000	No Ice	0.689	0.657	19.473
(T-Mobile)			0.000 0.000			1/2" Ice	0.814	0.860	28.287
DBXNH-6565B-A2M	A	From Leg	2.000	0.0000	130.000	No Ice	8.411	5.405	46.300
(T-Mobile)			0.000 0.000			1/2" Ice	8.964	5.863	96.807
DBXNH-6565B-A2M	B	From Leg	2.000	0.0000	130.000	No Ice	8.411	5.405	46.300
(T-Mobile)			0.000 0.000			1/2" Ice	8.964	5.863	96.807
DBXNH-6565B-A2M	C	From Leg	2.000	0.0000	130.000	No Ice	8.411	5.405	46.300
(T-Mobile)			0.000 0.000			1/2" Ice	8.964	5.863	96.807

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 lb
6' w/Radome	A	Paraboloid	From	2.000	0.0000		177.000	6.000	No Ice	28.274	380.000
(CSP - 11)		w/Radome	Leg	0.000 0.000					1/2" Ice	29.065	450.000
6' w/Radome	C	Paraboloid	From	2.000	0.0000		174.000	6.000	No Ice	28.274	380.000
(VSC - 4)		w/Radome	Leg	0.000 0.000					1/2" Ice	29.065	450.000
Andrew 6' w/Radome	C	Paraboloid	From	2.000	0.0000		170.000	6.000	No Ice	28.274	380.000
(CSP - 13)		w/Radome	Leg	0.000					1/2" Ice	29.065	450.000

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight lb
				0.000							
4' Paraflector (Existing)	A	Grid	From Leg	2.000 0.000 0.000	0.0000		115.000	4.000	No Ice 1/2" Ice	16.000 16.674	34.000 48.000
6' w/Radome (CSP - 65)	A	Paraboloid w/Radome	From Leg	2.000 0.000 0.000	0.0000		180.000	6.000	No Ice 1/2" Ice	28.274 29.065	380.000 450.000
6' w/Radome (CSP - 66)	B	Paraboloid w/Radome	From Leg	2.000 0.000 0.000	0.0000		180.000	6.000	No Ice 1/2" Ice	28.274 29.065	380.000 450.000
6' w/Radome (CSP - 67)	C	Paraboloid w/Radome	From Leg	2.000 0.000 0.000	0.0000		180.000	6.000	No Ice 1/2" Ice	28.274 29.065	380.000 450.000
4' Paraflector (NEU)	A	Grid	From Leg	2.000 0.000 0.000	0.0000		156.000	4.000	No Ice 1/2" Ice	16.000 16.674	34.000 48.000

Tower Pressures - No Ice

$G_H = 1.121$

Section Elevation ft	z ft	K_z	q_z ksf	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	177.500	1.617	0.037	56.082	A	5.526	4.171	4.171	43.02	0.000	0.000
180.000-175.0					B	5.526	4.171		43.02	0.000	0.000
00					C	4.866	12.580		23.91	0.000	0.000
T2	170.833	1.6	0.037	97.919	A	6.293	6.952	6.952	52.49	0.000	0.000
175.000-166.6					B	6.293	6.952		52.49	0.000	0.000
67					C	6.606	23.166		23.35	0.000	0.000
T3	162.500	1.577	0.036	103.475	A	6.518	6.952	6.952	51.61	0.000	0.000
166.667-158.3					B	6.518	6.952		51.61	0.000	0.000
33					C	7.130	28.259		19.64	0.000	0.000
T4	154.167	1.553	0.036	109.031	A	6.746	6.952	6.952	50.75	0.000	0.000
158.333-150.0					B	6.746	6.952		50.75	0.000	0.000
00					C	7.229	30.711		18.32	0.000	0.000
T5	137.500	1.503	0.035	360.425	A	31.437	23.662	20.856	37.85	0.000	0.000
150.000-125.0					B	25.593	71.992		21.37	0.000	0.000
00					C	27.731	99.182		16.43	0.000	0.000
T6	112.500	1.42	0.033	410.425	A	37.501	24.363	20.856	33.71	0.000	0.000
125.000-100.0					B	26.357	115.113		14.74	0.000	0.000
00					C	32.813	105.887		15.04	0.000	0.000
T7	95.833	1.356	0.031	147.919	A	13.268	8.121	6.952	32.50	0.000	0.000
100.000-91.66					B	9.644	38.371		14.48	0.000	0.000
7					C	11.732	35.841		14.61	0.000	0.000
T8	87.500	1.321	0.031	154.157	A	21.130	1.169	7.473	33.51	0.000	0.000
91.667-83.333					B	17.544	31.419		15.26	0.000	0.000
					C	19.550	29.585		15.21	0.000	0.000
T9	79.167	1.284	0.030	159.712	A	21.520	1.169	7.473	32.94	0.000	0.000
83.333-75.000					B	17.969	31.419		15.13	0.000	0.000
					C	19.900	30.236		14.91	0.000	0.000
T10	62.500	1.2	0.028	514.334	A	40.966	32.184	28.676	39.20	0.000	0.000
75.000-50.000					B	31.150	122.934		18.61	0.000	0.000
					C	36.950	119.885		18.28	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z ksf	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
T11	43.750	1.084	0.025	275.917	A	21.483	16.092	14.338	38.16	0.000	0.000
50.000-37.500					B	16.704	61.467		18.34	0.000	0.000
					C	19.614	59.942		18.02	0.000	0.000
T12	31.250	1	0.023	288.417	A	22.193	16.092	14.338	37.45	0.000	0.000
37.500-25.000					B	17.488	61.467		18.16	0.000	0.000
					C	20.349	60.467		17.74	0.000	0.000
T13	18.750	1	0.023	300.917	A	22.157	16.092	14.338	37.49	0.000	0.000
25.000-12.500					B	17.507	61.467		18.16	0.000	0.000
					C	20.259	61.583		17.52	0.000	0.000
T14	6.250	1	0.023	313.417	A	22.863	14.970	14.338	37.90	0.000	0.000
12.500-0.000					B	21.210	31.305		27.30	0.000	0.000
					C	22.168	31.701		26.62	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.121$

Section Elevation ft	z ft	K_Z	q_z ksf	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	177.500	1.617	0.034	0.500	56.499	A	5.526	7.046	5.005	39.81	0.000	0.000
180.000-175.000						B	5.526	7.046		39.81	0.000	0.000
						C	4.393	20.233		20.33	0.000	0.000
T2	170.833	1.6	0.033	0.500	98.614	A	6.293	10.859	8.342	48.64	0.000	0.000
175.000-166.667						B	6.293	10.859		48.64	0.000	0.000
						C	6.443	37.123		19.15	0.000	0.000
T3	162.500	1.577	0.033	0.500	104.170	A	6.518	10.949	8.342	47.76	0.000	0.000
166.667-158.333						B	6.518	10.949		47.76	0.000	0.000
						C	6.995	45.647		15.85	0.000	0.000
T4	154.167	1.553	0.032	0.500	109.726	A	6.746	11.041	8.342	46.90	0.000	0.000
158.333-150.000						B	6.746	11.041		46.90	0.000	0.000
						C	6.968	50.338		14.56	0.000	0.000
T5	137.500	1.503	0.031	0.500	362.510	A	33.587	42.819	25.027	32.75	0.000	0.000
150.000-125.000						B	23.994	118.054		17.62	0.000	0.000
						C	23.364	163.565		13.39	0.000	0.000
T6	112.500	1.42	0.029	0.500	412.510	A	40.189	45.358	25.027	29.25	0.000	0.000
125.000-100.000						B	21.369	191.060		11.78	0.000	0.000
						C	27.588	177.339		12.21	0.000	0.000
T7	95.833	1.356	0.028	0.500	148.614	A	14.164	15.407	8.342	28.21	0.000	0.000
100.000-91.667						B	8.044	64.037		11.57	0.000	0.000
						C	9.995	60.459		11.84	0.000	0.000
T8	87.500	1.321	0.027	0.500	154.852	A	22.952	7.211	8.400	27.85	0.000	0.000
91.667-83.333						B	16.897	55.867		11.54	0.000	0.000
						C	18.692	53.562		11.63	0.000	0.000
T9	79.167	1.284	0.027	0.500	160.407	A	23.343	7.357	8.400	27.36	0.000	0.000
83.333-75.000						B	17.346	56.037		11.45	0.000	0.000
						C	18.999	54.923		11.36	0.000	0.000
T10	62.500	1.2	0.025	0.500	516.419	A	43.653	51.568	32.847	34.50	0.000	0.000
75.000-50.000						B	27.077	199.445		14.50	0.000	0.000
						C	32.066	197.202		14.33	0.000	0.000
T11	43.750	1.084	0.022	0.500	276.960	A	22.827	26.080	16.424	33.58	0.000	0.000
50.000-37.500						B	14.757	100.092		14.30	0.000	0.000
						C	17.273	98.978		14.13	0.000	0.000
T12	31.250	1	0.021	0.500	289.460	A	23.537	26.291	16.424	32.96	0.000	0.000
37.500-25.000						B	15.591	100.346		14.17	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z ksf	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	17.979	100.548		13.86	0.000	0.000
T13	18.750	1	0.021	0.500	301.960	A	23.501	26.504	16.424	32.84	0.000	0.000
25.000-12.500						B	15.648	100.596		14.13	0.000	0.000
						C	17.752	103.594		13.53	0.000	0.000
T14	6.250	1	0.021	0.500	314.460	A	23.346	24.692	16.424	34.19	0.000	0.000
12.500-0.000						B	20.556	51.378		22.83	0.000	0.000
						C	21.226	53.346		22.02	0.000	0.000

Tower Pressure - Service

$G_H = 1.121$

Section Elevation ft	z ft	K_Z	q_z ksf	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	177.500	1.617	0.010	56.082	A	5.526	4.171	4.171	43.02	0.000	0.000
180.000-175.0					B	5.526	4.171		43.02	0.000	0.000
00					C	4.866	12.580		23.91	0.000	0.000
T2	170.833	1.6	0.010	97.919	A	6.293	6.952	6.952	52.49	0.000	0.000
175.000-166.6					B	6.293	6.952		52.49	0.000	0.000
67					C	6.606	23.166		23.35	0.000	0.000
T3	162.500	1.577	0.010	103.475	A	6.518	6.952	6.952	51.61	0.000	0.000
166.667-158.3					B	6.518	6.952		51.61	0.000	0.000
33					C	7.130	28.259		19.64	0.000	0.000
T4	154.167	1.553	0.010	109.031	A	6.746	6.952	6.952	50.75	0.000	0.000
158.333-150.0					B	6.746	6.952		50.75	0.000	0.000
00					C	7.229	30.711		18.32	0.000	0.000
T5	137.500	1.503	0.010	360.425	A	31.437	23.662	20.856	37.85	0.000	0.000
150.000-125.0					B	25.593	71.992		21.37	0.000	0.000
00					C	27.731	99.182		16.43	0.000	0.000
T6	112.500	1.42	0.009	410.425	A	37.501	24.363	20.856	33.71	0.000	0.000
125.000-100.0					B	26.357	115.113		14.74	0.000	0.000
00					C	32.813	105.887		15.04	0.000	0.000
T7	95.833	1.356	0.009	147.919	A	13.268	8.121	6.952	32.50	0.000	0.000
100.000-91.66					B	9.644	38.371		14.48	0.000	0.000
7					C	11.732	35.841		14.61	0.000	0.000
T8	87.500	1.321	0.008	154.157	A	21.130	1.169	7.473	33.51	0.000	0.000
91.667-83.333					B	17.544	31.419		15.26	0.000	0.000
					C	19.550	29.585		15.21	0.000	0.000
T9	79.167	1.284	0.008	159.712	A	21.520	1.169	7.473	32.94	0.000	0.000
83.333-75.000					B	17.969	31.419		15.13	0.000	0.000
					C	19.900	30.236		14.91	0.000	0.000
T10	62.500	1.2	0.008	514.334	A	40.966	32.184	28.676	39.20	0.000	0.000
75.000-50.000					B	31.150	122.934		18.61	0.000	0.000
					C	36.950	119.885		18.28	0.000	0.000
T11	43.750	1.084	0.007	275.917	A	21.483	16.092	14.338	38.16	0.000	0.000
50.000-37.500					B	16.704	61.467		18.34	0.000	0.000
					C	19.614	59.942		18.02	0.000	0.000
T12	31.250	1	0.006	288.417	A	22.193	16.092	14.338	37.45	0.000	0.000
37.500-25.000					B	17.488	61.467		18.16	0.000	0.000
					C	20.349	60.467		17.74	0.000	0.000
T13	18.750	1	0.006	300.917	A	22.157	16.092	14.338	37.49	0.000	0.000
25.000-12.500					B	17.507	61.467		18.16	0.000	0.000
					C	20.259	61.583		17.52	0.000	0.000

tnxTower	Job: MODification - 180' Lattice Tower (CSP #36)	Page: 22 of 56
AECOM 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-529-8882 FAX: 860-529-3991	Project: Westbrook, Connecticut	Date: 11:57:55 05/21/15
	Client: T-Mobile	Designed by: MCD

Section Elevation ft	z ft	K_Z	q_z ksf	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
T14	6.250	1	0.006	313.417	A	22.863	14.970	14.338	37.90	0.000	0.000
12.500-0.000					B	21.210	31.305		27.30	0.000	0.000
					C	22.168	31.701		26.62	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w klf	Ctrl. Face
T1	39.290	592.305	A	0.173	2.689	0.585	1	1	7.967	1201.737	0.240	C
180.000-175.0			B	0.173	2.689	0.585	1	1	7.967			
00			C	0.311	2.267	0.619	1	1	12.658			
T2	77.870	755.494	A	0.135	2.826	0.579	1	1	10.320	1978.848	0.237	C
175.000-166.6			B	0.135	2.826	0.579	1	1	10.320			
67			C	0.304	2.285	0.617	1	1	20.903			
T3	102.450	768.073	A	0.13	2.846	0.579	1	1	10.541	2229.242	0.268	C
166.667-158.3			B	0.13	2.846	0.579	1	1	10.541			
33			C	0.342	2.19	0.63	1	1	24.923			
T4	111.360	780.881	A	0.126	2.863	0.578	1	1	10.764	2331.372	0.280	C
158.333-150.0			B	0.126	2.863	0.578	1	1	10.764			
00			C	0.348	2.176	0.632	1	1	26.631			
T5	620.220	3994.805	A	0.153	2.761	0.582	1	1	45.206	7637.080	0.305	C
150.000-125.0			B	0.271	2.377	0.607	1	1	69.319			
00			C	0.352	2.167	0.633	1	1	90.537			
T6	832.060	4822.083	A	0.151	2.769	0.582	1	1	51.671	8034.290	0.321	C
125.000-100.0			B	0.345	2.184	0.631	1	1	98.947			
00			C	0.338	2.2	0.628	1	1	99.336			
T7	279.333	1971.333	A	0.145	2.791	0.581	1	1	17.984	2678.749	0.321	C
100.000-91.66			B	0.325	2.233	0.624	1	1	33.577			
7			C	0.322	2.24	0.623	1	1	34.051			
T8	281.863	2177.704	A	0.145	2.791	0.581	1	1	21.809	2917.971	0.350	C
91.667-83.333			B	0.318	2.25	0.621	1	1	37.069			
			C	0.319	2.247	0.622	1	1	37.946			
T9	284.228	2217.593	A	0.142	2.801	0.58	1	1	22.199	2904.433	0.349	C
83.333-75.000			B	0.309	2.272	0.619	1	1	37.410			
			C	0.314	2.26	0.62	1	1	38.655			
T10	854.500	6527.158	A	0.142	2.8	0.58	1	1	59.643	7873.960	0.315	C
75.000-50.000			B	0.3	2.297	0.616	1	1	106.849			
			C	0.305	2.283	0.617	1	1	110.969			
T11	427.250	3351.672	A	0.136	2.823	0.579	1	1	30.808	3679.647	0.294	C
50.000-37.500			B	0.283	2.341	0.611	1	1	54.257			
			C	0.288	2.327	0.612	1	1	56.323			
T12	428.750	3845.718	A	0.133	2.836	0.579	1	1	31.511	3483.247	0.279	C
37.500-25.000			B	0.274	2.368	0.608	1	1	54.874			
			C	0.28	2.35	0.61	1	1	57.237			
T13	431.938	3469.888	A	0.127	2.858	0.578	1	1	31.462	3545.185	0.284	C
25.000-12.500			B	0.262	2.401	0.605	1	1	54.703			
			C	0.272	2.373	0.608	1	1	57.685			
T14	156.510	4121.618	A	0.121	2.882	0.577	1	1	31.506	2839.024	0.227	C
12.500-0.000			B	0.168	2.708	0.584	1	1	39.502			
			C	0.172	2.693	0.585	1	1	40.715			
Sum Weight:	4927.623	39396.324						OTM	4815.134 kip-ft	53334.784		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w klf	Ctrl Face
T1	39.290	592.305	A	0.173	2.689	0.585	0.8	1	6.862	1109.337	0.222	C
180.000-175.000			B	0.173	2.689	0.585	0.8	1	6.862			
			C	0.311	2.267	0.619	0.8	1	11.685			
T2	77.870	755.494	A	0.135	2.826	0.579	0.8	1	9.062	1853.769	0.222	C
175.000-166.667			B	0.135	2.826	0.579	0.8	1	9.062			
			C	0.304	2.285	0.617	0.8	1	19.582			
T3	102.450	768.073	A	0.13	2.846	0.579	0.8	1	9.237	2101.693	0.252	C
166.667-158.333			B	0.13	2.846	0.579	0.8	1	9.237			
			C	0.342	2.19	0.63	0.8	1	23.497			
T4	111.360	780.881	A	0.126	2.863	0.578	0.8	1	9.415	2204.799	0.265	C
158.333-150.000			B	0.126	2.863	0.578	0.8	1	9.415			
			C	0.348	2.176	0.632	0.8	1	25.185			
T5	620.220	3994.805	A	0.153	2.761	0.582	0.8	1	38.919	7169.236	0.287	C
150.000-125.000			B	0.271	2.377	0.607	0.8	1	64.201			
			C	0.352	2.167	0.633	0.8	1	84.991			
T6	832.060	4822.083	A	0.151	2.769	0.582	0.8	1	44.171	7521.159	0.301	B
125.000-100.000			B	0.345	2.184	0.631	0.8	1	93.675			
			C	0.338	2.2	0.628	0.8	1	92.773			
T7	279.333	1971.333	A	0.145	2.791	0.581	0.8	1	15.330	2494.170	0.299	C
100.000-91.667			B	0.325	2.233	0.624	0.8	1	31.649			
			C	0.322	2.24	0.623	0.8	1	31.705			
T8	281.863	2177.704	A	0.145	2.791	0.581	0.8	1	17.583	2617.306	0.314	C
91.667-83.333			B	0.318	2.25	0.621	0.8	1	33.560			
			C	0.319	2.247	0.622	0.8	1	34.036			
T9	284.228	2217.593	A	0.142	2.801	0.58	0.8	1	17.895	2605.378	0.313	C
83.333-75.000			B	0.309	2.272	0.619	0.8	1	33.816			
			C	0.314	2.26	0.62	0.8	1	34.675			
T10	854.500	6527.158	A	0.142	2.8	0.58	0.8	1	51.450	7349.593	0.294	C
75.000-50.000			B	0.3	2.297	0.616	0.8	1	100.619			
			C	0.305	2.283	0.617	0.8	1	103.579			
T11	427.250	3351.672	A	0.136	2.823	0.579	0.8	1	26.511	3423.361	0.274	C
50.000-37.500			B	0.283	2.341	0.611	0.8	1	50.916			
			C	0.288	2.327	0.612	0.8	1	52.400			
T12	428.750	3845.718	A	0.133	2.836	0.579	0.8	1	27.072	3235.568	0.259	C
37.500-25.000			B	0.274	2.368	0.608	0.8	1	51.376			
			C	0.28	2.35	0.61	0.8	1	53.167			
T13	431.938	3469.888	A	0.127	2.858	0.578	0.8	1	27.031	3296.168	0.264	C
25.000-12.500			B	0.262	2.401	0.605	0.8	1	51.201			
			C	0.272	2.373	0.608	0.8	1	53.633			
T14	156.510	4121.618	A	0.121	2.882	0.577	0.8	1	26.934	2529.875	0.202	C
12.500-0.000			B	0.168	2.708	0.584	0.8	1	35.260			
			C	0.172	2.693	0.585	0.8	1	36.281			
Sum Weight:	4927.623	39396.324						OTM	4489.071 kip-ft	49511.411		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w klf	Ctrl Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w klf	Ctrl Face
T1	39.290	592.305	A	0.173	2.689	0.585	0.85	1	7.138	1132.437	0.226	C
180.000-175.0			B	0.173	2.689	0.585	0.85	1	7.138			
00			C	0.311	2.267	0.619	0.85	1	11.928			
T2	77.870	755.494	A	0.135	2.826	0.579	0.85	1	9.376	1885.039	0.226	C
175.000-166.6			B	0.135	2.826	0.579	0.85	1	9.376			
67			C	0.304	2.285	0.617	0.85	1	19.912			
T3	102.450	768.073	A	0.13	2.846	0.579	0.85	1	9.563	2133.580	0.256	C
166.667-158.3			B	0.13	2.846	0.579	0.85	1	9.563			
33			C	0.342	2.19	0.63	0.85	1	23.854			
T4	111.360	780.881	A	0.126	2.863	0.578	0.85	1	9.752	2236.442	0.268	C
158.333-150.0			B	0.126	2.863	0.578	0.85	1	9.752			
00			C	0.348	2.176	0.632	0.85	1	25.547			
T5	620.220	3994.805	A	0.153	2.761	0.582	0.85	1	40.490	7286.197	0.291	C
150.000-125.0			B	0.271	2.377	0.607	0.85	1	65.480			
00			C	0.352	2.167	0.633	0.85	1	86.377			
T6	832.060	4822.083	A	0.151	2.769	0.582	0.85	1	46.046	7636.204	0.305	C
125.000-100.0			B	0.345	2.184	0.631	0.85	1	94.993			
00			C	0.338	2.2	0.628	0.85	1	94.414			
T7	279.333	1971.333	A	0.145	2.791	0.581	0.85	1	15.994	2540.315	0.305	C
100.000-91.66			B	0.325	2.233	0.624	0.85	1	32.131			
7			C	0.322	2.24	0.623	0.85	1	32.292			
T8	281.863	2177.704	A	0.145	2.791	0.581	0.85	1	18.639	2692.472	0.323	C
91.667-83.333			B	0.318	2.25	0.621	0.85	1	34.438			
			C	0.319	2.247	0.622	0.85	1	35.014			
T9	284.228	2217.593	A	0.142	2.801	0.58	0.85	1	18.971	2680.142	0.322	C
83.333-75.000			B	0.309	2.272	0.619	0.85	1	34.715			
			C	0.314	2.26	0.62	0.85	1	35.670			
T10	854.500	6527.158	A	0.142	2.8	0.58	0.85	1	53.498	7480.685	0.299	C
75.000-50.000			B	0.3	2.297	0.616	0.85	1	102.177			
			C	0.305	2.283	0.617	0.85	1	105.427			
T11	427.250	3351.672	A	0.136	2.823	0.579	0.85	1	27.585	3487.433	0.279	C
50.000-37.500			B	0.283	2.341	0.611	0.85	1	51.751			
			C	0.288	2.327	0.612	0.85	1	53.381			
T12	428.750	3845.718	A	0.133	2.836	0.579	0.85	1	28.181	3297.488	0.264	C
37.500-25.000			B	0.274	2.368	0.608	0.85	1	52.250			
			C	0.28	2.35	0.61	0.85	1	54.185			
T13	431.938	3469.888	A	0.127	2.858	0.578	0.85	1	28.139	3358.422	0.269	C
25.000-12.500			B	0.262	2.401	0.605	0.85	1	52.076			
			C	0.272	2.373	0.608	0.85	1	54.646			
T14	156.510	4121.618	A	0.121	2.882	0.577	0.85	1	28.077	2607.162	0.209	C
12.500-0.000			B	0.168	2.708	0.584	0.85	1	36.321			
			C	0.172	2.693	0.585	0.85	1	37.389			
Sum Weight:	4927.623	39396.324						OTM	4569.097 kip-ft	50454.017		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w klf	Ctrl Face
T1	123.187	862.271	A	0.223	2.523	0.595	1	1	9.720	1342.814	0.269	C
180.000-175.0			B	0.223	2.523	0.595	1	1	9.720			
00			C	0.436	1.997	0.667	1	1	17.886			
T2	252.324	1098.615	A	0.174	2.685	0.585	1	1	12.650	2312.394	0.277	C
175.000-166.6			B	0.174	2.685	0.585	1	1	12.650			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w klf	Ctrl Face
67			C	0.442	1.987	0.67	1	1	31.298			
T3	334.134	1119.335	A	0.168	2.707	0.584	1	1	12.916	2703.210	0.324	C
166.667-158.3			B	0.168	2.707	0.584	1	1	12.916			
33			C	0.505	1.893	0.7	1	1	38.959			
T4	369.268	1140.408	A	0.162	2.727	0.583	1	1	13.187	2884.657	0.346	C
158.333-150.0			B	0.162	2.727	0.583	1	1	13.187			
00			C	0.522	1.873	0.709	1	1	42.664			
T5	1970.095	5582.627	A	0.211	2.56	0.593	1	1	58.964	9119.079	0.365	C
150.000-125.0			B	0.392	2.08	0.648	1	1	100.529			
00			C	0.516	1.88	0.706	1	1	138.778			
T6	2689.508	6689.411	A	0.207	2.572	0.592	1	1	67.038	9690.881	0.388	B
125.000-100.0			B	0.515	1.881	0.705	1	1	156.114			
00			C	0.497	1.904	0.696	1	1	150.991			
T7	904.310	2688.967	A	0.199	2.599	0.59	1	1	23.257	3160.987	0.379	B
100.000-91.66			B	0.485	1.92	0.69	1	1	52.228			
7			C	0.474	1.936	0.685	1	1	51.387			
T8	914.287	2974.304	A	0.195	2.614	0.589	1	1	27.202	3299.092	0.396	C
91.667-83.333			B	0.47	1.942	0.683	1	1	55.032			
			C	0.467	1.947	0.681	1	1	55.170			
T9	923.613	3032.898	A	0.191	2.625	0.589	1	1	27.674	3284.064	0.394	C
83.333-75.000			B	0.457	1.961	0.677	1	1	55.268			
			C	0.461	1.956	0.678	1	1	56.255			
T10	2777.995	8569.054	A	0.184	2.649	0.587	1	1	73.941	9090.506	0.364	C
75.000-50.000			B	0.439	1.993	0.668	1	1	160.332			
			C	0.444	1.984	0.671	1	1	164.294			
T11	1388.997	4414.059	A	0.177	2.676	0.586	1	1	38.107	4215.572	0.337	C
50.000-37.500			B	0.415	2.036	0.658	1	1	80.587			
			C	0.42	2.026	0.66	1	1	82.584			
T12	1397.400	5043.813	A	0.172	2.692	0.585	1	1	38.920	3988.390	0.319	C
37.500-25.000			B	0.401	2.063	0.652	1	1	80.998			
			C	0.409	2.046	0.656	1	1	83.890			
T13	1415.256	4641.603	A	0.166	2.715	0.584	1	1	38.978	4086.303	0.327	C
25.000-12.500			B	0.385	2.095	0.646	1	1	80.592			
			C	0.402	2.06	0.652	1	1	85.333			
T14	515.164	5440.722	A	0.153	2.761	0.582	1	1	37.715	3060.229	0.245	C
12.500-0.000			B	0.229	2.503	0.597	1	1	51.213			
			C	0.237	2.477	0.599	1	1	53.163			
Sum Weight:	15975.537	53298.087						OTM	5686.027 kip-ft	62238.179		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w klf	Ctrl Face
T1	123.187	862.271	A	0.223	2.523	0.595	0.8	1	8.615	1276.856	0.255	C
180.000-175.0			B	0.223	2.523	0.595	0.8	1	8.615			
00			C	0.436	1.997	0.667	0.8	1	17.007			
T2	252.324	1098.615	A	0.174	2.685	0.585	0.8	1	11.391	2217.192	0.266	C
175.000-166.6			B	0.174	2.685	0.585	0.8	1	11.391			
67			C	0.442	1.987	0.67	0.8	1	30.010			
T3	334.134	1119.335	A	0.168	2.707	0.584	0.8	1	11.613	2606.138	0.313	C
166.667-158.3			B	0.168	2.707	0.584	0.8	1	11.613			
33			C	0.505	1.893	0.7	0.8	1	37.560			
T4	369.268	1140.408	A	0.162	2.727	0.583	0.8	1	11.838	2790.428	0.335	C

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w klf	Ctrl. Face
158.333-150.0			B	0.162	2.727	0.583	0.8	1	11.838			
00			C	0.522	1.873	0.709	0.8	1	41.270			
T5	1970.095	5582.627	A	0.211	2.56	0.593	0.8	1	52.246	8812.024	0.352	C
150.000-125.0			B	0.392	2.08	0.648	0.8	1	95.730			
00			C	0.516	1.88	0.706	0.8	1	134.105			
T6	2689.508	6689.411	A	0.207	2.572	0.592	0.8	1	59.000	9425.579	0.377	B
125.000-100.0			B	0.515	1.881	0.705	0.8	1	151.840			
00			C	0.497	1.904	0.696	0.8	1	145.474			
T7	904.310	2688.967	A	0.199	2.599	0.59	0.8	1	20.425	3063.620	0.368	B
100.000-91.66			B	0.485	1.92	0.69	0.8	1	50.619			
7			C	0.474	1.936	0.685	0.8	1	49.388			
T8	914.287	2974.304	A	0.195	2.614	0.589	0.8	1	22.611	3080.830	0.370	B
91.667-83.333			B	0.47	1.942	0.683	0.8	1	51.652			
			C	0.467	1.947	0.681	0.8	1	51.432			
T9	923.613	3032.898	A	0.191	2.625	0.589	0.8	1	23.005	3062.234	0.367	C
83.333-75.000			B	0.457	1.961	0.677	0.8	1	51.799			
			C	0.461	1.956	0.678	0.8	1	52.455			
T10	2777.995	8569.054	A	0.184	2.649	0.587	0.8	1	65.211	8735.657	0.349	C
75.000-50.000			B	0.439	1.993	0.668	0.8	1	154.916			
			C	0.444	1.984	0.671	0.8	1	157.880			
T11	1388.997	4414.059	A	0.177	2.676	0.586	0.8	1	33.542	4039.227	0.323	C
50.000-37.500			B	0.415	2.036	0.658	0.8	1	77.636			
			C	0.42	2.026	0.66	0.8	1	79.129			
T12	1397.400	5043.813	A	0.172	2.692	0.585	0.8	1	34.213	3817.432	0.305	C
37.500-25.000			B	0.401	2.063	0.652	0.8	1	77.880			
			C	0.409	2.046	0.656	0.8	1	80.294			
T13	1415.256	4641.603	A	0.166	2.715	0.584	0.8	1	34.278	3916.289	0.313	C
25.000-12.500			B	0.385	2.095	0.646	0.8	1	77.462			
			C	0.402	2.06	0.652	0.8	1	81.782			
T14	515.164	5440.722	A	0.153	2.761	0.582	0.8	1	33.045	2815.861	0.225	C
12.500-0.000			B	0.229	2.503	0.597	0.8	1	47.101			
			C	0.237	2.477	0.599	0.8	1	48.918			
Sum Weight:	15975.537	53298.087						OTM	5469.747 kip-ft	59659.364		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w klf	Ctrl. Face
T1	123.187	862.271	A	0.223	2.523	0.595	0.85	1	8.891	1293.345	0.259	C
180.000-175.0			B	0.223	2.523	0.595	0.85	1	8.891			
00			C	0.436	1.997	0.667	0.85	1	17.227			
T2	252.324	1098.615	A	0.174	2.685	0.585	0.85	1	11.706	2240.992	0.269	C
175.000-166.6			B	0.174	2.685	0.585	0.85	1	11.706			
67			C	0.442	1.987	0.67	0.85	1	30.332			
T3	334.134	1119.335	A	0.168	2.707	0.584	0.85	1	11.939	2630.406	0.316	C
166.667-158.3			B	0.168	2.707	0.584	0.85	1	11.939			
33			C	0.505	1.893	0.7	0.85	1	37.909			
T4	369.268	1140.408	A	0.162	2.727	0.583	0.85	1	12.175	2813.985	0.338	C
158.333-150.0			B	0.162	2.727	0.583	0.85	1	12.175			
00			C	0.522	1.873	0.709	0.85	1	41.619			
T5	1970.095	5582.627	A	0.211	2.56	0.593	0.85	1	53.926	8888.787	0.356	C
150.000-125.0			B	0.392	2.08	0.648	0.85	1	96.930			
00			C	0.516	1.88	0.706	0.85	1	135.273			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w klf	Ctrl Face
T6	2689.508	6689.411	A	0.207	2.572	0.592	0.85	1	61.010	9491.905	0.380	B
125.000-100.0			B	0.515	1.881	0.705	0.85	1	152.909			
00			C	0.497	1.904	0.696	0.85	1	146.853			
T7	904.310	2688.967	A	0.199	2.599	0.59	0.85	1	21.133	3087.962	0.371	B
100.000-91.66			B	0.485	1.92	0.69	0.85	1	51.021			
7			C	0.474	1.936	0.685	0.85	1	49.888			
T8	914.287	2974.304	A	0.195	2.614	0.589	0.85	1	23.759	3131.425	0.376	C
91.667-83.333			B	0.47	1.942	0.683	0.85	1	52.497			
			C	0.467	1.947	0.681	0.85	1	52.366			
T9	923.613	3032.898	A	0.191	2.625	0.589	0.85	1	24.172	3117.691	0.374	C
83.333-75.000			B	0.457	1.961	0.677	0.85	1	52.666			
			C	0.461	1.956	0.678	0.85	1	53.405			
T10	2777.995	8569.054	A	0.184	2.649	0.587	0.85	1	67.393	8824.369	0.353	C
75.000-50.000			B	0.439	1.993	0.668	0.85	1	156.270			
			C	0.444	1.984	0.671	0.85	1	159.484			
T11	1388.997	4414.059	A	0.177	2.676	0.586	0.85	1	34.683	4083.313	0.327	C
50.000-37.500			B	0.415	2.036	0.658	0.85	1	78.374			
			C	0.42	2.026	0.66	0.85	1	79.993			
T12	1397.400	5043.813	A	0.172	2.692	0.585	0.85	1	35.390	3860.171	0.309	C
37.500-25.000			B	0.401	2.063	0.652	0.85	1	78.660			
			C	0.409	2.046	0.656	0.85	1	81.193			
T13	1415.256	4641.603	A	0.166	2.715	0.584	0.85	1	35.453	3958.792	0.317	C
25.000-12.500			B	0.385	2.095	0.646	0.85	1	78.244			
			C	0.402	2.06	0.652	0.85	1	82.670			
T14	515.164	5440.722	A	0.153	2.761	0.582	0.85	1	34.213	2876.953	0.230	C
12.500-0.000			B	0.229	2.503	0.597	0.85	1	48.129			
			C	0.237	2.477	0.599	0.85	1	49.979			
Sum Weight:	15975.537	53298.087						OTM	5523.470 kip-ft	60300.097		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w klf	Ctrl Face
T1	39.290	592.305	A	0.173	2.689	0.585	1	1	7.967	332.891	0.067	C
180.000-175.0			B	0.173	2.689	0.585	1	1	7.967			
00			C	0.311	2.267	0.619	1	1	12.658			
T2	77.870	755.494	A	0.135	2.826	0.579	1	1	10.320	548.157	0.066	C
175.000-166.6			B	0.135	2.826	0.579	1	1	10.320			
67			C	0.304	2.285	0.617	1	1	20.903			
T3	102.450	768.073	A	0.13	2.846	0.579	1	1	10.541	617.519	0.074	C
166.667-158.3			B	0.13	2.846	0.579	1	1	10.541			
33			C	0.342	2.19	0.63	1	1	24.923			
T4	111.360	780.881	A	0.126	2.863	0.578	1	1	10.764	645.809	0.077	C
158.333-150.0			B	0.126	2.863	0.578	1	1	10.764			
00			C	0.348	2.176	0.632	1	1	26.631			
T5	620.220	3994.805	A	0.153	2.761	0.582	1	1	45.206	2115.535	0.085	C
150.000-125.0			B	0.271	2.377	0.607	1	1	69.319			
00			C	0.352	2.167	0.633	1	1	90.537			
T6	832.060	4822.083	A	0.151	2.769	0.582	1	1	51.671	2225.565	0.089	C
125.000-100.0			B	0.345	2.184	0.631	1	1	98.947			
00			C	0.338	2.2	0.628	1	1	99.336			
T7	279.333	1971.333	A	0.145	2.791	0.581	1	1	17.984	742.036	0.089	C
100.000-91.66			B	0.325	2.233	0.624	1	1	33.577			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w klf	Ctrl Face
7			C	0.322	2.24	0.623	1	1	34.051			
T8	281.863	2177.704	A	0.145	2.791	0.581	1	1	21.809	808.302	0.097	C
91.667-83.333			B	0.318	2.25	0.621	1	1	37.069			
			C	0.319	2.247	0.622	1	1	37.946			
T9	284.228	2217.593	A	0.142	2.801	0.58	1	1	22.199	804.552	0.097	C
83.333-75.000			B	0.309	2.272	0.619	1	1	37.410			
			C	0.314	2.26	0.62	1	1	38.655			
T10	854.500	6527.158	A	0.142	2.8	0.58	1	1	59.643	2181.152	0.087	C
75.000-50.000			B	0.3	2.297	0.616	1	1	106.849			
			C	0.305	2.283	0.617	1	1	110.969			
T11	427.250	3351.672	A	0.136	2.823	0.579	1	1	30.808	1019.293	0.082	C
50.000-37.500			B	0.283	2.341	0.611	1	1	54.257			
			C	0.288	2.327	0.612	1	1	56.323			
T12	428.750	3845.718	A	0.133	2.836	0.579	1	1	31.511	964.888	0.077	C
37.500-25.000			B	0.274	2.368	0.608	1	1	54.874			
			C	0.28	2.35	0.61	1	1	57.237			
T13	431.938	3469.888	A	0.127	2.858	0.578	1	1	31.462	982.046	0.079	C
25.000-12.500			B	0.262	2.401	0.605	1	1	54.703			
			C	0.272	2.373	0.608	1	1	57.685			
T14	156.510	4121.618	A	0.121	2.882	0.577	1	1	31.506	786.433	0.063	C
12.500-0.000			B	0.168	2.708	0.584	1	1	39.502			
			C	0.172	2.693	0.585	1	1	40.715			
Sum Weight:	4927.623	39396.324						OTM	1333.832 kip-ft	14774.178		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w klf	Ctrl Face
T1	39.290	592.305	A	0.173	2.689	0.585	0.8	1	6.862	307.296	0.061	C
180.000-175.0			B	0.173	2.689	0.585	0.8	1	6.862			
00			C	0.311	2.267	0.619	0.8	1	11.685			
T2	77.870	755.494	A	0.135	2.826	0.579	0.8	1	9.062	513.510	0.062	C
175.000-166.6			B	0.135	2.826	0.579	0.8	1	9.062			
67			C	0.304	2.285	0.617	0.8	1	19.582			
T3	102.450	768.073	A	0.13	2.846	0.579	0.8	1	9.237	582.186	0.070	C
166.667-158.3			B	0.13	2.846	0.579	0.8	1	9.237			
33			C	0.342	2.19	0.63	0.8	1	23.497			
T4	111.360	780.881	A	0.126	2.863	0.578	0.8	1	9.415	610.748	0.073	C
158.333-150.0			B	0.126	2.863	0.578	0.8	1	9.415			
00			C	0.348	2.176	0.632	0.8	1	25.185			
T5	620.220	3994.805	A	0.153	2.761	0.582	0.8	1	38.919	1985.938	0.079	C
150.000-125.0			B	0.271	2.377	0.607	0.8	1	64.201			
00			C	0.352	2.167	0.633	0.8	1	84.991			
T6	832.060	4822.083	A	0.151	2.769	0.582	0.8	1	44.171	2083.423	0.083	B
125.000-100.0			B	0.345	2.184	0.631	0.8	1	93.675			
00			C	0.338	2.2	0.628	0.8	1	92.773			
T7	279.333	1971.333	A	0.145	2.791	0.581	0.8	1	15.330	690.906	0.083	C
100.000-91.66			B	0.325	2.233	0.624	0.8	1	31.649			
7			C	0.322	2.24	0.623	0.8	1	31.705			
T8	281.863	2177.704	A	0.145	2.791	0.581	0.8	1	17.583	725.015	0.087	C
91.667-83.333			B	0.318	2.25	0.621	0.8	1	33.560			
			C	0.319	2.247	0.622	0.8	1	34.036			
T9	284.228	2217.593	A	0.142	2.801	0.58	0.8	1	17.895	721.711	0.087	C

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w klf	Ctrl Face
83.333-75.000			B	0.309	2.272	0.619	0.8	1	33.816			
			C	0.314	2.26	0.62	0.8	1	34.675			
T10	854.500	6527.158	A	0.142	2.8	0.58	0.8	1	51.450	2035.898	0.081	C
75.000-50.000			B	0.3	2.297	0.616	0.8	1	100.619			
			C	0.305	2.283	0.617	0.8	1	103.579			
T11	427.250	3351.672	A	0.136	2.823	0.579	0.8	1	26.511	948.299	0.076	C
50.000-37.500			B	0.283	2.341	0.611	0.8	1	50.916			
			C	0.288	2.327	0.612	0.8	1	52.400			
T12	428.750	3845.718	A	0.133	2.836	0.579	0.8	1	27.072	896.279	0.072	C
37.500-25.000			B	0.274	2.368	0.608	0.8	1	51.376			
			C	0.28	2.35	0.61	0.8	1	53.167			
T13	431.938	3469.888	A	0.127	2.858	0.578	0.8	1	27.031	913.066	0.073	C
25.000-12.500			B	0.262	2.401	0.605	0.8	1	51.201			
			C	0.272	2.373	0.608	0.8	1	53.633			
T14	156.510	4121.618	A	0.121	2.882	0.577	0.8	1	26.934	700.796	0.056	C
12.500-0.000			B	0.168	2.708	0.584	0.8	1	35.260			
			C	0.172	2.693	0.585	0.8	1	36.281			
Sum Weight:	4927.623	39396.324						OTM	1243.510 kip-ft	13715.072		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w klf	Ctrl Face
T1	39.290	592.305	A	0.173	2.689	0.585	0.85	1	7.138	313.695	0.063	C
180.000-175.0			B	0.173	2.689	0.585	0.85	1	7.138			
00			C	0.311	2.267	0.619	0.85	1	11.928			
T2	77.870	755.494	A	0.135	2.826	0.579	0.85	1	9.376	522.172	0.063	C
175.000-166.6			B	0.135	2.826	0.579	0.85	1	9.376			
67			C	0.304	2.285	0.617	0.85	1	19.912			
T3	102.450	768.073	A	0.13	2.846	0.579	0.85	1	9.563	591.019	0.071	C
166.667-158.3			B	0.13	2.846	0.579	0.85	1	9.563			
33			C	0.342	2.19	0.63	0.85	1	23.854			
T4	111.360	780.881	A	0.126	2.863	0.578	0.85	1	9.752	619.513	0.074	C
158.333-150.0			B	0.126	2.863	0.578	0.85	1	9.752			
00			C	0.348	2.176	0.632	0.85	1	25.547			
T5	620.220	3994.805	A	0.153	2.761	0.582	0.85	1	40.490	2018.337	0.081	C
150.000-125.0			B	0.271	2.377	0.607	0.85	1	65.480			
00			C	0.352	2.167	0.633	0.85	1	86.377			
T6	832.060	4822.083	A	0.151	2.769	0.582	0.85	1	46.046	2115.292	0.085	C
125.000-100.0			B	0.345	2.184	0.631	0.85	1	94.993			
00			C	0.338	2.2	0.628	0.85	1	94.414			
T7	279.333	1971.333	A	0.145	2.791	0.581	0.85	1	15.994	703.688	0.084	C
100.000-91.66			B	0.325	2.233	0.624	0.85	1	32.131			
7			C	0.322	2.24	0.623	0.85	1	32.292			
T8	281.863	2177.704	A	0.145	2.791	0.581	0.85	1	18.639	745.837	0.090	C
91.667-83.333			B	0.318	2.25	0.621	0.85	1	34.438			
			C	0.319	2.247	0.622	0.85	1	35.014			
T9	284.228	2217.593	A	0.142	2.801	0.58	0.85	1	18.971	742.422	0.089	C
83.333-75.000			B	0.309	2.272	0.619	0.85	1	34.715			
			C	0.314	2.26	0.62	0.85	1	35.670			
T10	854.500	6527.158	A	0.142	2.8	0.58	0.85	1	53.498	2072.212	0.083	C
75.000-50.000			B	0.3	2.297	0.616	0.85	1	102.177			
			C	0.305	2.283	0.617	0.85	1	105.427			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w klf	Ctrl. Face
T11	427.250	3351.672	A	0.136	2.823	0.579	0.85	1	27.585	966.048	0.077	C
50.000-37.500			B	0.283	2.341	0.611	0.85	1	51.751			
			C	0.288	2.327	0.612	0.85	1	53.381			
T12	428.750	3845.718	A	0.133	2.836	0.579	0.85	1	28.181	913.431	0.073	C
37.500-25.000			B	0.274	2.368	0.608	0.85	1	52.250			
			C	0.28	2.35	0.61	0.85	1	54.185			
T13	431.938	3469.888	A	0.127	2.858	0.578	0.85	1	28.139	930.311	0.074	C
25.000-12.500			B	0.262	2.401	0.605	0.85	1	52.076			
			C	0.272	2.373	0.608	0.85	1	54.646			
T14	156.510	4121.618	A	0.121	2.882	0.577	0.85	1	28.077	722.206	0.058	C
12.500-0.000			B	0.168	2.708	0.584	0.85	1	36.321			
			C	0.172	2.693	0.585	0.85	1	37.389			
Sum Weight:	4927.623	39396.324						OTM	1265.678 kip-ft	13976.182		

Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	13087.082					
Bracing Weight	26309.241					
Total Member Self-Weight	39396.324			-1.941	13.286	
Total Weight	51661.604			-1.941	13.286	
Wind 0 deg - No Ice		389.772	-72808.956	-7821.685	-51.660	-42.455
Wind 30 deg - No Ice		34904.996	-60861.480	-6612.683	-3765.005	-31.690
Wind 60 deg - No Ice		59176.587	-34403.229	-3730.220	-6386.348	-8.859
Wind 90 deg - No Ice		69384.271	61.797	15.046	-7482.244	16.404
Wind 120 deg - No Ice		62583.590	36075.069	3856.269	-6690.889	32.805
Wind 150 deg - No Ice		34828.378	59789.343	6427.367	-3757.203	37.692
Wind 180 deg - No Ice		-52.466	68097.581	7339.309	20.213	39.157
Wind 210 deg - No Ice		-35036.720	60411.895	6532.352	3815.978	31.766
Wind 240 deg - No Ice		-62679.593	36580.566	3939.585	6731.876	9.650
Wind 270 deg - No Ice		-68731.568	429.846	74.158	7396.546	-15.930
Wind 300 deg - No Ice		-58036.379	-33684.346	-3610.201	6218.893	-30.298
Wind 330 deg - No Ice		-33824.930	-59988.542	-6464.629	3609.430	-38.243
Member Ice	13901.763					
Total Weight Ice	80090.913			0.170	33.007	
Wind 0 deg - Ice		351.741	-84513.595	-9104.845	-25.386	-55.386
Wind 30 deg - Ice		41179.799	-71668.055	-7774.943	-4422.903	-45.159
Wind 60 deg - Ice		70180.976	-40832.229	-4419.515	-7547.362	-17.482
Wind 90 deg - Ice		81661.319	109.308	23.429	-8781.604	15.161
Wind 120 deg - Ice		72257.430	43328.937	4693.091	-7722.108	40.730
Wind 150 deg - Ice		40603.117	71609.036	7735.209	-4347.478	53.201
Wind 180 deg - Ice		-40.537	81756.725	8835.729	37.870	52.562
Wind 210 deg - Ice		-40781.707	72175.543	7830.543	4440.556	39.260
Wind 240 deg - Ice		-72338.134	43781.687	4767.313	7799.894	14.655
Wind 270 deg - Ice		-81059.125	433.138	74.911	8744.036	-14.723
Wind 300 deg - Ice		-69136.871	-40182.607	-4311.429	7435.891	-35.080
Wind 330 deg - Ice		-40196.943	-70870.538	-7639.874	4323.512	-47.739
Total Weight	51661.604			-1.941	13.286	
Wind 0 deg - Service		107.970	-20168.686	-2169.802	-10.853	-11.760
Wind 30 deg - Service		9668.974	-16859.136	-1834.899	-1039.481	-8.778
Wind 60 deg - Service		16392.406	-9529.980	-1036.433	-1765.614	-2.454
Wind 90 deg - Service		19220.020	17.118	1.037	-2069.187	4.544

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 120 deg - Service		17336.175	9993.094	1065.088	-1849.975	9.087
Wind 150 deg - Service		9647.750	16562.145	1777.303	-1037.319	10.441
Wind 180 deg - Service		-14.534	18863.596	2029.919	9.056	10.847
Wind 210 deg - Service		-9705.463	16734.597	1806.385	1060.515	8.800
Wind 240 deg - Service		-17362.768	10133.121	1088.167	1868.242	2.673
Wind 270 deg - Service		-19039.216	119.071	17.412	2052.362	-4.413
Wind 300 deg - Service		-16076.559	-9330.844	-1003.186	1726.142	-8.393
Wind 330 deg - Service		-9369.787	-16617.325	-1793.887	1003.299	-10.594

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	180 - 175	Leg	Max Tension	17	513.757	-1.045	-0.037
			Max. Compression	19	-2552.923	0.962	-0.195
			Max. Mx	17	513.757	-1.045	-0.037
			Max. My	22	-1415.312	-0.004	-1.613
			Max. Vy	23	1837.473	-0.000	-0.000
			Max. Vx	22	2550.361	0.000	0.000
		Diagonal	Max Tension	20	3311.175	0.000	0.000
			Max. Compression	20	-3480.424	0.000	0.000
			Max. Mx	22	1572.951	0.044	0.000
			Max. My	19	-347.657	0.000	-0.002
			Max. Vy	22	23.607	0.000	0.000
			Max. Vx	19	-0.917	0.000	0.000
		Top Girt	Max Tension	21	2803.775	0.024	0.009
			Max. Compression	15	-2967.154	0.031	0.006
			Max. Mx	17	-1561.985	0.033	0.003
			Max. My	15	364.694	0.021	0.010
			Max. Vy	17	26.485	0.033	0.003
			Max. Vx	15	-2.488	0.000	0.000
T2	175 - 166.667	Leg	Max Tension	17	2861.161	-1.045	-0.037
			Max. Compression	23	-6683.307	0.869	0.016
			Max. Mx	17	2861.161	-1.045	-0.037
			Max. My	26	-2524.506	-0.070	1.223
			Max. Vy	17	1053.663	-0.984	0.010
			Max. Vx	26	-1506.555	-0.070	1.223
		Diagonal	Max Tension	18	6557.830	0.000	0.000
			Max. Compression	18	-6708.039	0.000	0.000
			Max. Mx	22	4829.785	0.064	0.000
			Max. My	15	-1170.902	0.000	0.003
			Max. Vy	22	-25.188	0.000	0.000
			Max. Vx	15	-1.369	0.000	0.000
		Horizontal	Max Tension	17	3911.289	0.000	0.000
			Max. Compression	23	-3960.023	0.023	0.009
			Max. Mx	21	79.447	0.025	0.004
			Max. My	22	3081.205	0.019	0.012
			Max. Vy	21	19.319	0.025	0.004
			Max. Vx	22	-2.602	0.000	0.000
T3	166.667 - 158.333	Leg	Max Tension	21	9897.385	-0.771	-0.335
			Max. Compression	23	-15724.427	1.026	-0.118
			Max. Mx	21	9830.264	-1.077	-0.051
			Max. My	26	-2530.265	-0.070	1.223
			Max. Vy	17	-635.962	-0.984	0.010
			Max. Vx	26	752.273	-0.070	1.223
		Diagonal	Max Tension	18	9443.858	0.000	0.000
			Max. Compression	18	-9601.283	0.000	0.000
			Max. Mx	22	7608.074	0.069	0.000
			Max. My	15	-41.394	0.000	0.004
			Max. Vy	22	-26.602	0.000	0.000
			Max. Vx	15	-1.384	0.000	0.000
		Top Girt	Max Tension	18	5661.458	0.025	0.015
			Max. Compression	18	-5622.381	0.025	0.015
			Max. Mx	21	-924.327	0.030	0.004
			Max. My	18	-5622.381	0.025	0.015
			Max. Vy	21	20.930	0.030	0.004
			Max. Vx	18	-3.019	0.000	0.000
T4	158.333 - 150	Leg	Max Tension	21	19898.401	-1.077	-0.051
			Max. Compression	23	-27687.431	0.701	-0.094
			Max. Mx	21	19898.401	-1.077	-0.051
			Max. My	20	-3273.763	0.029	-1.415
			Max. Vy	21	-825.123	-1.077	-0.051

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	20	-863.592	0.113	-1.036
		Diagonal	Max Tension	18	10596.745	0.000	0.000
			Max. Compression	18	-10763.522	0.000	0.000
			Max. Mx	22	9127.863	0.074	0.000
			Max. My	15	137.118	0.000	0.004
			Max. Vy	22	28.011	0.000	0.000
			Max. Vx	15	1.394	0.000	0.000
		Top Girt	Max Tension	18	6582.430	0.028	0.017
			Max. Compression	18	-6508.113	0.028	0.017
			Max. Mx	21	-873.689	0.036	0.005
			Max. My	18	-6508.113	0.028	0.017
			Max. Vy	21	22.497	0.036	0.005
			Max. Vx	18	-3.126	0.000	0.000
T5	150 - 125	Leg	Max Tension	17	60063.139	0.048	0.143
			Max. Compression	23	-76929.359	-0.921	-0.025
			Max. Mx	23	-76856.852	1.598	0.042
			Max. My	18	-5574.631	-0.191	1.640
			Max. Vy	23	1546.362	0.879	-0.007
			Max. Vx	24	-1113.259	0.144	0.727
		Diagonal	Max Tension	16	16849.640	-0.026	0.003
			Max. Compression	16	-17349.480	0.000	0.000
			Max. Mx	15	-690.500	-0.078	-0.008
			Max. My	21	-14206.401	-0.043	0.014
			Max. Vy	15	36.178	-0.078	-0.008
			Max. Vx	21	3.397	0.000	0.000
		Horizontal	Max Tension	16	11035.957	0.051	-0.001
			Max. Compression	16	-11027.145	0.051	-0.001
			Max. Mx	17	678.524	0.080	0.017
			Max. My	23	869.280	0.018	-0.020
			Max. Vy	17	36.219	0.080	0.017
			Max. Vx	23	3.687	0.018	-0.020
		Redund Horz 1 Bracing	Max Tension	23	1701.710	0.000	0.000
			Max. Compression	17	-1484.592	0.000	0.000
			Max. Mx	14	127.861	-0.007	0.000
			Max. My	15	1330.933	0.000	0.000
			Max. Vy	14	-7.828	0.000	0.000
			Max. Vx	15	-0.181	0.000	0.000
		Redund Diag 1 Bracing	Max Tension	17	1228.164	0.000	0.000
			Max. Compression	23	-1264.141	0.000	0.000
			Max. Mx	22	871.547	-0.010	0.000
			Max. My	15	537.315	0.000	-0.000
			Max. Vy	22	7.563	0.000	0.000
			Max. Vx	15	0.354	0.000	0.000
		Inner Bracing	Max Tension	15	5.563	0.000	0.000
			Max. Compression	21	-12.732	0.000	0.000
			Max. Mx	14	-3.350	-0.031	0.000
			Max. My	15	5.201	0.000	-0.000
			Max. Vy	14	17.503	0.000	0.000
			Max. Vx	15	0.186	0.000	0.000
T6	125 - 100	Leg	Max Tension	21	118109.173	0.783	-0.094
			Max. Compression	23	-143539.311	-1.510	-0.080
			Max. Mx	23	-143479.332	2.412	0.052
			Max. My	20	-10903.112	-0.255	-1.885
			Max. Vy	23	1207.011	2.412	0.052
			Max. Vx	20	-1068.158	-0.178	-1.768
		Diagonal	Max Tension	16	19122.756	-0.062	0.004
			Max. Compression	16	-19704.141	0.000	0.000

Section No	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	16	7801.194	-0.128	-0.007
			Max. My	21	-16530.063	-0.039	0.014
			Max. Vy	16	48.239	-0.128	-0.007
			Max. Vx	21	3.305	0.000	0.000
		Horizontal	Max Tension	16	13508.460	0.080	-0.002
			Max. Compression	16	-13522.327	0.080	-0.002
			Max. Mx	21	1295.823	0.122	0.026
			Max. My	23	492.400	0.031	-0.031
			Max. Vy	21	50.753	0.122	0.026
			Max. Vx	23	5.074	0.030	-0.030
		Redund Horz 1 Bracing	Max Tension	23	2488.161	0.000	0.000
			Max. Compression	23	-2488.161	0.000	0.000
			Max. Mx	14	157.225	-0.009	0.000
			Max. My	15	2482.238	0.000	0.000
			Max. Vy	14	-8.920	0.000	0.000
			Max. Vx	15	0.206	0.000	0.000
		Redund Diag 1 Bracing	Max Tension	23	1823.464	0.000	0.000
			Max. Compression	23	-1823.464	0.000	0.000
			Max. Mx	22	1507.251	-0.012	0.000
			Max. My	15	935.554	0.000	-0.001
			Max. Vy	22	8.641	0.000	0.000
			Max. Vx	15	0.355	0.000	0.000
		Inner Bracing	Max Tension	23	7.852	0.000	0.000
			Max. Compression	21	-15.777	0.000	0.000
			Max. Mx	14	-3.991	-0.041	0.000
			Max. My	23	6.543	0.000	-0.000
			Max. Vy	14	19.946	0.000	0.000
			Max. Vx	23	0.185	0.000	0.000
T7	100 - 91.6667	Leg	Max Tension	21	138691.666	0.860	-0.100
			Max. Compression	23	-166811.528	-1.509	-0.080
			Max. Mx	23	-166731.575	2.424	0.055
			Max. My	20	-12441.996	-0.256	-1.923
			Max. Vy	23	-1203.869	2.424	0.055
			Max. Vx	20	970.102	-0.256	-1.923
		Diagonal	Max Tension	16	19477.475	-0.071	0.004
			Max. Compression	16	-20155.011	0.000	0.000
			Max. Mx	16	7950.026	-0.124	-0.007
			Max. My	21	-16968.102	-0.034	0.015
			Max. Vy	16	48.105	-0.124	-0.007
			Max. Vx	21	3.394	0.000	0.000
		Horizontal	Max Tension	16	14066.868	-0.133	0.003
			Max. Compression	16	-14104.270	-0.133	0.003
			Max. Mx	21	1504.465	-0.195	-0.048
			Max. My	15	45.048	-0.067	0.055
			Max. Vy	21	-81.343	-0.195	-0.048
			Max. Vx	23	-8.364	-0.067	0.055
		Redund Horz 1 Bracing	Max Tension	23	2891.570	0.000	0.000
			Max. Compression	23	-2891.570	0.000	0.000
			Max. Mx	25	1440.847	-0.010	0.000
			Max. My	15	2884.542	0.000	0.000
			Max. Vy	25	9.284	0.000	0.000
			Max. Vx	15	-0.214	0.000	0.000
		Redund Diag 1 Bracing	Max Tension	23	1984.883	0.000	0.000
			Max. Compression	23	-1984.883	0.000	0.000
			Max. Mx	22	1715.109	-0.013	0.000

Section No.	Elevation ft	Component Type	Condition	Gov Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	15	976.769	0.000	-0.001
			Max. Vy	22	8.999	0.000	0.000
			Max. Vx	15	0.354	0.000	0.000
		Inner Bracing	Max Tension	23	12.200	0.000	0.000
			Max. Compression	21	-22.362	0.000	0.000
			Max. Mx	14	-4.816	-0.044	0.000
			Max. My	23	12.192	0.000	-0.000
			Max. Vy	14	20.760	0.000	0.000
			Max. Vx	23	0.173	0.000	0.000
T8	91.6667 - 83.3333	Leg	Max Tension	21	159300.739	0.872	-0.110
			Max. Compression	23	-190412.672	-1.389	-0.088
			Max. Mx	23	-190287.980	2.279	0.063
			Max. My	20	-14153.093	-0.266	-2.215
			Max. Vy	23	-1188.605	2.279	0.063
			Max. Vx	20	-1119.072	-0.256	-1.923
		Diagonal	Max Tension	16	19899.100	-0.051	0.004
			Max. Compression	16	-20612.241	0.000	0.000
			Max. Mx	16	8107.349	-0.105	-0.007
			Max. My	21	-17473.352	-0.053	0.016
			Max. Vy	16	45.694	-0.105	-0.007
			Max. Vx	21	3.524	0.000	0.000
		Horizontal	Max Tension	16	14744.227	-0.141	0.003
			Max. Compression	16	-14676.000	-0.141	0.003
			Max. Mx	21	1717.619	-0.192	-0.048
			Max. My	23	487.075	-0.086	0.056
			Max. Vy	21	-82.438	-0.192	-0.048
			Max. Vx	23	-8.260	-0.086	0.056
		Redund Horz 1 Bracing	Max Tension	23	3300.680	0.000	0.000
			Max. Compression	23	-3300.680	0.000	0.000
			Max. Mx	25	1645.608	-0.011	0.000
			Max. My	15	3291.564	0.000	0.000
			Max. Vy	25	9.649	0.000	0.000
			Max. Vx	15	0.223	0.000	0.000
		Redund Diag 1 Bracing	Max Tension	23	2224.242	0.000	0.000
			Max. Compression	23	-2224.242	0.000	0.000
			Max. Mx	22	1920.751	-0.014	0.000
			Max. My	15	1012.424	0.000	-0.001
			Max. Vy	22	9.357	0.000	0.000
			Max. Vx	15	-0.355	0.000	0.000
		Inner Bracing	Max Tension	23	11.682	0.000	0.000
			Max. Compression	21	-21.983	0.000	0.000
			Max. Mx	14	-4.946	-0.048	0.000
			Max. My	23	11.674	0.000	-0.000
			Max. Vy	14	21.574	0.000	0.000
			Max. Vx	23	0.166	0.000	0.000
T9	83.3333 - 75	Leg	Max Tension	21	179664.903	0.742	-0.138
			Max. Compression	23	-213949.288	-2.692	-0.131
			Max. Mx	23	-213949.288	-2.692	-0.131
			Max. My	20	-15890.562	-0.467	-3.616
			Max. Vy	23	1561.856	2.672	0.066
			Max. Vx	20	1454.336	-0.467	-3.616
		Diagonal	Max Tension	16	20366.870	-0.058	0.004
			Max. Compression	16	-21147.391	0.000	0.000
			Max. Mx	16	8297.882	-0.110	-0.008

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	21	-17959.243	-0.052	0.017
			Max. Vy	16	47.295	-0.110	-0.008
			Max. Vx	21	3.628	0.000	0.000
		Horizontal	Max Tension	16	15375.765	-0.152	0.003
			Max. Compression	16	-15309.099	-0.152	0.003
			Max. Mx	21	1930.072	-0.205	-0.047
			Max. My	15	-198.423	-0.093	0.056
			Max. Vy	21	-85.426	-0.205	-0.047
			Max. Vx	23	-8.047	-0.093	0.056
		Redund Horz 1 Bracing	Max Tension	23	3708.672	0.000	0.000
			Max. Compression	23	-3708.672	0.000	0.000
			Max. Mx	14	221.070	-0.011	0.000
			Max. My	15	3696.171	0.000	0.000
			Max. Vy	14	10.013	0.000	0.000
			Max. Vx	15	-0.231	0.000	0.000
		Redund Diag 1 Bracing	Max Tension	23	2456.895	0.000	0.000
			Max. Compression	23	-2456.895	0.000	0.000
			Max. Mx	22	2120.285	-0.015	0.000
			Max. My	15	1308.777	0.000	-0.001
			Max. Vy	22	9.717	0.000	0.000
			Max. Vx	15	0.357	0.000	0.000
		Inner Bracing	Max Tension	23	11.055	0.000	0.000
			Max. Compression	21	-21.109	0.000	0.000
			Max. Mx	14	-5.091	-0.051	0.000
			Max. My	15	10.971	0.000	-0.000
			Max. Vy	14	22.388	0.000	0.000
			Max. Vx	15	0.161	0.000	0.000
T10	75 - 50	Leg	Max Tension	21	228892.022	4.220	-0.168
			Max. Compression	23	-271699.856	-6.872	-0.131
			Max. Mx	23	-271619.161	8.954	0.077
			Max. My	20	-19422.233	-0.757	-4.024
			Max. Vy	23	2902.526	8.954	0.077
			Max. Vx	20	-1307.294	-0.757	-4.024
		Diagonal	Max Tension	16	27598.736	-0.319	0.015
			Max. Compression	16	-28422.745	0.000	0.000
			Max. Mx	22	13874.833	-0.418	0.023
			Max. My	15	-26339.243	0.275	-0.044
			Max. Vy	21	103.297	-0.417	0.021
			Max. Vx	16	7.165	0.000	0.000
		Horizontal	Max Tension	16	16774.300	0.143	-0.003
			Max. Compression	16	-17148.991	0.143	-0.003
			Max. Mx	21	2446.250	0.260	0.049
			Max. My	15	124.331	0.018	-0.058
			Max. Vy	21	76.464	0.260	0.049
			Max. Vx	23	7.506	0.009	-0.058
		Redund Horz 1 Bracing	Max Tension	23	4709.741	0.000	0.000
			Max. Compression	23	-4709.741	0.000	0.000
			Max. Mx	14	276.001	-0.017	0.000
			Max. My	16	254.295	0.000	0.000
			Max. Vy	14	13.485	0.000	0.000
			Max. Vx	16	-0.311	0.000	0.000
		Redund Diag 1 Bracing	Max Tension	23	3818.764	0.000	0.000
			Max. Compression	23	-3818.764	0.000	0.000
			Max. Mx	22	3184.627	-0.025	0.000
			Max. My	15	1941.836	0.000	-0.001

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	22	12.911	0.000	0.000
			Max. Vx	15	0.571	0.000	0.000
		Inner Bracing	Max Tension	19	8.645	0.000	0.000
			Max. Compression	21	-24.293	0.000	0.000
			Max. Mx	14	-7.185	-0.067	0.000
			Max. My	15	8.536	0.000	-0.000
			Max. Vy	14	26.978	0.000	0.000
			Max. Vx	15	0.169	0.000	0.000
T11	50 - 37.5	Leg	Max Tension	21	260178.652	4.834	-0.163
			Max. Compression	23	-307787.364	-6.187	-0.174
			Max. Mx	23	-307664.199	8.720	0.094
			Max. My	20	-22334.777	-0.801	-4.859
			Max. Vy	23	-2836.986	8.720	0.094
			Max. Vx	20	1462.008	-0.801	-4.859
		Diagonal	Max Tension	16	27504.490	-0.219	0.011
			Max. Compression	16	-28362.744	0.000	0.000
			Max. Mx	22	13867.020	-0.309	0.019
			Max. My	16	-26789.760	0.078	-0.046
			Max. Vy	22	84.829	-0.309	0.020
			Max. Vx	16	-7.138	0.000	0.000
		Horizontal	Max Tension	16	17394.323	0.153	-0.003
			Max. Compression	16	-17641.847	0.153	-0.003
			Max. Mx	21	2769.008	0.249	0.048
			Max. My	15	-66.419	0.050	-0.057
			Max. Vy	21	76.712	0.249	0.048
			Max. Vx	23	6.883	0.049	-0.057
		Redund Horz 1 Bracing	Max Tension	23	5335.294	0.000	0.000
			Max. Compression	23	-5335.294	0.000	0.000
			Max. Mx	14	309.842	-0.019	0.000
			Max. My	16	4605.027	0.000	0.000
			Max. Vy	14	14.160	0.000	0.000
			Max. Vx	16	0.327	0.000	0.000
		Redund Diag 1 Bracing	Max Tension	23	4067.632	0.000	0.000
			Max. Compression	23	-4067.632	0.000	0.000
			Max. Mx	22	3500.009	-0.027	0.000
			Max. My	15	2028.423	0.000	-0.001
			Max. Vy	22	13.567	0.000	0.000
			Max. Vx	15	-0.559	0.000	0.000
		Inner Bracing	Max Tension	19	5.690	0.000	0.000
			Max. Compression	21	-21.587	0.000	0.000
			Max. Mx	14	-6.836	-0.074	0.000
			Max. My	15	5.564	0.000	-0.000
			Max. Vy	14	28.327	0.000	0.000
			Max. Vx	15	0.125	0.000	0.000
T12	37.5 - 25	Leg	Max Tension	21	290471.819	4.112	-0.247
			Max. Compression	23	-343466.956	-7.409	-0.143
			Max. Mx	23	-343177.907	9.264	0.095
			Max. My	20	-24150.864	-0.801	-4.859
			Max. Vy	23	3027.101	9.264	0.095
			Max. Vx	20	-1459.999	-0.801	-4.859
		Diagonal	Max Tension	16	27953.315	-0.281	0.011
			Max. Compression	16	-28948.963	0.000	0.000
			Max. Mx	21	22256.466	-0.352	0.016
			Max. My	15	-27010.613	0.192	-0.051
			Max. Vy	21	91.440	-0.352	0.017

Section No	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	16	-7.626	0.000	0.000
		Top Girt	Max Tension	16	18044.373	-0.304	0.006
			Max. Compression	16	-18532.995	-0.304	0.006
			Max. Mx	21	-1699.802	-0.501	-0.078
			Max. My	15	-53.627	-0.094	0.097
			Max. Vy	21	-146.319	-0.501	-0.078
			Max. Vx	19	-11.467	-0.096	0.097
		Redund Horz 1 Bracing	Max Tension	23	5953.777	0.000	0.000
			Max. Compression	23	-5953.777	0.000	0.000
			Max. Mx	23	-2399.245	-0.020	0.000
			Max. My	16	321.032	0.000	0.000
			Max. Vy	23	14.834	0.000	0.000
			Max. Vx	16	-0.343	0.000	0.000
		Redund Diag 1 Bracing	Max Tension	23	4418.617	0.000	0.000
			Max. Compression	23	-4418.617	0.000	0.000
			Max. Mx	22	3799.369	-0.029	0.000
			Max. My	15	2070.456	0.000	-0.001
			Max. Vy	22	14.223	0.000	0.000
			Max. Vx	15	0.550	0.000	0.000
		Inner Bracing	Max Tension	16	321.001	0.000	0.000
			Max. Compression	16	-321.001	0.000	0.000
			Max. Mx	14	-8.616	-0.082	0.000
			Max. My	15	295.358	0.000	-0.000
			Max. Vy	14	29.675	0.000	0.000
			Max. Vx	15	0.101	0.000	0.000
T13	25 - 12.5	Leg	Max Tension	21	320712.428	5.169	-0.201
			Max. Compression	23	-379288.329	-6.784	-0.201
			Max. Mx	23	-378989.153	9.679	0.117
			Max. My	20	-27568.460	-0.866	-5.620
			Max. Vy	23	-3065.044	9.679	0.117
			Max. Vx	20	1752.567	-0.866	-5.620
		Diagonal	Max Tension	16	28023.229	-0.178	0.013
			Max. Compression	16	-28906.636	0.000	0.000
			Max. Mx	22	14123.483	-0.233	0.020
			Max. My	15	-27082.479	0.057	-0.045
			Max. Vy	22	71.972	-0.233	0.020
			Max. Vx	15	-6.609	0.000	0.000
		Horizontal	Max Tension	16	18654.397	0.210	-0.004
			Max. Compression	16	-18894.585	0.210	-0.004
			Max. Mx	21	3411.186	0.330	0.043
			Max. My	15	-206.084	0.081	-0.055
			Max. Vy	21	95.710	0.330	0.043
			Max. Vx	19	6.526	0.082	-0.055
		Redund Horz 1 Bracing	Max Tension	23	6574.717	0.000	0.000
			Max. Compression	23	-6574.717	0.000	0.000
			Max. Mx	14	379.842	-0.022	0.000
			Max. My	17	3386.453	0.000	0.001
			Max. Vy	14	15.508	0.000	0.000
			Max. Vx	17	-0.358	0.000	0.000
		Redund Diag 1 Bracing	Max Tension	23	4760.475	0.000	0.000
			Max. Compression	23	-4760.475	0.000	0.000
			Max. Mx	22	4090.962	-0.044	0.000
			Max. My	15	2236.382	0.000	-0.002
			Max. Vy	22	-21.005	0.000	0.000
			Max. Vx	15	-0.776	0.000	0.000

Section No	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Inner Bracing	Max Tension	10	3.172	0.000	0.000
			Max. Compression	16	-19.951	0.000	0.000
			Max. Mx	14	-7.489	-0.126	0.000
			Max. My	15	2.144	0.000	-0.000
			Max. Vy	14	43.787	0.000	0.000
			Max. Vx	15	0.104	0.000	0.000
T14	12.5 - 0	Leg	Max Tension	21	351158.915	4.519	-0.320
			Max. Compression	23	-415584.189	-0.000	0.000
			Max. Mx	23	-415410.572	8.452	0.101
			Max. My	20	-29535.375	-0.866	-5.620
			Max. Vy	23	-2683.959	8.452	0.101
			Max. Vx	20	-1474.561	-0.866	-5.620
		Diagonal	Max Tension	16	27872.086	-0.213	0.013
			Max. Compression	16	-28758.000	0.000	0.000
			Max. Mx	21	19959.032	-0.261	0.017
			Max. My	15	-26606.929	0.084	-0.044
			Max. Vy	21	76.385	-0.261	0.017
			Max. Vx	16	-6.506	0.000	0.000
		Top Girt	Max Tension	16	18983.166	-0.419	0.009
			Max. Compression	16	-19693.300	-0.419	0.009
			Max. Mx	21	-2307.414	-0.663	-0.073
			Max. My	15	214.445	-0.162	0.098
			Max. Vy	21	-183.993	-0.663	-0.073
			Max. Vx	19	-11.327	-0.164	0.098
		Redund Horz 1 Bracing	Max Tension	23	7203.882	0.000	0.000
			Max. Compression	23	-7203.882	0.000	0.000
			Max. Mx	14	442.456	-0.024	0.000
			Max. My	14	466.410	0.000	0.001
			Max. Vy	14	16.182	0.000	0.000
			Max. Vx	14	-0.374	0.000	0.000
		Redund Diag 1 Bracing	Max Tension	23	5099.070	0.000	0.000
			Max. Compression	23	-5099.070	0.000	0.000
			Max. Mx	15	5079.320	-0.047	0.000
			Max. My	15	1598.301	0.000	-0.002
			Max. Vy	15	21.932	0.000	0.000
			Max. Vx	15	-0.763	0.000	0.000
		Inner Bracing	Max Tension	16	341.098	0.000	0.000
			Max. Compression	16	-341.098	0.000	0.000
			Max. Mx	14	-9.755	-0.137	0.000
			Max. My	15	318.607	0.000	-0.000
			Max. Vy	14	-45.691	0.000	0.000
			Max. Vx	15	0.058	0.000	0.000

Maximum Reactions

Location	Condition	Gov Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	23	450397.394	42189.585	-24917.824
	Max. H_x	23	450397.394	42189.585	-24917.824
	Max. H_z	16	-331131.071	-30457.573	24010.860
	Min. Vert	17	-378801.171	-37764.663	22300.035
	Min. H_x	17	-378801.171	-37764.663	22300.035

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
	Min. H_z	22	386529.465	33524.895	-25405.407
Leg B	Max. Vert	19	445551.702	-42659.147	-23693.746
	Max. H_x	25	-371814.344	37764.409	20880.625
	Max. H_z	26	-324009.941	30908.076	21738.701
	Min. Vert	25	-371814.344	37764.409	20880.625
	Min. H_x	19	445551.702	-42659.147	-23693.746
	Min. H_z	19	445551.702	-42659.147	-23693.746
Leg A	Max. Vert	15	448835.391	-1297.343	48965.391
	Max. H_x	24	23219.535	8280.956	1644.712
	Max. H_z	15	448835.391	-1297.343	48965.391
	Min. Vert	21	-382960.870	1232.136	-44191.693
	Min. H_x	18	25606.423	-8347.455	1837.047
	Min. H_z	21	-382960.870	1232.136	-44191.693

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	51661.604	0.000	0.000	-1.941	13.286	0.000
Dead+Wind 0 deg - No Ice	51661.596	389.725	-72808.856	-7840.869	-51.696	-42.556
Dead+Wind 30 deg - No Ice	51661.598	34904.832	-60861.384	-6629.038	-3774.174	-31.791
Dead+Wind 60 deg - No Ice	51661.601	59176.432	-34403.142	-3739.420	-6402.025	-8.902
Dead+Wind 90 deg - No Ice	51661.599	69384.110	61.876	15.151	-7500.633	16.378
Dead+Wind 120 deg - No Ice	51661.596	62583.488	36075.044	3865.778	-6707.225	32.783
Dead+Wind 150 deg - No Ice	51661.599	34828.340	59789.185	6443.156	-3766.370	37.720
Dead+Wind 180 deg - No Ice	51661.601	-52.481	68097.404	7357.298	20.370	39.249
Dead+Wind 210 deg - No Ice	51661.598	-35036.714	60411.709	6548.353	3825.468	31.855
Dead+Wind 240 deg - No Ice	51661.596	-62679.506	36580.509	3949.221	6748.382	9.691
Dead+Wind 270 deg - No Ice	51661.599	-68731.408	429.925	74.422	7414.675	-15.917
Dead+Wind 300 deg - No Ice	51661.601	-58036.236	-33684.247	-3618.977	6234.125	-30.286
Dead+Wind 330 deg - No Ice	51661.599	-33824.818	-59988.429	-6480.462	3618.303	-38.276
Dead+Ice	80090.913	0.000	0.000	0.169	33.062	0.000
Dead+Wind 0 deg+Ice	80090.891	351.611	-84513.483	-9139.565	-25.337	-55.640
Dead+Wind 30 deg+Ice	80090.896	41179.379	-71667.941	-7804.762	-4439.619	-45.389
Dead+Wind 60 deg+Ice	80090.903	70180.630	-40832.051	-4436.431	-7576.079	-17.579
Dead+Wind 90 deg+Ice	80090.898	81661.021	109.549	23.611	-8815.075	15.152
Dead+Wind 120 deg+Ice	80090.892	72257.297	43328.935	4711.092	-7751.418	40.759
Dead+Wind 150 deg+Ice	80090.899	40603.107	71608.707	7764.729	-4363.924	53.335
Dead+Wind 180 deg+Ice	80090.902	-40.590	81756.329	8869.352	38.188	52.805
Dead+Wind 210 deg+Ice	80090.896	-40781.801	72175.132	7860.341	4457.643	39.492
Dead+Wind 240 deg+Ice	80090.892	-72338.047	43781.593	4785.474	7829.616	14.764
Dead+Wind 270 deg+Ice	80090.898	-81058.827	433.377	75.289	8777.309	-14.711
Dead+Wind 300 deg+Ice	80090.903	-69136.561	-40182.383	-4327.744	7464.159	-35.123
Dead+Wind 330 deg+Ice	80090.900	-40196.676	-70870.364	-7668.943	4340.007	-47.882
Dead+Wind 0 deg - Service	51661.604	107.970	-20168.636	-2173.435	-4.712	-11.782
Dead+Wind 30 deg - Service	51661.604	9668.951	-16859.093	-1837.729	-1035.878	-8.801
Dead+Wind 60 deg - Service	51661.604	16392.367	-9529.957	-1037.269	-1763.790	-2.473
Dead+Wind 90 deg - Service	51661.604	19219.973	17.118	2.769	-2068.134	4.536
Dead+Wind 120 deg - Service	51661.604	17336.132	9993.069	1069.438	-1848.363	9.086
Dead+Wind 150 deg - Service	51661.604	9647.726	16562.106	1783.395	-1033.745	10.454
Dead+Wind 180 deg - Service	51661.604	-14.533	18863.551	2036.626	15.265	10.868
Dead+Wind 210 deg - Service	51661.604	-9705.437	16734.556	1812.569	1069.315	8.823
Dead+Wind 240 deg - Service	51661.604	-17362.724	10133.096	1092.574	1879.016	2.690
Dead+Wind 270 deg - Service	51661.604	-19039.169	119.070	19.190	2063.585	-4.404
Dead+Wind 300 deg - Service	51661.604	-16076.521	-9330.822	-1003.908	1736.542	-8.399
Dead+Wind 330 deg - Service	51661.604	-9369.765	-16617.283	-1796.607	1011.904	-10.608

Solution Summary

Load Comb.	Sum of Applied Forces PX lb	PY lb	PZ lb	Sum of Reactions PX lb	PY lb	PZ lb	% Error
1	-0.000	-51661.604	0.000	-0.000	51661.604	-0.000	0.000%
2	389.772	-51661.604	-72808.956	-389.725	51661.596	72808.856	0.000%
3	34904.996	-51661.604	-60861.480	-34904.832	51661.598	60861.384	0.000%
4	59176.587	-51661.604	-34403.229	-59176.432	51661.601	34403.142	0.000%
5	69384.271	-51661.604	61.797	-69384.110	51661.599	-61.876	0.000%
6	62583.590	-51661.604	36075.068	-62583.488	51661.596	-36075.044	0.000%
7	34828.378	-51661.604	59789.343	-34828.340	51661.599	-59789.185	0.000%
8	-52.466	-51661.604	68097.581	52.481	51661.601	-68097.404	0.000%
9	-35036.720	-51661.604	60411.895	35036.714	51661.598	-60411.709	0.000%
10	-62679.593	-51661.604	36580.566	62679.506	51661.596	-36580.509	0.000%
11	-68731.568	-51661.604	429.846	68731.408	51661.599	-429.925	0.000%
12	-58036.379	-51661.604	-33684.346	58036.236	51661.601	33684.247	0.000%
13	-33824.930	-51661.604	-59988.542	33824.818	51661.599	59988.429	0.000%
14	-0.000	-80090.913	0.000	-0.000	80090.913	-0.000	0.000%
15	351.741	-80090.913	-84513.594	-351.611	80090.891	84513.483	0.000%
16	41179.799	-80090.913	-71668.055	-41179.379	80090.896	71667.941	0.000%
17	70180.976	-80090.913	-40832.229	-70180.630	80090.903	40832.051	0.000%
18	81661.318	-80090.913	109.308	-81661.021	80090.898	-109.549	0.000%
19	72257.430	-80090.913	43328.937	-72257.297	80090.892	-43328.935	0.000%
20	40603.117	-80090.913	71609.036	-40603.107	80090.899	-71608.707	0.000%
21	-40.537	-80090.913	81756.725	40.590	80090.902	-81756.329	0.000%
22	-40781.707	-80090.913	72175.543	40781.801	80090.896	-72175.132	0.000%
23	-72338.134	-80090.913	43781.687	72338.047	80090.892	-43781.593	0.000%
24	-81059.124	-80090.913	433.138	81058.827	80090.898	-433.377	0.000%
25	-69136.871	-80090.913	-40182.607	69136.561	80090.903	40182.383	0.000%
26	-40196.943	-80090.913	-70870.538	40196.676	80090.900	70870.364	0.000%
27	107.970	-51661.604	-20168.686	-107.970	51661.604	20168.636	0.000%
28	9668.974	-51661.604	-16859.136	-9668.951	51661.604	16859.093	0.000%
29	16392.406	-51661.604	-9529.980	-16392.367	51661.604	9529.957	0.000%
30	19220.020	-51661.604	17.118	-19219.973	51661.604	-17.118	0.000%
31	17336.174	-51661.604	9993.094	-17336.132	51661.604	-9993.069	0.000%
32	9647.750	-51661.604	16562.145	-9647.726	51661.604	-16562.106	0.000%
33	-14.534	-51661.604	18863.596	14.533	51661.604	-18863.551	0.000%
34	-9705.463	-51661.604	16734.597	9705.437	51661.604	-16734.556	0.000%
35	-17362.768	-51661.604	10133.121	17362.724	51661.604	-10133.096	0.000%
36	-19039.215	-51661.604	119.071	19039.169	51661.604	-119.070	0.000%
37	-16076.559	-51661.604	-9330.844	16076.521	51661.604	9330.822	0.000%
38	-9369.787	-51661.604	-16617.325	9369.765	51661.604	16617.283	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	0.00003385
3	Yes	4	0.00000001	0.00002925
4	Yes	4	0.00000001	0.00002370
5	Yes	4	0.00000001	0.00002911
6	Yes	4	0.00000001	0.00003374
7	Yes	4	0.00000001	0.00002914
8	Yes	4	0.00000001	0.00002377

9	Yes	4	0.00000001	0.00002921
10	Yes	4	0.00000001	0.00003378
11	Yes	4	0.00000001	0.00002926
12	Yes	4	0.00000001	0.00002388
13	Yes	4	0.00000001	0.00002925
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00005218
16	Yes	4	0.00000001	0.00004634
17	Yes	4	0.00000001	0.00003938
18	Yes	4	0.00000001	0.00004615
19	Yes	4	0.00000001	0.00005206
20	Yes	4	0.00000001	0.00004581
21	Yes	4	0.00000001	0.00003934
22	Yes	4	0.00000001	0.00004600
23	Yes	4	0.00000001	0.00005218
24	Yes	4	0.00000001	0.00004631
25	Yes	4	0.00000001	0.00003951
26	Yes	4	0.00000001	0.00004615
27	Yes	4	0.00000001	0.00002929
28	Yes	4	0.00000001	0.00002801
29	Yes	4	0.00000001	0.00002656
30	Yes	4	0.00000001	0.00002788
31	Yes	4	0.00000001	0.00002919
32	Yes	4	0.00000001	0.00002789
33	Yes	4	0.00000001	0.00002658
34	Yes	4	0.00000001	0.00002799
35	Yes	4	0.00000001	0.00002928
36	Yes	4	0.00000001	0.00002791
37	Yes	4	0.00000001	0.00002655
38	Yes	4	0.00000001	0.00002794

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb	Tilt °	Twist °
T1	180 - 175	3.795	27	0.1589	0.0169
T2	175 - 166.667	3.626	27	0.1590	0.0173
T3	166.667 - 158.333	3.341	27	0.1586	0.0171
T4	158.333 - 150	3.055	27	0.1567	0.0152
T5	150 - 125	2.773	27	0.1536	0.0142
T6	125 - 100	1.980	27	0.1369	0.0117
T7	100 - 91.6667	1.295	27	0.1125	0.0090
T8	91.6667 - 83.3333	1.098	27	0.1040	0.0083
T9	83.3333 - 75	0.913	27	0.0967	0.0074
T10	75 - 50	0.742	27	0.0888	0.0065
T11	50 - 37.5	0.347	27	0.0592	0.0044
T12	37.5 - 25	0.201	27	0.0457	0.0033
T13	25 - 12.5	0.098	27	0.0312	0.0024
T14	12.5 - 0	0.026	27	0.0161	0.0011

Critical Deflections and Radius of Curvature - Service Wind

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

Elevation ft	Appurtenance	Gov Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
193.000	4 Bay Dipole	27	3.795	0.1589	0.0169	119379
189.000	Lightning Rod	27	3.795	0.1589	0.0169	119379
185.500	OGT9-840	27	3.795	0.1589	0.0169	119379
185.000	DB212-1	27	3.795	0.1589	0.0169	119379
184.000	8"x2.5" Pipe Mount	27	3.795	0.1589	0.0169	119379
183.000	DB404	27	3.795	0.1589	0.0169	119379
182.000	2' Dipole	27	3.795	0.1589	0.0169	119379
180.000	6' w/Radome	27	3.795	0.1589	0.0169	119379
179.000	6'x3" Pipe Mount	27	3.761	0.1590	0.0170	119379
178.000	6' Side-Arm	27	3.727	0.1590	0.0171	119379
177.000	6' w/Radome	27	3.694	0.1590	0.0172	119379
174.000	6' w/Radome	27	3.592	0.1590	0.0174	117897
172.000	10' Dipole	27	3.524	0.1590	0.0175	141371
170.000	Andrew 6' w/Radome	27	3.456	0.1589	0.0175	215772
167.000	(2) SC479-HF1LDF	27	3.352	0.1587	0.0172	699345
166.000	10' Dipole	27	3.318	0.1585	0.0170	562967
164.000	SC479-HF1LDF	27	3.249	0.1582	0.0165	343904
160.000	10' x 1" Omni	27	3.112	0.1572	0.0155	227883
156.000	4' Paraflector	27	2.976	0.1560	0.0149	152390
155.000	Decibel DB 225 Dipole	27	2.942	0.1557	0.0148	138416
154.000	4' Side Mount Standoff (1)	27	2.908	0.1553	0.0147	126490
149.000	BCD-80609	27	2.740	0.1531	0.0141	94825
145.000	13' Sector Mount (1)	27	2.608	0.1511	0.0137	89067
137.000	Lightweight PCS Frame (3)	27	2.349	0.1461	0.0129	82687
135.000	Decibel DB 225 Dipole	27	2.286	0.1448	0.0127	80873
130.000	2' Sidearm	27	2.131	0.1410	0.0122	76668
122.000	Celwave PD100543	27	1.891	0.1343	0.0114	68246
120.000	DB212-2-A	27	1.833	0.1325	0.0112	65536
115.000	4' Paraflector	27	1.691	0.1278	0.0106	59538
110.000	Sidearm - vacant	27	1.553	0.1229	0.0101	54546
91.000	4 Bay Dipole	27	1.083	0.1034	0.0082	73607
81.500	4' Yagi	27	0.874	0.0951	0.0072	58610
81.000	2' Sidearm	27	0.864	0.0946	0.0072	55877
76.000	2' GPS Mount	27	0.761	0.0899	0.0066	37632
33.250	DB803M-XC	27	0.162	0.0409	0.0030	46055
30.000	3' Sidearm	27	0.135	0.0372	0.0028	58235
26.750	DB803M-XC	27	0.110	0.0333	0.0025	74654
17.250	DB580-XC	27	0.048	0.0219	0.0016	40054
15.000	2' Sidearm	27	0.037	0.0192	0.0014	34758
14.000	3' Yagi	27	0.032	0.0179	0.0013	33518

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 175	15.953	23	0.6658	0.0719
T2	175 - 166.667	15.247	23	0.6658	0.0738
T3	166.667 - 158.333	14.052	23	0.6642	0.0736
T4	158.333 - 150	12.856	23	0.6571	0.0673
T5	150 - 125	11.675	23	0.6437	0.0616
T6	125 - 100	8.350	23	0.5745	0.0527
T7	100 - 91.6667	5.468	23	0.4740	0.0416
T8	91.6667 - 83.3333	4.637	23	0.4384	0.0381
T9	83.3333 - 75	3.856	23	0.4080	0.0344
T10	75 - 50	3.131	23	0.3749	0.0304

Section No.	Elevation ft	Horz Deflection in	Gov. Load Comb.	Tilt °	Twist °
T11	50 - 37.5	1.464	23	0.2501	0.0208
T12	37.5 - 25	0.849	23	0.1932	0.0155
T13	25 - 12.5	0.411	23	0.1321	0.0111
T14	12.5 - 0	0.109	15	0.0679	0.0052

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
193.000	4 Bay Dipole	23	15.953	0.6658	0.0719	32292
189.000	Lightning Rod	23	15.953	0.6658	0.0719	32292
185.500	OGT9-840	23	15.953	0.6658	0.0719	32292
185.000	DB212-1	23	15.953	0.6658	0.0719	32292
184.000	8"x2.5" Pipe Mount	23	15.953	0.6658	0.0719	32292
183.000	DB404	23	15.953	0.6658	0.0719	32292
182.000	2' Dipole	23	15.953	0.6658	0.0719	32292
180.000	6' w/Radome	23	15.953	0.6658	0.0719	32292
179.000	6'x3" Pipe Mount	23	15.812	0.6658	0.0723	32292
178.000	6' Side-Arm	23	15.671	0.6659	0.0727	32292
177.000	6' w/Radome	23	15.530	0.6659	0.0731	32292
174.000	6' w/Radome	23	15.105	0.6658	0.0741	31877
172.000	10' Dipole	23	14.819	0.6656	0.0746	38160
170.000	Andrew 6' w/Radome	23	14.532	0.6653	0.0747	58363
167.000	(2) SC479-HF1LDF	23	14.100	0.6643	0.0738	188575
166.000	10' Dipole	23	13.956	0.6639	0.0732	218714
164.000	SC479-HF1LDF	23	13.669	0.6626	0.0713	114270
160.000	10' x 1" Omni	23	13.095	0.6590	0.0687	69210
156.000	4' Paraflector	23	12.523	0.6540	0.0655	43561
155.000	Decibel DB 225 Dipole	23	12.381	0.6525	0.0647	38671
154.000	4' Side Mount Standoff (1)	23	12.239	0.6509	0.0640	34070
149.000	BCD-80609	23	11.535	0.6417	0.0613	23242
145.000	13' Sector Mount (1)	23	10.981	0.6331	0.0601	21658
137.000	Lightweight PCS Frame (3)	23	9.899	0.6126	0.0574	20106
135.000	Decibel DB 225 Dipole	23	9.635	0.6068	0.0567	19752
130.000	2' Sidearm	23	8.985	0.5914	0.0548	18920
122.000	Celwave PD100543	23	7.977	0.5638	0.0514	16877
120.000	DB212-2-A	23	7.732	0.5564	0.0505	16151
115.000	4' Paraflector	23	7.133	0.5371	0.0483	14545
110.000	Sidearm - vacant	23	6.555	0.5168	0.0460	13229
91.000	4 Bay Dipole	23	4.573	0.4358	0.0378	17614
81.500	4' Yagi	23	3.690	0.4012	0.0335	13870
81.000	2' Sidearm	23	3.646	0.3993	0.0332	13226
76.000	2' GPS Mount	23	3.213	0.3792	0.0309	8925
33.250	DB803M-XC	23	0.682	0.1730	0.0141	10884
30.000	3' Sidearm	23	0.569	0.1571	0.0130	13751
26.750	DB803M-XC	23	0.464	0.1409	0.0118	17626
17.250	DB580-XC	23	0.202	0.0927	0.0075	9456
15.000	2' Sidearm	15	0.154	0.0810	0.0064	8205
14.000	3' Yagi	15	0.135	0.0758	0.0059	7912

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Diagonal	A325X	0.750	1	3311.180	12234.400	0.271 ✓	1.333	Member Bearing
		Top Girt	A325X	0.625	2	1483.580	9203.880	0.161 ✓	1.333	Bolt Shear
T2	175	Leg	A325X	0.750	6	476.860	19435.100	0.025 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.750	1	6557.830	12234.400	0.536 ✓	1.333	Member Bearing
		Horizontal	A325X	0.625	2	1980.010	8156.250	0.243 ✓	1.333	Member Bearing
T3	166.667	Diagonal	A325X	0.750	1	9443.860	12234.400	0.772 ✓	1.333	Member Bearing
		Top Girt	A325X	0.625	2	2830.730	8156.250	0.347 ✓	1.333	Member Bearing
T4	158.333	Diagonal	A325X	0.750	1	10596.700	12234.400	0.866 ✓	1.333	Member Bearing
		Top Girt	A325X	0.625	2	3291.210	8156.250	0.404 ✓	1.333	Member Bearing
T5	150	Leg	A325X	0.750	6	5083.880	19438.199	0.262 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.750	1	16849.600	20390.600	0.826 ✓	1.333	Member Bearing
		Horizontal	A325X	0.625	2	5517.980	9203.880	0.600 ✓	1.333	Bolt Shear
T6	125	Leg	A325X	0.750	6	13135.800	19437.100	0.676 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.750	1	19122.801	16312.500	1.172 ✓	1.333	Member Bearing
		Horizontal	A325X	0.625	2	6761.160	9203.880	0.735 ✓	1.333	Bolt Shear
T7	100	Leg	A325X	1.000	6	23115.301	34556.102	0.669 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.750	1	19477.500	16312.500	1.194 ✓	1.333	Member Bearing
		Horizontal	A325X	0.625	2	7052.140	18407.801	0.383 ✓	1.333	Bolt Shear
T8	91.6667	Diagonal	A325X	0.750	1	19899.100	16312.500	1.220 ✓	1.333	Member Bearing
		Horizontal	A325X	0.625	2	7372.110	18407.801	0.400 ✓	1.333	Bolt Shear
T9	83.3333	Diagonal	A325X	0.750	1	20366.900	16312.500	1.249 ✓	1.333	Member Bearing
		Horizontal	A325X	0.625	2	7687.880	18407.801	0.418 ✓	1.333	Bolt Shear
T10	75	Leg	A325X	1.000	8	24775.900	34555.199	0.717 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.750	1	27598.699	24468.801	1.128 ✓	1.333	Member Bearing
		Horizontal	A325X	0.625	2	8574.500	9203.880	0.932 ✓	1.333	Bolt Shear
T11	50	Leg	A325X	1.000	8	32522.301	34552.801	0.941 ✓	1.333	Bolt Tension
		Diagonal	A325X	1.000	1	27504.500	27187.500	1.012 ✓	1.333	Member Bearing
		Horizontal	A325X	0.625	2	8820.920	9203.880	0.958 ✓	1.333	Bolt Shear
T12	37.5	Diagonal	A325X	1.000	1	27953.301	27187.500	1.028 ✓	1.333	Member Bearing
		Top Girt	A325X	0.625	2	9266.500	18407.801	0.503 ✓	1.333	Bolt Shear
T13	25	Leg	A325X	1.000	8	40089.102	34552.102	1.160 ✓	1.333	Bolt Tension
		Diagonal	A325X	1.000	1	28023.199	21750.000	1.288 ✓	1.333	Member Bearing
		Horizontal	A325X	0.625	2	9447.290	9203.880	1.026 ✓	1.333	Bolt Shear
T14	12.5	Diagonal	A325X	1.000	1	27872.100	21750.000	1.281 ✓	1.333	Member Bearing
		Top Girt	A325X	0.625	2	9846.650	18407.801	0.535 ✓	1.333	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 175	Stainless P5x0.250	5.005	5.005	35.7 K=1.00	26.418	3.731	-2552.920	98556.797	0.026 ✓
T2	175 - 166.667	Stainless P5x0.250	8.342	8.342	59.5 K=1.00	22.798	3.731	-6683.310	85051.500	0.079 ✓
T3	166.667 - 158.333	Stainless P5x0.250	8.342	8.342	59.5 K=1.00	22.798	3.731	-15724.400	85051.500	0.185 ✓
T4	158.333 - 150	Stainless P5x0.250	8.342	8.342	59.5 K=1.00	22.798	3.731	-27687.400	85051.500	0.326 ✓
T5	150 - 125	Stainless P5x0.300	25.027	4.171	30.1 K=1.00	27.145	4.430	-76929.398	120244.000	0.640 ✓
T6	125 - 100	Stainless P5x0.400	25.027	4.171	30.7 K=1.00	27.071	5.781	-143539.00 0	156483.000	0.917 ✓
T7	100 - 91.6667	Stainless P5x0.500	8.342	4.171	31.3 K=1.00	26.995	7.069	-166812.00 0	190814.000	0.874 ✓
T8	91.6667 - 83.3333	1/3 Pipe w/ 5"x0.5 Stainless	8.342	4.171	32.1 K=1.00	26.887	9.027	-190413.00 0	242695.000	0.785 ✓
T9	83.3333 - 75	1/3 Pipe w/ 5"x0.5 Stainless	8.342	4.171	32.1 K=1.00	26.887	9.027	-213949.00 0	242695.000	0.882 ✓
T10	75 - 50	Stainless P6.875x0.400	25.027	6.257	32.7 K=1.00	31.679	8.137	-271700.00 0	257764.000	1.054 ✓
T11	50 - 37.5	Stainless P6.875x0.500	12.513	6.257	33.2 K=1.00	31.595	10.014	-307787.00 0	316391.000	0.973 ✓
T12	37.5 - 25	Stainless P6.875x0.500	12.513	6.257	33.2 K=1.00	31.595	10.014	-343467.00 0	316391.000	1.086 ✓
T13	25 - 12.5	Stainless P6.875x0.500	12.513	6.257	33.2 K=1.00	31.595	10.014	-379288.00 0	316391.000	1.199 ✓
T14	12.5 - 0	Stainless P6.875x0.500	12.513	6.257	33.2 K=1.00	31.595	10.014	-415584.00 0	316391.000	1.314 ✓

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 175	2L2 1/2x2x3/16	7.434	6.882	112.1 K=1.08	11.392	1.620	-3480.420	18454.500	0.189 ✓
T2	175 - 166.667	2L2 1/2x2x3/16	10.174	9.540	144.9 K=1.00	7.111	1.620	-6708.040	11520.300	0.582 ✓
T3	166.667 - 158.333	2L2 1/2x2x3/16	10.369	9.748	148.1 K=1.00	6.811	1.620	-9601.280	11034.500	0.870 ✓
T4	158.333 - 150	2L2 1/2x2x3/16	10.570	9.961	151.3 K=1.00	6.523	1.620	-10763.500	10567.400	1.019 ✓
T5	150 - 125	2L2 1/2x2x5/16	11.213	10.631	157.7 K=1.00	6.006	2.620	-17349.500	15734.600	1.103 ✓
T6	125 - 100	2L3x2 1/2x1/4	11.905	11.343	136.1	8.061	2.630	-19704.100	21199.400	0.929

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow P_a lb	Ratio $\frac{P}{P_a}$
					K=1.00					✓
T7	100 - 91.6667	2L3x2 1/2x1/4	12.145	11.588	139.1 K=1.00	7.723	2.630	-20155.000	20310.400	0.992 ✓
T8	91.6667 - 83.3333	2L3x2 1/2x1/4	12.390	11.838	142.1 K=1.00	7.401	2.630	-20612.199	19463.600	1.059 ✓
T9	83.3333 - 75	2L3x2 1/2x1/4	12.639	12.091	145.1 K=1.00	7.094	2.630	-21147.400	18657.400	1.133 ✓
T10	75 - 50	2L3 1/2x3x3/8	16.327	15.611	153.6 K=1.00	6.333	4.590	-28422.699	29069.900	0.978 ✓
T11	50 - 37.5	2L3 1/2x3x5/16	16.653	15.887	157.6 K=1.00	6.016	3.870	-28362.699	23281.801	1.218 ✓
T12	37.5 - 25	2L3 1/2x3x5/16	16.988	16.231	161.0 K=1.00	5.763	3.870	-28949.000	22302.801	1.298 ✓
T13	25 - 12.5	2L3x3 1/2x1/4	17.330	16.583	130.9 K=1.00	8.712	3.130	-28906.600	27269.801	1.060 ✓
T14	12.5 - 0	2L3x3 1/2x1/4	17.680	16.942	133.8 K=1.00	8.348	3.130	-28758.000	26128.199	1.101 ✓

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow P_a lb	Ratio $\frac{P}{P_a}$
T2	175 - 166.667	L2 1/2x2 1/2x3/16	11.000	10.188	142.8 K=0.91	7.319	0.902	-3960.020	6601.990	0.600 ✓
T5	150 - 125	L3x2 1/2x1/4	14.333	6.760	144.2 K=0.94	7.185	1.310	-11027.100	9412.490	1.172 ✓
T6	125 - 100	L3x3x5/16	16.333	7.760	146.6 K=0.93	6.947	1.780	-13522.300	12364.900	1.094 ✓
T7	100 - 91.6667	2L3x3x1/4	17.000	8.094	112.2 K=1.07	11.371	2.880	-14104.300	32748.900	0.431 ✓
T8	91.6667 - 83.3333	2L3x3x1/4	17.667	8.427	114.4 K=1.05	11.076	2.880	-14676.000	31897.600	0.460 ✓
T9	83.3333 - 75	2L3x3x1/4	18.333	8.760	116.5 K=1.03	10.776	2.880	-15309.100	31034.801	0.493 ✓
T10	75 - 50	L4x4x1/4	20.000	9.516	134.2 K=0.93	8.295	1.940	-17149.000	16093.000	1.066 ✓
T11	50 - 37.5	L4x4x1/4	21.000	10.016	140.6 K=0.93	7.549	1.940	-17641.801	14645.900	1.205 ✓
T13	25 - 12.5	L4x4x5/16	23.000	11.016	154.3 K=0.92	6.276	2.400	-18894.600	15063.000	1.254 ✓

Top Girt Design Data (Compression)

Section No	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow P_a lb	Ratio $\frac{P}{P_a}$

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 175	L3x3x1/4	10.599	9.786	123.9 K=0.98	9.722	1.440	-2967.150	14000.300	0.212 ✓
T3	166.667 - 158.333	L2 1/2x2 1/2x3/16	11.667	10.854	149.2 K=0.89	6.712	0.902	-5622.380	6054.060	0.929 ✓
T4	158.333 - 150	L2 1/2x2 1/2x3/16	12.333	11.521	155.5 K=0.87	6.177	0.902	-6508.110	5571.610	1.168 ✓
T12	37.5 - 25	2L4x4x1/4	22.000	10.516	110.5 K=1.09	11.460	3.880	-18533.000	44463.102	0.417 ✓
T14	12.5 - 0	2L4x4x5/16	24.000	11.516	115.7 K=1.04	10.888	4.800	-19693.301	52260.500	0.377 ✓

Redundant Horizontal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T5	150 - 125	L2x2x3/16	3.417	3.208	108.9 K=1.11	11.825	0.715	-1484.590	8454.980	0.176 ✓
T6	125 - 100	L2x2x3/16	4.083	3.875	119.0 K=1.01	10.424	0.715	-2488.160	7453.070	0.334 ✓
T7	100 - 91.6667	L2x2x3/16	4.250	4.042	123.1 K=1.00	9.834	0.715	-2891.570	7031.550	0.411 ✓
T8	91.6667 - 83.3333	L2x2x3/16	4.417	4.208	128.2 K=1.00	9.090	0.715	-3300.680	6499.300	0.508 ✓
T9	83.3333 - 75	L2x2x3/16	4.583	4.375	133.2 K=1.00	8.411	0.715	-3708.670	6013.550	0.617 ✓
T10	75 - 50	L2 1/2x2 1/2x3/16	5.000	4.714	117.1 K=1.03	10.690	0.902	-4709.740	9641.990	0.488 ✓
T11	50 - 37.5	L2 1/2x2 1/2x3/16	5.250	4.964	120.3 K=1.00	10.235	0.902	-5335.290	9232.300	0.578 ✓
T12	37.5 - 25	L2 1/2x2 1/2x3/16	5.500	5.214	126.4 K=1.00	9.348	0.902	-5953.780	8432.180	0.706 ✓
T13	25 - 12.5	L2 1/2x2 1/2x3/16	5.750	5.464	132.4 K=1.00	8.512	0.902	-6574.720	7678.160	0.856 ✓
T14	12.5 - 0	L2 1/2x2 1/2x3/16	6.000	5.714	138.5 K=1.00	7.784	0.902	-7203.880	7020.930	1.026 ✓

Redundant Diagonal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T5	150 - 125	L2x2x3/16	5.285	4.957	151.0 K=1.00	6.552	0.715	-1264.140	4684.970	0.270 ✓
T6	125 - 100	L2x2x3/16	5.719	5.415	164.9 K=1.00	5.490	0.715	-1742.520	3925.170	0.444 ✓
T7	100 - 91.6667	L2x2x3/16	5.835	5.537	168.6	5.251	0.715	-1984.880	3754.220	0.529

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
					K=1.00					✔
T8	91.6667 - 83.3333	L2x2x3/16	5.953	5.661	172.4 K=1.00	5.024	0.715	-2224.240	3591.920	0.619 ✔
T9	83.3333 - 75	L2x2x3/16	6.073	5.786	176.2 K=1.00	4.808	0.715	-2456.900	3437.850	0.715 ✔
T10	75 - 50	L2 1/2x2 1/2x3/16	7.851	7.378	178.9 K=1.00	4.668	0.902	-3697.850	4210.210	0.878 ✔
T11	50 - 37.5	L2 1/2x2 1/2x3/16	8.005	7.547	183.0 K=1.00	4.461	0.902	-4067.630	4024.240	1.011 ✔
T12	37.5 - 25	L2 1/2x2 1/2x3/16	8.164	7.718	187.1 K=1.00	4.265	0.902	-4418.620	3847.240	1.149 ✔
T13	25 - 12.5	L3x3x1/4	8.327	7.893	160.0 K=1.00	5.834	1.440	-4760.480	8400.320	0.567 ✔
T14	12.5 - 0	L3x3x1/4	8.494	8.071	163.6 K=1.00	5.579	1.440	-5099.070	8034.450	0.635 ✔

Inner Bracing Design Data (Compression)

Section No	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow P_a lb	Ratio $\frac{P}{P_a}$
T5	150 - 125	L2 1/2x2x3/16	7.167	7.167	201.4 K=1.00	3.681	0.809	-12.732	2978.230	0.004 ✔
T6	125 - 100	L2 1/2x2x3/16	8.167	8.167	229.5 K=1.00	2.835	0.809	-15.419	2293.520	0.007 ✔
T7	100 - 91.6667	L2 1/2x2x3/16	8.500	8.500	238.9 K=1.00	2.617	0.809	-22.362	2117.170	0.011 ✔
T8	91.6667 - 83.3333	L2 1/2x2x3/16	8.833	8.833	248.2 K=1.00	2.423	0.809	-21.983	1960.400	0.011 ✔
T9	83.3333 - 75	L2 1/2x2x3/16	9.167	9.167	257.6 K=1.00	2.250	0.809	-21.109	1820.410	0.012 ✔
T10	75 - 50	KL/R > 250 (C) - 278 L2 1/2x2 1/2x3/16	10.000	10.000	242.4 K=1.00	2.541	0.902	-23.587	2291.950	0.010 ✔
T11	50 - 37.5	L2 1/2x2 1/2x3/16	10.500	10.500	254.5 K=1.00	2.305	0.902	-21.587	2078.870	0.010 ✔
T12	37.5 - 25	KL/R > 250 (C) - 356 L2 1/2x2 1/2x3/16	11.000	11.000	266.7 K=1.00	2.100	0.902	-321.001	1894.180	0.169 ✔
T13	25 - 12.5	KL/R > 250 (C) - 383 L3x3x1/4	11.500	11.500	233.1 K=1.00	2.748	1.440	-19.951	3957.300	0.005 ✔
T14	12.5 - 0	L3x3x1/4	12.000	12.000	243.2 K=1.00	2.524	1.440	-341.098	3634.390	0.094 ✔

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 175	Stainless P5x0.250	5.005	5.005	35.7	30.000	3.731	513.757	111919.000	0.005 ✓
T2	175 - 166.667	Stainless P5x0.250	8.342	8.342	59.5	30.000	3.731	2861.160	111919.000	0.026 ✓
T3	166.667 - 158.333	Stainless P5x0.250	8.342	8.342	59.5	30.000	3.731	9897.380	111919.000	0.088 ✓
T4	158.333 - 150	Stainless P5x0.250	8.342	8.342	59.5	30.000	3.731	19898.400	111919.000	0.178 ✓
T5	150 - 125	Stainless P5x0.300	25.027	4.171	30.1	30.000	4.430	60063.102	132889.000	0.452 ✓
T6	125 - 100	Stainless P5x0.400	25.027	4.171	30.7	30.000	5.781	118109.000	173416.000	0.681 ✓
T7	100 - 91.6667	Stainless P5x0.500	8.342	4.171	31.3	30.000	7.069	138692.000	212058.000	0.654 ✓
T8	91.6667 - 83.3333	1/3 Pipe w/ 5"x0.5 Stainless	8.342	4.171	32.1	30.000	9.027	159301.000	270795.000	0.588 ✓
T9	83.3333 - 75	1/3 Pipe w/ 5"x0.5 Stainless	8.342	4.171	32.1	30.000	9.027	179665.000	270795.000	0.663 ✓
T10	75 - 50	Stainless P6.875x0.400	25.027	6.257	32.7	36.000	8.137	228892.000	292922.000	0.781 ✓
T11	50 - 37.5	Stainless P6.875x0.500	12.513	6.257	33.2	36.000	10.014	260179.000	360498.000	0.722 ✓
T12	37.5 - 25	Stainless P6.875x0.500	12.513	6.257	33.2	36.000	10.014	290472.000	360498.000	0.806 ✓
T13	25 - 12.5	Stainless P6.875x0.500	12.513	6.257	33.2	36.000	10.014	320712.000	360498.000	0.890 ✓
T14	12.5 - 0	Stainless P6.875x0.500	12.513	6.257	33.2	36.000	10.014	351159.000	360498.000	0.974 ✓

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 175	2L2 1/2x2x3/16	7.434	6.882	108.6	29.000	0.969	3311.180	28098.301	0.118 ✓
T2	175 - 166.667	2L2 1/2x2x3/16	10.174	9.540	149.0	29.000	0.969	6557.830	28098.301	0.233 ✓
T3	166.667 - 158.333	2L2 1/2x2x3/16	10.369	9.748	152.2	29.000	0.969	9443.860	28098.301	0.336 ✓
T4	158.333 - 150	2L2 1/2x2x3/16	10.570	9.961	155.4	29.000	0.969	10596.700	28098.301	0.377 ✓
T5	150 - 125	2L2 1/2x2x5/16	11.213	10.631	161.7	29.000	1.555	16849.600	45090.500	0.374 ✓
T6	125 - 100	2L3x2 1/2x1/4	11.905	11.343	139.4	29.000	1.644	19122.801	47686.898	0.401 ✓

Section No	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	lb	lb	
T7	100 - 91.6667	2L3x2 1/2x1/4	12.145	11.588	142.3	29.000	1.644	19477.500	47686.898	0.408 ✔
T8	91.6667 - 83.3333	2L3x2 1/2x1/4	12.390	11.838	145.3	29.000	1.644	19899.100	47686.898	0.417 ✔
T9	83.3333 - 75	2L3x2 1/2x1/4	12.639	12.091	148.3	29.000	1.644	20366.900	47686.898	0.427 ✔
T10	75 - 50	2L3 1/2x3x3/8	16.327	15.611	156.2	29.000	2.950	27598.699	85559.102	0.323 ✔
T11	50 - 37.5	2L3 1/2x3x5/16	16.653	15.887	160.9	29.000	2.375	27504.500	68879.500	0.399 ✔
T12	37.5 - 25	2L3 1/2x3x5/16	16.988	16.231	164.3	29.000	2.375	27953.301	68879.500	0.406 ✔
T13	25 - 12.5	2L3x3 1/2x1/4	17.330	16.583	133.6	29.000	1.926	28023.199	55843.102	0.502 ✔
T14	12.5 - 0	2L3x3 1/2x1/4	17.680	16.942	136.4	29.000	1.926	27872.100	55843.102	0.499 ✔

Horizontal Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	lb	lb	
T2	175 - 166.667	L2 1/2x2 1/2x3/16	11.000	10.188	163.2	29.000	0.571	3911.290	16559.900	0.236 ✔
T5	150 - 125	L3x2 1/2x1/4	14.333	6.760	111.1	29.000	0.842	11036.000	24414.400	0.452 ✔
T6	125 - 100	L3x3x5/16	16.333	7.760	103.6	29.000	1.159	13508.500	33617.301	0.402 ✔
T7	100 - 91.6667	2L3x3x1/4	17.000	8.094	107.0	29.000	1.879	14066.900	54483.801	0.258 ✔
T8	91.6667 - 83.3333	2L3x3x1/4	17.667	8.427	111.3	29.000	1.879	14744.200	54483.801	0.271 ✔
T9	83.3333 - 75	2L3x3x1/4	18.333	8.760	115.6	29.000	1.879	15375.800	54483.801	0.282 ✔
T10	75 - 50	L4x4x1/4	20.000	9.516	93.3	29.000	1.314	16774.301	38116.898	0.440 ✔
T11	50 - 37.5	L4x4x1/4	21.000	10.016	98.1	29.000	1.314	17394.301	38116.898	0.456 ✔
T13	25 - 12.5	L4x4x5/16	23.000	11.016	108.5	29.000	1.624	18654.400	47102.301	0.396 ✔

Top Girt Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	lb	lb	
T1	180 - 175	L3x3x1/4	10.599	9.786	131.4	29.000	0.939	2803.780	27241.900	0.103

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T3	166.667 - 158.333	L2 1/2x2 1/2x3/16	11.667	10.854	173.5	29.000	0.571	5661.460	16559.900	0.342
T4	158.333 - 150	L2 1/2x2 1/2x3/16	12.333	11.521	183.8	29.000	0.571	6582.430	16559.900	0.397
T12	37.5 - 25	2L4x4x1/4	22.000	10.516	102.8	29.000	2.629	18044.400	76233.797	0.237
T14	12.5 - 0	2L4x4x5/16	24.000	11.516	113.4	29.000	3.248	18983.199	94204.703	0.202

Redundant Horizontal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T5	150 - 125	L2x2x3/16	3.417	3.208	62.4	21.600	0.715	1701.710	15444.000	0.110
T6	125 - 100	L2x2x3/16	4.083	3.875	75.4	21.600	0.715	2488.160	15444.000	0.161
T7	100 - 91.6667	L2x2x3/16	4.250	4.042	78.6	21.600	0.715	2891.570	15444.000	0.187
T8	91.6667 - 83.3333	L2x2x3/16	4.417	4.208	81.8	21.600	0.715	3300.680	15444.000	0.214
T9	83.3333 - 75	L2x2x3/16	4.583	4.375	85.1	21.600	0.715	3708.670	15444.000	0.240
T10	75 - 50	L2 1/2x2 1/2x3/16	5.000	4.714	72.7	21.600	0.902	4709.740	19483.199	0.242
T11	50 - 37.5	L2 1/2x2 1/2x3/16	5.250	4.964	76.6	21.600	0.902	5335.290	19483.199	0.274
T12	37.5 - 25	L2 1/2x2 1/2x3/16	5.500	5.214	80.4	21.600	0.902	5953.780	19483.199	0.306
T13	25 - 12.5	L2 1/2x2 1/2x3/16	5.750	5.464	84.3	21.600	0.902	6574.720	19483.199	0.337
T14	12.5 - 0	L2 1/2x2 1/2x3/16	6.000	5.714	88.1	21.600	0.902	7203.880	19483.199	0.370

Redundant Diagonal (1) Design Data (Tension)

Section No	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow P_a lb	Ratio $\frac{P}{P_a}$
T5	150 - 125	L2x2x3/16	5.285	4.957	96.4	21.600	0.715	1228.160	15444.000	0.080
T6	125 - 100	L2x2x3/16	5.496	5.192	101.0	21.600	0.715	1823.460	15444.000	0.118
T7	100 - 91.6667	L2x2x3/16	5.835	5.537	107.7	21.600	0.715	1984.880	15444.000	0.129

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio P / P_a
T8	91.6667 - 83.3333	L2x2x3/16	5.953	5.661	110.1	21.600	0.715	2224.240	15444.000	0.144 ✔
T9	83.3333 - 75	L2x2x3/16	6.073	5.786	112.5	21.600	0.715	2456.900	15444.000	0.159 ✔
T10	75 - 50	L2 1/2x2 1/2x3/16	7.703	7.230	111.5	21.600	0.902	3818.760	19483.199	0.196 ✔
T11	50 - 37.5	L2 1/2x2 1/2x3/16	8.005	7.547	116.4	21.600	0.902	4067.630	19483.199	0.209 ✔
T12	37.5 - 25	L2 1/2x2 1/2x3/16	8.164	7.718	119.1	21.600	0.902	4418.620	19483.199	0.227 ✔
T13	25 - 12.5	L3x3x1/4	8.327	7.893	101.8	21.600	1.440	4760.480	31104.000	0.153 ✔
T14	12.5 - 0	L3x3x1/4	8.494	8.071	104.1	21.600	1.440	5099.070	31104.000	0.164 ✔

Inner Bracing Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio P / P_a
T5	150 - 125	L2 1/2x2x3/16	6.833	6.833	136.7	21.600	0.809	5.563	17474.400	0.000 ✔
T6	125 - 100	L2 1/2x2x3/16	7.500	7.500	150.1	21.600	0.809	7.852	17474.400	0.000 ✔
T7	100 - 91.6667	L2 1/2x2x3/16	8.500	8.500	170.1	21.600	0.809	12.200	17474.400	0.001 ✔
T8	91.6667 - 83.3333	L2 1/2x2x3/16	8.833	8.833	176.7	21.600	0.809	11.682	17474.400	0.001 ✔
T9	83.3333 - 75	L2 1/2x2x3/16	9.167	9.167	183.4	21.600	0.809	11.055	17474.400	0.001 ✔
T10	75 - 50	L2 1/2x2 1/2x3/16	9.500	9.500	146.5	21.600	0.902	8.645	19483.199	0.000 ✔
T11	50 - 37.5	L2 1/2x2 1/2x3/16	10.500	10.500	162.0	21.600	0.902	5.690	19483.199	0.000 ✔
T12	37.5 - 25	L2 1/2x2 1/2x3/16	11.000	11.000	169.7	21.600	0.902	321.001	19483.199	0.016 ✔
T13	25 - 12.5	L3x3x1/4	11.500	11.500	148.4	21.600	1.440	3.172	31104.000	0.000 ✔
T14	12.5 - 0	L3x3x1/4	12.000	12.000	154.8	21.600	1.440	341.098	31104.000	0.011 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T1	180 - 175	Leg	Stainless P5x0.250	2	-2552.920	131376.205	5.2	Pass
T2	175 - 166.667	Leg	Stainless P5x0.250	13	-6683.310	113373.645	5.9	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T3	166.667 - 158.333	Leg	Stainless P5x0.250	25	-15724.400	113373.645	13.9	Pass
T4	158.333 - 150	Leg	Stainless P5x0.250	37	-27687.400	113373.645	24.4	Pass
T5	150 - 125	Leg	Stainless P5x0.300	49	-76929.398	160285.245	48.0	Pass
T6	125 - 100	Leg	Stainless P5x0.400	124	-143539.000	208591.830	68.8	Pass
T7	100 - 91.6667	Leg	Stainless P5x0.500	199	-166812.000	254355.051	65.6	Pass
T8	91.6667 - 83.3333	Leg	1/3 Pipe w/ 5"x0.5 Stainless	226	-190413.000	323512.422	58.9	Pass
T9	83.3333 - 75	Leg	1/3 Pipe w/ 5"x0.5 Stainless	253	-213949.000	323512.422	66.1	Pass
T10	75 - 50	Leg	Stainless P6.875x0.400	280	-271700.000	343599.398	79.1	Pass
T11	50 - 37.5	Leg	Stainless P6.875x0.500	331	-307787.000	421749.185	73.0	Pass
T12	37.5 - 25	Leg	Stainless P6.875x0.500	358	-343467.000	421749.185	81.4	Pass
T13	25 - 12.5	Leg	Stainless P6.875x0.500	385	-379288.000	421749.185	89.9	Pass
T14	12.5 - 0	Leg	Stainless P6.875x0.500	412	-415584.000	421749.185	98.5	Pass
T1	180 - 175	Diagonal	2L2 1/2x2x3/16	9	-3480.420	24599.847	14.1 20.3 (b)	Pass
T2	175 - 166.667	Diagonal	2L2 1/2x2x3/16	18	-6708.040	15356.559	43.7	Pass
T3	166.667 - 158.333	Diagonal	2L2 1/2x2x3/16	32	-9601.280	14708.988	65.3	Pass
T4	158.333 - 150	Diagonal	2L2 1/2x2x3/16	44	-10763.500	14086.344	76.4	Pass
T5	150 - 125	Diagonal	2L2 1/2x2x5/16	67	-17349.500	20974.220	82.7	Pass
T6	125 - 100	Diagonal	2L3x2 1/2x1/4	142	-19704.100	28258.800	69.7 87.9 (b)	Pass
T7	100 - 91.6667	Diagonal	2L3x2 1/2x1/4	217	-20155.000	27073.763	74.4 89.6 (b)	Pass
T8	91.6667 - 83.3333	Diagonal	2L3x2 1/2x1/4	244	-20612.199	25944.977	79.4 91.5 (b)	Pass
T9	83.3333 - 75	Diagonal	2L3x2 1/2x1/4	271	-21147.400	24870.314	85.0 93.7 (b)	Pass
T10	75 - 50	Diagonal	2L3 1/2x3x3/8	298	-28422.699	38750.176	73.3 84.6 (b)	Pass
T11	50 - 37.5	Diagonal	2L3 1/2x3x5/16	349	-28362.699	31034.639	91.4	Pass
T12	37.5 - 25	Diagonal	2L3 1/2x3x5/16	376	-28949.000	29729.632	97.4	Pass
T13	25 - 12.5	Diagonal	2L3x3 1/2x1/4	403	-28906.600	36350.643	79.5 96.7 (b)	Pass
T14	12.5 - 0	Diagonal	2L3x3 1/2x1/4	430	-28758.000	34828.888	82.6 96.1 (b)	Pass
T2	175 - 166.667	Horizontal	L2 1/2x2 1/2x3/16	16	-3960.020	8800.453	45.0	Pass
T5	150 - 125	Horizontal	L3x2 1/2x1/4	66	-11027.100	12546.849	87.9	Pass
T6	125 - 100	Horizontal	L3x3x5/16	141	-13522.300	16482.412	82.0	Pass
T7	100 - 91.6667	Horizontal	2L3x3x1/4	216	-14104.300	43654.282	32.3	Pass
T8	91.6667 - 83.3333	Horizontal	2L3x3x1/4	243	-14676.000	42519.499	34.5	Pass
T9	83.3333 - 75	Horizontal	2L3x3x1/4	270	-15309.100	41369.388	37.0	Pass
T10	75 - 50	Horizontal	L4x4x1/4	297	-17149.000	21451.968	79.9	Pass
T11	50 - 37.5	Horizontal	L4x4x1/4	348	-17641.801	19522.984	90.4	Pass
T13	25 - 12.5	Horizontal	L4x4x5/16	402	-18894.600	20078.978	94.1	Pass
T1	180 - 175	Top Girt	L3x3x1/4	5	-2967.150	18662.399	15.9	Pass
T3	166.667 - 158.333	Top Girt	L2 1/2x2 1/2x3/16	28	-5622.380	8070.062	69.7	Pass
T4	158.333 - 150	Top Girt	L2 1/2x2 1/2x3/16	40	-6508.110	7426.956	87.6	Pass
T12	37.5 - 25	Top Girt	2L4x4x1/4	363	-18533.000	59269.312	31.3 37.8 (b)	Pass
T14	12.5 - 0	Top Girt	2L4x4x5/16	417	-19693.301	69663.244	28.3 40.1 (b)	Pass
T5	150 - 125	Redund Horz 1 Bracing	L2x2x3/16	95	-1484.590	11270.488	13.2	Pass
T6	125 - 100	Redund Horz 1 Bracing	L2x2x3/16	129	-2488.160	9934.942	25.0	Pass
T7	100 - 91.6667	Redund Horz 1 Bracing	L2x2x3/16	204	-2891.570	9373.056	30.8	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T8	91.6667 - 83.3333	Redund Horz 1 Bracing	L2x2x3/16	231	-3300.680	8663.566	38.1	Pass
T9	83.3333 - 75	Redund Horz 1 Bracing	L2x2x3/16	275	-3708.670	8016.062	46.3	Pass
T10	75 - 50	Redund Horz 1 Bracing	L2 1/2x2 1/2x3/16	285	-4709.740	12852.772	36.6	Pass
T11	50 - 37.5	Redund Horz 1 Bracing	L2 1/2x2 1/2x3/16	336	-5335.290	12306.655	43.4	Pass
T12	37.5 - 25	Redund Horz 1 Bracing	L2 1/2x2 1/2x3/16	365	-5953.780	11240.095	53.0	Pass
T13	25 - 12.5	Redund Horz 1 Bracing	L2 1/2x2 1/2x3/16	407	-6574.720	10234.987	64.2	Pass
T14	12.5 - 0	Redund Horz 1 Bracing	L2 1/2x2 1/2x3/16	419	-7203.880	9358.900	77.0	Pass
T5	150 - 125	Redund Diag 1 Bracing	L2x2x3/16	96	-1264.140	6245.065	20.2	Pass
T6	125 - 100	Redund Diag 1 Bracing	L2x2x3/16	130	-1742.520	5232.251	33.3	Pass
T7	100 - 91.6667	Redund Diag 1 Bracing	L2x2x3/16	205	-1984.880	5004.375	39.7	Pass
T8	91.6667 - 83.3333	Redund Diag 1 Bracing	L2x2x3/16	249	-2224.240	4788.029	46.5	Pass
T9	83.3333 - 75	Redund Diag 1 Bracing	L2x2x3/16	259	-2456.900	4582.654	53.6	Pass
T10	75 - 50	Redund Diag 1 Bracing	L2 1/2x2 1/2x3/16	286	-3697.850	5612.210	65.9	Pass
T11	50 - 37.5	Redund Diag 1 Bracing	L2 1/2x2 1/2x3/16	337	-4067.630	5364.312	75.8	Pass
T12	37.5 - 25	Redund Diag 1 Bracing	L2 1/2x2 1/2x3/16	366	-4418.620	5128.371	86.2	Pass
T13	25 - 12.5	Redund Diag 1 Bracing	L3x3x1/4	391	-4760.480	11197.627	42.5	Pass
T14	12.5 - 0	Redund Diag 1 Bracing	L3x3x1/4	420	-5099.070	10709.922	47.6	Pass
T5	150 - 125	Inner Bracing	L2 1/2x2x3/16	74	-12.732	3969.980	0.3	Pass
T6	125 - 100	Inner Bracing	L2 1/2x2x3/16	149	-15.419	3057.262	0.5	Pass
T7	100 - 91.6667	Inner Bracing	L2 1/2x2x3/16	224	-22.362	2822.187	0.8	Pass
T8	91.6667 - 83.3333	Inner Bracing	L2 1/2x2x3/16	251	-21.983	2613.213	0.8	Pass
T9	83.3333 - 75	Inner Bracing	L2 1/2x2x3/16	278	-21.109	2426.606	0.9	Pass
T10	75 - 50	Inner Bracing	L2 1/2x2 1/2x3/16	305	-23.587	3055.169	0.8	Pass
T11	50 - 37.5	Inner Bracing	L2 1/2x2 1/2x3/16	356	-21.587	2771.134	0.8	Pass
T12	37.5 - 25	Inner Bracing	L2 1/2x2 1/2x3/16	384	-321.001	2524.942	12.7	Pass
T13	25 - 12.5	Inner Bracing	L3x3x1/4	411	-19.951	5275.081	0.4	Pass
T14	12.5 - 0	Inner Bracing	L3x3x1/4	437	-341.098	4844.642	7.0	Pass
							Summary	
						Leg (T14)	98.5	Pass
						Diagonal (T12)	97.4	Pass
						Horizontal (T13)	94.1	Pass
						Top Girt (T4)	87.6	Pass
						Redund Horz 1 Bracing (T14)	77.0	Pass
						Redund Diag 1 Bracing (T12)	86.2	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
						Inner Bracing (T12)	12.7	Pass
						Bolt Checks	96.7	Pass
						RATING =	**98.5**	**Pass**

ANCHOR BOLT EVALUATION

AECOM

				Page	of
Job	180' Stainless Lattice Tower - Westbrook, CT	Project No.	NSS-015 Rev. 2	Sheet 1	of 2
Description	Anchor Bolt Analysis	Computed by	MCD	Date	05/21/15
		Checked by		Date	

ANCHOR BOLT ANALYSIS

Input Data

Max Pier Reactions:

Uplift:	Uplift := 382961 lbf	*user input*	
Shear:	Shear := 48999 lbf	*user input*	
Compression:	Compression := 450397 lbf	*user input*	

Anchor Bolt Data:

Use ASTM A36

Number of Anchor Bolts = N	$N := 6$	*user input*	
Bolt Ultimate Strength:	$F_u := 58\,ksi$	*user input*	
Bolt Yield Strength:	$Fy := 36\,ksi$	*user input*	
Bolt Modulus:	$E := 29000\,ksi$	*user input*	
Thickness of Anchor Bolts	$D := 1.75in$	*user input*	
Threads per Inch:	$n := 5$	*user input*	
Coefficient of Friction:	$\mu := 0.55$	*user input*	(for baseplate with grout ASCE 10-97)

AECOM

				Page	of
Job	180' Stainless Lattice Tower - Westbrook, CT	Project No.	NSS-015 Rev. 2	Sheet 2	of 2
Description	Anchor Bolt Analysis	Computed by	MCD	Date	05/21/15
		Checked by		Date	

Anchor Bolt Area:

Gross Area of Bolt:

$$A_g := \frac{\pi}{4} \cdot D^2 \qquad A_g = 2.405 \cdot in^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 \qquad A_n = 1.899 \cdot in^2$$

Check Tensile Forces:

Maximum Tensile Force (Gross Area):

$$AllowableTension := 1.33 \cdot (0.33 \cdot A_g \cdot F_u) \qquad AllowableTension = 61.2 \cdot kips$$

Note: 1.33 increase allowed per TIA/EIA

Maximum Tensile Force (Net Area):

$$F_{net.area} := 1.33 \cdot (0.60 \cdot A_n \cdot Fy) \qquad F_{net.area} = 54.6 \cdot kips$$

Note: 1.33 increase allowed per TIA/EIA

Applied Tension:

$$MaxTension := \frac{Uplift}{N} \qquad MaxTension = 63.8 \cdot kips$$

Additional Capacity Required

Note: An initial MODification analysis performed by URS Corporation, Project SAI-063 / 36924430.00000 (Dated June, 16 2011) installed (1) anchor support per tower leg to resist uplift. The lowest amount of stress to be reduced comes from the adhesive concrete anchor with a capacity of 28.115 Kips (ASD). The attached hand calculations are included to provide extra uplift resistance to support proposed loading conditions.

$ASD_{Cap} := 67174 lbf$

See Hand Calculations for modifications to determine "ASD.Cap"

$$ASD_{CapReq} := \left[(MaxTension - F_{net.area}) \cdot N \right] \qquad ASD_{CapReq} = 55555.8 \cdot lbf$$

Check Stresses:

$$\frac{ASD_{CapReq}}{ASD_{Cap}} = 0.83$$

$$Condition1 := if\left(\frac{ASD_{CapReq}}{ASD_{Cap}} \le 1.00, "OK", "Overstressed" \right)$$

Condition1 = "OK"

URS

Job Westbrook CSP tower | Project No. 155-015R1 | Page ____ of ____

Description Anchor bolt modification Strength check AISC 9th ED | Computed by MCD | Date ____ | Checked by ____ | Date ____ | Sheet ____ of ____

Reference

Anchor capacity needed (from previous sheet) = 50837.8 lbs

4 legs to 4 modified Anchor bolts (5) = 1.17 Ft ∴ $M = \frac{50837.8 \times 1.16}{5} = 19.827$ Kft

$V = \frac{50837.8}{5} = 16.946$ k

Wt 8X25 (@50ksi) → 18" length

$A_{wb} = 0.358 \times 18.1in = 6.44 in^2$

$S_{wb} = \frac{0.358 \times (18.1in)^2}{6} = 29.52 in^3$

- Check web strength:

$$\frac{\frac{19.827 \times 12}{29.52 in^3}}{50ksi \times 0.66} + \frac{\frac{16.946}{6.44 in^2}}{50ksi \times 0.4} = .475 \leq 1 \therefore (OK)$$

- Check weld strength:

5/16" fillet weld @ 17.5" length (both sides) w/ E70 electrode

$A_{weld} = 5/16 \times 0.707 \times 2 \times 17.5 = 7.732 in^2$

$S_{section\,weld} = \frac{5/16 \times (17.5")^2}{6} \times 2 = 31.90 in^3$

$$\frac{\frac{19.827 kft \times 12 in/ft}{31.90 in^3} + \frac{16.946 k}{7.732 in^2}}{0.3 \times 70 ksi} = 0.459 \leq 1 \therefore (OK)$$

URS

Job Westbrook CSP tower | Project No. NSS-CITR1 | Page ___ of ___

Description Anchor bolt modification Strength check ASD method | Computed by MCD | Date ___

Checked by ___ | Date ___

Reference

From Hilti 2009 product catalog

Using (8) 1¼" anchors to concrete

tensile bond capacity/anchor for f'c = 3000 PSI
= 28,115 lbf/anchor tension

Apply reduction factors:

(1) Central anchor @ 19" to closest edge

$0.3\left(\frac{19"}{14"}\right)+0.55 = 0.957 \times 28{,}115 \text{ lbf} = 26{,}910 \text{ lbf Anchor (+)}$

(2) Support anchors @ 7.75" to closest edge

$0.3\left(\frac{7.75"}{14"}\right)+0.55 = 0.716 \times 28{,}115 \text{ lbf} \times 2 = 40{,}265 \text{ lbf Anchor (T)}$

total tension = 67,174 lbf > 50837.9 lbs ∴ (OK)

$\frac{50837}{67174} = 75.7\%$ tower leg capacity

note: Reduction factors come from Hilti 2009 Page 272

FOUNDATION EVALUATION

AECOM

Job	180' Stainless Lattice Tower - Westbrook, CT	Project No.	NSS-015 Rev. 2	Page / Sheet	of / 1 of 4
Description	Pier and Square Mat Foundation Analysis	Computed by	MCD	Date	05/21/15
		Checked by		Date	

DEFINE VARIABLES

$f'_c := 3 \cdot ksi$

$f_y := 60 \cdot ksi$

Max Compressive Force of Tower: $P_{Tower} := 450.397 \cdot kip$

Max Uplift Force of Tower: $Uplift := 382.961 \cdot kip$

Max Shear at Base of Tower: $Shear := 48.999 \cdot kip$

Diameter of Pier: $Pier\phi := 4 \cdot ft$

Length of Pier: $L_c := 11.0 \cdot ft$

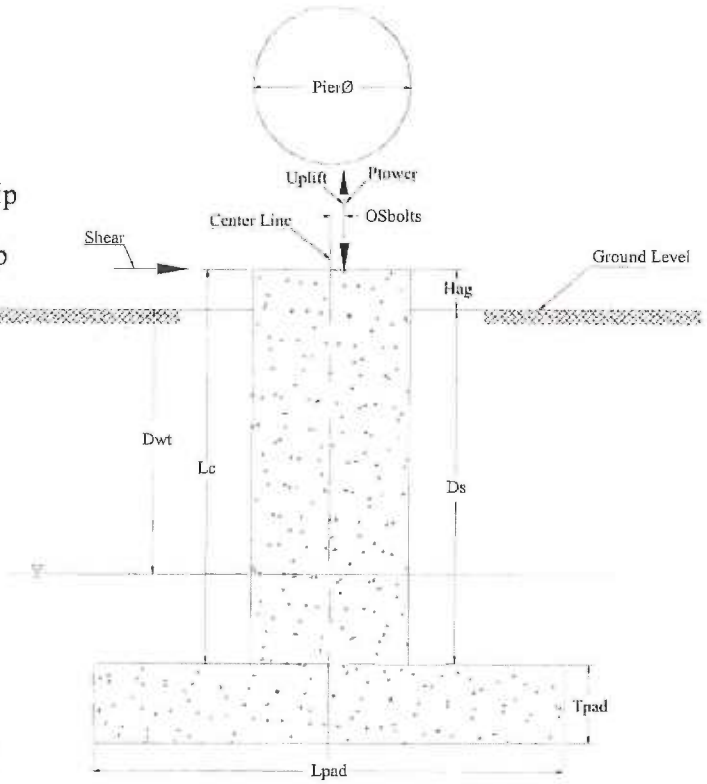
Height of Pier Above Grade: $H_{ag} := 1.0 \cdot ft$

Length of Pad: $L_{Pad} := 16.25 \cdot ft$

Thickness of Pad: $T_{Pad} := 2 \cdot ft$

Distance to Water Table: $D_{wt} := 999 \cdot ft$

NOTE: SET Dwt TO A VALUE GREATER THAN TOTAL DEPTH OF PAD IF WATER TABLE DOES NOT AFFECT FOOTING



Eccentricity of Anchor Bolts from Center Line of Pier: $OS_{bolts} := 9 \cdot in$

Diameter of Reinforcing Bars in Pad: $d_{bar} := 1.00 \cdot in$

$\gamma_s := 110 \cdot \frac{lb}{ft^3}$ $\gamma_c := 150 \cdot \frac{lb}{ft^3}$ $\gamma_w := 62.4 \cdot \frac{lb}{ft^3}$

Soil Internal Friction Angle: $\phi := 34 \cdot deg$

Allowable Soil Pressure: $q_u := 6.0 \cdot ksf$

Active Pressure of Soil Acting along Length of Pier: $K_a := \frac{1 - \sin(\phi)}{1 + \sin(\phi)}$ $P_{Active} := \frac{1}{2} \cdot (L_c + T_{Pad})^2 \cdot Pier\phi \cdot \gamma_s \cdot K_a$ $P_{Active} = 10.51 \cdot kip$

Passive Pressure of Soil Acting along Length of Pier: $K_p := \frac{1 + \sin(\phi)}{1 - \sin(\phi)}$ $P_{Passive} := \frac{1}{2} \cdot (L_c + T_{Pad})^2 \cdot Pier\phi \cdot \gamma_s \cdot K_p$ $P_{Passive} = 131.51 \cdot kip$

Distance from Grade to Bottom of Pier: $D_s := L_c - H_{ag}$ $D_s = 10\,ft$

Area and Volume of Pier: $A_c := \frac{\pi \cdot Pier\phi^2}{4}$ $V_c := A_c \cdot L_c$ $V_c = 138.23\,ft^3$

Area and Volume of Pad: $A_p := L_{Pad}^2$ $V_p := T_{Pad} \cdot A_p$ $V_p = 528.13\,ft^3$

ALLOWABLE SOIL PRESSURE

Assume water table is below bottom of footing

$D_{wtp} := if\left[\left(D_s + T_{Pad}\right) > D_{wt}, T_{Pad}, 0\cdot ft\right]$ $D_{wtp} = 0\,ft$

$W_p := \left(V_p\cdot\gamma_c\right) - D_{wtp}\cdot A_p\cdot\gamma_w$ $W_p = 79.22\cdot kip$

$D_{wtc} := if\left[D_s < D_{wt}, 0\cdot ft, \left(D_s - D_{wt}\right)\right]$ $D_{wtc} = 0\,ft$

$W_c := \left(V_c\cdot\gamma_c\right) - D_{wtc}\cdot A_c\cdot\gamma_w$ $W_c = 20.73\cdot kip$

$W_s := \left[\left(D_s\right)\cdot\left(A_p - A_c\right)\cdot\gamma_s\right]$ $W_s = 276.65\cdot kip$

$P_{Total} := W_p + W_c + W_s + P_{Tower}$ $P_{Total} = 827\cdot kip$

$q_{gr} := \frac{P_{Total}}{A_p}$ $q_{gr} = 3.13\cdot ksf$

$q_n := q_{gr} - \left(D_s + T_{Pad}\right)\cdot\gamma_s$ $q_n = 1.81\cdot ksf$

$SoilPressure := if\left(q_n < q_u, \text{"Okay"}, \text{"No Good"}\right)$

$SoilPressure = \text{"Okay"}$

PUNCHING SHEAR

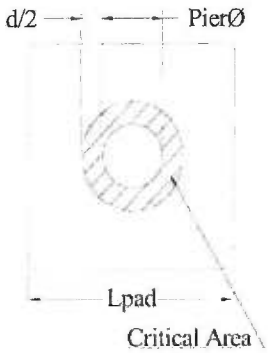
Critical section is located at a distance d/2 from the face of Pier

$$p_u := \left(\frac{1.3\cdot P_{Tower} + V_c\cdot\gamma_c}{L_{Pad}^{\,2}}\right) + \left[\frac{Shear\cdot\left(L_c + T_{Pad}\right) + P_{Tower}\cdot OS_{bolts} + \left(P_{Active} - P_{Passive}\right)\cdot\frac{L_c + T_{Pad}}{3}}{\frac{1}{6}\cdot L_{Pad}^{\,3}}\right]\cdot 1.3$$

$p_u = 3.11\cdot ksf$

$d := T_{Pad} - \left(3\cdot in + d_{bar}\right)$ $d = 1.67\,ft$

$b_o := (Pier\phi + d)\cdot\pi$ $b_o = 17.8\,ft$



$Aout_{bo} := L_{Pad}^{\,2} - \frac{\pi\cdot(Pier\phi + d)^2}{4}$

$Aout_{bo} = 238.84\,ft^2$

$V_u := Aout_{bo}\cdot p_u$ $V_u = 743.92\cdot kip$

$\phi V_c := .85\cdot 4\cdot\sqrt{f'_c\cdot\frac{lb}{in^2}}\cdot b_o\cdot d$ $\phi V_c = 795.66\cdot kip$

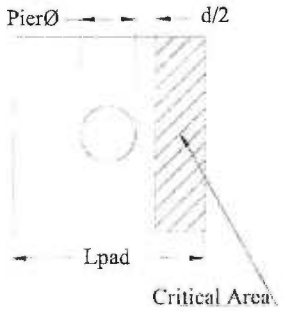
$PunchingShear := if\left(V_u < \phi V_c, \text{"Okay"}, \text{"No Good "}\right)$ $PunchingShear = \text{"Okay"}$

BEAM SHEAR

Critical section is located at a distance d/2 from the face of the Pier

$$V_u := p_u \cdot L_{Pad} \cdot \left(\frac{L_{Pad} - Pier\phi}{2} - \frac{d}{2} \right) \qquad V_u = 267.83 \cdot kip$$

$$\phi V_c := .85 \cdot 2 \cdot \sqrt{f_c \cdot \frac{lb}{in^2}} \cdot L_{Pad} \cdot d \qquad \phi V_c = 363.14 \cdot kip$$



$$BeamShear := if\left(V_u < \phi V_c, "Okay", "No\ Good\ " \right)$$

$$BeamShear = "Okay"$$

BENDING

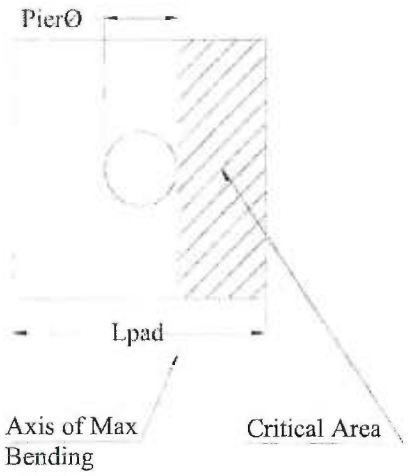
Critical section extends across width of footing at the face of Pier

$$A_{bar} := 0.79 \cdot in^2 \qquad NoOfBar := 20$$

$$As_{provided} := NoOfBar \cdot A_{bar} \qquad As_{provided} = 15.8 \cdot in^2$$

$$M_{Req} := p_u \cdot \frac{5}{6} \cdot L_{Pad} \cdot \left(\frac{L_{Pad} - Pier\phi}{2} \right)^2 \cdot \frac{1}{2}$$

$$M_{Req} = 791.16 \cdot kip \cdot ft$$



$$a := \frac{As_{provided} \cdot f_y}{.85 \cdot f_c \cdot L_{Pad}}$$

$$a = 1.91 \cdot in$$

$$M_{Avail} := 0.9 \cdot As_{provided} \cdot f_y \cdot \left(d - \frac{a}{2} \right)$$

$$M_{Avail} = 1.35 \times 10^3 \cdot kip \cdot ft$$

$$Bending := if\left(M_{Avail} > M_{Req}, "Okay", "No\ Good" \right)$$

$$Bending = "Okay"$$

UPLIFT

$$Soil_1 := \left[\left(D_s\right)\cdot\left(L_{Pad}{}^2 - A_c\right)\cdot\gamma_s\right]$$

$$Soil_2 := 4\cdot\left[\left(D_s + T_{Pad}\right)^2\cdot L_{Pad}\cdot\frac{\tan(\phi)}{2}\right]\cdot\gamma_s$$

$$Soil_3 := 4\cdot\left[\left(D_s + T_{Pad}\right)^3\cdot\frac{\tan(\phi)^2}{3}\right]\cdot\gamma_s$$

Note: The pad has a toe and in accordance with TIA/EIA-222-F section 7.2.4.1 the soil cone resisting uplift shall be taken from he base of the cone

$$WT_{soil} := Soil_1 + Soil_2 + Soil_3 \qquad WT_{soil} = 739.19\cdot kip$$

$$WT_{conc} := W_p + W_c \qquad WT_{conc} = 99.95\cdot kip$$

$$SafetyFactor_{req} := 2$$

$$Uplift_{All} := \frac{WT_{soil} + WT_{conc}}{SafetyFactor_{req}} \qquad Uplift_{All} = 419.57\cdot kip$$

$$UpLiftSafetyFactor_{prov} := \frac{WT_{soil} + WT_{conc}}{Uplift}$$

$$UpliftCheck := if\left(UpLiftSafetyFactor_{prov} < SafetyFactor_{req}, "No\ Good", "Okay"\right)$$

$UpliftCheck = "Okay"$ $\qquad UpLiftSafetyFactor_{prov} = 2.19$

CHECK OVERTURNING MOMENT

$$OTM := Shear\cdot\left(L_c + T_{Pad}\right) + Uplift\cdot\left(\frac{L_{Pad}}{2} - OS_{bolts}\right) + P_{Active}\cdot\frac{L_c + T_{Pad}}{3} \qquad OTM = 3.51\times 10^3\cdot kip\cdot ft$$

$$RM := P_{Tower}\cdot\left(\frac{L_{Pad}}{2} - OS_{bolts}\right) + \left[WT_{conc} + \left(Soil_1 + \frac{Soil_2}{2}\right)\right]\cdot\frac{L_{Pad}}{2} + P_{Passive}\cdot\frac{L_c + T_{Pad}}{3}$$

Considering soil wt + 1/2 wegde soil wt resistance. $\qquad RM = 8.36\times 10^3\cdot kip\cdot ft$

$$OMSafetyFactor_{Prov} := \frac{RM}{OTM} \qquad SafetyFactor_{req} := 2.0 \qquad OMSafetyFactor_{Prov} = 2.38$$

$$OTMCheck := if\left(OMSafetyFactor_{Prov} < SafetyFactor_{req}, "No\ Good", "Okay"\right) \qquad OTMCheck = "Okay"$$

About AECOM

AECOM (NYSE: ACM) is a global provider of professional technical and management support services to a broad range of markets, including transportation, facilities, environmental, energy, water and government. With approximately 45,000 employees around the world, AECOM is a leader in all of the key markets that it serves. AECOM provides a blend of global reach, local knowledge, innovation, and collaborative technical excellence in delivering solutions that enhance and sustain the world's built, natural, and social environments. A Fortune 500 company, AECOM serves clients in more than 100 countries and has annual revenue in excess of $6 billion.

More information on AECOM and its services can be found at www.aecom.com.

500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
860-529-8882
Fax: 860-529-3991

EXHIBIT C

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: CT11033E

CT State Police_1
315 Spencer Plains Rd.
Westbrook, CT 06498

May 29, 2015

EBI Project Number: 6215002588

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	75.91 %

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

EBI Consulting
environmental | engineering | due diligence

May 29, 2015

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

Emissions Analysis for Site: **CT11033E – CT State Police_1**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **315 Spencer Plains Rd., Westbrook, 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 public 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 public 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 467 $\mu W/cm^2$, and the general population exposure limit for the PCS and AWS 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 **315 Spencer Plains Rd., Westbrook, 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, 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 GSM 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 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 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) 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.

6) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB 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.

7) The antennas used in this modeling are the **Commscope DBXNH-6565B-VTM** for 700 MHz, 1900 MHz (PCS) and 2100 MHz (AWS) channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Commscope DBXNH-6565B-VTM** has a maximum gain of **13.1 dBd** at its main lobe at 700 MHz, **17.0 dBd** at its main lobe at 1900 MHz and **16.1 dBd** at its main lobe at 2100 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, 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.

8) The antenna mounting height centerline of the proposed antennas is **130 feet** above ground level (AGL).

9) 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.

All calculations were done with respect to uncontrolled / general public threshold limits.

EBI Consulting
environmental | engineering | due diligence

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Commscope DBXNH-6565B-VTM	Make / Model:	Commscope DBXNH-6565B-VTM	Make / Model:	Commscope DBXNH-6565B-VTM
Gain:	13.1/17/16.1 dBd	Gain:	13.1/17/16.1 dBd	Gain:	13.1/17/16.1 dBd
Height (AGL):	130	Height (AGL):	130	Height (AGL):	130
Frequency Bands	700 MHz / 1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	700 MHz / 1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	700 MHz / 1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	7	Channel Count	7	# PCS Channels:	7
Total TX Power:	270	Total TX Power:	270	# AWS Channels:	270
ERP (W):	11,515.33	ERP (W):	11,515.33	ERP (W):	11,515.33
Antenna A1 MPE%	2.86	Antenna B1 MPE%	2.86	Antenna C1 MPE%	2.86

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile	**8.57**
AT&T	13.06 %
Nextel	7.89 %
Fire dispatch yagi	2.77 %
LB Aux Yagi	3.66 %
Dispatch 1 Yagi	2.37 %
Dispatch 2 Yagi	3.95 %
scan corner reflector	5.71 %
hotline 2-dipole array	5.47 %
hear 4-dipole array	5.46 %
Med Base whip	0.73 %
F 800MHz whip w/ref	2.40 %
Sprint	6.42 %
MW-Lyme	0.49 %
MW-Goose Dish	0.32 %
MW-Killingworth Dish	0.27 %
MW-St Ranch Radome	2.60 %
MW-Goose Radome	2.85 %
CL&P	0.92 %
Site Total MPE %:	**75.91 %**

T-Mobile Sector 1 Total:	2.86 %
T-Mobile Sector 2 Total:	2.86 %
T-Mobile Sector 3 Total:	2.86 %
Site Total:	75.91 %

EBI Consulting
environmental | engineering | due diligence

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public 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 public exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector 1:	2.86 %
Sector 2:	2.86 %
Sector 3 :	2.86 %
T-Mobile Total:	8.57 %
Site Total:	75.91 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **75.91%** of the allowable FCC established general public 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.

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803