NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

Northeast Site Solutions
Denise Sabo
199 Brickyard Rd Farmington, CT 06032
860-209-4690
denise@northeastsitesolutions.com

August 17, 2016

Members of the Siting Council
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Notice of Exempt Modification
349R Mountain Street, Willimantic CT 06226
Latitude: 41.70309
Longitude: -72.221358
T-Mobile Site#: CT11505A_L1900

Dear Ms. Bachman:

T-Mobile currently maintains twelve (12) antennas at the 168-foot level of the existing 196-foot self-support tower at 349R Mountain Street, Willimantic CT 06226. The tower is owned by SBA. The property is owned by SBA. T-Mobile now intends to replace three (3) of its existing antennas with three (3) new 1900/2100 MHz antenna and add (1) hybrid cable. The new antennas would be installed at the 168-foot level of the tower. Please note three (3) of the existing twelve (12) antennas are listed for reserve loading only.

Planned Modifications:

Remove: NONE

Remove and Replace:
(3)AIR21 B4A /B2P (REMOVE) - (3)AIR32 B66Aa/B2a **(REPLACE)**

Install New: (1) 1-5/8" Hybrid Cable

Existing to Remain:
(3) EMS RR90-17-02DP (Reserve Loading ONLY)
(3)AIR21 B2A /B4P
(3) Commscope LNX-6515 Antenna
(3) RRUS11 B12
(3) Twin TMA
(12) 1-5/8" Coax
(1) 1-5/8" Hybrid Cable

This facility was approved by the Town of Windham. The town file is no longer available – See attached letter from the Town Planner.

NORTHEAST SITE SOLUTIONS

Turnkey Wireless Development

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to Mayor Ernie Eldridge, Elected Official for the Town of Windham, as well as the property owner and the tower owner.

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

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

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

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

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Denise Sabo
Mobile: 860-209-4690
Fax: 413-521-0558
Office: 199 Brickyard Rd, Farmington, CT 06032
Email: denise@northeastsitesolutions.com

Attachments
cc: Ernie Eldridge- Mayor - as elected official
SBA - as tower owner
SBA - as property owner

Exhibit A

Deborah Chase

From: Chuck Regulbuto
Sent: Thursday, August 11, 2016 9:25 AM
To: Denise Sabo
Subject: Fwd: 349 Mountain Street - Rear; Zoning Approval

Thank you,

Chuck Regulbuto
Director of Operations

(860)394-7021
(860)324-3187

---------- Forwarded message ----------
From: **Matthew Vertefeuille** <codedirector@windhamct.com>
Date: Thu, Aug 11, 2016 at 9:22 AM
Subject: Re: 349 Mountain Street - Rear; Zoning Approval
To: Chuck Regulbuto <chuck@northeastsitesolutions.com>

The property at 349 Mountain Street had a tower long before Zoning existed in Town. It was a radio communications tower which the cell antennas where attached to. We do not have any documentation on its construction, or any approvals (if needed).

Matthew Vertefeuille, CZEO, Director
Department of Code Enforcement
Town of Windham Connecticut

On Thu, Aug 11, 2016 at 9:07 AM, Chuck Regulbuto <chuck@northeastsitesolutions.com> wrote:
Good morning Mr. Vertefeuille. Please allow me to introduce myself and our company. I am Chuck Regulbuto and our company, Northeast Site Solutions is contracted to T-Mobile in Connecticut to perform site acquisition services for their cell site locations. T-Mobile has asked us to begin the process to upgrade their equipment located on the tower at 349 Mountain Street, Windham.

We will be submitting an application to the Connecticut Siting Council (CSC) to start this process. Per the CSC we need to submit a copy of the original zoning approval for this tower. I was in your offices Wednesday, August 10 and your staff allowed me to search through the files pertaining to this site and the only document that was available was the building permit which the CSC does not accept as the original zoning approval.

If no original documentation is available all the CSC asks us to obtain is a letter or email from the municipality stating that the documents pertaining to the original zoning approval are not available. If you could, please send this letter or email to my email address. I greatly appreciate your attention to this matter.

Thank you,

Chuck Regulbuto
Director of Operations

(860)394-7021
(860)324-3187

Exhibit B

Town of Windham, CT : Commercial Property Record Card

[Back to Search Results]

[Start a New Search][Help with Printing]

Search For Properties

Map-Block-Lot	Name	Street #	Street Name		
		349R	MOUNTAIN ST	Search	Reset Search

Map-Block-Lot	Card	Account #	Location	Zoning	District	State Class	Acres
3- 9/154/ 60EX	1	00004100	349R MOUNTAIN ST	R4		433 - n/a	2.050

Living Units
0

Owner Information

Sba Properties Inc
5900 Broken Sound Pkwy Nw
Boca Raton FL 33487

Property Picture

Deed Information

Book/Page: 631/299
Deed Date: 2001/04/10

Building Information

Building No: 1
Year Built: 1975
No of Units: 0
Structure Type: Tadio/Tv Transmitting Building
Grade: C
Identical Units: 1

Valuation

Land:	$124,400
Building:	$38,300
Total:	$162,700
Net Assessment:	$113,890

Sales History

Book/Page	Date	Price	Type	Validity
631/299	2001/04/10	$108,650	Land + Bldg	22
n/a	1987/10/01	$75,000	Land + Bldg	0

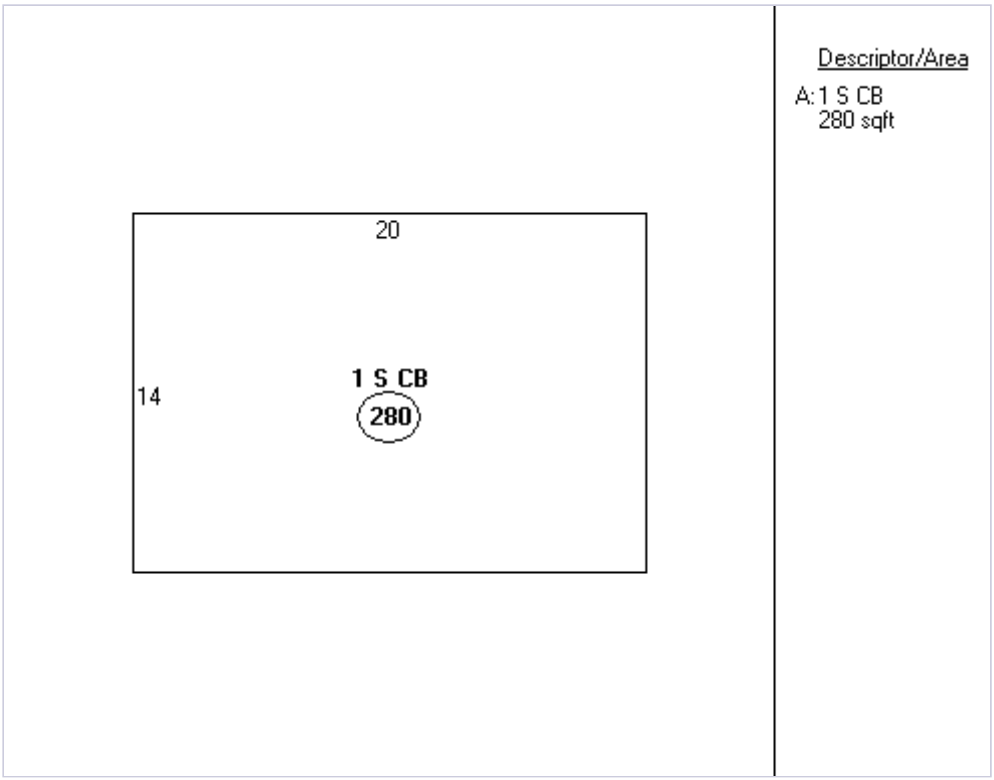
Out Building Information

Structure Code	Width	Lgth/SqFt	Year	RCNLD
Shed Frame			1990	$3,440
Paving Conc Slab			2002	$8,200

Exterior/Interior Information

Levels	Size	Use Type	Ext. Walls	Const. Type	Partitions	Heating	A/C	Plumbing	Condition	Func. Utility	Unadj. RCNLD
01-01	n/a	Warehouse	Conc. Block	Wood Joist	None	Electric	Central	None	Normal	Normal	15730

Building Sketch



Notice

The information delivered through this on-line database is provided in the spirit of open access to government information and is intended as an enhanced service and convenience for citizens of Town of Windham, CT.

The providers of this database: Tyler/CLT, Big Room Studios, and Town of Windham, CT assume no liability for any error or omission in the information provided here.

The following data is for assessment purposes only. It does not claim to reflect legal designations or regulations.

Please note that this information is updated about four times a year (last update March 2015). These values represent proposed values for the 2013 Revaluation. Currently, all values have not been finalized and are subject to change.

Comments regarding this service should be directed to: jsquier@windhamct.com

BUILT BY
big Room
STUDIOS

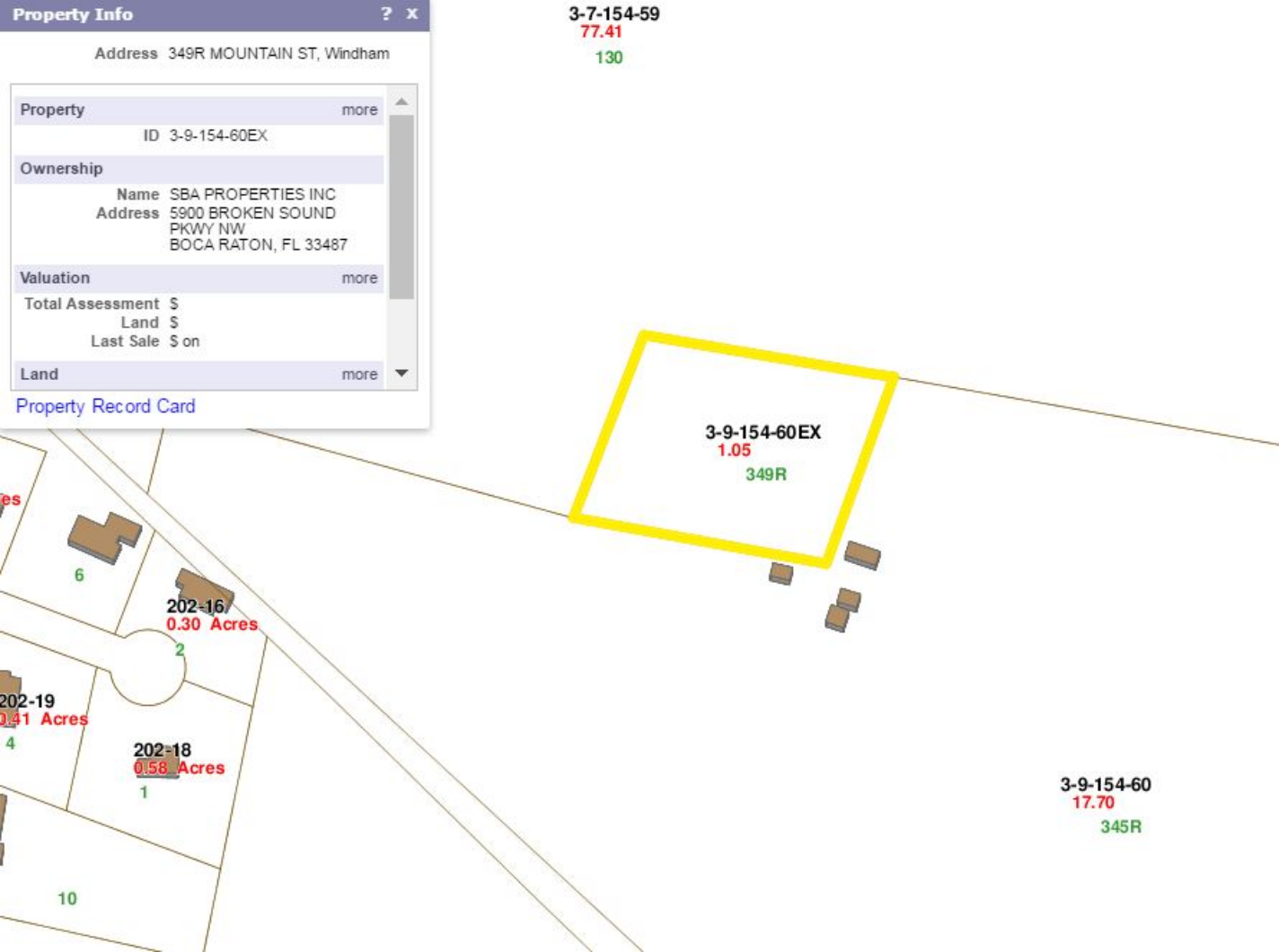

Property Info
Address 349R MOUNTAIN ST, Windham
Property more
ID 3-9-154-60EX
Ownership
Name SBA PROPERTIES INC
Address 5900 BROKEN SOUND PKWY NW
BOCA RATON, FL 33487
Valuation more
Total Assessment $
Land $
Last Sale $ on
Land more
Property Record Card
3-7-154-59
77.41
130
3-9-154-60EX
1.05
349R
202-16
0.30 Acres
2
202-18
0.58 Acres
1
3-9-154-60
17.70
345R
6
4
10

Exhibit C

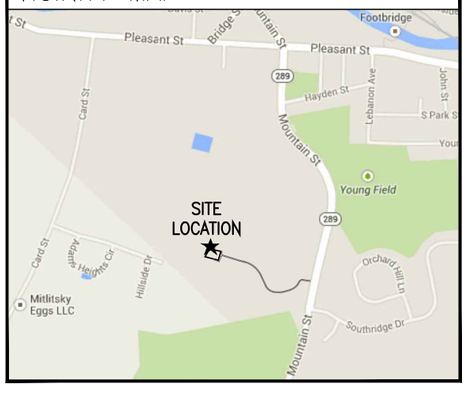
T-MOBILE NORTHEAST LLC

SITE #: CT11505A

SITE NAME: WILLIMANTIC - VERIZON

SITE ADDRESS:
349R MOUNTAIN STREET
WILLIMANTIC, CT 06226
WIRELESS BROADBAND FACILITY
CONSTRUCTION DRAWINGS
(792DB CONFIGURATION)

VICINITY MAP



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 DESIGN 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.
17. REFER TO STRUCTURAL ANALYSIS DOCUMENT ENTITLED, "STRUCTURAL ANALYSIS FOR SBA NETWORK SERVICES, INC. 196' SELF-SUPPORT TOWER (196' AGL)". PREPARED BY VELOCITEL INC., "T-MOBILE SITE ID CT11505A", DATED JULY 12, 2016.

SITE INFORMATION

SITE NUMBER:	CT11505A
SITE NAME:	WILLIMANTIC – VERIZON
SITE ADDRESS:	349R MOUNTAIN STREET WILLIMANTIC, CT 06226
LAT./LONG.:	N 41.70309 / W –72.221358
JURISDICTION:	TOWN OF WILLIMANTIC , CT
PROPERTY OWNER:	VERIZON WIRELESS 99 EAST RIVER DRIVE EAST HARTFORD, CT 06108 ATTN: ALEX TYURIN PHONE: (860) 803–8213

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
A&E:	ATLANTIS DESIGN GROUP INC. 54 JACQUELINE ROAD, SUITE #7 WALTHAM, MA 02452 (617)–852–3611

SHEET INDEX

SHEET	DESCRIPTION
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N–1	GENERAL AND ELECTRICAL NOTES
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A–2	ELEVATION
A–3	DETAILS
E–1	GROUNDING AND POWER ONE LINE DIAGRAM
E–2	GROUNDING DETAILS

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

ATLANTIS DESIGN GROUP, INC.
54 Jacqueline Road, Suite #7
Waltham, MA 02452
Phone number: 617-852-3611
Fax Number : 781-742-2247

SUBMITTALS

DATE	DESCRIPTION	REVISION
06/11/16	ISSUED FOR REVIEW	A
07/21/16	FINAL CD	0

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

PROJECT NO:	CT11505A
DRAWN BY:	MB
CHECKED BY:	KM

STATE OF CONNECTICUT
HOSSEIN VAHEDI
NO. ARI. 11162
LICENSED ARCHITECT

PROFESSIONAL SEAL

SITE NAME
CT11505A
SITE NAME
WILLIMANTIC - VERIZON
SITE ADDRESS
349R MOUNTAIN STREET
WILLIMANTIC, CT 06226

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.
   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.

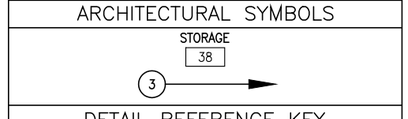
ADMINISTRATION

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



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

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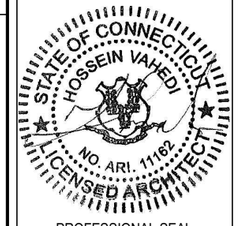
54 Jacqueline Road, Suite #7
Waltham, MA 02452
Phone number: 617-852-3611
Fax Number : 781-742-2247

SUBMITTALS

DATE	DESCRIPTION	REVISION
06/11/16	ISSUED FOR REVIEW	A
07/21/16	FINAL CD	0

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

PROJECT NO: CT11505A
DRAWN BY: MB
CHECKED BY: KM



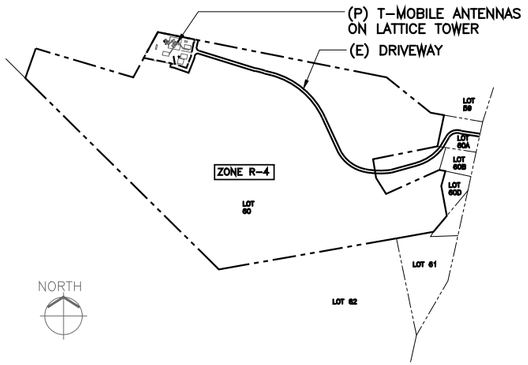
PROFESSIONAL SEAL

SITE NAME
CT11505A
SITE NAME
WILLIMANTIC - VERIZON
SITE ADDRESS
349R MOUNTAIN STREET
WILLIMANTIC, CT 06226

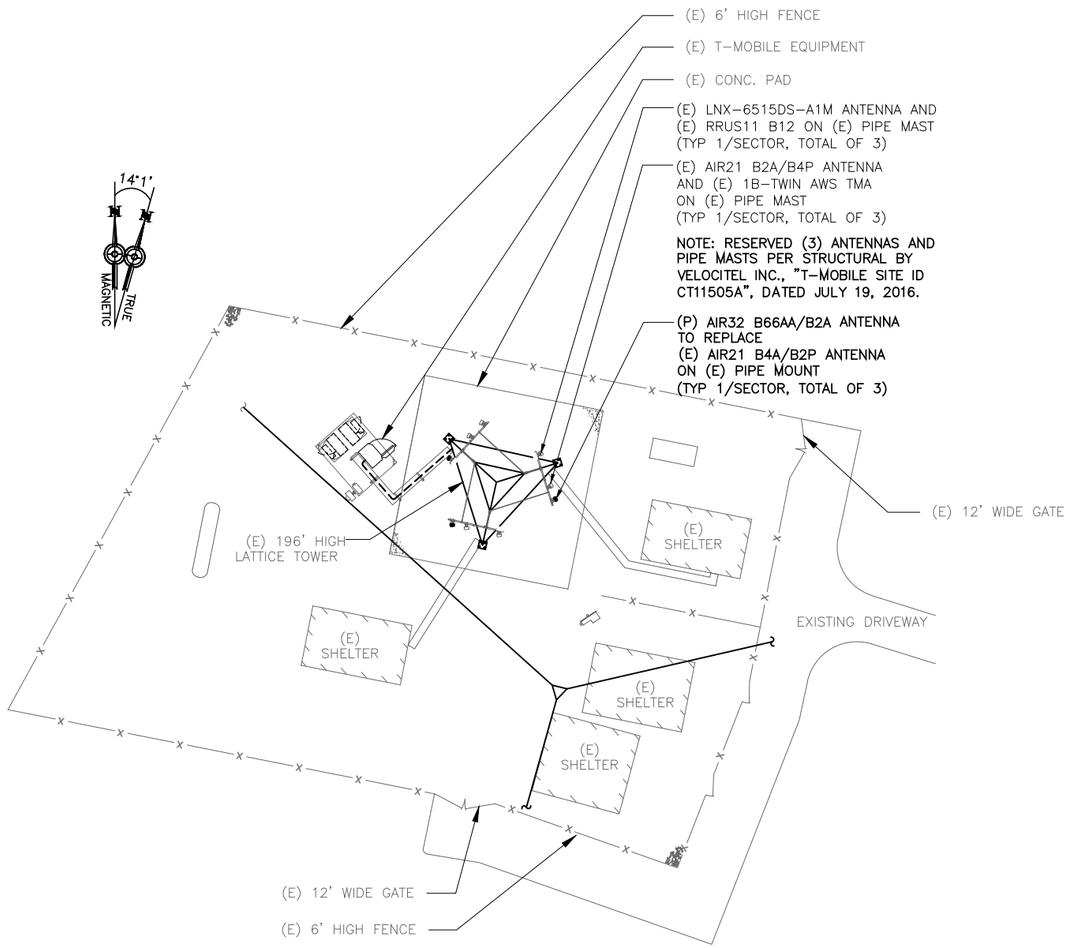
SHEET TITLE
GENERAL AND ELECTRICAL NOTES

SHEET NUMBER
N-1

REFER TO STRUCTURAL ANALYSIS DOCUMENT ENTITLED, "STRUCTURAL ANALYSIS FOR SBA NETWORK SERVICES, INC. 196' SELF-SUPPORT TOWER (196' AGL)". PREPARED BY VELOCITEL INC., "T-MOBILE SITE ID CT11505A", DATED JULY 12, 2016.



KEY PLAN 1/A-1
SCALE: N.T.S.



COMPOUND PLAN 2/A-1
SCALE: 1" = 20'-0" (11x17)

0 20 40 60
SCALE 1"=20' (11x17)
1"=10' (24x36)

GENERAL SITE NOTES:

1. SITE INFORMATION WAS OBTAINED FROM A FIELD INVESTIGATION PERFORMED BY ATLANTIS DESIGN GROUP, INC. CONTRACTOR TO FIELD VERIFY DIMENSIONS AS NECESSARY BEFORE CONSTRUCTION.

2. THE PROPOSED DEVELOPMENT DOES NOT INCLUDE SIGNS OF ADVERTISING.

3. THE PROPOSED DEVELOPMENT IS UNMANNED AND THEREFORE DOES NOT REQUIRE A MEANS OF WATER SUPPLY OR SEWAGE DISPOSAL.

4. NO LANDSCAPING WORK IS PROPOSED IN CONJUNCTION WITH THIS DEVELOPMENT OTHER THAN THAT WHICH IS SHOWN.

5. THE PROPOSED DEVELOPMENT DOES NOT INCLUDE OUTDOOR STORAGE OR ANY SOLID WASTE RECEPTACLES.

6. UTILITIES SHOWN ON PLAN ARE TAKEN FROM OWNERS RECORDS AND FIELD LOCATION OF VISIBLE SURFACE FEATURES. THE EXISTENCE, EXTENT AND EXACT HORIZONTAL AND VERTICAL LOCATIONS OF UTILITIES HAS NOT BEEN VERIFIED. ANY CONTRACTOR PERFORMING WORK ON THIS SITE MUST CONTACT CALL BEFORE YOU DIG THREE WORKING DAYS PRIOR TO COMMENCING WORK.

7. ALL OBSOLETE OR UNUSED FACILITIES SHALL BE REMOVED WITHIN 12 MONTHS OF CESSATION OF OPERATIONS.

SITE LEGEND

- SITE PROPERTY LINE
- STREET OR ROAD
- CHAIN LINK FENCE
- OPAQUE WOODEN FENCE
- BOARD ON BOARD FENCE
- DECIDUOUS TREES/SHRUBS
- EVERGREEN TREES/SHRUBS
- TREE LINE
- UTILITY POLE
- (E) EXISTING
- (N) NEW
- (P) PROPOSED
- (F) FUTURE
- PROP. LTE ANTENNA
- PROP. UMTS/GSM ANTENNA
- EX. GSM ANTENNA
- EX. UMTS ANTENNA

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RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO:	CT11505A
DRAWN BY:	MB
CHECKED BY:	KM

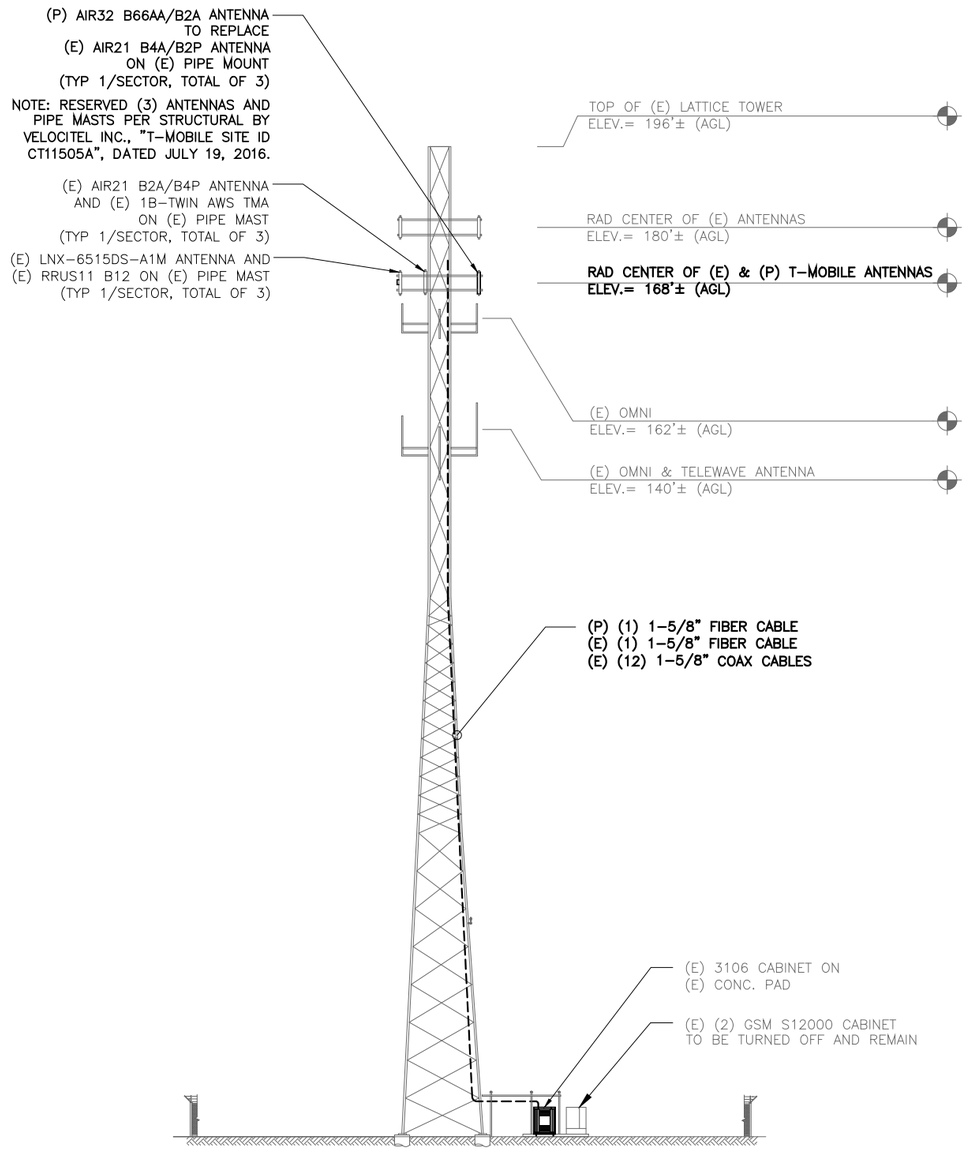
STATE OF CONNECTICUT HOSSEIN VAHEDI NO. ARI. 11162 LICENSED ARCHITECT
PROFESSIONAL SEAL

SITE NAME
CT11505A
SITE NAME
WILLIMANTIC - VERIZON
SITE ADDRESS
349R MOUNTAIN STREET
WILLIMANTIC, CT 06226

SHEET TITLE
COMPOUND PLAN AND ANTENNA PLAN

SHEET NUMBER
A-1

REFER TO STRUCTURAL ANALYSIS DOCUMENT ENTITLED, "STRUCTURAL ANALYSIS FOR SBA NETWORK SERVICES, INC. 196' SELF-SUPPORT TOWER (196' AGL)". PREPARED BY VELOCITEL INC., "T-MOBILE SITE ID CT11505A", DATED JULY 12, 2016.



ELEVATION

1
A-2

SCALE: 1" = 30'-0" (11x17)

0 30 60 90

SCALE 1"=30' (11x17)
1"=15' (24x36)

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PROJECT NO:	CT11505A
DRAWN BY:	MB
CHECKED BY:	KM

STATE OF CONNECTICUT
HOSSEIN VAHEDI
NO. ARI. 11162.
LICENSED ARCHITECT

PROFESSIONAL SEAL

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CT11505A
SITE NAME
WILLIMANTIC - VERIZON
SITE ADDRESS
349R MOUNTAIN STREET
WILLIMANTIC, CT 06226

SHEET TITLE
ELEVATION

SHEET NUMBER
A-2

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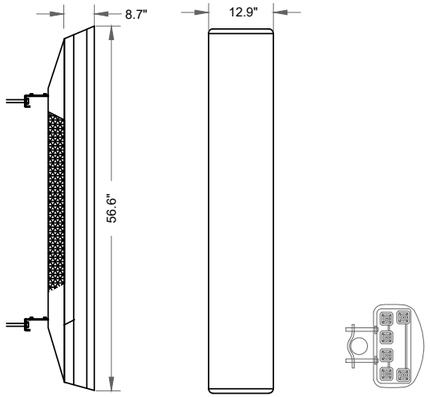
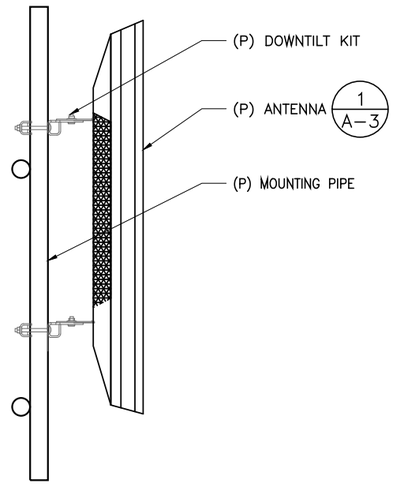


MANUFACTURER: ERICSSON
MODEL NO.:ERICSSON AIR32 AIR32 B66Aa/B2a
DIMENSIONS – HxWxD, (IN) 56.6"x12.9"x8.7"

ERICSSON AIR32 B66Aa/B2a ANTENNA DETAILS

1 / A-3

SCALE: N.T.S



ANTENNA MOUNT DETAILS

2 / A-3

SCALE: N.T.S

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CHECKED BY:	KM

STATE OF CONNECTICUT
HOSSEIN VAHEDI
NO. ARI. 11162
LICENSED ARCHITECT

PROFESSIONAL SEAL

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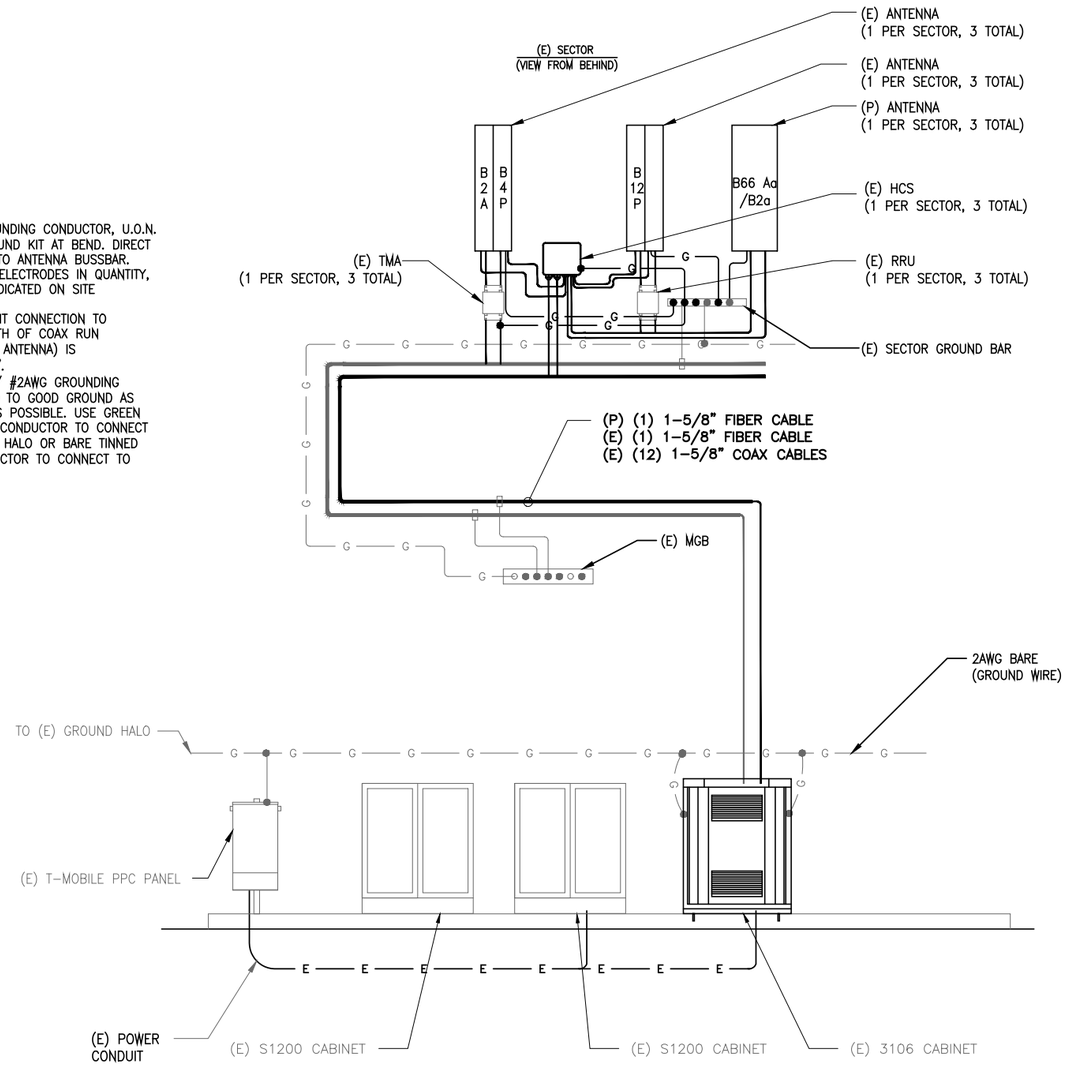
SHEET TITLE
ANTENNA PLAN AND DETAILS

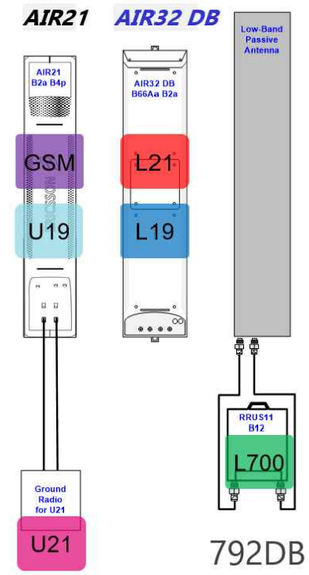
SHEET NUMBER
A-3

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 DIAGRAM
SCALE: N.T.S

1
E-1



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 ¾" (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 ¾" (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

792DB CONFIGURATION
COAX/FIBER PLUMBING DIAGRAM
SCALE: N.T.S

2
E-1

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Phone number: 617-852-3611
Fax Number : 781-742-2247

SUBMITTALS

DATE	DESCRIPTION	REVISION
05/11/16	ISSUED FOR REVIEW	A
07/21/16	FINAL CD	0

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

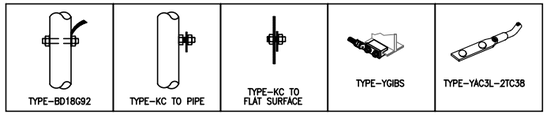
PROJECT NO:	CT11505A
DRAWN BY:	MB
CHECKED BY:	KM

STATE OF CONNECTICUT
HOSSEIN VAHEDI
NO. ARI. 11161.
LICENSED ARCHITECT
PROFESSIONAL SEAL

SITE NAME
CT11505A
SITE NAME
WILLIMANTIC - VERIZON
SITE ADDRESS
349R MOUNTAIN STREET
WILLIMANTIC, CT 06226

SHEET TITLE
GROUNDING AND POWER ONE LINE DIAGRAM

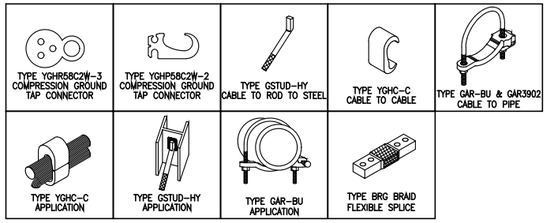
SHEET NUMBER
E-1



BURNDY GROUNDING DETAILS

1 E-2

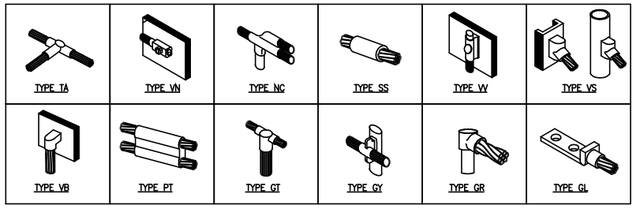
SCALE: N.T.S.



BURNDY GROUNDING PRODUCTS

2 E-2

SCALE: N.T.S.



CADWELD GROUNDING CONNECTION PRODUCTS

3 E-2

SCALE: N.T.S.

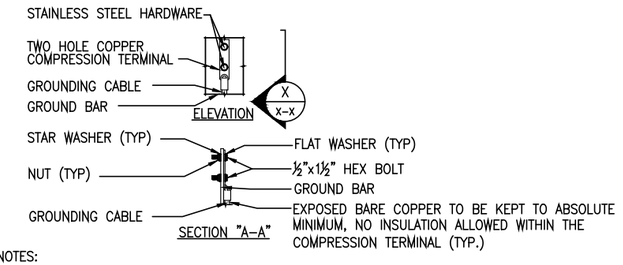
TERMINATION TYPES:
A. MECHANICAL COMPRESSION LUG
B. DOUBLE BARRELL COMPRESSION CONNECTOR
C. EXOTHERMIC TERMINATION
D. BEAM CLAMP

	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

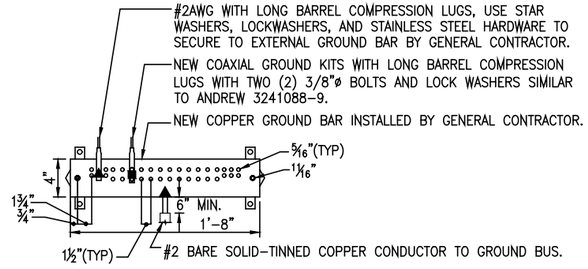
GROUNDING TERMINATION MARTIX

4 E-2

SCALE: N.T.S.



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

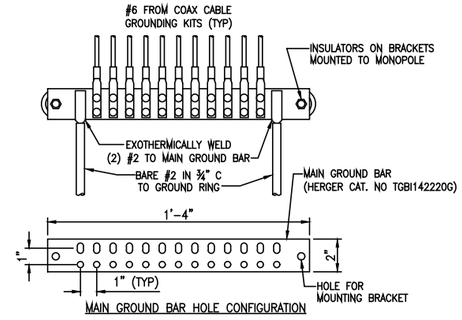


NOTES:
1. ALL HARDWARE STAINLESS STEEL COAT ALL SURFACES WITH KOPR-SHIELD BEFORE MATING.
2. FOR GROUND BOND TO STEEL ONLY: INSERT A TOOTH WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH KOPR-SHIELD.
3. ALL HOLES ARE COUNTERSUNK 1/16".

TYPICAL GROUND BAR CONNECTIONS DETAIL

5 E-2

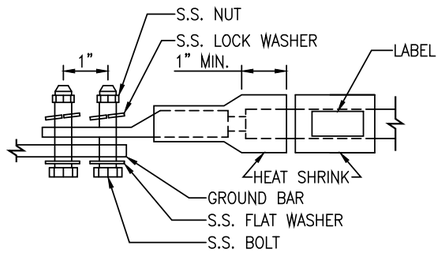
SCALE: N.T.S.



GROUND BAR DETAIL

6 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

7 E-2

SCALE: N.T.S.

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SUBMITTALS

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

PROJECT NO:	CT11505A
DRAWN BY:	MB
CHECKED BY:	KM

STATE OF CONNECTICUT
HOSSEIN VAHEDI
NO. ARI. 11162
LICENSED ARCHITECT

PROFESSIONAL SEAL

SITE NAME
CT11505A
SITE NAME
WILLIMANTIC - VERIZON
SITE ADDRESS
349R MOUNTAIN STREET
WILLIMANTIC, CT 06226

SHEET TITLE
GROUNDING DETAILS

SHEET NUMBER
E-2

Exhibit D

FDH VELOCITEL
ENGINEERING INNOVATION

Structural Analysis for
SBA Network Services, Inc.

196' Self-Support Tower (196' AGL)

SBA Site Name: Mountain Street
SBA Site ID: CT06462-A-02
T-Mobile Site ID: CT-11-505A
Site Address: 349 Mountain Street, Windham, CT 06226

FDH Velocitel Project Number 16FACT1400

Analysis Results

Tower Components	82.3%	Sufficient
Foundation	56.5%	Sufficient

Prepared By:

Phylicia D. Hicks
Project Engineer I

Reviewed By:

Dennis D. Abel, PE
Director of Structural Engineering
CT License No. 23247

Velocitel, Inc., d.b.a. FDH Velocitel
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STATE OF CONNECTICUT
DENNIS D. ABEL
No. 23247
LICENSED
PROFESSIONAL ENGINEER

07-12-2016

July 12, 2016

Prepared pursuant to the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and 2005 Connecticut State Building Code

TABLE OF CONTENTS

EXECUTIVE SUMMARY

At the request of SBA Network Services, Inc., FDH Velocitel performed a structural analysis of the existing Self-Support Tower located in Windham, CT to determine whether the tower is structurally adequate to support the antenna configuration in place per **Table 1** pursuant to the *TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and 2005 Connecticut State Building Code*. Information pertaining to the antenna loading, current tower geometry, member sizes, and below grade parameters was obtained from:

Source	Document Type	Reference	Date
Rohn Industries, Inc.	Tower Drawings	Eng. File No. 49204TT	September 27, 2001
Rohn Industries, Inc.	Foundation Drawings	Eng. File No. 49204TT	August 31, 2001
BL Companies	Geotechnical Report	Project No. 00C672-C	December 1, 2000
FDH Engineering, Inc.	TIA Inspection	Job No. 1301611800	May 03, 2013
SBA Network Services, Inc.	-	-	-

The *basic design wind speed* per the *TIA/EIA-222-F standards and 2005 Connecticut State Building Code* is 85 mph without ice and 38 mph with 1" radial ice. Ice is considered to increase in thickness with height.

Conclusions

With the antenna configuration in place per **Table 1** we have determined the tower stress level to be sufficient and the foundation(s) to be sufficient pursuant to the requirements stipulated by *TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and 2005 Connecticut State Building Code* provided the **Recommendations** listed below are satisfied. For a more detailed description of the analysis of the tower, see the **Results** section of this report.

Our structural analysis has been performed assuming all information provided to FDH Velocitel is accurate (i.e., the structure member information, tower layout, existing antenna loading, and proposed antenna loading) and that the tower has been properly erected and maintained per the original design drawings.

Recommendations

To ensure the requirements of the current analysis standards are met with the antenna configuration in place per **Table 1**, we have the following recommendations:

1. Feed lines must be installed as shown in **Figure 1**.
2. RRU/RRH Stipulation: The equipment may be installed in any arrangement as determined by the client.

APPURTENANCE LISTING

The antennas and equipment, with their corresponding feed lines, considered for this analysis are shown in **Table 1**. *If the actual layout determined in the field deviates from the layout, FDH Velocitel should be contacted to perform a revised analysis.*

Table 1 - Appurtenance Loading

Existing Loading:

Antenna Elevation (ft.)	Description	Feed Lines	Carrier	Mount Elevation (ft.)	Mount Type
185	(3) Antel BXA-80080/4FC (6) RFS Celwave FD9R6004/2C-3L	(3) 1-5/8”	Verizon	185	Direct
168	(3) Ericsson AIR21 B2/B4 (3) Ericsson AIR21 B4/B2 (3) Commscope LNX-6515DS-A1M (3) EMS RR90-17-02DP (3) Ericsson KRY 112 144 (3) Ericsson RRUS11 B12	(12) 1-5/8” (1) 1-5/8” Fiber	T-Mobile	168	(3) 10' T-Frames
162	(1) RFS PD1142-2B	(6) 7/8”	Connecticut Light and Power	158	(1) 1.5' Standoff
157	(1) RFS 458-2N			152	(1) 4' Standoff
	(1) Telwave ANT450D6-9			151	(1) 4' Standoff
140	(1) RFS 220-7N			130	(3) 8' Standoffs
134.5	(1) RFS PD1142-2B				
132.5	(1) Telwave ANT450D6-9				
120	(3) Commscope SBNHH-1D45B (6) Commscope SBNHH-1D65B (3) Alcatel Lucent RRH2X60-AWS (3) Alcatel Lucent RRH2x60-700 (3) Alcatel Lucent RRH2X60-PCS (2) RFS Celwave DB-T1-6Z-8AB-0Z	(8) 1-5/8” (2) 1-5/8” Fiber	Verizon	120	(3) 10’ T-Frames

Proposed Carrier Final Loading:

Antenna Elevation (ft.)	Description	Feed Lines	Carrier	Mount Elevation (ft.)	Mount Type
168	(3) Ericsson AIR21 B2/B4 (3) Ericsson AIR32 B66aa/B2a (3) Commscope LNX-6515DS-A1M (3) EMS RR90-17-02DP (3) Ericsson KRY 112 144 (3) Ericsson RRUS11 B12	(12) 1-5/8” (2) 1-5/8” Fiber	T-Mobile	168	(3) 10' T-Frames

RESULTS

The following material grades for individual members were used for analysis:

Table 2 - Material Grade

Member Type	Material Grade
Legs	A572-50
Bracing	A36

Table 3 and **Table 4** display the summary of capacities for the analyzed structure and its additional components. Values greater than 100% indicate locations where the maximum force in the member exceeds its capacity.

If the assumptions outlined in this report differ from actual field conditions, FDH Velocitel should be contacted to perform a revised analysis. Furthermore, as no information pertaining to the allowable twist and sway requirements for the appurtenances was provided, deflection and rotation were not taken into consideration when performing this analysis.

See the **Appendix** for detailed modeling information.

Table 3 - Structure Member Capacities

Section No.	Elevation (ft.)	Component Type	Size	% Capacity[1]	Pass / Fail
T1	196 - 188	Leg	ROHN 3 STD	0.7	Pass
T2	188 - 168	Leg	ROHN 3 STD	10.2	Pass
T3	168 - 160	Leg	ROHN 3 STD	23.3	Pass
T4	160 - 140	Leg	ROHN 3 EH	44.0	Pass
T5	140 - 120	Leg	ROHN 4 EH	47.1	Pass
T6	120 - 100	Leg	ROHN 5 EH	48.4	Pass
T7	100 - 80	Leg	ROHN 6 EHS	55.4	Pass
T8	80 - 60	Leg	ROHN 6 EH	59.3	Pass
T9	60 - 40	Leg	ROHN 8 EHS	54.4	Pass
T10	40 - 20	Leg	ROHN 8 EHS	62.5	Pass
T11	20 - 0	Leg	ROHN 8 EH	54.8	Pass
T1	196 - 188	Diagonal	L1 3/4x1 3/4x3/16	2.5 3.8 (b)	Pass
T2	188 - 168	Diagonal	L2x2x1/4	10.1 16.7 (b)	Pass
T3	168 - 160	Diagonal	L2x2x1/4	21.8 37.4 (b)	Pass
T4	160 - 140	Diagonal	L2x2x3/16	50.2 55.8 (b)	Pass
T5	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	41.2 51.6 (b)	Pass
T6	120 - 100	Diagonal	L2 1/2x2 1/2x1/4	73.6	Pass
T7	100 - 80	Diagonal	L3x3x1/4	57.7 62.0 (b)	Pass
T8	80 - 60	Diagonal	L3 1/2x3 1/2x1/4	58.7 67.5 (b)	Pass
T9	60 - 40	Diagonal	L3 1/2x3 1/2x1/4	75.7	Pass
T10	40 - 20	Diagonal	L4x4x1/4	63.3 78.5 (b)	Pass
T11	20 - 0	Diagonal	L4x4x1/4	78.2 82.3 (b)	Pass
T1	196 - 188	Top Girt	L1 3/4x1 3/4x3/16	1.4	Pass
T4	160 - 140	Top Girt	L1 3/4x1 3/4x3/16	4.6	Pass

1. Capacities include 1/3 allowable stress increase for wind, per TIA/EIA-222-F standards.

Table 4 – Additional Structure Component Capacities

Elevation (ft.)	Component	% Capacity	Pass / Fail	Notes
0	Anchor Rods	45.6	Pass	1
0	Base Foundation (Soil Interaction)	56.5	Pass	1
0	Base Foundation (Structural)	13.8	Pass	1

1. Capacities include 1/3 allowable stress increase for wind, per TIA/EIA-222-F standards.

GENERAL COMMENTS

This engineering analysis is based upon the theoretical capacity of the structure. It is not a condition assessment of the tower and its foundation. It is the responsibility of SBA Network Services, Inc. to verify that the tower modeled and analyzed is the correct structure (with accurate antenna loading information) modeled. If there are substantial modifications to be made or the assumptions made in this analysis are not accurate, FDH Velocitel should be notified immediately to perform a revised analysis.

LIMITATIONS

All opinions and conclusions are considered accurate to a reasonable degree of engineering certainty based upon the evidence available at the time of this report. All opinions and conclusions are subject to revision based upon receipt of new or additional/updated information. All services are provided exercising a level of care and diligence equivalent to the standard and care of our profession. No other warranty or guarantee, expressed or implied, is offered. Our services are confidential in nature and we will not release this report to any other party without the client's consent. The use of this engineering work is limited to the express purpose for which it was commissioned and it may not be reused, copied, or distributed for any other purpose without the written consent of FDH Velocitel.

APPENDIX

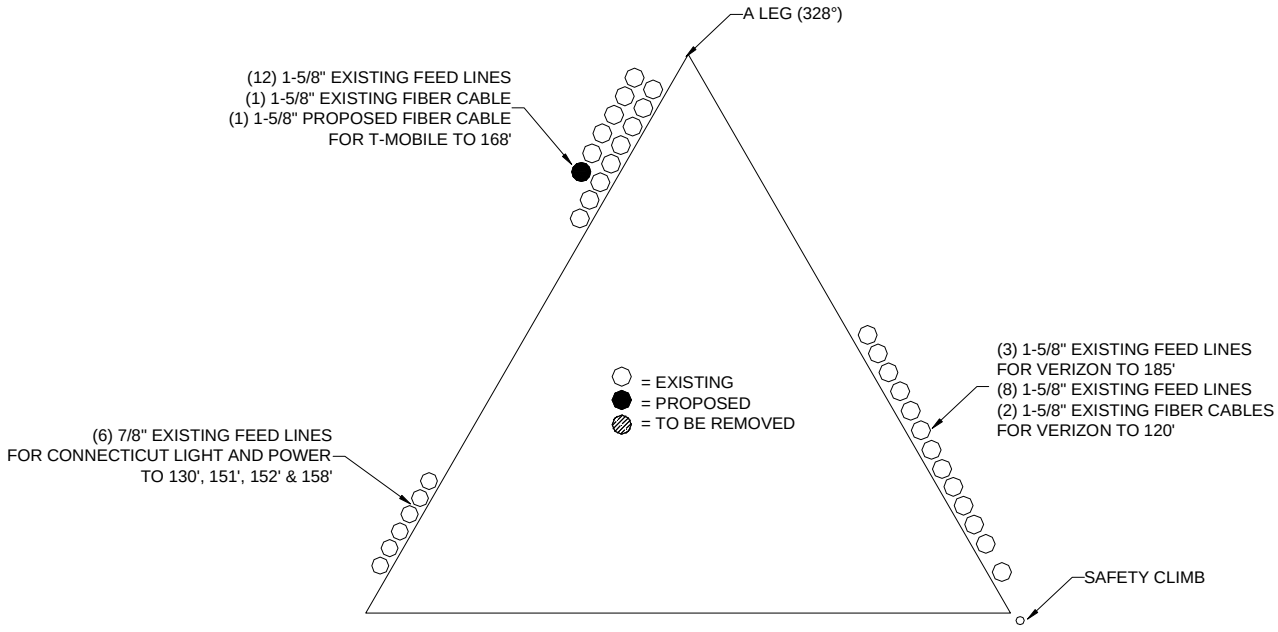
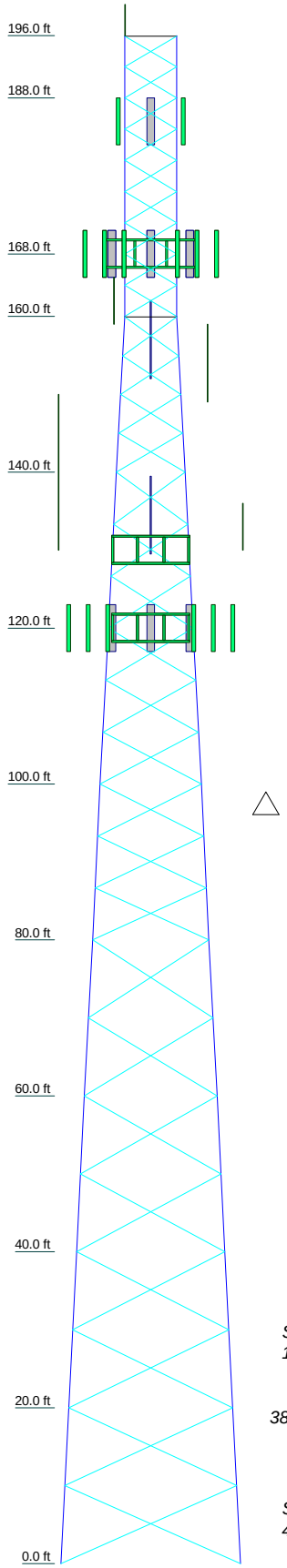


Figure 1 – Feed Line Layout

Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Girts	Face Width (ft)	# Panels @ (ft)	Weight (K)
T1			A		A	6.604	2 @ 3.95833	0.4
T2	ROHN 3 STD		L2x2x1/4		N.A.		7 @ 4	1.2
T3								0.5
T4	ROHN 3 EH		L2x2x3/16		L1 3/4x1 3/4x3/16	6.6875	4 @ 4.97917	1.2
T5	ROHN 4 EH		L2 1/2x2 1/2x1/4			8.76		1.8
T6	ROHN 5 EH					10.83	9 @ 6.66667	2.2
T7	ROHN 6 EHS	A572-50	L3x3x1/4	A36		12.92		2.7
T8	ROHN 6 EH		L3 1/2x3 1/2x1/4		N.A.	14.85		3.0
T9	ROHN 8 EHS					16.99	8 @ 10	3.4
T10			L4x4x1/4			19		3.8
T11	ROHN 8 EH					21		4.5
						23		24.8



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	196	RFS PD1142-2B	158
BXA-80080/4CF w/ Mount Pipe	185	(1) 1.5' Standoff	158
BXA-80080/4CF w/ Mount Pipe	185	RFS 458-2N	152
BXA-80080/4CF w/ Mount Pipe	185	(1) 4' Standoff	152
(2) FD9R6004/2C-3L	185	Telwave ANT450D6-9	151
(2) FD9R6004/2C-3L	185	(1) 4' Standoff	151
(2) FD9R6004/2C-3L	185	RFS 220-7N	130
AIR 21 B2/B4 w/Mount Pipe	168	RFS PD1142-2B	130
AIR 21 B2/B4 w/Mount Pipe	168	Telwave ANT450D6-9	130
AIR 21 B2/B4 w/Mount Pipe	168	(3) 8' Standoffs	130
AIR32 B66aa/B2a w/ Mount Pipe	168	(3) 10- T-Frames	120
AIR32 B66aa/B2a w/ Mount Pipe	168	(3) SBNHH-1D45B w/ Mount Pipe	120
AIR32 B66aa/B2a w/ Mount Pipe	168	(3) SBNHH-1D65B w/ Mount Pipe	120
LNX-6515DS-VTM w/ Mount Pipe	168	(3) SBNHH-1D65B w/ Mount Pipe	120
LNX-6515DS-VTM w/ Mount Pipe	168	RRH2X60-AWS	120
LNX-6515DS-VTM w/ Mount Pipe	168	RRH2X60-AWS	120
RR90-17-02DP w/Mount Pipe	168	RRH2X60-AWS	120
RR90-17-02DP w/Mount Pipe	168	RRH2x60-700	120
RR90-17-02DP w/Mount Pipe	168	RRH2x60-700	120
KRY 112 144	168	RRH2x60-700	120
KRY 112 144	168	RRH2X60-PCS	120
KRY 112 144	168	RRH2X60-PCS	120
RRUS11 B12	168	RRH2X60-PCS	120
RRUS11 B12	168	DB-T1-6Z-8AB-0Z	120
RRUS11 B12	168	DB-T1-6Z-8AB-0Z	120
(3) 10' T-Frames	168		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L1 3/4x1 3/4x3/16		

MATERIAL STRENGTH

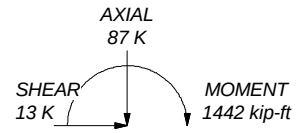
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

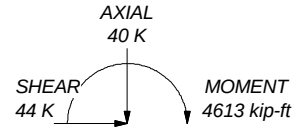
1. Tower is located in Windham County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 82.3%

MAX. CORNER REACTIONS AT BASE:
DOWN: 245 K
SHEAR: 27 K

UPLIFT: -202 K
SHEAR: 23 K



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



TORQUE 16 kip-ft
REACTIONS - 85 mph WIND

FDH Velocitel
6521 Meridien Drive, Suite 107
Raleigh, North Carolina 27616
Phone: 9197551012
FAX: 9197551031

Tower Analysis

Job: *Mountain Street [Twr #2], CT06462-A-02*			
Project: *16FACT1400*			
Client: SBA Network Services, Inc.	Drawn by: PHicks	App'd:	
Code: TIA/EIA-222-F	Date: 07/12/16	Scale: NTS	
Path:		Dwg No. E-1	

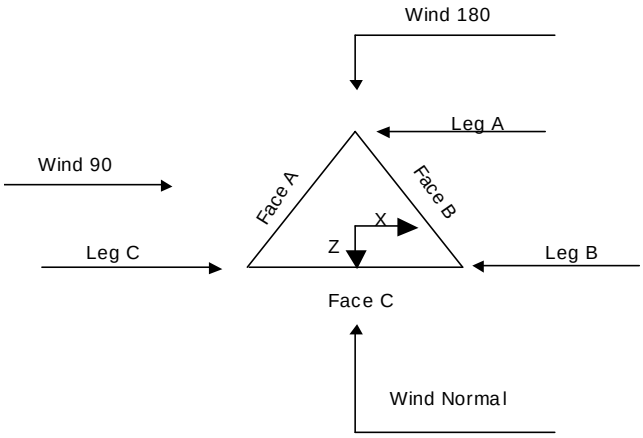
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 196.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 6.60 ft at the top and 23.00 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Windham County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
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		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned	√	Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area	√	SR Leg Bolts Resist Compression
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
√	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients	√	Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
√	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
√	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
√	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	196.00-188.00			6.60	1	8.00
T2	188.00-168.00			6.60	1	20.00
T3	168.00-160.00			6.60	1	8.00
T4	160.00-140.00			6.69	1	20.00
T5	140.00-120.00			8.76	1	20.00
T6	120.00-100.00			10.83	1	20.00
T7	100.00-80.00			12.92	1	20.00
T8	80.00-60.00			14.85	1	20.00
T9	60.00-40.00			16.99	1	20.00
T10	40.00-20.00			19.00	1	20.00
T11	20.00-0.00			21.00	1	20.00

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	196.00-188.00	3.96	X Brace	No	No	1.0000	0.0000
T2	188.00-168.00	4.00	X Brace	No	No	0.0000	0.0000
T3	168.00-160.00	4.00	X Brace	No	No	0.0000	0.0000
T4	160.00-140.00	4.98	X Brace	No	No	1.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T5	140.00-120.00	6.67	X Brace	No	No	0.0000	0.0000
T6	120.00-100.00	6.67	X Brace	No	No	0.0000	0.0000
T7	100.00-80.00	6.67	X Brace	No	No	0.0000	0.0000
T8	80.00-60.00	10.00	X Brace	No	No	0.0000	0.0000
T9	60.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T10	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T11	20.00-0.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 196.00-188.00	Pipe	ROHN 3 STD	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 188.00-168.00	Pipe	ROHN 3 STD	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T3 168.00-160.00	Pipe	ROHN 3 STD	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T4 160.00-140.00	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T5 140.00-120.00	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T6 120.00-100.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T7 100.00-80.00	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T8 80.00-60.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T9 60.00-40.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T10 40.00-20.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Equal Angle	L4x4x1/4	A36 (36 ksi)
T11 20.00-0.00	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Equal Angle	L4x4x1/4	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 196.00-188.00	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T4 160.00-140.00	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)

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_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 196.00-188.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 188.00-168.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 168.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T8 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T9 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T10 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T11 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	Yes	No	1	1	1	1	1	1	1	1
196.00-188.00				1	1	1	1	1	1	1
T2	Yes	No	1	1	1	1	1	1	1	1
188.00-168.00				1	1	1	1	1	1	1
T3	Yes	No	1	1	1	1	1	1	1	1
168.00-160.00				1	1	1	1	1	1	1
T4	Yes	No	1	1	1	1	1	1	1	1
160.00-140.00				1	1	1	1	1	1	1
T5	Yes	No	1	1	1	1	1	1	1	1
140.00-120.00				1	1	1	1	1	1	1
T6	Yes	No	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1
T7	Yes	No	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T8	Yes	No	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T9	Yes	No	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T10	Yes	No	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T11	Yes	No	1	1	1	1	1	1	1	1
20.00-0.00				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 196.00-188.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 188.00-168.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 168.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 160.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	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 196.00-188.00	Flange	0.7500 A325N	4	0.6250 A325N	1	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 188.00-168.00	Flange	0.8750 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 168.00-160.00	Flange	0.8750 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 160.00-140.00	Flange	0.8750 A325N	4	0.6250 A325N	1	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 140.00-120.00	Flange	1.0000 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 120.00-100.00	Flange	1.0000 A325N	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 100.00-80.00	Flange	1.0000 A325N	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 80.00-60.00	Flange	1.0000 A325N	8	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 60.00-40.00	Flange	1.0000 A325N	8	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 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.
T10 40.00-20.00	Flange	1.0000 A325N	8	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T11 20.00-0.00	Flange	1.0000 A354-BC	10	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF7-50A(1-5/8")	A	Yes	Ar (CfAe)	168.00 - 10.00	0.0000	0.35	14	8	0.5000	1.9800		0.82
Feedline Ladder (Af) ***	A	Yes	Af (CfAe)	168.00 - 10.00	0.0000	0.35	1	1	0.5000	3.0000	12.0000	8.40
LDF7-50A(1-5/8")	B	Yes	Ar (CfAe)	120.00 - 10.00	0.0000	0.35	13	13	0.5000	1.9800		0.82
Feedline Ladder (Af) ***	B	Yes	Af (CfAe)	180.00 - 10.00	0.0000	0.35	1	1	0.5000	3.0000	12.0000	8.40
LDF5-50A(7/8")	A	Yes	Ar (CfAe)	130.00 - 10.00	0.0000	-0.4	6	6	0.5000	1.0900		0.33
LDF5-50A(7/8")	A	Yes	Ar (CfAe)	151.00 - 130.00	0.0000	-0.4	3	3	0.5000	1.0900		0.33
LDF5-50A(7/8")	A	Yes	Ar (CfAe)	152.00 - 151.00	0.0000	-0.4	2	2	0.5000	1.0900		0.33
LDF5-50A(7/8")	A	Yes	Ar (CfAe)	158.00 - 152.00	0.0000	-0.4	1	1	0.5000	1.0900		0.33
Feedline Ladder (Af) ***	A	Yes	Af (CfAe)	160.00 - 10.00	0.0000	-0.4	1	1	0.5000	3.0000	12.0000	8.40
Safety Line 3/8 ***	B	Yes	Ar (CfAe)	196.00 - 10.00	0.0000	0.5	1	1	0.3750	0.3750		0.22
LDF7-50A(1-5/8")	B	Yes	Ar (CfAe)	185.00 - 120.00	0.0000	0.35	3	3	0.5000	1.9800		0.82

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	196.00-188.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.250	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	188.00-168.00	A	0.000	0.000	0.000	0.000	0.00
		B	9.040	3.000	0.000	0.000	0.15
		C	0.000	0.000	0.000	0.000	0.00
T3	168.00-160.00	A	10.560	2.000	0.000	0.000	0.16
		B	4.210	2.000	0.000	0.000	0.09

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	0.000	0.000	0.00
T4	160.00-140.00	A	30.124	10.000	0.000	0.000	0.58
		B	10.525	5.000	0.000	0.000	0.22
		C	0.000	0.000	0.000	0.000	0.00
T5	140.00-120.00	A	34.575	10.000	0.000	0.000	0.60
		B	10.525	5.000	0.000	0.000	0.22
		C	0.000	0.000	0.000	0.000	0.00
T6	120.00-100.00	A	37.300	10.000	0.000	0.000	0.61
		B	43.525	5.000	0.000	0.000	0.39
		C	0.000	0.000	0.000	0.000	0.00
T7	100.00-80.00	A	37.300	10.000	0.000	0.000	0.61
		B	43.525	5.000	0.000	0.000	0.39
		C	0.000	0.000	0.000	0.000	0.00
T8	80.00-60.00	A	37.300	10.000	0.000	0.000	0.61
		B	43.525	5.000	0.000	0.000	0.39
		C	0.000	0.000	0.000	0.000	0.00
T9	60.00-40.00	A	37.300	10.000	0.000	0.000	0.61
		B	43.525	5.000	0.000	0.000	0.39
		C	0.000	0.000	0.000	0.000	0.00
T10	40.00-20.00	A	37.300	10.000	0.000	0.000	0.61
		B	43.525	5.000	0.000	0.000	0.39
		C	0.000	0.000	0.000	0.000	0.00
T11	20.00-0.00	A	18.650	5.000	0.000	0.000	0.30
		B	21.762	2.500	0.000	0.000	0.19
		C	0.000	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	196.00-188.00	A	1.235	0.000	0.000	0.000	0.000	0.00
		B		1.897	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
T2	188.00-168.00	A	1.224	0.000	0.000	0.000	0.000	0.00
		B		10.979	11.659	0.000	0.000	0.48
		C		0.000	0.000	0.000	0.000	0.00
T3	168.00-160.00	A	1.212	2.936	14.651	0.000	0.000	0.50
		B		4.802	6.384	0.000	0.000	0.26
		C		0.000	0.000	0.000	0.000	0.00
T4	160.00-140.00	A	1.199	12.530	47.311	0.000	0.000	1.68
		B		11.920	15.932	0.000	0.000	0.64
		C		0.000	0.000	0.000	0.000	0.00
T5	140.00-120.00	A	1.179	12.976	53.448	0.000	0.000	1.77
		B		11.784	15.886	0.000	0.000	0.63
		C		0.000	0.000	0.000	0.000	0.00
T6	120.00-100.00	A	1.155	12.820	57.319	0.000	0.000	1.81
		B		11.628	57.168	0.000	0.000	1.37
		C		0.000	0.000	0.000	0.000	0.00
T7	100.00-80.00	A	1.128	12.636	57.196	0.000	0.000	1.78
		B		11.445	57.107	0.000	0.000	1.35
		C		0.000	0.000	0.000	0.000	0.00
T8	80.00-60.00	A	1.094	12.413	57.047	0.000	0.000	1.75
		B		11.221	57.032	0.000	0.000	1.32
		C		0.000	0.000	0.000	0.000	0.00
T9	60.00-40.00	A	1.051	12.124	56.855	0.000	0.000	1.71
		B		10.933	56.936	0.000	0.000	1.29
		C		0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T10	40.00-20.00	A	1.000	11.783	56.628	0.000	0.000	1.66
		B		10.592	56.822	0.000	0.000	1.25
		C		0.000	0.000	0.000	0.000	0.00
T11	20.00-0.00	A	1.000	5.892	28.314	0.000	0.000	0.83
		B		5.296	28.411	0.000	0.000	0.62
		C		0.000	0.000	0.000	0.000	0.00

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	196.00-188.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.277	0.026	0.196
		C	0.000	0.000	0.000	0.000
T2	188.00-168.00	A	0.000	0.000	0.000	0.000
		B	0.000	2.797	1.173	2.285
		C	0.000	0.000	0.000	0.000
T3	168.00-160.00	A	0.000	2.137	1.222	1.763
		B	0.000	1.382	0.604	1.140
		C	0.000	0.000	0.000	0.000
T4	160.00-140.00	A	0.000	6.582	3.482	5.424
		B	0.000	3.073	1.347	2.532
		C	0.000	0.000	0.000	0.000
T5	140.00-120.00	A	0.000	4.929	3.375	5.227
		B	0.000	2.069	1.175	2.194
		C	0.000	0.000	0.000	0.000
T6	120.00-100.00	A	0.000	4.820	3.393	5.215
		B	0.000	4.646	3.481	5.027
		C	0.000	0.000	0.000	0.000
T7	100.00-80.00	A	0.000	4.527	3.937	6.021
		B	0.000	4.369	4.039	5.810
		C	0.000	0.000	0.000	0.000
T8	80.00-60.00	A	0.000	3.098	3.260	4.954
		B	0.000	2.994	3.344	4.787
		C	0.000	0.000	0.000	0.000
T9	60.00-40.00	A	0.000	2.859	3.157	4.760
		B	0.000	2.768	3.239	4.608
		C	0.000	0.000	0.000	0.000
T10	40.00-20.00	A	0.000	2.633	3.526	5.266
		B	0.000	2.554	3.617	5.108
		C	0.000	0.000	0.000	0.000
T11	20.00-0.00	A	0.000	1.293	1.732	2.587
		B	0.000	1.255	1.777	2.509
		C	0.000	0.000	0.000	0.000

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	196.00-188.00	0.2987	0.1710	0.8993	0.5150

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T2	188.00-168.00	4.5849	1.6516	2.5802	1.0993
T3	168.00-160.00	2.3643	-7.5671	1.5747	-3.9299
T4	160.00-140.00	-0.1676	-6.9681	-0.0341	-3.5704
T5	140.00-120.00	-1.6301	-6.9827	-0.8182	-4.0432
T6	120.00-100.00	7.4925	-2.3933	5.9881	-0.8898
T7	100.00-80.00	7.6123	-2.3801	6.2754	-0.9042
T8	80.00-60.00	8.9495	-2.7528	7.6947	-1.1216
T9	60.00-40.00	9.0300	-2.7416	8.0013	-1.1680
T10	40.00-20.00	9.3513	-2.8106	8.4169	-1.2337
T11	20.00-0.00	5.8951	-1.7605	5.2796	-0.7662

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 K
Lightning Rod	C	From Leg	0.00 0.00 2.00	0.0000	196.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.25 0.66 0.97 1.49 2.68	0.25 0.66 0.97 1.49 2.68	0.03 0.03 0.04 0.06 0.14
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BXA-80080/4CF w/ Mount Pipe	A	From Leg	1.00 0.00 0.00	0.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.49 5.94 6.40 7.35 9.39	4.03 4.65 5.30 6.70 9.78	0.03 0.08 0.13 0.25 0.60
BXA-80080/4CF w/ Mount Pipe	B	From Leg	1.00 0.00 0.00	0.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.49 5.94 6.40 7.35 9.39	4.03 4.65 5.30 6.70 9.78	0.03 0.08 0.13 0.25 0.60
BXA-80080/4CF w/ Mount Pipe	C	From Leg	1.00 0.00 0.00	0.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.49 5.94 6.40 7.35 9.39	4.03 4.65 5.30 6.70 9.78	0.03 0.08 0.13 0.25 0.60
(2) FD9R6004/2C-3L	A	From Leg	1.00 0.00 0.00	0.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
(2) FD9R6004/2C-3L	B	From Leg	1.00 0.00 0.00	0.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
(2) FD9R6004/2C-3L	C	From Leg	1.00 0.00 0.00	0.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***									
(3) SBNHH-1D45B w/ Mount Pipe	A	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	12.60 13.19 13.78 15.00 17.54	6.47 7.23 8.00 9.60 13.19	0.64 0.71 0.80 1.00 1.54
(3) SBNHH-1D65B w/ Mount Pipe	B	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.53 9.18 9.80 11.07 13.72	7.00 8.19 9.08 10.90 14.93	0.08 0.14 0.22 0.40 0.91
(3) SBNHH-1D65B w/ Mount Pipe	C	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.53 9.18 9.80 11.07 13.72	7.00 8.19 9.08 10.90 14.93	0.08 0.14 0.22 0.40 0.91
RRH2X60-AWS	A	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
RRH2X60-AWS	B	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
RRH2X60-AWS	C	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
RRH2x60-700	A	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
RRH2x60-700	B	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
RRH2x60-700	C	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
RRH2X60-PCS	A	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.79 3.02 3.52 4.61	1.93 2.13 2.34 2.80 3.81	0.05 0.07 0.09 0.14 0.30
RRH2X60-PCS	B	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.79 3.02 3.52 4.61	1.93 2.13 2.34 2.80 3.81	0.05 0.07 0.09 0.14 0.30
RRH2X60-PCS	C	From Leg	3.00	0.0000	120.00	No Ice	2.57	1.93	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	2.79	2.13	0.07
			0.00			1" Ice	3.02	2.34	0.09
						2" Ice	3.52	2.80	0.14
						4" Ice	4.61	3.81	0.30
DB-T1-6Z-8AB-0Z	A	From Leg	3.00	0.0000	120.00	No Ice	5.60	2.33	0.04
			0.00			1/2" Ice	5.92	2.56	0.08
			0.00			1" Ice	6.24	2.79	0.12
						2" Ice	6.91	3.28	0.21
						4" Ice	8.37	4.37	0.45
DB-T1-6Z-8AB-0Z	A	From Leg	3.00	0.0000	120.00	No Ice	5.60	2.33	0.04
			0.00			1/2" Ice	5.92	2.56	0.08
			0.00			1" Ice	6.24	2.79	0.12
						2" Ice	6.91	3.28	0.21
						4" Ice	8.37	4.37	0.45
(3) 10- T-Frames	C	None		0.0000	120.00	No Ice	33.02	33.02	1.67
						1/2" Ice	47.36	47.36	2.22
						1" Ice	61.70	61.70	2.77
						2" Ice	90.38	90.38	3.88
						4" Ice	147.74	147.74	6.08
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AIR 21 B2/B4 w/Mount Pipe	A	From Leg	3.00	0.0000	168.00	No Ice	7.09	6.02	0.12
			0.00			1/2" Ice	7.78	7.17	0.18
			0.00			1" Ice	8.37	8.03	0.25
						2" Ice	9.60	9.79	0.40
						4" Ice	12.20	13.53	0.86
AIR 21 B2/B4 w/Mount Pipe	B	From Leg	3.00	0.0000	168.00	No Ice	7.09	6.02	0.12
			0.00			1/2" Ice	7.78	7.17	0.18
			0.00			1" Ice	8.37	8.03	0.25
						2" Ice	9.60	9.79	0.40
						4" Ice	12.20	13.53	0.86
AIR 21 B2/B4 w/Mount Pipe	C	From Leg	3.00	0.0000	168.00	No Ice	7.09	6.02	0.12
			0.00			1/2" Ice	7.78	7.17	0.18
			0.00			1" Ice	8.37	8.03	0.25
						2" Ice	9.60	9.79	0.40
						4" Ice	12.20	13.53	0.86
AIR32 B66aa/B2a w/ Mount Pipe	A	From Leg	3.00	0.0000	168.00	No Ice	7.34	6.15	0.15
			0.00			1/2" Ice	7.87	7.01	0.21
			0.00			1" Ice	8.39	7.80	0.28
						2" Ice	9.47	9.43	0.44
						4" Ice	11.76	12.91	0.89
AIR32 B66aa/B2a w/ Mount Pipe	B	From Leg	3.00	0.0000	168.00	No Ice	7.34	6.15	0.15
			0.00			1/2" Ice	7.87	7.01	0.21
			0.00			1" Ice	8.39	7.80	0.28
						2" Ice	9.47	9.43	0.44
						4" Ice	11.76	12.91	0.89
AIR32 B66aa/B2a w/ Mount Pipe	C	From Leg	3.00	0.0000	168.00	No Ice	7.34	6.15	0.15
			0.00			1/2" Ice	7.87	7.01	0.21
			0.00			1" Ice	8.39	7.80	0.28
						2" Ice	9.47	9.43	0.44
						4" Ice	11.76	12.91	0.89
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	3.00	0.0000	168.00	No Ice	11.63	9.79	0.07
			0.00			1/2" Ice	12.35	11.31	0.16
			0.00			1" Ice	13.07	12.85	0.26
						2" Ice	14.54	15.19	0.49
						4" Ice	17.81	20.05	1.14
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	3.00	0.0000	168.00	No Ice	11.63	9.79	0.07
			0.00			1/2" Ice	12.35	11.31	0.16

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	13.07	12.85	0.26
						2" Ice	14.54	15.19	0.49
						4" Ice	17.81	20.05	1.14
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	3.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.63 12.35 13.07 14.54 17.81	9.79 11.31 12.85 15.19 20.05	0.07 0.16 0.26 0.49 1.14
RR90-17-02DP w/Mount Pipe	A	From Leg	3.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.91 5.57 6.14 7.32 9.81	3.64 4.70 5.48 7.08 10.47	0.04 0.08 0.13 0.25 0.61
RR90-17-02DP w/Mount Pipe	B	From Leg	3.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.91 5.57 6.14 7.32 9.81	3.64 4.70 5.48 7.08 10.47	0.04 0.08 0.13 0.25 0.61
RR90-17-02DP w/Mount Pipe	C	From Leg	3.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.91 5.57 6.14 7.32 9.81	3.64 4.70 5.48 7.08 10.47	0.04 0.08 0.13 0.25 0.61
KRY 112 144	A	From Leg	3.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.60 0.82 1.36	0.19 0.26 0.33 0.51 0.97	0.01 0.01 0.02 0.03 0.08
KRY 112 144	B	From Leg	3.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.60 0.82 1.36	0.19 0.26 0.33 0.51 0.97	0.01 0.01 0.02 0.03 0.08
KRY 112 144	C	From Leg	3.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.60 0.82 1.36	0.19 0.26 0.33 0.51 0.97	0.01 0.01 0.02 0.03 0.08
RRUS11 B12	A	From Leg	3.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.31 3.55 3.80 4.33 5.50	1.36 1.54 1.73 2.13 3.04	0.05 0.07 0.10 0.15 0.31
RRUS11 B12	B	From Leg	3.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.31 3.55 3.80 4.33 5.50	1.36 1.54 1.73 2.13 3.04	0.05 0.07 0.10 0.15 0.31
RRUS11 B12	C	From Leg	3.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.31 3.55 3.80 4.33 5.50	1.36 1.54 1.73 2.13 3.04	0.05 0.07 0.10 0.15 0.31
(3) 10' T-Frames	A	None		0.0000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice	18.73 27.19 35.65 52.57	18.73 27.19 35.65 52.57	0.86 1.26 1.66 2.47

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	86.41	86.41	4.07
***									
RFS PD1142-2B	C	From Leg	1.50 0.00 4.00	0.0000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.32 3.75 5.18 8.11 12.39	2.32 3.75 5.18 8.11 12.39	0.01 0.03 0.06 0.14 0.42
(1) 1.5' Standoff	C	None		0.0000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.72 4.11 5.50 8.28 13.84	12.93 17.82 22.71 32.49 52.05	0.15 0.22 0.30 0.46 0.77
***									
RFS 458-2N	A	From Leg	4.00 0.00 5.00	0.0000	152.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.00 4.03 5.03 6.26 8.83	3.00 4.03 5.03 6.26 8.83	0.02 0.04 0.07 0.15 0.39
(1) 4' Standoff	A	None		0.0000	152.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.72 4.11 5.50 8.28 13.84	12.93 17.82 22.71 32.49 52.05	0.15 0.22 0.30 0.46 0.77
****									
Telwave ANT450D6-9	B	From Leg	4.00 0.00 3.00	0.0000	151.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.50 0.90 1.30 2.10 3.70	0.50 0.90 1.30 2.10 3.70	0.02 0.02 0.03 0.04 0.06
(1) 4' Standoff	B	None		0.0000	151.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.72 4.11 5.50 8.28 13.84	12.93 17.82 22.71 32.49 52.05	0.15 0.22 0.30 0.46 0.77
***									
RFS 220-7N	C	From Leg	8.00 0.00 10.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.28 6.20 8.15 12.08 19.42	4.28 6.20 8.15 12.08 19.42	0.02 0.05 0.10 0.22 0.62
RFS PD1142-2B	A	From Leg	8.00 0.00 4.50	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.32 3.75 5.18 8.11 12.39	2.32 3.75 5.18 8.11 12.39	0.01 0.03 0.06 0.14 0.42
Telwave ANT450D6-9	B	From Leg	8.00 0.00 3.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.50 0.90 1.30 2.10 3.70	0.50 0.90 1.30 2.10 3.70	0.02 0.02 0.03 0.04 0.06
(3) 8' Standoffs	C	None		0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	17.61 24.67 31.73 45.85 74.09	17.61 24.67 31.73 45.85 74.09	0.44 0.67 0.90 1.37 2.30
****									

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+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
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 Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	196 - 188	4.980	27	0.2165	0.0148
T2	188 - 168	4.616	27	0.2164	0.0149
T3	168 - 160	3.712	27	0.2106	0.0148
T4	160 - 140	3.357	27	0.2020	0.0145
T5	140 - 120	2.539	27	0.1726	0.0118
T6	120 - 100	1.855	27	0.1436	0.0099

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T7	100 - 80	1.275	27	0.1165	0.0077
T8	80 - 60	0.814	27	0.0878	0.0057
T9	60 - 40	0.471	27	0.0630	0.0042
T10	40 - 20	0.223	27	0.0410	0.0027
T11	20 - 0	0.070	27	0.0180	0.0013

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
196.00	Lightning Rod	27	4.980	0.2165	0.0148	Inf
185.00	BXA-80080/4CF w/ Mount Pipe	27	4.480	0.2163	0.0149	Inf
168.00	AIR 21 B2/B4 w/Mount Pipe	27	3.712	0.2106	0.0148	155826
158.00	RFS PD1142-2B	27	3.270	0.1994	0.0143	51215
152.00	RFS 458-2N	27	3.015	0.1910	0.0136	41310
151.00	Telwave ANT450D6-9	27	2.974	0.1895	0.0134	40064
130.00	RFS 220-7N	27	2.182	0.1577	0.0108	39378
120.00	(3) SBNHH-1D45B w/ Mount Pipe	27	1.855	0.1436	0.0099	53887

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	196 - 188	14.145	2	0.6150	0.0429
T2	188 - 168	13.113	2	0.6147	0.0430
T3	168 - 160	10.545	2	0.5977	0.0427
T4	160 - 140	9.538	2	0.5729	0.0418
T5	140 - 120	7.217	2	0.4883	0.0342
T6	120 - 100	5.284	2	0.4052	0.0286
T7	100 - 80	3.640	2	0.3301	0.0222
T8	80 - 60	2.327	2	0.2496	0.0165
T9	60 - 40	1.350	2	0.1793	0.0121
T10	40 - 20	0.640	2	0.1168	0.0077
T11	20 - 0	0.201	2	0.0514	0.0038

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
196.00	Lightning Rod	2	14.145	0.6150	0.0429	Inf
185.00	BXA-80080/4CF w/ Mount Pipe	2	12.726	0.6145	0.0430	362904
168.00	AIR 21 B2/B4 w/Mount Pipe	2	10.545	0.5977	0.0427	55455
158.00	RFS PD1142-2B	2	9.291	0.5654	0.0413	17861
152.00	RFS 458-2N	2	8.568	0.5411	0.0392	14364
151.00	Telwave ANT450D6-9	2	8.450	0.5368	0.0388	13924
130.00	RFS 220-7N	2	6.207	0.4453	0.0311	13867

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
120.00	(3) SBNHH-1D45B w/ Mount Pipe	2	5.284	0.4052	0.0286	19513

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	196	Leg	A325N	0.7500	4	0.04	19.44	0.002 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	0.20	3.87	0.050 ✓	1.333	Member Block Shear
		Top Girt	A325N	0.6250	1	0.03	6.44	0.004 ✓	1	Bolt Shear
T2	188	Leg	A325N	0.8750	4	1.47	26.46	0.056 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	1.43	6.44	0.222 ✓	1.333	Bolt Shear
T3	168	Leg	A325N	0.8750	4	3.39	26.46	0.128 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	3.03	6.07	0.499 ✓	1.333	Member Block Shear
T4	160	Leg	A325N	0.8750	4	8.83	26.46	0.334 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	3.39	4.55	0.743 ✓	1.333	Member Block Shear
		Top Girt	A325N	0.6250	1	0.11	3.87	0.029 ✓	1.333	Member Block Shear
T5	140	Leg	A325N	1.0000	4	13.87	34.56	0.401 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	4.43	6.44	0.688 ✓	1.333	Bolt Shear
T6	120	Leg	A325N	1.0000	6	13.63	34.56	0.394 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	6.10	7.97	0.765 ✓	1.333	Member Block Shear
T7	100	Leg	A325N	1.0000	6	18.02	34.56	0.522 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	6.74	8.16	0.826 ✓	1.333	Member Bearing
T8	80	Leg	A325N	1.0000	8	16.25	34.56	0.470 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	7.34	8.16	0.900 ✓	1.333	Member Bearing
T9	60	Leg	A325N	1.0000	8	19.09	34.56	0.553 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	8.04	8.16	0.985 ✓	1.333	Member Bearing
T10	40	Leg	A325N	1.0000	8	21.92	34.56	0.634 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	8.53	8.16	1.046 ✓	1.333	Member Bearing
T11	20	Leg	A354-BC	1.0000	10	19.71	32.40	0.608 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	8.95	8.16	1.098 ✓	1.333	Member Bearing

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 K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	196 - 188	ROHN 3 STD	8.00	3.96	40.8 K=1.00	25.716	2.2285	-0.39	57.31	0.007* ✔
T2	188 - 168	ROHN 3 STD	20.00	4.00	41.3 K=1.00	25.655	2.2285	-7.76	57.17	0.136 ✔
T3	168 - 160	ROHN 3 STD	8.00	4.00	41.3 K=1.00	25.655	2.2285	-17.77	57.17	0.311 ✔
T4	160 - 140	ROHN 3 EH	20.04	4.99	52.7 K=1.00	23.928	3.0159	-42.32	72.17	0.586 ✔
T5	140 - 120	ROHN 4 EH	20.04	6.68	54.3 K=1.00	23.671	4.4074	-65.55	104.33	0.628 ✔
T6	120 - 100	ROHN 5 EH	20.04	6.68	43.6 K=1.00	25.320	6.1120	-99.85	154.75	0.645 ✔
T7	100 - 80	ROHN 6 EHS	20.03	6.68	36.0 K=1.00	26.380	6.7133	-130.76	177.09	0.738 ✔
T8	80 - 60	ROHN 6 EH	20.04	10.02	54.8 K=1.00	23.589	8.4049	-156.83	198.26	0.791 ✔
T9	60 - 40	ROHN 8 EHS	20.03	10.02	40.6 K=1.00	25.754	9.8666	-184.40	254.10	0.726 ✔
T10	40 - 20	ROHN 8 EHS	20.03	10.02	40.6 K=1.00	25.754	9.8666	-211.85	254.10	0.834 ✔
T11	20 - 0	ROHN 8 EH	20.03	10.02	41.8 K=1.00	25.582	12.7627	-238.48	326.50	0.730 ✔

* DL controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	196 - 188	L1 3/4x1 3/4x3/16	7.70	3.56	124.4 K=1.00	9.646	0.6211	-0.20	5.99	0.033 ✔
T2	188 - 168	L2x2x1/4	7.72	3.57	112.2 K=1.02	11.377	0.9380	-1.43	10.67	0.134 ✔
T3	168 - 160	L2x2x1/4	7.77	3.61	113.1 K=1.02	11.252	0.9380	-3.07	10.55	0.290 ✔
T4	160 - 140	L2x2x3/16	9.85	4.79	145.8 K=1.00	7.023	0.7150	-3.36	5.02	0.669 ✔
T5	140 - 120	L2 1/2x2 1/2x1/4	12.43	6.08	148.5 K=1.00	6.773	1.1900	-4.43	8.06	0.550 ✔
T6	120 - 100	L2 1/2x2 1/2x1/4	14.23	6.92	169.0 K=1.00	5.228	1.1900	-6.10	6.22	0.981 ✔
T7	100 - 80	L3x3x1/4	15.99	7.73	156.7 K=1.00	6.081	1.4400	-6.74	8.76	0.770 ✔
T8	80 - 60	L3 1/2x3 1/2x1/4	19.26	9.48	164.0 K=1.00	5.553	1.6900	-7.34	9.39	0.782 ✔
T9	60 - 40	L3 1/2x3 1/2x1/4	21.03	10.25	177.2	4.753	1.6900	-8.11	8.03	1.009

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T10	40 - 20	L4x4x1/4	22.81	11.14	K=1.00 168.2	5.279	1.9400	-8.64	10.24	✔ 0.843
T11	20 - 0	L4x4x1/4	24.62	12.06	K=1.00 182.0	4.509	1.9400	-9.12	8.75	✔ 1.042
					K=1.00					✔

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 K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	196 - 188	L1 3/4x1 3/4x3/16	6.60	6.07	212.2 K=1.00	3.317	0.6211	-0.03	2.06	0.014* ✔
T4	160 - 140	KL/R > 200 (C) - 5 L1 3/4x1 3/4x3/16 KL/R > 200 (C) - 72	6.70	6.16	215.4 K=1.00	3.219	0.6211	-0.12	2.00	0.062 ✔

* DL controls

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 K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	196 - 188	ROHN 3 STD	8.00	3.96	40.8	30.000	2.2285	0.18	66.85	0.003 ✔
T2	188 - 168	ROHN 3 STD	20.00	4.00	41.3	30.000	2.2285	5.88	66.85	0.088 ✔
T3	168 - 160	ROHN 3 STD	8.00	4.00	41.3	30.000	2.2285	13.58	66.85	0.203 ✔
T4	160 - 140	ROHN 3 EH	20.04	4.99	52.7	30.000	3.0159	35.32	90.48	0.390 ✔
T5	140 - 120	ROHN 4 EH	20.04	6.68	54.3	30.000	4.4074	55.49	132.22	0.420 ✔
T6	120 - 100	ROHN 5 EH	20.04	6.68	43.6	30.000	6.1120	81.75	183.36	0.446 ✔
T7	100 - 80	ROHN 6 EHS	20.03	6.68	36.0	30.000	6.7133	108.14	201.40	0.537 ✔
T8	80 - 60	ROHN 6 EH	20.04	10.02	54.8	30.000	8.4049	129.97	252.15	0.515 ✔
T9	60 - 40	ROHN 8 EHS	20.03	10.02	40.6	30.000	9.8666	152.76	296.00	0.516 ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T10	40 - 20	ROHN 8 EHS	20.03	10.02	40.6	30.000	9.8666	175.39	296.00	0.593 ✔
T11	20 - 0	ROHN 8 EH	20.03	10.02	41.8	30.000	12.7627	197.10	382.88	0.515 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	196 - 188	L1 3/4x1 3/4x3/16	7.70	3.56	82.2	29.000	0.3604	0.20	10.45	0.019 ✔
T2	188 - 168	L2x2x1/4	7.72	3.57	72.7	29.000	0.5629	1.30	16.32	0.079 ✔
T3	168 - 160	L2x2x1/4	7.77	3.61	73.5	29.000	0.5629	3.03	16.32	0.186 ✔
T4	160 - 140	L2x2x3/16	9.41	4.57	91.2	29.000	0.4308	3.39	12.49	0.271 ✔
T5	140 - 120	L2 1/2x2 1/2x1/4	12.43	6.08	96.7	29.000	0.7519	4.37	21.80	0.200 ✔
T6	120 - 100	L2 1/2x2 1/2x1/4	13.62	6.61	105.3	29.000	0.7284	6.10	21.12	0.289 ✔
T7	100 - 80	L3x3x1/4	15.99	7.73	101.5	29.000	0.9159	6.74	26.56	0.254 ✔
T8	80 - 60	L3 1/2x3 1/2x1/4	19.26	9.48	105.9	29.000	1.1034	7.34	32.00	0.229 ✔
T9	60 - 40	L3 1/2x3 1/2x1/4	21.03	10.25	114.3	29.000	1.1034	8.04	32.00	0.251 ✔
T10	40 - 20	L4x4x1/4	22.81	11.14	108.3	29.000	1.2909	8.53	37.44	0.228 ✔
T11	20 - 0	L4x4x1/4	24.62	12.06	117.0	29.000	1.2909	8.95	37.44	0.239 ✔

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T4	160 - 140	L1 3/4x1 3/4x3/16	6.70	6.16	143.1	29.000	0.3604	0.11	10.45	0.011 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	196 - 188	Leg	ROHN 3 STD	1	-0.39	57.31	0.7	Pass
T2	188 - 168	Leg	ROHN 3 STD	20	-7.76	76.21	10.2	Pass
T3	168 - 160	Leg	ROHN 3 STD	53	-17.77	76.21	23.3	Pass
T4	160 - 140	Leg	ROHN 3 EH	69	-42.32	96.20	44.0	Pass
T5	140 - 120	Leg	ROHN 4 EH	99	-65.55	139.07	47.1	Pass
T6	120 - 100	Leg	ROHN 5 EH	120	-99.85	206.28	48.4	Pass
T7	100 - 80	Leg	ROHN 6 EHS	141	-130.76	236.06	55.4	Pass
T8	80 - 60	Leg	ROHN 6 EH	162	-156.83	264.29	59.3	Pass
T9	60 - 40	Leg	ROHN 8 EHS	177	-184.40	338.72	54.4	Pass
T10	40 - 20	Leg	ROHN 8 EHS	192	-211.85	338.72	62.5	Pass
T11	20 - 0	Leg	ROHN 8 EH	207	-238.48	435.22	54.8	Pass
T1	196 - 188	Diagonal	L1 3/4x1 3/4x3/16	8	-0.20	7.99	2.5 3.8 (b)	Pass
T2	188 - 168	Diagonal	L2x2x1/4	25	-1.43	14.22	10.1 16.7 (b)	Pass
T3	168 - 160	Diagonal	L2x2x1/4	57	-3.07	14.07	21.8 37.4 (b)	Pass
T4	160 - 140	Diagonal	L2x2x3/16	75	-3.36	6.69	50.2 55.8 (b)	Pass
T5	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	104	-4.43	10.74	41.2 51.6 (b)	Pass
T6	120 - 100	Diagonal	L2 1/2x2 1/2x1/4	123	-6.10	8.29	73.6	Pass
T7	100 - 80	Diagonal	L3x3x1/4	144	-6.74	11.67	57.7 62.0 (b)	Pass
T8	80 - 60	Diagonal	L3 1/2x3 1/2x1/4	165	-7.34	12.51	58.7 67.5 (b)	Pass
T9	60 - 40	Diagonal	L3 1/2x3 1/2x1/4	180	-8.11	10.71	75.7	Pass
T10	40 - 20	Diagonal	L4x4x1/4	195	-8.64	13.65	63.3 78.5 (b)	Pass
T11	20 - 0	Diagonal	L4x4x1/4	210	-9.12	11.66	78.2 82.3 (b)	Pass
T1	196 - 188	Top Girt	L1 3/4x1 3/4x3/16	5	-0.03	2.06	1.4	Pass
T4	160 - 140	Top Girt	L1 3/4x1 3/4x3/16	72	-0.12	2.66	4.6	Pass
							Summary	
						Leg (T10)	62.5	Pass
						Diagonal (T11)	82.3	Pass
						Top Girt (T4)	4.6	Pass
						Bolt Checks	82.3	Pass
						RATING =	**82.3**	**Pass**

FDH VELOCITEL
ENGINEERING INNOVATION

Version: 1.0
Issue Date: 6/14/2016

Self-Support Mat Foundation

Project Data		
Project Number:	*Project*	
Site Name:	*SiteName*	Mountain Street [Twr #2]
Site Number:	*SiteNumber*	CT06462-A

Legend	
Label/Units	Calc'd
Empty Input	Pass
Filled Input	Fail

Tower Reactions			
Moment:	*TwrM*	4613.0	ft-kip
Shear:	*TwrV*	44.0	kip
Axial:	*TwrP*	40.0	kip
Leg Compression:	*LegC*	245.0	kip

Code & Design Parameters			
Standard:	*Standard*	TIA/EIA-222-F	-
Maximum Soil Stress Ratio:	*MaxSoilRatio*	100.00%	-
Maximum Steel Stress Ratio:	*MaxSteelRatio*	100.00%	-

Site Details			
Frost Depth:	*Frost*	3.333	ft
Water Depth:	*Water*	100	ft
Seismic Design Category:	*SDC*	C	-

Soil Parameters			
Bearing Pressure Capacity:	*Bc*	2000	psf
Ultimate or Allowable:	*BcUltAll*	Allowable	-
Bearing Pressure Type:	*BcType*	Net	-
Unit Weight:	*gamma*	120	pcf
Angle of Internal Friction:	*phi*	32	deg
Cohesion:	*cohesion*	0	psf
Sliding Friction Coefficient:	*mu*	0.5	-
Passive Pressure Coefficient:	*K_p*	3.60	-
Passive Pressure Coeff. Override	*KpOver*	3.6	-

Design Dimensions			
Tower Width:	*TwrWidth*	23	ft
Base Leg Diameter:	*LegDiameter*	8.625	in
Eccentric Loading:	*EccLoading*	FALSE	-
Bearing Depth:	*D*	3.5	ft
Mat Width:	*W*	36	ft
Mat Length:	*L*	36	ft
Mat Thickness:	*T*	4	ft

Material Specifications			
Concrete Strength:	*fc*	3000	psi
Concrete Weight:	*ConcUnitWt*	150	pcf
Reinf. Yield Strength:	*Fy*	60	ksi

Reinforcement			
Utilize Minimum Steel?:	*MinSteelCheck*	No	-
Clear Cover:	*cc*	3	in
Reinforcement Size:	*PadSize*	7	-
Reinforcement Qty (Along L):	*PadQtyL*	40	-
Reinforcement Qty (Along W):	*PadQtyW*	40	-
Distance to Center of Reinf.:	*Dist*	44.13	in

Soil & Steel Checks		
Lateral:	*LatRatio*	17.8%
Overturning:	*OTRatio*	46.9%
Bearing:	*Qratio*	56.5%
One-Way Shear:	*V1Ratio*	13.8%
Two-Way Shear:	*V2Ratio*	24.2%
Flexure:	*FlexRatio*	37.5%
Min. Reinforcement:	*MinPadCheck*	OK
Reinf. Development:	*DevPadCheck*	OK

Controlling Percentages	
Controlling Soil - Bearing:	56.5%
Controlling Steel - One-Way Shear:	13.8%

Analysis Notes:

1. Buoyant unit weights must be entered directly in the "*ConcUnitWt* " and "*gamma* " cells.
2. Checks both mat diretions for worst case steel and soil capacities.
3. Utilizes elastic analysis methods with either trapezoidal or triangular distribution, a Kern limit of L/6, and a stability limit of L/2.
4. The assumed minimum steel used is based off the parameters from temperature & shrinkage (0.0018).

Exhibit E

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

T-Mobile Existing Facility

Site ID: CT11505A

Willimantic - Verizon
349R Mountain Street
Willimantic, CT 06226

August 5, 2016

EBI Project Number: 6216003516

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	5.90 %

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August 5, 2016

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

Emissions Analysis for Site: **CT11505A – Willimantic - Verizon**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **349R Mountain Street, Willimantic, 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 approximately 467 $\mu W/cm^2$, and the general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (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 **349R Mountain Street, Willimantic, 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 (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 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.

4) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 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

6) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

7) Since the 2100 MHz UMTS radios are ground mounted there are additional cabling losses accounted for. For each ground mounted 2100 MHz UMTS RF path an additional 2.33 dB of cable loss was factored into the calculations. This is based on manufacturers Specifications for 220 feet of 1-5/8" coax cable on each path.

8) 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.

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

10) The antennas used in this modeling are the **Ericsson AIR32 B66Aa/B2A** & **Ericsson AIR21 B2A/B4P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR32 B66Aa/B2A** has a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **Ericsson AIR21 B2A/B4P** has a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe at 700 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.

11) The antenna mounting height centerline of the proposed antennas is **168 feet** above ground level (AGL).

12) 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.

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

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T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR32 B66Aa/B2A	Make / Model:	Ericsson AIR32 B66Aa/B2A	Make / Model:	Ericsson AIR32 B66Aa/B2A
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	168	Height (AGL):	168	Height (AGL):	168
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	9,337.08
Antenna A1 MPE%	1.28	Antenna B1 MPE%	1.28	Antenna C1 MPE%	1.28
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	168	Height (AGL):	168	Height (AGL):	168
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	6	Channel Count	6	Channel Count	6
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	6,033.60	ERP (W):	6,033.60	ERP (W):	6,033.60
Antenna A2 MPE%	0.83	Antenna B2 MPE%	0.83	Antenna C2 MPE%	0.83
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	168	Height (AGL):	168	Height (AGL):	168
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power(W):	30	Total TX Power(W):	30	Total TX Power(W):	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	0.25	Antenna B3 MPE%	0.25	Antenna C3 MPE%	0.25

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**2.36 %**
Verizon Wireless	1.76 %
CL&P	1.78 %
Site Total MPE %:	**5.90 %**

T-Mobile Sector A Total:	2.36 %
T-Mobile Sector B Total:	2.36 %
T-Mobile Sector C Total:	2.36 %
Site Total:	5.90 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	168	6.40	AWS - 2100 MHz	1000	0.64%
T-Mobile PCS - 1900 MHz LTE	2	2,334.27	168	6.40	PCS - 1900 MHz	1000	0.64%
T-Mobile AWS - 2100 MHz UMTS	2	682.53	168	1.87	AWS - 2100 MHz	1000	0.19%
T-Mobile PCS - 1950 MHz UMTS	2	1,167.14	168	3.20	PCS - 1950 MHz	1000	0.32%
T-Mobile PCS - 1950 MHz GSM	2	1,167.14	168	3.20	PCS - 1950 MHz	1000	0.32%
T-Mobile 700 MHz LTE	1	865.21	168	1.19	700 MHz	467	0.25%
						Total:	**2.36%**

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 A:	2.36 %
Sector B:	2.36 %
Sector C:	2.36 %
T-Mobile Per Sector Maximum:	2.36 %
Site Total:	5.90 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **5.90%** 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.