Transcend Wireless

10 Industrial Avenue,
Suite 3
Mahwah, NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

July 18, 2019

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

Re:
Notice of Exempt Modification
33 Boardman Road, New Milford CT
Latitude 41.59944444
Longitude -73.4375
T-Mobile site: CTNH362B / L600

Dear Ms. Bachman:

T-Mobile currently maintains (6) antennas at the 140 foot level of the existing 154-foot Monopine tower at 33 Boardman Road in New Milford. The Monopine tower and property is owned by O&G Industries. T-Mobile now intends to replace (3) of its existing antennas with (3) 600/700 MHz antennas. The new antennas would be installed at the 140 foot level of the tower and mount modifications are required per the enclosed mount analysis.

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Planned Modifications:

Remove and Replace:
Antennas:
(3) Andrew LNX-6515DS (REMOVE) - (3) RFS APXVAARR24_43-U-NA20 - 600 MHz / 700 MHz (REPLACE)

Install New:
Antennas:
(3) Ericsson 4449 B71 B12 RRH's
Coax Cables:
One (1) 6x12 fiber cable

Existing to Remain:
Antennas:
(3) RFS APXV18-209014
(3) TMAs
Coax Cables:
(12) 1-5/8" coax

Ground:
Install new 125 Breaker

This facility was approved by Docket No. 285 by the Siting Council July 13, 2004, with no record of conditions that would restrict exempt modifications. Therefore, this modification complies with the aforementioned approval. A copy of the original approval is attached.

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 Pete Bass of New Milford, and Laura Regan, New Milford Planner.

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,

Elizabeth Jamieson

Elizabeth Jamieson
Transcend Wireless
10 Industrial Ave., Suite 3
Mahwah, New Jersey 07430
860-605-7808
EJamieson@TranscendWireless.com

cc:
Peter Bass, New Milford Mayor
Laura Regan, Planner, New Milford
O& Industries as tower and land owner

Exhibit A

Original Facility Approval

Connecticut Siting Council
Decisions

DOCKET NO. 285 - Sprint Spectrum, L.P. application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a wireless telecommunications facility at 33 Boardman Road, New Milford, Connecticut.	}	Connecticut Siting Council July 13, 2004

Decision and Order

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a telecommunications facility including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate either alone or cumulatively with other effects when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes **§** 16-50k, be issued to Sprint Spectrum, L.P. for the construction, maintenance and operation of a wireless telecommunications facility at 33 Boardman Road, New Milford, Connecticut.

The facility shall be constructed, operated, and maintained substantially as specified in the Council's record in this matter, and subject to the following conditions:

1. The tower shall be constructed as a monopole, no taller than necessary to provide the proposed telecommunications services, sufficient to accommodate the antennas of Sprint Spectrum L.P., Nextel Communications, Inc., and other entities, both public and private, but such tower shall not exceed a height of 150 feet above ground level. The height at the top of the antennas shall not exceed a height of 153 feet above ground level.

2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be served on the Town of New Milford, and all parties and intervenors as listed in the service list, and submitted to and approved by the Council prior to the commencement of facility construction. The D&M shall include:

   a. a final site plan(s) of site development to include specifications for the tower, tower foundation, antennas, equipment building, access road, utility line, and landscaping; and

   b. construction plans for site clearing, water drainage, and erosion and sedimentation control consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.

3. Prior to submission of the D&M plan to the Council, the Certificate Holder shall discuss the appropriateness and feasibility of stealth tower designs for this site with the Town. The Town and Certificate Holder shall agree upon the final tower design.

4. The Certificate Holder shall, prior to the commencement of operation, provide the Council worst-case modeling of electromagnetic radio frequency power density of all proposed entities' antennas at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall ensure a recalculated report of electromagnetic radio frequency power density is submitted to the

Council when circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order.

5. Upon the establishment of any new State or federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.

6. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.

7. The Certificate Holder shall provide reasonable space on the tower for no compensation for any municipal antennas, provided such antennas are compatible with the structural integrity of the tower.

8. If the facility does not initially provide wireless services within one year of completion of construction or ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made.

9. Any antenna that becomes obsolete and ceases to function shall be removed within 60 days after such antennas become obsolete and cease to function.

10. Unless otherwise approved by the Council, this Decision and Order shall be void if the facility authorized herein is not operational within one year of the effective date of this Decision and Order or within one year after all appeals to this Decision and Order have been resolved. Any request for extension of this period shall be filed with the Council no later than sixty days prior to expiration date of this Certificate and shall be served on all parties and intervenors, as listed in the service list. Any proposed modifications to this Decision and Order shall likewise be so served.

Pursuant to General Statutes **§** 16-50p, we hereby direct that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below, and notice of issuance shall be published in the Hartford Courant, the New Milford Spectrum, and the New Milford Times.

By this Decision and Order, the Council disposes of the legal rights, duties, and privileges of each party named or admitted to the proceeding in accordance with Section 16-50j-17 of the Regulations of Connecticut State Agencies.

The parties and intervenors to this proceeding are:

Applicant	**Its Representative**
Sprint Spectrum, L.P. -	Thomas J. Regan, Esquire Brown Rudnick Berlack Isreals LLP CityPlace I, 38th Floor 185 Asylum Street Hartford, CT 06103-3402
Intervenor	**Its Representative**
Nextel Communications, Inc.	Julie Donaldson Kohler Hurwitz & Sagarin P.O. Box 112 Milford, CT 06460

Content Last Modified on 7/15/2004 12:58:33 PM

Exhibit B

Property card

33 BOARDMAN RD

Location	33 BOARDMAN RD	**Mblu**	47/ / 73/ /
Acct#		**Owner**	QUARRY STONE AND GRAVEL LLC
Assessment	$2,871,680	**Appraisal**	$4,896,500
PID	8323	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$1,205,300	$3,691,200	$4,896,500
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$843,710	$2,027,970	$2,871,680

Owner of Record

Owner	QUARRY STONE AND GRAVEL LLC	**Sale Price**	$0
Co-Owner	% O + G INDUSTRIES	**Certificate**	
Address	112 WALL ST TORRINGTON, CT 06790	**Book & Page**	778/ 681
		Sale Date	09/11/2003
		Instrument	03

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
QUARRY STONE AND GRAVEL LLC	$0		778/ 681	03	09/11/2003
QUARRY STONE AND GRAVEL LLC	$0		765/ 512	03	07/08/2003
KOVACS ROBERT G + KOVACS PAUL B + KOVACS	$0		705/ 499	29	05/23/2002
QUARRY STONE AND GRAVEL LLC	$0		690/ 804	03	01/09/2002
KOVACS ROGER P + PAUL B + ROBERT G	$0		361/ 142		12/24/1986

Building Information

Building 1 : Section 1

Year Built: 1989
Living Area: 9,000
Replacement Cost: $305,640
Building Percent Good: 66
Replacement Cost Less Depreciation: $201,700

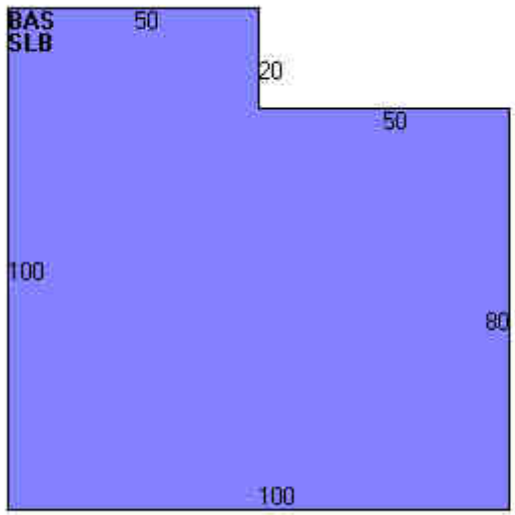
Building Attributes	
Field	**Description**
STYLE	Pre-Eng Whse
MODEL	Ind/Comm
Grade	C
Stories:	1

Occupancy	1
Exterior Wall 1	Pre-finsh Metl
Exterior Wall 2	Minimum
Roof Structure	Gable
Roof Cover	Enamel Metal
Interior Wall 1	Minim/Masonry
Interior Wall 2	
Interior Floor 1	Concr-Finished
Interior Floor 2	
Heating Fuel	Oil
Heating Type	Forced Air-Duc
AC Type	None
Bldg Use	Sand+Gravl
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	410I
Heat/AC	NONE
Frame Type	STEEL
Baths/Plumbing	AVERAGE
Ceiling/Wall	NONE
Rooms/Prtns	AVERAGE
Wall Height	20
% Comn Wall	0

Building Photo

(http://images.vgsi.com/photos/NewMilfordCTPhotos//\00\01\57/

Building Layout



(http://images.vgsi.com/photos/NewMilfordCTPhotos//Sketches/8

Building Sub-Areas (sq ft)	Legend

Code	Description	Gross Area	Living Area
BAS	First Floor	9,000	9,000
SLB	Slab	9,000	0
		18,000	9,000

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	410
Description	Sand+Gravl
Zone	I/R40
Neighborhood	C100
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	342.45
Frontage	0
Depth	0
Assessed Value	$2,027,970
Appraised Value	$3,691,200

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
SHD1	Shed	CB	CindBk/Frame	200 S.F.	$1,600	1

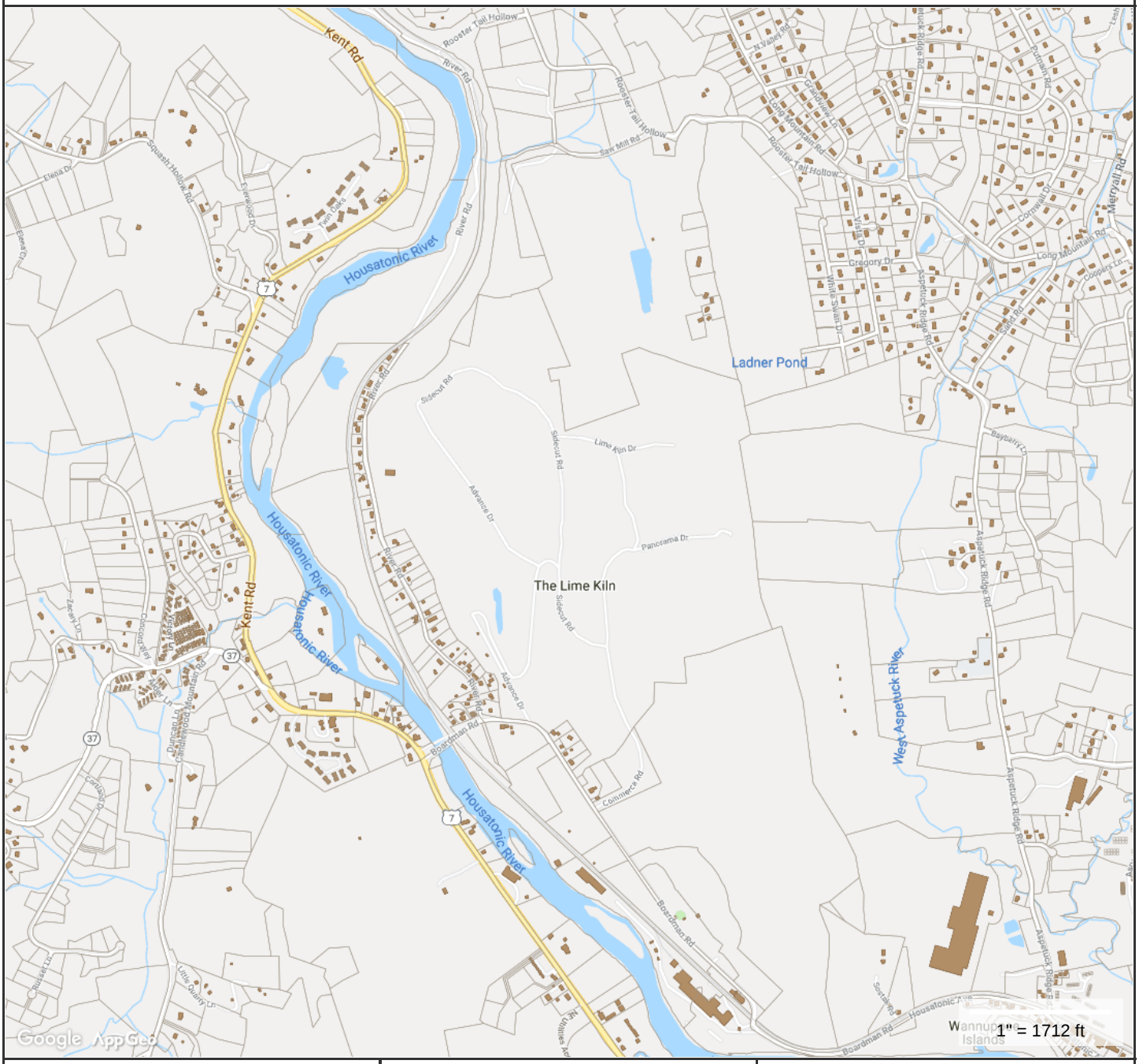
SHD1	Shed	FR	Frame	400 S.F.	$3,200	1
LT1	Light (1)			100 Units	$93,600	1
SCL1	Scale			60 TONS	$21,600	1
SCL1	Scale			60 TONS	$21,600	1
SITE	Cell Site Tenant	TW	Tower	4 Units	$862,000	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$1,205,300	$3,691,200	$4,896,500
2014	$1,086,200	$3,691,200	$4,777,400
2009	$219,200	$9,275,200	$9,494,400

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$843,710	$2,027,970	$2,871,680
2014	$760,340	$2,010,550	$2,770,890
2009	$153,440	$2,038,320	$2,191,760

33 Boardman Rd New Milford CT



MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of New Milford, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 5/1/2018
Data updated 11/19/2018

Exhibit C

Construction Drawings

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

NH362/BOARDMAN_MP

SITE ID: CTNH362B

33 BOARDMAN ROAD

NEW MILFORD, CT 06776

T-MOBILE RF CONFIGURATION
67D04G_1DP+1OP

PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:

   A. REMOVE (3) EXISTING ANTENNAS, TYP. (1) PER SECTOR
   B. INSTALL (3) NEW RFS ANTENNAS, TYP. (1) PER SECTOR
   C. INSTALL (3) NEW RRU'S, TYP. (1) PER SECTOR
   D. INSTALL NEW 100A BREAKER
   E. INSTALL (1) NEW 6x12 HYBRID CABLE
   F. INSTALL MOUNT STABILIZER KIT

PROJECT INFORMATION

SITE NAME:	NH362/BOARDMAN_MP
SITE ID:	CTNH362B
SITE ADDRESS:	33 BOARDMAN ROAD NEW MILFORD, CT 06776
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	DAN REID (PROJECT MANAGER) TRANSCEND WIRELESS, LLC (203) 592-8291
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-35'-58.3" N LONGITUDE: 73°-26'-15.0" W GROUND ELEVATION: 580'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	DESIGN BASIS AND SITE NOTES	0
C-1	SITE LOCATION PLAN	0
C-2	COMPOUND PLAN & ELEVATION	0
C-3	ANTENNA MOUNTING CONFIG. AND ELEVATION	0
E-1	TYPICAL ELECTRICAL DETAILS	0
E-2	TYPICAL ELECTRICAL DETAILS	0

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2018 CONNECTICUT FIRE SAFETY CODE, 2017 NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND "MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T-MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

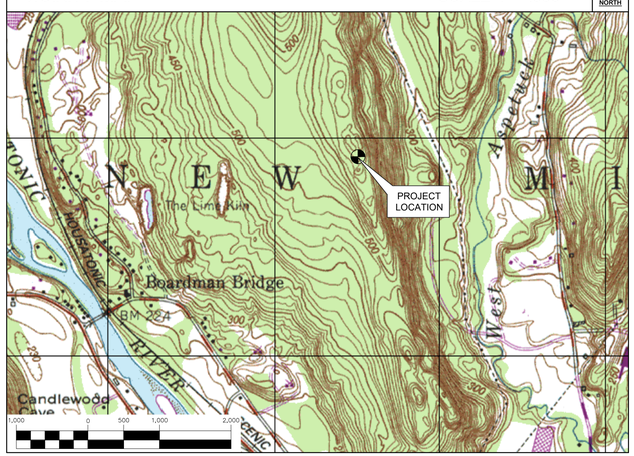
FROM: 35 GRIFFIN ROAD SOUTH, BLOOMFIELD, CT 06002 **TO:** 33 BOARDMAN ROAD, NEW MILFORD, CT 06776

1.	HEAD NORTH ON GRIFFIN ROAD S. TOWARD HARTMAN RD.	0.30 MI.
2.	TAKE LEFT ONTO DAY HILL RD.	0.61 MI.
3.	TAKE RIGHT ONTO TUNXIS AVE/CT-189	0.30 MI.
4.	TAKE LEFT ONTO STATE HIGHWAY 187/CT-187	0.56 MI.
5.	MERGE ONTO CT-189 N TOWARD TARIFFVILLE/GRANBY	5.14 MI.
6.	TAKE RIGHT ONTO SALMON BROOK ST/US-202 E/CT-10	0.09 MI.
7.	TAKE SLIGHT LEFT ONTO N GRANBY RD/ CT-189/CT-20	3.65 MI.
8.	TAKE LEFT ONTO BARKHAMSTED RD/CT-219	3.78 MI.
9.	TAKE SLIGHT LEFT ONTO E HARTFORD RD/CT-179/CT-219	2.52 MI
10.	TAKE SLIGHT RIGHT ONTO SAVILLE DAM RD	1.69 MI.
11.	TAKE LEFT ONTO PLEASANT VALLEY RD/CT-181/CT-318	1.46 MI.
12.	TAKE RIGHT ONTO NEW HARTFORD RD/US-44 W	3.15 MI.
13.	MERGE ONTO CT-8 S VIA THE RAMP ON THE LEFT	11.19 MI.
14.	TAKE THE CT-118 EXIT, EXIT 42, TOWARD LITCHFIELD/HARWINTON	0.23 MI.
15.	TAKE RIGHT ONTO EAST ST/CT-118	4.77 MI.
16.	TAKE SLIGHT LEFT ONTO EAST ST/US-202 W.	18.55 MI.
17.	TAKE RIGHT ONTO ELM ST	0.19 MI.
18.	TAKE RIGHT ONTO RAILROAD ST.	0.02 MI.
19.	TAKE LEFT ONTO HOUSATONIC AVE	0.75 MI.
20.	HOUSATONIC AVE BECOMES BOARDMAN RD	0.30 MI.

VICINITY MAP

SCALE: 1" = 1000'

NORTH



PROFESSIONAL ENGINEER SEAL

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	07/16/19	RTS	CAG	CONSTRUCTION DRAWING - ISSUED FOR CONSTRUCTION

T-Mobile

Transcend Wireless

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

T-MOBILE NORTHEAST LLC

WIRELESS COMMUNICATIONS FACILITY

NH362/BOARDMAN_MP
SITE ID: CTNH362B
33 BOARDMAN ROAD
NEW MILFORD, CT 06776

DATE: 05/21/19
SCALE: AS NOTED
JOB NO. 19027.65

TITLE SHEET

T-1

Sheet No. 1 of 7

DESIGN BASIS:

GOVERNING CODE: 2015 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2018 CT STATE BUILDING CODE AND AMENDMENTS.

1. DESIGN CRITERIA:

- RISK CATEGORY: II (BASED ON IBC TABLE 1604.5)
- ULTIMATE DESIGN WIND SPEED (OTHER STRUCTURE): 115 MPH (V_{ULT}) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-10) PER 2015 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2018 CONNECTICUT STATE BUILDING CODE.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7-10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES
10. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
13. NO DRILLING WELDING OR TAPING ON EVERSOURCE OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

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

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

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

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0	07/16/19	RTS	CAG	CONSTRUCTION DRAWING - ISSUED FOR CONSTRUCTION

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T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY

NH362/BOARDMAN_MP
SITE ID: CTNH362B
33 BOARDMAN ROAD
NEW MILFORD, CT 06776

DATE: 05/21/19
SCALE: AS NOTED
JOB NO. 19027.65

GENERAL NOTES AND SPECIFICATIONS

N-1

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

APPROX. NORTH

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

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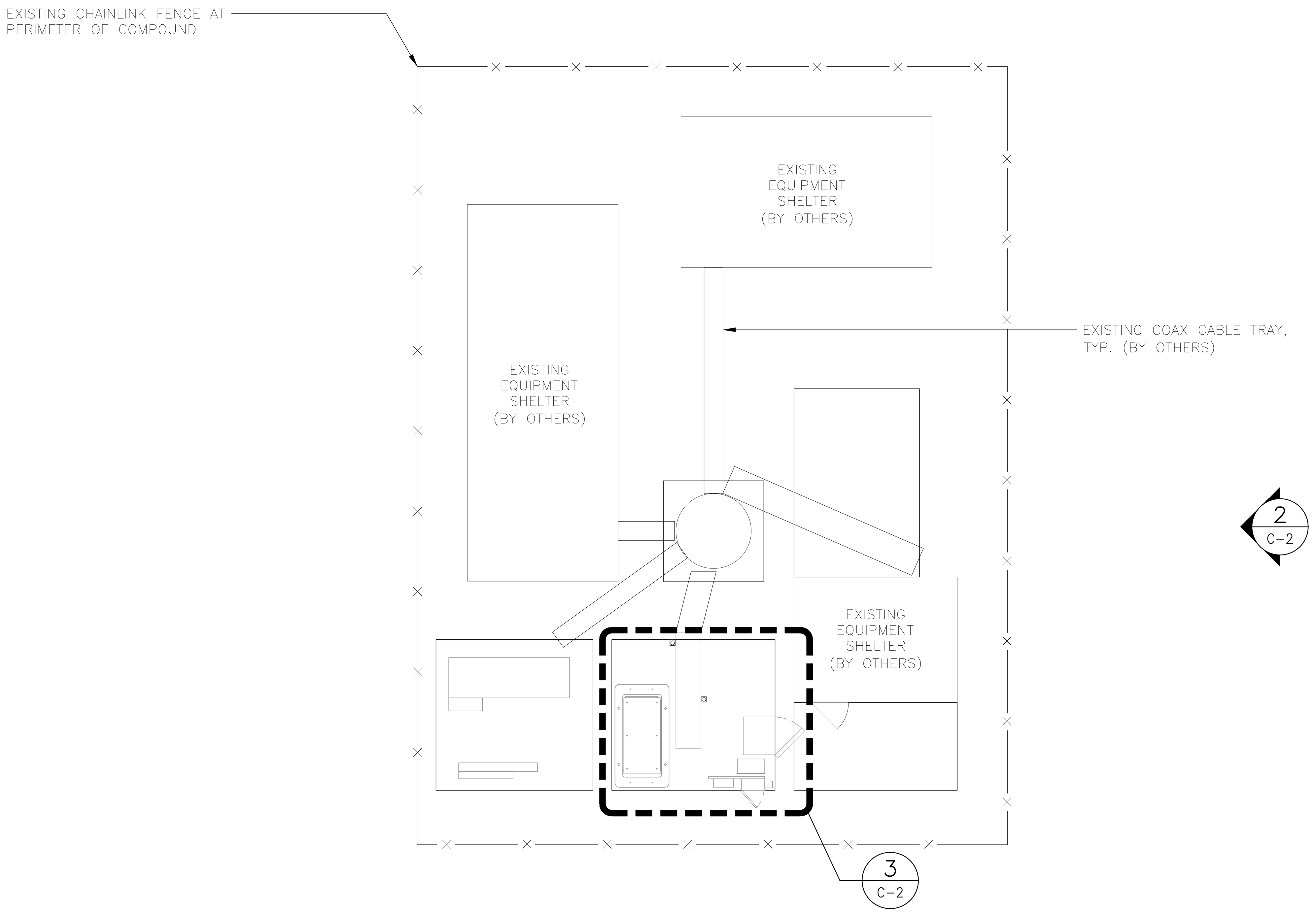
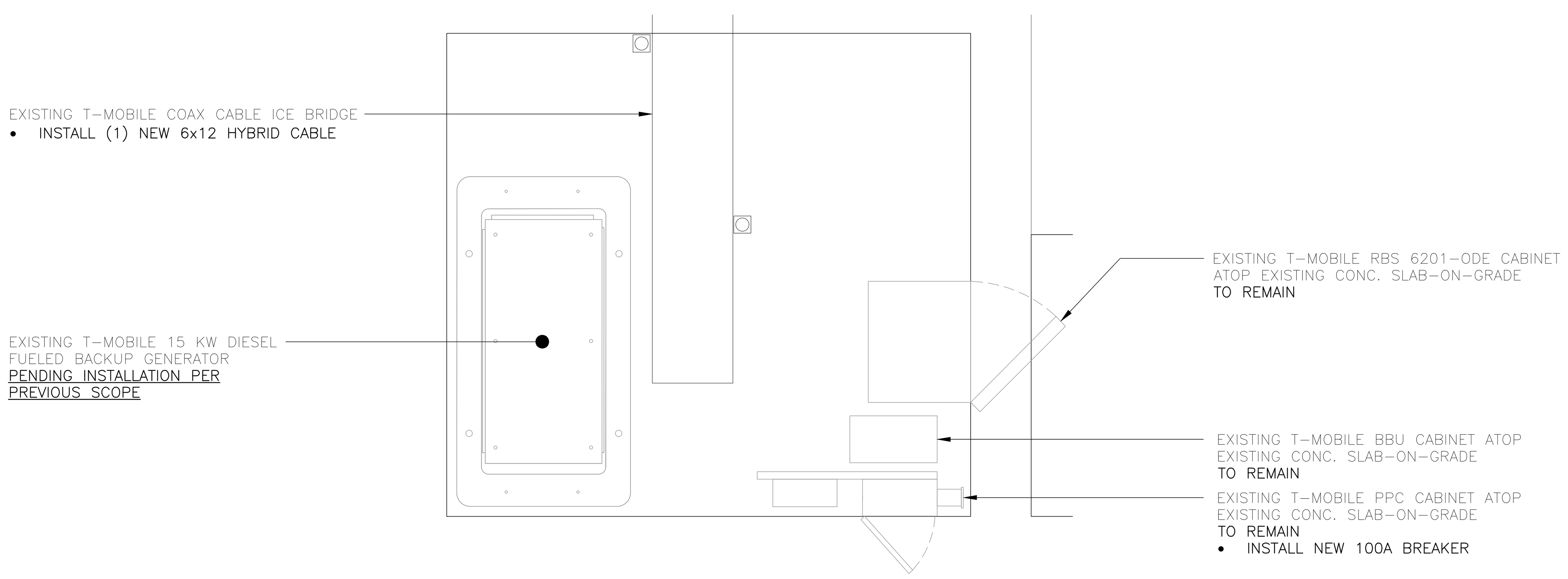
SITE LOCATION PLAN

C-1

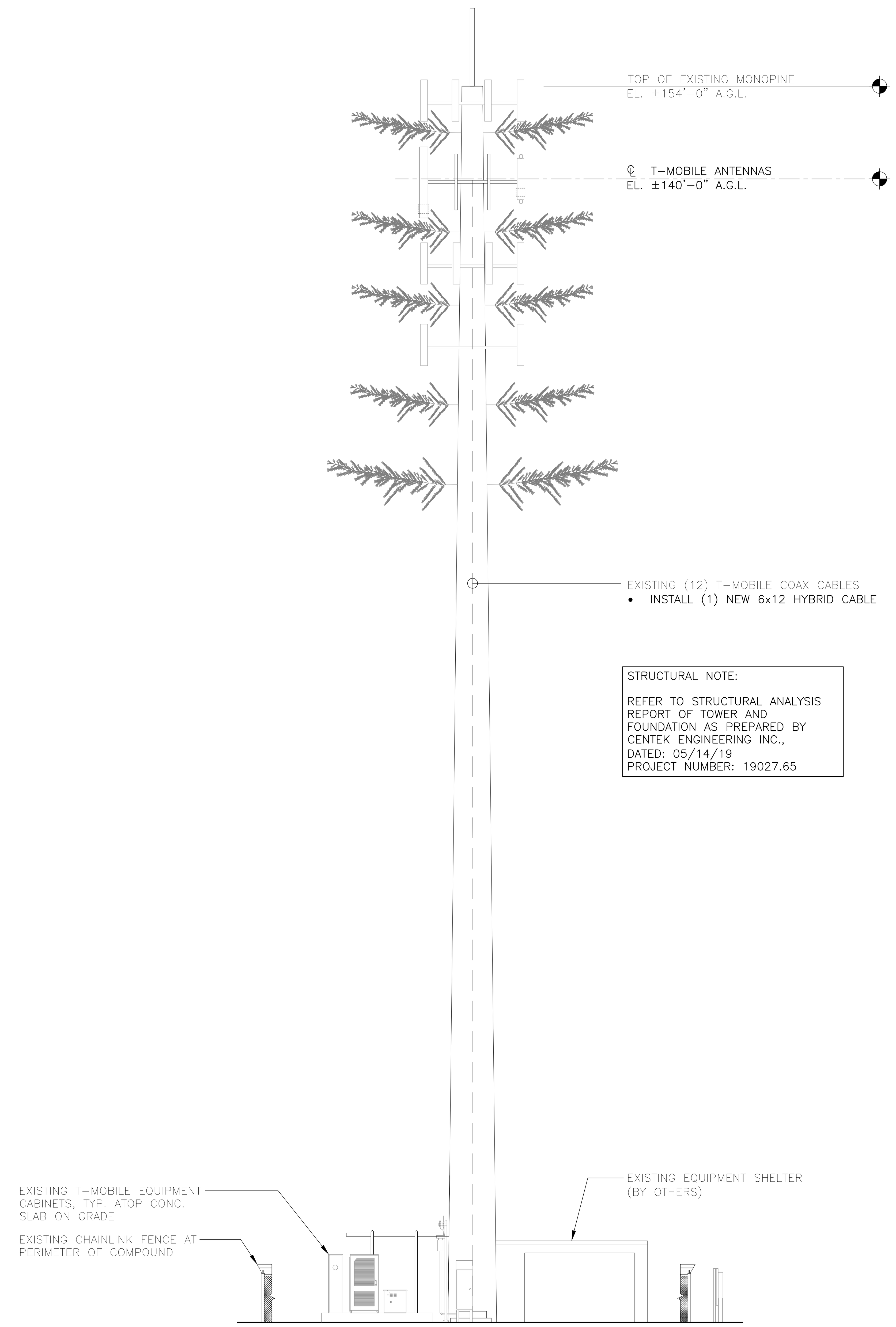
Sheet No. 3 of 7



1 C-2 **COMPOUND PLAN**
SCALE: 1/8" = 1'
TRUE NORTH



3 C-2 **EQUIPMENT PLAN - PROPOSED**
SCALE: 3/8" = 1'
TRUE NORTH



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

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

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SCALE:	AS NOTED
JOB NO.	19027.65

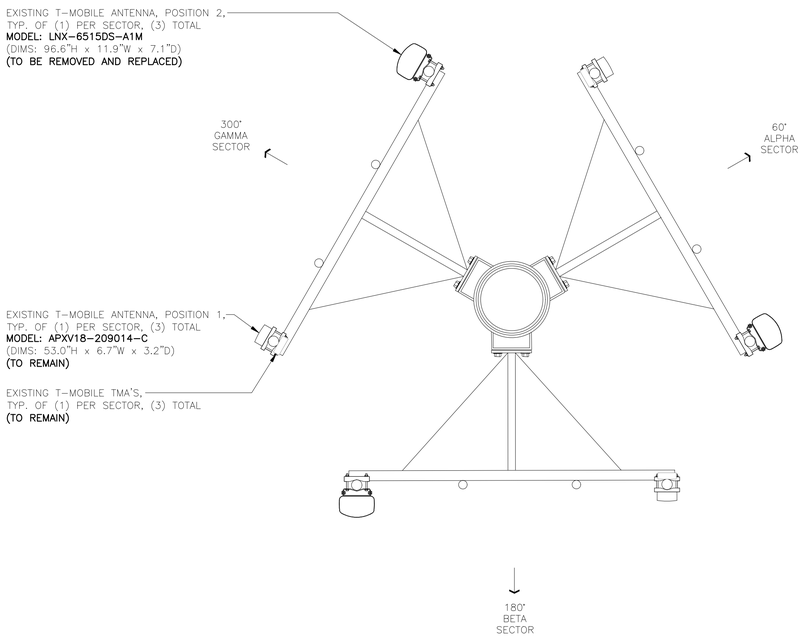
COMPOUND PLAN AND ELEVATION

C-2

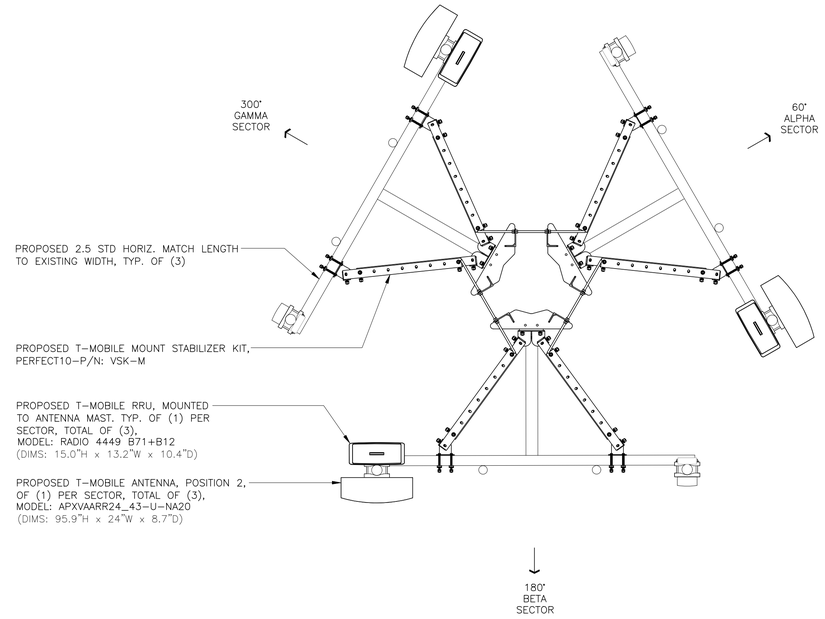
Sheet No. 4 of 7

T-MOBILE RAN TEMPLATE: 67D04G

T-MOBILE RF CONFIGURATION: 67D04G_1DP+10P



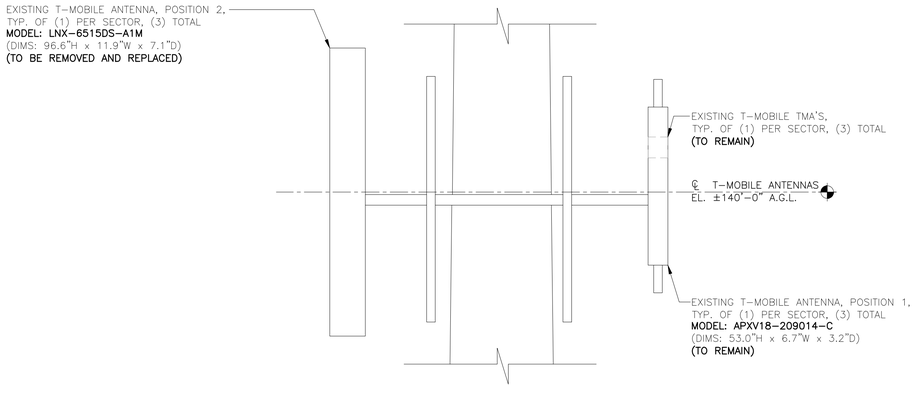
1 C-3 **EXISTING ANTENNA MOUNTING CONFIGURATION**
SCALE: 1/2" = 1' **140' ELEVATION** TRUE NORTH



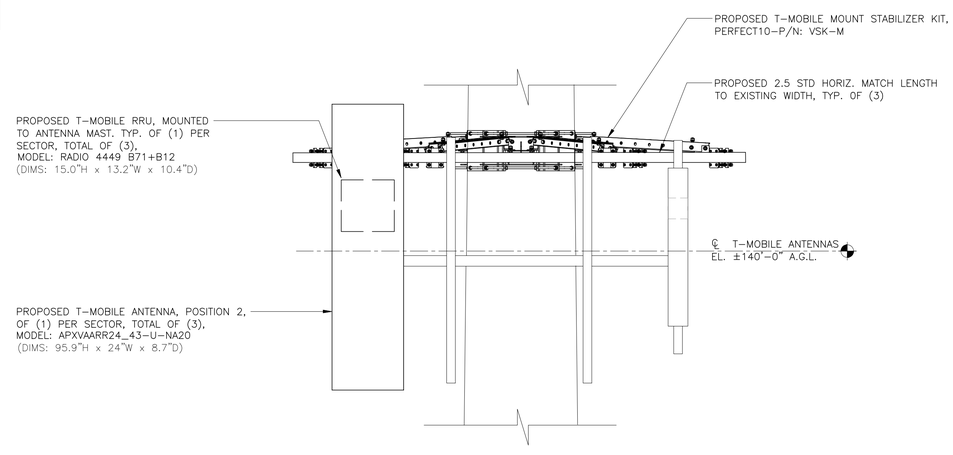
2 C-3 **PROPOSED ANTENNA MOUNTING CONFIGURATION**
SCALE: 1/2" = 1' **140' ELEVATION** TRUE NORTH

ADDITIONAL ANTENNA MAST NOTE:

REPLACE EXISTING PIPE MAST WITH 2" STD (O.D = 2.375") x 9'-0" LONG PIPE @ RFS APXVAARR24_43-U-NA20



3 C-3 **ANTENNA ELEVATION - EXISTING**
SCALE: 1/2" = 1'



4 C-3 **ANTENNA ELEVATION - PROPOSED**
SCALE: 1/2" = 1'

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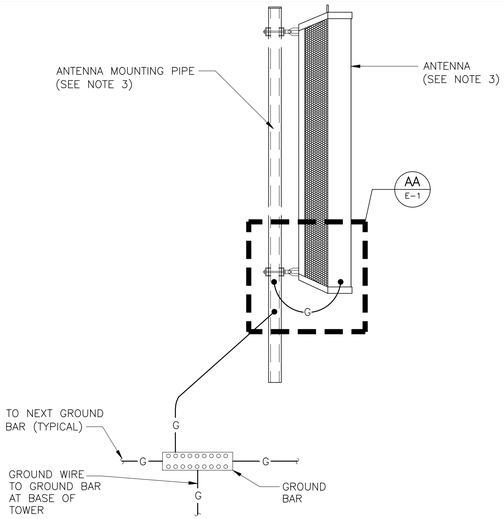
ANTENNA MOUNTING CONFIGURATION

C-3

Sheet No. 5 of 7

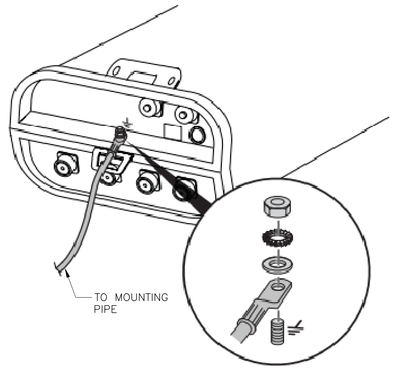


NOTES:

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

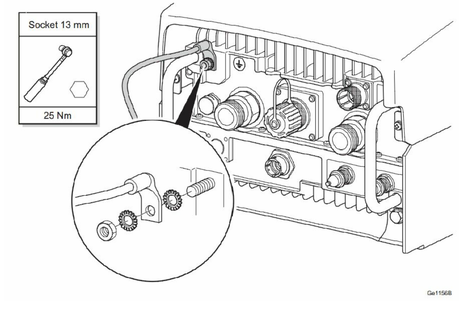
1 E-1 TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NONE



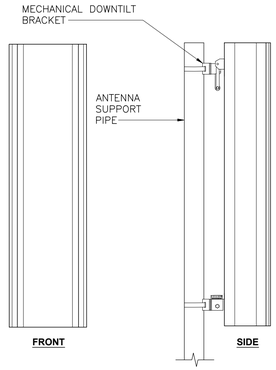
AA E-1 TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NOT TO SCALE



2 E-1 TYPICAL RRU GROUNDING DETAIL

NOT TO SCALE



RFS ANTENNA

ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: RFS MODEL: APXVAARR24_43-U-NA20	95.9"H x 24"W x 8.7"D	153 LBS

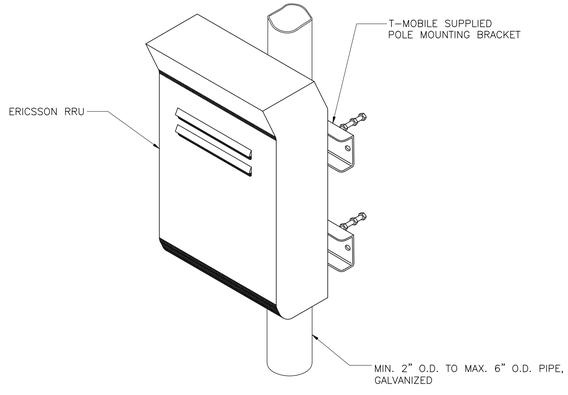
3 E-1 PROPOSED ANTENNAS DETAIL

SCALE: NOT TO SCALE

RRH (REMOTE RADIO HEAD)		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: RRU 4449 B71+B12	14.9"H x 13.2"W x 9.3"D	±74 LBS

4 E-1 REMOTE RADIO HEAD (RRH) DETAIL (TYP)

SCALE: NOT TO SCALE



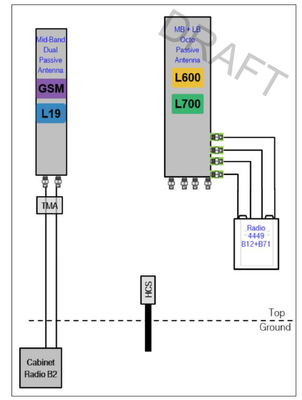
ISOMETRIC VIEW

NOTES:

1. T-MOBILE SHALL SUPPLY RRU, AND RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL INSTALLS RRU AND MAKES CABLE TERMINATIONS.
2. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

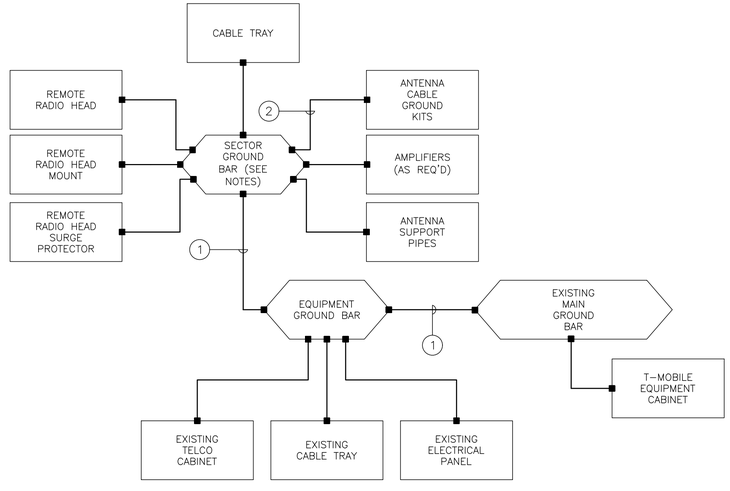
5 E-1 TYPICAL RRUS MOUNTING DETAILS

SCALE: NOT TO SCALE



6 E-1 PROPOSED PLUMBING DIAGRAM

SCALE: NONE



GROUNDING SCHEMATIC NOTES

1. #2 AWG
2. #6 AWG

GENERAL NOTES:

1. ALL SURGE SUPPRESSION EQUIPMENT SHALL BE BONDED TO GROUND PER MANUFACTURER'S SPECIFICATIONS
2. UNLESS OTHERWISE NOTED OR REQUIRED BY CODE, GROUND CONDUCTORS SHOWN SHALL BE #2 AWG (SOLID TINNED BCW - EXTERIOR; STRANDED GREEN INSULATED - INTERIOR).
3. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.
4. BOND ALL EQUIPMENT CABINETS AND BATTERY CABINETS TO GROUND PER MANUFACTURER'S SPECIFICATIONS.
5. COORDINATE ALL ROOF MOUNTED EQUIPMENT WITH OWNER.
6. ALL ROOF MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
7. ALL GROUNDING SHALL BE IN ACCORDANCE WITH NEC AND OWNER'S REQUIREMENTS.

7 E-1 TYPICAL GROUNDING SCHEMATIC DETAIL

SCALE: NOT TO SCALE

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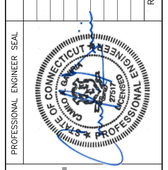

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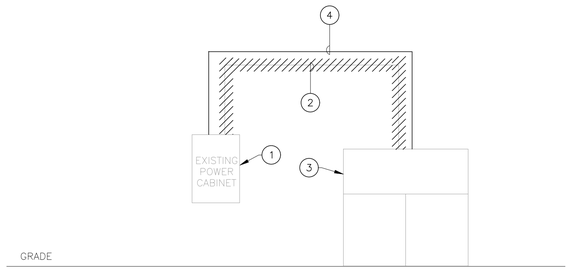
TYPICAL ELECTRICAL DETAILS

E-1

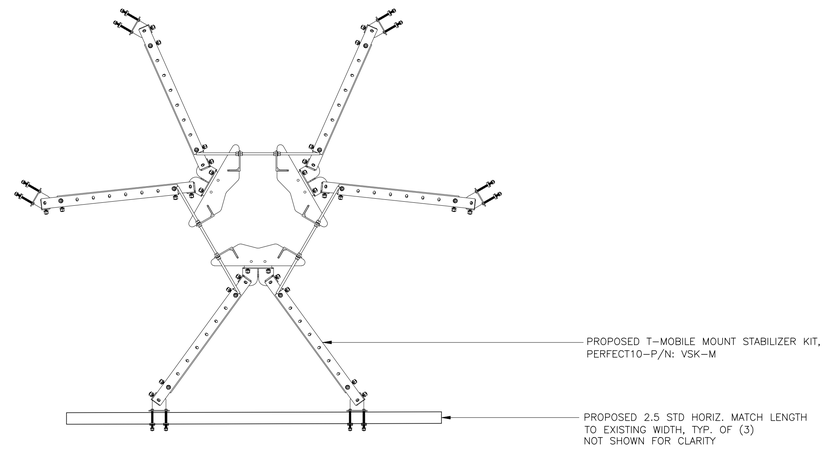
Sheet No. 6 of 7

RISER DIAGRAM NOTES

1. EXISTING POWER CABINET TO REMAIN
2. EXISTING CONDUITS, CONDUCTORS AND ASSOCIATED CIRCUIT BREAKER TO BE REMOVED.
3. EXISTING RADIO CABINET TO REMAIN
4. (3) #1 AWG, (1) #6 AWG GROUND, 1-1/2" CONDUIT CONNECTED TO NEW 100A/2P CIRCUIT BREAKER.



1 / E-2 **ELECTRICAL POWER RISER DIAGRAM**
SCALE: NOT TO SCALE



2 / E-2 **MOUNT STABILIZER DETAIL**
SCALE: NOT TO SCALE

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TYPICAL ELECTRICAL DETAILS

E-2

Sheet No. 7 of 7

Exhibit D

Structural Analysis Report

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

153-ft Existing EEI Monopole

Proposed T-Mobile
Antenna Upgrade (L600)

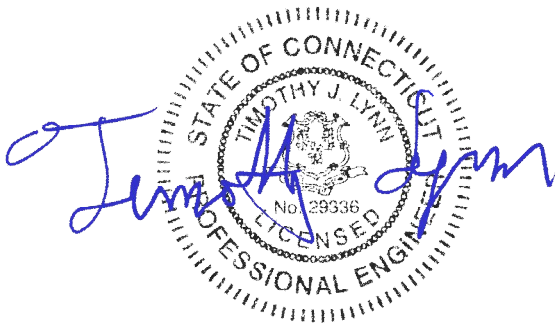
T-Mobile Site Ref: CTNH362B

33 Boardman Road
New Milford, CT

Centek Project No. 19027.65

Date: May 14, 2019

Max Stress Ratio = 85.7%



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by T-Mobile on the existing monopine (tower) located in New Milford, CT.

The host tower is a 153-ft tall, four-section, eighteen sided, tapered monopine, originally designed and manufactured by Engineered Endeavors Inc., job no; 13200, dated March 2, 2005. The tower geometry, structure member sizes and foundation system information were obtained from a previous structural report prepared by Centek job no. 14001.60 dated December 1, 2014.

Antenna and appurtenance information were obtained from a previous structural report prepared by Infinigy for Sprint dated November 27, 2017 and a T-Mobile RF sheet.

The tower is made up of four (4) tapered vertical sections consisting of A572-65 pole sections. The vertical tower sections are slip joint connected. The diameter of the pole (flat-flat) is 25.25-in at the top and 61.0-in at the base.

Antenna and Appurtenance Summary

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

- MOTOROLA (EXISTING):
  Antennas: One (1) RFI BA40-41 Omni-directional whip antenna, one (1) Radiowave HP2-4.7 microwave dish and one (1) Radiowave HP3-4.7 microwave dish pipe mounted on one (1) universal tri-bracket to the top of the tower.
  Coax Cables: Three (3) 7/8" ∅ coax cables running within the interior of the existing tower.
- SPRINT (EXISTING):
  Antennas: Three (3) Commscope DT465B-2XR panel antennas, three (3) RFS APXVSPP18-C-A20 panel antennas, three (3) ALU 1900 MHz RRHs, six (6) ALU 800 MHz RRHs and three (3) 2500 MHz RRHs mounted on three (3) existing 10-ft T-Arms with a RAD center elevation of 150-ft above grade.
  Coax Cables: Nine (9) 1-5/8" ∅ coax cables and four (4) 1-1/4" ∅ Hybriflex cables running within the interior of the existing tower.
- VERIZON (EXISTING):
  Antennas: Three (3) Antel BXA-70063-6CF panel antennas, six (6) Andrew HBXX-6517DS panel antennas, three (3) Andrew LNX-8513DS panel antennas, three (3) Alcatel-Lucent RRH-2x60-AWS remote radio heads, six (6) RFS FD9R6004/2C-3L Diplexers and one (1) RFD DB-T1-6Z-8AB-0Z main distribution box mounted on three (3) existing 10-ft T-Arms with a RAD center elevation of 130-ft above grade.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables and one (1) 1-5/8" ∅ fiber cable running within the interior of the existing tower.

- AT&T (EXISTING):
  Antennas: Two (2) Kathrein 80010965 panel antennas, one (1) Kathrein 80010966 panel antenna, three (3) Powerwave 7770 panel antennas, six (6) HPA-65R-BUU-H6 panel antennas, three (3) Powerwave LGP21401 TMAs, three (3) Ericsson RRUS-11 Remote Radio Heads, six (6) Ericsson RRUS-32 Remote Radio Heads, three (3) Ericsson 4426 B66 Remote Radio Heads, six (6) Ericsson 4478 Remote Radio Heads and three (3) Raycap DC6-48-60-18-8F surge arrestor mounted on three (3) existing 10-ft T-Arms with a RAD center elevation of 120-ft above grade.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables, one (1) fiber cable and two (2) dc control cables running within the interior of the existing tower.
- T-MOBILE (Existing to Remain):
  Antennas: Three (3) RFS APXV18-209014 panel antennas, three (3) TMAs and three (3) Bias Tees mounted on three (3) existing 10-ft T-Arms with a RAD center elevation of 140-ft above grade.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the inside of the existing tower.
- T-MOBILE (Existing to Remove):
  Antennas: Three (3) Andrew LNX-6515DS panel antennas mounted on three (3) existing 10-ft T-Arms with a RAD center elevation of 140-ft above grade.
- **T-MOBILE (Proposed):**
  Antennas: Three (3) RFS APXVAARR24_43 panel antennas and three (3) Ericsson 4449 B71 B12 remote radio heads mounted on three (3) existing 10-ft T-Arms with a RAD center elevation of 140-ft above grade. (Perfect10 Monopole Sector Stabilizer Kit (p/n VSK-M) to be installed on T-Arms)
  Coax Cables: One (1) 6x12 fiber cable running on the inside of the existing tower.

Primary Assumptions Used in the Analysis

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

Analysis

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

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

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

Tower Loading

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

Basic Wind Speed:	New Milford; v = 89 mph (3 second gust)	*[Appendix N of the 2018 CT Building Code]*
Load Cases:	Load Case 1; 89 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2018 CT Building Code]*
	Load Case 2; 40 mph wind speed w/ 1.00" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

[1] The 2015 International Building Code as amended by the 2018 Connecticut State Building Code (CSBC).

Tower Capacity

- Calculated stresses were found to be within allowable limits. This tower was found to be at **85.3%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L2)	89.16'-134.83'	85.7%	**PASS**

Foundation and Anchors

The existing foundation consists of a 7.5-ft square x 3.5-ft long reinforced concrete pier on a 32.0-ft square x 4.0-ft thick reinforced concrete pad. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned structural report prepared by Centek. The base of the tower is connected to the foundation by means of (28) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 7-ft into the concrete foundation structure.

- The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Location	Vector	Proposed Reactions
Base	Shear	67 kips
	Compression	80 kips
	Moment	7842 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	TIA-222-G Section 9.4 FS[(1)]	Proposed Loading (FS)[(1)]	Result
Reinforced Concrete Pad and Pier	OTM[(2)]	1.0	1.63	**PASS**

Note 1: FS denotes Factor of Safety.
Note 2: OTM denotes Overturning Moment.

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

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Combined Axial and Shear	62.7%	**PASS**
Base Plate	Bending	69.7%	**PASS**

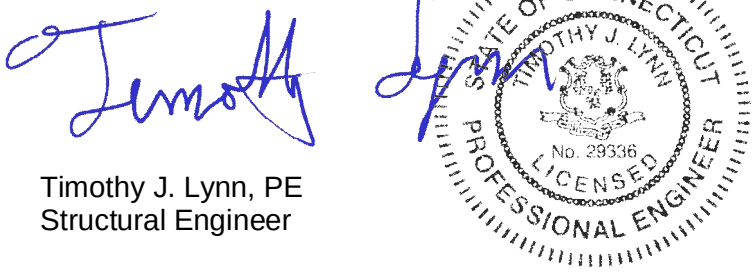
Conclusion

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

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

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

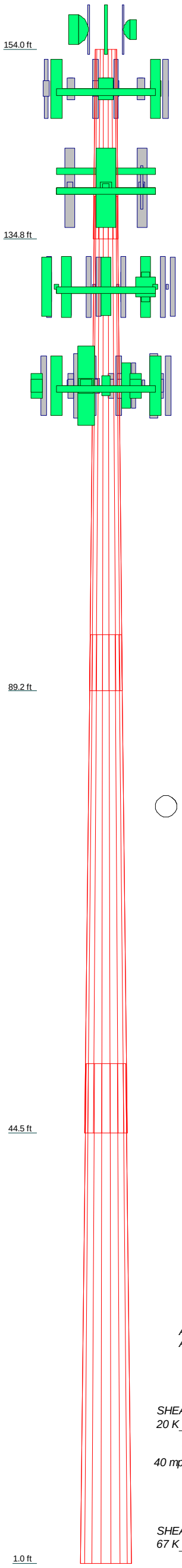
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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

TnxTower Features:

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

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	19.170	18	0.188	4.330	25.250	30.030		1.1
2	50.000	18	0.313	5.670	28.575	40.910		5.8
3	50.290	18	0.500	6.920	38.886	51.280	A572-65	12.1
4	50.460	18	0.563		48.575	61.000		16.6



ALL REACTIONS ARE FACTORED

AXIAL 141 K
SHEAR 20 K
MOMENT 2475 kip-ft
TORQUE 0 kip-ft
40 mph WIND - 1.000 in ICE

AXIAL 80 K
SHEAR 67 K
MOMENT 7842 kip-ft
TORQUE 1 kip-ft
REACTIONS - 89 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
HP2-4.7 (Motorola - Existing)	156	HBXX-6517DS (Verizon - Existing)	130
HP3-4.7 (Motorola - Existing)	156	HBXX-6517DS (Verizon - Existing)	130
BA40-41 (Motorola - Existing)	154	LNX-8513DS (Verizon - Existing)	130
Valmont Uni-Tri Bracket (Motorola - Existing)	154	HBXX-6517DS (Verizon - Existing)	130
5'0"x4.5" Pipe Mount (Motorola - Existing)	154	HBXX-6517DS (Verizon - Existing)	130
5'0"x4.5" Pipe Mount (Motorola - Existing)	154	RRH2x60-AWS (Verizon - Existing)	130
5'0"x4.5" Pipe Mount (Motorola - Existing)	154	RRH2x60-AWS (Verizon - Existing)	130
DT465B-2XR (Sprint - Existing)	150	RRH2x60-AWS (Verizon - Existing)	130
DT465B-2XR (Sprint - Existing)	150	DB-T1-6Z-8AB-0Z (Verizon - Existing)	130
DT465B-2XR (Sprint - Existing)	150	(2) FD9R6004/2C-3L Diplexer (Verizon - Existing)	130
APXVSPP18-C-A20 (Sprint - Existing)	150	(2) FD9R6004/2C-3L Diplexer (Verizon - Existing)	130
APXVSPP18-C-A20 (Sprint - Existing)	150	(2) FD9R6004/2C-3L Diplexer (Verizon - Existing)	130
APXVSPP18-C-A20 (Sprint - Existing)	150	EEI 10' Universal T-Arm (Verizon - Existing)	130
TD-RRH8x20-25 (Sprint - Existing)	150	EEI 10' Universal T-Arm (Verizon - Existing)	130
TD-RRH8x20-25 (Sprint - Existing)	150	EEI 10' Universal T-Arm (Verizon - Existing)	130
TD-RRH8x20-25 (Sprint - Existing)	150	EEI Pine Branches	130
(2) FD-RRH 2x50 800 (Sprint - Existing)	150	BXA-70063/6CF (Verizon - Existing)	130
(2) FD-RRH 2x50 800 (Sprint - Existing)	150	7770.00 (ATI - Existing)	120
(2) FD-RRH 2x50 800 (Sprint - Existing)	150	(2) HPA-65R-BUU-H6 (ATI - Existing)	120
FD-RRH 4x40 1900 (Sprint - Existing)	150	(2) HPA-65R-BUU-H6 (ATI - Existing)	120
FD-RRH 4x40 1900 (Sprint - Existing)	150	(2) HPA-65R-BUU-H6 (ATI - Existing)	120
FD-RRH 4x40 1900 (Sprint - Existing)	150	80010965 (ATI - Existing)	120
EEI 10' Universal T-Arm (Sprint - Existing)	150	80010965 (ATI - Existing)	120
EEI 10' Universal T-Arm (Sprint - Existing)	150	80010966 (ATI - Existing)	120
EEI 10' Universal T-Arm (Sprint - Existing)	150	LGP21401 TMA (ATI - Existing)	120
EEI Pine Branches	150	LGP21401 TMA (ATI - Existing)	120
Monopole Sector Stabilizer Kit VSK-M (T-Mobile - Existing)	142	LGP21401 TMA (ATI - Existing)	120
		RRUS-11 (ATI - Existing)	120
APXV18-209014 (T-Mobile - Existing)	140	RRUS-11 (ATI - Existing)	120
APXV18-209014 (T-Mobile - Existing)	140	RRUS-11 (ATI - Existing)	120
APXVAARR24-43 (T-Mobile - Proposed)	140	(2) RRUS-32 (ATI - Existing)	120
APXVAARR24-43 (T-Mobile - Proposed)	140	(2) RRUS-32 (ATI - Existing)	120
APXVAARR24-43 (T-Mobile - Proposed)	140	(2) RRUS-32 (ATI - Existing)	120
Radio 4449 B71 B12 (T-Mobile - Proposed)	140	4426 B66 (ATI - Existing)	120
Radio 4449 B71 B12 (T-Mobile - Proposed)	140	4426 B66 (ATI - Existing)	120
Radio 4449 B71 B12 (T-Mobile - Proposed)	140	4426 B66 (ATI - Existing)	120
ATSBT-TOP-FM-4G (T-Mobile - Existing)	140	(2) 4478 B14 (ATI - Existing)	120
ATSBT-TOP-FM-4G (T-Mobile - Existing)	140	(2) 4478 B14 (ATI - Existing)	120
ATSBT-TOP-FM-4G (T-Mobile - Existing)	140	(2) 4478 B14 (ATI - Existing)	120
TMA 10"x8"x3" (T-Mobile - Existing)	140	EEI 10' Universal T-Arm (ATI - Existing)	120
TMA 10"x8"x3" (T-Mobile - Existing)	140	EEI 10' Universal T-Arm (ATI - Existing)	120
TMA 10"x8"x3" (T-Mobile - Existing)	140	EEI 10' Universal T-Arm (ATI - Existing)	120
APXV18-209014 (T-Mobile - Existing)	140	DC6-48-60-18-8F Surge Arrestor (ATI - Existing)	120
EEI 10' Universal T-Arm (T-Mobile - Existing)	140	DC6-48-60-18-8F Surge Arrestor (ATI - Existing)	120
EEI 10' Universal T-Arm (T-Mobile - Existing)	140	DC6-48-60-18-8F Surge Arrestor (ATI - Existing)	120
EEI 10' Universal T-Arm (T-Mobile - Existing)	140	7770.00 (ATI - Existing)	120
EEI Pine Branches	140	EEI Pine Branches	120
BXA-70063/6CF (Verizon - Existing)	130	7770.00 (ATI - Existing)	120
BXA-70063/6CF (Verizon - Existing)	130	EEI Pine Branches	110
LNX-8513DS (Verizon - Existing)	130	EEI Pine Branches	100
HBXX-6517DS (Verizon - Existing)	130	EEI Pine Branches	90
HBXX-6517DS (Verizon - Existing)	130	EEI Pine Branches	80
LNX-8513DS (Verizon - Existing)	130		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 89 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.000 ft
7. TOWER RATING: 85.7%

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

Job: **19027.65 - CTNH362B**			
Project: **153-ft EEI Monopine - 33 Boardman Rd., New Milford, CT**			
Client: T-Mobile	Drawn by: TJL	App'd:	
Code: TIA-222-G	Date: 05/14/19	Scale: NTS	
Path:		Dwg No. E-1	

Tower Input Data

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

Basic wind speed of 89 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.000 ft.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 40 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Splice Length* *ft*	*Number of Sides*	*Top Diameter* *in*	*Bottom Diameter* *in*	*Wall Thickness* *in*	*Bend Radius* *in*	*Pole Grade*
L1	154.000-134.830	19.170	4.330	18	25.250	30.030	0.188	0.750	A572-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L2	134.830-89.160	50.000	5.670	18	28.575	40.910	0.313	1.250	A572-65 (65 ksi)
L3	89.160-44.540	50.290	6.920	18	38.886	51.280	0.500	2.000	A572-65 (65 ksi)
L4	44.540-1.000	50.460		18	48.575	61.000	0.563	2.250	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	25.611	14.915	1183.638	8.897	12.827	92.277	2368.833	7.459	4.114	21.941
	30.464	17.760	1998.257	10.594	15.255	130.988	3999.143	8.882	4.955	26.428
L2	30.053	28.033	2829.053	10.033	14.516	194.888	5661.828	14.019	4.479	14.334
	41.493	40.268	8384.791	14.412	20.782	403.459	16780.616	20.138	6.650	21.281
L3	40.828	60.919	11340.739	13.627	19.754	574.092	22696.401	30.465	5.964	11.928
	51.994	80.588	26253.818	18.027	26.050	1007.815	52542.181	40.302	8.145	16.291
L4	50.967	85.720	24964.271	17.044	24.676	1011.687	49961.392	42.868	7.559	13.438
	61.854	107.904	49795.073	21.455	30.988	1606.915	99655.668	53.962	9.746	17.326

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 154.000-134.830				1	1	1			
L2 134.830-89.160				1	1	1			
L3 89.160-44.540				1	1	1			
L4 44.540-1.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
7/8 (Town - Existing)	B	No	Yes	Inside Pole	151.000 - 4.000	3	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
1 5/8 (Sprint - Existing)	B	No	Yes	Inside Pole	151.000 - 4.000	9	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
HYBRIFLEX 1-1/4" (Sprint - Existing)	C	No	Yes	Inside Pole	151.000 - 4.000	4	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
1 5/8	B	No	Yes	Inside Pole	141.000 - 4.000	12	No Ice	0.000	0.001

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
(T-Mobile - Existing)							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
1 5/8	B	No	Yes	Inside Pole	131.000 - 4.000	12	No Ice	0.000	0.001
(Verizon - Existing)							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
HYBRIFLEX 1-5/8"	B	No	Yes	Inside Pole	131.000 - 4.000	1	No Ice	0.000	0.002
(Verizon - Existing)							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002
1 5/8	B	No	Yes	Inside Pole	121.000 - 4.000	12	No Ice	0.000	0.001
(AT&T - Existing)							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
RG6-Fiber	C	No	Yes	Inside Pole	121.000 - 4.000	1	No Ice	0.000	0.001
(AT&T - Existing)							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
#8 AWG Copper	C	No	Yes	Inside Pole	121.000 - 4.000	2	No Ice	0.000	0.000
WIre							1/2" Ice	0.000	0.000
(AT&T - Existing)							1" Ice	0.000	0.000
HYBRIFLEX 1-5/8"	B	No	Yes	Inside Pole	141.000 - 4.000	1	No Ice	0.000	0.002
(T-Mobile - Proposed)							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002

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
L1	154.000-134.830	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.266
		C	0.000	0.000	0.000	0.000	0.084
L2	134.830-89.160	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	2.157
		C	0.000	0.000	0.000	0.000	0.273
L3	89.160-44.540	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	2.330
		C	0.000	0.000	0.000	0.000	0.281
L4	44.540-1.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	2.117
		C	0.000	0.000	0.000	0.000	0.255

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
L1	154.000-134.830	A	2.318	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.266
		C		0.000	0.000	0.000	0.000	0.084
L2	134.830-89.160	A	2.258	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	2.157
		C		0.000	0.000	0.000	0.000	0.273
L3	89.160-44.540	A	2.145	0.000	0.000	0.000	0.000	0.000

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
		B		0.000	0.000	0.000	0.000	2.330
		C		0.000	0.000	0.000	0.000	0.281
L4	44.540-1.000	A	1.929	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	2.117
		C		0.000	0.000	0.000	0.000	0.255

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

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
EEI Pine Branches	C	None		0.000	150.000	No Ice	90.000	90.000	1.500
						1/2" Ice	130.000	130.000	1.900
						1" Ice	170.000	170.000	2.300
EEI Pine Branches	C	None		0.000	140.000	No Ice	90.000	90.000	1.500
						1/2" Ice	130.000	130.000	1.900
						1" Ice	170.000	170.000	2.300
EEI Pine Branches	C	None		0.000	130.000	No Ice	90.000	90.000	1.500
						1/2" Ice	130.000	130.000	1.900
						1" Ice	170.000	170.000	2.300
EEI Pine Branches	C	None		0.000	120.000	No Ice	90.000	90.000	1.500
						1/2" Ice	130.000	130.000	1.900
						1" Ice	170.000	170.000	2.300
EEI Pine Branches	C	None		0.000	110.000	No Ice	90.000	90.000	1.500
						1/2" Ice	130.000	130.000	1.900
						1" Ice	170.000	170.000	2.300
EEI Pine Branches	C	None		0.000	100.000	No Ice	90.000	90.000	1.500
						1/2" Ice	130.000	130.000	1.900
						1" Ice	170.000	170.000	2.300
EEI Pine Branches	C	None		0.000	90.000	No Ice	90.000	90.000	1.500
						1/2" Ice	130.000	130.000	1.900
						1" Ice	170.000	170.000	2.300
EEI Pine Branches	C	None		0.000	80.000	No Ice	90.000	90.000	1.500
						1/2" Ice	130.000	130.000	1.900
						1" Ice	170.000	170.000	2.300
DT465B-2XR	A	From Face	3.000	0.000	150.000	No Ice	9.098	5.973	0.060
(Sprint - Existing)			5.000			1/2" Ice	9.564	6.432	0.118
			0.000			1" Ice	10.036	6.898	0.182
DT465B-2XR	B	From Face	3.000	0.000	150.000	No Ice	9.098	5.973	0.060
(Sprint - Existing)			5.000			1/2" Ice	9.564	6.432	0.118
			0.000			1" Ice	10.036	6.898	0.182
DT465B-2XR	C	From Face	3.000	0.000	150.000	No Ice	9.098	5.973	0.060
(Sprint - Existing)			5.000			1/2" Ice	9.564	6.432	0.118
			0.000			1" Ice	10.036	6.898	0.182
APXVSPP18-C-A20	A	From Face	3.000	0.000	150.000	No Ice	8.024	5.283	0.057

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
(Sprint - Existing)			-5.000			1/2" Ice	8.480	5.736	0.107
			0.000			1" Ice	8.943	6.196	0.162
APXVSPP18-C-A20	B	From Face	3.000	0.000	150.000	No Ice	8.024	5.283	0.057
(Sprint - Existing)			-5.000			1/2" Ice	8.480	5.736	0.107
			0.000			1" Ice	8.943	6.196	0.162
APXVSPP18-C-A20	C	From Face	3.000	0.000	150.000	No Ice	8.024	5.283	0.057
(Sprint - Existing)			-5.000			1/2" Ice	8.480	5.736	0.107
			0.000			1" Ice	8.943	6.196	0.162
TD-RRH8x20-25	A	From Face	3.000	0.000	150.000	No Ice	4.045	1.533	0.070
(Sprint - Existing)			0.000			1/2" Ice	4.298	1.712	0.097
			0.000			1" Ice	4.557	1.899	0.128
TD-RRH8x20-25	B	From Face	3.000	0.000	150.000	No Ice	4.045	1.533	0.070
(Sprint - Existing)			0.000			1/2" Ice	4.298	1.712	0.097
			0.000			1" Ice	4.557	1.899	0.128
TD-RRH8x20-25	C	From Face	3.000	0.000	150.000	No Ice	4.045	1.533	0.070
(Sprint - Existing)			0.000			1/2" Ice	4.298	1.712	0.097
			0.000			1" Ice	4.557	1.899	0.128
(2) FD-RRH 2x50 800	A	From Face	3.000	0.000	150.000	No Ice	2.058	1.932	0.064
(Sprint - Existing)			0.000			1/2" Ice	2.240	2.109	0.086
			0.000			1" Ice	2.429	2.293	0.111
(2) FD-RRH 2x50 800	B	From Face	3.000	0.000	150.000	No Ice	2.058	1.932	0.064
(Sprint - Existing)			0.000			1/2" Ice	2.240	2.109	0.086
			0.000			1" Ice	2.429	2.293	0.111
(2) FD-RRH 2x50 800	C	From Face	3.000	0.000	150.000	No Ice	2.058	1.932	0.064
(Sprint - Existing)			0.000			1/2" Ice	2.240	2.109	0.086
			0.000			1" Ice	2.429	2.293	0.111
FD-RRH 4x40 1900	A	From Face	3.000	0.000	150.000	No Ice	2.236	2.322	0.060
(Sprint - Existing)			0.000			1/2" Ice	2.439	2.527	0.083
			0.000			1" Ice	2.648	2.739	0.109
FD-RRH 4x40 1900	B	From Face	3.000	0.000	150.000	No Ice	2.236	2.322	0.060
(Sprint - Existing)			0.000			1/2" Ice	2.439	2.527	0.083
			0.000			1" Ice	2.648	2.739	0.109
FD-RRH 4x40 1900	C	From Face	3.000	0.000	150.000	No Ice	2.236	2.322	0.060
(Sprint - Existing)			0.000			1/2" Ice	2.439	2.527	0.083
			0.000			1" Ice	2.648	2.739	0.109
EEI 10' Universal T-Arm	A	None		0.000	150.000	No Ice	13.340	13.340	0.450
(Sprint - Existing)						1/2" Ice	16.800	16.800	0.600
						1" Ice	20.260	20.260	0.750
EEI 10' Universal T-Arm	B	None		0.000	150.000	No Ice	13.340	13.340	0.450
(Sprint - Existing)						1/2" Ice	16.800	16.800	0.600
						1" Ice	20.260	20.260	0.750
EEI 10' Universal T-Arm	C	None		0.000	150.000	No Ice	13.340	13.340	0.450
(Sprint - Existing)						1/2" Ice	16.800	16.800	0.600
						1" Ice	20.260	20.260	0.750
APXV18-209014	A	From Face	3.000	0.000	140.000	No Ice	3.570	2.003	0.009
(T-Mobile - Existing)			0.000			1/2" Ice	3.913	2.326	0.029
			0.000			1" Ice	4.253	2.657	0.053
APXV18-209014	B	From Face	3.000	0.000	140.000	No Ice	3.570	2.003	0.009
(T-Mobile - Existing)			0.000			1/2" Ice	3.913	2.326	0.029
			0.000			1" Ice	4.253	2.657	0.053
APXV18-209014	C	From Face	3.000	0.000	140.000	No Ice	3.570	2.003	0.009
(T-Mobile - Existing)			0.000			1/2" Ice	3.913	2.326	0.029
			0.000			1" Ice	4.253	2.657	0.053
APXVAARR24-43	A	From Face	3.000	0.000	140.000	No Ice	20.243	8.889	0.155
(T-Mobile - Proposed)			0.000			1/2" Ice	20.890	9.487	0.268
			0.000			1" Ice	21.544	10.092	0.389
APXVAARR24-43	B	From Face	3.000	0.000	140.000	No Ice	20.243	8.889	0.155

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
(T-Mobile - Proposed)			0.000			1/2" Ice	20.890	9.487	0.268
			0.000			1" Ice	21.544	10.092	0.389
APXVAARR24-43	C	From Face	3.000	0.000	140.000	No Ice	20.243	8.889	0.155
(T-Mobile - Proposed)			0.000			1/2" Ice	20.890	9.487	0.268
			0.000			1" Ice	21.544	10.092	0.389
Radio 4449 B71 B12	A	From Face	3.000	0.000	140.000	No Ice	1.639	1.291	0.074
(T-Mobile - Proposed)			0.000			1/2" Ice	1.799	1.436	0.091
			0.000			1" Ice	1.966	1.587	0.111
Radio 4449 B71 B12	B	From Face	3.000	0.000	140.000	No Ice	1.639	1.291	0.074
(T-Mobile - Proposed)			0.000			1/2" Ice	1.799	1.436	0.091
			0.000			1" Ice	1.966	1.587	0.111
Radio 4449 B71 B12	C	From Face	3.000	0.000	140.000	No Ice	1.639	1.291	0.074
(T-Mobile - Proposed)			0.000			1/2" Ice	1.799	1.436	0.091
			0.000			1" Ice	1.966	1.587	0.111
ATSBT-TOP-FM-4G	A	From Face	3.000	0.000	140.000	No Ice	0.174	0.095	0.050
(T-Mobile - Existing)			0.000			1/2" Ice	0.229	0.140	0.052
			0.000			1" Ice	0.292	0.193	0.054
ATSBT-TOP-FM-4G	B	From Face	3.000	0.000	140.000	No Ice	0.174	0.095	0.050
(T-Mobile - Existing)			0.000			1/2" Ice	0.229	0.140	0.052
			0.000			1" Ice	0.292	0.193	0.054
ATSBT-TOP-FM-4G	C	From Face	3.000	0.000	140.000	No Ice	0.174	0.095	0.050
(T-Mobile - Existing)			0.000			1/2" Ice	0.229	0.140	0.052
			0.000			1" Ice	0.292	0.193	0.054
TMA 10"x8"x3"	A	From Face	3.000	0.000	140.000	No Ice	0.667	0.258	0.015
(T-Mobile - Existing)			0.000			1/2" Ice	0.770	0.331	0.020
			0.000			1" Ice	0.881	0.411	0.027
TMA 10"x8"x3"	B	From Face	3.000	0.000	140.000	No Ice	0.667	0.258	0.015
(T-Mobile - Existing)			0.000			1/2" Ice	0.770	0.331	0.020
			0.000			1" Ice	0.881	0.411	0.027
TMA 10"x8"x3"	C	From Face	3.000	0.000	140.000	No Ice	0.667	0.258	0.015
(T-Mobile - Existing)			0.000			1/2" Ice	0.770	0.331	0.020
			0.000			1" Ice	0.881	0.411	0.027
Monopole Sector Stabilizer	A	None		0.000	142.000	No Ice	9.000	9.000	0.350
Kit VSK-M						1/2" Ice	11.500	11.500	0.425
(T-Mobile - Existing)						1" Ice	14.000	14.000	0.500
EEI 10' Universal T-Arm	A	None		0.000	140.000	No Ice	13.340	13.340	0.450
(T-Mobile - Existing)						1/2" Ice	16.800	16.800	0.600
						1" Ice	20.260	20.260	0.750
EEI 10' Universal T-Arm	B	None		0.000	140.000	No Ice	13.340	13.340	0.450
(T-Mobile - Existing)						1/2" Ice	16.800	16.800	0.600
						1" Ice	20.260	20.260	0.750
EEI 10' Universal T-Arm	C	None		0.000	140.000	No Ice	13.340	13.340	0.450
(T-Mobile - Existing)						1/2" Ice	16.800	16.800	0.600
						1" Ice	20.260	20.260	0.750
BXA-70063/6CF	A	From Face	3.000	0.000	130.000	No Ice	7.569	4.158	0.012
(Verizon - Existing)			0.000			1/2" Ice	8.016	4.595	0.054
			0.000			1" Ice	8.470	5.040	0.103
BXA-70063/6CF	B	From Face	3.000	0.000	130.000	No Ice	7.569	4.158	0.012
(Verizon - Existing)			0.000			1/2" Ice	8.016	4.595	0.054
			0.000			1" Ice	8.470	5.040	0.103
BXA-70063/6CF	C	From Face	3.000	0.000	130.000	No Ice	7.569	4.158	0.012
(Verizon - Existing)			0.000			1/2" Ice	8.016	4.595	0.054
			0.000			1" Ice	8.470	5.040	0.103
LNX-8513DS	A	From Face	3.000	0.000	130.000	No Ice	8.173	5.405	0.045
(Verizon - Existing)			6.000			1/2" Ice	8.633	5.863	0.096
			0.000			1" Ice	9.100	6.327	0.152
HBXX-6517DS	A	From Face	3.000	0.000	130.000	No Ice	8.528	5.243	0.050

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
(Verizon - Existing)			4.000			1/2" Ice	9.000	5.709	0.100
			0.000			1" Ice	9.480	6.183	0.157
HBXX-6517DS	A	From Face	3.000	0.000	130.000	No Ice	8.528	5.243	0.050
(Verizon - Existing)			-4.000			1/2" Ice	9.000	5.709	0.100
			0.000			1" Ice	9.480	6.183	0.157
LNX-8513DS	B	From Face	3.000	0.000	130.000	No Ice	8.173	5.405	0.045
(Verizon - Existing)			6.000			1/2" Ice	8.633	5.863	0.096
			0.000			1" Ice	9.100	6.327	0.152
HBXX-6517DS	B	From Face	3.000	0.000	130.000	No Ice	8.528	5.243	0.050
(Verizon - Existing)			4.000			1/2" Ice	9.000	5.709	0.100
			0.000			1" Ice	9.480	6.183	0.157
HBXX-6517DS	B	From Face	3.000	0.000	130.000	No Ice	8.528	5.243	0.050
(Verizon - Existing)			-4.000			1/2" Ice	9.000	5.709	0.100
			0.000			1" Ice	9.480	6.183	0.157
LNX-8513DS	C	From Face	3.000	0.000	130.000	No Ice	8.173	5.405	0.045
(Verizon - Existing)			6.000			1/2" Ice	8.633	5.863	0.096
			0.000			1" Ice	9.100	6.327	0.152
HBXX-6517DS	C	From Face	3.000	0.000	130.000	No Ice	8.528	5.243	0.050
(Verizon - Existing)			4.000			1/2" Ice	9.000	5.709	0.100
			0.000			1" Ice	9.480	6.183	0.157
HBXX-6517DS	C	From Face	3.000	0.000	130.000	No Ice	8.528	5.243	0.050
(Verizon - Existing)			-4.000			1/2" Ice	9.000	5.709	0.100
			0.000			1" Ice	9.480	6.183	0.157
RRH2x60-AWS	A	From Face	3.000	0.000	130.000	No Ice	3.357	2.025	0.055
(Verizon - Existing)			-4.000			1/2" Ice	3.614	2.258	0.078
			0.000			1" Ice	3.878	2.498	0.105
RRH2x60-AWS	B	From Face	3.000	0.000	130.000	No Ice	3.357	2.025	0.055
(Verizon - Existing)			-4.000			1/2" Ice	3.614	2.258	0.078
			0.000			1" Ice	3.878	2.498	0.105
RRH2x60-AWS	C	From Face	3.000	0.000	130.000	No Ice	3.357	2.025	0.055
(Verizon - Existing)			-4.000			1/2" Ice	3.614	2.258	0.078
			0.000			1" Ice	3.878	2.498	0.105
DB-T1-6Z-8AB-0Z	C	From Face	3.000	0.000	130.000	No Ice	4.800	2.000	0.044
(Verizon - Existing)			-4.000			1/2" Ice	5.070	2.193	0.080
			0.000			1" Ice	5.348	2.393	0.120
(2) FD9R6004/2C-3L	A	From Face	3.000	0.000	130.000	No Ice	0.314	0.076	0.003
Diplexer			0.000			1/2" Ice	0.386	0.119	0.005
(Verizon - Existing)			0.000			1" Ice	0.466	0.169	0.009
(2) FD9R6004/2C-3L	B	From Face	3.000	0.000	130.000	No Ice	0.314	0.076	0.003
Diplexer			0.000			1/2" Ice	0.386	0.119	0.005
(Verizon - Existing)			0.000			1" Ice	0.466	0.169	0.009
(2) FD9R6004/2C-3L	C	From Face	3.000	0.000	130.000	No Ice	0.314	0.076	0.003
Diplexer			0.000			1/2" Ice	0.386	0.119	0.005
(Verizon - Existing)			0.000			1" Ice	0.466	0.169	0.009
EEI 10' Universal T-Arm	A	None		0.000	130.000	No Ice	13.340	13.340	0.450
(Verizon - Existing)						1/2" Ice	16.800	16.800	0.600
						1" Ice	20.260	20.260	0.750
EEI 10' Universal T-Arm	B	None		0.000	130.000	No Ice	13.340	13.340	0.450
(Verizon - Existing)						1/2" Ice	16.800	16.800	0.600
						1" Ice	20.260	20.260	0.750
EEI 10' Universal T-Arm	C	None		0.000	130.000	No Ice	13.340	13.340	0.450
(Verizon - Existing)						1/2" Ice	16.800	16.800	0.600
						1" Ice	20.260	20.260	0.750
7770.00	A	From Face	3.000	0.000	120.000	No Ice	5.508	2.928	0.035
(AT&T - Existing)			-2.000			1/2" Ice	5.867	3.273	0.068
			0.000			1" Ice	6.233	3.625	0.105
7770.00	B	From Face	3.000	0.000	120.000	No Ice	5.508	2.928	0.035

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
(AT&T - Existing)			-2.000			1/2" Ice	5.867	3.273	0.068
			0.000			1" Ice	6.233	3.625	0.105
7770.00	C	From Face	3.000	0.000	120.000	No Ice	5.508	2.928	0.035
(AT&T - Existing)			-2.000			1/2" Ice	5.867	3.273	0.068
			0.000			1" Ice	6.233	3.625	0.105
(2) HPA-65R-BUU-H6	A	From Face	3.000	0.000	120.000	No Ice	9.658	6.450	0.051
(AT&T - Existing)			0.000			1/2" Ice	10.128	6.913	0.114
			0.000			1" Ice	10.606	7.384	0.183
(2) HPA-65R-BUU-H6	B	From Face	3.000	0.000	120.000	No Ice	9.658	6.450	0.051
(AT&T - Existing)			0.000			1/2" Ice	10.128	6.913	0.114
			0.000			1" Ice	10.606	7.384	0.183
(2) HPA-65R-BUU-H6	C	From Face	3.000	0.000	120.000	No Ice	9.658	6.450	0.051
(AT&T - Existing)			0.000			1/2" Ice	10.128	6.913	0.114
			0.000			1" Ice	10.606	7.384	0.183
80010965	A	From Face	3.000	0.000	120.000	No Ice	13.814	5.833	0.109
(AT&T - Existing)			2.000			1/2" Ice	14.347	6.324	0.186
			0.000			1" Ice	14.888	6.821	0.269
80010965	B	From Face	3.000	0.000	120.000	No Ice	13.814	5.833	0.109
(AT&T - Existing)			2.000			1/2" Ice	14.347	6.324	0.186
			0.000			1" Ice	14.888	6.821	0.269
80010966	C	From Face	3.000	0.000	120.000	No Ice	17.363	7.500	0.126
(AT&T - Existing)			2.000			1/2" Ice	17.991	8.089	0.218
			0.000			1" Ice	18.626	8.686	0.319
LGP21401 TMA	A	From Face	3.000	0.000	120.000	No Ice	0.817	0.346	0.018
(AT&T - Existing)			0.000			1/2" Ice	0.937	0.440	0.023
			0.000			1" Ice	1.065	0.540	0.031
LGP21401 TMA	B	From Face	3.000	0.000	120.000	No Ice	0.817	0.346	0.018
(AT&T - Existing)			0.000			1/2" Ice	0.937	0.440	0.023
			0.000			1" Ice	1.065	0.540	0.031
LGP21401 TMA	C	From Face	3.000	0.000	120.000	No Ice	0.817	0.346	0.018
(AT&T - Existing)			0.000			1/2" Ice	0.937	0.440	0.023
			0.000			1" Ice	1.065	0.540	0.031
RRUS-11	A	From Face	1.000	0.000	120.000	No Ice	2.566	1.068	0.050
(AT&T - Existing)			2.000			1/2" Ice	2.765	1.211	0.070
			0.000			1" Ice	2.971	1.361	0.092
RRUS-11	B	From Face	1.000	0.000	120.000	No Ice	2.566	1.068	0.050
(AT&T - Existing)			2.000			1/2" Ice	2.765	1.211	0.070
			0.000			1" Ice	2.971	1.361	0.092
RRUS-11	C	From Face	1.000	0.000	120.000	No Ice	2.566	1.068	0.050
(AT&T - Existing)			2.000			1/2" Ice	2.765	1.211	0.070
			0.000			1" Ice	2.971	1.361	0.092
(2) RRUS-32	A	From Face	1.000	0.000	120.000	No Ice	3.314	2.424	0.077
(AT&T - Existing)			2.000			1/2" Ice	3.558	2.638	0.105
			0.000			1" Ice	3.809	2.860	0.136
(2) RRUS-32	B	From Face	1.000	0.000	120.000	No Ice	3.314	2.424	0.077
(AT&T - Existing)			2.000			1/2" Ice	3.558	2.638	0.105
			0.000			1" Ice	3.809	2.860	0.136
(2) RRUS-32	C	From Face	1.000	0.000	120.000	No Ice	3.314	2.424	0.077
(AT&T - Existing)			2.000			1/2" Ice	3.558	2.638	0.105
			0.000			1" Ice	3.809	2.860	0.136
4426 B66	A	From Face	1.000	0.000	120.000	No Ice	1.650	0.727	0.049
(AT&T - Existing)			2.000			1/2" Ice	1.810	0.844	0.062
			0.000			1" Ice	1.978	0.971	0.077
4426 B66	B	From Face	1.000	0.000	120.000	No Ice	1.650	0.727	0.049
(AT&T - Existing)			2.000			1/2" Ice	1.810	0.844	0.062
			0.000			1" Ice	1.978	0.971	0.077
4426 B66	C	From Face	1.000	0.000	120.000	No Ice	1.650	0.727	0.049

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
(AT&T - Existing)			2.000			1/2" Ice	1.810	0.844	0.062
			0.000			1" Ice	1.978	0.971	0.077
(2) 4478 B14	A	From Face	1.000	0.000	120.000	No Ice	1.843	1.059	0.060
(AT&T - Existing)			2.000			1/2" Ice	2.012	1.197	0.076
			0.000			1" Ice	2.190	1.342	0.094
(2) 4478 B14	B	From Face	1.000	0.000	120.000	No Ice	1.843	1.059	0.060
(AT&T - Existing)			2.000			1/2" Ice	2.012	1.197	0.076
			0.000			1" Ice	2.190	1.342	0.094
(2) 4478 B14	C	From Face	1.000	0.000	120.000	No Ice	1.843	1.059	0.060
(AT&T - Existing)			2.000			1/2" Ice	2.012	1.197	0.076
			0.000			1" Ice	2.190	1.342	0.094
EEI 10' Universal T-Arm	A	None		0.000	120.000	No Ice	13.340	13.340	0.450
(AT&T - Existing)						1/2" Ice	16.800	16.800	0.600
						1" Ice	20.260	20.260	0.750
EEI 10' Universal T-Arm	B	None		0.000	120.000	No Ice	13.340	13.340	0.450
(AT&T - Existing)						1/2" Ice	16.800	16.800	0.600
						1" Ice	20.260	20.260	0.750
EEI 10' Universal T-Arm	C	None		0.000	120.000	No Ice	13.340	13.340	0.450
(AT&T - Existing)						1/2" Ice	16.800	16.800	0.600
						1" Ice	20.260	20.260	0.750
DC6-48-60-18-8F Surge	A	From Face	0.500	0.000	120.000	No Ice	1.909	1.909	0.020
Arrestor			0.000			1/2" Ice	2.098	2.098	0.039
(AT&T - Existing)			0.000			1" Ice	2.294	2.294	0.062
DC6-48-60-18-8F Surge	B	From Face	0.500	0.000	120.000	No Ice	1.909	1.909	0.020
Arrestor			0.000			1/2" Ice	2.098	2.098	0.039
(AT&T - Existing)			0.000			1" Ice	2.294	2.294	0.062
DC6-48-60-18-8F Surge	C	From Face	0.500	0.000	120.000	No Ice	1.909	1.909	0.020
Arrestor			0.000			1/2" Ice	2.098	2.098	0.039
(AT&T - Existing)			0.000			1" Ice	2.294	2.294	0.062
BA40-41	A	From Leg	1.000	0.000	154.000	No Ice	4.480	4.480	0.032
(Motorola - Existing)			0.000			1/2" Ice	7.660	7.660	0.040
			5.000			1" Ice	10.840	10.840	0.048
Valmont Uni-Tri Bracket	A	From Face	0.000	0.000	154.000	No Ice	1.750	1.750	0.290
(Motorola - Existing)			0.000			1/2" Ice	1.940	1.940	0.306
			0.000			1" Ice	2.130	2.130	0.323
5'0"x4.5" Pipe Mount	A	From Face	1.000	0.000	154.000	No Ice	1.538	1.538	0.054
(Motorola - Existing)			0.000			1/2" Ice	2.076	2.076	0.070
			2.000			1" Ice	2.397	2.397	0.090
5'0"x4.5" Pipe Mount	B	From Face	1.000	0.000	154.000	No Ice	1.538	1.538	0.054
(Motorola - Existing)			0.000			1/2" Ice	2.076	2.076	0.070
			2.000			1" Ice	2.397	2.397	0.090
5'0"x4.5" Pipe Mount	C	From Face	1.000	0.000	154.000	No Ice	1.538	1.538	0.054
(Motorola - Existing)			0.000			1/2" Ice	2.076	2.076	0.070
			2.000			1" Ice	2.397	2.397	0.090

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
HP2-4.7	B	Paraboloid	From	1.000	Worst		156.000	2.000	No Ice	3.142	0.027
(Motorola - Existing)		w/Shroud (HP)	Leg	0.000					1/2" Ice	3.409	0.044
				0.000					1" Ice	3.676	0.062
HP3-4.7	C	Paraboloid	From	1.000	Worst		156.000	3.000	No Ice	7.069	0.050
(Motorola - Existing)		w/Shroud (HP)	Leg	0.000					1/2" Ice	7.467	0.067
				0.000					1" Ice	7.865	0.084

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1	144.139	1.367	0.026	44.790	A	0.000	44.790	44.790	100.00	0.000	0.000
154.000-134.8					B	0.000	44.790		100.00	0.000	0.000
30					C	0.000	44.790		100.00	0.000	0.000
L2	111.022	1.294	0.025	136.145	A	0.000	136.145	136.145	100.00	0.000	0.000
134.830-89.16					B	0.000	136.145		100.00	0.000	0.000
0					C	0.000	136.145		100.00	0.000	0.000
L3	66.351	1.161	0.022	172.571	A	0.000	172.571	172.571	100.00	0.000	0.000
89.160-44.540					B	0.000	172.571		100.00	0.000	0.000
					C	0.000	172.571		100.00	0.000	0.000
L4	22.981	0.929	0.018	204.677	A	0.000	204.677	204.677	100.00	0.000	0.000
44.540-1.000					B	0.000	204.677		100.00	0.000	0.000
					C	0.000	204.677		100.00	0.000	0.000

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1	144.139	1.367	0.005	2.318	52.195	A	0.000	52.195	52.195	100.00	0.000	0.000
154.000-134.830						B	0.000	52.195		100.00	0.000	0.000
						C	0.000	52.195		100.00	0.000	0.000
L2	111.022	1.294	0.005	2.258	153.787	A	0.000	153.787	153.787	100.00	0.000	0.000
134.830-89.160						B	0.000	153.787		100.00	0.000	0.000
						C	0.000	153.787		100.00	0.000	0.000
L3	66.351	1.161	0.005	2.145	189.363	A	0.000	189.363	189.363	100.00	0.000	0.000
89.160-44.540						B	0.000	189.363		100.00	0.000	0.000
						C	0.000	189.363		100.00	0.000	0.000
L4 44.540-1.000	22.981	0.929	0.004	1.929	220.241	A	0.000	220.241	220.241	100.00	0.000	0.000
						B	0.000	220.241		100.00	0.000	0.000
						C	0.000	220.241		100.00	0.000	0.000

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	144.139	1.367	0.011	44.790	A	0.000	44.790	44.790	100.00	0.000	0.000
154.000-134.8					B	0.000	44.790		100.00	0.000	0.000
30					C	0.000	44.790		100.00	0.000	0.000
L2	111.022	1.294	0.010	136.145	A	0.000	136.145	136.145	100.00	0.000	0.000
134.830-89.16					B	0.000	136.145		100.00	0.000	0.000
0					C	0.000	136.145		100.00	0.000	0.000
L3	66.351	1.161	0.009	172.571	A	0.000	172.571	172.571	100.00	0.000	0.000
89.160-44.540					B	0.000	172.571		100.00	0.000	0.000
					C	0.000	172.571		100.00	0.000	0.000
L4	22.981	0.929	0.007	204.677	A	0.000	204.677	204.677	100.00	0.000	0.000
44.540-1.000					B	0.000	204.677		100.00	0.000	0.000
					C	0.000	204.677		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.350	1.066	A	1	0.65	0.026	1	1	44.790	0.843	0.044	C
154.000-134.8			B	1	0.65		1	1	44.790			
30			C	1	0.65		1	1	44.790			
L2	2.430	5.810	A	1	0.65	0.025	1	1	136.145	2.423	0.053	C
134.830-89.16			B	1	0.65		1	1	136.145			
0			C	1	0.65		1	1	136.145			
L3	2.611	12.108	A	1	0.65	0.022	1	1	172.571	2.749	0.062	C
89.160-44.540			B	1	0.65		1	1	172.571			
			C	1	0.65		1	1	172.571			
L4	2.372	16.623	A	1	0.65	0.018	1	1	204.677	2.604	0.060	C
44.540-1.000			B	1	0.65		1	1	204.677			
			C	1	0.65		1	1	204.677			
Sum Weight:	7.764	35.607						OTM	624.200 kip-ft	8.620		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.350	1.066	A	1	0.65	0.026	1	1	44.790	0.843	0.044	C
154.000-134.8			B	1	0.65		1	1	44.790			
30			C	1	0.65		1	1	44.790			
L2	2.430	5.810	A	1	0.65	0.025	1	1	136.145	2.423	0.053	C
134.830-89.16			B	1	0.65		1	1	136.145			
0			C	1	0.65		1	1	136.145			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L3	2.611	12.108	A	1	0.65	0.022	1	1	172.571	2.749	0.062	C
89.160-44.540			B	1	0.65		1	1	172.571			
			C	1	0.65		1	1	172.571			
L4	2.372	16.623	A	1	0.65	0.018	1	1	204.677	2.604	0.060	C
44.540-1.000			B	1	0.65		1	1	204.677			
			C	1	0.65		1	1	204.677			
Sum Weight:	7.764	35.607						OTM	624.200 kip-ft	8.620		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.350	1.066	A	1	0.65	0.026	1	1	44.790	0.843	0.044	C
154.000-134.8			B	1	0.65		1	1	44.790			
30			C	1	0.65		1	1	44.790			
L2	2.430	5.810	A	1	0.65	0.025	1	1	136.145	2.423	0.053	C
134.830-89.16			B	1	0.65		1	1	136.145			
0			C	1	0.65		1	1	136.145			
L3	2.611	12.108	A	1	0.65	0.022	1	1	172.571	2.749	0.062	C
89.160-44.540			B	1	0.65		1	1	172.571			
			C	1	0.65		1	1	172.571			
L4	2.372	16.623	A	1	0.65	0.018	1	1	204.677	2.604	0.060	C
44.540-1.000			B	1	0.65		1	1	204.677			
			C	1	0.65		1	1	204.677			
Sum Weight:	7.764	35.607						OTM	624.200 kip-ft	8.620		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.350	1.066	A	1	0.65	0.026	1	1	44.790	0.843	0.044	C
154.000-134.8			B	1	0.65		1	1	44.790			
30			C	1	0.65		1	1	44.790			
L2	2.430	5.810	A	1	0.65	0.025	1	1	136.145	2.423	0.053	C
134.830-89.16			B	1	0.65		1	1	136.145			
0			C	1	0.65		1	1	136.145			
L3	2.611	12.108	A	1	0.65	0.022	1	1	172.571	2.749	0.062	C
89.160-44.540			B	1	0.65		1	1	172.571			
			C	1	0.65		1	1	172.571			
L4	2.372	16.623	A	1	0.65	0.018	1	1	204.677	2.604	0.060	C
44.540-1.000			B	1	0.65		1	1	204.677			
			C	1	0.65		1	1	204.677			
Sum Weight:	7.764	35.607						OTM	624.200	8.620		

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
									kip-ft			

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.350	2.709	A	1	1.2	0.005	1	1	52.195	0.366	0.019	C
154.000-134.8			B	1	1.2		1	1	52.195			
30			C	1	1.2		1	1	52.195			
L2	2.430	10.588	A	1	1.2	0.005	1	1	153.787	1.021	0.022	C
134.830-89.16			B	1	1.2		1	1	153.787			
0			C	1	1.2		1	1	153.787			
L3	2.611	17.769	A	1	1.2	0.005	1	1	189.363	1.125	0.025	C
89.160-44.540			B	1	1.2		1	1	189.363			
			C	1	1.2		1	1	189.363			
L4	2.372	22.591	A	1	1.2	0.004	1	1	220.241	1.045	0.024	C
44.540-1.000			B	1	1.2		1	1	220.241			
			C	1	1.2		1	1	220.241			
Sum Weight:	7.764	53.656						OTM	261.238 kip-ft	3.557		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.350	2.709	A	1	1.2	0.005	1	1	52.195	0.366	0.019	C
154.000-134.8			B	1	1.2		1	1	52.195			
30			C	1	1.2		1	1	52.195			
L2	2.430	10.588	A	1	1.2	0.005	1	1	153.787	1.021	0.022	C
134.830-89.16			B	1	1.2		1	1	153.787			
0			C	1	1.2		1	1	153.787			
L3	2.611	17.769	A	1	1.2	0.005	1	1	189.363	1.125	0.025	C
89.160-44.540			B	1	1.2		1	1	189.363			
			C	1	1.2		1	1	189.363			
L4	2.372	22.591	A	1	1.2	0.004	1	1	220.241	1.045	0.024	C
44.540-1.000			B	1	1.2		1	1	220.241			
			C	1	1.2		1	1	220.241			
Sum Weight:	7.764	53.656						OTM	261.238 kip-ft	3.557		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.350	2.709	A	1	1.2	0.005	1	1	52.195	0.366	0.019	C
154.000-134.8			B	1	1.2		1	1	52.195			
30			C	1	1.2		1	1	52.195			
L2	2.430	10.588	A	1	1.2	0.005	1	1	153.787	1.021	0.022	C
134.830-89.16			B	1	1.2		1	1	153.787			
0			C	1	1.2		1	1	153.787			
L3	2.611	17.769	A	1	1.2	0.005	1	1	189.363	1.125	0.025	C
89.160-44.540			B	1	1.2		1	1	189.363			
			C	1	1.2		1	1	189.363			
L4	2.372	22.591	A	1	1.2	0.004	1	1	220.241	1.045	0.024	C
44.540-1.000			B	1	1.2		1	1	220.241			
			C	1	1.2		1	1	220.241			
Sum Weight:	7.764	53.656						OTM	261.238 kip-ft	3.557		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.350	2.709	A	1	1.2	0.005	1	1	52.195	0.366	0.019	C
154.000-134.8			B	1	1.2		1	1	52.195			
30			C	1	1.2		1	1	52.195			
L2	2.430	10.588	A	1	1.2	0.005	1	1	153.787	1.021	0.022	C
134.830-89.16			B	1	1.2		1	1	153.787			
0			C	1	1.2		1	1	153.787			
L3	2.611	17.769	A	1	1.2	0.005	1	1	189.363	1.125	0.025	C
89.160-44.540			B	1	1.2		1	1	189.363			
			C	1	1.2		1	1	189.363			
L4	2.372	22.591	A	1	1.2	0.004	1	1	220.241	1.045	0.024	C
44.540-1.000			B	1	1.2		1	1	220.241			
			C	1	1.2		1	1	220.241			
Sum Weight:	7.764	53.656						OTM	261.238 kip-ft	3.557		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.350	1.066	A	1	0.65	0.011	1	1	44.790	0.343	0.018	C
154.000-134.8			B	1	0.65		1	1	44.790			
30			C	1	0.65		1	1	44.790			
L2	2.430	5.810	A	1	0.65	0.010	1	1	136.145	0.985	0.022	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
134.830-89.16			B	1	0.65		1	1	136.145			
0			C	1	0.65		1	1	136.145			
L3	2.611	12.108	A	1	0.65	0.009	1	1	172.571	1.118	0.025	C
89.160-44.540			B	1	0.65		1	1	172.571			
			C	1	0.65		1	1	172.571			
L4	2.372	16.623	A	1	0.65	0.007	1	1	204.677	1.059	0.024	C
44.540-1.000			B	1	0.65		1	1	204.677			
			C	1	0.65		1	1	204.677			
Sum Weight:	7.764	35.607						OTM	253.829 kip-ft	3.505		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.350	1.066	A	1	0.65	0.011	1	1	44.790	0.343	0.018	C
154.000-134.8			B	1	0.65		1	1	44.790			
30			C	1	0.65		1	1	44.790			
L2	2.430	5.810	A	1	0.65	0.010	1	1	136.145	0.985	0.022	C
134.830-89.16			B	1	0.65		1	1	136.145			
0			C	1	0.65		1	1	136.145			
L3	2.611	12.108	A	1	0.65	0.009	1	1	172.571	1.118	0.025	C
89.160-44.540			B	1	0.65		1	1	172.571			
			C	1	0.65		1	1	172.571			
L4	2.372	16.623	A	1	0.65	0.007	1	1	204.677	1.059	0.024	C
44.540-1.000			B	1	0.65		1	1	204.677			
			C	1	0.65		1	1	204.677			
Sum Weight:	7.764	35.607						OTM	253.829 kip-ft	3.505		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.350	1.066	A	1	0.65	0.011	1	1	44.790	0.343	0.018	C
154.000-134.8			B	1	0.65		1	1	44.790			
30			C	1	0.65		1	1	44.790			
L2	2.430	5.810	A	1	0.65	0.010	1	1	136.145	0.985	0.022	C
134.830-89.16			B	1	0.65		1	1	136.145			
0			C	1	0.65		1	1	136.145			
L3	2.611	12.108	A	1	0.65	0.009	1	1	172.571	1.118	0.025	C
89.160-44.540			B	1	0.65		1	1	172.571			
			C	1	0.65		1	1	172.571			
L4	2.372	16.623	A	1	0.65	0.007	1	1	204.677	1.059	0.024	C
44.540-1.000			B	1	0.65		1	1	204.677			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
Sum Weight:	7.764	35.607	C	1	0.65		1	1 OTM	204.677 253.829 kip-ft	3.505		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.350	1.066	A	1	0.65	0.011	1	1	44.790	0.343	0.018	C
154.000-134.8			B	1	0.65		1	1	44.790			
30			C	1	0.65		1	1	44.790			
L2	2.430	5.810	A	1	0.65	0.010	1	1	136.145	0.985	0.022	C
134.830-89.16			B	1	0.65		1	1	136.145			
0			C	1	0.65		1	1	136.145			
L3	2.611	12.108	A	1	0.65	0.009	1	1	172.571	1.118	0.025	C
89.160-44.540			B	1	0.65		1	1	172.571			
			C	1	0.65		1	1	172.571			
L4	2.372	16.623	A	1	0.65	0.007	1	1	204.677	1.059	0.024	C
44.540-1.000			B	1	0.65		1	1	204.677			
			C	1	0.65		1	1	204.677			
Sum Weight:	7.764	35.607						OTM	253.829 kip-ft	3.505		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	35.607					
Bracing Weight	0.000					
Total Member Self-Weight	35.607			0.124	0.163	
Total Weight	66.402			0.124	0.163	
Wind 0 deg - No Ice		0.000	-42.128	-4729.370	0.163	-0.029
Wind 30 deg - No Ice		21.011	-36.484	-4095.738	-2357.992	0.199
Wind 45 deg - No Ice		29.714	-29.789	-3344.133	-3334.771	0.296
Wind 60 deg - No Ice		36.392	-21.064	-2364.623	-4084.281	0.373
Wind 90 deg - No Ice		42.022	0.000	0.124	-4716.147	0.448
Wind 120 deg - No Ice		36.392	21.064	2364.871	-4084.281	0.402
Wind 135 deg - No Ice		29.714	29.789	3344.381	-3334.771	0.337
Wind 150 deg - No Ice		21.011	36.484	4095.986	-2357.992	0.249
Wind 180 deg - No Ice		0.000	42.128	4729.618	0.163	0.029
Wind 210 deg - No Ice		-21.011	36.484	4095.986	2358.318	-0.199
Wind 225 deg - No Ice		-29.714	29.789	3344.381	3335.098	-0.296
Wind 240 deg - No Ice		-36.392	21.064	2364.871	4084.607	-0.373
Wind 270 deg - No Ice		-42.022	0.000	0.124	4716.473	-0.448
Wind 300 deg - No Ice		-36.392	-21.064	-2364.623	4084.607	-0.402

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 315 deg - No Ice		-29.714	-29.789	-3344.133	3335.098	-0.337
Wind 330 deg - No Ice		-21.011	-36.484	-4095.738	2358.318	-0.249
Member Ice	18.050					
Total Weight Ice	125.266			1.395	-0.410	
Wind 0 deg - Ice		0.000	-20.264	-2273.792	-0.410	0.001
Wind 30 deg - Ice		10.120	-17.549	-1968.975	-1136.572	-0.021
Wind 45 deg - Ice		14.312	-14.329	-1607.405	-1607.186	-0.030
Wind 60 deg - Ice		17.529	-10.132	-1136.198	-1968.301	-0.037
Wind 90 deg - Ice		20.241	0.000	1.395	-2272.735	-0.043
Wind 120 deg - Ice		17.529	10.132	1138.989	-1968.301	-0.038
Wind 135 deg - Ice		14.312	14.329	1610.196	-1607.186	-0.031
Wind 150 deg - Ice		10.120	17.549	1971.766	-1136.572	-0.023
Wind 180 deg - Ice		0.000	20.264	2276.583	-0.410	-0.001
Wind 210 deg - Ice		-10.120	17.549	1971.766	1135.753	0.021
Wind 225 deg - Ice		-14.312	14.329	1610.196	1606.367	0.030
Wind 240 deg - Ice		-17.529	10.132	1138.989	1967.482	0.037
Wind 270 deg - Ice		-20.241	0.000	1.395	2271.916	0.043
Wind 300 deg - Ice		-17.529	-10.132	-1136.198	1967.482	0.038
Wind 315 deg - Ice		-14.312	-14.329	-1607.405	1606.367	0.031
Wind 330 deg - Ice		-10.120	-17.549	-1968.975	1135.753	0.023
Total Weight	66.402			0.124	0.163	
Wind 0 deg - Service		0.000	-17.131	-1923.112	0.163	-0.012
Wind 30 deg - Service		8.544	-14.836	-1665.447	-958.774	0.081
Wind 45 deg - Service		12.083	-12.114	-1359.809	-1355.979	0.120
Wind 60 deg - Service		14.799	-8.566	-961.494	-1660.765	0.152
Wind 90 deg - Service		17.088	0.000	0.124	-1917.711	0.182
Wind 120 deg - Service		14.799	8.566	961.742	-1660.765	0.164
Wind 135 deg - Service		12.083	12.114	1360.057	-1355.979	0.137
Wind 150 deg - Service		8.544	14.836	1665.695	-958.774	0.101
Wind 180 deg - Service		0.000	17.131	1923.359	0.163	0.012
Wind 210 deg - Service		-8.544	14.836	1665.695	959.100	-0.081
Wind 225 deg - Service		-12.083	12.114	1360.057	1356.305	-0.120
Wind 240 deg - Service		-14.799	8.566	961.742	1661.091	-0.152
Wind 270 deg - Service		-17.088	0.000	0.124	1918.037	-0.182
Wind 300 deg - Service		-14.799	-8.566	-961.494	1661.091	-0.164
Wind 315 deg - Service		-12.083	-12.114	-1359.809	1356.305	-0.137
Wind 330 deg - Service		-8.544	-14.836	-1665.447	959.100	-0.101

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 45 deg - No Ice
7	0.9 Dead+1.6 Wind 45 deg - No Ice
8	1.2 Dead+1.6 Wind 60 deg - No Ice
9	0.9 Dead+1.6 Wind 60 deg - No Ice
10	1.2 Dead+1.6 Wind 90 deg - No Ice
11	0.9 Dead+1.6 Wind 90 deg - No Ice
12	1.2 Dead+1.6 Wind 120 deg - No Ice
13	0.9 Dead+1.6 Wind 120 deg - No Ice
14	1.2 Dead+1.6 Wind 135 deg - No Ice

Comb. No.	Description
15	0.9 Dead+1.6 Wind 135 deg - No Ice
16	1.2 Dead+1.6 Wind 150 deg - No Ice
17	0.9 Dead+1.6 Wind 150 deg - No Ice
18	1.2 Dead+1.6 Wind 180 deg - No Ice
19	0.9 Dead+1.6 Wind 180 deg - No Ice
20	1.2 Dead+1.6 Wind 210 deg - No Ice
21	0.9 Dead+1.6 Wind 210 deg - No Ice
22	1.2 Dead+1.6 Wind 225 deg - No Ice
23	0.9 Dead+1.6 Wind 225 deg - No Ice
24	1.2 Dead+1.6 Wind 240 deg - No Ice
25	0.9 Dead+1.6 Wind 240 deg - No Ice
26	1.2 Dead+1.6 Wind 270 deg - No Ice
27	0.9 Dead+1.6 Wind 270 deg - No Ice
28	1.2 Dead+1.6 Wind 300 deg - No Ice
29	0.9 Dead+1.6 Wind 300 deg - No Ice
30	1.2 Dead+1.6 Wind 315 deg - No Ice
31	0.9 Dead+1.6 Wind 315 deg - No Ice
32	1.2 Dead+1.6 Wind 330 deg - No Ice
33	0.9 Dead+1.6 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	154 - 134.83	Pole	Max Tension	2	0.000	-0.001	-0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	34	-28.105	0.449	0.129
			Max. Mx	26	-9.456	136.967	0.175
			Max. My	2	-9.450	0.312	136.785
			Max. Vy	26	-20.549	136.967	0.175
			Max. Vx	18	20.552	0.312	-136.451
			Max. Torque	18			-0.528
L2	134.83 - 89.16	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-77.924	-0.377	-1.420
			Max. Mx	26	-30.284	1835.784	-0.126
			Max. My	18	-30.259	0.203	-1841.229
			Max. Vy	26	-53.201	1835.784	-0.126
			Max. Vx	18	53.376	0.203	-1841.229
			Max. Torque	11			-0.699
L3	89.16 - 44.54	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-107.353	-0.377	-1.420
			Max. Mx	26	-51.590	4483.687	-0.148
			Max. My	18	-51.576	0.210	-4496.739
			Max. Vy	26	-64.493	4483.687	-0.148
			Max. Vx	18	64.668	0.210	-4496.739
			Max. Torque	11			-0.696
L4	44.54 - 1	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-140.667	-0.377	-1.420
			Max. Mx	26	-79.621	7820.297	-0.151
			Max. My	18	-79.621	0.212	-7842.041
			Max. Vy	26	-67.308	7820.297	-0.151
			Max. Vx	18	67.477	0.212	-7842.041
			Max. Torque	11			-0.694

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	43	140.667	-0.000	-20.264
	Max. H_x	26	79.682	67.236	-0.000
	Max. H_z	2	79.682	0.000	67.405
	Max. M_x	2	7841.729	0.000	67.405
	Max. M_z	10	7819.876	-67.236	-0.000
	Max. Torsion	27	0.693	67.236	-0.000
	Min. Vert	15	59.761	-47.543	-47.662
	Min. H_x	10	79.682	-67.236	-0.000
	Min. H_z	18	79.682	0.000	-67.405
	Min. M_x	18	-7842.041	0.000	-67.405
	Min. M_z	26	-7820.297	67.236	-0.000
	Min. Torsion	11	-0.693	-67.236	-0.000

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	66.402	0.000	0.000	0.124	0.163	0.000
1.2 Dead+1.6 Wind 0 deg - No	79.682	-0.000	-67.405	-7841.729	0.212	-0.082

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
0.9 Dead+1.6 Wind 0 deg - No Ice	59.761	0.000	-67.405	-7767.420	0.156	-0.073
1.2 Dead+1.6 Wind 30 deg - No Ice	79.682	33.618	-58.374	-6791.154	-3909.809	0.274
0.9 Dead+1.6 Wind 30 deg - No Ice	59.761	33.618	-58.374	-6726.792	-3872.789	0.284
1.2 Dead+1.6 Wind 45 deg - No Ice	79.682	47.543	-47.662	-5544.942	-5529.408	0.429
0.9 Dead+1.6 Wind 45 deg - No Ice	59.761	47.543	-47.662	-5492.397	-5477.030	0.439
1.2 Dead+1.6 Wind 60 deg - No Ice	79.682	58.228	-33.702	-3920.833	-6772.181	0.555
0.9 Dead+1.6 Wind 60 deg - No Ice	59.761	58.228	-33.702	-3883.689	-6708.017	0.564
1.2 Dead+1.6 Wind 90 deg - No Ice	79.682	67.236	0.000	0.150	-7819.876	0.688
0.9 Dead+1.6 Wind 90 deg - No Ice	59.761	67.236	0.000	0.111	-7745.792	0.693
1.2 Dead+1.6 Wind 120 deg - No Ice	79.682	58.228	33.702	3921.137	-6772.186	0.636
0.9 Dead+1.6 Wind 120 deg - No Ice	59.761	58.228	33.702	3883.913	-6708.021	0.635
1.2 Dead+1.6 Wind 135 deg - No Ice	79.682	47.543	47.662	5545.249	-5529.414	0.543
0.9 Dead+1.6 Wind 135 deg - No Ice	59.761	47.543	47.662	5492.623	-5477.034	0.540
1.2 Dead+1.6 Wind 150 deg - No Ice	79.682	33.618	58.374	6791.464	-3909.814	0.414
0.9 Dead+1.6 Wind 150 deg - No Ice	59.761	33.618	58.374	6727.020	-3872.793	0.408
1.2 Dead+1.6 Wind 180 deg - No Ice	79.682	-0.000	67.405	7842.041	0.212	0.082
0.9 Dead+1.6 Wind 180 deg - No Ice	59.761	0.000	67.405	7767.651	0.156	0.073
1.2 Dead+1.6 Wind 210 deg - No Ice	79.682	-33.618	58.374	6791.463	3910.237	-0.272
0.9 Dead+1.6 Wind 210 deg - No Ice	59.761	-33.618	58.374	6727.019	3873.104	-0.282
1.2 Dead+1.6 Wind 225 deg - No Ice	79.682	-47.543	47.662	5545.248	5529.836	-0.427
0.9 Dead+1.6 Wind 225 deg - No Ice	59.761	-47.543	47.662	5492.622	5477.345	-0.437
1.2 Dead+1.6 Wind 240 deg - No Ice	79.682	-58.228	33.702	3921.136	6772.608	-0.553
0.9 Dead+1.6 Wind 240 deg - No Ice	59.761	-58.228	33.702	3883.912	6708.331	-0.563
1.2 Dead+1.6 Wind 270 deg - No Ice	79.682	-67.236	0.000	0.150	7820.297	-0.688
0.9 Dead+1.6 Wind 270 deg - No Ice	59.761	-67.236	0.000	0.111	7746.101	-0.693
1.2 Dead+1.6 Wind 300 deg - No Ice	79.682	-58.228	-33.702	-3920.832	6772.602	-0.637
0.9 Dead+1.6 Wind 300 deg - No Ice	59.761	-58.228	-33.702	-3883.688	6708.327	-0.637
1.2 Dead+1.6 Wind 315 deg - No Ice	79.682	-47.543	-47.662	-5544.941	5529.830	-0.545
0.9 Dead+1.6 Wind 315 deg - No Ice	59.761	-47.543	-47.662	-5492.396	5477.340	-0.542
1.2 Dead+1.6 Wind 330 deg - No Ice	79.682	-33.618	-58.374	-6791.153	3910.232	-0.416

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
0.9 Dead+1.6 Wind 330 deg - No Ice	59.761	-33.618	-58.374	-6726.791	3873.100	-0.410
1.2 Dead+1.0 Ice+1.0 Temp	140.667	0.000	0.000	1.420	-0.377	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	140.667	0.000	-20.264	-2471.765	-0.445	-0.008
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	140.667	10.121	-17.549	-2140.386	-1235.605	-0.031
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	140.667	14.313	-14.329	-1747.310	-1747.224	-0.039
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	140.667	17.529	-10.132	-1235.044	-2139.804	-0.045
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	140.667	20.241	0.000	1.676	-2470.763	-0.047
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	140.667	17.529	10.132	1238.396	-2139.802	-0.037
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	140.667	14.313	14.329	1750.661	-1747.222	-0.028
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	140.667	10.121	17.549	2143.736	-1235.603	-0.017
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	140.667	0.000	20.264	2475.113	-0.445	0.008
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	140.667	-10.121	17.549	2143.737	1234.714	0.031
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	140.667	-14.313	14.329	1750.662	1746.334	0.039
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	140.667	-17.529	10.132	1238.396	2138.914	0.045
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	140.667	-20.241	0.000	1.676	2469.875	0.047
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	140.667	-17.529	-10.132	-1235.044	2138.916	0.037
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	140.667	-14.313	-14.329	-1747.311	1746.336	0.028
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	140.667	-10.121	-17.549	-2140.387	1234.716	0.017
Dead+Wind 0 deg - Service	66.402	0.000	-17.131	-1983.676	0.174	-0.020
Dead+Wind 30 deg - Service	66.402	8.544	-14.836	-1717.897	-988.962	0.072
Dead+Wind 45 deg - Service	66.402	12.083	-12.114	-1402.633	-1398.676	0.112
Dead+Wind 60 deg - Service	66.402	14.799	-8.566	-991.773	-1713.061	0.144
Dead+Wind 90 deg - Service	66.402	17.088	0.000	0.131	-1978.099	0.178
Dead+Wind 120 deg - Service	66.402	14.799	8.566	992.035	-1713.061	0.164
Dead+Wind 135 deg - Service	66.402	12.083	12.114	1402.895	-1398.676	0.140
Dead+Wind 150 deg - Service	66.402	8.544	14.836	1718.159	-988.962	0.106
Dead+Wind 180 deg - Service	66.402	0.000	17.131	1983.938	0.174	0.020
Dead+Wind 210 deg - Service	66.402	-8.544	14.836	1718.159	989.311	-0.072
Dead+Wind 225 deg - Service	66.402	-12.083	12.114	1402.895	1399.024	-0.112
Dead+Wind 240 deg - Service	66.402	-14.799	8.566	992.035	1713.409	-0.144
Dead+Wind 270 deg - Service	66.402	-17.088	0.000	0.131	1978.448	-0.178
Dead+Wind 300 deg - Service	66.402	-14.799	-8.566	-991.773	1713.409	-0.164
Dead+Wind 315 deg - Service	66.402	-12.083	-12.114	-1402.633	1399.024	-0.140
Dead+Wind 330 deg - Service	66.402	-8.544	-14.836	-1717.897	989.310	-0.106

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-66.402	0.000	0.000	66.402	0.000	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
2	0.000	-79.682	-67.405	0.000	79.682	67.405	0.000%
3	0.000	-59.761	-67.405	0.000	59.761	67.405	0.000%
4	33.618	-79.682	-58.374	-33.618	79.682	58.374	0.000%
5	33.618	-59.761	-58.374	-33.618	59.761	58.374	0.000%
6	47.543	-79.682	-47.662	-47.543	79.682	47.662	0.000%
7	47.543	-59.761	-47.662	-47.543	59.761	47.662	0.000%
8	58.228	-79.682	-33.702	-58.228	79.682	33.702	0.000%
9	58.228	-59.761	-33.702	-58.228	59.761	33.702	0.000%
10	67.236	-79.682	0.000	-67.236	79.682	-0.000	0.000%
11	67.236	-59.761	0.000	-67.236	59.761	-0.000	0.000%
12	58.228	-79.682	33.702	-58.228	79.682	-33.702	0.000%
13	58.228	-59.761	33.702	-58.228	59.761	-33.702	0.000%
14	47.543	-79.682	47.662	-47.543	79.682	-47.662	0.000%
15	47.543	-59.761	47.662	-47.543	59.761	-47.662	0.000%
16	33.618	-79.682	58.374	-33.618	79.682	-58.374	0.000%
17	33.618	-59.761	58.374	-33.618	59.761	-58.374	0.000%
18	0.000	-79.682	67.405	0.000	79.682	-67.405	0.000%
19	0.000	-59.761	67.405	0.000	59.761	-67.405	0.000%
20	-33.618	-79.682	58.374	33.618	79.682	-58.374	0.000%
21	-33.618	-59.761	58.374	33.618	59.761	-58.374	0.000%
22	-47.543	-79.682	47.662	47.543	79.682	-47.662	0.000%
23	-47.543	-59.761	47.662	47.543	59.761	-47.662	0.000%
24	-58.228	-79.682	33.702	58.228	79.682	-33.702	0.000%
25	-58.228	-59.761	33.702	58.228	59.761	-33.702	0.000%
26	-67.236	-79.682	0.000	67.236	79.682	-0.000	0.000%
27	-67.236	-59.761	0.000	67.236	59.761	-0.000	0.000%
28	-58.228	-79.682	-33.702	58.228	79.682	33.702	0.000%
29	-58.228	-59.761	-33.702	58.228	59.761	33.702	0.000%
30	-47.543	-79.682	-47.662	47.543	79.682	47.662	0.000%
31	-47.543	-59.761	-47.662	47.543	59.761	47.662	0.000%
32	-33.618	-79.682	-58.374	33.618	79.682	58.374	0.000%
33	-33.618	-59.761	-58.374	33.618	59.761	58.374	0.000%
34	0.000	-140.667	0.000	0.000	140.667	0.000	0.000%
35	0.000	-140.667	-20.264	-0.000	140.667	20.264	0.000%
36	10.120	-140.667	-17.549	-10.121	140.667	17.549	0.000%
37	14.312	-140.667	-14.329	-14.313	140.667	14.329	0.000%
38	17.529	-140.667	-10.132	-17.529	140.667	10.132	0.000%
39	20.241	-140.667	0.000	-20.241	140.667	-0.000	0.000%
40	17.529	-140.667	10.132	-17.529	140.667	-10.132	0.000%
41	14.312	-140.667	14.329	-14.313	140.667	-14.329	0.000%
42	10.120	-140.667	17.549	-10.121	140.667	-17.549	0.000%
43	0.000	-140.667	20.264	-0.000	140.667	-20.264	0.000%
44	-10.120	-140.667	17.549	10.121	140.667	-17.549	0.000%
45	-14.312	-140.667	14.329	14.313	140.667	-14.329	0.000%
46	-17.529	-140.667	10.132	17.529	140.667	-10.132	0.000%
47	-20.241	-140.667	0.000	20.241	140.667	-0.000	0.000%
48	-17.529	-140.667	-10.132	17.529	140.667	10.132	0.000%
49	-14.312	-140.667	-14.329	14.313	140.667	14.329	0.000%
50	-10.120	-140.667	-17.549	10.121	140.667	17.549	0.000%
51	0.000	-66.402	-17.131	0.000	66.402	17.131	0.000%
52	8.544	-66.402	-14.836	-8.544	66.402	14.836	0.000%
53	12.083	-66.402	-12.114	-12.083	66.402	12.114	0.000%
54	14.799	-66.402	-8.566	-14.799	66.402	8.566	0.000%
55	17.088	-66.402	0.000	-17.088	66.402	0.000	0.000%
56	14.799	-66.402	8.566	-14.799	66.402	-8.566	0.000%
57	12.083	-66.402	12.114	-12.083	66.402	-12.114	0.000%
58	8.544	-66.402	14.836	-8.544	66.402	-14.836	0.000%
59	0.000	-66.402	17.131	0.000	66.402	-17.131	0.000%
60	-8.544	-66.402	14.836	8.544	66.402	-14.836	0.000%
61	-12.083	-66.402	12.114	12.083	66.402	-12.114	0.000%
62	-14.799	-66.402	8.566	14.799	66.402	-8.566	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
63	-17.088	-66.402	0.000	17.088	66.402	0.000	0.000%
64	-14.799	-66.402	-8.566	14.799	66.402	8.566	0.000%
65	-12.083	-66.402	-12.114	12.083	66.402	12.114	0.000%
66	-8.544	-66.402	-14.836	8.544	66.402	14.836	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00023795
3	Yes	4	0.00000001	0.00010269
4	Yes	6	0.00000001	0.00004644
5	Yes	5	0.00000001	0.00045574
6	Yes	6	0.00000001	0.00004842
7	Yes	5	0.00000001	0.00047400
8	Yes	6	0.00000001	0.00004616
9	Yes	5	0.00000001	0.00045280
10	Yes	4	0.00000001	0.00033567
11	Yes	4	0.00000001	0.00017856
12	Yes	6	0.00000001	0.00004669
13	Yes	5	0.00000001	0.00045834
14	Yes	6	0.00000001	0.00004842
15	Yes	5	0.00000001	0.00047397
16	Yes	6	0.00000001	0.00004613
17	Yes	5	0.00000001	0.00045251
18	Yes	4	0.00000001	0.00023794
19	Yes	4	0.00000001	0.00010268
20	Yes	6	0.00000001	0.00004634
21	Yes	5	0.00000001	0.00045450
22	Yes	6	0.00000001	0.00004844
23	Yes	5	0.00000001	0.00047410
24	Yes	6	0.00000001	0.00004661
25	Yes	5	0.00000001	0.00045744
26	Yes	4	0.00000001	0.00033574
27	Yes	4	0.00000001	0.00017858
28	Yes	6	0.00000001	0.00004608
29	Yes	5	0.00000001	0.00045193
30	Yes	6	0.00000001	0.00004844
31	Yes	5	0.00000001	0.00047418
32	Yes	6	0.00000001	0.00004665
33	Yes	5	0.00000001	0.00045776
34	Yes	4	0.00000001	0.00000001
35	Yes	5	0.00000001	0.00047285
36	Yes	5	0.00000001	0.00084253
37	Yes	5	0.00000001	0.00093446
38	Yes	5	0.00000001	0.00084487
39	Yes	5	0.00000001	0.00047317
40	Yes	5	0.00000001	0.00084634
41	Yes	5	0.00000001	0.00093883
42	Yes	5	0.00000001	0.00084784
43	Yes	5	0.00000001	0.00047424
44	Yes	5	0.00000001	0.00084791
45	Yes	5	0.00000001	0.00093792
46	Yes	5	0.00000001	0.00084501
47	Yes	5	0.00000001	0.00047281

48	Yes	5	0.00000001	0.00084350
49	Yes	5	0.00000001	0.00093350
50	Yes	5	0.00000001	0.00084254
51	Yes	4	0.00000001	0.00004856
52	Yes	4	0.00000001	0.00072257
53	Yes	4	0.00000001	0.00082919
54	Yes	4	0.00000001	0.00071186
55	Yes	4	0.00000001	0.00005296
56	Yes	4	0.00000001	0.00073222
57	Yes	4	0.00000001	0.00082968
58	Yes	4	0.00000001	0.00071146
59	Yes	4	0.00000001	0.00004857
60	Yes	4	0.00000001	0.00071974
61	Yes	4	0.00000001	0.00083086
62	Yes	4	0.00000001	0.00072918
63	Yes	4	0.00000001	0.00005298
64	Yes	4	0.00000001	0.00070918
65	Yes	4	0.00000001	0.00083087
66	Yes	4	0.00000001	0.00073122

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	154 - 134.83	29.247	59	1.640	0.001
L2	139.16 - 89.16	24.181	59	1.606	0.001
L3	94.83 - 44.54	11.013	59	1.116	0.000
L4	51.46 - 1	3.162	59	0.575	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
156.000	HP2-4.7	59	29.247	1.640	0.001	30463
154.000	BA40-41	59	29.247	1.640	0.001	30463
150.000	EEI Pine Branches	59	27.871	1.635	0.001	30463
142.000	Monopole Sector Stabilizer Kit VSK-M	59	25.138	1.618	0.001	12729
140.000	EEI Pine Branches	59	24.463	1.610	0.001	11072
130.000	EEI Pine Branches	59	21.160	1.546	0.001	7866
120.000	EEI Pine Branches	59	18.009	1.446	0.000	6266
110.000	EEI Pine Branches	59	15.049	1.322	0.000	5202
100.000	EEI Pine Branches	59	12.320	1.187	0.000	4443
90.000	EEI Pine Branches	59	9.861	1.051	0.000	4099
80.000	EEI Pine Branches	59	7.694	0.921	0.000	4033

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	154 - 134.83	115.564	18	6.489	0.004
L2	139.16 - 89.16	95.558	18	6.355	0.003
L3	94.83 - 44.54	43.543	18	4.416	0.001
L4	51.46 - 1	12.505	18	2.274	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
156.000	HP2-4.7	18	115.564	6.489	0.004	7925
154.000	BA40-41	18	115.564	6.489	0.004	7925
150.000	EEI Pine Branches	18	110.130	6.470	0.004	7925
142.000	Monopole Sector Stabilizer Kit VSK-M	18	99.340	6.400	0.003	3310
140.000	EEI Pine Branches	18	96.673	6.370	0.003	2878
130.000	EEI Pine Branches	18	83.628	6.116	0.002	2036
120.000	EEI Pine Branches	18	71.182	5.721	0.002	1614
110.000	EEI Pine Branches	18	59.491	5.232	0.001	1336
100.000	EEI Pine Branches	18	48.709	4.695	0.001	1139
90.000	EEI Pine Branches	18	38.991	4.159	0.001	1048
80.000	EEI Pine Branches	18	30.425	3.646	0.001	1028

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	154 - 134.83 (1)	TP30.03x25.25x0.188	19.170	0.000	0.0	17.118	-9.454	1101.640	0.009
L2	134.83 - 89.16 (2)	TP40.91x28.575x0.313	50.000	0.000	0.0	38.880	-30.259	2704.810	0.011
L3	89.16 - 44.54 (3)	TP51.28x38.886x0.5	50.290	0.000	0.0	77.881	-51.576	5786.200	0.009
L4	44.54 - 1 (4)	TP61x48.575x0.563	50.460	0.000	0.0	107.904	-79.621	7868.290	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	154 - 134.83 (1)	TP30.03x25.25x0.188	137.006	652.443	0.210	0.000	652.443	0.000
L2	134.83 - 89.16	TP40.91x28.575x0.313	1841.225	2179.983	0.845	0.000	2179.983	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L3	89.16 - 44.54 (2)	TP51.28x38.886x0.5	4496.742	5825.591	0.772	0.000	5825.591	0.000
L4	44.54 - 1 (3)	TP61x48.575x0.563	7842.041	9764.667	0.803	0.000	9764.667	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	154 - 134.83 (1)	TP30.03x25.25x0.188	20.550	550.821	0.037	0.373	1307.767	0.000
L2	134.83 - 89.16 (2)	TP40.91x28.575x0.313	53.376	1352.410	0.039	0.083	4370.550	0.000
L3	89.16 - 44.54 (3)	TP51.28x38.886x0.5	64.668	2893.100	0.022	0.082	11683.333	0.000
L4	44.54 - 1 (4)	TP61x48.575x0.563	67.477	3934.150	0.017	0.082	19580.583	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	154 - 134.83 (1)	0.009	0.210	0.000	0.037	0.000	0.220 ✔	1.000	4.8.2 ✔
L2	134.83 - 89.16 (2)	0.011	0.845	0.000	0.039	0.000	0.857 ✔	1.000	4.8.2 ✔
L3	89.16 - 44.54 (3)	0.009	0.772	0.000	0.022	0.000	0.781 ✔	1.000	4.8.2 ✔
L4	44.54 - 1 (4)	0.010	0.803	0.000	0.017	0.000	0.814 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	154 - 134.83	Pole	TP30.03x25.25x0.188	1	-9.454	1101.640	22.0	Pass
L2	134.83 - 89.16	Pole	TP40.91x28.575x0.313	2	-30.259	2704.810	85.7	Pass
L3	89.16 - 44.54	Pole	TP51.28x38.886x0.5	3	-51.576	5786.200	78.1	Pass
L4	44.54 - 1	Pole	TP61x48.575x0.563	4	-79.621	7868.290	81.4	Pass
							Summary	
						Pole (L2)	85.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
						RATING =	**85.7**	**Pass**

CENTEK engineering
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Subject:	Anchor Bolt and Baseplate Analysis
Location:	153-FT EEI Monopine New Milford, CT
Rev. 0: 5/14/19	Prepared by: T.J.L. Checked by: C.A.G. Job No. 19027.65

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$M_u := 7842 \cdot ft \cdot kips$	(Input From RisaTower)
Shear Force =	$Shear := 67 \cdot kips$	(Input From RisaTower)
Axial Force =	$R_u := 80 \cdot kips$	(Input From RisaTower)

Anchor Bolt Data:

ASTMA615 Grade 75

Number of Anchor Bolts =	$N := 28$	(User Input)
Diameter of Bolt Circle =	$D_{BC} := 68.0 \cdot in$	(User Input)
Bolt "Column" Distance =	$l := 3.0 \cdot in$	(User Input)
Bolt Ultimate Strength =	$F_u := 100 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 75 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Anchor Bolts =	$D := 2.25 \cdot in$	(User Input)
Threads per Inch =	$n := 4.5$	(User Input)
Top of Concrete to Bot Leveling Nut =	$l_{ar} := 2 \cdot in$	(User Input)
Anchor Rod Force Correction Factor =	$n_c = 1$	Table 2-1 Addendum 3

Base Plate Data:

Use AST MA572 Grade 60

Plate Yield Strength =	$F_{yf} := 60 \cdot ksi$	(User Input)
Base Plate Thickness =	$t_{TP} := 3 \cdot in$	(User Input)
Base Plate Diameter =	$D_{OD} := 74 \cdot in$	(User Input)
Outer Pole Diameter =	$D_T := 61 \cdot in$	(User Input)
Pole Wall Thickness =	$t_T := 0.5625 \cdot in$	(User Input)
Pole Design Yield Strength =	$F_{yp} := 65 \cdot ksi$	(User Input)
	$\eta := 0.5$	For Ungrouted Base Plate per TIA-222-G Section 4.9.9

Anchor Bolt Analysis:

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 = 3.248 \cdot in^2$

Tensile Root Diameter = $d_{rt} := D - \frac{0.9743 \cdot in}{n} = 2.033 \cdot in$

Plastic Section Modulus = $Z := \frac{d_{rt}^3}{6} = 1.401 \cdot in^3$

Maximum Anchor Rod Force = $P_u := \frac{n_c \cdot \pi \cdot M_u}{N \cdot D_{BC}} + \frac{R_u}{N} = 158.1 \cdot kips$

Maximum Shear Force = $V_u := \frac{Shear}{N} = 2.4 \cdot kips$

Design Tensile Strength = $\Phi R_{nt} := 0.8 \cdot F_u \cdot A_n = 259.815 \cdot k$

Bolt % of Capacity = $\frac{\left(P_u + \frac{V_u}{\eta} \right)}{\Phi R_{nt}} \cdot 100 = 62.7$

Condition1 = $Condition1 := if\left[\frac{\left(P_u + \frac{V_u}{\eta} \right)}{\Phi R_{nt}} \le 1.00, "OK", "Overstressed" \right]$

Condition1 = "OK"

Design Shear Strength = $\Phi R_{nv} := 0.75 \cdot 0.45 \cdot F_u \cdot A_g = 134.193 \cdot k$

Design Flexural Strength = $\Phi R_{nm} := 0.9 \cdot F_y \cdot Z = 94.597 \cdot in \cdot k$

$M_u := \begin{cases} 0 & \text{if } l_{ar} < D \\ 0.65 \cdot l_{ar} \cdot V_u & \text{otherwise} \end{cases} = 0 \cdot in \cdot k$

Bolt % of Capacity = $\left[\left(\frac{V_u}{\Phi R_{nv}} \right)^2 + \left(\frac{P_u}{\Phi R_{nt}} + \frac{M_u}{\Phi R_{nm}} \right)^2 \right] \cdot 100 = 37.1$

Condition2 = $Condition2 := if\left[\left(\frac{V_u}{\Phi R_{nv}} \right)^2 + \left(\frac{P_u}{\Phi R_{nt}} + \frac{M_u}{\Phi R_{nm}} \right)^2 \le 1.00, "OK", "Overstressed" \right]$

Condition2 = "OK"

Base Plate Analysis:

Strength Resistance Factor for Yielding due to Bending = $\phi_b := 0.9$

Strength Resistance Factor for Yielding due to Shear = $\phi_v := 1.0$

Outside Fillet Horizontal Leg Dimension = $w_1 := 0.25 \cdot in$

Effective Pole Outside Diameter = $D_e := D_T + w_1 = 61.25 \cdot in$

Effective Base Plate Outside Diameter = $D_{oe} := \begin{cases} D_{OD} & \text{if } D_{OD} \le \left(D_{BC} + 6 \cdot t_{TP}\right) \\ \left(D_{BC} + 6 \cdot t_{TP}\right) & \text{otherwise} \end{cases} = 74 \cdot in$

Half-Angle Between Radial Lines Extending from Pole Centerline Through Midpoints Between Adjacent Anchor Rods = $\theta_1 := \frac{\pi}{N} = 0.112$

Angle Defining Limiting Effective Base Plate Width Based on Plate Thickness = $\theta_2 := \operatorname{asin}\left(\frac{12 \cdot t_{TP}}{D_{BC}}\right) = 0.558$

Angle Defining Limiting Effective Base Plate Width Based on Distance Between Anchor Rod Bolt Circle and Effective Pole Outside Diameter = $\theta_3 := \operatorname{acos}\left(\frac{D_{BC} + D_e}{2 \cdot D_{BC}}\right) = 0.316$

Governing Angle Defining Effective Base Plate Width Resisting Bending = $\theta := \min\left(\theta_1, \theta_2, \theta_3\right) = 0.112$

Effective Moment Arm of Anchor Rod Force = $x := 0.5 \cdot \left(D_{BC} - D_e\right) = 3.375 \cdot in$

Effective Base Plate Width Resisting Bending from Transverse Bend Line = $B_{et} := D_{BC} \cdot \sin(\theta) = 7.614 \cdot in$

Effective Base Plate Width Resisting Bending from Radial Bend Lines = $B_{er} := \left(D_{oe} - D_e\right) \cdot \sin(\theta) = 1.428 \cdot in$

Total Effective Base Plate Width Resisting Bending = $B_{eff} := B_{et} + B_{er} = 9.041 \cdot in$

Required Base Plate Thickness = $t_{TP.Req} := \sqrt{\frac{4 \cdot P_u \cdot x}{\phi_b \cdot F_{yf} \cdot B_{eff}}} = 2.091 \cdot in$

Plate Bending Stress % of Capacity = $\frac{t_{TP.Req}}{t_{TP}} = 69.7 \cdot \%$

Condition2 = $Condition3 := if\left(\frac{t_{TP.Req}}{t_{TP}} < 1.00, "Ok", "Overstressed"\right)$

Condition3 = "Ok"

Required Base Plate Thickness = $t_{TP.Req} := \frac{\phi_b \cdot t_T \cdot F_{yp}}{\phi_v \cdot 0.6 \cdot F_{yf}} = 0.914 \cdot in$

Plate Bending Stress % of Capacity = $\frac{t_{TP.Req}}{t_{TP}} = 30.5 \cdot \%$

Condition2 = $Condition4 := if\left(\frac{t_{TP.Req}}{t_{TP}} < 1.00, "Ok", "Overstressed"\right)$

Condition4 = "Ok"

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Subject: FOUNDATION ANALYSIS

Location: 163-ft EEI Monopine
New Milford, CT

Rev. 0: 5/14/19

Prepared by: T.J.L Checked by: C.A.G.
Job no. 19027.65

Standard Monopole Foundation:

Input Data:

Tower Data

Overturning Moment =	OM := 7842·ft·kips	(User Input)	
Shear Force =	Shear := 67·kip	(User Input)	
Axial Force =	Axial := 80·kip	(User Input)	
Tower Height =	H_t := 153·ft	(User Input)	

Footing Data:

Overall Depth of Footing =	D_f := 6.5·ft	(User Input)	
Length of Pier =	L_p := 3.5·ft	(User Input)	
Extension of Pier Above Grade =	L_{pag} := 1·ft	(User Input)	
Diameter of Pier =	d_p := 7.5·ft	(User Input)	
Thickness of Footing =	T_f := 4·ft	(User Input)	
Width of Footing =	W_f := 32·ft	(User Input)	

Anchor Bolt Data:

Length of Anchor Bolts=	L_{st} := 96·in	(User Input)	
Projection of Anchor Bolts Above Pier =	A_{BP} := 12·in	(User Input)	
Anchor Bolt Diameter =	d_{anchor} := 2.25·in	(User Input)	
Base Plate Bolt Circle =	MP := 68·in	(User Input)	

Material Properties:

Concrete Compressive Strength =	f_c := 3000·psi	(User Input)	
Steel Reinforcment Yield Strength =	f_y := 60000·psi	(User Input)	
Anchor Bolt Yield Strength =	f_{ya} := 75000·psi	(User Input)	
Internal Friction Angle of Soil =	Φ_s := 10·deg	(User Input)	
Ultimate Soil Bearing Capacity =	q_u := 12000·psf	(User Input)	
Allowable Soil Bearing Capacity =	$q_a := \frac{q_u}{2}$ = 6000·psf	(User Input)	
Unit Weight of Soil =	γ_{soil} := 100·pcf	(User Input)	
Unit Weight of Concrete =	γ_{conc} := 150·pcf	(User Input)	
Foundation Bouyancy =	Bouyancy := 0	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	n := 0·ft	(User Input)	
Cohesion of Clay Type Soil =	c := 0·ksf	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	Z := 2	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	μ := 0.45	(User Input)	

Pier Reinforcement:

Bar Size =	$BS_{pier} := 11$	(User Input)	
Bar Diameter =	$d_{bpier} := 1.41 \cdot in$	(User Input)	
Number of Bars =	$NB_{pier} := 36$	(User Input)	
Clear Cover of Reinforcement =	$Cvr_{pier} := 3 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Diameter of Tie =	$d_{Tie} := 3 \cdot in$	(User Input)	

Pad Reinforcement:

Bar Size =	$BS_{top} := 11$	(User Input)	(Top of Pad)
Bar Diameter =	$d_{btop} := 1.41 \cdot in$	(User Input)	(Top of Pad)
Number of Bars =	$NB_{top} := 42$	(User Input)	(Top of Pad)
Bar Size =	$BS_{bot} := 11$	(User Input)	(Bottom of Pad)
Bar Diameter =	$d_{bbot} := 1.41 \cdot in$	(User Input)	(Bottom of Pad)
Number of Bars =	$NB_{bot} := 42$	(User Input)	(Bottom of Pad)
Clear Cover of Reinforcement =	$Cvr_{pad} := 3.0 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)

Calculated Factors:

Pier Reinforcement Bar Area = $A_{bpier} := \frac{\pi \cdot d_{bpier}^2}{4} = 1.561 \cdot in^2$

Pad Top Reinforcement Bar Area = $A_{btop} := \frac{\pi \cdot d_{btop}^2}{4} = 1.561 \cdot in^2$

Pad Bottom Reinforcement Bar Area = $A_{bbot} := \frac{\pi \cdot d_{bbot}^2}{4} = 1.561 \cdot in^2$

Coefficient of Lateral Soil Pressure = $K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 1.42$

Stability of Footing:

Adjusted Concrete Unit Weight =

$$\gamma_c := \text{if}\left(\text{Bouyancy} = 1, \gamma_{conc} - 62.4pcf, \gamma_{conc}\right) = 150 \cdot pcf$$

Adjusted Soil Unit Weight =

$$\gamma_s := \text{if}\left(\text{Bouyancy} = 1, \gamma_{soil} - 62.4pcf, \gamma_{soil}\right) = 100 \cdot pcf$$

Passive Pressure =

$$P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0 \cdot ksf$$

$$P_{pt} := K_p \cdot \gamma_s \cdot \left(D_f - T_f\right) + c \cdot 2 \cdot \sqrt{K_p} = 0.355 \cdot ksf$$

$$P_{top} := \text{if}\left[n < \left(D_f - T_f\right), P_{pt}, P_{pn}\right] = 0.355 \cdot ksf$$

$$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 0.923 \cdot ksf$$

$$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 0.639 \cdot ksf$$

$$T_p := \text{if}\left[n < \left(D_f - T_f\right), T_f, \left(D_f - n\right)\right] = 4$$

$$A_p := W_f \cdot T_p = 128$$

Ultimate Shear =

$$S_u := P_{ave} \cdot A_p = 81.808 \cdot kip$$

Weight of Concrete Pad =

$$WT_c := \left[\left(W_f^2 \cdot T_f\right) + d_p^2 L_p\right] \cdot \gamma_c = 643.931 \cdot kip$$

Weight of Soil Above Footing =

$$WT_{s1} := \left[\left(W_f^2 - d_p^2\right) \cdot \left(\left|L_p - L_{pag} - n\right|\right)\right] \cdot \gamma_s = 241.94 \cdot kip$$

Weight of Soil Wedge at Back Face =

$$WT_{s2} := \left(\frac{D_f^2 \cdot \tan\left(\Phi_s\right)}{2} \cdot W_f\right) \cdot \gamma_s = 11.92 \cdot kip$$

Weight of Soil Wedge at back face Corners =

$$WT_{s3} := 2 \cdot \left[\left(D_f\right)^3 \cdot \frac{\tan\left(\Phi_s\right)}{3}\right] \cdot \gamma_s = 3.228 \cdot kips$$

Total Weight =

$$WT_{tot} := WT_c + WT_{s1} + Axial = 965.869 \cdot kip$$

Resisting Weight =

$$WT_R := 0.9 \cdot WT_c + 0.75 \cdot WT_{s1} + 0.75 \cdot Axial = 820.991 \cdot kip$$

Resisting Moment =

$$M_r := \left(WT_R\right) \cdot \frac{W_f}{2} + 0.75 \cdot S_u \cdot \frac{T_f}{3} + 0.75 \cdot \left[\left(WT_{s2} + WT_{s3}\right) \cdot \left(W_f + \frac{D_f \cdot \tan\left(\Phi_s\right)}{3}\right)\right] = 13586 \cdot kip \cdot ft$$

Overturning Moment =

$$M_{ot} := OM + Shear \cdot \left(L_p + T_f\right) = 8345 \cdot kip \cdot ft$$

Factor of Safety Actual =

$$FS := \frac{M_r}{M_{ot}} = 1.63$$

Factor of Safety Required =

$$FS_{req} := 1$$

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

OverTurning_Moment_Check = "Okay"

Shear Capacity in Pier:

Shear Resistance of Pier = $S_p := \frac{P_{ave} \cdot A_p + \mu \cdot WT_{tot}}{FS_{req}} = 516.449 \cdot kips$

$Shear\_Check := if(S_p > Shear, "Okay", "No Good")$

Shear_Check = "Okay"

Bearing Pressure Caused by Footing:

Area of the Mat = $A_{mat} := W_f^2 = 1.024 \times 10^3$

Section Modulus of Mat = $S := \frac{W_f^3}{6} = 5461.33 \cdot ft^3$

Maximum Pressure in Mat = $P_{max} := \frac{WT_{tot}}{A_{mat}} + \frac{M_{ot}}{S} = 2.471 \cdot ksf$

$Max\_Pressure\_Check := if(P_{max} < .75 \cdot q_u, "Okay", "No Good")$

Max_Pressure_Check = "Okay"

Minimum Pressure in Mat = $P_{min} := \frac{WT_{tot}}{A_{mat}} - \frac{M_{ot}}{S} = -0.585 \cdot ksf$

$Min\_Pressure\_Check := if[(P_{min} \geq 0) \cdot (P_{min} < .75 \cdot q_u), "Okay", "No Good"]$

Min_Pressure_Check = "No Good"

Distance to Resultant of Pressure Distribution = $X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3} = 8.626$

Distance to Kern = $X_k := \frac{W_f}{6} = 5.333$ Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity = $e := \frac{\frac{M_{ot}}{1.6}}{WT_{tot}} = 5.4$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot WT_{tot}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e\right)} = 1.898 \cdot ksf$

$q_{adj} := if(P_{min} < 0, P_a, P_{max}) = 1.898 \cdot ksf$

$Pressure\_Check := if(q_{adj} < q_a, "Okay", "No Good")$

Pressure_Check = "Okay"

Concrete Bearing Capacity:

Strength Reduction Factor = $\Phi_c := 0.65$ (ACI-2008 9.3.2.2)

Bearing Strength Between Pier and Pad = $P_b := \Phi_c \cdot 0.85 \cdot f_c \cdot \frac{\pi \cdot d_p^2}{4} = 1.054 \times 10^4 \cdot kips$ (ACI-2008 10.14)

$Bearing\_Check := if\left(P_b > Axial, "Okay", "No Good"\right)$

Bearing_Check = "Okay"

Shear Strength of Concrete:

Beam Shear: (Critical section located at a distance d from the face of Pier) (ACI 11.3.1.1)

$\phi_c := 0.85$ (ACI 9.3.2.5)

$d := T_f - Cvr_{pad} - d_{bbot} = 3.632$

$d_1 := \frac{W_f}{2} - \frac{d_p}{2}$

$d_2 := d_1 - d$

$L := \left(\frac{W_f}{2} - e\right) \cdot 3$

$Slope := if\left(L > W_f, \frac{P_{max} - P_{min}}{W_f}, \frac{q_{adj}}{L}\right)$

$V_{req} := \left[\left(q_{adj} - Slope \cdot d_1\right) + \left(\frac{Slope \cdot d_1}{2}\right)\right] \cdot W_f \cdot d_1$

$V_{Avail} := \phi_c \cdot 2 \cdot \sqrt{f_c \cdot psi} \cdot W_f \cdot d$ (ACI-2008 11.2.1.1)

$Beam\_Shear\_Check := if\left(V_{req} < V_{Avail}, "Okay", "No Good"\right)$

Beam_Shear_Check = "Okay"

Punching Shear: (Critical Section Located at a distance of d/2 from the face of pier) (ACI 11.11.1.2)

Critical Perimeter of Punching Shear = $b_o := \left(d_p + d\right) \cdot \pi = 35$

Area Included Inside Perimeter = $A_{bo} := \frac{\pi \cdot \left(d_p + d\right)^2}{4} = 97.3$

Area Outside of Perimeter = $A_{out} := A_{mat} - A_{bo} = 926.7$

Guess Value = $v_u := 1ksf$ (From "Foundation Analysis and design", By Joseph Bowles, Eq. 8-9)

Given $d^2 + d_p \cdot d = \frac{WT_{tot}}{\pi \cdot v_u}$

$v_u := Find(v_u) = 7.6 \cdot ksf$

$V_u := v_u \cdot d \cdot W_f = 883.7 \cdot kips$

Required Shear Strength = $V_{req} := V_u = 883.7 \cdot kips$

Available Shear Strength = $V_{Avail} := \phi_c \cdot 4 \cdot \sqrt{f_c \cdot psi} \cdot b_o \cdot d = 3406.8 \cdot kip$ (ACI-2008 11.11.2.1)

$Punching\_Shear\_Check := if(V_{req} < V_{Avail}, "Okay", "No Good")$

Punching_Shear_Check = "Okay"

Steel Reinforcement in Pad:

Required Reinforcement for Bending:

Strength Reduction Factor = $\phi_m := .90$ (ACI-2008 9.3.2.1)

$q_b := q_{adj} - d_1 \cdot Slope = 1.167 \cdot ksf$

Maximum Bending at Face of Pier = $M_n := \frac{1}{\phi_m} \cdot \left[(q_{adj} - q_b) \cdot \frac{d_1^2}{3} + q_b \cdot \frac{d_1^2}{2} \right] \cdot W_f = 4413.9 \cdot kip \cdot ft$

$\beta := \begin{cases} 0.85 & \text{if } 2500 \cdot psi \le f_c \le 4000 \cdot psi \\ 0.65 & \text{if } f_c > 8000 \cdot psi \\ \left[0.85 - \left[\frac{\left(\frac{f_c}{psi} - 4000 \right)}{1000} \right] \cdot 0.5 \right] & \text{otherwise} \end{cases} = 0.85$ (ACI-200810.2.7.3)

$R_n := \frac{M_n}{W_f \cdot d^2} = 72.6 \cdot psi$

$\rho := \frac{0.85 \cdot f_c}{f_y} \left(1 - \sqrt{1 - \frac{2 \cdot R_n}{0.85 \cdot f_c}} \right) = 0.0012$

$\rho_{min} := \rho = 0.00123$

Required Reinforcement for Temperature and Shrinkage:

$$\rho_{sh} := \begin{cases} .0018 & \text{if } f_y \geq 60000 \cdot psi \\ .0020 & \text{otherwise} \end{cases}$$ (ACI-2008 7.12.2.1)

Check Bottom Bars:

$$As := \begin{cases} \rho_{min} \cdot W_f \cdot d & \text{if } \rho_{min} > \frac{\rho_{sh}}{2} \\ \rho_{sh} \cdot W_f \cdot \frac{d}{2} & \text{otherwise} \end{cases} = 20.549 \cdot in^2$$

$As_{prov.bot} := A_{bbot} \cdot NB_{bot} = 65.6 \cdot in^2$

$Pad\_Reinforcement\_Bot := if(As_{prov.bot} > As, "Okay", "No Good")$

$Pad\_Reinforcement\_Bot = "Okay"$

Check Temp Shrinkage Reinforcement:

$As := \rho_{sh} \cdot (W_f \cdot T_f) = 33.2 \cdot in^2$

$As_{prov.top} := A_{btop} \cdot NB_{top} = 65.6 \cdot in^2$

$As_{prov.tot} := As_{prov.bot} + As_{prov.top} = 131.2 \cdot in^2$

$Pad\_Reinforcement\_Temp := if(As_{prov.tot} > As, "Okay", "No Good")$

$Pad\_Reinforcement\_Temp = "Okay"$

Developement Length Pad Reinforcement:

Bar Spacing =

$$B_{sPad} := \frac{W_f - 2 \cdot Cvr_{pad} - NB_{bot} \cdot d_{bbot}}{NB_{bot} - 1} = 7.78 \cdot in$$

Spacing or Cover Dimension =

$$c := if\left(Cvr_{pad} < \frac{B_{sPad}}{2}, Cvr_{pad}, \frac{B_{sPad}}{2}\right) = 3 \cdot in$$

Transverse Reinforcement Index =

$k_{tr} := 0$ (ACI-2008 12.2.3)

$$L_{dbt} := \frac{3 \cdot f_y \alpha_{pad} \cdot \beta_{pad} \cdot \gamma_{pad} \cdot \lambda_{pad}}{40 \cdot \sqrt{f_c \cdot psi} \cdot \frac{c + k_{tr}}{d_{bbot}}} \cdot d_{bbot} = 54.4 \cdot in$$

Minimum Development Length =

$L_{dbmin} := 12 \cdot in$ (ACI-2008 12.2.1)

$L_{dbtCheck} := if(L_{dbt} \geq L_{dbmin}, "Use L.dbt", "Use L.dbmin")$

Available Length in Pad =

$$L_{Pad} := \frac{W_f}{2} - \frac{d_p}{2} - Cvr_{pad} = 144 \cdot in$$

$Lpad\_Check := if(L_{Pad} > L_{dbt}, "Okay", "No Good")$

$Lpad\_Check = "Okay"$

Steel Reinforcement in Pier:

Area of Pier = $A_p := d_p^2 = 8100 \cdot in^2$

$A_{smin} := 0.01 \cdot 0.5 \cdot A_p = 40.5 \cdot in^2$ (ACI-2008 10.8.4 & 10.9.1)

$A_{sprov} := NB_{pier} \cdot A_{bpier} = 56.21 \cdot in^2$

$Steel\_Area\_Check := if(A_{sprov} > A_{smin}, "Okay", "No Good")$

Steel_Area_Check = "Okay"

NOTE: Anchor Bolts are not accounted for in reinforcement calculation and will provide additional reinforcement to satisfy minimum requirement of steel.

Bar Spacing In Pier = $B_{sPier} := \frac{d_p \cdot \pi}{NB_{pier}} - d_{bpier} = 6.444 \cdot in$

Diameter of Reinforcement Cage = $Diam_{cage} := d_p - 2 \cdot Cvr_{pier} = 84 \cdot in$

Maximum Moment in Pier = $M_p := \left[OM + Shear \cdot \left(L_p + \frac{A_{BP}}{2} \right) \right] = 97320 \cdot in \cdot kips$

Pier Check evaluated from outside program and results are listed below;

$(D \ N \ n \ P_u \ M_{xu}) := \left(d_p \cdot 12 \ \ NB_{pier} \ \ BS_{pier} \ \ \frac{Axial \cdot 1.333}{kips} \ \ \frac{M_p}{in \cdot kips} \right)$

$(D \ N \ n \ P_u \ M_{xu}) = (90 \ \ 36 \ \ 11 \ \ 106.6 \ \ 97320)$

$(\phi P_n \ \ \phi M_{xn} \ \ f_{sp} \ \ \rho) := (0 \ \ 0 \ \ 0 \ \ 0)$

$(\phi P_n \ \ \phi M_{xn} \ \ f_{sp} \ \ \rho) := \phi P'_n(D, N, n, P_u, M_{xu})^T$

$(\phi P_n \ \ \phi M_{xn} \ \ f_{sp} \ \ \rho) = (123.2 \ \ 1.1 \times 10^5 \ \ -60 \ \ 0)$

$Axial\_Load\_Check := if(\phi P_n \geq P_u, "Okay", "No Good")$

Axial_Load_Check = "Okay"

$Bending\_Check := if(\phi M_{xn} \geq M_{xu}, "Okay", "No Good")$

Bending_Check = "Okay"

Development Length Pier Reinforcement:

Available Length in Foundation:

$L_{pier} := L_p - Cvr_{pier} = 39 \cdot in$

$L_{pad} := T_f - Cvr_{pad} = 45 \cdot in$

Tension: (ACI-2008 12.2.3)

Spacing or Cover Dimension =

$c := if\left(Cvr_{pier} < \frac{B_{sPier}}{2}, Cvr_{pier}, \frac{B_{sPier}}{2}\right) = 3 \cdot in$

Transverse Reinforcement =

$k_{tr} := 0$ (ACI-2008 12.2.3)

$L_{dbt} := \frac{3 \cdot f_y \alpha_{pier} \cdot \beta_{pier} \cdot \gamma_{pier} \cdot \lambda_{pier}}{40 \cdot \sqrt{f_c \cdot psi} \cdot \left(\frac{c + k_{tr}}{d_{bpier}}\right)} \cdot d_{bpier} = 54.45 \cdot in$

Minimum Development Length =

$L_{dh} := \frac{1200 \cdot d_{bpier}}{\sqrt{\frac{f_c}{psi}}} \cdot .7 = 21.624 \cdot in$ (ACI 12.2.1)

Pier reinforcement bars are standard 90 degree hooks and therefore developement in the pad is computed as follows:

$L_{db} := \max\left(L_{dbt}, L_{dbmin}\right)$

$L_{tension\_Check} := if\left(L_{pier} + L_{pad} > L_{dbt}, "Okay", "No Good"\right)$

$L_{tension\_Check} = "Okay"$

Compression: (ACI-2008 12.3.2)

$L_{dbc1} := \frac{.02 \cdot d_{bpier} \cdot f_y}{\sqrt{f_c \cdot psi}} = 30.892 \cdot in$

$L_{dbmin} := 0.0003 \cdot \frac{in^2}{lb} \cdot \left(d_{bpier} \cdot f_y\right) = 25.38 \cdot in$

$L_{dbc} := if\left(L_{dbc1} \geq L_{dbmin}, L_{dbc1}, L_{dbmin}\right) = 30.892 \cdot in$

$L_{compression\_Check} := if\left(L_{pier} + L_{pad} > L_{dbc}, "Okay", "No Good"\right)$

$L_{compression\_Check} = "Okay"$

RAN Template:	A&L Template:	Power System Template:
67D04G	67D04G_1DP+1OP	Custom

CTNH362B_L600_5.1_draft

Section 1 - Site Information

Site ID: CTNH362B
Status: Draft
Version: 5.1
Project Type: L600
Approved: Not Approved
Approved By: Not Approved
Last Modified: 4/30/2019 8:55:31 PM
Last Modified By: GSM1900\AMurill9

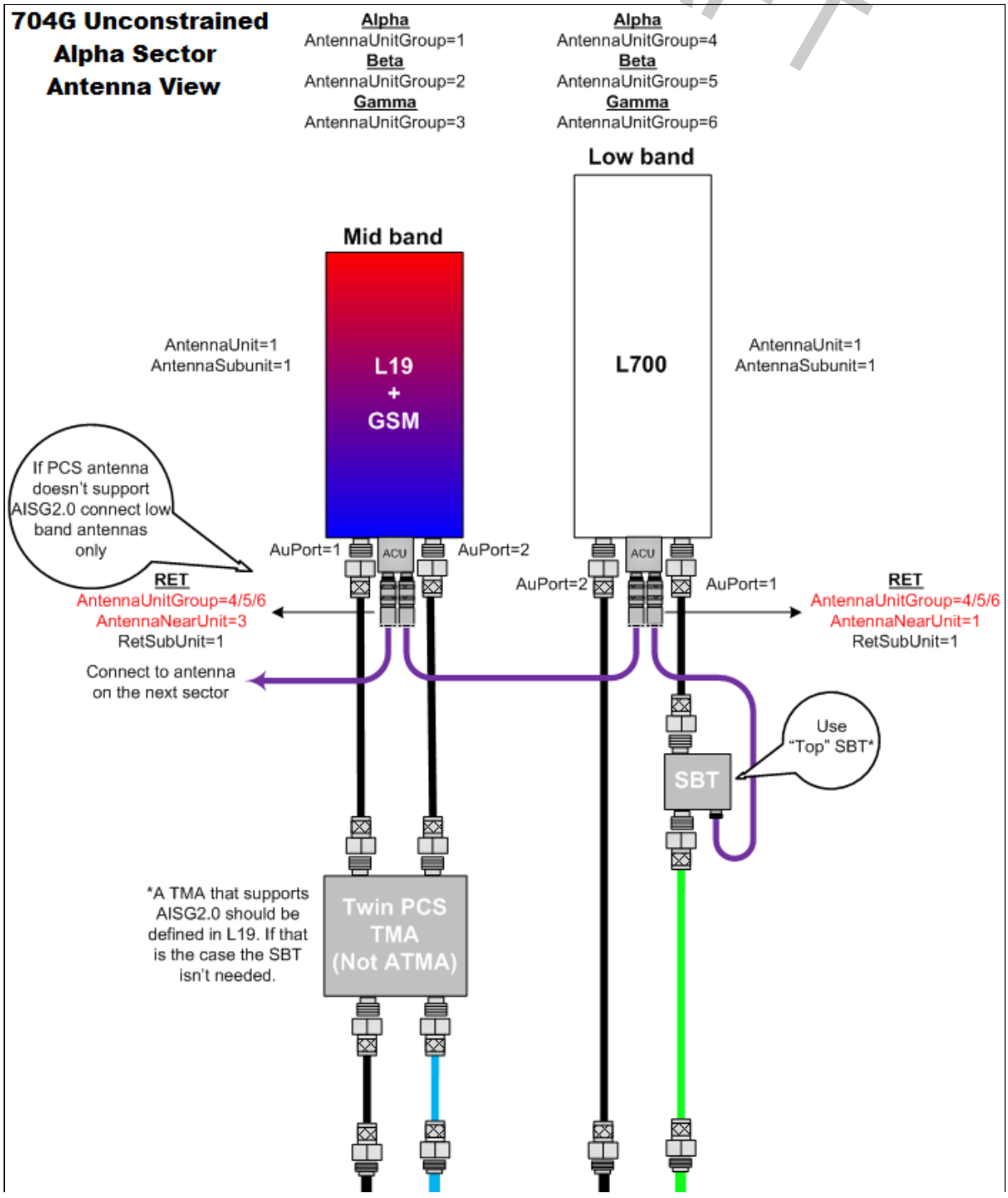
Site Name: NH362/Boardman_MP
Site Class: Monopole
Site Type: Structure Non Building
Plan Year:
Market: CONNECTICUT
Vendor: Ericsson
Landlord: private

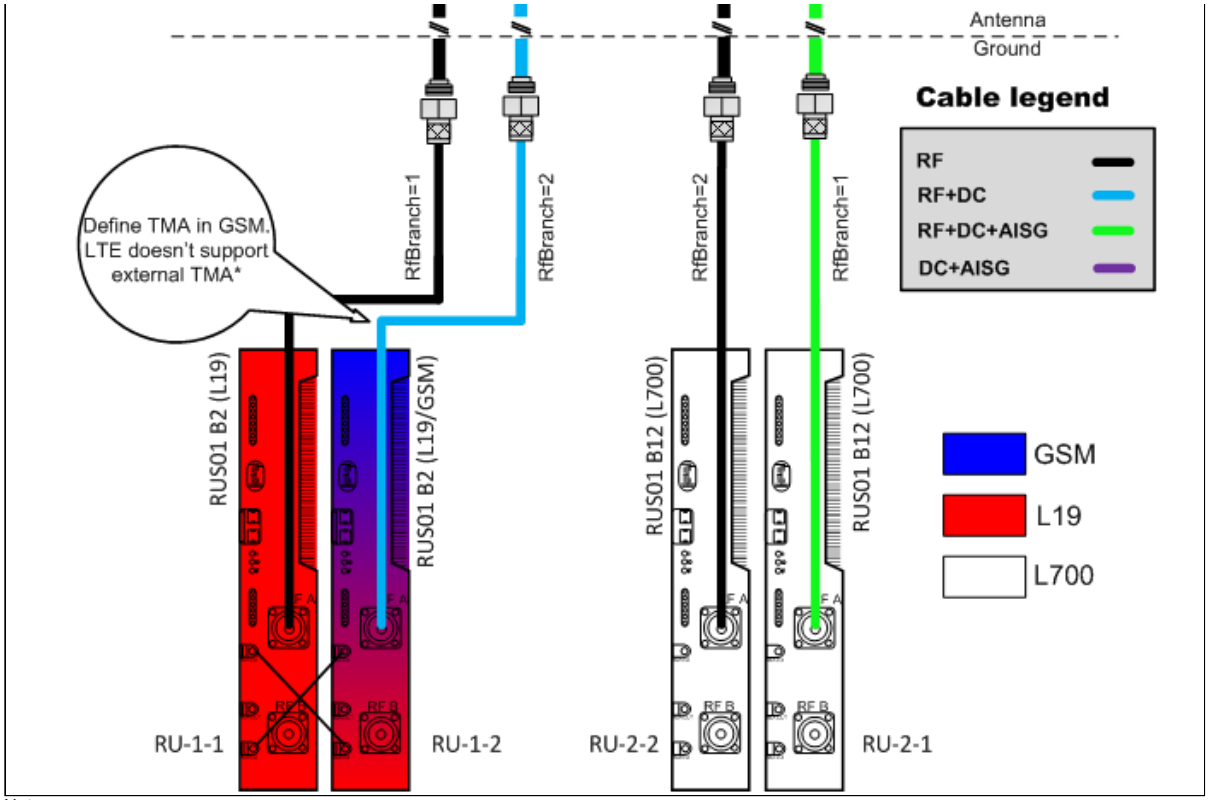
Latitude: 41.5995543900
Longitude: -73.4376092000
Address: 33 Boardman Road
City, State: New Milford, CT
Region: NORTHEAST

RAN Template: 67D04G			AL Template: 67D04G_1DP+1OP	
Sector Count: 3	**Antenna Count:** 6	**Coax Line Count:** 12	**TMA Count:** 3	**RRU Count:** 3

Section 2 - Existing Template Images

AL_704G_Unconstrained.png

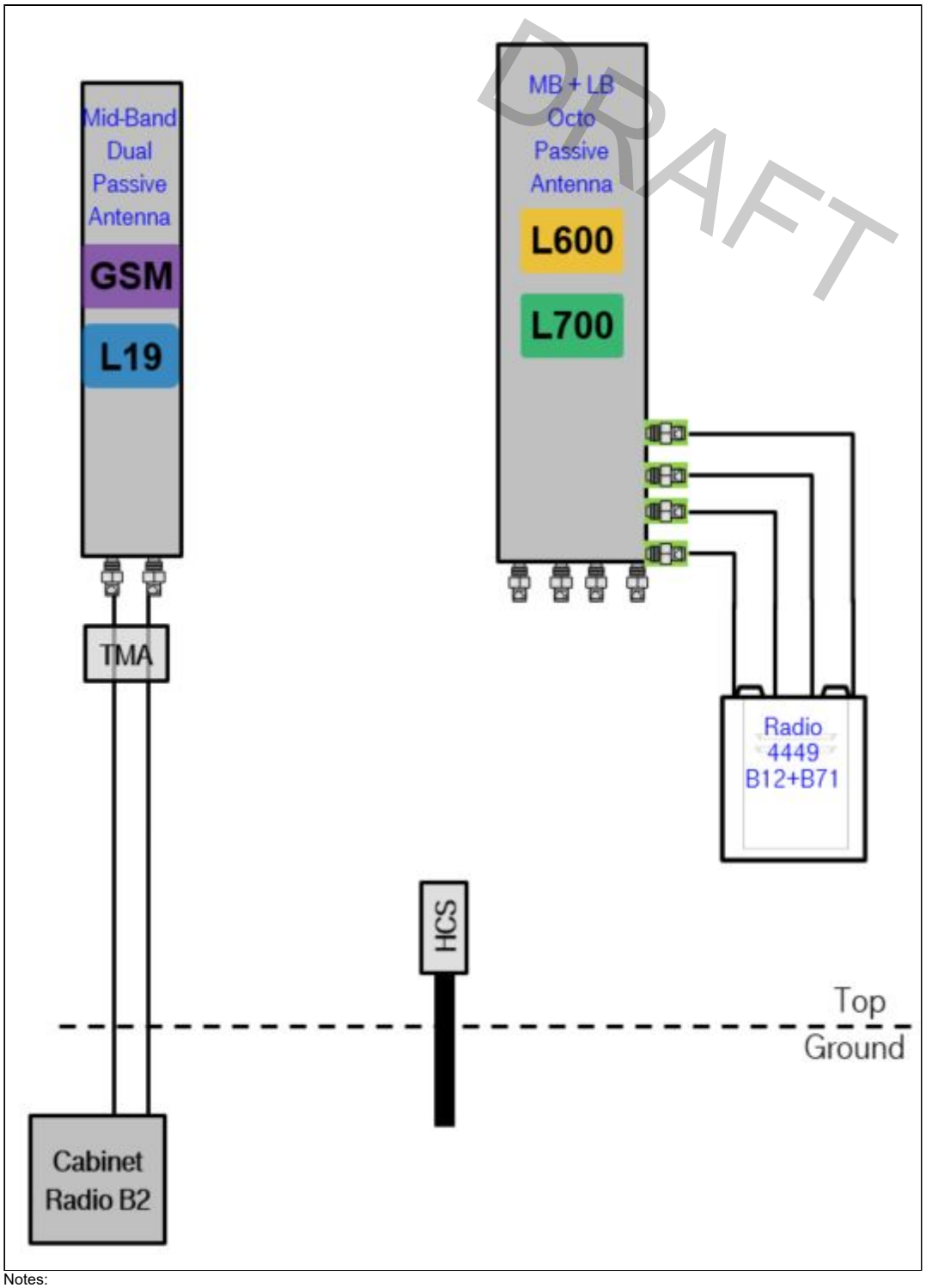



Antenna
Ground
Cable legend
RF
RF+DC
RF+DC+AISG
DC+AISG
Define TMA in GSM. LTE doesn't support external TMA*
RfBranch=1
RfBranch=2
RfBranch=2
RfBranch=1
RUS01 B2 (L19)
RUS01 B2 (L19/GSM)
RUS01 B12 (L700)
RUS01 B12 (L700)
GSM
L19
L700
RU-1-1
RU-1-2
RU-2-2
RU-2-1

Notes:

Section 3 - Proposed Template Images

Capture.JPG



Notes:

Section 4 - Siteplan Images

----- This section is intentionally blank. -----

RAN Template:	A&L Template:	Power System Template:
67D04G	67D04G_1DP+1OP	Custom

CTNH362B_L600_5.1_draft

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 704G

Enclosure	1
Enclosure Type	RBS 6201
Baseband	DUG20, DUS41
Radio	RUS01 B2 (x3) [L1900, G1900]; RUS01 B2 (x3) [L1900]; RUS01 B12 (x6) [L700]

Proposed RAN Equipment

Template: 67D04G

Enclosure	1
Enclosure Type	RBS 6201 ODE
Baseband	DUG20 [G1900]; BB 6630 [L1900, L700, L600]; BB 6630 [N600 (DARK)]
Hybrid Cable System	Ericsson 6x12 HCS *Select Length & AWG*
Radio	RUS01 B2 (x3) [G1900]; RUS01 B2 (x3) [L1900]

RAN Scope of Work:

*** Existing Cabinet RBS6201 ODE ***

Remove all (6) RUS01 B12 from cabinet.

Add (1) 6X12 HCS
Existing: (12) Coaxial Lines

RAN Template:	A&L Template:	Power System Template:
67D04G	67D04G_1DP+1OP	Custom

CTNH362B_L600_5.1_draft

Section 6 - A&L Equipment

Existing Template: 704G_Unconstrained
Proposed Template: 67D04G_1DP+1OP

Sector 1 (Existing) view from behind		
Coverage Type	A - Outdoor Macro	
Antenna	**1**	**2**
Antenna Model	RFS - APXV18-209014-C-A20 (Dual)	Andrew - LNX-6515DS-A1M (Dual)
Azimuth	60	60
M. Tilt	0	0
Height	140	140
Ports	**P1**	**P2**
Active Tech.	L1900 G1900	L700
Dark Tech.		
Restricted Tech.		
Decomm. Tech.		
E. Tilt	2	
Cables	1-5/8" Coax - 160 ft. **(x2)**	1-5/8" Coax - 160 ft. **(x2)**
TMAs	Generic Twin Style 1A - PCS (AtAntenna)	
Diplexers / Combiners		
Radio		
Sector Equipment		Andrew Smart Bias T (At Antenna)

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D04G	67D04G_1DP+1OP	Custom

CTNH362B_L600_5.1_draft

Sector 1 (Proposed) view from behind					
Coverage Type	A - Outdoor Macro				
Antenna	1	2			
Antenna Model	RFS - APXV18-209014-C-A20 (Dual)	RFS - APXVAARR24_43-U-NA20 (Octo)			
Azimuth	60	60			
M. Tilt	0	0			
Height	140	140			
Ports	P1	P2	P3	P4	P5
Active Tech.	L1900 G1900	L700 L600	L700 L600		
Dark Tech.					
Restricted Tech.					
Decomm. Tech.					
E. Tilt	2				
Cables	1-5/8" Coax - 160 ft. **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**		
TMAs	Generic Twin Style 1A - PCS (AtAntenna)				
Diplexers / Combiners					
Radio		Radio 4449 B71+B12 (At Antenna)	SHARED Radio 4449 B71+B12 (At Antenna)		
Sector Equipment					Andrew Smart Bias T (At Antenna)

Unconnected Equipment:

Cable: 1-5/8" Coax - 160 ft.

Cable: 1-5/8" Coax - 160 ft.

Scope of Work:

Replace LB Dual in Position 2 with (1) LB/MB Octo.
Add (1) Radio 4449 B71+B12 for L600 and L700 to Position 2 at antenna.

Smart Bias-T should be present. Daisy-chain RETs.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:	Power System Template:
67D04G	67D04G_1DP+1OP	Custom

CTNH362B_L600_5.1_draft

Sector 2 (Existing) view from behind		
Coverage Type	A - Outdoor Macro	
Antenna	1	2
Antenna Model	RFS - APXV18-209014-C-A20 (Dual)	Andrew - LNX-6515DS-A1M (Dual)
Azimuth	180	180
M. Tilt	0	0
Height	140	140
Ports	P1	P2
Active Tech.	L1900 G1900	L700
Dark Tech.		
Restricted Tech.		
Decomm. Tech.		
E. Tilt	2	
Cables	1-5/8" Coax - 160 ft. (x2)	1-5/8" Coax - 160 ft. (x2)
TMAs	Generic Twin Style 1A - PCS (AtAntenna)	
Diplexers / Combiners		
Radio		
Sector Equipment		Andrew Smart Bias T (At Antenna)

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D04G	67D04G_1DP+1OP	Custom

CTNH362B_L600_5.1_draft

Sector 2 (Proposed) view from behind					
Coverage Type	A - Outdoor Macro				
Antenna	1	2			
Antenna Model	RFS - APXV18-209014-C-A20 (Dual)	RFS - APXVAARR24_43-U-NA20 (Octo)			
Azimuth	180	180			
M. Tilt	0	0			
Height	140	140			
Ports	P1	P2	P3	P4	P5
Active Tech.	L1900 G1900	L700 L600	L700 L600		
Dark Tech.					
Restricted Tech.					
Decomm. Tech.					
E. Tilt	2				
Cables	1-5/8" Coax - 160 ft. **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**		
TMAs	Generic Twin Style 1A - PCS (AtAntenna)				
Diplexers / Combiners					
Radio		Radio 4449 B71+B12 (At Antenna)	SHARED Radio 4449 B71+B12 (At Antenna)		
Sector Equipment					Andrew Smart Bias T (At Antenna)

Unconnected Equipment:

Cable: 1-5/8" Coax - 160 ft. | Cable: 1-5/8" Coax - 160 ft.

Scope of Work:

Replace LB Dual in Position 2 with (1) LB/MB Octo.
Add (1) Radio 4449 B71+B12 for L600 and L700 to Position 2 at antenna.

Smart Bias-T should be present. Daisy-chain RETs.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:	Power System Template:
67D04G	67D04G_1DP+1OP	Custom

CTNH362B_L600_5.1_draft

Sector 3 (Existing) view from behind		
Coverage Type	A - Outdoor Macro	
Antenna	1	2
Antenna Model	RFS - APXV18-209014-C-A20 (Dual)	Andrew - LNX-6515DS-A1M (Dual)
Azimuth	300	300
M. Tilt	0	0
Height	140	140
Ports	P1	P2
Active Tech.	L1900 G1900	L700
Dark Tech.		
Restricted Tech.		
Decomm. Tech.		
E. Tilt	2	
Cables	1-5/8" Coax - 160 ft. (x2)	1-5/8" Coax - 160 ft. (x2)
TMAs	Generic Twin Style 1A - PCS (AtAntenna)	
Diplexers / Combiners		
Radio		
Sector Equipment		Andrew Smart Bias T (At Antenna)

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D04G	67D04G_1DP+1OP	Custom

CTNH362B_L600_5.1_draft

Sector 3 (Proposed) view from behind					
Coverage Type	A - Outdoor Macro				
Antenna	1	2			
Antenna Model	RFS - APXV18-209014-C-A20 (Dual)	RFS - APXVAARR24_43-U-NA20 (Octo)			
Azimuth	300	300			
M. Tilt	0	0			
Height	140	140			
Ports	P1	P2	P3	P4	P5
Active Tech.	L1900 G1900	L700 L600	L700 L600		
Dark Tech.					
Restricted Tech.					
Decomm. Tech.					
E. Tilt	2				
Cables	1-5/8" Coax - 160 ft. **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**		
TMAs	Generic Twin Style 1A - PCS (AtAntenna)				
Diplexers / Combiners					
Radio		Radio 4449 B71+B12 (At Antenna)	SHARED Radio 4449 B71+B12 (At Antenna)		
Sector Equipment					Andrew Smart Bias T (At Antenna)

Unconnected Equipment:

Cable: 1-5/8" Coax - 160 ft. | Cable: 1-5/8" Coax - 160 ft.

Scope of Work:

Replace LB Dual in Position 2 with (1) LB/MB Octo.
Add (1) Radio 4449 B71+B12 for L600 and L700 to Position 2 at antenna.

Smart Bias-T should be present. Daisy-chain RETs.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:	Power System Template:
67D04G	67D04G_1DP+1OP	Custom

CTNH362B_L600_5.1_draft

Section 7 - Power Systems Equipment

Existing Power Systems Equipment

----- This section is intentionally blank. -----

Proposed Power Systems Equipment

RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

FEATURES / BENEFITS

This antenna provides a 8 Port multi-band flexible platform for advanced use for flexible use in deployment scenarios for encompassing 600MHz, 700MHz, AWS & PCS applications.

- **24 Inch Width For Easier Zoning**
- **Field Replaceable (Integrated) AISG RET platform for reduced environmental exposure and long lasting quality**
- **Superior elevation pattern performance across the entire electrical down tilt range**
- **Includes three AISG RET motors - Includes 0.5m AISG jumper for optional diasy chain of two high band RET motors for one single AISG point of high band tilt control.**
- **Low band arrays driven by a single RET motor**

Technical Features

LOW BAND LEFT ARRAY (617-746 MHZ) [R1]

Frequency Band	MHz	617-698	698-746
Gain	dBi	15.1	15.5
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.4
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	24
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

LOW BAND RIGHT ARRAY (617-746 MHZ) [R2]

Frequency Band	MHz	617-698	698-746
Gain	dBi	14.8	15.1
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.3
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	23
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

ELECTRICAL SPECIFICATIONS

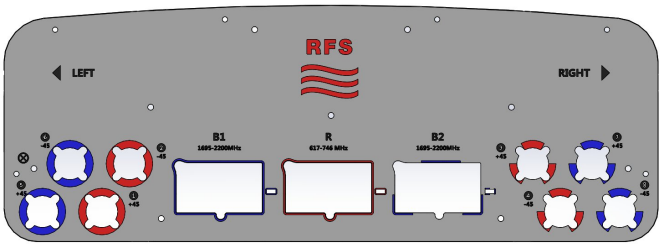
Impedance	Ohm	50.0
Polarization	Deg	±45°

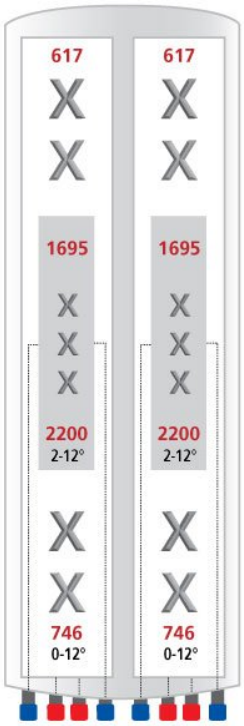
MECHANICAL SPECIFICATIONS

Dimensions - H x W x D	mm (in)	2436 x 609 x 222 (95.9 x 24 x 8.7)
Weight (Antenna Only)	kg (lb)	58 (128)
Weight (Mounting Hardware only)	kg (lb)	11.5 (25.3)
Shipping Weight	kg (lb)	80 (176)
Connector type		8 x 4.3-10 female at bottom + 6 AISG connectors (3 male, 3 female)
Adjustment mechanism		Integrated RET solution AISG compliant (Field Replaceable) + Manual Override + External Tilt Indicator
Mounting Hardware Material		Galvanized steel
Radome Material / Color		Fiber Glass / Light Grey RAL7035

TESTING AND ENVIRONMENTAL

Temperature Range	°C (°F)	-40 to 60 (-40 to 140)
Lightning protection		IEC 61000-4-5
Survival/Rated Wind Velocity	km/h	241 (150)
Environmental		ETSI 300-019-2-4 Class 4.1E





ORDERING INFORMATION

Order No.	Configuration	Mounting Hardware	Mounting pipe Diameter	Shipping Weight
APXVAARR24_43-U-NA20	Field Replace RET included (3)	APM40-5E Beam tilt kit (included)	60-120mm	80 Kg

Exhibit E

Mount Analysis

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

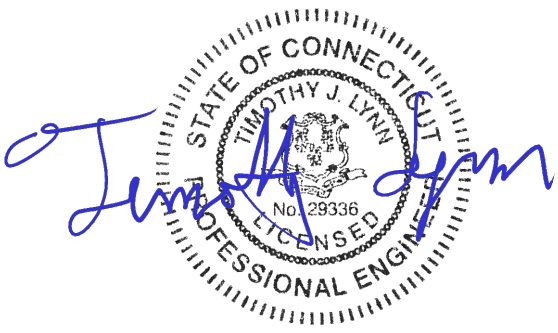
T-Mobile Site #: CTNH362B

33 Boardman Road
New Milford, CT

Centek Project No. 19027.65

Date: May 14, 2019

Max Stress Ratio = 64.3%



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

CENTEK engineering

Centered on Solutions℠

May 14, 2019

Mr. Dan Reid
Transcend Wireless
10 Industrial Ave
Mahwah, NJ 07430

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CTNH362B
33 Boardman Road
New Milford, CT 06776

Centek Project No. 19027.65

Dear Mr. Reid,

Centek Engineering, Inc. has reviewed the T-Mobile antenna installation at the above referenced site. The purpose of the review is to determine the structural adequacy of the existing mount, consisting of three (3) 10-ft T-arms to support the proposed/existing equipment configuration. The review considered the effects of wind load, dead load and ice load in accordance with the 2015 International Building Code as modified by the 2018 Connecticut State Building Code (CTBC) including ASCE 7-10 and ANSI/TIA-222-G *Structural Standards for Steel Antenna Towers and Supporting Structures*.

The loads considered in this analysis consist of the following:

- T-Mobile:
  T-Arms: Three (3) RFS APXV18-209014 panel antennas, three (3) RFS APXVAARR24-43-NA20 panel antennas, three (3) KRY112 TMAs and three (3) Ericsson 4449 B71_B12 remote radio units mounted on three (3) T-Arms with a RAD center elevation of 140-ft +/- AGL.

The antenna mount was analyzed per the requirements of the 2015 International Building Code as modified by the 2018 Connecticut State Building Code considering a nominal design wind speed of 89 mph for New Milford as required in Appendix N of the 2018 Connecticut State Building Code.

A structural analysis of tower and foundation needs to be completed prior to any work.

Based on our review of the installation, it is our opinion that the subject antenna mount with the installation of one (1) stabilizer kit (Perfect10 p/n: VSK-M) has sufficient capacity to support the aforementioned antenna configuration. If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

Section 2 - Calculations

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

Subject: Loads on Equipment

Location: New Milford,CT

Rev. 0: 05/13/19

Prepared by: F.J.P Checked by: T.J.L.
Job No. 19027.65

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA-222-G

Wind Speeds

Basic Wind Speed	$V := 89$	mph	(User Input - 2018 CSBC Appendix N)
Basic Wind Speed with Ice	$V_i := 40$	mph	(User Input per Annex B of TIA-222-G)

Input

Structure Type =	$Structure\_Type := Pole$		(User Input)
Structure Category =	$SC := II$		(User Input)
Exposure Category =	$Exp := C$		(User Input)
Structure Height =	$h := 154$	ft	(User Input)
Height to Center of Antennas =	$z := 140$	ft	(User Input)
Radial Ice Thickness =	$t_i := 1.00$	in	(User Input per Annex B of TIA-222-G)
Radial Ice Density =	$Id := 56.00$	pcf	(User Input)
Topograpic Factor =	$K_{zt} := 1.0$		(User Input)
	$K_a := 1.0$		(User Input)
Gust Response Factor =	$G_H = 1.1$		(User Input)

Output

Wind Direction Probability Factor =

$$K_d := \begin{cases} 0.95 & \text{if } Structure\_Type = Pole \\ 0.85 & \text{if } Structure\_Type = Lattice \end{cases} = 0.95$$

(Per Table 2-2 of TIA-222-G)

(Per Table 2-3 of TIA-222-G)

Importance Factors =

$$I_{Wind} := \begin{cases} 0.87 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.15 & \text{if } SC = 3 \end{cases} = 1$$

$$I_{Wind\_w\_Ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.00 & \text{if } SC = 3 \end{cases} = 1$$

$$I_{ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.25 & \text{if } SC = 3 \end{cases} = 1$$

$$K_{iz} := \left(\frac{z}{33}\right)^{0.1} = 1.155$$

Velocity Pressure Coefficient Antennas =

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.311$$

$$Kz := 2.01 \cdot \left(\left(\frac{z}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.359$$

Velocity Pressure w/o Ice Antennas = $qz := 0.00256 \cdot K_d \cdot Kz \cdot V^2 \cdot I_{Wind} = 26.17$ psf

Velocity Pressure with Ice Antennas = $qz_{ice} := 0.00256 \cdot K_d \cdot Kz \cdot V_i^2 \cdot I_{Wind} = 5.286$ psf

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS - APXV18-209014-C-A20		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 53.1$	in	(User Input)
Antenna Width =	$W_{ant} := 6.9$	in	(User Input)
Antenna Thickness =	$T_{ant} := 3.15$	in	(User Input)
Antenna Weight =	$WT_{ant} := 18.7$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 7.7$		
Antenna Force Coefficient =	$Ca_{ant} = 1.42$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 2.5$	sf
Total Antenna Wind Force Front =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 104$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.2$	sf
Total Antenna Wind Force Side =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 48$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 4.6$	sf
Total Antenna Wind Force w/ Ice Front =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 38$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 3.1$	sf
Total Antenna Wind Force w/ Ice Side =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 26$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 19$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1154$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 4015$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 130$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 130$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APXVAARR24_43-U-NA20		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 24$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 153$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.0$		
Antenna Force Coefficient =	$Ca_{ant} = 1.27$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$	sf
Total Antenna Wind Force Front =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 583$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.8$	sf
Total Antenna Wind Force Side =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 211$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 20$	sf
Total Antenna Wind Force w/ Ice Front =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 147$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 9.3$	sf
Total Antenna Wind Force w/ Ice Side =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 68$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 153$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \cdot 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 2 \cdot 10^4$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 593$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 593$	lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model =	Ericsson 4449 B71B12		
RRUS Shape =	Flat		(User Input)
RRUS Height =	$L_{RRUS} := 14.9$	in	(User Input)
RRUS Width =	$W_{RRUS} := 13.2$	in	(User Input)
RRUS Thickness =	$T_{RRUS} := 10.4$	in	(User Input)
RRUS Weight =	$WT_{RRUS} := 74$	lbs	(User Input)
Number of RRUS's =	$N_{RRUS} := 1$		
RRUS Aspect Ratio =	$Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.1$		
RRUS Force Coefficient =	$Ca_{RRUS} = 1.2$		

Wind Load (without ice)

Surface Area for One RRUS =	$SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.4$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 47$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.1$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 37$	lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.4$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 17$	lbs
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 2$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 14$	lbs

Gravity Load (without ice)

Weight of All RRUSs =	$WT_{RRUS} \cdot N_{RRUS} = 74$	lbs

Gravity Loads (ice only)

Volume of Each RRUS =	$V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2045$	cu in
Volume of Ice on Each RRUS =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 3181$	cu in
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 103$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 103$	lbs

Development of Wind & Ice Load on TMA's

TMA Data:

TMA Model =	Ericsson KRY112 TMA		
TMA Shape =	Flat	in	(User Input)
TMA Height =	$L_{TMA} := 7.7$	in	(User Input)
TMA Width =	$W_{TMA} := 7.5$	in	(User Input)
TMA Thickness =	$T_{TMA} := 3.4$	lbs	(User Input)
TMA Weight =	$WT_{TMA} := 11$		(User Input)
Number of TMA's =	$N_{TMA} := 1$		(User Input)
TMA Aspect Ratio =	$Ar_{TMA} := \frac{L_{TMA}}{W_{TMA}} = 1$		
TMA Force Coefficient =	$Ca_{TMA} = 1.2$		

Wind Load (without ice)

Surface Area for One TMA =	$SA_{TMAF} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.4$	sf
Total TMA Wind Force =	$F_{TMA} := qz \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAF} = 14$	lbs
Surface Area for One TMA =	$SA_{TMAS} := \frac{L_{TMA} \cdot T_{TMA}}{144} = 0.2$	sf
Total TMA Wind Force =	$F_{TMA} := qz \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAS} = 6$	lbs

Wind Load (with ice)

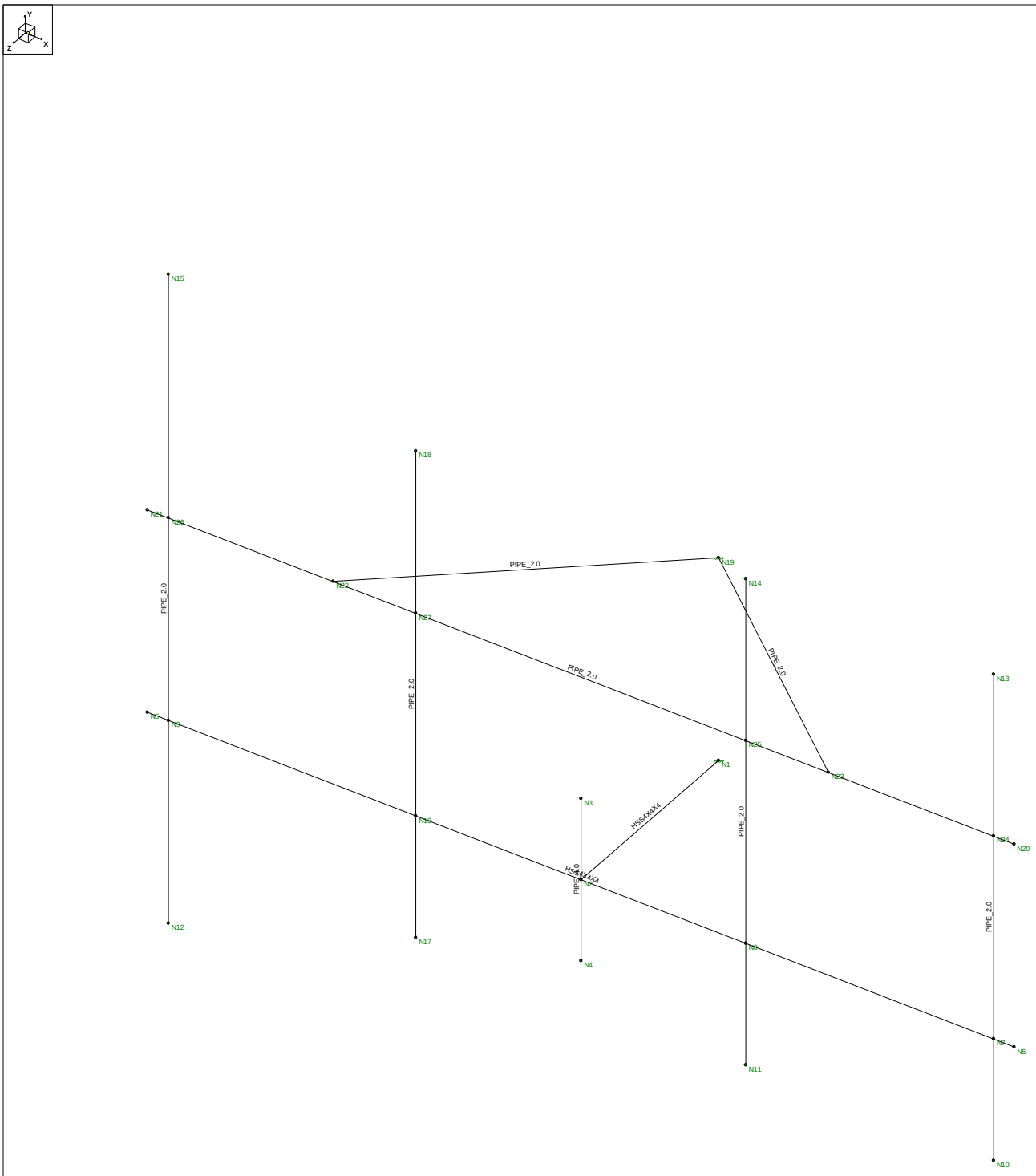
Surface Area for One TMA w/ Ice =	$SA_{ICETMAF} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (W_{TMA} + 2 \cdot t_{iz})}{144} = 1$	sf
Total TMA Wind Force w/ Ice =	$Fi_{TMA} := qz_{ice} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAF} = 7$	lbs
Surface Area for One TMA w/ Ice =	$SA_{ICETMAS} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz})}{144} = 0.7$	sf
Total TMA Wind Force w/ Ice =	$Fi_{TMA} := qz_{ice} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAS} = 5$	lbs

Gravity Load (without ice)

Weight of All TMAs =	$WT_{TMA} \cdot N_{TMA} = 11$	lbs

Gravity Loads (ice only)

Volume of Each TMA =	$V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 196$	cu in
Volume of Ice on Each TMA =	$V_{ice} := (L_{TMA} + 2 \cdot t_{iz}) \cdot (W_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz}) - V_{TMA} = 1002$	cu in
Weight of Ice on Each TMA =	$W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 32$	lbs
Weight of Ice on All TMAs =	$W_{ICETMA} \cdot N_{TMA} = 32$	lbs



Envelope Only Solution

Centek		
TJL	CTNH362B	May 14, 2019 at 8:30 AM
19027.65	Member Framing	Mount.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI S100-10: ASD
Wood Code	AWC NDS-12: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-11
Masonry Code	ACI 530-11: ASD
Aluminum Code	AA ADM1-10: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	150.001
Footing Concrete f'c (ksi)	4
Footing Concrete Ec (ksi)	3644
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	2
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
6	A53 Grade B	29000	11154	.3	.65	.49	35	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Outrigger	HSS4X4X4	Beam	Tube	A500 Gr.46	Typical	3.37	7.8	7.8	12.8
2	Horz	HSS4X4X4	Beam	Pipe	A500 Gr.46	Typical	3.37	7.8	7.8	12.8
3	Antenna Mast	PIPE_2.0	Column	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
4	Vert	PIPE_4.0	Column	Pipe	A53 Grade B	Typical	2.96	6.82	6.82	13.6
5	Stabilizer Kit	PIPE_2.0	Beam	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Outrigger	2.5			Lbyy						Lateral
2	M2	Vert	2			Lbyy						Lateral
3	M3	Horz	10.5			Lbyy						Lateral
4	M4	Antenna Mast	8			Lbyy						Lateral
5	M5	Antenna Mast	6			Lbyy						Lateral
6	M6	Antenna Mast	6			Lbyy						Lateral
7	M7	Antenna Mast	6			Lbyy						Lateral
8	M8	Stabilizer Kit	10.5			Lbyy						Lateral
9	M9	Stabilizer Kit	3.905			Lbyy						Lateral
10	M10	Stabilizer Kit	3.905			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	N1	N2			Outrigger	Beam	Tube	A500 Gr...	Typical
2	M2	N3	N4			Vert	Column	Pipe	A53 Gra...	Typical
3	M3	N6	N5			Horz	Beam	Pipe	A500 Gr...	Typical
4	M4	N12	N15			Antenna Mast	Column	Pipe	A53 Gra...	Typical
5	M5	N11	N14			Antenna Mast	Column	Pipe	A53 Gra...	Typical
6	M6	N10	N13			Antenna Mast	Column	Pipe	A53 Gra...	Typical
7	M7	N17	N18			Antenna Mast	Column	Pipe	A53 Gra...	Typical
8	M8	N21	N20			Stabilizer Kit	Beam	Pipe	A53 Gra...	Typical
9	M9	N22	N19			Stabilizer Kit	Beam	Pipe	A53 Gra...	Typical
10	M10	N19	N23			Stabilizer Kit	Beam	Pipe	A53 Gra...	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	0	0	0	0	
2	N2	0	0	2.5	0	
3	N3	0	1	2.5	0	
4	N4	0	-1	2.5	0	
5	N5	5.25	0	2.5	0	
6	N6	-5.25	0	2.5	0	
7	N7	5	0	2.5	0	
8	N8	2	0	2.5	0	
9	N9	-5	0	2.5	0	
10	N10	5	-1.5	2.5	0	
11	N11	2	-1.5	2.5	0	
12	N12	-5	-2.5	2.5	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
13	N13	5	4.5	2.5	0	
14	N14	2	4.5	2.5	0	
15	N15	-5	5.5	2.5	0	
16	N16	-2	0	2.5	0	
17	N17	-2	-1.5	2.5	0	
18	N18	-2	4.5	2.5	0	
19	N19	0	2.5	0	0	
20	N20	5.25	2.5	2.5	0	
21	N21	-5.25	2.5	2.5	0	
22	N22	-3	2.5	2.5	0	
23	N23	3	2.5	2.5	0	
24	N24	5	2.5	2.5	0	
25	N25	2	2.5	2.5	0	
26	N26	-5	2.5	2.5	0	
27	N27	-2	2.5	2.5	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N19	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Member Point Loads (BLC 2 : Equipment Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M4	Y	-.077	.5
2	M4	Y	-.077	7.5
3	M6	Y	-.01	.5
4	M6	Y	-.01	5.5
5	M4	Y	-.074	%50
6	M6	Y	-.011	%50

Member Point Loads (BLC 3 : Ice Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M4	Y	-.297	.5
2	M4	Y	-.297	7.5
3	M6	Y	-.065	.5
4	M6	Y	-.065	5.5
5	M4	Y	-.103	%50
6	M6	Y	-.032	%50

Member Point Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M4	X	.034	.5
2	M4	X	.034	7.5
3	M6	X	.013	.5
4	M6	X	.013	5.5
5	M4	X	.014	%50
6	M6	X	.005	%50

Member Point Loads (BLC 5 : Wind X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M4	X	.106	.5
2	M4	X	.106	7.5
3	M6	X	.024	.5
4	M6	X	.024	5.5
5	M4	X	.037	%50
6	M6	X	.006	%50

Member Point Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M4	Z	.074	.5
2	M4	Z	.074	7.5
3	M6	Z	.019	.5
4	M6	Z	.019	5.5

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M4	Z	.292	.5
2	M4	Z	.292	7.5
3	M6	Z	.052	.5
4	M6	Z	.052	5.5

Member Distributed Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M4	X	.003	.003	0	0
2	M7	X	.003	.003	0	0
3	M5	X	.003	.003	0	0
4	M6	X	.003	.003	0	0
5	M2	X	.003	.003	0	0
6	M1	X	.003	.003	0	0
7	M9	X	.003	.003	0	0
8	M10	X	.003	.003	0	0

Member Distributed Loads (BLC 5 : Wind X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M4	X	.009	.009	0	0
2	M7	X	.009	.009	0	0
3	M5	X	.009	.009	0	0
4	M6	X	.009	.009	0	0
5	M2	X	.009	.009	0	0
6	M1	X	.009	.009	0	0
7	M9	X	.009	.009	0	0
8	M10	X	.009	.009	0	0

Member Distributed Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M7	Z	.003	.003	0	0
2	M5	Z	.003	.003	0	0
3	M3	Z	.003	.003	0	0

Member Distributed Loads (BLC 6 : Wind w/ Ice Z) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
4	M8	Z	.003	.003	0	0
5	M2	Z	.003	.003	0	0
6	M9	Z	.003	.003	0	0
7	M10	Z	.003	.003	0	0

Member Distributed Loads (BLC 7 : Wind Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M7	Z	.009	.009	0	0
2	M5	Z	.009	.009	0	0
3	M3	Z	.009	.009	0	0
4	M8	Z	.009	.009	0	0
5	M2	Z	.009	.009	0	0
6	M9	Z	.009	.009	0	0
7	M10	Z	.009	.009	0	0

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Self Weight	DL		-1						
2	Equipment Weight	DL					6			
3	Ice Weight	DL					6			
4	Wind w/ Ice X	WLX					6	8		
5	Wind X	WLZ					6	8		
6	Wind w/ Ice Z	WLX					4	7		
7	Wind Z	WLZ					4	7		

Load Combinations

	Description	Solve	PDel...	S...	B...	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	B...	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.2D + 1.6W (X-dire...	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6W (X-dire...	Yes	Y		1	.9	2	.9	5	1.6														
3	1.2D + 1.0Di + 1.0Wi...	Yes	Y		1	1.2	2	1.2	3	1	4	1												
4	1.2D + 1.6W (Z-direc...	Yes	Y		1	1.2	2	1.2	7	1.6														
5	0.9D + 1.6W (Z-direc...	Yes	Y		1	.9	2	.9	7	1.6														
6	1.2D + 1.0Di + 1.0Wi...	Yes	Y		1	1.2	2	1.2	3	1	6	1												

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	-.595	5	1.409	6	.277	3	-.555	5	-.989	3	.332	5
2		min	-.903	3	.468	2	-.419	5	-2.886	3	-3.099	4	-1.332	3
3	N19	max	.835	6	.162	3	-.089	2	-.018	5	.454	3	.24	5
4		min	-.274	2	-.035	5	-1.329	4	-.223	3	-.768	5	-.535	3
5	Totals:	max	0	6	1.557	6	0	3						
6		min	-1.036	1	.524	2	-1.717	4						

Envelope Joint Displacements

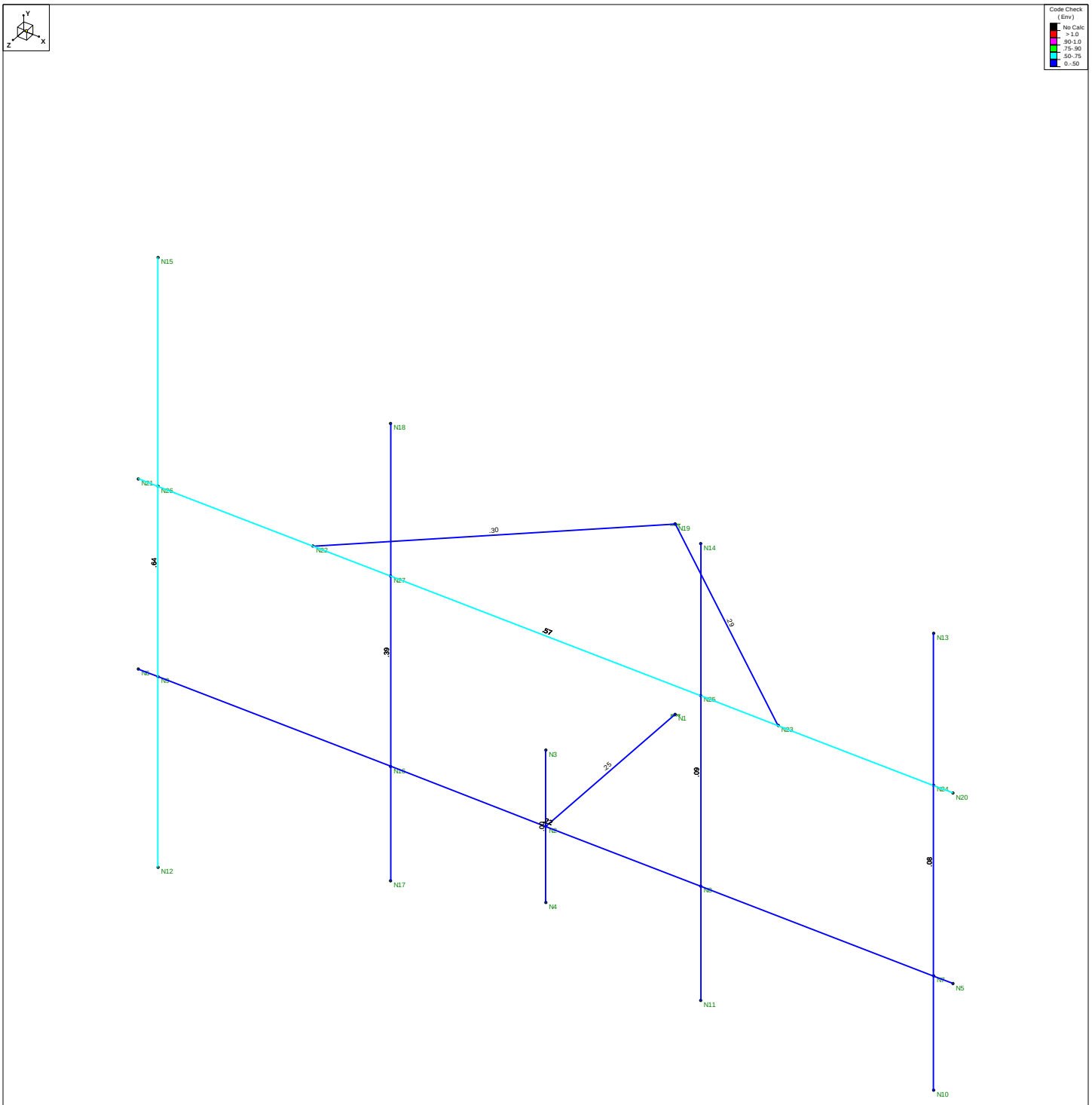
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
1	N1	max	0	6	0	6	0	6	0	6	0	6	0	6
2		min	0	1	0	1	0	1	0	1	0	1	0	1
3	N2	max	.077	5	-.004	5	0	5	2.3e-03	3	4.597e-03	5	3.36e-03	3
4		min	.009	3	-.054	3	0	3	-2.634e-04	5	-2.724e-04	3	-8.368e-04	5
5	N3	max	.087	5	-.004	5	.027	3	2.3e-03	3	4.597e-03	5	3.359e-03	3
6		min	-.032	3	-.054	3	-.003	5	-2.612e-04	5	-2.724e-04	3	-8.368e-04	5
7	N4	max	.071	4	-.004	5	.003	5	2.3e-03	3	4.597e-03	5	3.36e-03	3
8		min	.042	2	-.054	3	-.028	3	-2.655e-04	5	-2.724e-04	3	-8.368e-04	5
9	N5	max	.077	5	.082	3	.04	3	2.414e-03	3	3.808e-03	5	1.831e-03	3
10		min	.009	3	-.115	5	-.256	5	-8.214e-04	5	-8.756e-04	6	-2.148e-03	5
11	N6	max	.078	5	.045	5	.481	5	6.487e-04	1	9.332e-03	5	6.634e-03	3
12		min	.009	3	-.432	3	-.086	3	-3.033e-03	5	-1.72e-03	3	-1.03e-03	5
13	N7	max	.077	5	.076	3	.038	3	2.414e-03	3	3.808e-03	5	1.831e-03	3
14		min	.009	3	-.108	5	-.244	5	-8.214e-04	5	-8.756e-04	6	-2.148e-03	5
15	N8	max	.077	5	.009	6	.011	3	2.268e-03	3	4.104e-03	5	2.145e-03	3
16		min	.009	3	-.037	4	-.104	5	-5.572e-04	5	-6.232e-04	3	-1.762e-03	5
17	N9	max	.078	5	.042	5	.453	5	6.487e-04	1	9.332e-03	5	6.634e-03	3
18		min	.009	3	-.412	3	-.081	3	-3.033e-03	5	-1.72e-03	3	-1.03e-03	5
19	N10	max	.043	3	.076	3	-.002	6	2.413e-03	3	3.808e-03	5	1.911e-03	3
20		min	.032	2	-.108	5	-.224	5	-1.233e-03	5	-8.756e-04	6	-2.148e-03	5
21	N11	max	.049	4	.009	6	-.029	6	2.268e-03	3	4.104e-03	5	2.161e-03	3
22		min	.033	2	-.037	4	-.095	4	-6.373e-04	5	-6.232e-04	3	-1.762e-03	5
23	N12	max	.224	3	.042	5	.75	5	6.477e-04	1	9.332e-03	5	7.34e-03	3
24		min	.047	5	-.413	3	-.097	3	-1.227e-02	5	-1.72e-03	3	-1.029e-03	5
25	N13	max	.207	5	.076	3	.176	6	2.667e-03	6	2.758e-03	5	2.179e-03	6
26		min	-.118	3	-.108	5	-.228	5	-3.693e-05	2	-1.33e-03	6	-2.346e-03	5
27	N14	max	.196	5	.009	6	.081	3	9.563e-04	3	4.2e-03	5	2.527e-03	3
28		min	-.129	3	-.037	4	-.127	5	-9.626e-05	5	-1.768e-03	3	-1.905e-03	5
29	N15	max	.293	2	.042	5	1.366	5	2.618e-02	5	1.668e-02	5	3.963e-03	6
30		min	-.205	6	-.413	3	-.155	3	-1.248e-03	3	-8.16e-04	3	-7.905e-03	2
31	N16	max	.077	5	.013	5	.145	5	1.202e-03	3	7.293e-03	5	5.878e-03	3
32		min	.009	3	-.172	3	-.022	3	-1.601e-03	5	-1.372e-03	3	-7.546e-04	5
33	N17	max	.115	3	.013	5	.175	5	1.202e-03	3	7.293e-03	5	5.895e-03	3
34		min	.052	2	-.172	3	-.044	3	-1.681e-03	5	-1.372e-03	3	-7.546e-04	5
35	N18	max	.188	5	.012	5	.085	5	-1.256e-05	2	6.772e-03	5	4.038e-03	3
36		min	-.166	3	-.172	3	-.067	6	-8.137e-04	3	-2.677e-03	3	-1.501e-03	5
37	N19	max	0	6	0	6	0	6	0	6	0	6	0	6
38		min	0	1	0	1	0	1	0	1	0	1	0	1
39	N20	max	.15	5	.083	3	.118	3	2.453e-03	6	2.757e-03	5	2.224e-03	3
40		min	-.068	3	-.115	5	-.265	5	-3.692e-05	2	-1.33e-03	6	-2.346e-03	5
41	N21	max	.152	5	.048	5	.616	5	1.169e-02	5	1.668e-02	5	3.927e-03	6
42		min	-.069	3	-.424	3	-.113	3	-1.237e-03	3	-8.16e-04	3	-2.005e-03	2
43	N22	max	.153	5	.023	5	.188	5	2.62e-03	4	1.072e-02	5	7.61e-03	3
44		min	-.069	3	-.245	3	-.081	3	1.856e-04	2	-2.503e-03	3	-6.714e-04	5
45	N23	max	.15	5	.033	3	.081	3	9.822e-04	6	4.781e-03	5	1.733e-03	3
46		min	-.068	3	-.058	5	-.178	5	1.982e-04	2	-2.081e-03	3	-1.887e-03	5
47	N24	max	.15	5	.076	3	.115	3	2.453e-03	6	2.758e-03	5	2.224e-03	3
48		min	-.068	3	-.108	5	-.257	5	-3.692e-05	2	-1.33e-03	6	-2.346e-03	5
49	N25	max	.151	5	.009	6	.058	3	9.562e-04	3	4.2e-03	5	2.566e-03	3
50		min	-.068	3	-.037	4	-.124	5	-2.863e-04	5	-1.768e-03	3	-1.905e-03	5
51	N26	max	.152	5	.042	5	.566	5	1.169e-02	5	1.668e-02	5	3.927e-03	6

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
52		min	-.069	3	-.413	3	-.11	3	-1.237e-03	3	-8.16e-04	3	-2.005e-03	2
53	N27	max	.152	5	.012	5	.087	5	-1.256e-05	2	6.772e-03	5	4.077e-03	3
54		min	-.069	3	-.172	3	-.047	6	-8.522e-04	6	-2.677e-03	3	-1.501e-03	5

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

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	...	...	phi*P...	phi*P...	phi*...	phi*...	...	Eqn
1	M1	HSS4X4X4	.247	0	4	.134	0	y	3	135....	139....	16.181	16.181	...	H1-...
2	M2	PIPE_4.0	.001	1	4	.001	1		4	92.055	93.24	10.631	10.631	1	H1-...
3	M3	HSS4X4X4	.222	5.25	3	.071	5.25	y	6	87.952	139....	16.181	16.181	...	H1-...
4	M4	PIPE_2.0	.643	5	4	.222	5		4	14.916	32.13	1.872	1.872	...	H1-...
5	M5	PIPE_2.0	.085	4	5	.031	4		3	20.867	32.13	1.872	1.872	...	H1-...
6	M6	PIPE_2.0	.078	1.5	6	.034	4		4	20.867	32.13	1.872	1.872	...	H1-...
7	M7	PIPE_2.0	.390	1.5	6	.086	4		6	20.867	32.13	1.872	1.872	...	H1-...
8	M8	PIPE_2.0	.575	2.1...	4	.330	2.1...		5	8.922	32.13	1.872	1.872	...	H3-6
9	M9	PIPE_2.0	.298	3.9...	3	.088	3.9...		3	26.761	32.13	1.872	1.872	...	H1-...
10	M10	PIPE_2.0	.287	0	5	.039	3.9...		5	26.761	32.13	1.872	1.872	...	H1-...



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek		
TJL	CTNH362B	May 14, 2019 at 8:30 AM
19027.65	Unity Check	Mount.r3d

Exhibit F

Power Density/RF Emissions Report

EBI Consulting

environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CTNH362B

NH362/Boardman_MP
33 Boardman Road
New Milford, Connecticut 06776

May 20, 2019

EBI Project Number: 6219001697

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**17.00%**

EBI Consulting

environmental | engineering | due diligence

May 20, 2019

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

Emissions Analysis for Site: CTNH362B - NH362/Boardman_MP

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **33 Boardman Road** in **New Milford, Connecticut** 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 ($\mu W/cm^2$). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits; therefore, it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$, respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 33 Boardman Road in New Milford, Connecticut 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 manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 4 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.

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) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated

value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

6) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

7) The antennas used in this modeling are the RFS APXV18-209014-C-A20 for the 1900 MHz / 1900 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 700 MHz channel(s) in Sector A, the RFS APXV18-209014-C-A20 for the 1900 MHz / 1900 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 700 MHz channel(s) in Sector B, the RFS APXV18-209014-C-A20 for the 1900 MHz / 1900 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 700 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antenna mounting height centerline of the proposed antennas is 140 feet above ground level (AGL).

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

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	RFS APXV18-209014-C-A20	Make / Model:	RFS APXV18-209014-C-A20	Make / Model:	RFS APXV18-209014-C-A20
Frequency Bands:	1900 MHz / 1900 MHz	Frequency Bands:	1900 MHz / 1900 MHz	Frequency Bands:	1900 MHz / 1900 MHz
Gain:	14.4 dBd / 14.4 dBd	Gain:	14.4 dBd / 14.4 dBd	Gain:	14.4 dBd / 14.4 dBd
Height (AGL):	140 feet	Height (AGL):	140 feet	Height (AGL):	140 feet
Channel Count:	6	Channel Count:	6	Channel Count:	6
Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts
ERP (W):	6,610.15	ERP (W):	6,610.15	ERP (W):	6,610.15
Antenna A1 MPE %:	**1.21%**	Antenna B1 MPE %:	**1.21%**	Antenna C1 MPE %:	**1.21%**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Frequency Bands:	600 MHz / 700 MHz	Frequency Bands:	600 MHz / 700 MHz	Frequency Bands:	600 MHz / 700 MHz
Gain:	12.95 dBd / 13.35 dBd	Gain:	12.95 dBd / 13.35 dBd	Gain:	12.95 dBd / 13.35 dBd
Height (AGL):	140 feet	Height (AGL):	140 feet	Height (AGL):	140 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts
ERP (W):	2,481.08	ERP (W):	2,481.08	ERP (W):	2,481.08
Antenna A2 MPE %:	**1.05%**	Antenna B2 MPE %:	**1.05%**	Antenna C2 MPE %:	**1.05%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	2.26%
Sprint	2.37%
AT&T	8.92%
Verizon	3.45%
Site Total MPE % :	17.00%

T-Mobile Sector A Total:	2.26%
T-Mobile Sector B Total:	2.26%
T-Mobile Sector C Total:	2.26%
Site Total:	17.00%

T-Mobile Maximum MPE Power Values (Sector A)

T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile 1900 MHz GSM	4	826.27	140.0	6.06	1900 MHz GSM	1000	0.61%
T-Mobile 1900 MHz LTE	2	1652.54	140.0	6.06	1900 MHz LTE	1000	0.61%
T-Mobile 600 MHz LTE	2	591.73	140.0	2.17	600 MHz LTE	400	0.54%
T-Mobile 700 MHz LTE	2	648.82	140.0	2.38	700 MHz LTE	467	0.51%
						Total:	**2.26%**

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector A:	2.26%
Sector B:	2.26%
Sector C:	2.26%
T-Mobile Maximum MPE % (Sector A):	2.26%
Site Total:	17.00%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **17.00%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Exhibit G

Mailing Receipts/Proof of Notice

UPS Internet Shipping: View/Print Label

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

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

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

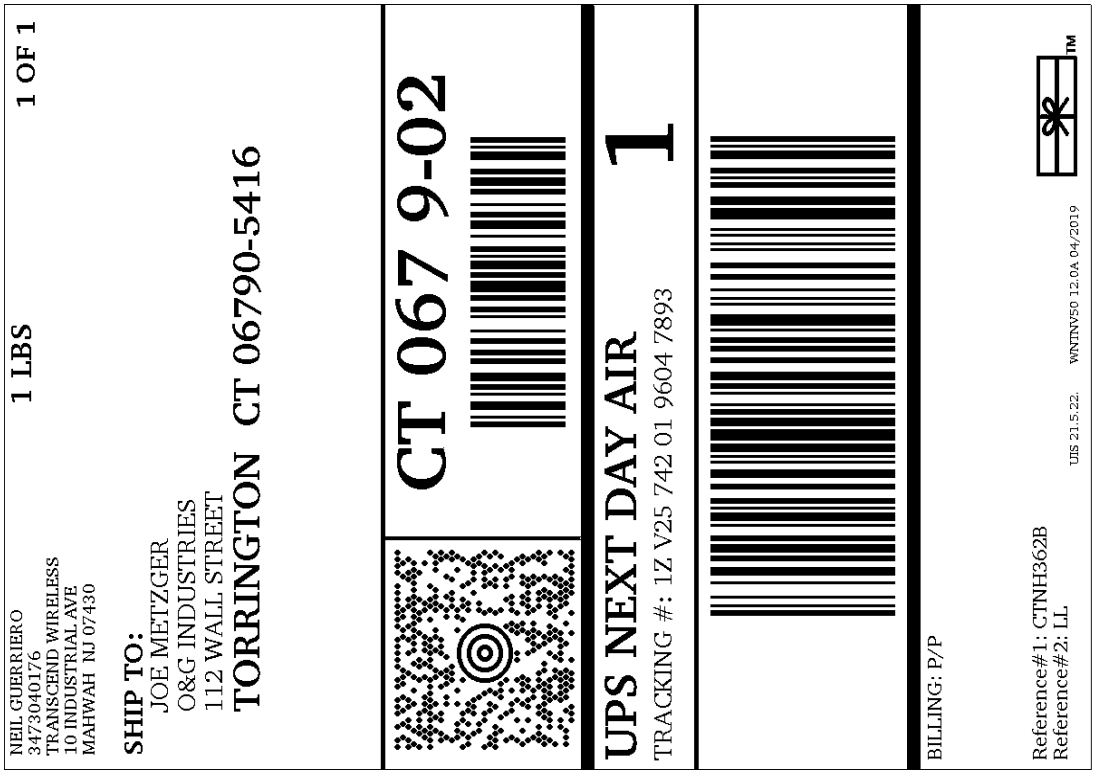
   Customers without a Daily Pickup
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To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

UPS Access Point™
THE UPS STORE
115 FRANKLIN TPKE
MAHWAH ,NJ 07430

UPS Access Point™
THE UPS STORE
120 E MAIN ST
RAMSEY ,NJ 07446

UPS Access Point™
POSTNET NY137
74 LAFAYETTE AVE
SUFFERN ,NY 10901

FOLD HERE



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

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SUFFERN ,NY 10901

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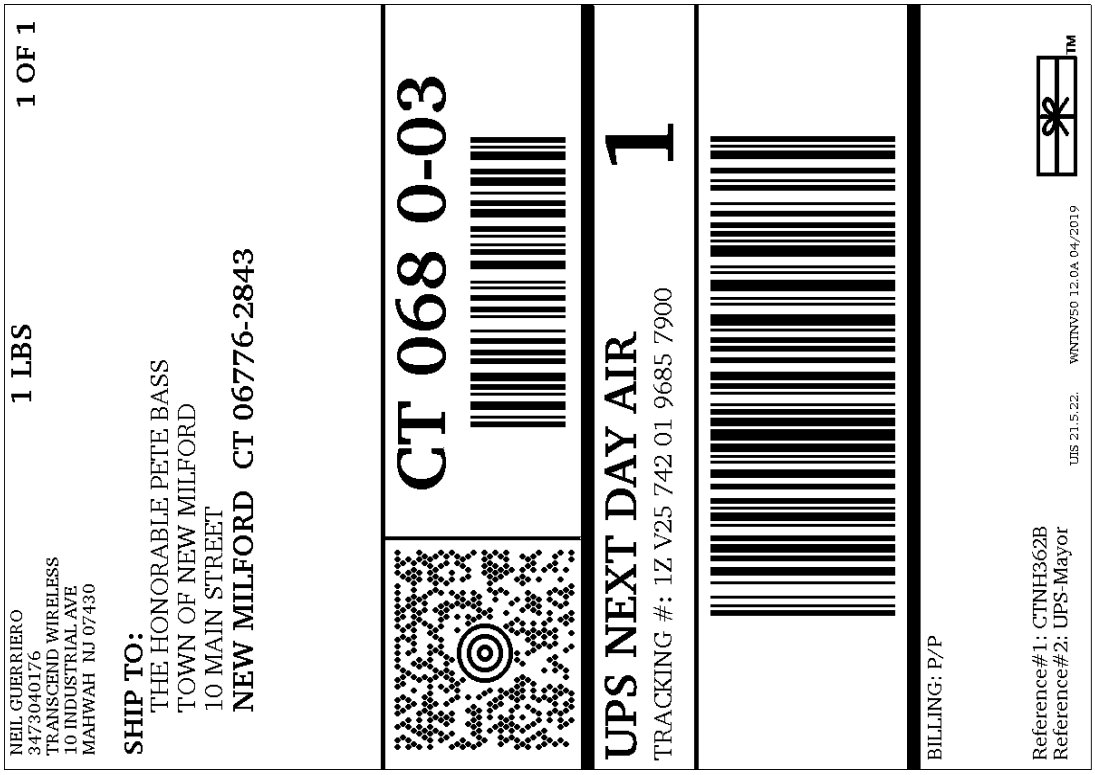

UPS Internet Shipping: View/Print Label

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

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

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