CENTERLINE COMMUNICATIONS

750 West Center Street, Floor 3 / Suite 301
West Bridgewater, MA 02379 *Corporate Headquarters*
781.713.4725
617.249.0819

Centerline Communications
Mark Appleby
750 West Center Street, Floor 3
West Bridgewater, MA 02379
860-209-4694
mappleby@clinellc.com

May 27, 2021

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

Notice of Exempt Modification
869-871 Hopmeadow St Simsbury CT, Connecticut 06070
Latitude: 42 '52 42.35" N
Longitude: -72.'48 08.48" W
T-Mobile Site#: CT11277A _L600

Dear Ms. Bachman:

T-Mobile currently maintains Three (3) antennas at the 138-foot level of the existing 140-foot lattice tower at 869-871 Hopmeadow St Simsbury CT, Connecticut 06070. The 180-foot lattice tower is owned by the Simsbury Fire District and property is owned Simsbury Fire District. T-Mobile now intends to replace three (3) of its existing antennas with three (3) new 2500 MHz antennas. The new antennas would be installed at the 138-foot level of the lattice. The proposed upgrades will make the site available for 5G deployment in the future.

Planned Modifications:

Remove and Replace:
(3) Existing Antennas **(Remove)** (3) RFS APXVAARR24_43-U-NA20 Antennas **(Replace)**

Install New:
(3) RRU 4424 B25 Radios Antenna Level
(3) RRU 4415 B66A Radios Antenna Level
(3) RRU 4449 B71 B12 Radios Antenna Level

Remove (6) 1-5/8" Coax Replace with (6) Fiber Cables

Ground: Install (2) New Cabinets

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T-Mobile originally were approved to locate on the Fire Department in September 1999 Tower by the Town of Simsbury. I have attached parts of the original lease with exhibits please see 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 Eric Wellman First Selectman Michael Glidden Town Planner, Simsbury Fire Department the tower owner.

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

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

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

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

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

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

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

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

Sincerely,

Mark Appleby

Mobile: 860-209-4694
Fax: 508-819-3017
Office: 750 W. Center Street Suite 301
West Bridgewater, MA 02379
Email: mappleby@clinellc.com

Attachments
cc: Town of Simsbury First Selectman Eric Wellman
Town of Simsbury Town Planner Michel Glidden
Simsbury Fire District Property Owner

Exhibit A

Original Facility Approval

CT-11-277A.

STANDARD LEASE AGREEMENT

This Standard Lease Agreement ("Agreement") is by and between **OMNIPOINT COMMUNICATIONS, INC.,** a Delaware corporation, having a principal place of business at 360 Newark-Pompton Turnpike, Wayne, New Jersey 07470 ("Lessee") and the Simsbury Fire District, having a principal place of business at 871 Hopmeadow Street, Simsbury, CT., 06070 ATTN: Kevin North ("Lessor").

WHEREAS, Lessor is the owner of property having a street address of 871 Hopmeadow Street, located in the Town of Simsbury, County of Hartford, State of Connecticut, and hereafter referred to as the "Property". The Property is more fully described on Exhibit "A" attached hereto and made a part of this Agreement.

NOW, THEREFORE, in consideration of the mutual covenants contained herein and for good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, the parties hereto agree as follows:

1. **Lease.** Lessor agrees to lease to Lessee approximately 9 x 11 square ft., necessary to ground mount a BTS and space for telecommunications equipment as more fully described in Exhibit "B", for Lessee's Installation (as defined below), together with a non-exclusive easement for access thereto for ingress, egress and utilities (such space and easement for access being hereinafter collectively referred to as the "Premises"). Lessor shall maintain the Premises (exclusive of Lessee's Installation and any fenced area around the Installation) so as not to interfere with Lessee's use of the Premises and rights under this Agreement.

2. **Use of Premises.**

(a) Lessee agrees to use the Premises for the installation, operation and maintenance of a wireless communications facility, including, without limitation, installation of radio equipment cabinets, associated antennas, mounting equipment, telephone, electric and radio cables and other transmission lines, and other related equipment, as applicable, for use and occupancy by providers of wireless communications services ("Users") under agreements with Lessee (collectively, the "Installation"). Lessee agrees to provide Lessor a copy of its construction plans prior to the beginning of installation for Lessor's review and approval. After installation is complete Lessee shall provide Lessor with copies of plans for changes to the installation for Lessor's approval except for routine maintaince and repair. Lessee agrees to attach Lessors antenna and cabling to the tower during Lessees installation. Lessor shall provide said antenna and cabling. The lessor will provide space for the lessee's antennae as shown in exhibit "B". The Installation, whether attached to or otherwise brought onto the Premises, shall at all times remain personal property and shall not be considered fixtures, and at Lessee's option may be removed by Lessee at any time during the Term hereof or any Renewal Terms (as defined below). Upon expiration or termination of this Agreement, Lessee agrees to repair any damage to the Premises caused by Lessee, and restore the Premises to its condition on the Commencement Date (as defined below), ordinary wear and tear, damage from the elements excepted. In connection with the Installation, Lessee shall have the right, at its sole cost and expense, to obtain electrical and telephone service directly from the servicing utility company, including the right to install a separate meter and main breaker, where required. Lessee shall be responsible for the electricity it consumes for its operations. Lessee shall have the right, at

Lessee's sole cost and expense, to run transmission lines from the equipment area to the antenna locations and to run power and telephone service from the main feed on the Property to the communications equipment. Lessor agrees that if an easement is required to obtain and maintain utility services, the form and location of the easement will be subject to the reasonable approval of the Lessor and the servicing utility company, and Lessor shall grant such easement in writing to the servicing utility company.

(b) Lessee shall have the right to use whatever measures it deems reasonably appropriate to install the Installation on the Premises, provided that it is in compliance with all applicable laws and regulations. Lessee agrees to use its best efforts not to unreasonably interfere with the use of the property during the installation process. Further, Lessee agrees to perform all improvements in a good and workmanlike manner. Lessor agrees to cooperate with Lessee in making application for and obtaining, at Lessee's expense any local, state, federal licenses, permits and any other approvals (the Approvals") which may be required to allow Lessee's use of the Premises. Lessee shall employ due diligence to obtain Approvals in a timely manner. If, however, Lessee is denied or is unable to obtain a required Approval, Lessee shall have the exclusive right to terminate this Agreement in its sole discretion, and no further liabilities under this Agreement shall remain in force or effect, including but not limited to the payment of Rent (as defined below).

(c) Lessor agrees to provide twenty-four (24) hours, seven (7) days a week access to the Premises without charge to Lessee, Lessee's employees, Users, contractors, or any subcontractors or agents, which access shall remain unimpeded throughout the Term and any Renewal Term of this Agreement. Lessor agrees that if requested by Lessee it will (i) provide Lessee with any key or keys necessary to access the Premises, and (ii) permit Lessee, at its own cost and expense, to install a lock box for Lessee's sole use at the Premises that will contain any access keys necessary for Lessee's purposes.

(d) Lessee shall operate its Installation, in compliance with all Federal Communications Commission ("FCC") regulations.

3. **Site Testing; Reports.** Lessee, at its option, following the Effective Date of this Agreement, may perform or prepare, or cause to be performed or prepared, (a) engineering surveys, title reports and structural analysis reports for any existing support structure on which Lessee will locate its Installation, and (b) any other testing or other reports in connection with Lessee's occupancy of the Premises for its intended purposes. Lessee shall provide Lessor a copy of an insurance certificate prior to entering the site to begin testing. Lessee agrees to restore any property disturbed by the testing. Lessee shall provide Lessor with copies of test results and Lessor shall receive such reports in confidence and not share the results with any other persons or business entities. Any adverse test result or report will entitle Lessee to terminate this Agreement, in its sole discretion, and no further liabilities under this Agreement shall remain in force or effect, including but not limited to the payment of Rent.

4. **Interference.**

(a) Lessee agrees not to cause interference to the radio frequency communication operations of Lessor, Lessor's tenants, or anyone holding an agreement with Lessor to operate on the Property if such equipment is installed and properly operating prior to the Effective

the terms or conditions of this Agreement, or any information provided during negotiation of this Agreement, other than to Lessee's Users, if any, or as required by final order of a court of competent jurisdiction.

(g) Lessee, at any time, and from time to time, upon at least twenty (20) days prior notice by Lessor, shall execute, acknowledge and deliver to Lessor, and/or to any other person, firm or corporation specified by Lessor, a statement certifying that this Agreement is unmodified and in full force and effect (or, if there have been modifications, that the same is in full force and effect as modified and stating the modifications), stating the dates to which the Rent and any additional rent have been paid, and stating whether or not there exists any defaults by Lessor under this Agreement, and, if so, specifying each such default.

(h) Exhibits "A", "B" attached hereto, as well as addenda and riders identified below are made a material part of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the Effective Date.

LESSOR:
Simsbury Fire District
A municipal district formed pursuant to Connecticut law.

By: _____
Name: Kevin North
Title: President
Date: 8/30/99
Tax Id No.: _____

LESSSEE:
OMNIPOINT COMMUNICATIONS, INC.,
A Delaware corporation

By: _____
Name: Michael S. Fulton
Title: Technical Director
Date: SEP -7 1999

EXHIBIT A

DESCRIPTION OF PROPERTY

Forming a part of the Agreement by and between **Simsbury Fire District, a Connecticut corporation**, as Lessor, and **OMNIPOINT COMMUNICATIONS, INC.**, as Lessee.

The Property is described and/or depicted as follows:

Site Address: **871 Hopmeadow Street, Simsbury, CT. 06070**

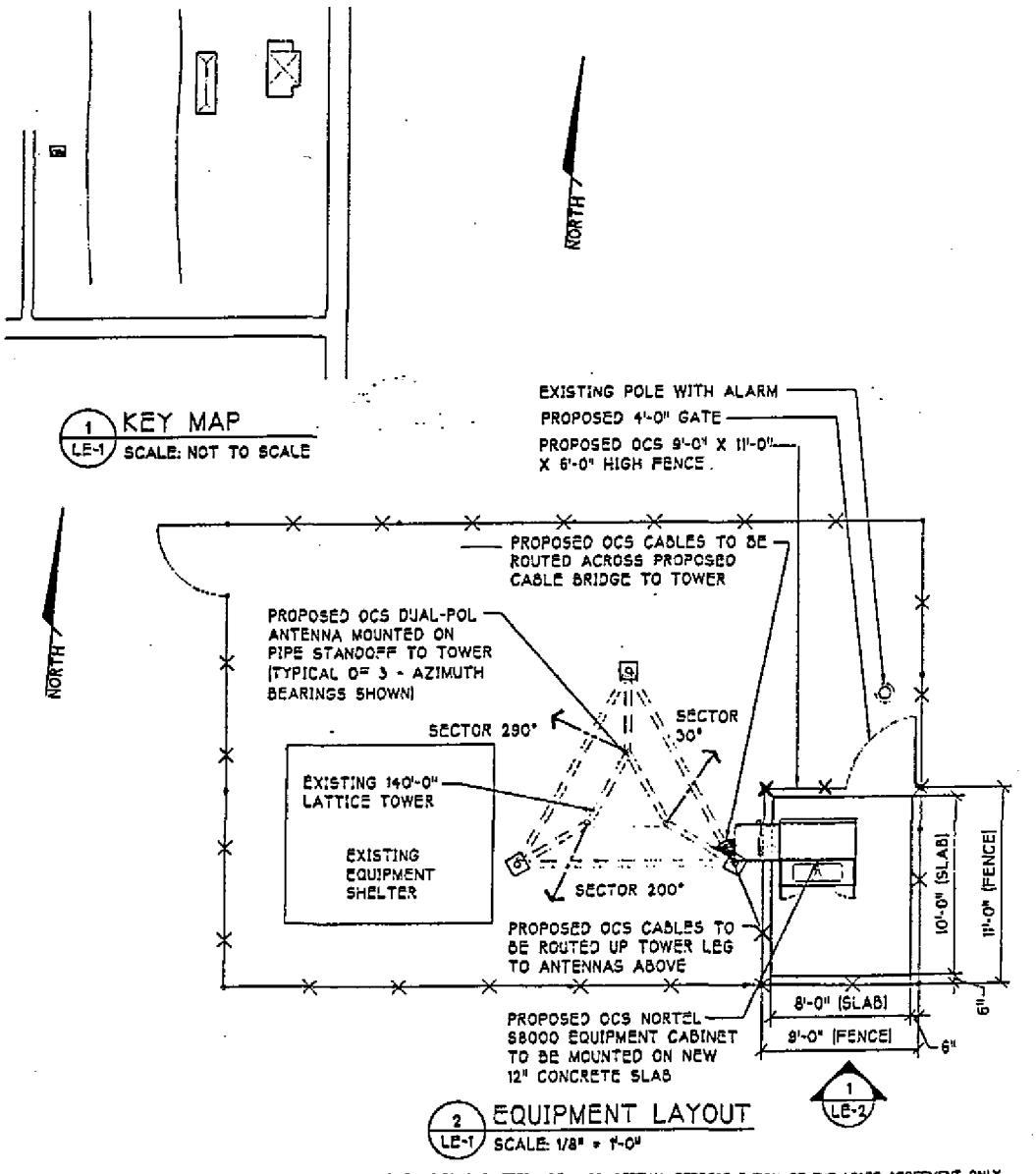
Legal Description:

EXHIBIT B

DESCRIPTION OF PREMISES

Forming a part of the Agreement by and between **Simsbury Fire District a Connecticut corporation** as *Lessor*, and ***OMNIPOINT COMMUNICATIONS, INC.***, as *Lessee*.

The Premises is described and/or depicted as follows [include site location (ground, rooftop, and/or pole space) and access for ingress, egress and utilities]:



NOTE: EXHIBITS SUBMITTED ARE A CONCEPTUAL REPRESENTATION OF THE LEASE AGREEMENT ONLY. ACTUAL CONSTRUCTION DOCUMENTATION MAY VARY TO COMPLY WITH ALL APPLICABLE CODES.

ARCNET ARCHITECTS, INC.
670 North Beers Street, Building 2, Holmdel, NJ 07733
Tel: 732.739.3200 Fax: 732.739.0440

Drawing Title: KEY & EQUIPMENT LAYOUT
OCS

Project: SIMSBURY FIRE DEPT
Address: 871 HOPMEADOW ST
SIMSBURY, CT

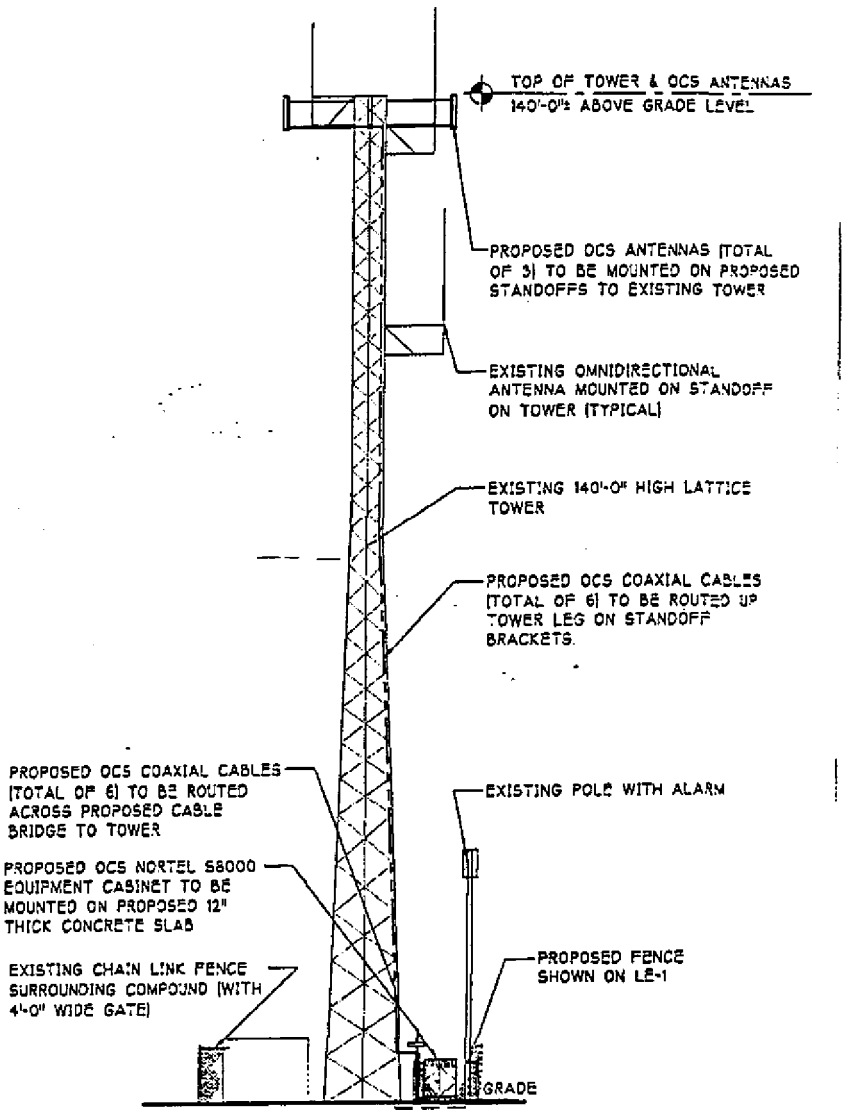
PROJ. MGR: _____ DATE: _____
R.F. ENGR: _____ DATE: _____
SAC: _____ DATE: _____
OWNER: _____ DATE: _____

REV-1 SAC 08/06/99

SIMSBURY-3/RT 10
CT-11-277A

P.C. JDi | P.C. Check | Chkd. by | ARCNET Project No. A99.506-835B | Drawn JMc | Date 3/24/99

Drawing No. LE-1



1 / LE-2 ELEVATION
SCALE: 1" = 20'-0"

NOTE: EXHIBITS SUBMITTED ARE A CONCEPTUAL REPRESENTATION OF THE LEASE AGREEMENT ONLY. ACTUAL CONSTRUCTION DOCUMENTATION MAY VARY TO COMPLY WITH ALL APPLICABLE CODES.

ARCNET ARCHITECTS, INC.
670 North Beers Street, Building 2, Holmdel, NJ 07733
Tel: 732.739.3200 Fax: 732.739.0440

Drawing Title: ELEVATION
Client: OCS
Project: SIMSBURY FIRE DEPT
Address: 871 HOPMEADOW ST SIMSBURY, CT
Approved by: PROJ. MGR: _____ DATE: _____
R.F. ENGR: _____ DATE: _____
SAC: _____ DATE: _____
OWNER: _____ DATE: _____

Search Area: SIMSBURY-3/RT 10
Site ID No.: CT-11-277A
P.C.: JDi
ARCNET Project No.: A99.506-8358
Drawn: JMc
Date: 3/24/99
Drawing No.: LE-2

Exhibit B

Property Card

Town of Simsbury, CT

Property Listing Report

Map Block Lot: G09 202 012 | Building #: 1 | Unique Identifier: 04007601

Property Information

Property Location	869 HOPMEADOW STREET
Mailing Address	869 HOPMEADOW STREET SIMSBURY CT 06070
Land Use	Fire Station - Volunteer
Zoning Code	SCZ
Neighborhood	0223

Owner	SIMSBURY FIRE DISTRICT
Co-Owner	
Book / Page	0077/0405
Land Class	Public Utility
Census Tract	4663000
Acreage	2.17

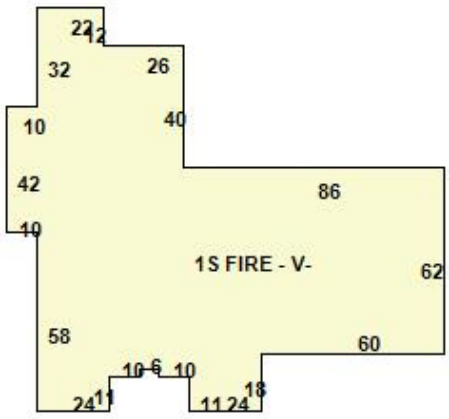
Valuation Summary

(Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	2733366	1913360
Outbuildings	191923	134350
Land	375410	262780
Total	3300699	2310490

Utility Information

Electric	No
Gas	No
Sewer	No
Public Water	No
Well	No



Primary Construction Details

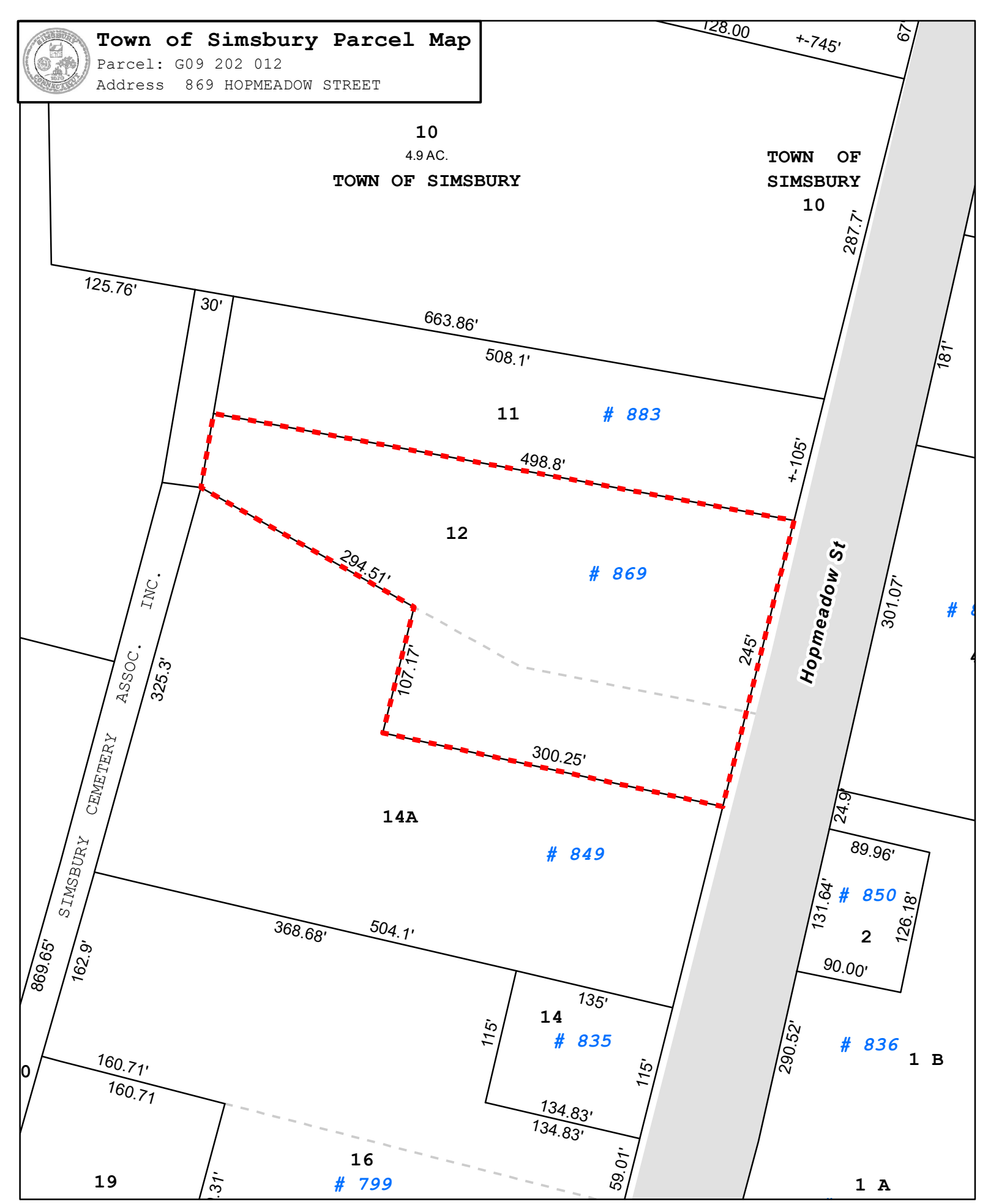
Year Built	2009
Building Desc.	Commercial
Building Style	
Stories	1
Exterior Walls	B. V. Solid
Exterior Walls 2	
Interior Walls	
Interior Walls 2	
Interior Floors 1	
Interior Floors 2	

Heating Fuel	
Heating Type	FHA
AC Type	Central
Bedrooms	0
Full Bathrooms	0
Half Bathrooms	0
Extra Fixtures	24
Total Rooms	0
Bath Style	NA
Kitchen Style	
Occupancy	0

Livable Area (ft)	11946
Building Use	Fire Station -
Building Condition	Excellent
Frame Type	Excellent
Building Grade	75
Fireplaces	0
Wood Stoves	0
Attic Access	
Roof Style	
Roof Cover	Asphalt

Bsmt Area	0
Fin Bsmt Area	0
Fin Bsmt Quality	
Bsmt Access	
Bsmt Gar	0
Bsmt Sump Pump	No

Report Created On 5/27/2021



Disclaimer: This map is for informational purposes only All information is subject to verification by any user. The Town of Simsbury and its mapping contractors assume no legal responsibility for the information contained herein.

Map Produced: February 2021

Town of Simsbury, CT

Property Listing Report | Map Block Lot **G09 202 012** | Building # **1** | Unique Identifier **04007601**

Detached Outbuildings

Type	Description	Area (sq ft)	Condition	Year Built
Garage	Comm Det 1 Story Masonry	484	VG/Exc	2010
Paving	Paving	30000	VG/Exc	2010
Garage	Comm Det 1 Story Masonry	800	VG/Exc	2010

Attached Extra Features

Type	Description	Area (sq ft)	Condition	Year Built

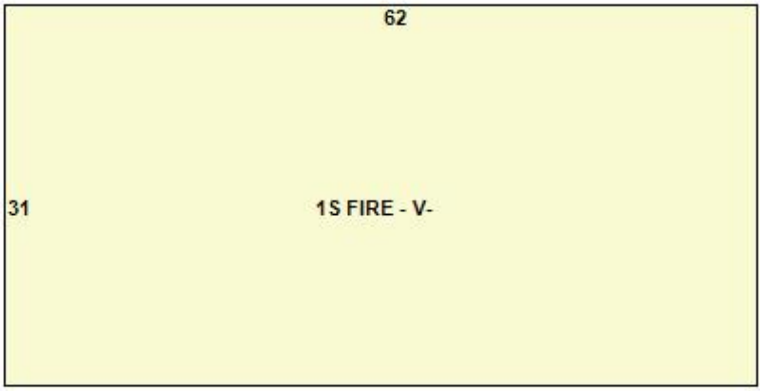
Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
SIMSBURY FIRE DISTRICT	0077_0405	12/27/1946	0

Report Created On **5/27/2021**

Town of Simsbury, CT

Property Listing Report | Map Block Lot: G09 202 012 | Building #: 2 | Unique Identifier: 04007601



Primary Construction Details

Year Built	1984	Heating Fuel	Oil	Livable Area (ft)	1922	Bsmt Area	0
Building Desc.	Fire Station - Volunteer	Heating Type	FHA	Building Use	Commercial	Fin Bsmt Area	0
Building Style		AC Type		Building Condition	VG/GD	Fin Bsmt Quality	
Stories	1	Bedrooms	0	Frame Type	Good	Bsmt Access	
Exterior Walls	B. V. Solid	Full Bathrooms	0	Building Grade	25	Bsmt Garage	0
Exterior Walls 2		Half Bathrooms	0	Fireplaces	0	Bsmt Sump Pump	No
Interior Walls		Extra Fixtures	2	Wood Stoves	0		
Interior Walls 2		Total Rooms	0	Attic Access			
Interior Floors 1	Concrete	Bath Style	NA	Roof Style			
Interior Floors 2		Kitchen Style		Roof Cover	Asphalt		
		Occupancy	0				

Attached Extra Features

Type	Description	Area (sq ft)	Condition	Year Built

Report Created On 5/27/2021

Exhibit C

Construction Drawings

SITE NAME: SIMSBURY-3/RT 10

871 HOPMEADOW ROAD
SIMSBURY, CT 06070
HARTFORD COUNTY

SITE NUMBER: CT11277A

PROJECT: T-MOBILE L600

CONFIGURATION: 67D93D4 HYBRID

CONSTRUCTION

GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF T–MOBILE NORTHEAST, LLC. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE T–MOBILE NORTHEAST. LLC REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

SPECIAL CONSTRUCTION NOTES

1. ALL WORK TO BE COMPLETED IN ACCORDANCE WITH THE GLOBAL TOWER STRUCTURAL ANALYSIS PREPARED BY EFI GLOBAL, INC DATED 02/04/2021. ALL TOWER MODIFICATIONS NOTED THEREIN, INCLUDING A POST MODIFICATION INSPECTION REPORT SHALL BE COMPLETED PRIOR TO THE PLACEMENT OF ANY T–MOBILE EQUIPMENT.
2. THE CONSTRUCTION SHOWN IN THE GLOBAL TOWER STRUCTURAL ANALYSIS MAY REQUIRE SPECIAL INSPECTIONS. APPLICANT/CONTRACTOR SHALL VERIFY WITH THE AUTHORITIES HAVING JURISDICTION (AHJ) PRIOR TO CONSTRUCTION AND ENGAGE THE ENGINEER OR RECORD (EOR), INSPECTOR AND/OR APPROPRIATE 3RD PARTIES AS MAY BE REQUIRED.
3. PROTERRA DESIGN GROUP ASSUMES THAT THE SELF SUPPORT TOWER IS PROPERLY CONSTRUCTED AND MAINTAINED. ALL STRUCTURAL MEMBERS AND THEIR CONNECTION ARE ASSUMED TO BE IN GOOD CONDITION AND ARE FREE FROM DEFECTS WITH NO DETERIORATION TO ITS MEMBER CAPACITIES.
4. ANY REQUIRED ANTENNA MOUNT WORK SHALL BE COMPLETED PRIOR TO THE INSTALLATION OF ANY EQUIPMENT IN ACCORDANCE WITH THE ANTENNA MOUNT STRUCTURAL ANALYSIS, (MSA) PREPARED BY DESTEK ENGINEERING, LLC DATED 08/23/2019.

T-MOBILE TECHNICIAN SITE SAFETY NOTES

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

DIG SAFE SYSTEM
(MA, ME, NH, RI, VT):
1–888–344–7233

CALL BEFORE YOU DIG
(CT): 1–800–922–4455

PROJECT INFORMATION

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY T–MOBILE EQUIPMENT ALTERATION
ZONING JURISDICTION:	SPECIAL ZONING NOTE (ELIGIBLE FACILITY REQUEST): BASED ON INFORMATION PROVIDED BY T–MOBILE REGULATORY COMPLIANCE PROFESSIONALS AND LEGAL COUNSEL, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS CONSIDERED AN ELIGIBLE FACILITY UNDER THE MIDDLE CLASS TAX RELIEF AND JOB CREATION ACT OF 2012, 47 USC 1455(A), SECTION 6409(A), AND IS SUBJECT TO AN ELIGIBLE FACILITY REQUEST, EXPEDITED REVIEW AND LIMITED/PARTIAL ZONING PRE–EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW OR ADMINISTRATIVE REVIEW).
SITE ADDRESS:	871 HOPMEADOW ROAD SIMSBURY, CT 06070
LATITUDE:	41° 52' 42.35" N (FROM RFDS: 41.878432)
LONGITUDE:	72° 48' 08.48" W (FROM RFDS: –72.802356)
JURISDICTION:	CONNECTICUT SITING COUNCIL / TOWN OF SIMSBURY
BUILDING CODE:	2018 CONNECTICUT STATE BUILDING CODE WITH AMENDMENTS (IBC 2015 BASED)
ELECTRICAL CODE:	2017 NATIONAL ELECTRICAL CODE AND AMENDMENTS
CURRENT/ PROPOSED USE:	TELECOMMUNICATIONS FACILITY
TOWER OWNER:	SIMSBURY FIRE DISTRICT

DRAWING INDEX

SHEET NO.	DESCRIPTION	REV.
T–1	TITLE SHEET	0
GN–1	GENERAL NOTES	0
A–1	COMPOUND & EQUIPMENT PLANS	0
A–2	ELEVATION & ANTENNA PLANS	0
A–3	DETAILS	0
S–1	ANTENNA MOUNTING DETAILS	0
E–1	ONE–LINE DIAGRAM & GROUNDING DETAILS	0

T-MOBILE NORTHEAST LLC
35 Griffin Road South
Bloomfield, CT 06002
Office: (860) 648–1116

CENTERLINE COMMUNICATIONS
750 West Center St. Suite 301
West Bridgewater, MA 02379

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413) 320–4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER
4/27/21

APPROVALS

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

PROJECT NO:	19–023
DRAWN BY:	JEB/PN
CHECKED BY:	TEJ/JMM

0	04/27/21	FOR CONSTRUCTION
B	03/09/21	ISSUED FOR REVIEW
A	09/05/19	ISSUED FOR REVIEW

SITE NUMBER: CT11277A
SITE NAME:
SIMSBURY-3/RT 10

871 HOPMEADOW ROAD
SIMSBURY, CT 06070
HARTFORD COUNTY

SHEET TITLE

TITLE SHEET

SHEET NUMBER

T–1

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

   CONTRACTOR – CENTERLINE COMMUNICATIONS
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – T–MOBILE

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.

3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.

5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.

7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.

9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.

10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CUR\BS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.

11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

14. ANY NEW CONCRETE NEEDED FOR CONSTRUCTION SHALL BE AIR–ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 35 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

16. CONSTRUCTION SHALL COMPLY WITH LTE OR 700 MHz SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF T–MOBILE SITES."

17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.

18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

20. APPLICABLE BUILDING CODES:
    SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

    BUILDING CODE: 2018 CONNECTICUT STATE BUILDING CODE, (IBC 2015) WITH AMENDMENTS

    ELECTRICAL CODE: NEC 2017 AND AMENDMENTS

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

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

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, 14TH EDITION;

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

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

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

GROUNDING NOTES

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

ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	EQ	EQUAL	RAN	RADIO ACCESS NETWORK
AWG	AMERICAN WIRE GAUGE	G.C.	GENERAL CONTRACTOR	REF	REFERENCE
BTCW	BARE TINNED SOLID COPPER WIRE	GRC	GALVANIZED RIGID CONDUIT	REQ	REQUIRED
		MSA	MOUNT STRUCTURAL ANALYSIS	RF	RADIO FREQUENCY
BGR	BURIED GROUND RING	MGB	MASTER GROUND BAR	TBD	TO BE DETERMINED
BTS	BASE TRANSCEIVER STATION	MIN	MINIMUM	TBR	TO BE REMOVED
EXISTING	EXISTING OR (E)	PROPOSED	NEW OR (P)	TBRR	TO BE REMOVED AND REPLACED
EGB	EQUIPMENT GROUND BAR	N.T.S.	NOT TO SCALE	TYP	TYPICAL
EGR	EQUIPMENT GROUND RING	RAD	RADIATION CENTERLINE (ANTENNA)	VIF	VERIFY IN FIELD

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STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER
4/27/21

APPROVALS

CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING/SITE ACQ.	DATE
OPERATIONS	DATE
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B	03/09/21	ISSUED FOR REVIEW
A	09/05/19	ISSUED FOR REVIEW

SITE NUMBER: CT11277A
SITE NAME:
SIMSBURY-3/RT 10

871 HOPMEADOW ROAD
SIMSBURY, CT 06070
HARTFORD COUNTY

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN–1

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

MOUNT MODIFICATIONS TO BE COMPLETED PRIOR TO THE INSTALLATION OF ANY EQUIPMENT. REFER TO THE MOUNT STRUCTURAL ANALYSIS REPORT BY DESTEK ENGINEERING, LLC DATED 08/23/2019.

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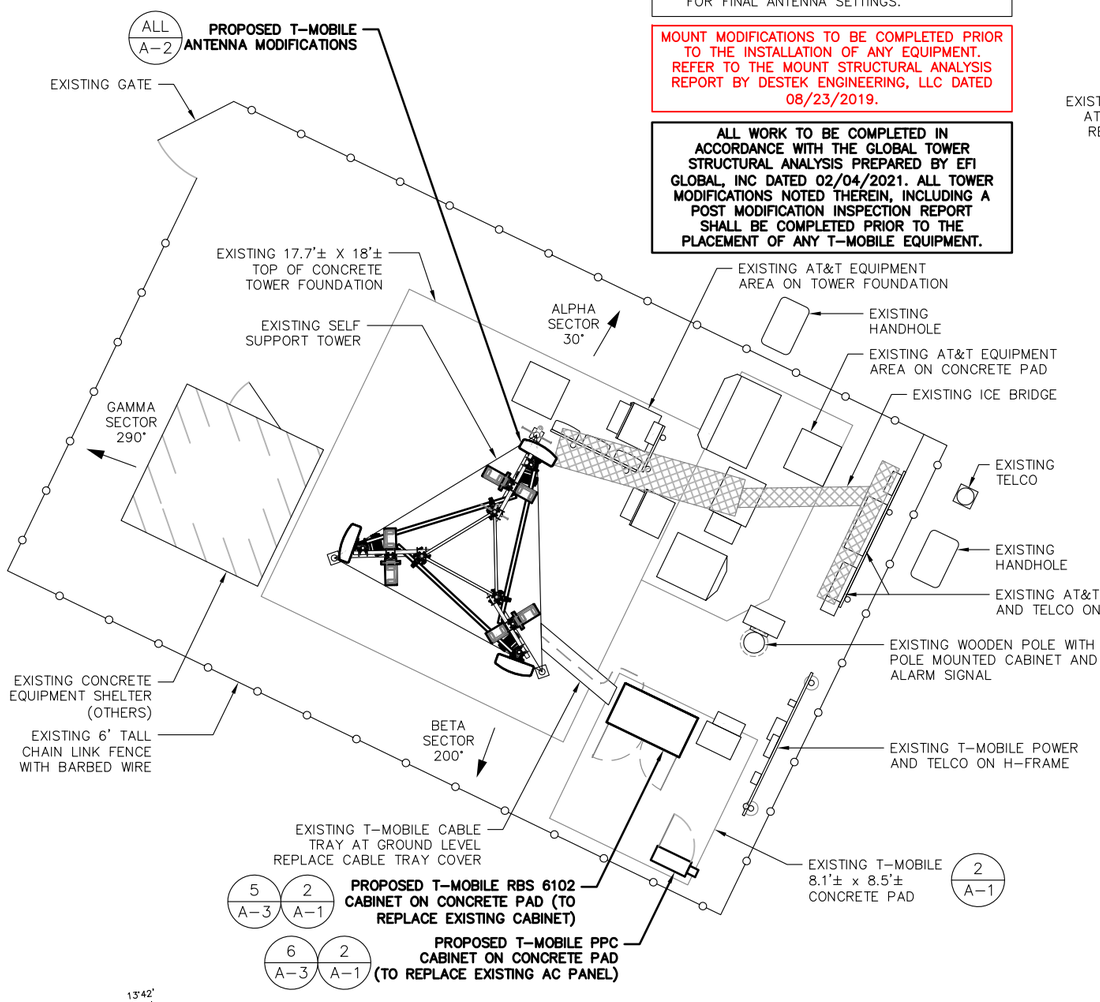
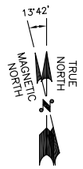


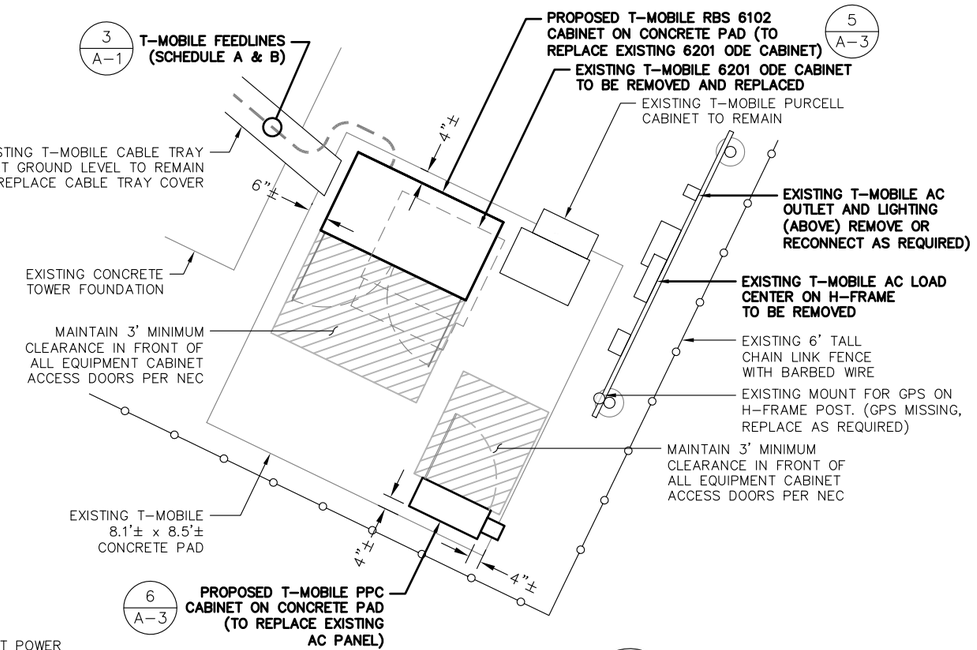


COMPOUND PLAN

1 A–1

SCALE: 1"=8' (11"x17")
1"=4' (22"x34")

8 4 0 8



EQUIPMENT LAYOUT

2 A–1

SCALE: 1"=5' (11"x17")
1"=2.5' (22"x34")

GROUND EQUIPMENT PHOTO DETAIL

3 A–1

SCALE: N.T.S.

FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING TO BE REMOVED: (6) 1⅝" COAX TO 138' RAD	UP SELF SUPPORT TOWER TO RAD
B	PROPOSED: (3) 6x12 HYBRID TO 138' RAD	UP SELF SUPPORT TOWER TO RAD

NOTE: EXISTING T–MOBILE EQUIPMENT FEEDLINE LEASING ENTITLEMENTS BASED ON T–MOBILE RFDS. OBSERVED FIELD CONDITIONS MAY DIFFER.

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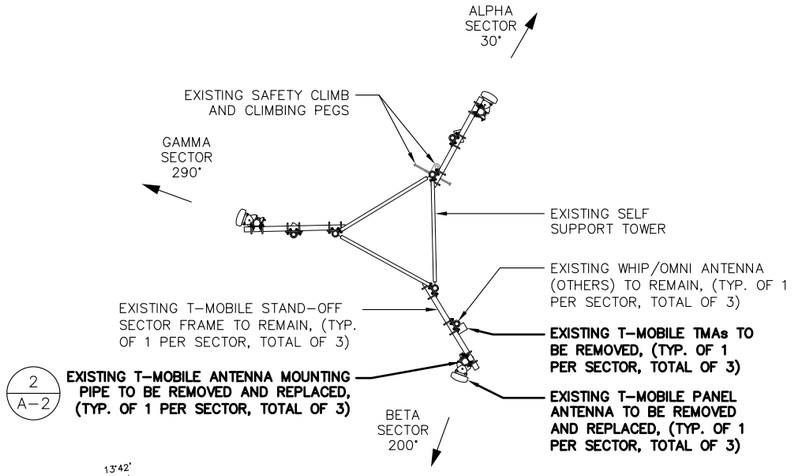
SHEET TITLE

COMPOUND & EQUIPMENT PLANS

SHEET NUMBER

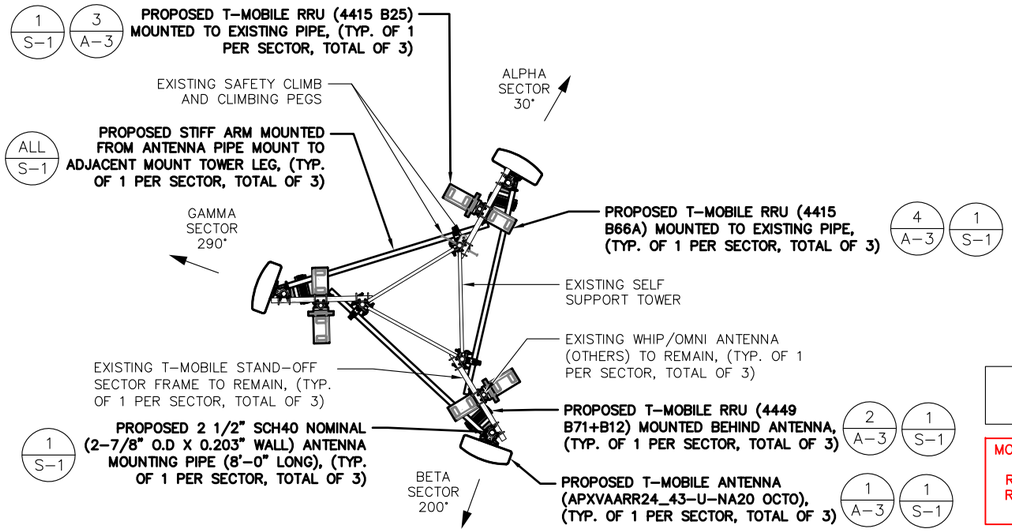
A–1



EXISTING ANTENNA PLAN

SCALE: N.T.S.

1 A-2



PROPOSED ANTENNA PLAN

SCALE: N.T.S.

2 A-2

1 S-1 1 A-3 PROPOSED T-MOBILE PANEL ANTENNA (APXVAARR24_43-U-NA20 OCTO), (TYP. OF 1 PER SECTOR, TOTAL OF 3)

1 S-1 PROPOSED 2 1/2" SCH40 NOMINAL (2-7/8" O.D X 0.203" WALL) ANTENNA MOUNTING PIPE (8'-0" LONG), (TYP. OF 1 PER SECTOR, TOTAL OF 3)

1 S-1 2 A-3 PROPOSED T-MOBILE RRU (4449 B71+B12) MOUNTED BEHIND ANTENNA, (TYP. OF 1 PER SECTOR, TOTAL OF 3)

1 S-1 4 A-3 PROPOSED T-MOBILE RRU (4415 B66A) MOUNTED TO EXISTING PIPE, (TYP. OF 1 PER SECTOR, TOTAL OF 3)

ALL S-1 PROPOSED STIFF ARM MOUNTED FROM ANTENNA PIPE MOUNT TO ADJACENT MOUNT TOWER LEG, (TYP. OF 1 PER SECTOR, TOTAL OF 3)

1 S-1 3 A-3 PROPOSED T-MOBILE RRU (4415 B25) MOUNTED TO EXISTING PIPE, (TYP. OF 1 PER SECTOR, TOTAL OF 3)

IMAGE SOURCE: PROTERRA 04/29/2019
NOTE: ONLY ONE SECTOR SHOWN FOR CLARITY

ANTENNA PHOTO DETAIL

SCALE: N.T.S.

3 A-2

IMAGE SOURCE: PROTERRA 04/29/2019

PARTIAL ELEVATION PHOTO DETAIL

SCALE: N.T.S.

4 A-2

NOTE:
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SHEET TITLE

ELEVATION & ANTENNA PLANS

SHEET NUMBER

A-2

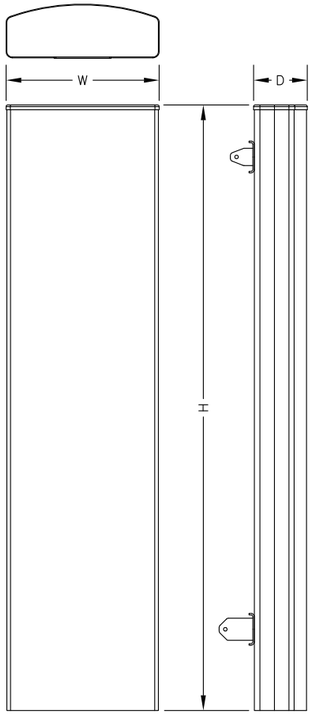
ANTENNA CONFIGURATION

SECTOR	BAND	ANTENNA MODEL	ANTENNA RAD (FROM RFDS)	AZIMUTH	DOWNTILT MECH./ELEC.		RADIOS	CABLE FEED LINES (APPROX. CABLE LENGTH 195'±)
ALPHA	L600 L700 G1900 L1900 L2100	(1) RFS – APXVAARR24_43-U-NA20 (OCTA)	138'±	30°	0°	2°	PROPOSED (1) 4449 B71+B12 RRU, (1) 4415 B25 RRU, (1) 4415 B66A RRU	PROPOSED (1) 6x12 HYBRID CABLE TRUNK
BETA	L600 L700 G1900 L1900 L2100	(1) RFS – APXVAARR24_43-U-NA20 (OCTA)	138'±	200°	0°	2°	PROPOSED (1) 4449 B71+B12 RRU, (1) 4415 B25 RRU, (1) 4415 B66A RRU	PROPOSED (1) 6x12 HYBRID CABLE TRUNK
GAMMA	L600 L700 G1900 L1900 L2100	(1) RFS – APXVAARR24_43-U-NA20 (OCTA)	138'±	290°	0°	2°	PROPOSED (1) 4449 B71+B12 RRU, (1) 4415 B25 RRU, (1) 4415 B66A RRU	PROPOSED (1) 6x12 HYBRID CABLE TRUNK

BASED ON RFDS DATED 04/15/2019. REFER TO FINAL RFDS FOR FINAL ANTENNA SETTINGS, CONFIGURATION, QUANTITIES AND RAN WIRING.

APXVAARR24_43-U-NA20 (OCTA) ANTENNA SPECIFICATIONS

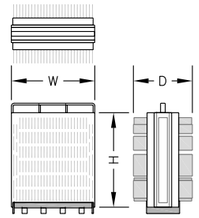
MANUF.	RFS
MODEL #	APXVAARR24_43-U-NA20 (OCTO)
HEIGHT	95.9"
WIDTH	24"
DEPTH	8.7"
WEIGHT	128± LBS.



ANTENNA DETAIL (1 / A-3)
SCALE: N.T.S.

4449 B71+B12 SPECIFICATIONS

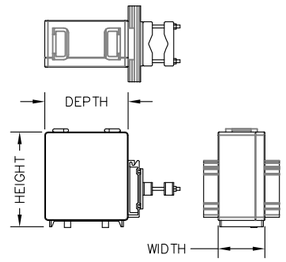
MANUF.	ERICSSON
MODEL #	4449 B71+B12
HEIGHT	14.9"
WIDTH	13.2"
DEPTH	9.2"
WEIGHT	74± LBS.



REMOTE RADIO UNIT (RRU) DETAIL (2 / A-3)
SCALE: N.T.S.

4415 B25 SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	4415 B25
HEIGHT	14.96"
WIDTH	13.19"
DEPTH	5.39"
WEIGHT	44± LBS.

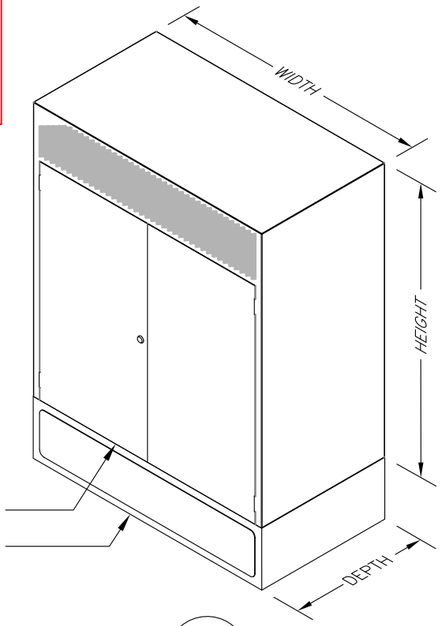


REMOTE RADIO UNIT (RRU) DETAIL (3 / A-3)
SCALE: N.T.S.

***SPECIAL WORK NOTE:**
AN INTERNAL EQUIPMENT CABINET UPGRADE WITHIN THE PROPOSED RBS 6102 IS REQUIRED TO ALLOW THE CABINET TO BE WIRED FOR 125A SERVICE. THE POWER CONNECTION UNIT (PCU AC 08) SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS PRIOR TO CONNECTION TO THE 125A BREAKER.

RBS SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	RBS 6102
HEIGHT	57.1"
WIDTH	51.2"
DEPTH	27.6"
WEIGHT	728± LBS. W/O BATTERIES
MAX WEIGHT	~1600 LBS.

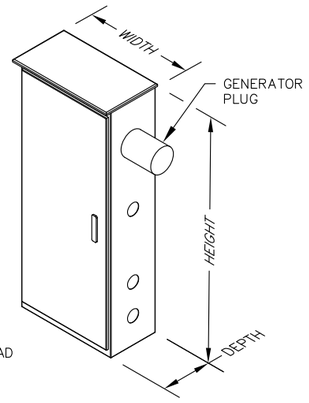


RBS 6102 (5 / A-3)
SCALE: N.T.S.

PPC SPECIFICATIONS

MANUF.	VERTIV NETXTEND
MODEL #	CS7S2-W836
HEIGHT	60"
WIDTH	25"
DEPTH	10"
WEIGHT	150± LBS.

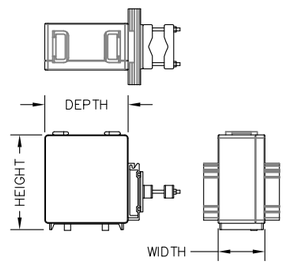
NOTE: CONFIRM WITH MANUFACTURER PAD MOUNTING REQUIREMENTS.



POWER PROTECTION CABINET (PPC) (6 / A-3)
SCALE: N.T.S.

4415 B66A SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	4415 B66A
HEIGHT	14.96"
WIDTH	13.19"
DEPTH	5.39"
WEIGHT	44± LBS.



REMOTE RADIO UNIT (RRU) DETAIL (4 / A-3)
SCALE: N.T.S.

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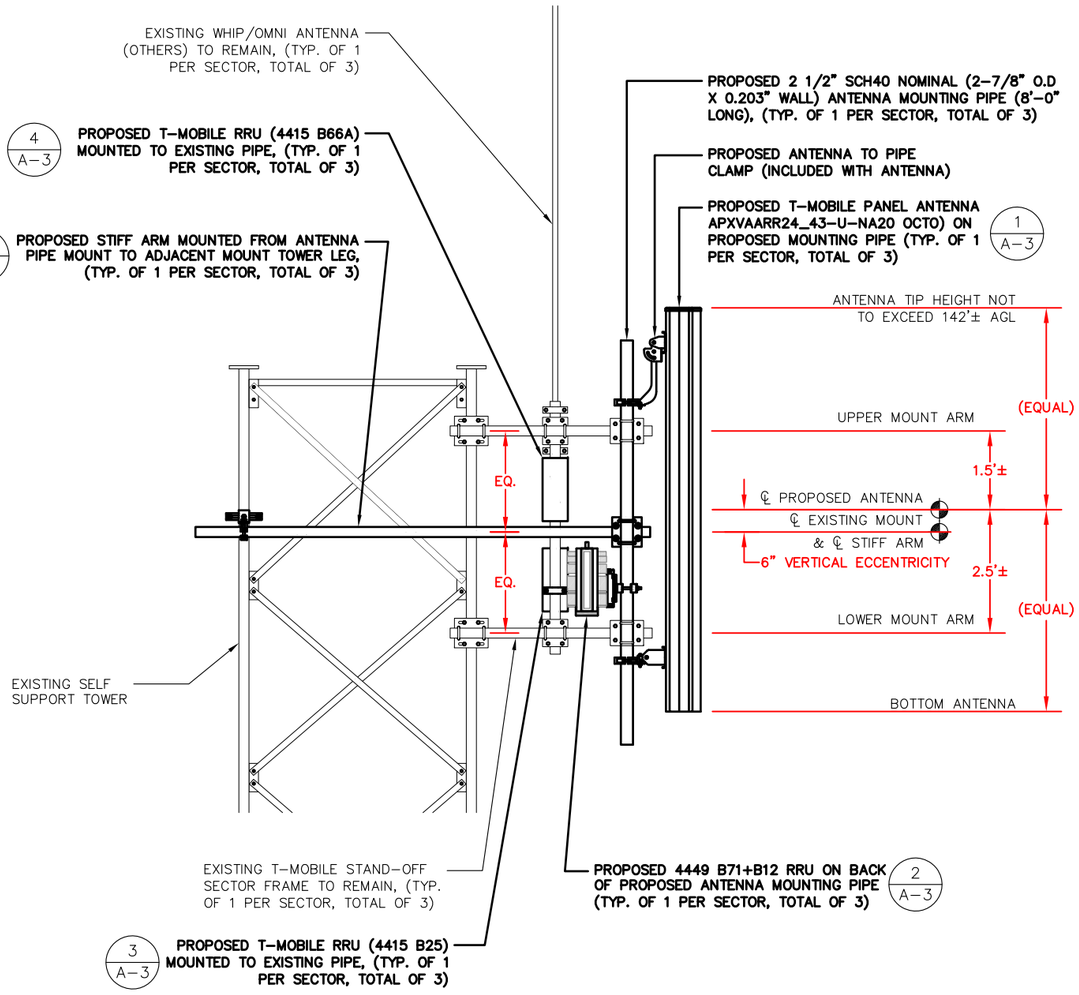

TYPICAL ANTENNA MOUNTING DETAIL

SCALE: N.T.S.

1 S-1

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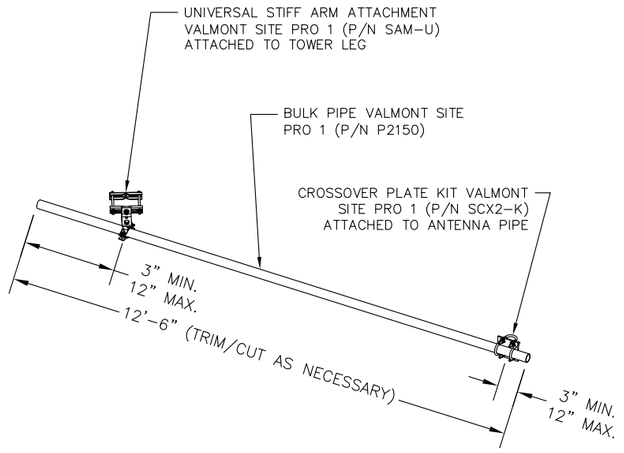
MOUNT MODIFICATIONS TO BE COMPLETED PRIOR TO THE INSTALLATION OF ANY EQUIPMENT. REFER TO THE MOUNT STRUCTURAL ANALYSIS REPORT BY DESTEK ENGINEERING, LLC DATED 08/23/2019.

ALL WORK TO BE COMPLETED IN ACCORDANCE WITH THE GLOBAL TOWER STRUCTURAL ANALYSIS PREPARED BY EFI GLOBAL, INC DATED 02/04/2021. ALL TOWER MODIFICATIONS NOTED THEREIN, INCLUDING A POST MODIFICATION INSPECTION REPORT SHALL BE COMPLETED PRIOR TO THE PLACEMENT OF ANY T-MOBILE EQUIPMENT.



STIFF ARM DETAIL

SCALE: N.T.S.

2 S-1

T-MOBILE NORTHEAST LLC
35 Griffin Road South
Bloomfield, CT 06002
Office: (860) 648-1116

CENTERLINE COMMUNICATIONS
750 West Center St. Suite 301
West Bridgewater, MA 02379

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph.(413) 320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER
4/27/21

APPROVALS

CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING/SITE ACQ.	DATE
OPERATIONS	DATE
TOWER OWNER	DATE
PROJECT NO:	19-023
DRAWN BY:	JEB/PN
CHECKED BY:	TEJ/JMM

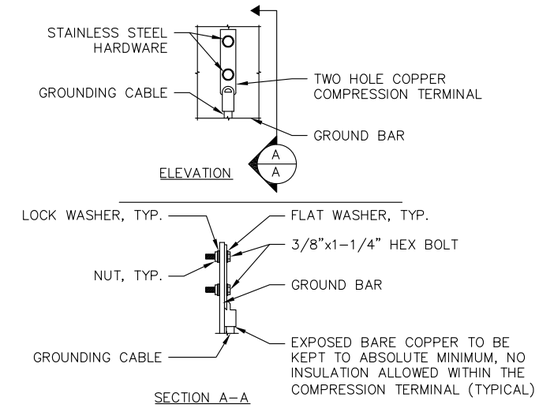
0	04/27/21	FOR CONSTRUCTION
B	03/09/21	ISSUED FOR REVIEW
A	09/05/19	ISSUED FOR REVIEW

SITE NUMBER: CT11277A
SITE NAME:
SIMSBURY-3/RT 10

871 HOPMEADOW ROAD
SIMSBURY, CT 06070
HARTFORD COUNTY

SHEET TITLE
ANTENNA MOUNTING DETAILS

SHEET NUMBER
S-1

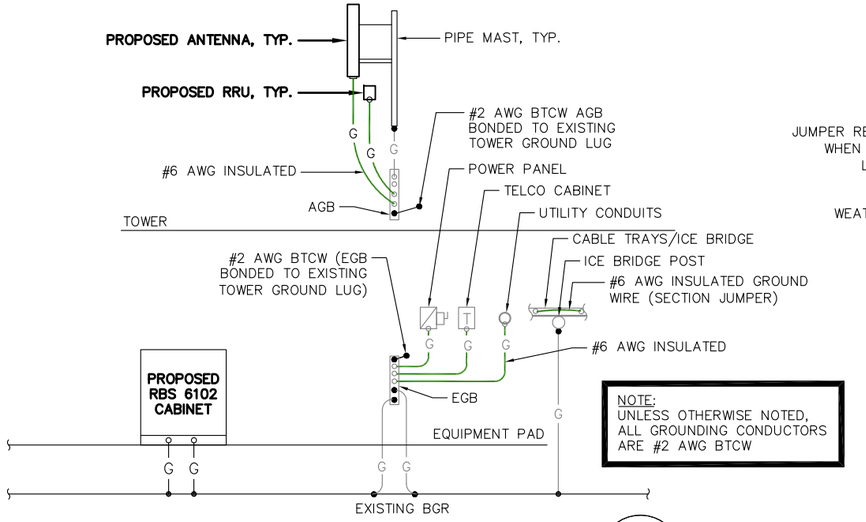


NOTES:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.

TYPICAL GROUND BAR CONNECTION DETAIL

1 / E-1

SCALE: N.T.S.

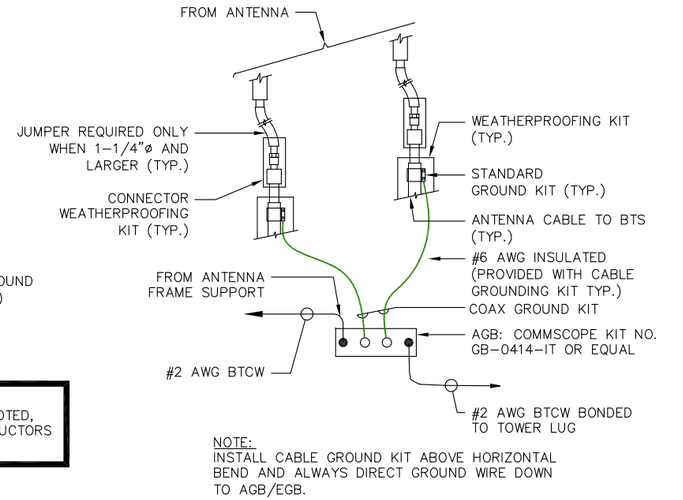


NOTE:
UNLESS OTHERWISE NOTED, ALL GROUNDING CONDUCTORS ARE #2 AWG BTCW

TYPICAL GROUNDING RISER DIAGRAM

2 / E-1

SCALE: N.T.S.



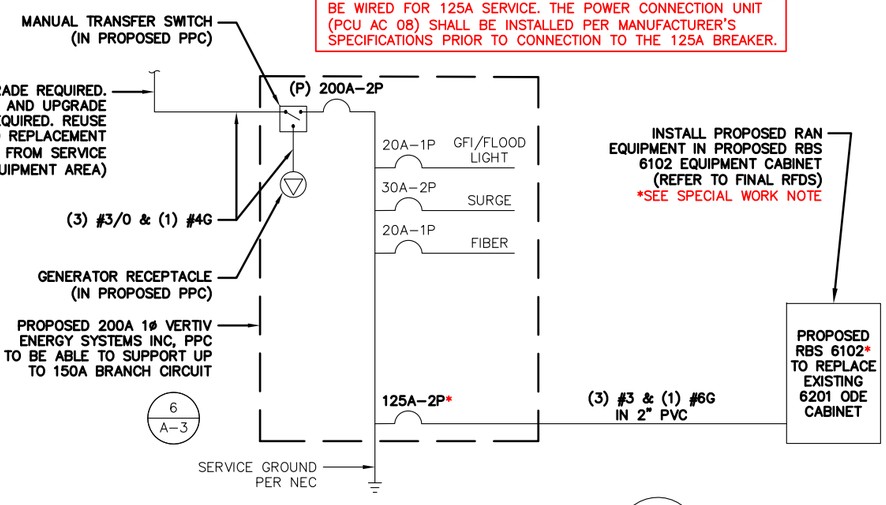
NOTE:
INSTALL CABLE GROUND KIT ABOVE HORIZONTAL BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO AGB/EGB.

TOWER TOP CABLE GROUNDING DETAIL

3 / E-1

SCALE: N.T.S.

*SPECIAL WORK NOTE:
AN INTERNAL EQUIPMENT CABINET UPGRADE WITHIN THE PROPOSED RBS 6102 IS REQUIRED TO ALLOW THE CABINET TO BE WIRED FOR 125A SERVICE. THE POWER CONNECTION UNIT (PCU AC 08) SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS PRIOR TO CONNECTION TO THE 125A BREAKER.



ONE LINE POWER SCHEMATIC

4 / E-1

SCALE: N.T.S.

NOTE:
ELECTRICAL UPGRADE DESIGN BASED ON RECOMMENDATIONS NOTED IN THE T-MOBILE ELECTRICAL SERVICE INVESTIGATION LETTER PREPARED BY McPHEE ELECTRIC LTD DATED JUNE 28, 2019.

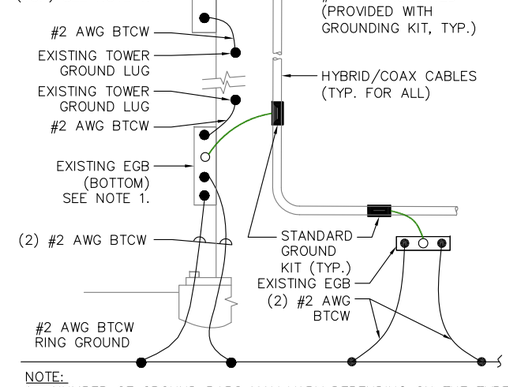
CONTRACTOR NOTE:
G.C. TO VERIFY THAT THE EXISTING CONDUITS AND WIRE SIZES ARE ADEQUATE FOR THE PROPOSED LOADING IN ACCORDANCE WITH NEC AND INCLUDE ELECTRICAL UPGRADES IN THE SCOPE OF WORK AS REQUIRED.

ELECTRICAL LEGEND

A	AMPERE
V	VOLT
KWH	KILOWATT - HOUR
C	CONDUIT
GRC	GALVANIZED RIGID CONDUIT
BTCW	BARE TINNED (SOLID) COPPER WIRE (#2 AWG, UNLESS NOTES OTHERWISE)
G	GROUND
	GROUND
MGB	MASTER GROUND BAR — ○ MECHANICAL CONNECTION ● CADWELD CONNECTION
AGB/EGB	EQUIPMENT GROUND BAR/ANTENNA GROUND BAR
G	GROUND COPPER WIRE, SIZE AS NOTED
	EXPOSED WIRING
	INSULATED GROUNDING CONDUCTOR (#6 AWG STRANDED, UNLESS NOTED OTHERWISE)
	5/8"x10' COPPER CLAD STAINLESS STEEL GROUND ROD
	● EXOTHERMIC (CAD WELD) OR ○ MECHANICAL (COMPRESSION TYPE) CONNECTION
PPC	POWER PROTECTION CABINET
	OMNI-DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALL

ELECTRICAL & GROUNDING NOTES:

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) 2017 AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATIONS INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
4. GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
5. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
6. RIGID STEEL CONDUITS SHALL BE GROUNDED AT BOTH ENDS.
7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THHN INSULATION AS REQUIRED BY NEC.
8. RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL ROOM AND PROPOSED CELL SITE POWER PEDESTAL AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
9. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROPOSED CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON DRAWING A-1. PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
10. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
11. GROUNDING SHALL COMPLY WITH NEC ART. 250.
12. GROUND COAXIAL CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
13. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.
14. ALL GROUND CONNECTIONS TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
15. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
16. CONNECTIONS TO MGB SHALL BE ARRANGED IN THREE MAIN GROUPS: SURGE PRODUCERS (COAXIAL CABLE GROUND KITS, TELCO AND POWER PANEL GROUND); (GROUNDING ELECTRODE RING OR BUILDING STEEL); NON-SURGING OBJECTS (EGB GROUND IN BTS UNIT).
17. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LYGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
18. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.
19. BOND ANTENNA MOUNTING BRACKETS, COAXIAL CABLE GROUND KITS, AND ALNA TO EGB PLACED NEAR THE ANTENNA LOCATION.
20. BOND ANTENNA EGB'S AND MGB TO WATER MAIN/GROUND RING.
21. TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION.
22. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
23. VERIFY PROPOSED SERVICE UPGRADE WITH LOCAL UTILITY COMPANY PRIOR TO CONSTRUCTION.



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

TOWER BOTTOM CABLE GROUNDING DETAIL

5 / E-1

SCALE: N.T.S.

T-MOBILE NORTHEAST LLC
35 Griffin Road South
Bloomfield, CT 06002
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750 West Center St. Suite 301
West Bridgewater, MA 02379

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Hadley, MA 01035 Ph: (413) 320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
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SITE NUMBER: CT11277A
SITE NAME:
SIMSBURY-3/RT 10

871 HOPMEADOW ROAD
SIMSBURY, CT 06070
HARTFORD COUNTY

SHEET TITLE

ONE LINE DIAGRAM & GROUNDING DETAILS

SHEET NUMBER

E-1

Exhibit D

Structural &Mount Analysis Report

STRUCTURAL ANALYSIS REPORT - UPGRADE
SELF-SUPPORT TOWER

Prepared For:

ProTerra Design Group, LLC
4 Bay Road, Building A Suite 200
Hadley, MA 01035

Structure Rating:	
Self-Support Tower:	**99.1% (Pass)**
Anchor Bolts:	**65.8% (Pass)**
Foundation:	**90.0% (Pass)**

Sincerely,
EFI Global, Inc
Firm License No: PEC00001429

STATE OF CONNECTICUT
AHMET COLAKOGLU
PEN 27057
LICENSED
PROFESSIONAL ENGINEER

02-4-2021

Ahmet Colakoglu, PE
Connecticut Professional Engineer
License No: PEN 27057

T-Mobile Site Name: Simsbury-3/Rt 10
T-Mobile Site Number: CT11277A
871 Hopmeadow Street
Simsbury, CT 06070

EFI Global, Inc.
1117 Perimeter Center West, Ste E500, Atlanta, GA 30338-Tel: (770) 693 0835

CONTENTS

EFI Global, Inc.
1117 Perimeter Center West, Ste E500, Atlanta, GA 30338-Tel: (770) 693 0835

1.0 SUBJECT AND REFERENCES

The purpose of this analysis is to evaluate the structural capacity of the 140 ft. Self-Support Tower located at 871 Hopmeadow Street, Simsbury, CT 06070 for the addition of wireless telecommunication appurtenances proposed by T-Mobile.

The structural analysis is based on the following documentation provided to EFI Global, Inc (EFI):

- Tower & Mount Mapping Report prepared by Hightower Solutions, dated 08/06/2019.
- Structural Analysis Report prepared by Fullerton Engineering, dated 05/04/2017.
- Construction Drawings prepared by Fullerton Engineering, dated 05/26/2017.
- RFDS provided by T-Mobile, dated 04/16/2019.
- Site Photographs provided by Proterra.
- Site Photographs provided by Hightower Solutions.
- Mount Structural Analysis Report prepared by Destek, dated 08/23/2019.
- Geotechnical Report prepared by Welti Geotechnical, P.C., dated 12/10/2020.
- Ground Layout prepared by Pro Terra.

1.1 STRUCTURE

The structure is a 3-sided, 140’-7” tall self-support tower formed by seven 20’-1” sections. Pipe legs are X-braced at all sections with either single angle or double angle diagonals. The tower is 12’-6” wide at the base, and has a constant taper down to 4’-6” wide at 80’-4”. The tower width is uniform from 80’-4” to the top. Based on the results of the mapping, it is clear that the tower has been modified; Plates have been attached to the tower legs, secondary horizontals have been installed, some diagonals appear to have been replaced, and additional anchor rods have been installed. Please refer to the software output in Appendix A, for tower geometry, member sizes and other details.

2.0 EXISTING AND PROPOSED APPURTENANCES

The analysis is based on the following proposed appurtenances:

Existing Configuration of T-Mobile Appurtenances:

RAD CENTER (FT)	ANTENNA & TMA	COAX	MOUNT
138.0	(3) EMS RR90-17-XXDP (3) 11”T x 6”W x 4”D TMAs	(6) 1-5/8’’	(1) Existing Standoff Mount Frame

EFI Global, Inc.
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Proposed and Final Configuration of T-Mobile Appurtenances:

RAD CENTER (FT)	ANTENNA & TMA	COAX	MOUNT
138.0	(3) RFS APXVAARR24_43-U-NA20 (3) Radio 4449 B71+B12 (3) Radio 4415 B25 (3) Radio 4415 B66A	(3) 6x12 HCS	(3) Existing Standoff Mount Frames with Proposed Mount Modifications

Existing Appurtenance by Other:

RAD CENTER (FT)	ANTENNA & TMA	COAX	MOUNT
138.0	(1) 14’ Whip 1.75” Dia. (1) 14’ Whip 3.5 Dia. (1) 10’ Dipole/ 4 Elements	(3) 7/8”	(3) Existing Standoff Mount Frames with Proposed Mount Modifications
117.0	(3) HPA-65R-BUU-H8 (3) 800 10121 (6) LGP2140X (3) RRUS 11 B12 (3) RRUS 12 B2 (3) RRUS A2 B2 (1) DC6-48-60-18-8F	(6) 1-1/4” (2) Flex Conduit 2.32” (1) 0.32” Black Cable	(3) Existing Sector Mounts
110.67	2’ Whip	(1) 0.32” Black Cable	(1) On Dipole
108.25	20’ Whip	(1) 1-1/4”	(1) Standoff Mount
101.50	Yagi 3’	(1) 0.40” Black Cable	(1) On Dipole
101.33	Radiowaves HP2-18EX Dish	(1) 1/2"	(1) Standoff Mount
88.83	Yagi 3’	(1) 0.40” Black Cable	(1) On Dipole
	23’-8” Dipole	(2) 0.40” Black Cable	(2) Angle Mounts
63.75	(1) Kathrein GPS OG-860/1920/GPS-A	(1) 1/2’’	(1) Pipe Mount
54.49	6’ Whip	(1) 0.40” Black Cable	(1) Standoff Mount

EFI Global, Inc.
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3.0 CODES AND LOADING

This analysis has been performed in accordance with the 2018 Connecticut Building Code (2015 IBC) based upon an ultimate 3-second gust wind speed of 120 mph (Risk Category II) converted to a nominal 3-second gust wind speed of 93 mph per section 1609.3.1 as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. The following loading criteria were used in the analysis:

- Basic wind speed of 93 mph without ice (V)
- Basic wind speed of 50 mph concurrent with the design ice thickness of 1 " (V_i and t_i)
- Exposure Category C
- Topographic Category 1
- Risk Category II (I_w = 1.0)

The following load combinations were used with wind blowing at 0°, 30°, 60°, and 90°, measured from a line normal to the face of the tower:

- 1.2 D + 1.6 W_o
- 0.9 D + 1.6 W_o
- 1.2 D + 1.0 D_i + 1.0 W_i + 1.0 T_i

D: Dead load of structures and appurtenances
D_i: Weight of ice due to factored ice thickness (based upon t_i)
T_i: Load effects due to temperature
W_o: Wind load without ice (based upon V)
W_i: Weight of ice due to factored ice thickness (based upon V_i)

EFI Global, Inc.
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4.0 STANDARD CONDITIONS FOR ENGINEERING SERVICES ON EXISTING STRUCTURES

The analysis is based on the information provided to EFI and is assumed to be current and correct. Unless otherwise noted, the structure is assumed to be in good condition, free of defects, and can achieve theoretical strength.

It is assumed that the structure has been maintained and shall be maintained during its service lifespan. The superstructure and the foundation system are assumed to be designed with proper engineering practice and fabricated, constructed and erected in accordance with the design documents. EFI will accept no liability which may arise due to any existing deficiency in design, material, fabrication, erection, construction, etc. or lack of maintenance.

The analysis does not include a qualification of the antenna mounts attached on the structure or their connections. The analysis is performed to verify the capacity of the main structural members, which is the current practice in the tower industry.

The analysis results presented in this report are only applicable for the previously mentioned existing and proposed appurtenances. Any deviation of the appurtenances and placement, etc., will require EFI to generate an additional structural analysis.

5.0 ANALYSIS AND ASSUMPTIONS

The monopole was analyzed by utilizing tnxTower, a non-linear, three-dimensional, finite element-analysis software package, a product of Tower Numerics, Inc. Software output for this analysis is provided in Appendix A of this report.

EFI Global, Inc.
1117 Perimeter Center West, Ste E500, Atlanta, GA 30338-Tel: (770) 693 0835

6.0 RESULTS AND CONCLUSION

Based on a structural analysis per ANSI/TIA-222-G, the existing self-support tower **will have adequate** structural capacity for the proposed changes by T-Mobile, **once it has been upgraded in accordance with the upgrade drawings attached with this report, dated 02/04/2021**. For the code specified load combinations and as a maximum, the leg bolts are stressed to **99.1%** of their structural capacities. The tower leg, diagonals, anchor bolts and horizontals are stressed to **98.0%, 96.6%, 65.8%** & **38.8%** of their structural capacities, respectively.

The existing base foundation **will also have adequate** structural capacity for the proposed changes by T-Mobile. For the code specified load combinations and as a maximum, the base foundation is stressed to **90%** of its structural capacity.

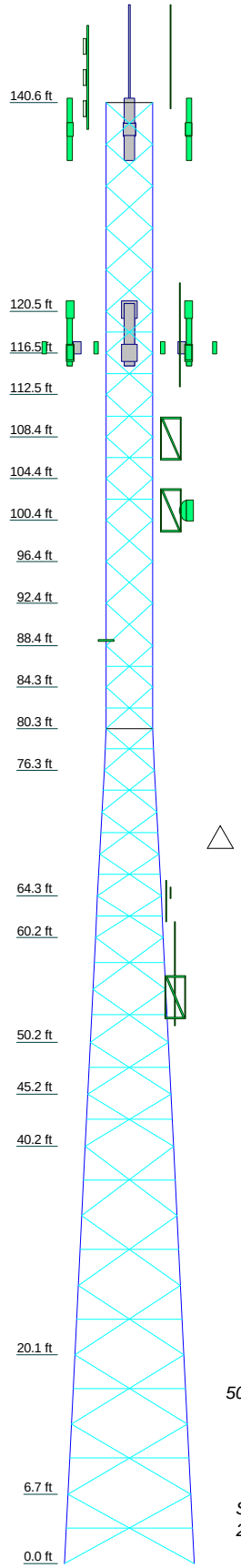
Therefore, the additions and alterations proposed by T-Mobile **can** be implemented as intended and with the conditions outlined in this report**.**

Should you need any clarifications or have any questions about this report, please contact telecom@efiglobal.com.

EFI Global, Inc.
1117 Perimeter Center West, Ste E500, Atlanta, GA 30338-Tel: (770) 693 0835

APPENDIX A
SOFTWARE OUTPUT

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	
Legs	P2x.154	A					CT11277A-P2.5x0.203+1/2-HSS3.5x0.3							B				CT11277-P3x0.3+1/2HSS4.5x0.337			
Leg Grade	A572-50																				
Diagonals	L1 1/2x1 1/2x1/8					L2x2x1/4						L1 1/2x1 1/2x1/8			L1 3/4x1 3/4x1/8		2L1 3/4x1 3/4x1/8		2L2x2x1/8	
Diagonal Grade	A36															C					
Top Girts	L1 1/2x1 1/2x1/8					N.A.					D							N.A.			
Sec. Horizontals	N.A.	L2 1/2x2 1/2x1/4				E	N.A.			L3x3x3/16		L2x2x3/16		G	L3x3x3/16		F	L3x3x3/16			
Face Width (ft)	4.5											4.9		6.1	6.5	7.5	8	8.5	10.5	11.8333	12.5
# Panels @ (ft)	5 @ 4.01666						11 @ 4.0167						3 @ 4.01667		2 @ 5.02085	2 @ 5.0208		3 @ 6.69443	2 @ 6.69445	H	9.9
Weight (K)	0.5	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.3	0.3	0.2	0.7	0.3	0.7	0.4	0.4	2.1	1.5	0.8	



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
14' Whip 1.75 Dia	138	(2) LGP2140X	117
14' Whip 3.5 Dia	138	(2) LGP2140X	117
10' Dipole	138	(2) LGP2140X	117
APXVAARR24_43-U-NA20 w/ Mount Pipe	138	RRUS 11 B12	117
APXVAARR24_43-U-NA20 w/ Mount Pipe	138	RRUS 11 B12	117
APXVAARR24_43-U-NA20 w/ Mount Pipe	138	RRUS 11 B12	117
RADIO 4449 B12/B71	138	RRUS 12 B2	117
RADIO 4449 B12/B71	138	RRUS 12 B2	117
RADIO 4449 B12/B71	138	RRUS 12 B2	117
RRUS 4415 B25	138	RRUS A2 B2	117
RRUS 4415 B25	138	RRUS A2 B2	117
RRUS 4415 B25	138	RRUS A2 B2	117
RADIO 4415 B66A	138	DC6-48-60-18-8F	117
RADIO 4415 B66A	138	Sector Mount [SM 401-3]	117
RADIO 4415 B66A	138	20' Whip	108.25
Side Arm Mount [SO 306-3]	138	Side Arm Mount [SO 302-1]	108.25
8'-P2x0.154 H	138	Side Arm Mount [SO 302-1]	101.333
8'-P2x0.154 H	138	HP2-18EX	101.333
8'-P2x0.154 H	138	Yagi 3'	88.833
HPA-65R-BUU-H8	117	Yagi 3'	88.833
HPA-65R-BUU-H8	117	23' 8" Dipole	88.833
HPA-65R-BUU-H8	117	3' horizontal 2 1/2"x2 1/2" angle	88.833
800 10121	117	2' Whip	88.833
800 10121	117	4'-P2x0.154	63.75
800 10121	117	OG-860/1920/GPS-A	63.75
		Side Arm Mount [SO 301-1]	54.4997
		6' Whip	54.4997

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	CT11277A-P2x0.154+1/2-HSS3x0.25	E	L3x3x3/16
B	CT11277A-P2.5x0.276+1/2-HSS3.5x0.3	F	L2x2x3/16
C	2L1 1/2x1 1/2x1/8	G	1 @ 4.0167
D	L1 1/2x1 1/2x1/8	H	1 @ 6.6941

MATERIAL STRENGTH

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

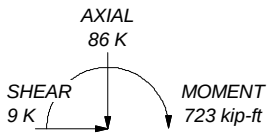
TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 93.0 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50.0 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60.0 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 99.1%

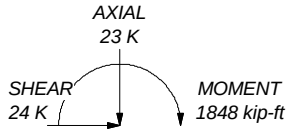
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 179 K
SHEAR: 15 K

UPLIFT: -157 K
SHEAR: 14 K



TORQUE 2 kip-ft
50.0 mph WIND - 1.00 in ICE

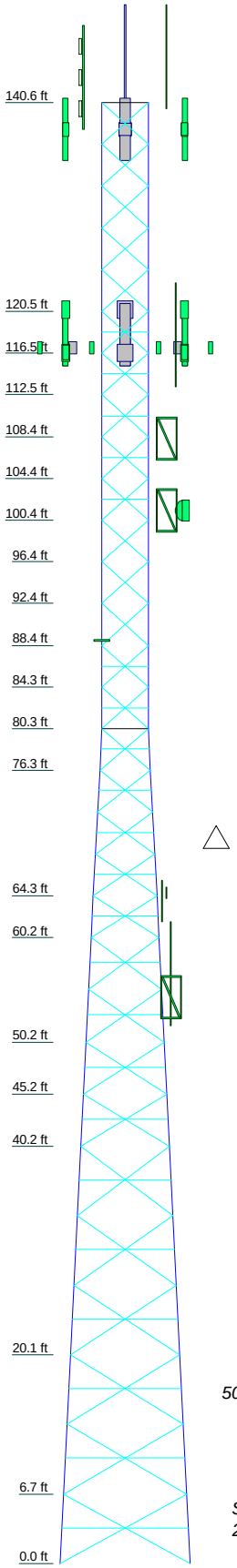


TORQUE 9 kip-ft
REACTIONS - 93.0 mph WIND

EFI Global, Inc.
efi global 1117 Perimeter Center West, Suite E500
Atlanta, GA 30338
Phone: (770) 693-0835
FAX:

Job: CT11277A			
Project: 049.01174 - 1978011			
Client: Proterra	Drawn by: Ahmet Colakoglu	App'd:	
Code: TIA-222-G	Date: 02/04/21	Scale: NTS	
Path:		Dwg No. E-1	

Section		T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	
Legs		P2x.154	A											CT11277A-P2.5x0.203+1/2-HSS3.5x0.3		B			CT11277-P3x0.3+1/2HSS4.5x0.337			
Leg Grade		A572-50																				
Diagonals		L1 1/2x1 1/2x1/8						L2x2x1/4						L1 1/2x1 1/2x1/8		L1 3/4x1 3/4x1/8		C	2L1 3/4x1 3/4x1/8		2L2x2x1/8	
Diagonal Grade		A36																				
Top Girts		L1 1/2x1 1/2x1/8					N.A.						D									
Sec. Horizontals		N.A.	L2 1/2x2 1/2x1/4				E	N.A.			L3x3x3/16		L2x2x3/16		G	L3x3x3/16		F	L3x3x3/16			
Face Width (ft)	4.5												4.9		6.1	6.5	7.5	8	8.5	10.5	11.8333	12.5
# Panels @ (ft)		5 @ 4.01666						11 @ 4.0167						3 @ 4.01667		2 @ 5.02085	2 @ 5.0208	2 @ 5.0208	3 @ 6.69443	2 @ 6.69445	H	
Weight (K)		0.5	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.3	0.3	0.2	0.7	0.3	0.7	0.4	0.4	2.1	1.5	0.8	9.9



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	CT11277A-P2x0.154+1/2-HSS3x0.25	E	L3x3x3/16
B	CT11277A-P2.5x0.276+1/2-HSS3.5x0.3	F	L2x2x3/16
C	2L1 1/2x1 1/2x1/8	G	1 @ 4.0167
D	L1 1/2x1 1/2x1/8	H	1 @ 6.6941

MATERIAL STRENGTH

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

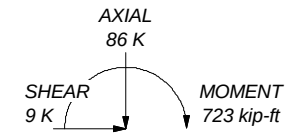
TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 93.0 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50.0 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60.0 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 99.1%

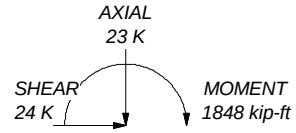
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 179 K
SHEAR: 15 K

UPLIFT: -157 K
SHEAR: 14 K



TORQUE 2 kip-ft
50.0 mph WIND - 1.00 in ICE



TORQUE 9 kip-ft
REACTIONS - 93.0 mph WIND

EFI Global, Inc.
efi global 1117 Perimeter Center West, Suite E500
Atlanta, GA 30338
Phone: (770) 693-0835
FAX:

Job: **CT11277A**			
Project: **049.01174 - 1978011**			
Client: Proterra	Drawn by: Ahmet Colakoglu	App'd:	
Code: TIA-222-G	Date: 02/04/21	Scale: NTS	
Path:		Dwg No. E-1	

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 140.58 ft above the ground line.

The base of the tower is set at an elevation of 0.00 ft above the ground line.

The face width of the tower is 4.50 ft at the top and 12.50 ft at the base.

This tower is designed using the TIA-222-H Standard.

The following design criteria apply:

- Basic wind speed of 93.0 mph.
- Structure Class II.
- Exposure Category C.
- Topographic Category 1.
- Crest Height 0.00 ft.
- Nominal ice thickness of 1.00 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50.0 mph is used in combination with ice.
- Deflections calculated using a wind speed of 60.0 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in tower member design is 1.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

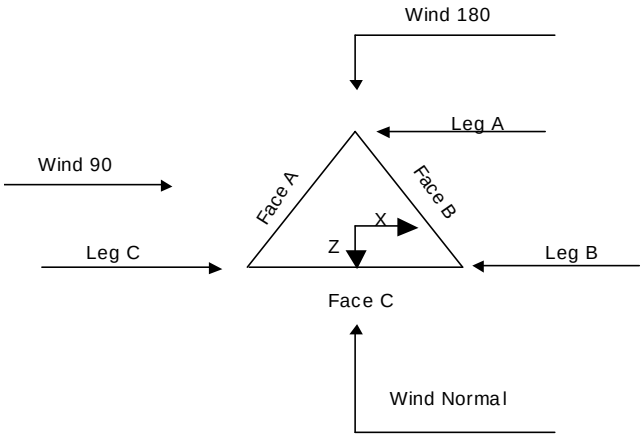
Consider Moments - Legs
Consider Moments - Horizontals
Consider Moments - Diagonals
Use Moment Magnification
√ Use Code Stress Ratios
√ Use Code Safety Factors - Guys
Escalate Ice
Always Use Max Kz
Use Special Wind Profile
√ Include Bolts In Member Capacity
Leg Bolts Are At Top Of Section
√ Secondary Horizontal Braces Leg
Use Diamond Inner Bracing (4 Sided)
SR Members Have Cut Ends
SR Members Are Concentric

Distribute Leg Loads As Uniform
Assume Legs Pinned
√ Assume Rigid Index Plate
√ Use Clear Spans For Wind Area
√ Use Clear Spans For KL/r
√ Retension Guys To Initial Tension
√ Bypass Mast Stability Checks
√ Use Azimuth Dish Coefficients
√ Project Wind Area of Appurt.
Autocalc Torque Arm Areas
Add IBC .6D+W Combination
√ Sort Capacity Reports By Component
Triangulate Diamond Inner Bracing
Treat Feed Line Bundles As Cylinder
Ignore KL/ry For 60 Deg. Angle Legs

Use ASCE 10 X-Brace Ly Rules
√ Calculate Redundant Bracing Forces
Ignore Redundant Members in FEA
√ SR Leg Bolts Resist Compression
All Leg Panels Have Same Allowable
Offset Girt At Foundation
√ Consider Feed Line Torque
√ Include Angle Block Shear Check
Use TIA-222-H Bracing Resist. Exemption
Use TIA-222-H Tension Splice Exemption

Poles

Include Shear-Torsion Interaction
Always Use Sub-Critical Flow
Use Top Mounted Sockets
Pole Without Linear Attachments
Pole With Shroud Or No Appurtenances
Outside and Inside Corner Radii Are Known



Triangular Tower

Tower Section Geometry

Tower Section	*Tower Elevation* ft	*Assembly Database*	*Description*	*Section Width* ft	*Number of Sections*	*Section Length* ft
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Tower Section Geometry *(cont'd)*

Tower Section	*Tower Elevation* *ft*	*Diagonal Spacing* *ft*	*Bracing Type*	*Has K Brace End Panels*	*Has Horizontals*	*Top Girt Offset* *in*	*Bottom Girt Offset* *in*
[illegible]	[illegible]	[illegible]	□ □ra□e	□o	□o	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	□ □ra□e	□o	□e□	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	□ □ra□e	□o	□e□	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	□ □ra□e	□o	□e□	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	□ □ra□e	□o	□e□	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	□ □ra□e	□o	□e□	[illegible]	[illegible]

Tower Section Geometry *(cont'd)*

Tower Elevation *ft*	*Leg Type*	*Leg Size*	*Leg Grade*	*Diagonal Type*	*Diagonal Size*	*Diagonal Grade*
[illegible]	□i□e	[illegible]	[illegible] □□□ □i□	□□ual □n□le	[illegible]	[illegible] □□□ □i□
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Tower Elevation ft	*Leg Type*	*Leg Size*	*Leg Grade*	*Diagonal Type*	*Diagonal Size*	*Diagonal Grade*
[illegible]	Arbitrary Shape	[illegible]	[illegible]	Equal Angle	[illegible]	[illegible]
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[illegible]	Arbitrary Shape	[illegible]	[illegible]	Double Equal Angle	[illegible]	[illegible]

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*Top Girt Type*	*Top Girt Size*	*Top Girt Grade*	*Bottom Girt Type*	*Bottom Girt Size*	*Bottom Girt Grade*
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[illegible]	Equal Angle	[illegible]	[illegible]	Single Angle		[illegible]

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*Secondary Horizontal Type*	*Secondary Horizontal Size*	*Secondary Horizontal Grade*	*Inner Bracing Type*	*Inner Bracing Size*	*Inner Bracing Grade*
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[illegible]	Equal Angle	[illegible]	[illegible]	Single Angle		[illegible]
[illegible]	Equal Angle	[illegible]	[illegible]	Single Angle		[illegible]
[illegible]	Equal Angle	[illegible]	[illegible]	Single Angle		[illegible]
[illegible]	Equal Angle	[illegible]	[illegible]	Single Angle		[illegible]
[illegible]	Equal Angle	[illegible]	[illegible]	Single Angle		[illegible]
[illegible]	Equal Angle	[illegible]	[illegible]	Single Angle		[illegible]
[illegible]	Equal Angle	[illegible]	[illegible]	Single Angle		[illegible]
[illegible]	Equal Angle	[illegible]	[illegible]	Single Angle		[illegible]

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
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[illegible]	Equal Angle	[illegible]	[illegible]	Single Angle		[illegible]
[illegible]	Equal Angle	[illegible]	[illegible]	Single Angle		[illegible]

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Mid-Pt	Mid-Pt	Mid-Pt
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Mid-Pt	Mid-Pt	Mid-Pt
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Mid-Pt	Mid-Pt	Mid-Pt
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Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft^2	in					in	in	in

Tower Section Geometry *(cont'd)*

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Brace Diags X	K Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
ft																	

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*Leg*		*Diagonal*		*Top Girt*		*Bottom Girt*		*Mid Girt*		*Long Horizontal*		*Short Horizontal*	
	Net Width Deduct in	*U*	*Net Width Deduct in*	*U*	*Net Width Deduct in*	*U*	*Net Width Deduct in*	*U*	*Net Width Deduct in*	*U*	*Net Width Deduct in*	*U*	*Net Width Deduct in*	*U*
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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Tower Section Geometry *(cont'd)*

Tower Elevation ft	*Leg Connection Type*	*Leg*		*Diagonal*		*Top Girt*		*Bottom Girt*		*Mid Girt*		*Long Horizontal*		*Short Horizontal*	
		Bolt Size in	*No.*	*Bolt Size in*	*No.*	*Bolt Size in*	*No.*	*Bolt Size in*	*No.*	*Bolt Size in*	*No.*	*Bolt Size in*	*No.*	*Bolt Size in*	*No.*
[illegible]	Flange	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Flange	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
[illegible]	Flange	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Flange	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Flange	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Flange	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Flange	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
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[illegible]DF[illegible]	[illegible]	[illegible]o	[illegible]o	[illegible]r [illegible]Ca[illegible]a[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]

Description	*Face or Leg*	*Allow Shield*	*Exclude From Torque Calculation*	*Component Type*	*Placement* *ft*	*Face Offset* *in*	*Lateral Offset (Frac FW)*	*#*	*# Per Row*	*Clear Spacing* *in*	*Width or Diameter* *in*	*Perimeter* *in*	*Weight* *plf*
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Description	*Face or Leg*	*Allow Shield*	*Exclude From Torque Calculation*	*Component Type*	*Placement* *ft*	*Face Offset* *in*	*Lateral Offset (Frac FW)*	*#*	*# Per Row*	*Clear Spacing* *in*	*Width or Diameter* *in*	*Perimeter* *in*	*Weight* *plf*
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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*
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Tower Section	*Tower Elevation ft*	*Face*	*A_R ft²*	*A_F ft²*	*C_AA_A In Face ft²*	*C_AA_A Out Face ft²*	*Weight K*
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Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	*Tower Elevation ft*	*Face or Leg*	*Ice Thickness in*	*A_R ft²*	*A_F ft²*	*C_AA_A In Face ft²*	*C_AA_A Out Face ft²*	*Weight K*
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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*
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Feed Line Center of Pressure

Section	*Elevation ft*	CP_X *in*	CP_Z *in*	CP_X *Ice in*	CP_Z *Ice in*
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Shielding Factor Ka

Tower Section	*Feed Line Record No.*	*Description*	*Feed Line Segment Elev.*	*K_a No Ice*	*K_a Ice*
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Tower Section	*Feed Line Record No.*	*Description*	*Feed Line Segment Elev.*	*K_a No Ice*	*K_a Ice*
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[illegible]	[illegible]	Feedline □adder □□f□	[illegible]	[illegible]	[illegible]

Tower Section	*Feed Line Record No.*	*Description*	*Feed Line Segment Elev.*	*K_a No Ice*	*K_a Ice*
T1		AVA 50(4	6.69 20.	0. 00	0. 00
T1		CF7 50 (/8	6.69 20.	0. 00	0. 00
T1		DF 50 2	6.69 20.	0. 00	0. 00
T1		DF 50(8	6.69 20.	0. 00	0. 00
T1		"x0 326 ' ra	6.69 20.	0. 00	0. 00
T1		"x0 326 ' ra	6.69 20.	0. 00	0. 00
T1		"x0 326 ' ra	6.69 20.	0. 00	0. 00
T2		CF15 50 (/8	0.00 6	0. 00	0. 00
T2		DF 50 2	0.00 6	0. 00	0. 00
T20	6	i a a it rid for TMO 1.584 '	0.00 - 6 9	0. 000	0. 000
T2		DF 50(8	0.00 6	0. 00	0. 00
T2		2 3 " Flex Conduit	0.00 6	0. 00	0. 00
T2		Feedline Ladder f	0.00 6	0. 00	0. 00
T2		Feedline Ladder f	0.00 6	0. 00	0. 00
T2		AVA 50(4	0.00 6	0. 00	0. 00
T2		CF7 50 (/8	0.00 6	0. 00	0. 00
T2		DF 50 2	0.00 6	0. 00	0. 00
T2		DF 50(8	0.00 6	0. 00	0. 00
T2		"x0 326 ' ra	0.00 6	0. 00	0. 00
T2		"x0 326 ' ra	0.00 6	0. 00	0. 00
T2		"x0 326 ' ra	0.00 6	0. 00	0. 00

Discrete Tower Loads

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		*C_AA_A Front* *ft²*	*C_AA_A Side* *ft²*	*Weight* *K*
**									
14' i 1 75 Dia	A	From Leg	2.00	0 00	138.0	No Ice	2. 5	2.45	0.03
			0.00			1/2 Ice	3. 5	3.85	0.04
			7.0			1' Ice	5.	5.2	0.0
14' i 3 5 Dia	B	From Leg	2.00	0 00	138.0	No Ice	4. 0	4.90	0.05
			0.00			1/2 Ice	6. 0	6.30	0.09
			7.0			1' Ice	7.	7.7	0.1
10' Dipole	C	From Leg	2.00	0 00	138.0	No Ice	2. 0	2.00	0.02
			0.00			1/2 Ice	3. 0	3.00	0.04
			5.0			1' Ice	4.	4.0	0.0
** 138 TMO *									
A XVAARR24_43- A20 w/ Mount Pipe	A	From Leg	4.00	0 00	138.0	No Ice	14.69	6.87	0.19
			0.00			1/2 Ice	15.46	7.55	0.31
			0.0			1' Ice	16.2	8.2	0.4
A XVAARR24_43- A20 w/ Mount Pipe	B	From Leg	4.00	0 00	138.0	No Ice	14.69	6.87	0.19
			0.00			1/2 Ice	15.46	7.55	0.31
			0.0			1' Ice	16.2	8.2	0.4
A XVAARR24_43- A20 w/ Mount Pipe	C	From Leg	4.00	0 00	138.0	No Ice	14.69	6.87	0.19
			0.00			1/2 Ice	15.46	7.55	0.31
			0.0			1' Ice	16.2	8.2	0.4
D 4449 12/ 71	A	From Leg	4.00	0 00	138.0	No Ice	1. 5	1.30	0.08
			0.00			1/2 Ice	1. 1	1.44	0.09
			0.0			1' Ice	1.	1.6	0.1

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*
RADIO 4449 12/ 71	B	From Leg	4.00	0 00	138.0	No Ice	1. 5	1.30	0.08
			0.00			1/2" Ice	1. 1	1.44	0.09
			0.0			1" Ice	1.	1.6	0.1
RADIO 4449 12/ 71	C	From Leg	4.00	0 00	138.0	No Ice	1. 5	1.30	0.08
			0.00			1/2" Ice	1. 1	1.44	0.09
			0.0			1" Ice	1.	1.6	0.1
RRUS 4415 B25	A	From Leg	4.00	0 00	138.0	No Ice	1. 4	0.68	0.04
			0.00			1/2" Ice	1. 0	0.79	0.06
			0.0			1" Ice	1.	0.9	0.0
RRUS 4415 B25	B	From Leg	4.00	0 00	138.0	No Ice	1. 4	0.68	0.04
			0.00			1/2" Ice	1. 0	0.79	0.06
			0.0			1" Ice	1.	0.9	0.0
RRUS 4415 B25	C	From Leg	4.00	0 00	138.0	No Ice	1. 4	0.68	0.04
			0.00			1/2" Ice	1. 0	0.79	0.06
			0.0			1" Ice	1.	0.9	0.0
RADIO 4415 B66A	A	From Leg	4.00	0 00	138.0	No Ice	1. 6	0.87	0.05
			0.00			1/2" Ice	2. 3	1.00	0.06
			0.0			1" Ice	2.	1.1	0.0
RADIO 4415 B66A	B	From Leg	4.00	0 00	138.0	No Ice	1. 6	0.87	0.05
			0.00			1/2" Ice	2. 3	1.00	0.06
			0.0			1" Ice	2.	1.1	0.0
RADIO 4415 B66A	C	From Leg	4.00	0 00	138.0	No Ice	1. 6	0.87	0.05
			0.00			1/2" Ice	2. 3	1.00	0.06
			0.0			1" Ice	2.	1.1	0.0
Side Arm Mount [SO 306-3]	C	None		0 00	138.0	No Ice	3. 0	3.20	0.13
						1/2" Ice	5. 7	5.57	0.19
						1" Ice	8.	8.0	0.2
8' 2 0.154 H	A	From Leg	4.00	0 00	138.0	No Ice	1. 0	0.02	0.03
			0.00			1/2" Ice	2. 3	0.14	0.04
			0.0			1" Ice	3.	0.2	0.0
8' 2 0.154 H	B	From Leg	4.00	0 00	138.0	No Ice	1. 0	0.02	0.03
			0.00			1/2" Ice	2. 3	0.14	0.04
			0.0			1" Ice	3.	0.2	0.0
8' 2 0.154 H	C	From Leg	4.00	0 00	138.0	No Ice	1. 0	0.02	0.03
			0.00			1/2" Ice	2. 3	0.14	0.04
			0.0			1" Ice	3.	0.2	0.0
** 119 AT&T *									
HPA 65R- UU H8	A	From Leg	4.00	0 00	117.0	No Ice	12.26	6.30	0.07
			0.00			1/2" Ice	13.23	7.20	0.15
			1.2			1" Ice	14.2	8.1	0.2
HPA 65R- UU H8	B	From Leg	4.00	0 00	117.0	No Ice	12.26	6.30	0.07
			0.00			1/2" Ice	13.23	7.20	0.15
			1.2			1" Ice	14.2	8.1	0.2
HPA 65R- UU H8	C	From Leg	4.00	0 00	117.0	No Ice	12.26	6.30	0.07
			0.00			1/2" Ice	13.23	7.20	0.15
			1.2			1" Ice	14.2	8.1	0.2
800 1012	A	From Leg	4.00	0 00	117.0	No Ice	3. 4	2.17	0.05
			0.00			1/2" Ice	4. 8	2.58	0.08
			1.2			1" Ice	4.	3.0	0.1
800 1012	B	From Leg	4.00	0 00	117.0	No Ice	3. 4	2.17	0.05
			0.00			1/2" Ice	4. 8	2.58	0.08
			1.2			1" Ice	4.	3.0	0.1
800 1012	C	From Leg	4.00	0 00	117.0	No Ice	3. 4	2.17	0.05
			0.00			1/2" Ice	4. 8	2.58	0.08
			1.2			1" Ice	4.	3.0	0.1
2) LGP2140X	A	From Leg	4.00	0 00	117.0	No Ice	1. 8	0.36	0.01
			0.0			1/2" Ice	1.	0.4	0.0

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight K
			0.0[illegible]			1" Ice	1.[illegible]	0.5[illegible]	0.0[illegible]
(2) LGP2140X	B	From Leg	4.00	0[illegible]00[illegible]	117.0[illegible]	No Ice	1.[illegible]8	0.36	0.01
			0.00			1/2" Ice	1.[illegible]1	0.45	0.02
			0.0[illegible]			1" Ice	1.[illegible]	0.5[illegible]	0.0[illegible]
(2) LGP2140X	C	From Leg	4.00	0[illegible]00[illegible]	117.0[illegible]	No Ice	1.[illegible]8	0.36	0.01
			0.00			1/2" Ice	1.[illegible]1	0.45	0.02
			0.0[illegible]			1" Ice	1.[illegible]	0.5[illegible]	0.0[illegible]
RRUS 11 B12	A	From Leg	4.00	0[illegible]00[illegible]	117.0[illegible]	No Ice	2.[illegible]3	1.18	0.05
			0.00			1/2" Ice	3.[illegible]4	1.33	0.07
			3.6[illegible]			1" Ice	3.[illegible]	1.4[illegible]	0.1[illegible]
RRUS 11 B12	B	From Leg	4.00	0[illegible]00[illegible]	117.0[illegible]	No Ice	2.[illegible]3	1.18	0.05
			0.00			1/2" Ice	3.[illegible]4	1.33	0.07
			3.6[illegible]			1" Ice	3.[illegible]	1.4[illegible]	0.1[illegible]
RRUS 11 B12	C	From Leg	4.00	0[illegible]00[illegible]	117.0[illegible]	No Ice	2.[illegible]3	1.18	0.05
			0.00			1/2" Ice	3.[illegible]4	1.33	0.07
			3.6[illegible]			1" Ice	3.[illegible]	1.4[illegible]	0.1[illegible]
RRUS 12 B2	A	From Leg	4.00	0[illegible]00[illegible]	117.0[illegible]	No Ice	3.[illegible]4	1.28	0.05
			0.00			1/2" Ice	3.[illegible]6	1.43	0.07
			[illegible]0 [illegible]			1" Ice	3.[illegible]	1.6[illegible]	0.1[illegible]
RRUS 12 B2	B	From Leg	4.00	0[illegible]00[illegible]	117.0[illegible]	No Ice	3.[illegible]4	1.28	0.05
			0.00			1/2" Ice	3.[illegible]6	1.43	0.07
			[illegible]0 [illegible]			1" Ice	3.[illegible]	1.6[illegible]	0.1[illegible]
RRUS 12 B2	C	From Leg	4.00	0[illegible]00[illegible]	117.0[illegible]	No Ice	3.[illegible]4	1.28	0.05
			0.00			1/2" Ice	3.[illegible]6	1.43	0.07
			[illegible]0 [illegible]			1" Ice	3.[illegible]	1.6[illegible]	0.1[illegible]
RRUS A2 B2	A	From Leg	4.00	0[illegible]00[illegible]	117.0[illegible]	No Ice	2.[illegible]0	0.54	0.02
			0.00			1/2" Ice	2.[illegible]8	0.65	0.04
			[illegible]0 [illegible]			1" Ice	2.[illegible]	0.7[illegible]	0.0[illegible]
RRUS A2 B2	B	From Leg	4.00	0[illegible]00[illegible]	117.0[illegible]	No Ice	2.[illegible]0	0.54	0.02
			0.00			1/2" Ice	2.[illegible]8	0.65	0.04
			[illegible]0 [illegible]			1" Ice	2.[illegible]	0.7[illegible]	0.0[illegible]
RRUS A2 B2	C	From Leg	4.00	0[illegible]00[illegible]	117.0[illegible]	No Ice	2.[illegible]0	0.54	0.02
			0.00			1/2" Ice	2.[illegible]8	0.65	0.04
			[illegible]0 [illegible]			1" Ice	2.[illegible]	0.7[illegible]	0.0[illegible]
DC6-48-6[illegible]-18-8F	A	From Leg	4.00	0[illegible]00[illegible]	117.0[illegible]	No Ice	0.[illegible]9	0.79	0.02
			0.00			1/2" Ice	1.[illegible]7	1.27	0.03
			0.5[illegible]			1" Ice	1.[illegible]	1.4[illegible]	0.0[illegible]
Sector Mount [[illegible]M 401-[illegible]]	A	None		0[illegible]00[illegible]	117.0[illegible]	No Ice	17.82	17.[illegible]2	0.80
						1/2" Ice	25.01	25.[illegible]1	1.14
						1" Ice	32.1[illegible]	32.[illegible]	1.6[illegible]
**[illegible]									
[illegible]0' [illegible] [illegible]i[illegible]	B	From Leg	3.00	0[illegible]00[illegible]	108.2[illegible]	No Ice	5.[illegible]0	5.00	0.05
			0.00			1/2" Ice	7.[illegible]3	7.03	0.09
			10.[illegible]			1" Ice	9.[illegible]	9.0[illegible]	0.1[illegible]
Side Arm Mount [SO 302-1]	B	From Leg	2.00	0[illegible]00[illegible]	108.2[illegible]	No Ice	0.[illegible]1	3.31	0.06
			0.00			1/2" Ice	1.[illegible]0	5.00	0.08
			0.0[illegible]			1" Ice	1.[illegible]	6.8[illegible]	0.1[illegible]
**[illegible]									
Side Arm Mount [SO 302-1]	B	From Leg	2.00	0[illegible]00[illegible]	101.3[illegible]	No Ice	0.[illegible]1	3.31	0.06
			0.00			1/2" Ice	1.[illegible]0	5.00	0.08
			0.0[illegible]			1" Ice	1.[illegible]	6.8[illegible]	0.1[illegible]
2' [illegible] [illegible]i[illegible]	C	From Leg	3.00	0[illegible]00[illegible]	88[illegible]3	No Ice	0.[illegible]0	0.00	0.00
			0.00			1/2" Ice	0.[illegible]0	0.00	0.00
			21.[illegible]			1" Ice	0.[illegible]	0.0[illegible]	0.0[illegible]
[illegible]a[illegible]i 3'	C	From Leg	3.00	0[illegible]00[illegible]	88[illegible]3	No Ice	2.[illegible]8	2.08	0.03
			0.00			1/2" Ice	3.[illegible]9	3.79	0.04
			12.[illegible]			1" Ice	5.[illegible]	5.5[illegible]	0.0[illegible]

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
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Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
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Load Combinations

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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*
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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
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			Ma□□Co□□re□□ion	□□	□□□□□	□	□
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			Ma□□□□	□□	□□□□	□	□
		Dia□onal	Ma□□en□ion	□□	□□□□	□	□
			Ma□□Co□□re□□ion	□□	□□□□	□	□
			Ma□□M□	□□	□□□□	□	□
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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
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			Ma□□Co□ □re□□ion	□□	□□□□□	□□	□
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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
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Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
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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
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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*
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□□Dead□□□ □ ind □□de□ □ □o □e	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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□□Dead□□□ □ ind □□de□□□□ □e	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
□□Dead□□□ □ ind □□de□□□□ □e	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
□□Dead□□□ □ ind □□de□□□□ □e	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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□□Dead□□□ □ ind □□□	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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
de[illegible]e						
[illegible]Dead[illegible] ind [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
de[illegible]e						
Dead[illegible] ind [illegible]de[illegible]er[illegible]i[illegible]e	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dead[illegible] ind [illegible]de[illegible]er[illegible]i[illegible]e	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dead[illegible] ind [illegible]de[illegible]er[illegible]i[illegible]e	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dead[illegible] ind [illegible]de[illegible]er[illegible]i[illegible]e	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dead[illegible] ind [illegible]de[illegible]er[illegible]i[illegible]e	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dead[illegible] ind [illegible]de[illegible]er[illegible]i[illegible]e	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dead[illegible] ind [illegible]de[illegible]er[illegible]i[illegible]e	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dead[illegible] ind [illegible]de[illegible]er[illegible]i[illegible]e	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dead[illegible] ind [illegible]de[illegible]er[illegible]i[illegible]e	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dead[illegible] ind [illegible]de[illegible]er[illegible]i[illegible]e	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dead[illegible] ind [illegible]de[illegible]er[illegible]i[illegible]e	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dead[illegible] ind [illegible]de[illegible]er[illegible]i[illegible]e	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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EFI Global, Inc.
1117 Perimeter Center West, Suite E500
Atlanta, GA 30338
Phone: (770) 693-0835
FAX:

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	*PX K*	*PY K*	*PZ K*	*PX K*	*PY K*	*PZ K*	*% Error*
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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Non-Linear Convergence Results

Load Combination	*Converged?*	*Number of Cycles*	*Displacement Tolerance*	*Force Tolerance*
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
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Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
□□□□□	□□□□ □i□ □□□□Dia	□□	□□□□	□□□□□	□□□□□	□□□□□□
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Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	84.3497 80. 3	9.1	3	1.28	0.20
T1	80.333 76.316	8.0	3	1.18	0.19
T1	76. 163 64. 66	7.1	3	1.07	0.16
T1	64. 663 60. 49	4.7	3	0.79	0.10
T1	60. 496 50. 07	4.0	3	0.71	0.08
T1	50. 079 45. 87	2.7	3	0.54	0.05
T1	45. 871 40. 66	2.1	3	0.46	0.04
T1	40.1663 20. 8	1.6	3	0.38	0.03
T1	20.083 6. 94	0.4	3	0.18	0.01
T2	6. 941	0.0	3	0.06	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
138 0	14' i 1 75 Dia	3	28 0	1 85	0. 2	2766
117 0	PA 65R BUU H	3	19 9	1 76	0. 9	1515
108 2	20' i	3	16 7	1 68	0. 7	487
101 3	HP 18EX	3	14 3	1 57	0. 4	322
88.8	2 i	3	10 4	1 37	0. 1	317
63.7	OG 860/1920/ P A	3	4.6	0 78	0. 0	284
54.5	6 i	3	3.2	0 61	0. 6	342

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T	140 58	Leg	A325N	0.6		2 6	20.7	0 12		Bolt Tension
		Diagonal	A325N	0.50	1	1 60	3. 1	0 42	1	Member Block Shear
		Top Girt	A325N	0.50	1	0 13	3. 1	0 03	1	Member Block Shear
T	120.	Leg	A325N	0.6		3 4	20.7	0 16		Bolt Tension
		Diagonal	A325N	0.50	1	2 12	3. 1	0 55	1	Member Block Shear
		Secondary Horizontal	A325N	0.63	1	0 33	8. 5	0 04	1	Gusset Bearing
T3	116 483	Diagonal	A325N	0.50	1	3 02	3. 1	0 79	1	Member Block Shear
		Secondary Horizontal	A325N	0.63	1	0 39	8. 5	0 04	1	Gusset Bearing
T4	112 467	Diagonal	A325N	0.50	1	3 30	3. 1	0 86	1	Member Block Shear
		Secondary Horizontal	A325N	0.63	1	0 52	8. 5	0 06	1	Gusset Bearing
T5	108 45	Diagonal	A325N	0.50	1	3 68	3. 1	0 96	1	Member Block Shear
		Secondary Horizontal	A325N	0.63	1	0 66	8. 5	0 07	1	Gusset Bearing

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
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Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
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P_u ϕP_n control

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$

Section No.	*Elevation* *ft*	*Size*	*L* *ft*	L_u *ft*	*Kl/r*	*A* in^2	P_u *K*	ϕP_n *K*	*Ratio* $\frac{P_u}{\phi P_n}$
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[illegible] P_u [illegible] ϕP_n [illegible]ontrol[illegible]

Secondary Horizontal Design Data (Compression)

Section No.	*Elevation* *ft*	*Size*	*L* *ft*	L_u *ft*	*Kl/r*	*A* in^2	P_u *K*	ϕP_n *K*	*Ratio* $\frac{P_u}{\phi P_n}$
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Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
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P_u ϕP_n ontrol

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
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P_u ϕP_n ontrol

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
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Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
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[illegible]	[illegible]	C[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	C[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	C[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	C[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	C[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	C[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	C[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	C[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	C[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	C[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	C[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	C[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

P_u [illegible] ϕP_n [illegible]ontrol[illegible]

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible] P_u [illegible] ϕP_n [illegible]ontrol[illegible]

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
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□ P_u □ ϕP_n □ontrol□

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
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□ P_u □ ϕP_n □ontrol□

Section Capacity Table

□ection No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
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Section No.	*Elevation ft*	*Component Type*	*Size*	*Critical Element*	*P K*	*øP$_{allow}$ K*	*% Capacity*	*Pass Fail*
[illegible]	[illegible]	Leg	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Leg	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Leg	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Leg	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Leg	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Diagonal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Diagonal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Diagonal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Diagonal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Diagonal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Diagonal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Diagonal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Diagonal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Diagonal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Diagonal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Diagonal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	Diagonal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Diagonal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Diagonal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Diagonal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Diagonal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Diagonal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Diagonal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Diagonal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Secondary Horizontal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Secondary Horizontal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Secondary Horizontal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Secondary Horizontal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Secondary Horizontal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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ection No.	Elevation ft	Component Type	Size	Critical Element	P K	øP$_{allow}$ K	% Capacity	Pass Fail
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		e ondar ori ontal						a
		e ondar ori ontal						a
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		o irt					u ar	a
						e		a
						Dia onal		a
						e ondar ori ontal		a
						o irt		a
						olt C e		a
						RATING =	**99.1**	**Pass**

Project Information

BU #	
Site #	CT11277A
Order #	

Tower Information

Tower Type	Self Support
TIA-222 Rev	G

☐ Load Z Normalization

Applied Loads

	Comp.	Uplift
Axial (k)	177.00	156.00
Shear (k)	15.00	13.00

Anchor Rod Data

Quantity:	6
Diameter (in):	0.875
Material Grade:	A354-BC
Grout Considered:	Yes
l_{ar} (in):	
Eta Factor, η:	0.55
Thread Type:	N-Included
Configuration:	Symmetrical

Fy=109 ksi Fu=125 ksi

Grout Considered

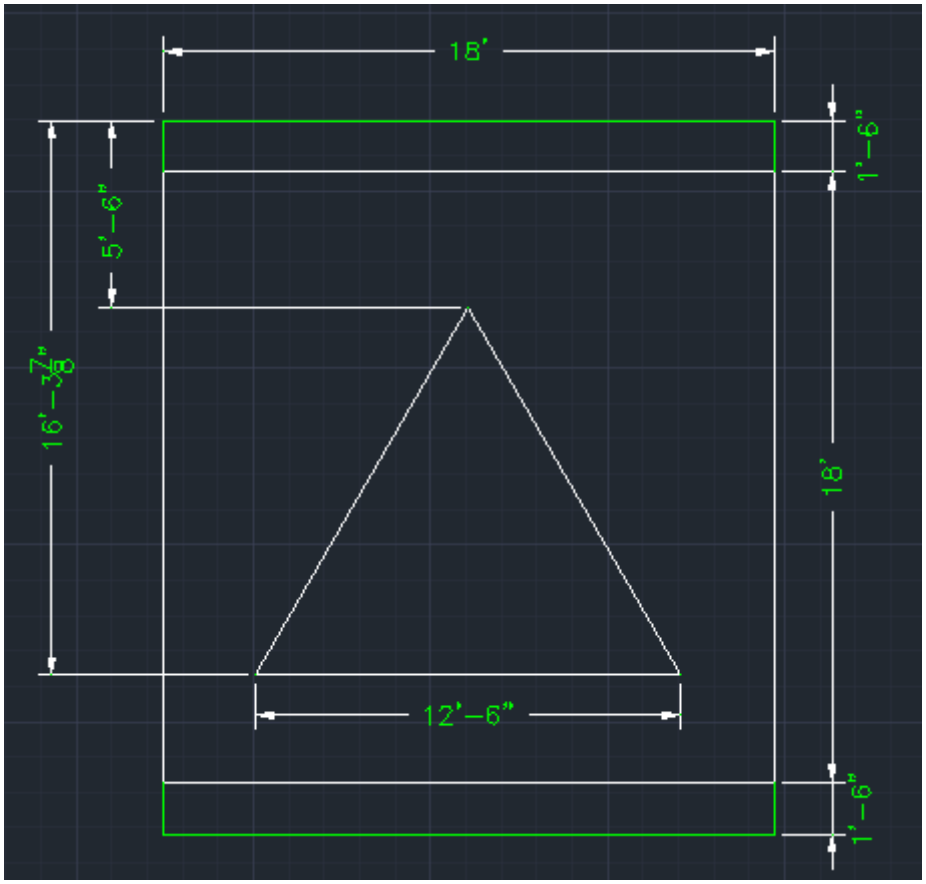
Bending Interaction Not Considered

Anchor Rod Results

Axial, Pu_t (kips)	26.00
Shear, Vu (kips)	2.17
Moment, Mu (kip-in)	
Axial Cap., φPn_t (kips)	46.20
Shear Cap., ϕVn (kips)	-
Moment Cap., ϕMn (kip-in)	
Stress Rating	64.8%

Pass

FOUNDATION CALCULATIONS



Joint Reactions (By Combination)

	L...	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	5	N241	-5.471	-75.682	3.723	0	.005	0
2	5	N242	5.126	-72.678	4.026	0	-.006	0
3	5	N243	.225	165.856	14.286	0	0	0
4	5	Totals:	-.12	17.495	22.034			
5	5	COG (ft):	X: .378	Y: 67.274	Z: -.648			

CALCULATION SHEET

efi global

$B := 12.5 \cdot ft$ □□idt□of □o□er

$P := 165.856 kip$ □Co□□re□□ion for □□D□□□□□ load □a□e

$T := 74.18 kip$ □□en□ion for □□D□□□□□ load □a□e

$V := 22.034 \cdot kip$ □□□ear for □□D□□□□□ load □a□e

$e_{Tower} := 26.603 in$ □□o□er e□□entri□it□on t□e □la□

$P_{Tower} := P - 2 \cdot T = 17.5 \cdot kip$

$M_{Tower} := P \cdot \frac{2 \cdot B}{3} \cdot \sin\left(\frac{}{3}\right) + 2T \cdot \frac{B}{3} \cdot \sin\left(\frac{}{3}\right) = 1732 \cdot kip \cdot ft$

$Width_{mat} := 18 ft$ □□idt□of Mat

$Length_{mat} := 21 \cdot ft$ □□en□t□of Mat □□□□e□ten□ion on eit□er □ide□□

$Length_{pier} := 0 in$ □ei□□t of □ier

$Thick_{mat} := 4.5 \cdot ft$ □□□i□□ne□□of □on□rete

$Depth_{soil} := 0 \cdot ft$ □□oil □□o□e footin□

$_{concrete} := 150 pcf$ □Con□rete □ ei□□t □ad□u□ted for □ater de□t□□

$_{soil} := 120 \cdot pcf$ □□oil □ ei□□t □ad□u□ted for □ater de□t□□

$M_{over} := 2 \cdot T \cdot (195.9 in) + V \cdot \left(Length_{pier} + Thick_{mat}\right) = 2521 \cdot kip \cdot ft$

$Soil_{weight} := \left(Width_{mat} \cdot Length_{mat}\right) \cdot Depth_{soil} \cdot {}_{soil} = 0 \cdot kip$

$Conc_{weight} := \left(Width_{mat} \cdot Length_{mat}\right) \cdot Thick_{mat} \cdot {}_{concrete} = 255 \cdot kip$

$M_{Rs} := Soil_{weight} \cdot \frac{Length_{mat}}{2} = 0 \cdot kip \cdot ft$

CALCULATION SHEET

$$M_{Rc} := Conc_{weight} \cdot \frac{Length_{mat}}{2} = 2679 \cdot kip \cdot ft$$

$$M_{Rr} := P \cdot (66in) = 912 \cdot kip \cdot ft$$

$$M_{over} := \left(M_{over}\right) = 2521.13 \cdot kip \cdot ft$$

$$M_{res} := 0.75M_{Rs} + 0.9M_{Rc} + M_{Rr} = 3323.38 \cdot kip \cdot ft$$

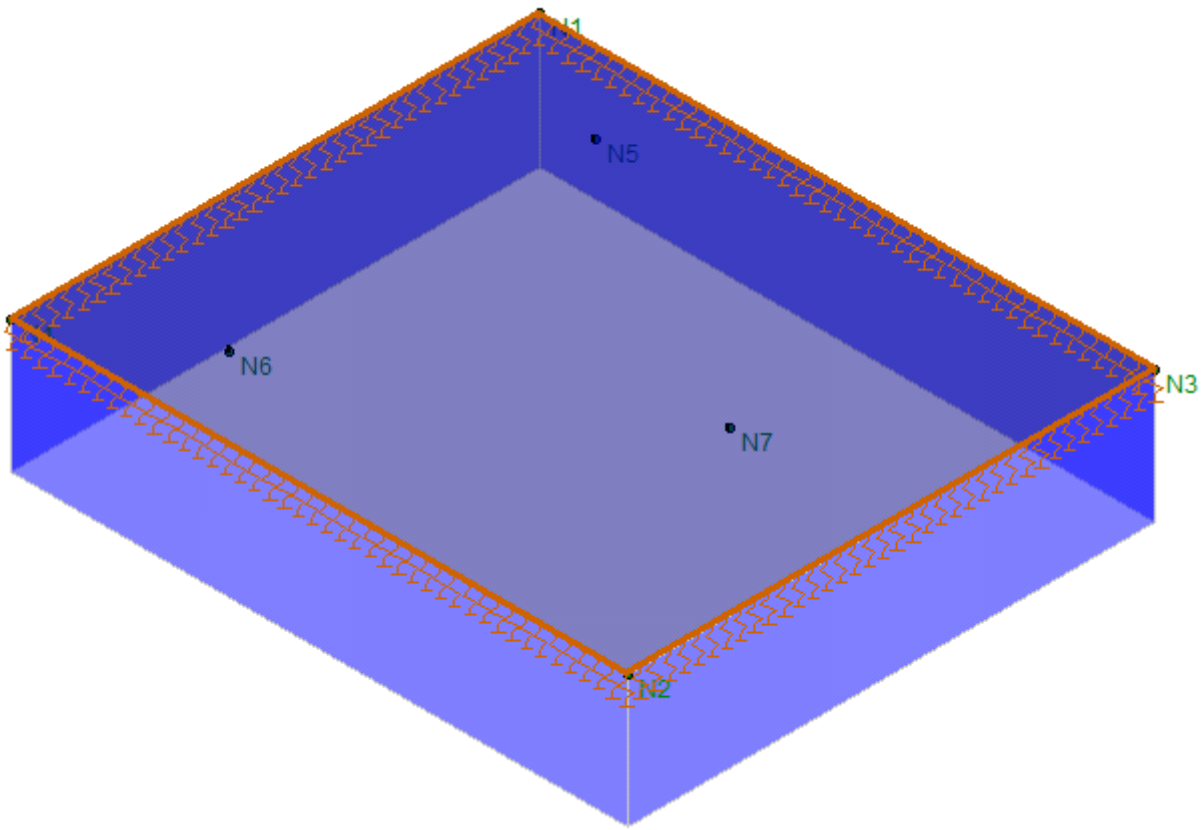
:0.9 for Con□rete □e□i□tan□e
:0.75 for □oil □e□i□tan□e

$$SF := \frac{M_{res}}{M_{over}} = 1.318$$ ==> Ch□cks □it□□elo□

$$Usage_{stability} := \frac{M_{over}}{M_{res}} = 75.9 \cdot \%$$ <100% **.... OK in overturning**

CALCULATION SHEET

M□D□□M□□in □□□□ F□□□D□□□□□



Slab Overturning Safety Factors (By Combination)

Overturning Safety Factors | Sliding Safety Factors

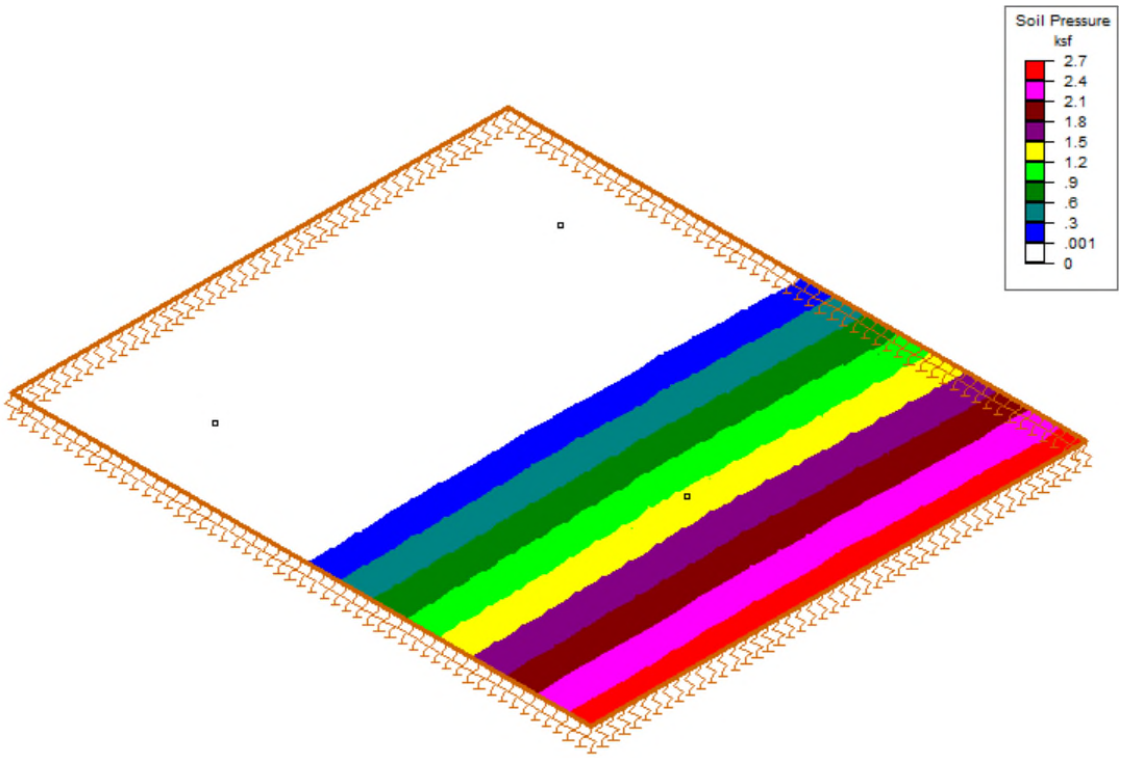
LC	Slab	Mo-XX[k-ft]	Ms-XX[k-ft]	Mo-ZZ[k-ft]	Ms-ZZ[k-ft]	Ms-XX/Mo-XX	Ms-ZZ/Mo-ZZ
1	1	S1	1335.24	3559.419	2521.176	3323.376	2.666	1.318

C□e□□e□ult□□at□□ □□□ **OK**

CALCULATION SHEET

efi global

CHECK BEARING WITH RISA FOUNDATION



:= 0.75 □for □oil □earin□

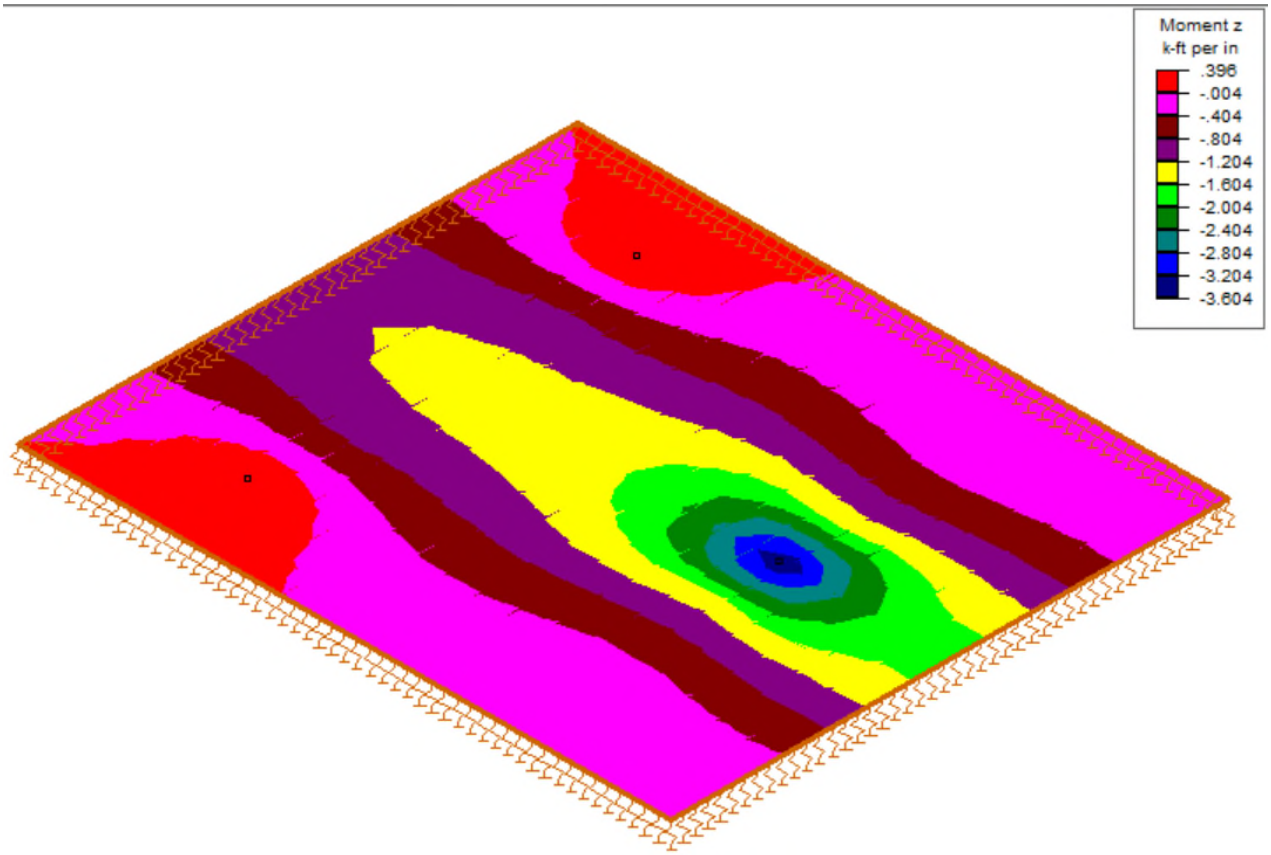
max := 2.638ksf □□tual □earin□ □re□□ure

ult := 8ksf □lti□ate □earin□ □re□□ure

$$Usage_{Bearing} := \frac{max}{\cdot\ ult} = 44 \cdot \%$$ □□□□□

.... OK in bearing

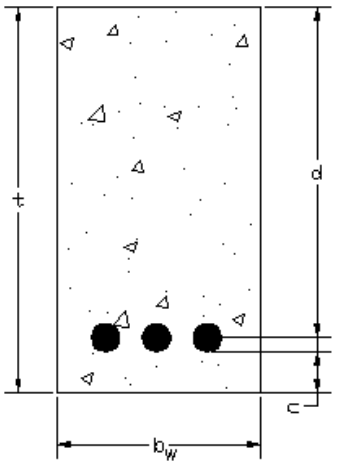
Mat Foundation Structural Check:



$M_u := 3.604kip \cdot ft$

Ma□i□u□ □□lied Mo□ent

Base Pad Check:



$f_c := 3000psi$ Co□□re□i□e □tren□t□of Con□rete

$f_y := 60000psi$ □ield □tren□t□of re□ar

$_c := 150pcf$ Con□rete Den□it□

$c := 3in$ □lear □□a□in□□□C□□□□□□□□□

$dia_{bar} := 1in$ $A_{bar} := 0.79in^2$ □□re□ar□a□□u□ed

$n := 1.514$ □u□□er of re□ar□□er foot

$d := Thick_{mat} - c - dia_{bar} \cdot 0.5 = 51 \cdot in$

$b_w := 12in$ effe□ti□e □la□□idt□□on□idered

Check Bending

$A_s := n \cdot A_{bar} = 1.2 \cdot in^2$ □rea of □teel □er foot

Mini□u□ □teel C□e□□

$$:= \frac{A_s}{b_w \cdot d} = 0.001974$$

$_{min} := 0.0018$ □C□□□□□□□□□□□□

Test := "Steel amount is more than minimum" if $_{min}$ <
"Increase steel amount" otherwise

Test = "Steel amount is more than minimum"

□ad C□e□□

$$a := \frac{A_s \cdot f_y}{0.85 \cdot f_c \cdot b_w} = 2 \cdot in$$

$M_n := A_s \cdot f_y \cdot (d - a \cdot 0.5) = 294.993 \cdot kip \cdot ft$ $_b := 0.9$

$_b \cdot M_n = 265.493 \cdot kip \cdot ft$ Mo□ent □a□a□it□of □ad

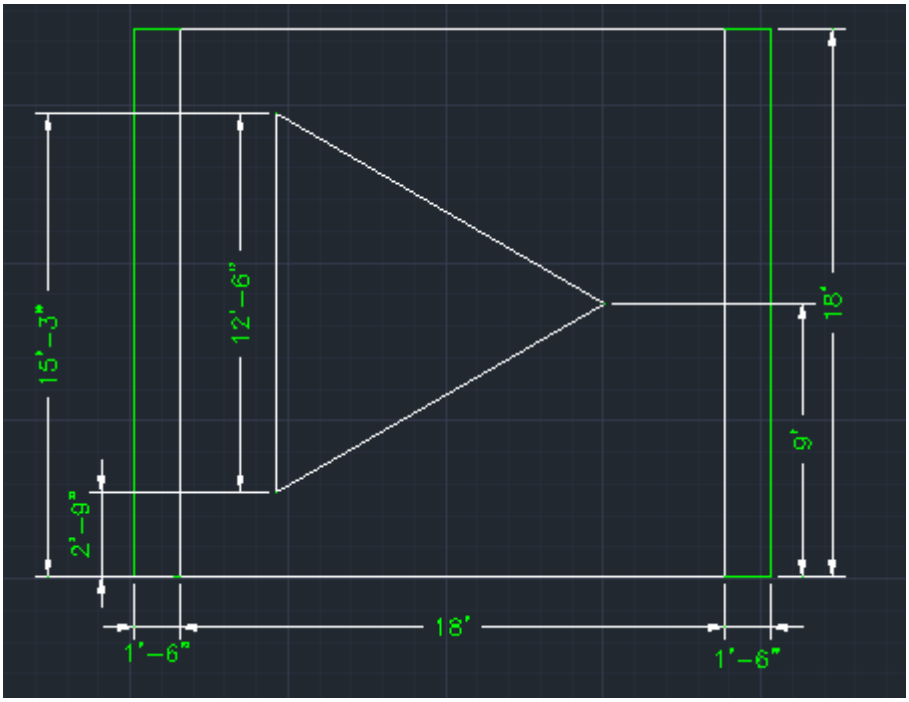
Test := "Moment Capacity is adequate" if $_b \cdot M_n > M_u$
"Change Section Properties " otherwise

Test = "Moment Capacity is adequate"

$$Usage_{concrete} := \left[\frac{(M_u)}{_b \cdot M_n}\right] = 1.4 \cdot \%$$ .....OK!

CALCULATION SHEET

FOUNDATION CALCULATIONS



Joint Reactions (By Combination)

	L...	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	17	N241	-10.546	-137.208	5.549	0	-.003	0
2	17	N242	-11.219	147.406	-5.891	0	-.003	0
3	17	N243	-.795	7.297	.469	0	.006	0
4	17	Totals:	-22.56	17.495	.127			
5	17	COG (ft):	X: .851	Y: 67.274	Z: -.175			

CALCULATION SHEET

$B := 12.5 \cdot ft$ □□idt□of □o□er

$P_1 := 147.406 kip$ □Co□□re□ion for □□D□□□□ load □a□e

$P_2 := 7.297 kip$ □Co□□re□ion for □□D□□□□ load □a□e

$T := 137.208 kip$ □□en□ion for □□D□□□□ load □a□e

$V := 22.56 \cdot kip$ □□□ear for □□D□□□□ load □a□e

$e_{Tower} := 0 in$ □o□er e□□entri□it□on t□e □la□

$Width_{mat} := 18 ft$ □□idt□of Mat

$Length_{mat} := 21 \cdot ft$ □□en□t□of Mat □□□□e□ten□ion on eit□er □ide□□

$Length_{pier} := 0 in$ □ei□□t of □ier

$Thick_{mat} := 4.5 \cdot ft$ □□□i□□ne□□of □on□rete

$Depth_{soil} := 0 \cdot ft$ □oil □□o□e footin□

$\gamma_{concrete} := 150 pcf$ □Con□rete □ ei□□t □ad□u□ted for □ater de□t□□

$\gamma_{soil} := 120 \cdot pcf$ □oil □ ei□□t □ad□u□ted for □ater de□t□□

$M_{over} := T \cdot (183 in) + V \cdot (Length_{pier} + Thick_{mat}) = 2194 \cdot kip \cdot ft$

$Soil_{weight} := (Width_{mat} \cdot Length_{mat}) \cdot Depth_{soil} \cdot \gamma_{soil} = 0 \cdot kip$

$Conc_{weight} := (Width_{mat} \cdot Length_{mat}) \cdot Thick_{mat} \cdot \gamma_{concrete} = 255 \cdot kip$

$M_{Rs} := Soil_{weight} \cdot \frac{Width_{mat}}{2} = 0 \cdot kip \cdot ft$

CALCULATION SHEET

efi global

$$M_{Rc} := Conc_{weight} \cdot \frac{Width_{mat}}{2} = 2296 \cdot kip \cdot ft$$

$$M_{Rr} := P_1 \cdot (33in) + P_2 \cdot (108in) = 471 \cdot kip \cdot ft$$

$$M_{over} := \left(M_{over}\right) = 2193.94 \cdot kip \cdot ft$$

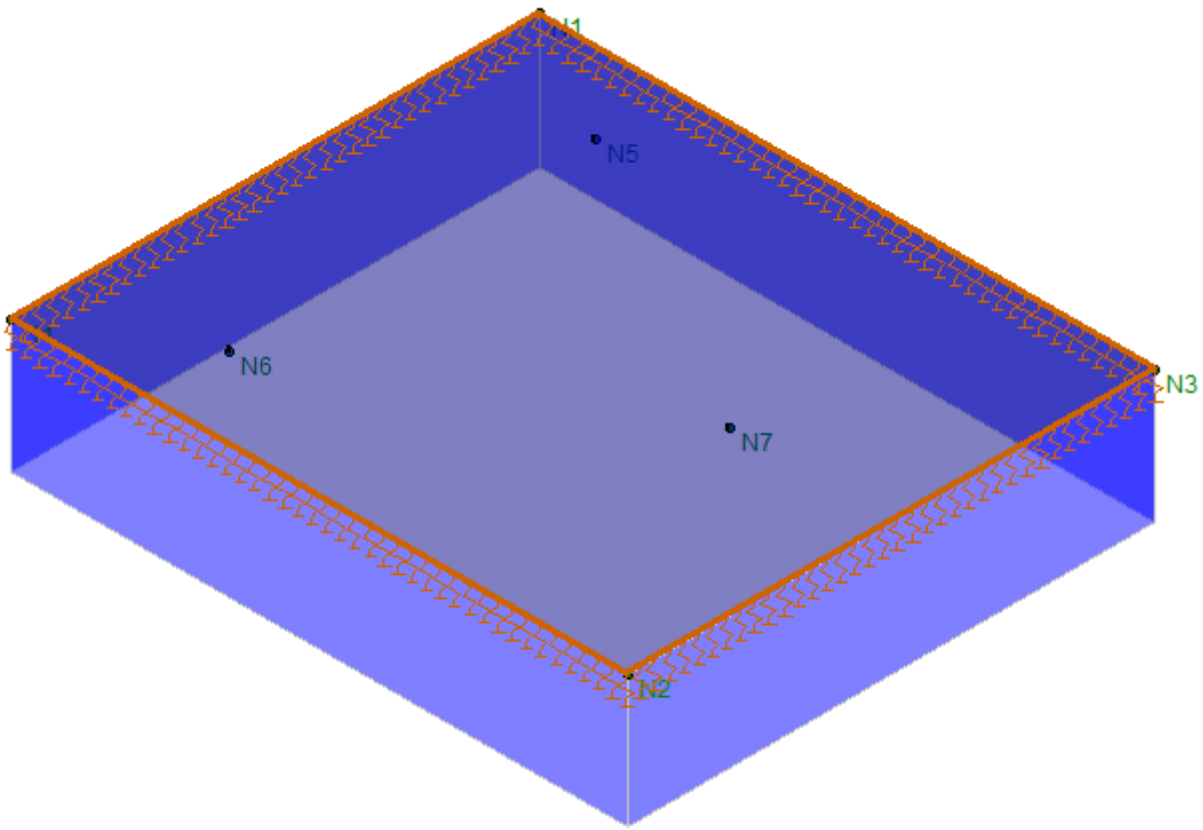
$$M_{res} := 0.75M_{Rs} + 0.9M_{Rc} + M_{Rr} = 2537.75 \cdot kip \cdot ft$$

:0.9 for Con□rete □e□i□tan□e
:0.75 for □oil □e□i□tan□e

$$SF := \frac{M_{res}}{M_{over}} = 1.157$$ ==> Ch□cks □it□□elo□

$$Usage_{stability} := \frac{M_{over}}{M_{res}} = 86.5 \cdot \%$$ <100% **.... OK in overturning**

M□D□□M□□in □□□□ F□□□D□□□□□



Slab Overturning Safety Factors (By Combination)

Overturning Safety Factors | Sliding Safety Factors

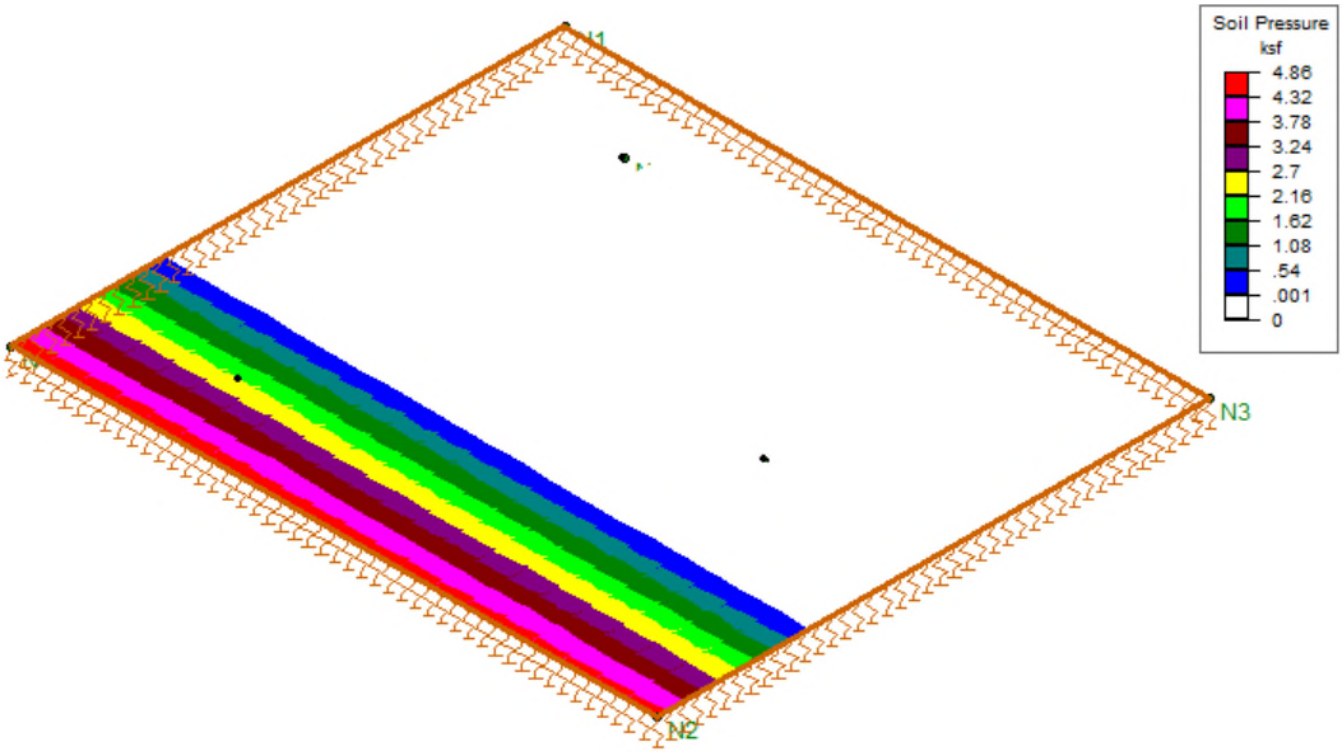
LC	Slab	Mo-XX[k-ft]	Ms-XX[k-ft]	Mo-ZZ[k-ft]	Ms-ZZ[k-ft]	Ms-XX/Mo-XX	Ms-ZZ/Mo-ZZ
1	1	S1	2193.942	2537.755	2239.964	4857.751	1.157	2.169

C□e□□e□ult□□at□□ □□□ **OK**

CALCULATION SHEET

efi global

CHECK BEARING WITH RISA FOUNDATION



$:= 0.75$ □for □oil □earin□

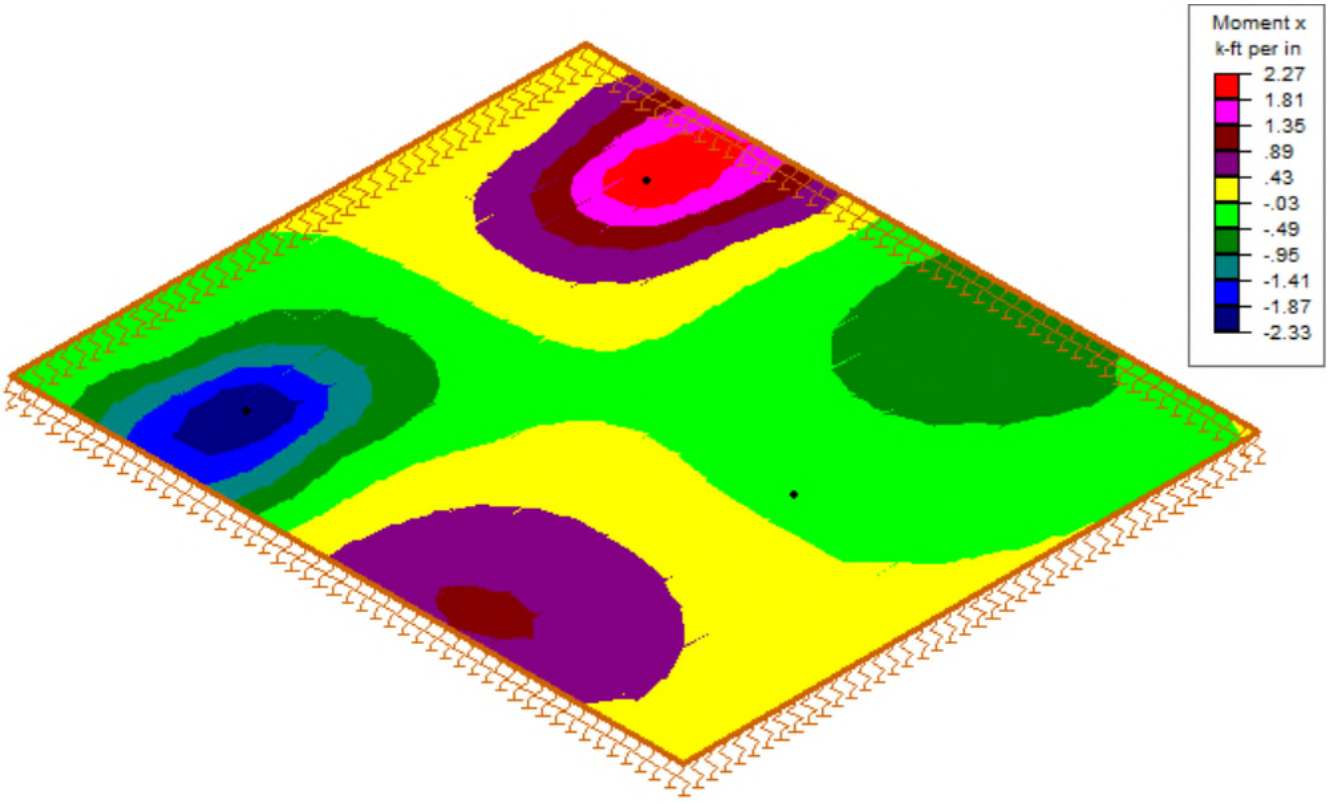
$_{max} := 4.799ksf$ □□tual □earin□ □re□ure

$_{ult} := 8ksf$ □lti□ate □earin□ □re□ure

$Usage_{Bearing} := \frac{max}{\cdot ult} = 80 \cdot \%$ □□□□□ **.... OK in bearing**

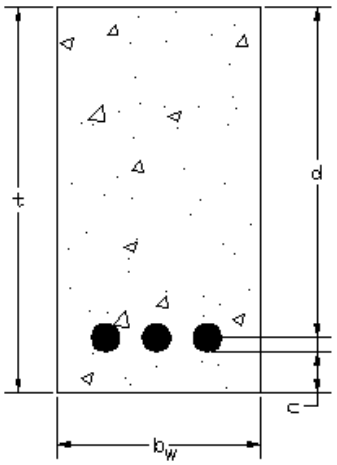
CALCULATION SHEET

Mat Foundation Structural Check:



$M_u := 2.33kip \cdot ft$ Ma□i□u□ □□lied Mo□ent

Base Pad Check:



$f_c := 3000psi$ Co□□re□i□e □tren□t□of Con□rete

$f_y := 60000psi$ □ield □tren□t□of re□ar

$_c := 150pcf$ Con□rete Den□it□

$c := 3in$ □lear □□a□in□□□C□□□□□□□□□

$dia_{bar} := 1in$ $A_{bar} := 0.79in^2$ □□re□ar□a□□u□ed

$n := 1.514$ □u□□er of re□ar□□er foot

$d := Thick_{mat} - c - dia_{bar} \cdot 0.5 = 51 \cdot in$

$b_w := 12in$ effe□ti□e □la□□idt□□on□idered

Check Bending

$A_s := n \cdot A_{bar} = 1.2 \cdot in^2$ □rea of □teel □er foot

Mini□u□ □teel C□e□□

$$:= \frac{A_s}{b_w \cdot d} = 0.001974$$

$_{min} := 0.0018$ □C□□□□□□□□□□□□

Test := "Steel amount is more than minimum" if $_{min}$ <
"Increase steel amount" otherwise

Test = "Steel amount is more than minimum"

□ad C□e□□

$$a := \frac{A_s \cdot f_y}{0.85 \cdot f_c \cdot b_w} = 2 \cdot in$$

$M_n := A_s \cdot f_y \cdot (d - a \cdot 0.5) = 294.993 \cdot kip \cdot ft$ $_b := 0.9$

$_b \cdot M_n = 265.493 \cdot kip \cdot ft$ Mo□ent □a□a□it□of □ad

Test := "Moment Capacity is adequate" if $_b \cdot M_n > M_u$
"Change Section Properties " otherwise

Test = "Moment Capacity is adequate"

$$Usage_{concrete} := \left[\frac{(M_u)}{_b \cdot M_n}\right] = 0.9 \cdot \%$$ .....OK!

NOTES:

1. UPGRADE DESIGN VALID FOR APPURTENANCES LISTED IN EFI ANALYSIS REPORT DATED 02/04/2021. CONTRACTOR TO REVIEW AND SHOULD ADHERE TO THE REPORT.

2. CONTRACTOR TO REMOVE AND REATTACH EXISTING APPURTENANCES AS NEEDED.

3. ALL DIMENSIONS ARE BASED ON TOWER & MOUNT MAPPING REPORT PREPARED BY HIGHTOWER SOLUTIONS, DATED 08/06/2019.

4. CONTRACTOR TO FIELD VERIFY EXISTING TOWER MEMBER SIZES AND TOWER DIMENSIONS IN THE VICINITY OF THE UPGRADE, BEFORE FABRICATION OF STEEL AND COMMENCEMENT OF WORK. ANY DISCREPANCY SHOULD BE REPORTED TO EFI IMMEDIATELY FOR FURTHER EVALUATION.

5. DO NOT PERFORM THE WORK ON THE TOWER WHEN WINDS GUST MORE THAN 15 MPH AT THE GROUND LEVEL.

6. NEW TOWER REACTIONS:

BASE MOMENT:	1848 KIP-FT
LEG UPLIFT:	157 KIPS
LEG COMPRESSION:	179 KIPS
LEG SHEAR:	15 KIPS

7. CONTRACTOR TO HAVE THE SAFETY CLIMB INTACT AND FUNCTIONAL AFTER WORK IS COMPLETE.

8. TOWER WILL BECOME UNSTABLE WHEN MEMBERS ARE DISCONNECTED OR BEING REPLACED. CONTRACTOR IS FULLY RESPONSIBLE TO MAINTAIN STABILITY OF THE TOWER DURING WORK AND SHOULD CONSULT WITH AN ENGINEER.

9. EFI DISCLAIMS ANY LIABILITY ARISING FROM THE ORIGINAL MATERIAL, FABRICATION OR ERECTION OF THE TOWER.

10. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION), OSHA, AND GENERAL INDUSTRY STANDARDS. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION.

1. DESIGN INFORMATION AND GENERAL REQUIREMENTS

1.1 CODES
a. 2018 CONNECTICUT BUILDING CODE (2015 IBC).
b. MINIMUM DESIGN LOADS AND ASSOCIATED CRITERIA FOR BUILDINGS AND OTHER STRUCTURES, ASCE/SEI 7-10, AMERICAN SOCIETY OF CIVIL ENGINEERS
c. STEEL CONSTRUCTION MANUAL, 14TH EDITION, AMERICAN INSTITUTE OF STEEL CONSTRUCTION
d. STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, ANSI/TIA-222-G TELECOMMUNICATIONS INDUSTRY ASSOCIATION

1.2 GENERAL
a. PRIOR TO PURCHASE OR FABRICATION OF MATERIAL, THE CONTRACTOR SHALL PERFORM AN INSPECTION VERIFYING MEMBER DIMENSIONS AND BOLT SIZES. SHOULD THE CONTRACTOR DISCOVER ANY DAMAGED OR MISSING MEMBERS OR THE MEMBER OR BOLT SIZES DO NOT MATCH THOSE LISTED, EFI SHALL BE NOTIFIED IMMEDIATELY.
b. CONTRACTOR TO REPLACE ALL BOLTS REMOVED WITH NEW BOLTS OF SAME TYPE, UNLESS NOTED OTHERWISE.

1.3 LOADS & DESIGN CRITERIA
a. WIND LOADING: V=120MPH (ULTIMATE DESIGN WIND SPEED), EXPOSURE CATEGORY C, RISK CATEGORY II

2. STRUCTURAL STEEL

2.1 MATERIALS
a. STRUCTURAL STEEL . . . . . ASTM A992
ANGLE & PLATE . . . . . ASTM A36 U.N.O.
PIPE . . . . . ASTM A53 GRADE B (OR Fy>35KSI)
HSS ROUND . . . . . ASTM A500 GRADE B (OR Fy>42KSI)
BARS (SOLID RODS) . . . . . ASTM A572 GRADE 50
b. BOLTS . . . . . ASTM A325N U.N.O.
c. WELDING ELECTRODES . . . . . AWS A5.1 (E70XX)
d. STEEL CONSTRUCTION SHALL CONFORM TO "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS, ANSI/AISC 360-10"
e. WELDING SHALL CONFORM TO AWS D1.1/D1.3/D1.7 AS APPLICABLE.
f. THE FABRICATOR SHALL FURNISH CHECKED SHOP AND ERECTION DRAWINGS TO THE ENGINEER, AND OBTAIN APPROVAL PRIOR TO FABRICATING ANY STRUCTURAL STEEL. SHOP DRAWINGS SHALL CONFORM TO "DETAILING FOR STEEL CONSTRUCTION, 2ND EDITION"
g. POOR MATCHING OF HOLES SHALL BE CORRECTED BY DRILLING TO THE NEXT LARGER SIZE. WELDING FOR RE-DRILLING WILL NOT BE PERMITTED.

2.2 CONNECTIONS
a. SHOP CONNECTIONS MAY BE BOLTED OR WELDED
b. FIELD CONNECTIONS BOLTED WITH A325-N BOLTS, (INSTALLED SNUG TIGHT) UNLESS OTHERWISE SPECIFIED OR IF WELDED CONNECTIONS ARE NOTED ON DRAWINGS
c. FIELD CONNECTIONS SHALL BE MADE WITH A325-N BOLTS AND HARDENED WASHERS EXCEPT AS INDICATED ON THE DESIGN DRAWINGS
d. CONNECTIONS NOT SHOWN ON DRAWINGS SHALL BE DESIGNED BY THE STEEL FABRICATOR. CONNECTIONS SHALL BE DESIGNED IN ACCORDANCE WITH AISC "SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS" AND "AISC CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"
e. DO NOT FIELD CUT OR ALTER STRUCTURAL MEMBERS WITHOUT PRIOR WRITTEN APPROVAL OF ENGINEER.
f. BOLT HOLES SHALL BE CUT, DRILLED OR PUNCHED AT RIGHT ANGLES TO THE SURFACE OF THE METAL AND SHALL NOT BE MADE OR ENLARGED BY BURNING. HOLES SHALL BE CLEAN CUT WITHOUT TORN OR RAGGED EDGES. OUTSIDE BURRS RESULTING FROM DRILLING OR REAMING OPERATION SHALL BE REMOVED WITH A TOOL MAKING A 1/16 INCH BEVEL. BOLT HOLES SHALL BE 1/16 INCH OVERSIZE.

2.3 FINISHES
a. STRUCTURAL STEEL SHALL BE HOT DIP GALVANIZED AFTER FABRICATION PER ASTM A123
b. BOLTS AND NUTS SHALL BE HOT DIP GALVANIZED PER ASTM A153.
c. ALL SURFACES DAMAGED DURING THE WORK SHALL BE PAINTED WITH COLD GALVANIZING COMPOUND TWICE. THE PAINT SHOULD BE AT LEAST 93% PURE ZINC. RUST-OLEUM PROFESSIONAL, (MODEL# 7585838) OR SIMILAR.

2.4 WELDING
a. CONTRACTOR TO TAKE ALL NECESSARY PRECAUTIONS FOR FIRE PREVENTION DURING WELDING, SUCH AS; INSTALLING 3000 (NFPA 701) FIRE BLANKET AROUND COAX. MORE SPLATTER AND SPARKS SHOULD BE ANTICIPATED WHILE WELDING ON GALVANIZED SURFACE. COAX IS FLAMMABLE AND SHALL CATCH FIRE IF NOT PROTECTED. WATER SHALL BE ON SITE OF ADEQUATE AMOUNT AND AVAILABLE AT SHORT NOTICE AT ALL TIMES DURING WELDING ACTIVITY. CONTRACTOR SHOULD BE ABLE TO TRANSPORT THE WATER TO THE HEIGHT WELDING BEING PERFORMED.
b. WELDING ON GALVANIZED SURFACE SHOULD BE DONE WITH EXTREME CAUTION. IF THE WELD MATERIAL IS CONTAMINATED WITH ZINC, IT DOES NOT PROVIDE A STRUCTURAL WELD. GRIND GALVANIZING BEFORE WELDING.
c. WELDING CERTIFICATE MUST BE PROVIDED PRIOR TO WELDING. ALL WELDING SHALL BE PERFORMED BY AWS QUALIFIED WELDER WHO HAS EXPERIENCE WITH GALVANIZED SURFACES.

3. CONCRETE

2.1 MATERIALS
a. ALL CONCRETE DESIGN AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH ACI 318-14 AND ACI 301-10.
b. CEMENT SHALL BE TYPE I OR III CONFORMING TO ASTM C-150 AND CONCRETE SHALL DEVELOP A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3000 PSI.
c. TEST CYLINDERS SHALL BE TAKEN AS A REPRESENTATIVE SAMPLE OF CONCRETE PLACED IN THE AMOUNT ACCORDING TO THE LESSER OF THE FOLLOWING:
i. 75 CUBIC YARDS
ii. 24 HOUR PERIOD
iii. CHANGE IN CONCRETE STRENGTH.
d. TEST RESULTS SHALL BE FORWARDED TO THE ARCHITECT/ENGINEER, UNLESS NOTED OTHERWISE.
e. NORMAL WEIGHT CONCRETE (150 PCF) SHALL BE USED WITH A 1" MAX COURSE AGGREGATE CONFORMING TO ASTM C 33.
f. CONCRETE SLUMP SHALL BE 3"-5" (MAX) FOR REGULAR MIX, WITH SUPERPLASTICIZER ADMIXTURES INCREASING SLUMP TO 8" (MAX). CONCRETE AIR-ENTRAINMENT SHALL BE 4.5% TO 7.5% FOR EXTERIOR SLABS AND 0% TO 3% FOR INTERIOR SLABS.
g. UNLESS NOTED OTHERWISE, CONCRETE COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:
i. CONCRETE CAST AGAINST EARTH – 3"
ii. FORMED CONCRETE EXPOSED TO EARTH OR WEATHER – 2"

3.2 FIELD WORK
a. WHERE NEW CONCRETE IS TO BE POURED ONTO EXISTING CONCRETE, ROUGHEN AND CLEAN SURFACE OF ADJOINING AREA AND COAT WITH SIKADUR 32 HI-MOD OR AN APPROVED BONDING AGENT.
b. NO ADDITIONAL WATER SHALL BE ADDED TO THE CONCRETE AT THE JOB SITE.
c. THE RESULTS OF ALL CONCRETE COMPRESSIVE TESTS SHALL BE AT THE JOB SITE FOR REVIEW BY THE INSPECTOR.
d. FLY ASH, MEETING ASTM C-618 CLASS C OR CLASS F, MAY BE USED TO REPLACE UP TO 25% OF PORTLAND CEMENT. CONTRACTOR AND SUPPLIER SHALL COORDINATE TO ENSURE THAT REQUIRED SET TIMES FOR CONCRETE ARE NOT ADVERSELY AFFECTED BY USE OF FLY ASH. CONTRACTOR AND ALL CONCRETE SUBCONTRACTORS SHALL HAVE EXPERIENCE WITH HANDLING, PLACING AND FINISHING CONCRETE WITH FLY ASH.

4. EARTHWORK

4.1 GENERAL
a. THE FOUNDATION MODIFICATION WAS BASED ON GEOTECHNICAL REPORT PREPARED BY WELTI GEOTECHNICAL, P.C. DATED 12/10/2020.
b. THE FOUNDATION MODIFICATION HAS BEEN DEVELOPED IN ACCORDANCE WITH GENERALLY ACCEPTED PROFESSIONAL ENGINEERING PRINCIPLES AND PRACTICES
c. IF THE CONTRACTOR DISCOVERS ANY SUBSURFACE CONDITIONS THAT ARE NOT AS REPRESENTED IN THE GEOTECHNICAL REPORT, EFI SHALL BE CONTACTED IMMEDIATELY TO EVALUATE THE SIGNIFICANCE OF THE DEVIATION.
d. CONTRACTOR SHALL VERIFY DIMENSIONS WITH ORIGINAL DRAWINGS.
e. FOUNDATION DESIGN MODIFICATIONS ASSUME LEVEL GRADE AT THE SITE.
f. THE FOUNDATION DESIGN ASSUMES FIELD INSPECTIONS WILL BE PERFORMED TO VERIFY THAT CONSTRUCTION MATERIALS, INSTALLATION METHODS, AND ASSUMED DESIGN PARAMETERS ARE ACCEPTABLE BASED ON THE CONDITIONS AT THE SITE.

4.2 EXCAVATION
a. WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES AND SAFETY REGULATIONS, PROCEDURES FOR THE PROTECTION OF EXCAVATIONS, EXISTING CONSTRUCTION, AND UTILITIES SHALL BE ESTABLISHED PRIOR TO BEGINNING WORK.
b. LOOSE MATERIAL TO BE REMOVED FROM THE BOTTOM OF EXCAVATION PRIOR TO CONCRETE PLACEMENT.

4.3 COMPACTION NOTES
a. FILL MATERIALS SHALL BE COMPACTED PER THE ORIGINAL GEOTECHNICAL RECOMMENDATIONS TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR METHOD (ASTM D698). MOISTURE CONTENTS SHALL BE MAINTAINED TO WITHIN 1% TO 3% OF THE OPTIMUM MOISTURE CONTENT.
b. FILL MATERIAL SHOULD NOT CONTAIN MORE THAN 5% BY WEIGHT OF ORGANIC MATTER,WASTE,DEBRIS, OR ANY OTHER DELETERIOUS MATERIAL. FILL MATERIAL SHOULD HAVE
A MAXIMUM PARTICLE SIZE OF 4 INCHES AND 20% OR LESS OF THE MATERIAL SHOULD HAVE A PARTICLE SIZE BETWEEN 2 TO 4 INCHES.
c. FILL MATERIAL SHALL BE PLACED IN LOOSE HORIZONTAL LIFTS NO GREATER THAN 9 INCHES. IF SMALL HANDHELD OR WALK-BEHIND COMPACTION EQUIPMENT IS USED, LOOSE LIFTS SHALL NOT EXCEED 6 INCHES.
d. WE RECOMMEND THAT ON-SITE OBSERVATION AND TESTING OF FILL MATERIAL BE PERFORMED TO VERIFY THAT NECESSARY COMPACTION IS ARCHIVED. IN ADDITION TO THE VISUAL EVALUATION A SUFFICIENT AMOUNT OF IN-PLACE FIELD DENSITY TESTS SHOULD BE CONDUCTED TO CONFIRM THE REQUIRED COMPACTION IS BEING ATTAINED.

STATE OF CONNECTICUT
AHMET COLAKOGLU
PEN 27057
LICENSED PROFESSIONAL ENGINEER
02-4-2021

Ahmet Colakoglu, PE
CT License No: PEN 27057

DRAWINGS PLOTTED TO SCALE ON 11x17 SHEETS

efi global
EFI GLOBAL, INC.
1117 PERIMETER CENTER W
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ATLANTA, GA 30338
TEL NO: 770-693-0835
TELECOM@EFIGLOBAL.COM

PREPARED FOR:
ProTerra Design Group, LLC
4 Bay Road, Building A Suite 200
Hadley, MA 01035

NUM	DATE	DESCRIPTION:
A	02/04/21	ISSUED FOR CONSTRUCTION

CT11277A

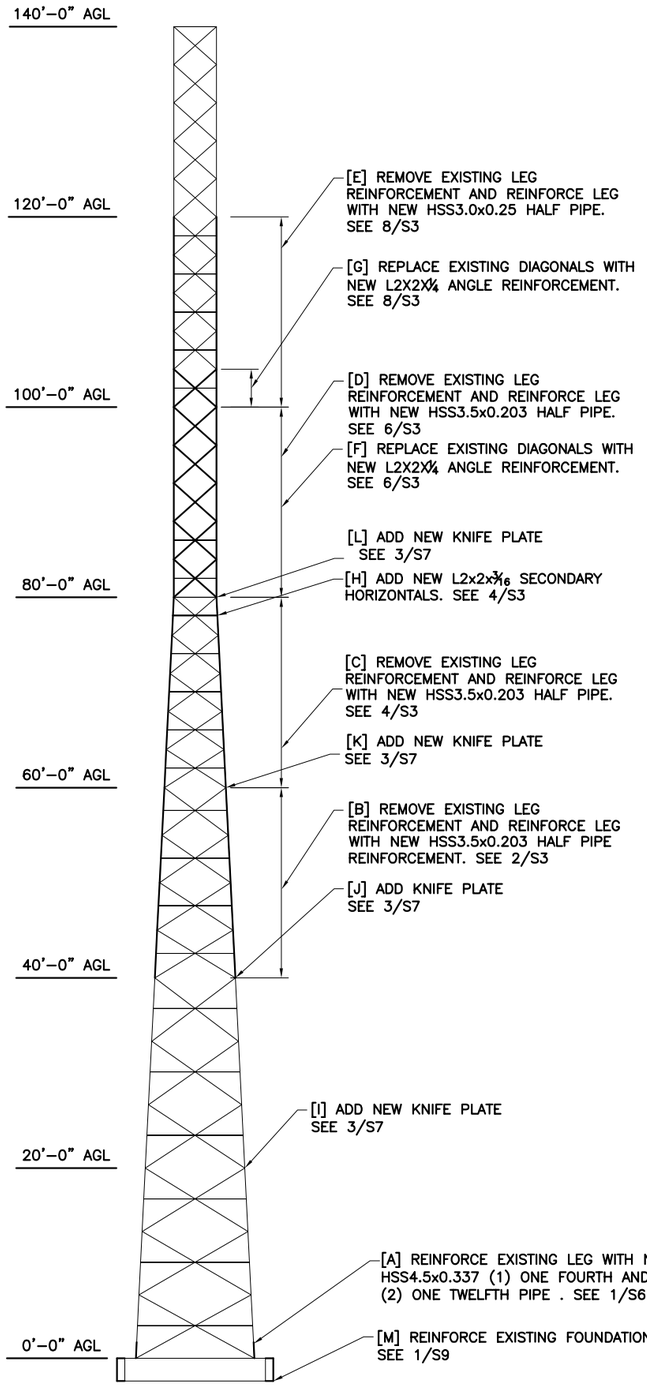
ADDRESS:
871 HOPMEADOW STREET,
SIMSBURY, CT 06070

DESIGNED: SK
DRAWN: SK
CHECKED: AC

JOB #: 049.01174-1978011

S1
NOTES

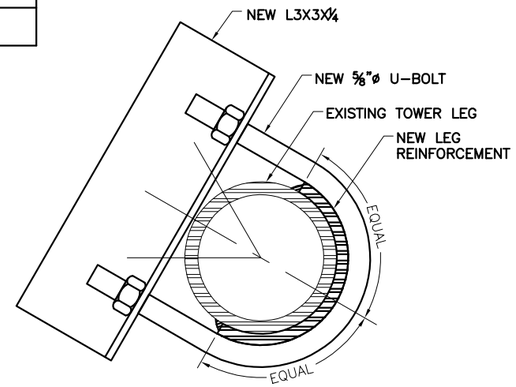
SELF-SUPPORT TOWER EXISTING MEMBER SIZES								
SECTION	T1	T2	T3	T4	T5	T6	T7	T8
LEGS	P2X0.154	P2x0.154 + ½ PIPE	P2.5x0.203 + ½ PIPE	P2.5x0.203 + PLATES	P2.5x0.276 + ½ Pipe	P2.5x0.276 + ½ Pipe	P3x0.3 + ½ Pipe	P3x0.3 + ½ Pipe
DIAGONALS	L1½X1½X⅛				X		2L1¾X1¾X⅛	2L2X2X⅛



1 / S2 TOWER ELEVATION
1/16" = 1'-0"

TOWER MODIFICATION SCHEDULE				
	FROM (FT)	TO (FT)	MODIFICATION	REFERENCE SHEET
A	0'–0"	0'–10"	REINFORCE EXISTING LEG WITH NEW HSS4.5x0.337 (1) ONE FOURTH AND (2) ONE TWELFTH PIPE	S4
B	40'–0"	60'–0"	REMOVE EXISTING LEG REINFORCEMENT AND REINFORCE LEG WITH NEW HSS3.5x0.203 HALF PIPE	S3
C	60'–0"	80'–0"	REMOVE EXISTING LEG REINFORCEMENT AND REINFORCE LEG WITH NEW HSS3.5x0.203 HALF PIPE	S3
D	80'–0"	100'–0"	REMOVE EXISTING LEG REINFORCEMENT AND REINFORCE LEG WITH NEW HSS3.5x0.203 HALF PIPE	S3
E	100'–0"	120'–0"	REMOVE EXISTING LEG REINFORCEMENT AND REINFORCE LEG WITH NEW HSS3.0x0.25 HALF PIPE	S3
F	80'–0"	100'–0"	REPLACE EXISTING DIAGONALS WITH NEW L2X2X¼ ANGLE REINFORCEMENT	S3
G	100'–0"	104'–0"	REPLACE EXISTING DIAGONALS WITH NEW L2X2X¼ ANGLE REINFORCEMENT	S3
H	78'–0"	78'–0"	ADD NEW L2x2x3/16 SECONDARY HORIZONTALS	S3
I	20'–0"	20'–0"	ADD NEW KNIFE PLATE	S7
J	40'–0"	40'–0"	ADD NEW KNIFE PLATE	S7
K	60'–0"	60'–0"	ADD NEW KNIFE PLATE	S7
L	80'–0"	80'–0"	ADD NEW KNIFE PLATE	S7
M	0'–0"	0'–0"	REINFORCE EXISTING FOUNDATION	S9
NOTE: APPLY INDICATED MODIFICATIONS TO ALL 3 TOWER FACES				

SYMBOL LIST	
MARK	SIZE
X	2L1½X1½X⅛



2 / S2 LEG REINFORCEMENT
N.T.S.

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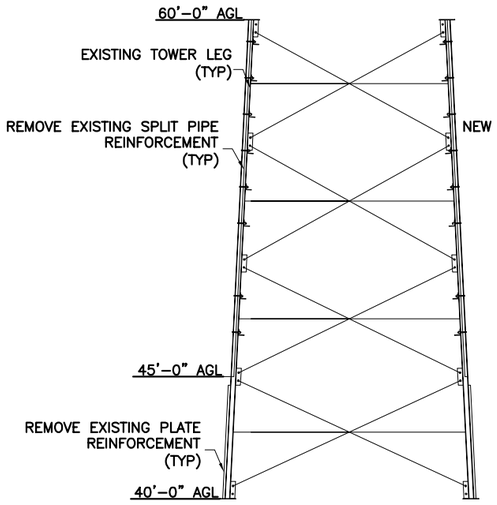
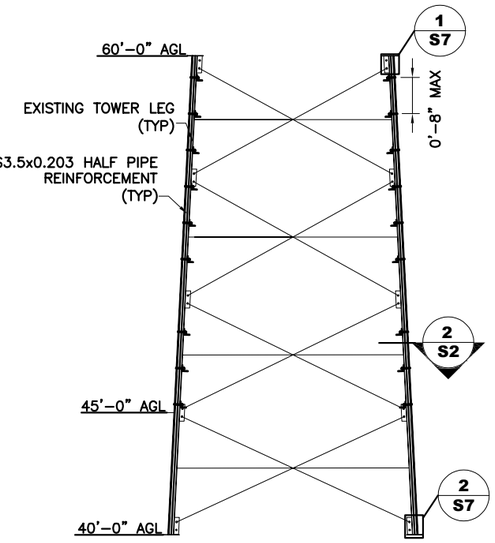
S2 SCOPE OF MODIFICATIO

STATE OF CONNECTICUT AHMET COLAKOGLU PEN 27057 LICENSED PROFESSIONAL ENGINEER
02-4-2021

Ahmet Colakoglu, PE
CT License No: PEN 27057



1 S3 EXISTING LEG MODIFICATION
N.T.S.



2 S3 PROPOSED LEG MODIFICATION
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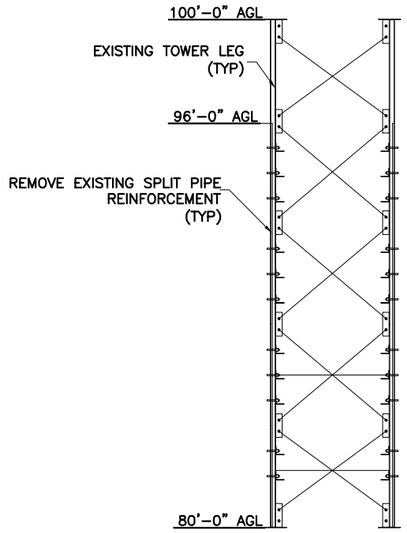
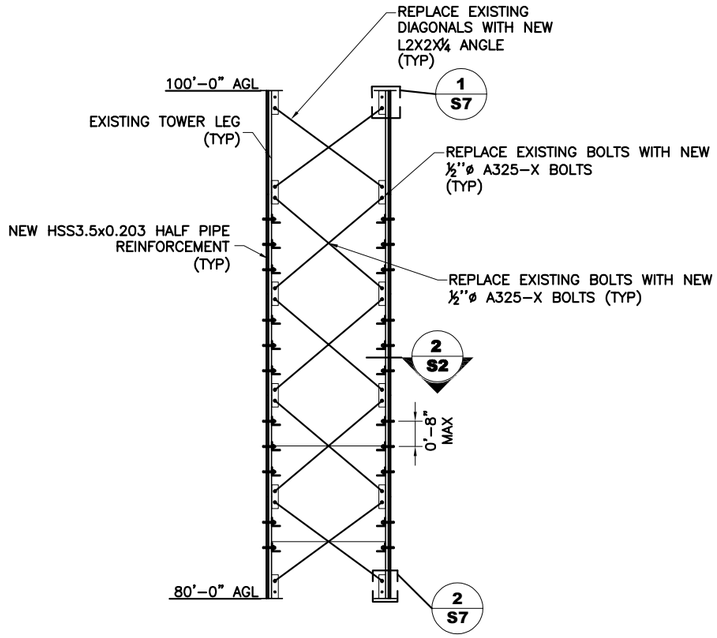
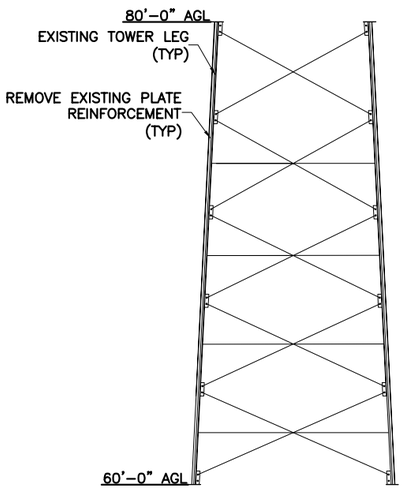


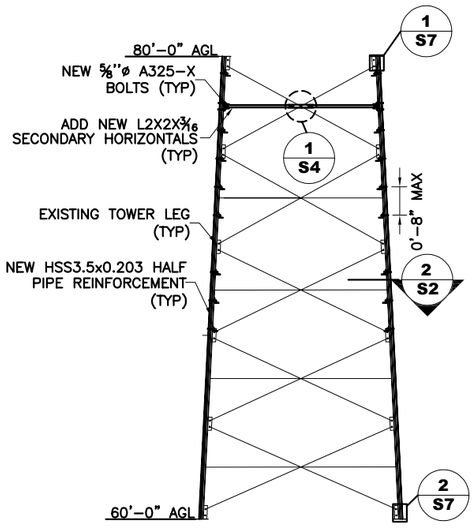
5 S3 EXISTING LEG MODIFICATION
N.T.S.



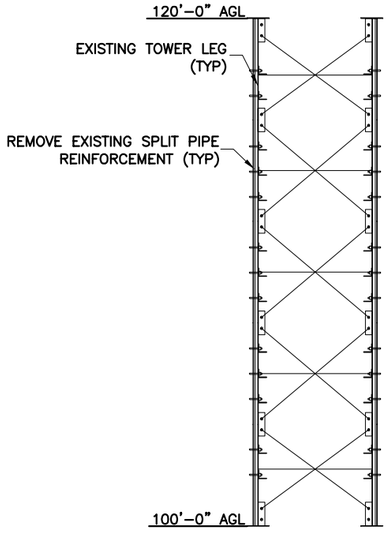
6 S3 PROPOSED LEG MODIFICATION
N.T.S.



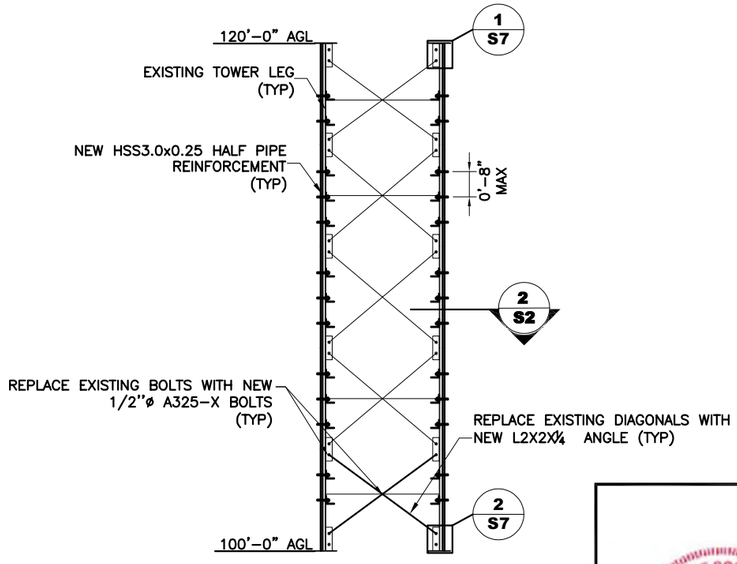
3 S3 EXISTING LEG MODIFICATION
N.T.S.



4 S3 PROPOSED LEG MODIFICATION
N.T.S.



7 S3 EXISTING LEG MODIFICATION
N.T.S.



8 S3 PROPOSED LEG MODIFICATION
N.T.S.

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S3 STRUCTURAI DETAILS

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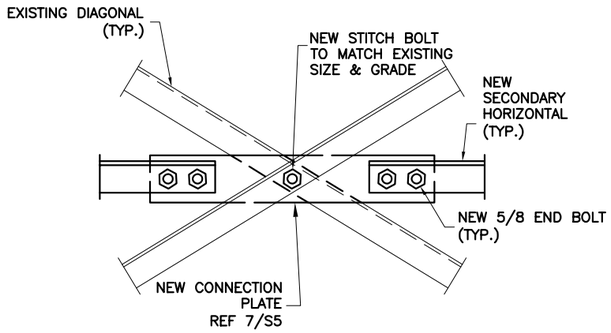
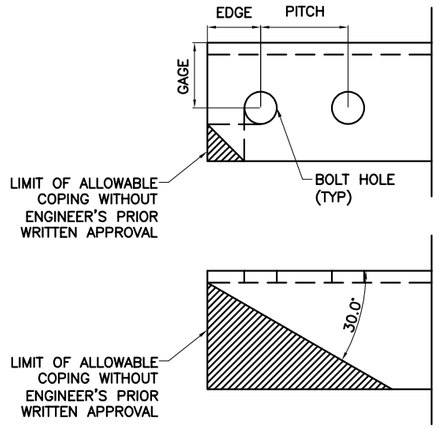
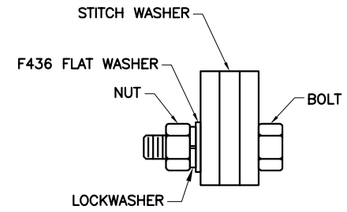
LICENSED PROFESSIONAL ENGINEER
02-4-2021

Ahmet Colakoglu, PE
CT License No: PEN 27057



1 / S4 CONNECTION PLATE
N.T.S.

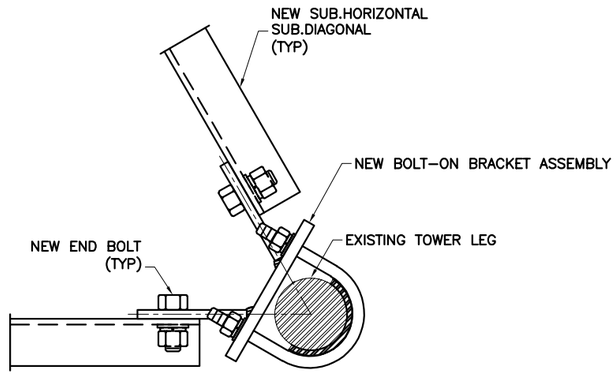




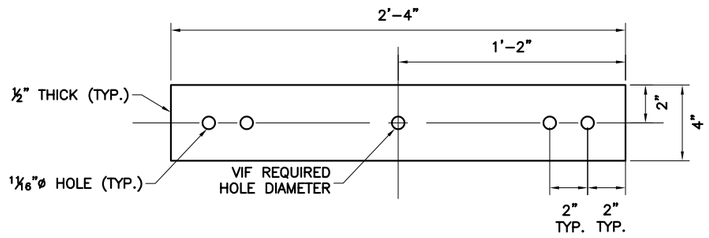
4 / S4 TYPICAL BOLT ASSEMBLY
N.T.S.

BOLT SCHEDULE

MEMBER SIZE	CONNECTION TYPE	BOLT SIZE	MIN EDGE DISTANCE	PITCH DISTANCE	GAGE DISTANCE	BOLT HOLE
L2X2X¼	END	½"ø X 2" LONG	¾"	1⅓"	1⅛"	9⁄16"
L2X2X3⁄16	END	⅝"ø X 2" LONG	⅞"	1⅔"	1⅛"	1⁄16"
NOTE: ALL BOLTS TO BE A325-X						



2 / S4 BOLT-ON BRACKET
N.T.S.



3 / S4 CONNECTION PLATE DETAIL
N.T.S.

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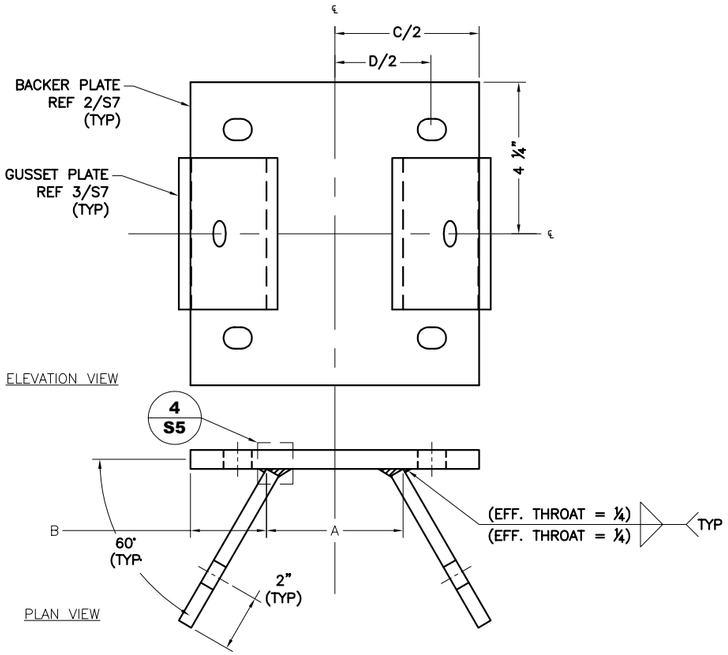
S4 STRUCTURAI DETAILS



1 S5 BOLT-ON BRACKET ASSEMBLY
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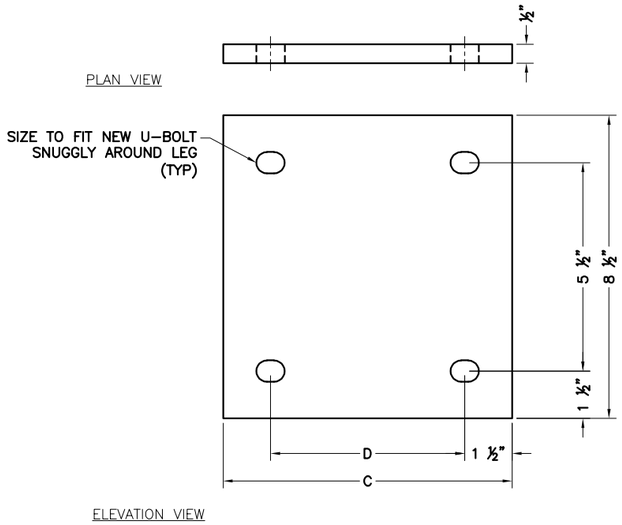
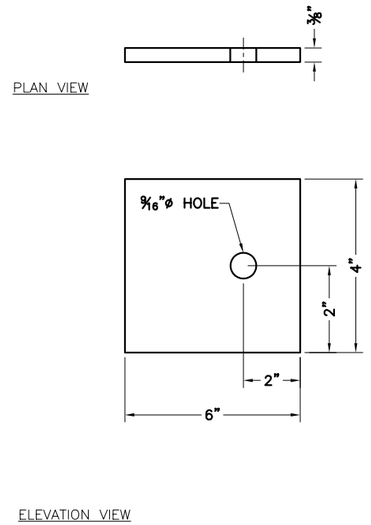


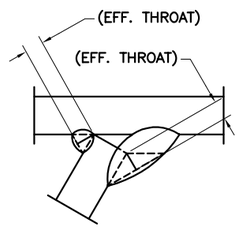
2 S5 BACKER PLATE
N.T.S.



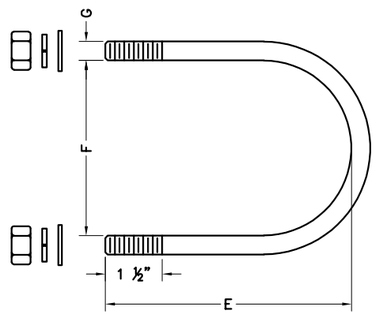
3 S5 GUSSET PLATE
N.T.S.

LEG	OUTER DIAMETER	ASSEMBLY		BACKER PLATE		U-BOLT		
		A (in)	B (in)	C (in)	D (in)	E (in)	F (in)	G (in)
PIPE2.5STD+HSS3.5X0.203 SPLIT PIPE	3.5"	3	2	7	4⅛	5½	3⅝	½

NOTES:
1. ALL MATERIAL SHALL BE 50 KSI (A572).
2. WELD TO BE E70xx ELECTRODES.
3. USE 2 U-BOLTS PER ASSEMBLY, COMPLETE W/ NUTS, WASHERS AND LOCK WASHERS.
4. ALL HOLES TO BE SHOP FABRICATED, UNLESS NOTED OTHERWISE.



4 S5 WELD DETAIL
N.T.S.



5 S5 U-BOLT
N.T.S.

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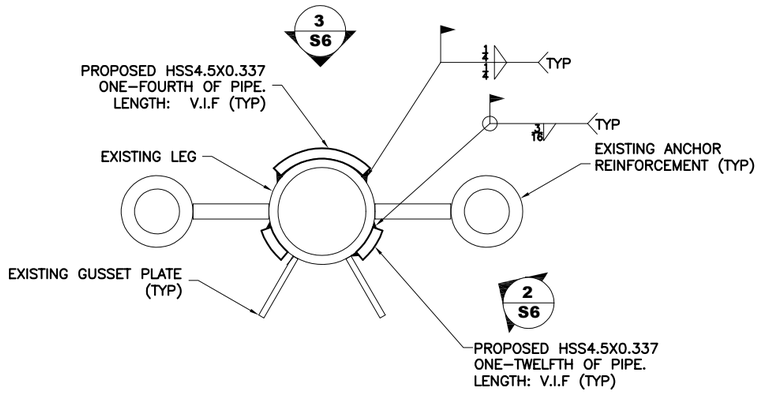
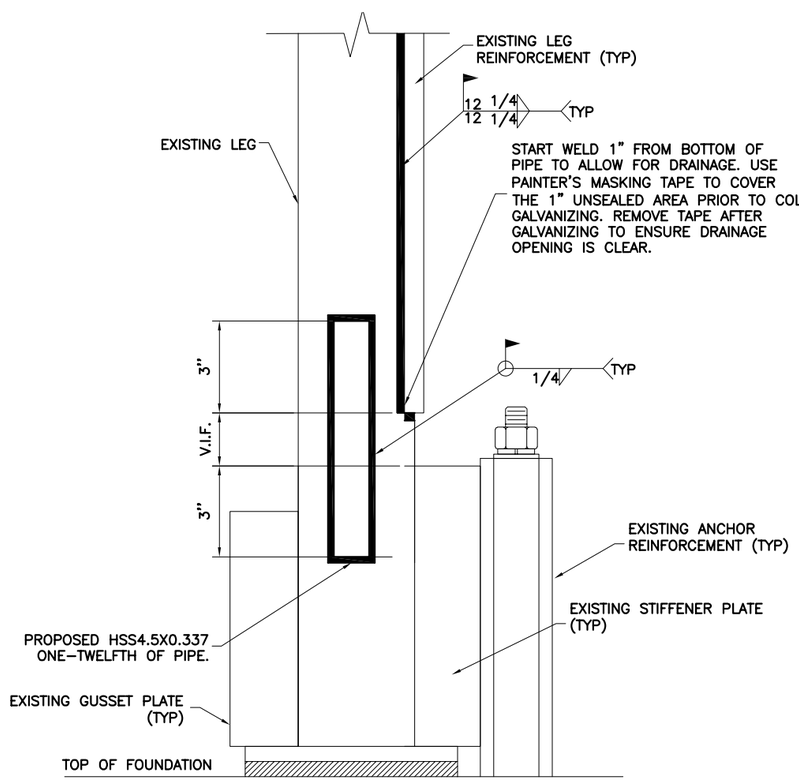
S5 STRUCTURAI DETAILS



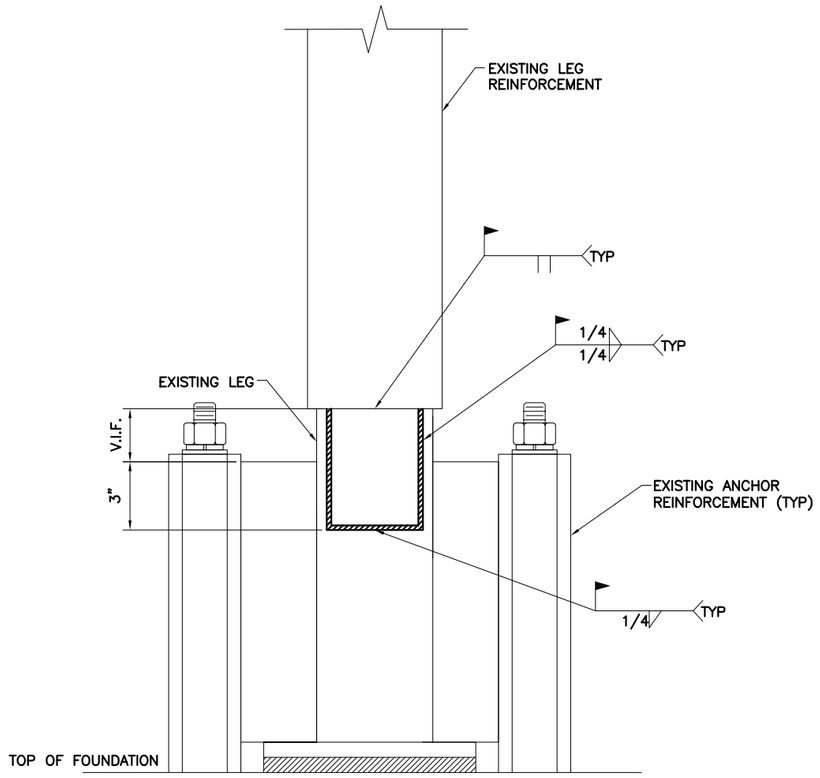
1 S6 TYPICAL LEG MODIFICATION (0'-1'): PLAN VIEW

N.T.S.



2 S6 TYPICAL LEG MODIFICATION (0'-1'): ELEVATION VIEW

N.T.S.



3 S6 TYPICAL LEG MODIFICATION (0'-1'): ELEVATION VIEW

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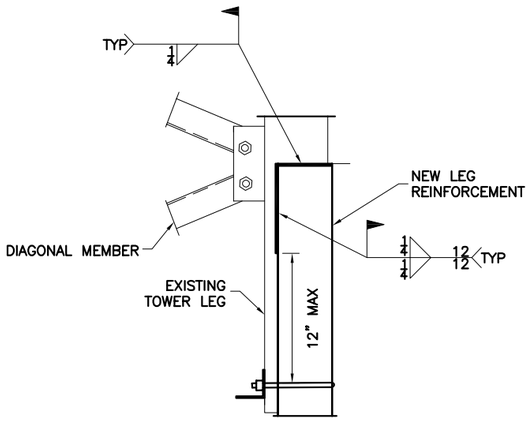
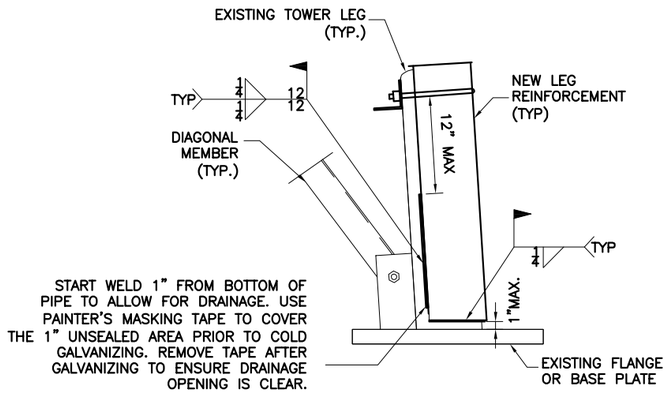
S6 STRUCTURAI DETAILS



1 S7 **TOP OF LEG CONNECTION**

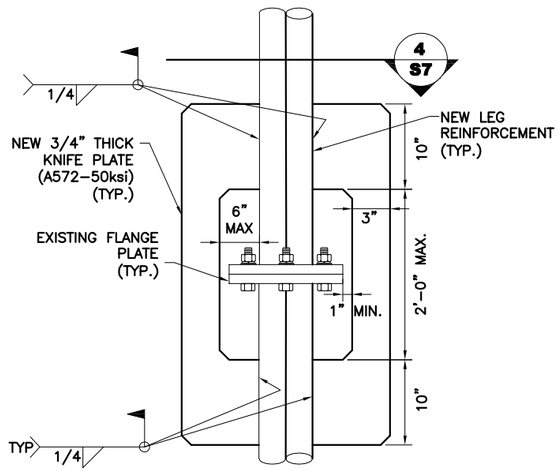
N.T.S.



2 S7 **BASE OF LEG CONNECTION**

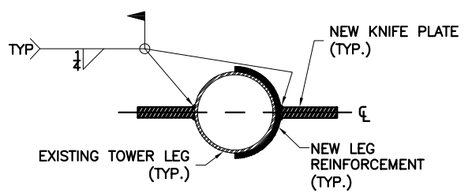
N.T.S.

NOTE: FLANGE BOLTS NOT SHOWN FOR CLARITY



3 S7 **KNIFE PLATE DETAIL**

N.T.S.



4 S7 **KNIFE PLATE DETAIL**

N.T.S.

DRAWINGS PLOTTED TO SCALE ON 11x17 SHEETS

efi global

EFI GLOBAL, INC.
1117 PERIMETER CENTER W
SUITE E500
ATLANTA, GA 30338
TEL NO: 770-693-0835
TELECOM@EFIGLOBAL.COM

PREPARED FOR:
ProTerra Design Group, LLC
4 Bay Road, Building A Suite 200
Hadley, MA 01035

NUM	DATE	DESCRIPTION:
A	02/04/21	ISSUED FOR CONSTRUCTION

CT11277A

ADDRESS:
871 HOPMEADOW STREET,
SIMSBURY, CT 06070

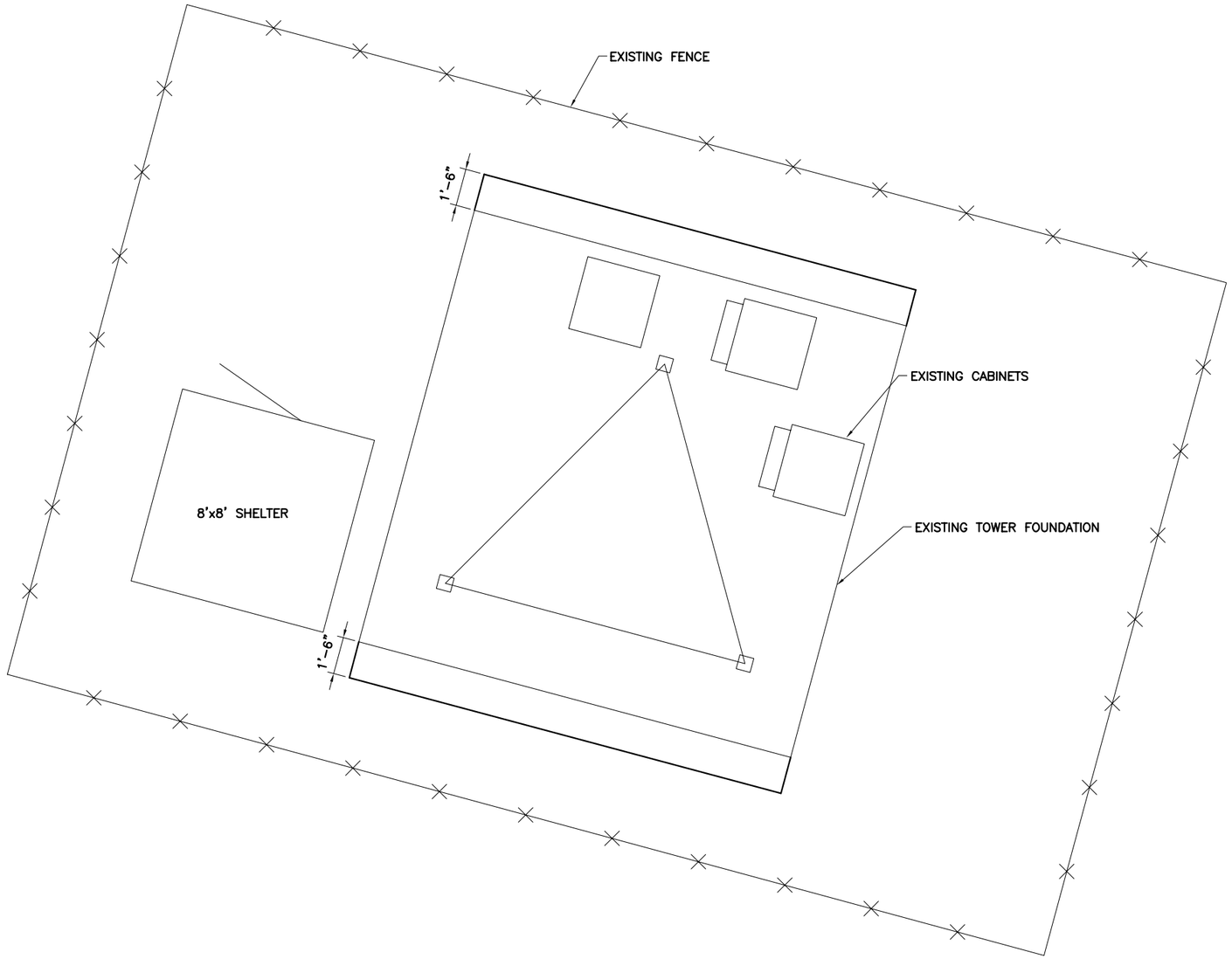
STATE OF CONNECTICUT
AHMET COLAKOGLU
PEN 27057
LICENSED
PROFESSIONAL ENGINEER
02-4-2021

Ahmet Colakoglu, PE
CT License No: PEN 27057

DESIGNED: SK
DRAWN: SK
CHECKED: AC

JOB #: 049.01174-1978011

S7 STRUCTURAI DETAILS



1/S8 **SITE PLAN**
N.T.S.

DRAWINGS PLOTTED TO SCALE ON 11x17 SHEETS

efi global

EFI GLOBAL, INC.
1117 PERIMETER CENTER W
SUITE E500
ATLANTA, GA 30338
TEL NO: 770-693-0835
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PREPARED FOR:
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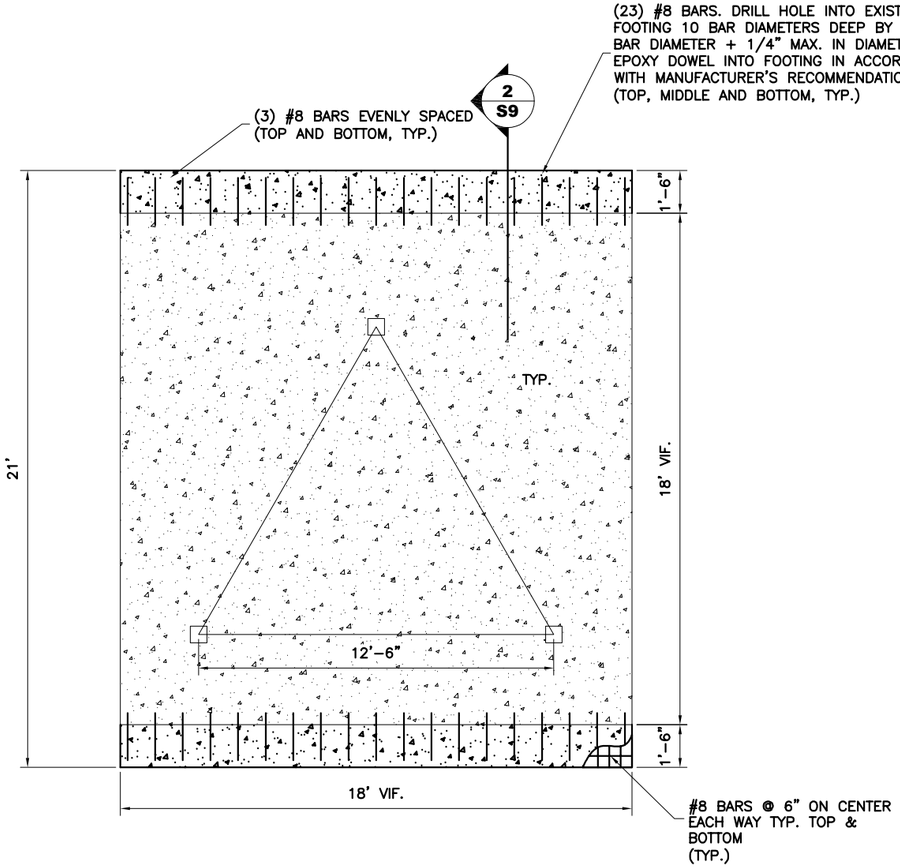
DESIGNED: SK
DRAWN: SK
CHECKED: AC

JOB #: 049.01174-1978011

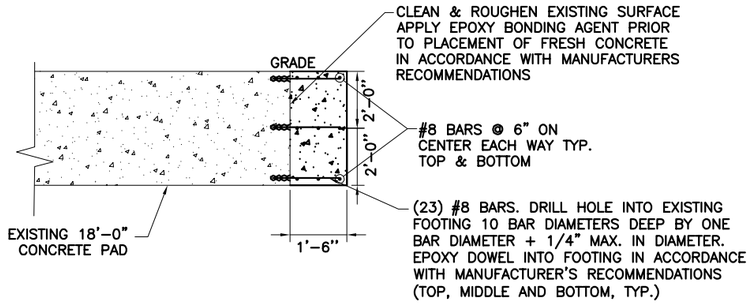
S8
SITE PLAN

Ahmet Colakoglu, PE
CT License No: PEN 27057



1 S9 SST UNIT BASE FOUNDATION PLAN VIEW

N.T.S.



2 S9 FOUNDATION SECTION VIEW

N.T.S.

NOTE:
1. FOUNDATION TO BE REINFORCED IN TWO SIDES

DRAWINGS PLOTTED TO SCALE ON 11x17 SHEETS

efi global

EFI GLOBAL, INC.
1117 PERIMETER CENTER W
SUITE E500
ATLANTA, GA 30338
TEL NO: 770-693-0835
TELECOM@EFIGLOBAL.COM

PREPARED FOR:
ProTerra Design Group, LLC
4 Bay Road, Building A Suite 200
Hadley, MA 01035

NUM	DATE	DESCRIPTION:
A	02/04/21	ISSUED FOR CONSTRUCTION

CT111277A

ADDRESS: 871 HOPMEADOW STREET,
SIMSBURY, CT 06070

DESIGNED: SK
DRAWN: SK
CHECKED: AC

JOB #: 049.01174-1978011

S9 FOUNDATION DETAILS

STATE OF CONNECTICUT
AHMET COLAKOGLU
PEN 27057
LICENSED PROFESSIONAL ENGINEER
02-4-2021

Ahmet Colakoglu, PE
CT License No: PEN 27057

Date: 8/23/2019

To: Mr. Peter Nute
ProTerra Design Group, LLC
4 Bay Road, Building A, Suite 200
Hadley, MA 01035

Subject:	**Mount Structural Analysis Report**	
T-Mobile Designation:	**Site ID:**	CT11277A
	Site Name:	Simsbury-3/Rt 10
Destek Designation:	**Project Number:**	1978011
Site Data:	**871 Hopmeadow Street, Simsbury, CT 06070** **Latitude 41.878432, Longitude -72.802356**	

Dear Mr. Nute,

Destek Engineering, LLC is pleased to submit this **"Mount Structural Analysis Report"** to determine the structural capacity of the antenna mount utilized by T-Mobile at the above referenced site.

The purpose of the analysis is to determine acceptability of the mount stress level for the changes proposed by T-Mobile. Under the following load case we have determined the mount to have:

Existing + Proposed Equipment — **Adequate Capacity with Mods (71.7%)**
Note: See Analysis Criteria for loading configuration

The analysis has been performed in accordance with TIA-222-G Standard and the 2018 Connecticut State Building Code (2015 IBC).

We at *Destek Engineering, LLC* appreciate the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this or any other projects, please give us a call.

Sincerely,
Destek Engineering, LLC
License No: PEC00001429

8/23/2019

STATE OF CONNECTICUT
AHMET COLAKOGLU
PEN 27057
LICENSED
PROFESSIONAL ENGINEER

Ahmet Colakoglu, PE
Connecticut Professional Engineer
License No: PEN 27057

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Suite 100, Marietta, GA 30066 - Tel: (770) 693-0835

1) ANALYSIS CRITERIA

The analysis was performed for the existing and proposed appurtenances as specified in the loading information referenced below, and per the following loading criteria of Table 1.

Table 1 – Loading and Analysis Criteria

Rad Center	138’
Structure Type	Self-Support Tower
Exposure Category	C
Wind Speed	120 mph* √0.6 = 93 mph (ASD)
Ice Loading	1.00” with 50 mph Wind
Risk Category	II
Topographic Factor	Kzt = 1.0

Table 1.1 – Existing Appurtenance Configuration

Qty	Model
3	EMS RR90-17-XXDP – Antennas
3	Ericsson 11’’T x 6’’W x 4’’D – TMAs

Table 1.2 – Proposed and Final Appurtenance Configuration

Qty	Model
3	RFS APXVAARR24_43-U-NA20 – Antennas
3	Radio 4449 B71+B12 – RRUs
3	Radio 4415 B25– RRUs
3	Radio 4415 B66A – RRUS

Table 1.3 – Assumed Material Properties

Member Type	ASTM Material Designation	Fy (ksi)	Fu (ksi)
Pipes	A53 Gr. B	35	60
Angles/Channels	A36	36	58
Rectangular HSS	A500 Gr. B - 46	46	58
Round HSS	A500 Gr. B - 42	42	58
Others (UNO)	A572 Gr. 50	50	65

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Suite 100, Marietta, GA 30066 - Tel: (770) 693-0835

2) ANALYSIS PROCEDURE

The analysis is based on the following information:

Table 2 – Documents

Document	Provided By	Date
Mount Mapping & Site Photographs	High Tower Solutions	08/06/2019
RFDS	T-Mobile	04/16/2019

2.1) Analysis Method

Risa-3D, a commercially available analysis software package, was used to create a three-dimensional model of the mount and calculate member stresses for various loading cases. Selected output from the analysis is included in the Appendix.

2.2) Analysis Conditions and Assumptions

1) The mount was built and installed in accordance with the manufacturer's specifications.
2) The mount has been maintained and will be maintained in accordance with the manufacturer's specifications. All structural members and connections of the mount are in good condition and can achieve theoretical strength.
3) The configuration of antennas is as specified in "1) Analysis Criteria".
4) The analysis was performed for the subject mount only. It does not include an evaluation of the other mounts or the tower, which should be analyzed by others.
5) The evaluation does not include any antenna rigging loads. The equipment should not be rigged using the subject antenna mount as the support.
6) The analysis includes a minimum 250 lbf maintenance point load at the worst-case location on the mount, as well as a minimum 250 lbf maintenance point load at each antenna location in conjunction with a 30 mph wind load.
7) Any steel grating represented in this model is for loading purposes only and it is not considered to provide any structural restraint or support.
8) Member sizes per the available site photographs, mount mapping report and assumed based on our experience with similar structures. Please refer to calculation output in the appendix of this report for sizes and lengths assumed.
9) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.

Destek Engineering, LLC must be notified immediately if any of these assumptions are discovered to be incorrect. The results of this analysis may be affected if any of the assumptions are not valid or have been made in error.

3) ANALYSIS RESULTS AND CONCLUSION

The analysis results are shown on the table below.

Table 3.3 – Mount Component Stresses vs. Capacity

Component	% Capacity	Pass / Fail
Horizontal Face Pipe - Top	71.7	Pass
Horizontal Face Pipe - Bottom	66.5	Pass
Antenna Mount Pipe	48.6	Pass

Sector Mounts: The existing sector mounts **will have adequate** capacity for the proposed changes by T-Mobile, **once a new tie back pipe (Valmont/Site Pro 1 P/N: P2150) is attached directly to the outside mount pipe, using cross over plate kits (Valmont/Site Pro 1 SCX2-K) and equally spaced between the horizontal arm members. The other end of the tie back should be installed directly to the adjacent mount's tower leg, using stiff arm attachment (Valmont/Site Pro 1 SAM-U).** For the code specified load combinations and as a maximum, the mount members are stressed to **71.7%** of their structural capacity.

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Suite 100, Marietta, GA 30066 - Tel: (770) 693-0835

APPENDIX

INPUT LOADS
ANALYSIS OUTPUT
MOUNT MAPPING REPORT

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Suite 100, Marietta, GA 30066 - Tel: (770) 693-0835

CLIENT: ProTerra

PROJECT: 1978011 - CT11277A

SUBJECT: Antenna Loads -TIA 222 G Stanadard (chapter 16 revisions)

Tower Height	140.00	ft	Type of Mount: Sector
Basic Wind Speed, V	93	mph (=Ultimate Speed*Sqrt(0.6))	
Basic Wind Speed with Ice, V_i	50	mph	
Maintanence Load Factor, L_{FM}	0.1041	Load Factor for Maint. Load Cases (Basic Wind Speed=30 mph)	
Design Ice Thickness, t_i	1	inches	

Table 2-3 Importance Factors

Structure Classification	Wind Load Without Ice	Wind Load With Ice	Ice Thickness	Earthquake
II	1	1	1	1

1

Table 2-4 Exposure Category Coefficients

Exposure Category	Zg	α	Kzmin	Ke	m
C	900	9.5	0.85	1	0.6

Table 2-5 Topographic Categories

Kzt 1.000

Table 2-2 Wind Directionality Factor, Kd

Structure Type	Kd	
Lattice Tower	0.95	DOES NOT CHANGE

Gust Effect Factor Gh

Structure Type	Gh	
Lattice Tower	1.00	DOES NOT CHANGE

Shielding Factor, Ka

Structure Type	Ka	
Lattice Tower	0.90	DOES NOT CHANGE

Seismic Factors

Ss		
S1		
Fa		
Fv		
R	3	Truss or Pole

CLIENT: ProTerra

PROJECT: 1978011 - CT11277A

SUBJECT: Antenna Loads -TIA 222 G Stanadard (chapter 16 revisions)

Rad Center **138.00** ft

Antenna AND Mount Without Ice

Mounting Pole	Height (ft)	Model Number	#	Weight (lbs)	H (in)	*W (in)	D (in)	Ka	**A_N (ft2)	***A_T (ft2)	Aspect (FRONT)	Aspect (SIDE)	Ca (FRONT)	Ca (SIDE)	K_z	q_z (psf)	Pounds: Wind Load (Front)	Wind Load (Side)	Dead Load	Total Wind Load (Front)	Total Wind Load (Side)	Total Dead Load	Lateral Load (Seismic)	Vertical Load (Seismic)
Pos. 1	**138.00**	RFS APXVAARR24_43-U-NA20	1	128.0	95.9	24.0	8.7	0.90	15.98	5.79	4.00	11.02	1.27	1.53	1.354	28.5	519.0	227.9	128	519	257	203	6	0
	138.00	Radio 4449 B71+B12	1	75.0	15.0	N/A	9.3	0.90	-	0.96	-	1.62	-	1.20	1.354	28.5	0.0	29.5	75					
		Empty		0.0	-	N/A	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0					
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0					
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0					
																				260	**129**	**102**	**3**	**0**
Pos.2		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	90	40	94	3	0
on standoff pipe	**138.00**	Radio 4415 B25	1	44.0	15.0	13.2	5.4	0.90	1.37	0.56	1.13	2.78	1.20	1.21	1.354	28.5	42.2	17.4	44					
	138.00	Radio 4415 B66A	1	49.6	16.5	13.5	6.3	0.90	1.55	0.72	1.22	2.62	1.20	1.21	1.354	28.5	47.6	22.3	49.6					
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0					
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0					
																				45	**20**	**47**	**1**	**0**
Pos.3		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	0	0	0	0	0
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0					
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0					
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0					
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0					
																				0	**0**	**0**	**0**	**0**
Pos.4		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	0	0	0	0	0
		Empty		0.0	-	N/A	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0					
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0					
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0					
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0					
																				0	**0**	**0**	**0**	**0**

* Enter N/A in the W column for front sheilded apurtanances.

** A_N is the product of H and W

*** A_T is the product of H and D

DL 297

Mount	Height (ft)	Member	*L (in)	**W (in)	D (in)	Weight (lb/ft)	*** Ca	K_z	q_z (psf)	Wind Load (PLF)	Lateral Load (Seismic)	Vertical Load (Seismic)
	138.00	3.0 STD Pipe	12.00	3.50	0.00		1.20	1.354	25.6	9	-	-
	138.00	2.5 STD Pipe	12.00	2.88	0.00		1.20	1.354	25.6	7	-	-
	138.00	2.0 STD Pipe	12.00	2.38	0.00		1.20	1.354	25.6	6	-	-
	138.00	1.25 STD Pipe	12.00	1.66	0.00		1.20	1.354	25.6	4	-	-
	138.00	1.0 SR	0.00	1.00	0.00		-	-	-	-	-	-
	138.00	5/8 SR	0.00	0.63	0.00		-	-	-	-	-	-
	138.00	(L3x3)	0.00	3.00	3.00		-	-	-	-	-	-
	138.00	(L2.5x2.5)	0.00	2.50	2.50		-	-	-	-	-	-
	138.00	Plate Horizontal (PL4x3/8)	0.00	0.38	4.00		-	-	-	-	-	-
	138.00	Plate Horizontal (PL7x0.4)	0.00	0.40	7.00		-	-	-	-	-	-
	138.00	Double Angle (LL2x2x3x0)	0.00	2.00	2.00		-	-	-	-	-	-
	138.00	Tapered Section	0.00	2.00	4.00		-	-	-	-	-	-
	138.00	Invert U 5.375x3.625x.375	0.00	3.63	5.38		-	-	-	-	-	-

* The dimension L is the longest dimension of the member

** The dimension W is the height or width of the member that resists wind load

*** Ca will equal 1.2 for round members and 2.0 for flat members

CLIENT: ProTerra

PROJECT: 1978011 - CT11277A

SUBJECT: Antenna Loads -TIA 222 G Stanadard (chapter 16 revisions)

ti (in) 2.307632 Kiz 1.1538159 reduction 0.28905

Antenna AND Mount With Ice

Mounting Pole	Height (ft)	Model Number	#	H (in)	W (in)	D (in)	Ka	*A_N (ft2)	*A_T (ft2)	*Volume Ice (ft3)	*Weight Ice (lbs)	**Ca (FRONT)	**Ca (SIDE)	Kz	q_z (psf)	Pounds: Ice Wind Load (Front)	Ice Wind Load (Side)	Combined Wind Load (Front)	Combined Wind Load (Side)	Ice Dead Load	**Total Wind Load (Front)	**Total Wind Load (Side)	Total Ice Load
Pos. 1	**138.00**	RFS APXVAARR24_43-U-NA20	1	95.9	24.0	8.7	0.90	3.99	3.50	10.58	592.23	0.72	0.81	1.354	8.2	21.4	21.1	171.4	86.9	592	171	100	690
	138.00	Radio 4449 B71+B12	1	15.0	13.2	9.3	0.90	-	0.92	1.74	97.42	0.70	0.70	1.354	8.2	0.0	4.8	0.0	13.3	97			
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0			
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0			
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0			
																					86	**51**	**345**
Pos.2		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	37	20	168
on standoff pipe	**138.00**	Radio 4415 B25	1	15.0	13.2	5.4	0.90	1.05	0.80	1.40	78.55	0.70	0.70	1.354	8.2	5.4	4.2	17.6	9.2	79			
	138.00	Radio 4415 B66A	1	16.5	13.5	6.3	0.90	1.11	0.88	1.60	89.83	0.70	0.70	1.354	8.2	5.8	4.6	19.5	11.0	90			
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0			
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0			
																					19	**11**	**85**
Pos.3		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0			
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0			
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0			
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0			
																					0	**0**	**0**
Pos.4		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0			
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0			
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0			
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0			
																					0	**0**	**0**

* A_N ,A_T, Volume Ice and Weight Ice are calculated per unit

** Ca will equal 1.2 for all ice load calculations

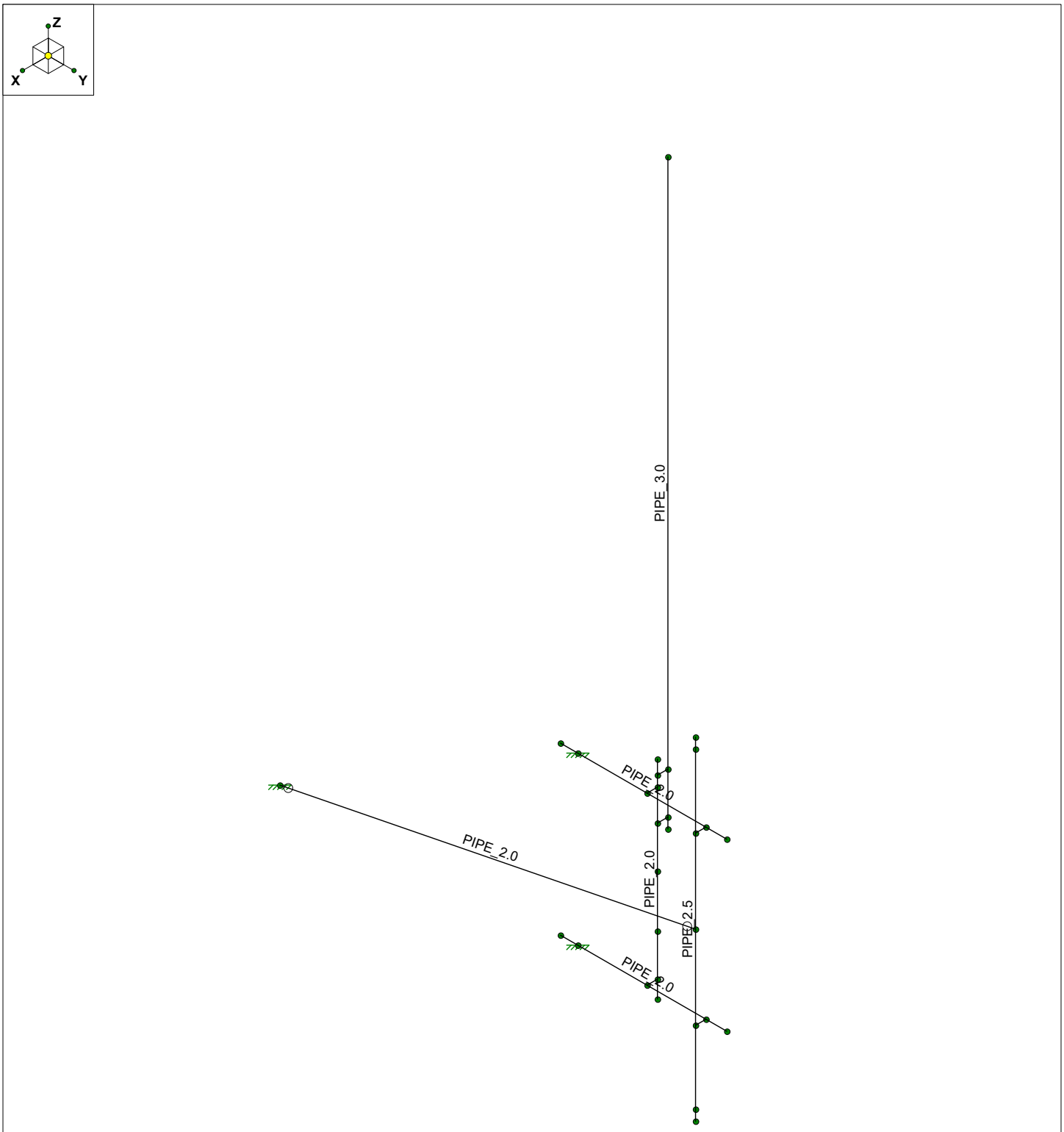
Mount	Height (ft)	Member	*L (in)	**W (in)	D (in)	***A_N (ft2)	Volume Ice (ft3)	Weight Ice (lbs)	****Ca (FRONT)	Kz	q_z (psf)	PLF: Ice Wind Load (Front)	Combined Wind Load (Front)	Ice Dead Load
	138.00	3.0 STD Pipe	12.00	3.50	0.00	0.64	0.29	16.37	1.20	1.354	7.4	5.7	8.3	16
	138.00	2.5 STD Pipe	12.00	2.88	0.00	0.62	0.26	14.63	1.20	1.354	7.4	5.6	7.7	15
	138.00	2.0 STD Pipe	12.00	2.38	0.00	0.61	0.24	13.22	1.20	1.354	7.4	5.4	7.2	13
	138.00	1.25 STD Pipe	12.00	1.66	0.00	0.59	0.20	11.19	1.20	1.354	7.4	5.2	6.4	11
	138.00	1.0 SR	0.00	1.00	0.00	-	-	-	-	-	-	-	-	-
	138.00	5/8 SR	0.00	0.63	0.00	-	-	-	-	-	-	-	-	-
	138.00	(L3x3)	0.00	3.00	3.00	-	-	-	-	-	-	-	-	-
	138.00	(L2.5x2.5)	0.00	2.50	2.50	-	-	-	-	-	-	-	-	-
	138.00	Plate Horizontal (PL4x3/8)	0.00	0.38	4.00	-	-	-	-	-	-	-	-	-
	138.00	Plate Horizontal (PL7x0.4)	0.00	0.40	7.00	-	-	-	-	-	-	-	-	-
	138.00	Double Angle (LL2x2x3x0)	0.00	2.00	2.00	-	-	-	-	-	-	-	-	-
	138.00	Tapered Section	0.00	2.00	4.00	-	-	-	-	-	-	-	-	-
	138.00	Invert U 5.375x3.625x.375	0.00	3.63	5.38	-	-	-	-	-	-	-	-	-

* The dimension L is the longest dimension of the member

** The dimension W is the height or width of the member that resists wind load

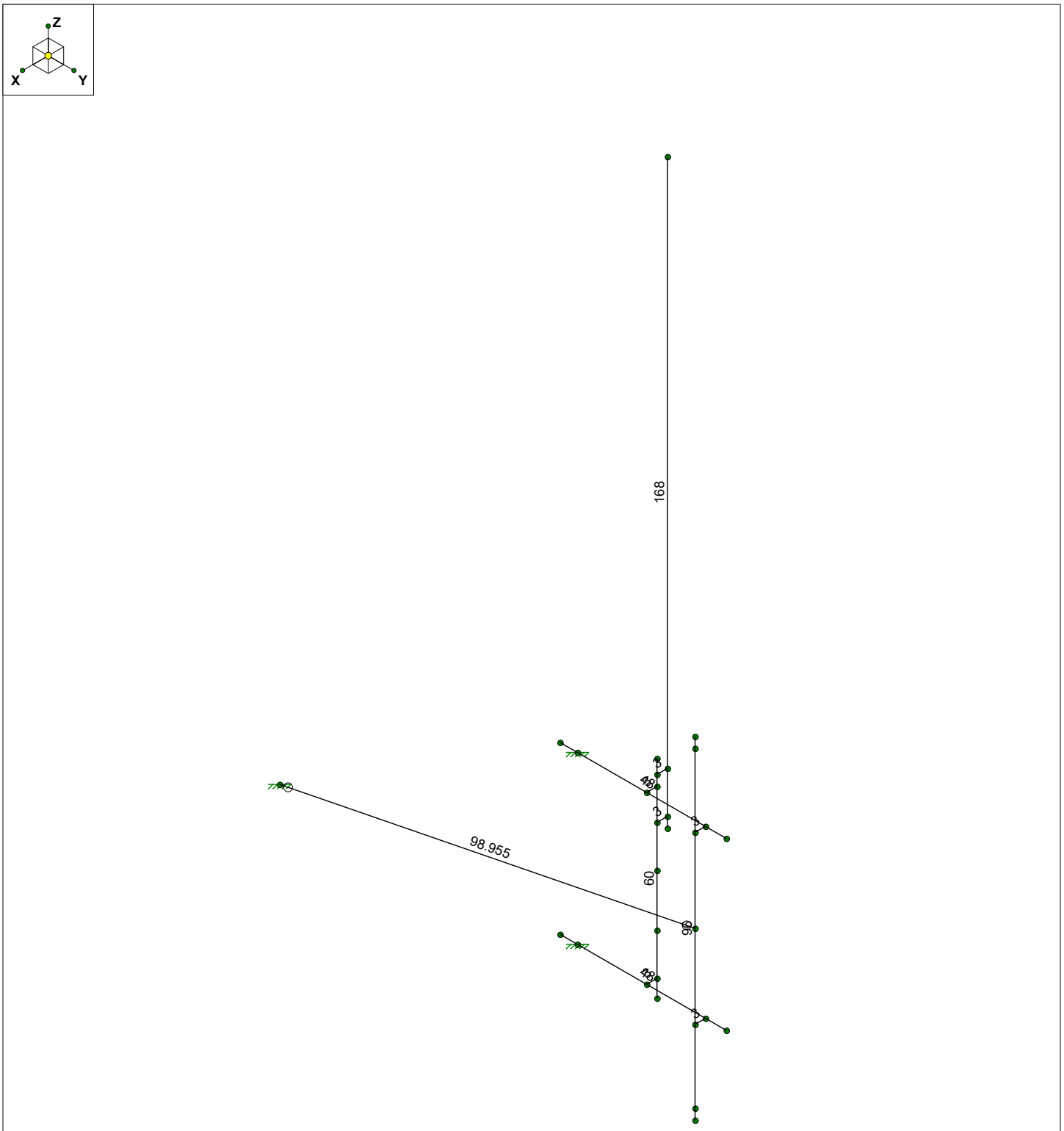
*** A_N is the area of ice built up on the LW plane

**** Ca will equal 1.2 for all ice load calculations



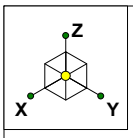
Envelope Only Solution

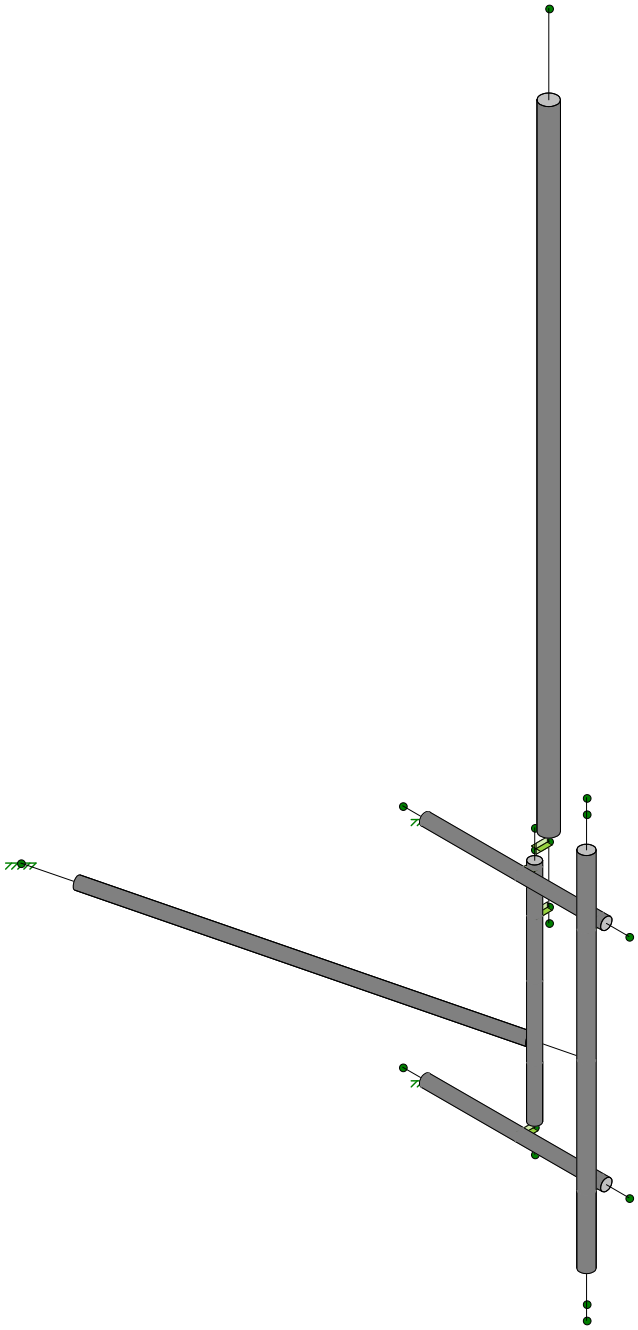
Proterra/Destek Engineeri...	CT11277A	SK - 1
MAZ		Aug 23, 2019 at 4:48 PM
1978011		1978011 - CT11277A Conditional ...



Member Length (in) Displayed
Envelope Only Solution

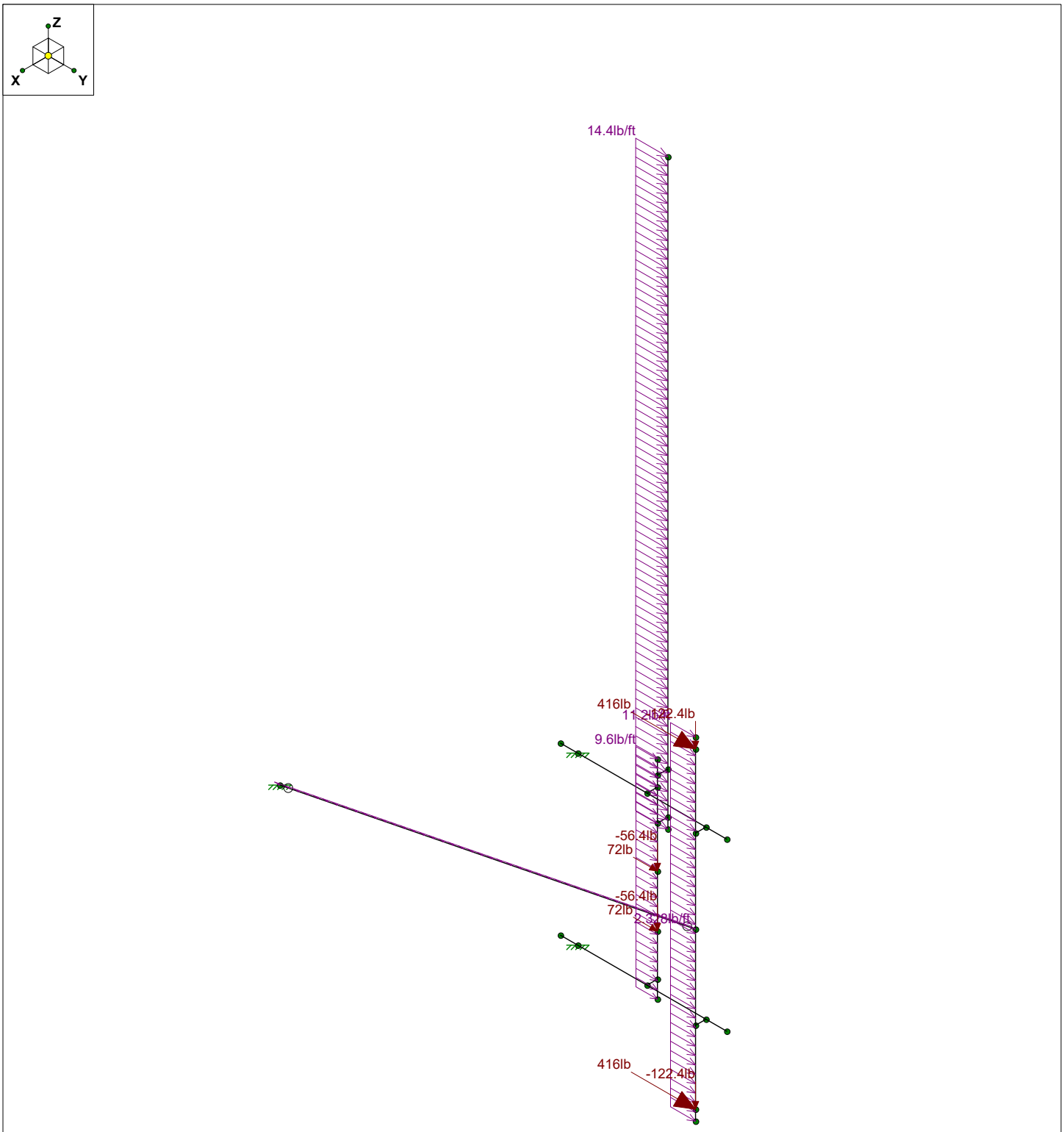
Proterra/Destek Engineeri...	CT11277A	SK - 2
MAZ		Aug 23, 2019 at 4:48 PM
1978011		1978011 - CT11277A Conditional ...





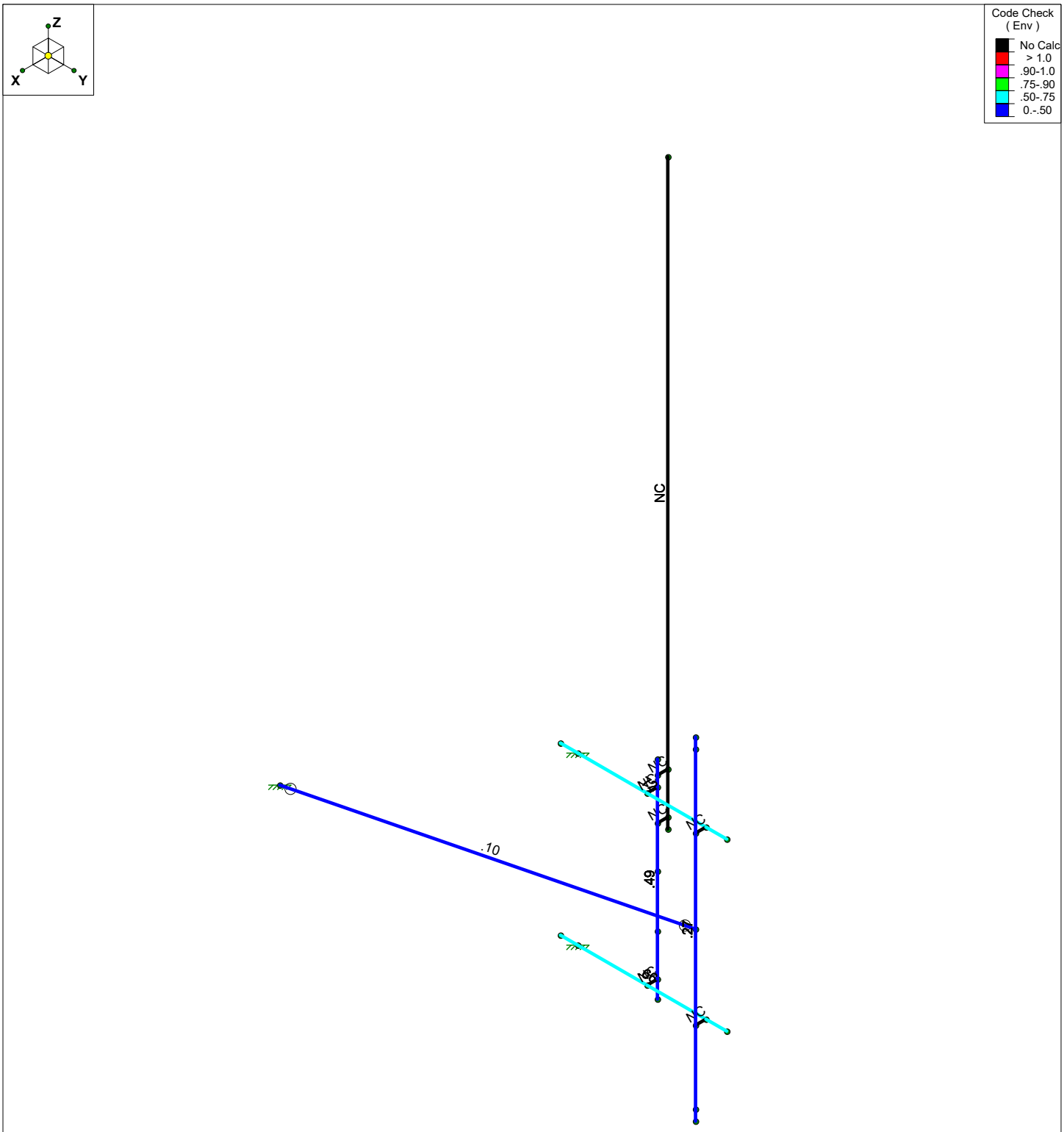
Envelope Only Solution

Proterra/Destek Engineeri...		SK - 3
MAZ	CT11277A	Aug 23, 2019 at 4:49 PM
1978011		1978011 - CT11277A Conditional ...



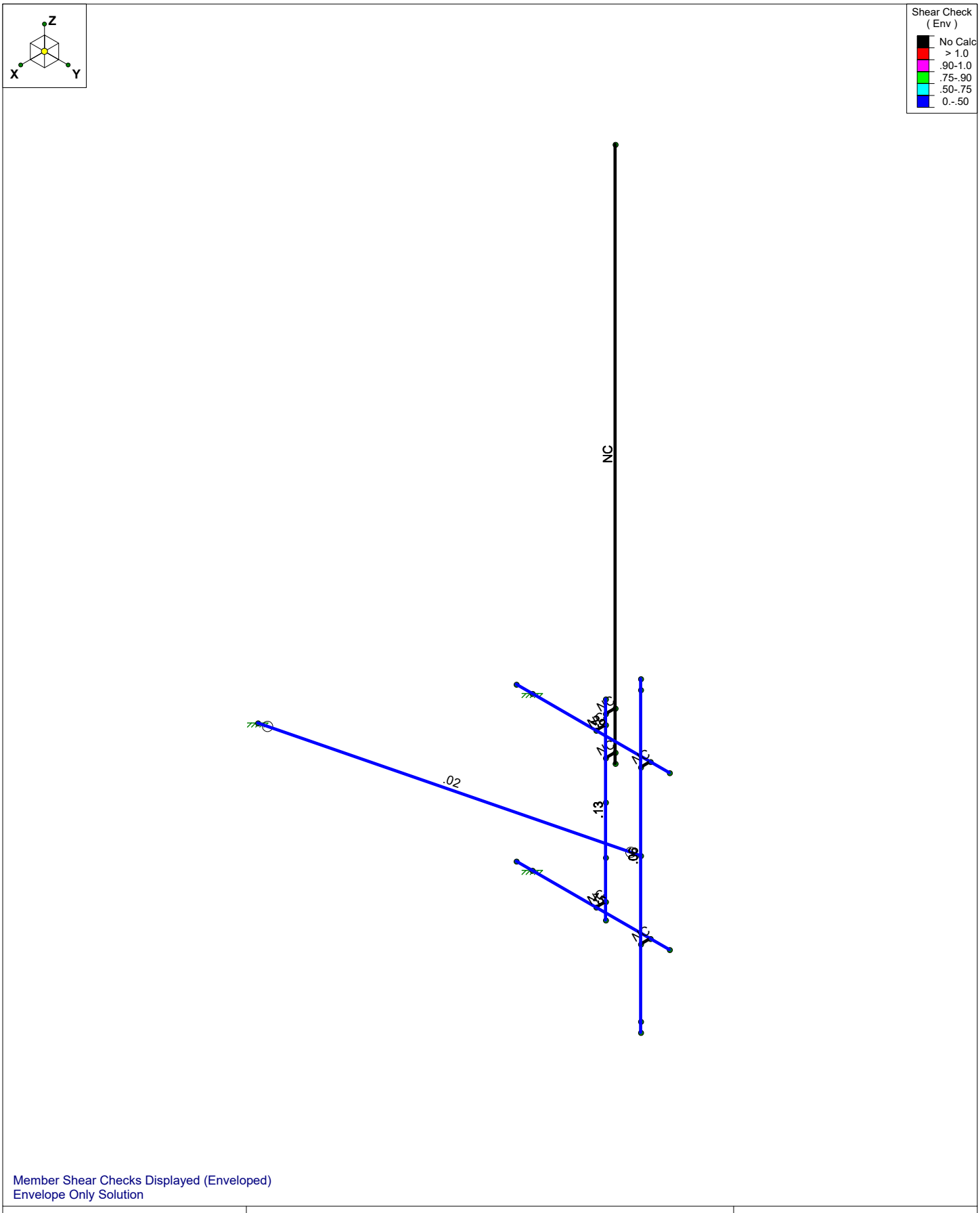
Loads: LC 1, DL + WL (NO ICE) 0 Degree
Envelope Only Solution

Proterra/Destek Engineeri...		SK - 4
MAZ	CT11277A	Aug 23, 2019 at 4:49 PM
1978011		1978011 - CT11277A Conditional ...



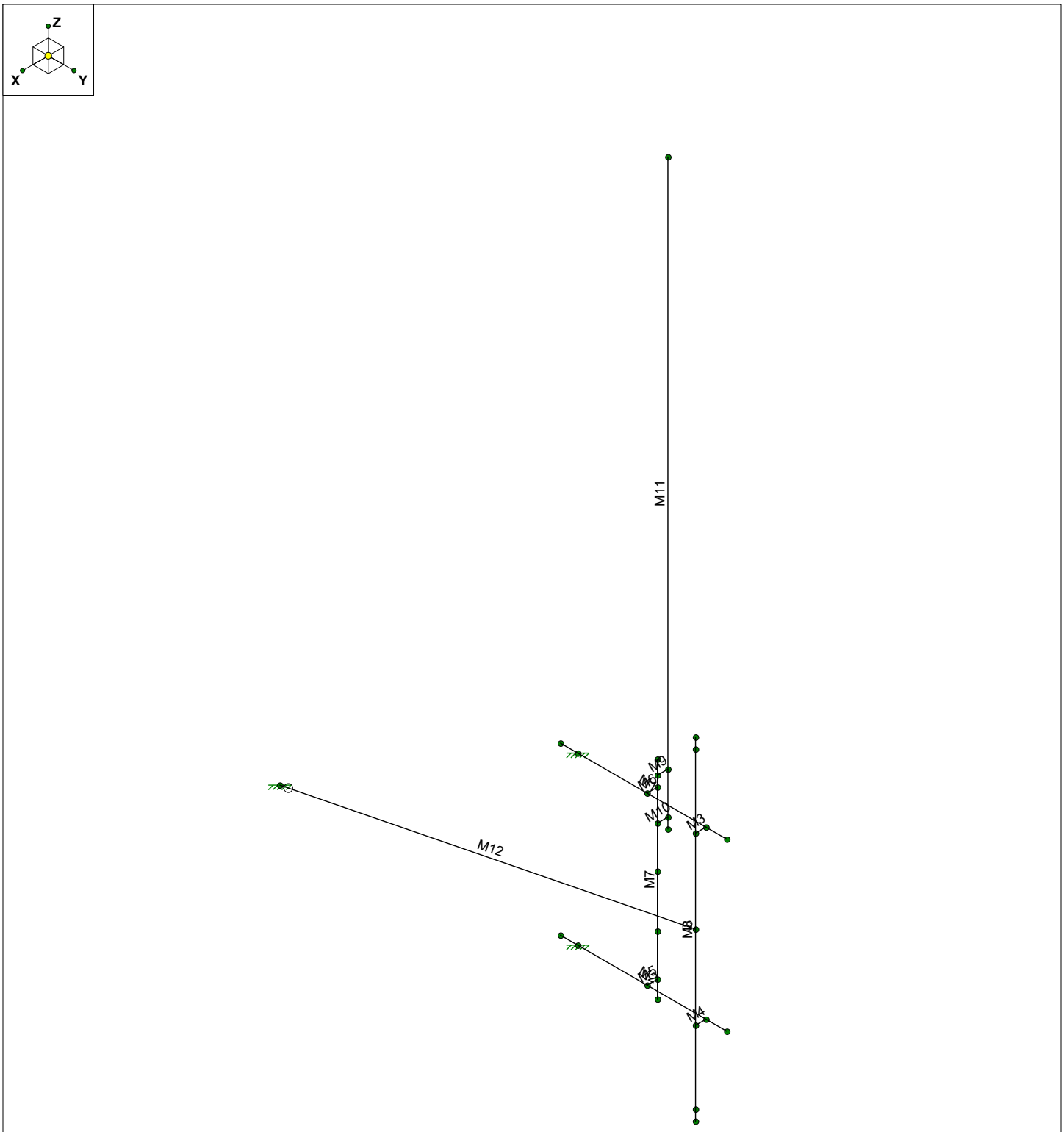
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Proterra/Destek Engineeri...		SK - 5
MAZ	CT11277A	Aug 23, 2019 at 4:49 PM
1978011		1978011 - CT11277A Conditional ...



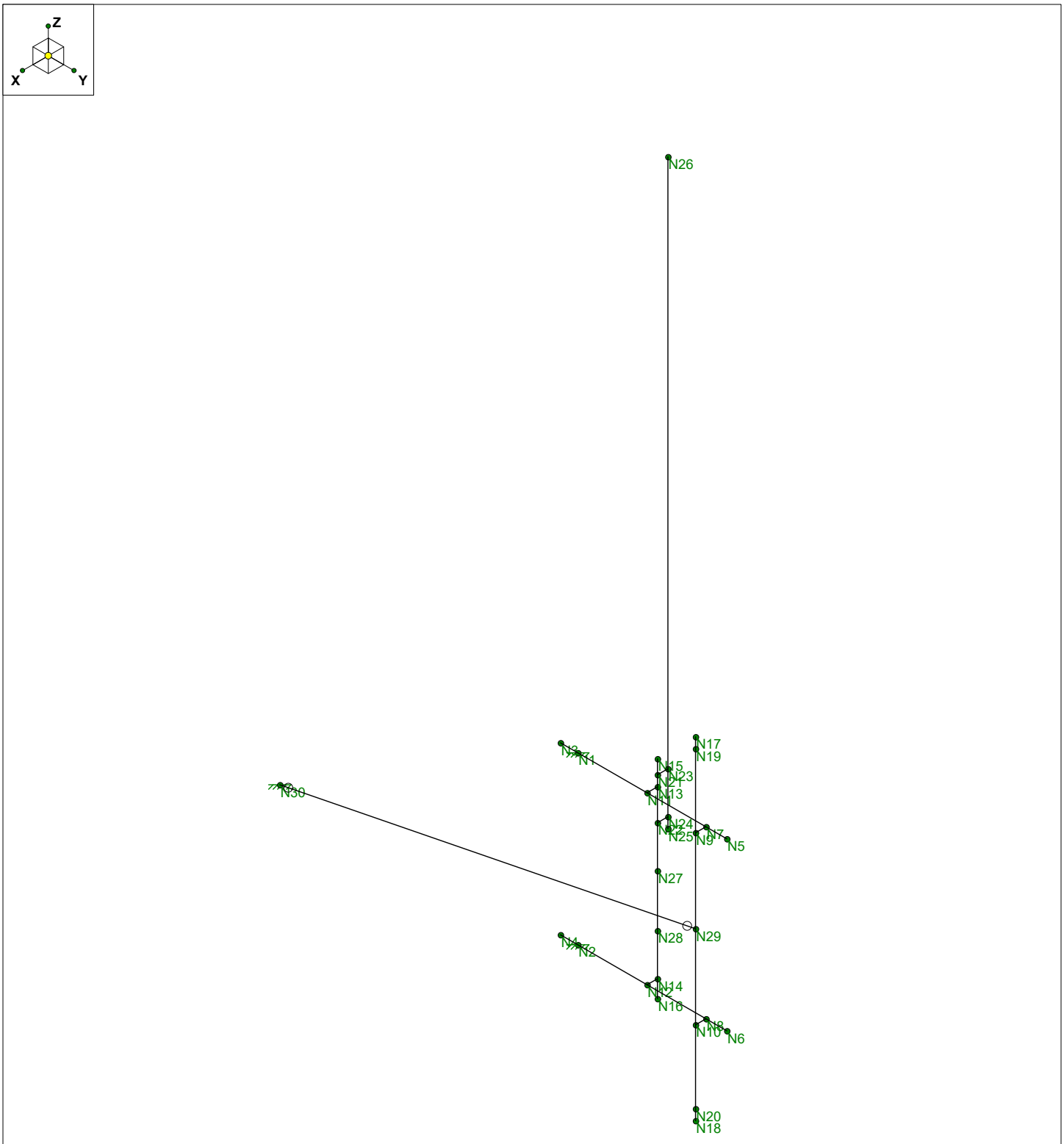
Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Proterra/Destek Engineeri...		SK - 6
MAZ	CT11277A	Aug 23, 2019 at 4:49 PM
1978011		1978011 - CT11277A Conditional ...



Envelope Only Solution

Proterra/Destek Engineeri...	CT11277A	SK - 7
MAZ		Aug 23, 2019 at 4:50 PM
1978011		1978011 - CT11277A Conditional ...



Envelope Only Solution

Proterra/Destek Engineeri...		SK - 8
MAZ	CT11277A	Aug 23, 2019 at 4:50 PM
1978011		1978011 - CT11277A Conditional ...

(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 (in/sec^2)	386.4
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Z
Global Member Orientation Plane	XY
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 13th(360-05): ASD
Cold Formed Steel Code	AISI NAS-01: ASD
Wood Code	AF&PA NDS-05/08: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-05
Masonry Code	ACI 530-05: ASD
Aluminum Code	AA ADM1-05: ASD - Building
	AISC 14th(360-10): ASD

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 7-05
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	Yes
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	Not Entered
Occupancy 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

Project Grid Lines

	Label	Start X [in]	End X [in]	Start Y [in]	End Y [in]	Start Bubble	End Bubble
No Data to Print ...							

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E...	Density[k/ft...	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	65	1.1
3	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	HR1	W4x13	Beam	Wide Flange	A36 Gr.36	Typical	3.83	3.86	11.3	.151

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M3	N9	N7			RIGID	None	None	RIGID	Typical
2	M4	N10	N8			RIGID	None	None	RIGID	Typical
3	M5	N12	N14			RIGID	None	None	RIGID	Typical
4	M6	N11	N13			RIGID	None	None	RIGID	Typical
5	M9	N21	N23			RIGID	None	None	RIGID	Typical
6	M10	N22	N24			RIGID	None	None	RIGID	Typical
7	M11	N26	N25			PIPE_3.0	Beam	Wide Flange	A53 Gr.B	Typical
8	M8	N17	N18			PIPE_2.5	Beam	Wide Flange	A53 Gr.B	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
9	M1	N3	N5			PIPE_2.0	Beam	Wide Flange	A53 Gr.B	Typical
10	M2	N4	N6			PIPE_2.0	Beam	Wide Flange	A53 Gr.B	Typical
11	M7	N15	N16			PIPE_2.0	Beam	Wide Flange	A53 Gr.B	Typical
12	M12	N29	N30			PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Analysis ...	Inactive	Seismic Design ...
1	M3						Yes			None
2	M4						Yes			None
3	M5						Yes			None
4	M6						Yes			None
5	M9						Yes			None
6	M10						Yes			None
7	M11						Yes		Exclude	None
8	M8						Yes			None
9	M1						Yes			None
10	M2						Yes			None
11	M7						Yes			None
12	M12	BenPIN	BenPIN				Yes			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torq...	Kyy	Kzz	Cb	Function
1	M11	PIPE_3.0	168			Lbyy						Lateral
2	M8	PIPE_2.5	96			Lbyy						Lateral
3	M1	PIPE_2.0	48			Lbyy						Lateral
4	M2	PIPE_2.0	48			Lbyy						Lateral
5	M7	PIPE_2.0	60			Lbyy						Lateral
6	M12	PIPE_2.0	98.955			Lbyy						Lateral

Joint Coordinates and Temperatures

	Label	X [in]	Y [in]	Z [in]	Temp [F]	Detach From Diap...
1	N1	0	0	0	0	
2	N2	0	0	-48	0	
3	N3	0	-5	0	0	
4	N4	0	-5	-48	0	
5	N5	0	43	0	0	
6	N6	0	43	-48	0	
7	N7	0	37	0	0	
8	N8	0	37	-48	0	
9	N9	3	37	0	0	
10	N10	3	37	-48	0	
11	N11	0	20	0	0	
12	N12	0	20	-48	0	
13	N13	-3	20	0	0	
14	N14	-3	20	-48	0	
15	N15	-3	20	7	0	
16	N16	-3	20	-53	0	
17	N17	3	37	24	0	
18	N18	3	37	-72	0	
19	N19	3	37	21	0	
20	N20	3	37	-69	0	
21	N21	-3	20	3	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [in]	Y [in]	Z [in]	Temp [F]	Detach From Diap...
22	N22	-3	20	-9	0	
23	N23	-6	20	3	0	
24	N24	-6	20	-9	0	
25	N25	-6	20	-12	0	
26	N26	-6	20	156	0	
27	N27	-3	20	-21	0	
28	N28	-3	20	-36	0	
29	N29	3	37	-24	0	
30	N30	27	-59	-24	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	N2	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N30	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	DEAD LOAD	None			-1	4				
2	DEAD LOAD ICE	None				4		6		
3	WIND LOAD (NO ICE) FRONT	None				4		6		
4	WIND LOAD (NO ICE) SIDE	None				4		6		
5	WIND LOAD (ICE) FRONT	None				4		6		
6	WIND LOAD (ICE) SIDE	None				4		6		
7	LIVE LOAD 1	None				1				
8	LIVE LOAD 2	None				1				
9	LIVE LOAD 3	None								
10	MAINTENANCE LOAD 1	None				1				
11	MAINTENANCE LOAD 2	None				1				
12	MAINTENANCE LOAD 3	None								
13	MAINTENANCE LOAD 4	None								

Joint Loads and Enforced Displacements (BLC 1 : DEAD LOAD)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
1	N19	L	Z	-102
2	N20	L	Z	-102
3	N27	L	Z	-47
4	N28	L	Z	-47

Joint Loads and Enforced Displacements (BLC 2 : DEAD LOAD ICE)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
1	N19	L	Z	-345
2	N20	L	Z	-345
3	N27	L	Z	-85
4	N28	L	Z	-85

Joint Loads and Enforced Displacements (BLC 3 : WIND LOAD (NO ICE) FRONT)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
1	N19	L	Y	260
2	N20	L	Y	260
3	N27	L	Y	45

Joint Loads and Enforced Displacements (BLC 3 : WIND LOAD (NO ICE) FRONT) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
4	N28	L	Y	45

Joint Loads and Enforced Displacements (BLC 4 : WIND LOAD (NO ICE) SIDE)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
1	N19	L	X	129
2	N20	L	X	129
3	N27	L	X	20
4	N28	L	X	20

Joint Loads and Enforced Displacements (BLC 5 : WIND LOAD (ICE) FRONT)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
1	N19	L	Y	86
2	N20	L	Y	86
3	N27	L	Y	19
4	N28	L	Y	19

Joint Loads and Enforced Displacements (BLC 6 : WIND LOAD (ICE) SIDE)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
1	N19	L	X	51
2	N20	L	X	51
3	N27	L	X	11
4	N28	L	X	11

Joint Loads and Enforced Displacements (BLC 7 : LIVE LOAD 1)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
1	N6	L	Z	-250

Joint Loads and Enforced Displacements (BLC 8 : LIVE LOAD 2)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
1	N4	L	Z	-250

Joint Loads and Enforced Displacements (BLC 10 : MAINTENANCE LOAD 1)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
1	N18	L	Z	-500

Joint Loads and Enforced Displacements (BLC 11 : MAINTENANCE LOAD 2)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
1	N16	L	Z	-500

Member Point Loads

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

Member Distributed Loads (BLC 2 : DEAD LOAD ICE)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,...	Start Location[in,%]	End Location[in,%]
1	M11	Z	-16	-16	0	0
2	M8	Z	-15	-15	0	0
3	M1	Z	-13	-13	0	0
4	M2	Z	-13	-13	0	0
5	M7	Z	-13	-13	0	0

Member Distributed Loads (BLC 2 : DEAD LOAD ICE) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,...	Start Location[in,%]	End Location[in,%]
6	M12	Z	-13	-13	0	0

Member Distributed Loads (BLC 3 : WIND LOAD (NO ICE) FRONT)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,...	Start Location[in,%]	End Location[in,%]
1	M11	PY	9	9	0	0
2	M8	PY	7	7	0	0
3	M1	PY	6	6	0	0
4	M2	PY	6	6	0	0
5	M7	PY	6	6	0	0
6	M12	PY	6	6	0	0

Member Distributed Loads (BLC 4 : WIND LOAD (NO ICE) SIDE)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,...	Start Location[in,%]	End Location[in,%]
1	M11	PX	9	9	0	0
2	M8	PX	7	7	0	0
3	M1	PX	6	6	0	0
4	M2	PX	6	6	0	0
5	M7	PX	6	6	0	0
6	M12	PX	6	6	0	0

Member Distributed Loads (BLC 5 : WIND LOAD (ICE) FRONT)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,...	Start Location[in,%]	End Location[in,%]
1	M11	PY	8.3	8.3	0	0
2	M8	PY	7.7	7.7	0	0
3	M1	PY	7.2	7.2	0	0
4	M2	PY	7.2	7.2	0	0
5	M7	PY	7.2	7.2	0	0
6	M12	PY	7.2	7.2	0	0

Member Distributed Loads (BLC 6 : WIND LOAD (ICE) SIDE)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,...	Start Location[in,%]	End Location[in,%]
1	M11	PX	8.3	8.3	0	0
2	M8	PX	7.7	7.7	0	0
3	M1	PX	7.2	7.2	0	0
4	M2	PX	7.2	7.2	0	0
5	M7	PX	7.2	7.2	0	0
6	M12	PX	7.2	7.2	0	0

Member Area Loads

Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
No Data to Print ...						

Load Combinations

	Description	So..	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..
1	DL + WL (NO ICE) 0 ...	Yes	Y		1	1.2			3	1.6																
2	DL + WL (NO ICE) 30 ...	Yes	Y		1	1.2			3	1.3...	4	.8														
3	DL + WL (NO ICE) 60 ...	Yes	Y		1	1.2			3	.8	4	1.3...														
4	DL + WL (NO ICE) 90 ...	Yes	Y		1	1.2					4	1.6														
5	DL + WL (NO ICE) 12...	Yes	Y		1	1.2			3	-.8	4	1.3...														
6	DL + WL (NO ICE) 15...	Yes	Y		1	1.2			3	-1.3...	4	.8														
7	DL + WL (NO ICE) 18...	Yes	Y		1	1.2			3	-1.6																
8	DL + WL (NO ICE) 21...	Yes	Y		1	1.2			3	-1.3...	4	-.8														

Load Combinations (Continued)

	Description	So..	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
9	DL + WL (NO ICE) 24...	Yes	Y		1	1.2			3	-.8	4	-1.3...														
10	DL + WL (NO ICE) 27...	Yes	Y		1	1.2					4	-1.6														
11	DL + WL (NO ICE) 30...	Yes	Y		1	1.2			3	.8	4	-1.3...														
12	DL + WL (NO ICE) 33...	Yes	Y		1	1.2			3	1.3...	4	-.8														
13	DL + DL ICE + WL (IC...	Yes	Y		1	1.2	2	1	5	1																
14	DL + DL ICE + WL (IC...	Yes	Y		1	1.2	2	1	5	.866	6	.5														
15	DL + DL ICE + WL (IC...	Yes	Y		1	1.2	2	1	5	.5	6	.866														
16	DL + DL ICE + WL (IC...	Yes	Y		1	1.2	2	1			6	1														
17	DL + DL ICE + WL (IC...	Yes	Y		1	1.2	2	1	5	-.5	6	.866														
18	DL + DL ICE + WL (IC...	Yes	Y		1	1.2	2	1	5	-.866	6	.5														
19	DL + DL ICE + WL (IC...	Yes	Y		1	1.2	2	1	5	-1																
20	DL + DL ICE + WL (IC...	Yes	Y		1	1.2	2	1	5	-.866	6	-.5														
21	DL + DL ICE + WL (IC...	Yes	Y		1	1.2	2	1	5	-.5	6	-.866														
22	DL + DL ICE + WL (IC...	Yes	Y		1	1.2	2	1			6	-1														
23	DL + DL ICE + WL (IC...	Yes	Y		1	1.2	2	1	5	.5	6	-.866														
24	DL + DL ICE + WL (IC...	Yes	Y		1	1.2	2	1	5	.866	6	-.5														
25	DEAD LOAD + LIVE L...	Yes	Y		1	1.2					7	1.5														
26	DEAD LOAD + LIVE L...	Yes	Y		1	1.2					8	1.5														
27	DEAD LOAD + LIVE L...	Yes	Y		1	1.2					9	1.5														
28	DL + MAIN L1+30MP...	Yes	Y		1	1.2	10	1.5	3	.104																
29	DL + MAIN L2+30MP...	Yes	Y		1	1.2	11	1.5	3	.104																
30	DL + MAIN L3+30MP...	Yes	Y		1	1.2	12	1.5	3	.104																
31	DL + MAIN L4+30MP...	Yes	Y		1	1.2	13	1.5	3	.104																
32	DL + MAIN L1+30MP...	Yes	Y		1	1.2	10	1.5	4	.104																
33	DL + MAIN L2+30MP...	Yes	Y		1	1.2	11	1.5	4	.104																
34	DL + MAIN L3+30MP...	Yes	Y		1	1.2	12	1.5	4	.104																
35	DL + MAIN L4+30MP...	Yes	Y		1	1.2	13	1.5	4	.104																
36	DL + MAIN L1+30MP...	Yes	Y		1	1.2	10	1.5	3	-.104																
37	DL + MAIN L2+30MP...	Yes	Y		1	1.2	11	1.5	3	-.104																
38	DL + MAIN L3+30MP...	Yes	Y		1	1.2	12	1.5	3	-.104																
39	DL + MAIN L4+30MP...	Yes	Y		1	1.2	13	1.5	3	-.104																
40	DL + MAIN L1+30MP...	Yes	Y		1	1.2	10	1.5	4	-.104																
41	DL + MAIN L2+30MP...	Yes	Y		1	1.2	11	1.5	4	-.104																
42	DL + MAIN L3+30MP...	Yes	Y		1	1.2	12	1.5	4	-.104																
43	DL + MAIN L4+30MP...	Yes	Y		1	1.2	13	1.5	4	-.104																

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	675.387	10	951.841	8	1198.034	17	1.193	16	.347	10	1.042	4
2		min	-672.15	4	-1353.122	2	32.442	11	.128	10	-.337	4	-1.032	10
3	N2	max	35.88	16	916.336	22	1127.85	23	1.21	24	.096	5	.295	5
4		min	-38.445	33	-399.274	3	14.836	5	.058	6	-.099	11	-.315	11
5	N30	max	282.431	10	962.841	4	71.411	22	.006	4	.023	10	0	1
6		min	-277.625	4	-970.031	10	16.545	3	-.006	10	-.024	4	0	1
7	Totals:	max	969.584	10	1334.4	7	2097.218	17						
8		min	-969.584	4	-1334.399	1	617.018	11						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation ...	LC	Y Rotation ...	LC	Z Rotation [...	LC
1	N1	max	0	4	0	2	0	11	0	10	0	4	0	10
2		min	0	10	0	8	0	17	0	16	0	10	0	4
3	N2	max	0	33	0	3	0	5	0	6	0	11	0	11
4		min	0	16	0	22	0	23	0	24	0	5	0	5
5	N3	max	0	4	0	2	0	32	2.049e-06	21	0	4	1.146e-06	4

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation ...	LC	Y Rotation ...	LC	Z Rotation [...	LC
6		min	0	10	0	8	0	20	4.971e-07	32	0	10	-1.146e-06	10
7	N4	max	0	4	0	3	0	28	3.227e-04	26	0	11	1.146e-06	4
8		min	0	10	0	22	-.001	26	4.971e-07	28	0	5	-1.146e-06	10
9	N5	max	.287	4	.002	2	.004	6	2.895e-03	5	6.278e-03	4	7.512e-03	11
10		min	-.283	10	-.001	8	-.194	24	-3.92e-03	11	-5.879e-03	10	-7.447e-03	5
11	N6	max	.186	5	0	3	-.015	9	2.612e-03	11	2.305e-03	11	6.546e-03	11
12		min	-.195	11	-.001	9	-.189	14	-3.544e-03	5	-1.854e-03	5	-6.476e-03	5
13	N7	max	.246	4	.002	2	-.013	6	2.896e-03	5	6.278e-03	4	7.51e-03	11
14		min	-.242	10	-.001	8	-.178	13	-3.919e-03	11	-5.879e-03	10	-7.445e-03	5
15	N8	max	.147	5	0	3	-.016	8	2.613e-03	11	2.305e-03	11	6.545e-03	11
16		min	-.156	11	-.001	9	-.176	14	-3.544e-03	5	-1.854e-03	5	-6.474e-03	5
17	N9	max	.246	4	.023	11	-.015	8	2.896e-03	5	6.278e-03	4	7.51e-03	11
18		min	-.242	10	-.022	5	-.18	14	-3.919e-03	11	-5.879e-03	10	-7.445e-03	5
19	N10	max	.147	5	.019	11	-.016	8	2.613e-03	11	2.305e-03	11	6.545e-03	11
20		min	-.156	11	-.019	5	-.18	14	-3.544e-03	5	-1.854e-03	5	-6.474e-03	5
21	N11	max	.114	4	.001	2	-.01	9	8.601e-04	7	5.798e-03	4	7.868e-03	10
22		min	-.111	10	0	8	-.1	14	-5.323e-03	13	-5.974e-03	10	-8.146e-03	4
23	N12	max	.048	5	0	3	-.006	6	-2.904e-04	7	1.696e-03	11	5.151e-03	11
24		min	-.052	11	0	22	-.101	24	-4.733e-03	13	-1.649e-03	5	-4.741e-03	5
25	N13	max	.114	4	.025	4	-.012	6	8.601e-04	7	5.798e-03	4	7.868e-03	10
26		min	-.111	10	-.024	10	-.099	24	-5.323e-03	13	-5.974e-03	10	-8.146e-03	4
27	N14	max	.048	5	.014	5	-.011	6	-2.904e-04	7	1.696e-03	11	5.151e-03	11
28		min	-.052	11	-.016	11	-.099	24	-4.733e-03	13	-1.649e-03	5	-4.741e-03	5
29	N15	max	.158	4	.044	14	-.012	6	2.155e-03	7	6.39e-03	4	7.749e-03	10
30		min	-.157	10	-.024	9	-.099	24	-5.154e-03	13	-6.564e-03	10	-7.969e-03	4
31	N16	max	.056	5	.01	5	-.011	6	-2.915e-04	7	1.697e-03	11	5.151e-03	11
32		min	-.06	11	-.03	23	-.099	24	-4.732e-03	13	-1.65e-03	5	-4.741e-03	5
33	N17	max	.421	4	.151	12	-.015	8	5.167e-03	6	7.701e-03	4	7.51e-03	11
34		min	-.407	10	-.127	6	-.181	14	-6.173e-03	12	-7.302e-03	10	-7.445e-03	5
35	N18	max	.213	5	.114	12	-.016	8	4.709e-03	12	3.53e-03	11	6.545e-03	11
36		min	-.232	11	-.137	6	-.181	14	-5.653e-03	6	-3.079e-03	5	-6.474e-03	5
37	N19	max	.398	4	.133	12	-.015	8	5.167e-03	6	7.701e-03	4	7.51e-03	11
38		min	-.386	10	-.111	6	-.181	14	-6.173e-03	12	-7.301e-03	10	-7.445e-03	5
39	N20	max	.204	5	.1	12	-.016	8	4.709e-03	12	3.529e-03	11	6.545e-03	11
40		min	-.222	11	-.12	6	-.181	14	-5.653e-03	6	-3.079e-03	5	-6.474e-03	5
41	N21	max	.132	4	.028	4	-.012	6	2.155e-03	7	6.39e-03	4	7.749e-03	10
42		min	-.131	10	-.021	9	-.099	24	-5.154e-03	13	-6.564e-03	10	-7.969e-03	4
43	N22	max	.06	4	.024	5	-.012	6	1.215e-03	7	5.876e-03	4	7.594e-03	10
44		min	-.057	10	-.036	11	-.099	24	-3.406e-03	13	-6.019e-03	10	-7.883e-03	4
45	N23	max	.132	4	.052	4	.002	5	2.155e-03	7	6.39e-03	4	7.749e-03	10
46		min	-.131	10	-.044	10	-.107	23	-5.154e-03	13	-6.564e-03	10	-7.969e-03	4
47	N24	max	.06	4	.046	5	.002	5	1.215e-03	7	5.876e-03	4	7.594e-03	10
48		min	-.057	10	-.057	11	-.107	23	-3.406e-03	13	-6.019e-03	10	-7.883e-03	4
49	N25	max	.043	4	.047	5	.002	5	1.215e-03	7	5.876e-03	4	7.594e-03	10
50		min	-.038	10	-.061	11	-.107	23	-3.406e-03	13	-6.019e-03	10	-7.883e-03	4
51	N26	max	2.369	4	1.871	1	.002	5	1.309e-02	7	1.736e-02	4	7.749e-03	10
52		min	-2.393	10	-1.585	7	-.107	23	-1.491e-02	1	-1.754e-02	10	-7.969e-03	4
53	N27	max	.021	4	.025	6	-.011	6	2.256e-03	24	1.214e-03	4	6.757e-03	10
54		min	-.018	10	-.035	12	-.099	24	-3.159e-04	6	-9.877e-04	10	-6.818e-03	4
55	N28	max	.027	5	.021	5	-.011	6	1.617e-03	13	1.798e-03	11	5.72e-03	11
56		min	-.029	11	-.014	11	-.099	24	-5.662e-04	6	-1.495e-03	5	-5.542e-03	5
57	N29	max	.143	5	.032	5	-.016	8	8.925e-04	14	2.259e-03	4	7.027e-03	11
58		min	-.144	11	-.033	11	-.18	14	5.77e-05	8	-2.03e-03	10	-6.959e-03	5
59	N30	max	0	4	0	10	0	3	0	10	0	4	0	1
60		min	0	10	0	4	0	22	0	4	0	10	0	1

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

	Member	Shape	Code C...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-...	phi*Mn z-...	Cb	Eqn
1	M8	PIPE_2.5	.271	48	10	.060	48		4	30038.461	50715	3.596	3.596	1....	H1-1b
2	M1	PIPE_2.0	.717	5	16	.290	5		4	26521.424	32130	1.872	1.872	1....	H1-1b
3	M2	PIPE_2.0	.665	5	24	.146	25		14	26521.424	32130	1.872	1.872	1....	H1-1b
4	M7	PIPE_2.0	.486	55	13	.133	6.875		6	23808.54	32130	1.872	1.872	2....	H1-1b
5	M12	PIPE_2.0	.098	49.477	16	.019	0		4	14217.613	32130	1.872	1.872	1....	H1-1b

Exhibit E

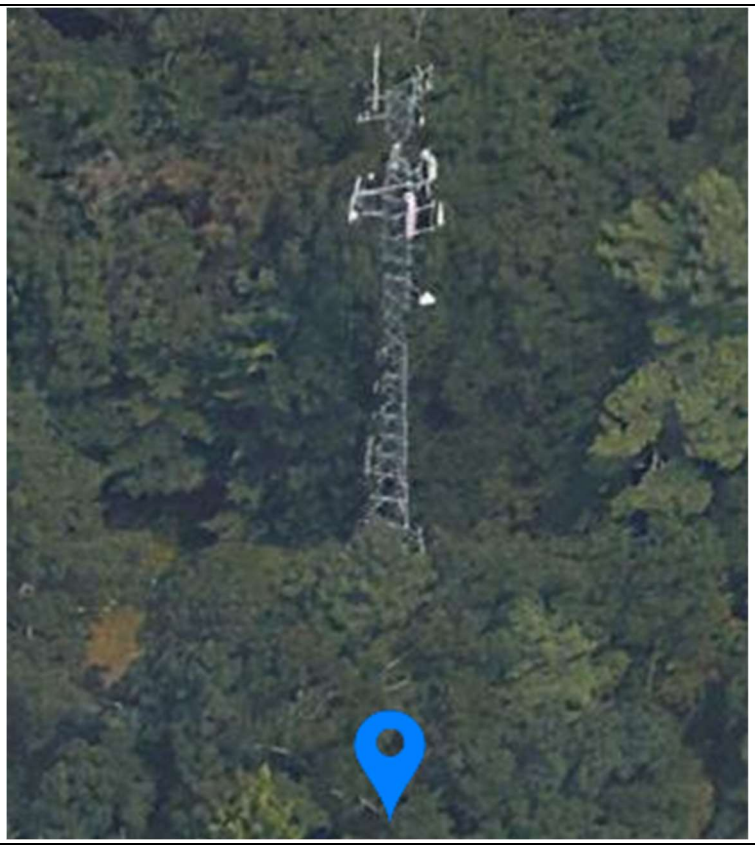
Power Density/RF Emissions Report

Radio Frequency Emissions Analysis Report

T-Mobile Wireless Self Support Tower Facility

May 27, 2021

Analysis Format: Theoretical Calculations



Sign Count	
	1
	0
	1
	0
	1

Statement of Compliance

T-Mobile will be compliant with FCC Regulations once the mitigation measures recommended in this report are implemented.

CT11277A
Simsbury-3/RT 10
871 Hopmeadow Rd., Simsbury, CT 06070

Contents

Overview

Centerline Communications, LLC ("Centerline") has been contracted to provide a Radio Frequency (RF) Analysis for the following T-Mobile wireless self support tower facility to determine whether the facility is in compliance with federal standards and regulations regarding RF emissions. This analysis includes theoretical emissions calculations for all existing equipment for T-Mobile .

The facility is located on a self support tower in Simsbury, Connecticut. Access to the facility is restricted to authorized personnel and facility management.

Analysis Site Data

Site ID:	CT11277A
Site Name:	Simsbury-3/RT 10
Site Address:	871 Hopmeadow Rd., Simsbury, CT 06070
Site Latitude:	41.878432
Site Longitude:	-72.80236
Facility Type:	Self Support Tower

Compliance Summary

Status:	T-Mobile will be compliant with FCC Regulations Upon Installation of Signage
Site Modeled Composite MPE% (General Public Limit):	0.12 %
T-Mobile Max Modeled MPE% (General Public Limit):	0.05 %
Lock or Control Measures if Present:	Unknown

In addition to the T-Mobile antennas and radio equipment there are antennas and radio equipment for AT&T and Unknown Carrier(s) which have been included in this analysis as part of the overall site compliance determination.

*To be conservative, all sites are considered uncontrolled for modeling purposes unless confirmed otherwise by a site visit.

FCC Guidelines

All power density values used in this report were 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 public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 600, 700, and 800 MHz Bands is approximately 400 $\mu W/cm^2$, 467 $\mu W/cm^2$, and 567 $\mu W/cm^2$ respectively, and the general population exposure limit for the 1900 MHz PCS, 2100 MHz AWS, 2500 MHz, 3500 MHz CBRS, 5000 MHz LAA, 28GHz, and 39GHz 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. Reference the Site Antenna Data Table for list of frequencies in operation at this site.

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, have been properly trained in RF safety 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, have been trained in RF safety and can exercise control over his or her exposure by leaving the area or by some other appropriate means. The Occupational/Controlled exposure limits all utilized frequency bands is five (5) times the FCC's General Public / Uncontrolled exposure limit.

Additional details can be found in FCC OET 65.

Calculation Methodology & Data

Centerline has performed theoretical calculations on all transmission equipment located on this facility. All calculations have been performed using the RoofMaster® software from Waterford Consultants LLC. This software performs calculations using a cylindrical model for very conservative power density predictions within the near-field of the antenna where the antenna pattern has not truly formed yet. Within this area power density values tend to decrease based upon an inverse distance function. At the point where it is appropriate for modeling to change from near-field calculations to far-field calculations the power decreases inversely with the square of the distance. This modeling technique is accurate with low antenna centerlines, such as rooftops, where persons can get close to the antennas and pass through fields in close proximity.

The below calculation in Figure 1 shows the theoretical distribution of power over an imaginary cylinder with equal power distribution in all directions.

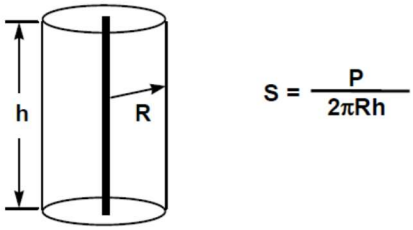


Figure 1: Distribution of power over an imaginary cylinder in all directions

This model can be modified for directional antennas to show directionality of power distribution. This formula will tend to be conservative as it assumes that all power is focused between the 3 dB power roll off points as shown in Figure 2.

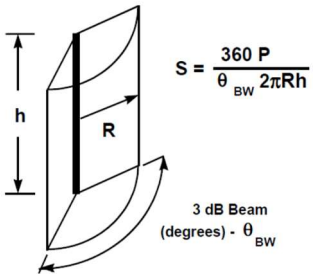


Figure 2: Distribution of power over an imaginary cylinder in all directions inside the half power roll off points (HBW)

The **proposed antenna configuration** for T-Mobile and any other known wireless carriers at this facility are shown below in **Table 1 – Site Antenna Data Table**.

All calculations for this facility were performed assuming that all radios were running at full power and were uncombined in their RF paths with the configuration shown in table 1. FCC OET Bulletin 65 – Edition 97-01 recommends that modeling of this nature should be done as described prior to yield a worst-case scenario. Due to the dynamic nature of many deployed systems the "real world" values will most likely be less than those shown in this report due to worst-case values being shown in all instances.

For all "Other" systems on this facility, exact equipment was used if available. In instances where "Other" system equipment was not available, standard radio configurations for these systems were utilized based upon prior experience with these systems on facilities in this area.

Site Antenna Data Table

Sector	Operator	Frequency Band	TX Power Per Channel	Tx #	ERP	Antenna Make	Antenna Model	Gain (dBd)	Az (°)	Antenna Centerline Height (ft)	Z Value (ft)**
A1	T-Mobile	L700	40	4	3707.83	RFS	APXVAALL24 43-U-NA20	13.65	30	138	134.00
A1	T-Mobile	L600	40	2	1577.94	RFS	APXVAALL24 43-U-NA20	12.95	30	138	134.00
A1	T-Mobile	N600	30	2	1183.45	RFS	APXVAALL24 43-U-NA20	12.95	30	138	134.00
A1	T-Mobile	L1900	40	4	5612.03	RFS	APXVAALL24 43-U-NA20	15.45	30	138	134.00
A1	T-Mobile	G1900	15	1	526.13	RFS	APXVAALL24 43-U-NA20	15.45	30	138	134.00
A1	T-Mobile	L2100	40	4	7065.13	RFS	APXVAALL24 43-U-NA20	16.45	30	138	134.00
B2	T-Mobile	L700	40	4	3707.83	RFS	APXVAALL24 43-U-NA20	13.65	200	138	134.00
B2	T-Mobile	L600	40	2	1577.94	RFS	APXVAALL24 43-U-NA20	12.95	200	138	134.00
B2	T-Mobile	N600	30	2	1183.45	RFS	APXVAALL24 43-U-NA20	12.95	200	138	134.00
B2	T-Mobile	L1900	40	4	5612.03	RFS	APXVAALL24 43-U-NA20	15.45	200	138	134.00
B2	T-Mobile	G1900	15	1	526.13	RFS	APXVAALL24 43-U-NA20	15.45	200	138	134.00
B2	T-Mobile	L2100	40	4	7065.13	RFS	APXVAALL24 43-U-NA20	16.45	200	138	134.00
C3	T-Mobile	L700	40	4	3707.83	RFS	APXVAALL24 43-U-NA20	13.65	290	138	134.00
C3	T-Mobile	L600	40	2	1577.94	RFS	APXVAALL24 43-U-NA20	12.95	290	138	134.00
C3	T-Mobile	N600	30	2	1183.45	RFS	APXVAALL24 43-U-NA20	12.95	290	138	134.00
C3	T-Mobile	L1900	40	4	5612.03	RFS	APXVAALL24 43-U-NA20	15.45	290	138	134.00
C3	T-Mobile	G1900	15	1	526.13	RFS	APXVAALL24 43-U-NA20	15.45	290	138	134.00
C3	T-Mobile	L2100	40	4	7065.13	RFS	APXVAALL24 43-U-NA20	16.45	290	138	134.00
4	AT&T	850	40	1	545.83	KATHREIN	80010121	11.35	90	117	114.73
5	AT&T	1900	60	2	3582.46	CCI	HPA-65R-BUU-H8	14.75	90	117	113.13
5	AT&T	700	30	2	1297.63	CCI	HPA-65R-BUU-H8	13.35	90	117	113.13
6	AT&T	850	40	4	4356.32	CCI	HPA-65R-BUU-H8	14.35	90	117	113.13
7	AT&T	700	40	2	1730.17	CCI	HPA-65R-BUU-H8	13.35	90	117	113.13
7	AT&T	850	40	2	2178.16	CCI	HPA-65R-BUU-H8	14.35	90	117	113.13
7	AT&T	2300	25	4	3273.41	CCI	HPA-65R-BUU-H8	15.15	90	117	113.13
8	AT&T	850	40	1	545.83	KATHREIN	80010121	11.35	200	117	114.73
9	AT&T	1900	60	2	3665.91	CCI	HPA-65R-BUU-H8	14.85	200	117	113.13
9	AT&T	700	30	2	1297.63	CCI	HPA-65R-BUU-H8	13.35	200	117	113.13
10	AT&T	850	40	4	4356.32	CCI	HPA-65R-BUU-H8	14.35	200	117	113.13
11	AT&T	700	40	2	1730.17	CCI	HPA-65R-BUU-H8	13.35	200	117	113.13
11	AT&T	2300	40	2	2618.73	CCI	HPA-65R-BUU-H8	15.15	200	117	113.13
12	AT&T	850	25	4	1364.58	KATHREIN	80010121	11.35	320	117	114.73
13	AT&T	1900	60	2	3665.91	CCI	HPA-65R-BUU-H8	14.85	320	117	113.13
13	AT&T	700	30	2	1297.63	CCI	HPA-65R-BUU-H8	13.35	320	117	113.13
14	AT&T	850	40	4	4356.32	CCI	HPA-65R-BUU-H8	14.35	320	117	113.13
15	AT&T	700	40	2	1730.17	CCI	HPA-65R-BUU-H8	13.35	320	117	113.13
15	AT&T	850	40	2	2178.16	CCI	HPA-65R-BUU-H8	14.35	320	117	113.13
15	AT&T	2300	25	4	3273.41	CCI	HPA-65R-BUU-H8	15.15	320	117	113.13

16	Unknown	2100	8	1	15.42	GENERIC	OMNI 2’	2.85	0	110.7	110.37
17	Unknown	450	25	1	98.61	GENERIC	OMNI 20’	5.96	0	108.3	103.55
18	Unknown	450	0.6	1	20.10	Carrier	Yagi 3’	15.25	180	101.5	101.50
19	Unknown	18000	0.1	1	495.45	GENERIC	MICROWAVE	36.95	30	101.3	100.30
20	Unknown	450	0.6	1	20.10	Carrier	Yagi 3’	15.25	270	88.5	88.50
21	Unknown	450	25	1	98.61	GENERIC	OMNI 23’ 8”	5.96	0	88.5	83.75
22	Unknown	150	25	1	198.58	GENERIC	OMNI 6’	9	0	54.5	52.50
23	Unknown	450	25	1	98.61	GENERIC	OMNI 14’	5.96	0	138	133.25
24	Unknown	450	25	1	98.61	GENERIC	OMNI 14’	5.96	0	138	133.25
25	Unknown	450	25	1	98.61	GENERIC	OMNI 10’	5.96	0	138	133.25

*Table 1: Total Site Antenna data table **(Z Value is distance from bottom of antenna to walking surface)*

Results

All calculations performed based upon the data listed for this facility have produced results that are within allowable limits for General Population for exposure to RF emissions as specified by federal standards.

T-Mobile's RF Exposure: Responsibilities, Procedures & Guidelines document states that microwave dishes are compliant if they are mounted 20 feet or greater above any accessible walking or working surface.

Maximum Predicted MPE Level on Site:	% of MPE Limit:	Location:
Accessible **General Population** MPE Limits:	**0.05%**	**Sector A**
Accessible **Occupational** MPE Limits:	**0.01%**	

Ground Level Assessment:	% of MPE Limit:
Ground Level **General Population** MPE Limits:	**0.12%**
Ground Level **Occupational** MPE Limits:	**0.02%**

Sector A: Transmitting over Ground	% of MPE Limit:	*Distance from Antenna:
Accessible **General Population** MPE Limits:	**0.05%**	**0'**
Accessible **Occupational** MPE Limits:	**0.01%**	**0'**

Sector B: Transmitting over Ground	% of MPE Limit:	*Distance from Antenna:
Accessible **General Population** MPE Limits:	**0.05%**	**0'**
Accessible **Occupational** MPE Limits:	**0.01%**	**0'**

Sector C: Transmitting over Ground	% of MPE Limit:	*Distance from Antenna:
Accessible **General Population** MPE Limits:	**0.05%**	**0'**
Accessible **Occupational** MPE Limits:	**0.01%**	**0'**

**Distance from Antenna is the distance in feet that the MPE limits are exceeded from the front face of the antenna, outward across an accessible area.*

APPENDIX A: Emissions Thresholds for Walking Surfaces and Signage

Ground (0ft.) T-Mobile

Emissions Thresholds for Walking Surfaces for:

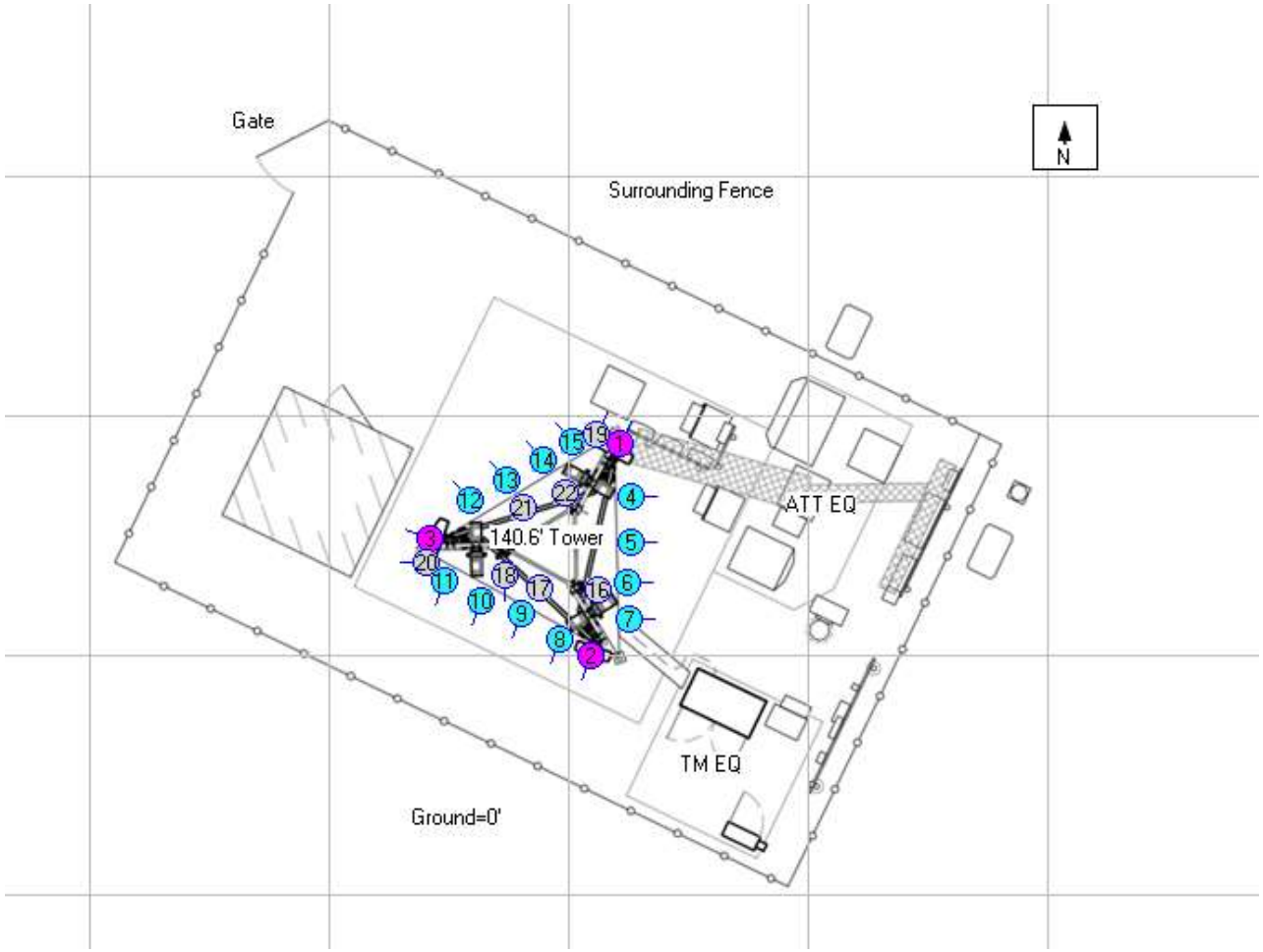
CT11277A / Simsbury-3/RT 10

Ground (0ft.) Composite

Emissions Thresholds for Walking Surfaces for:

CT11277A / Simsbury-3/RT 10

Access/Tower Base



Existing Item

Proposed Item

Signage Count									
	1		0		1		0		1

Signage Diagram

Signage for:

CT11277A/ Simsbury-3/RT 10

Compliance Actions

Access	• Install (1) Guideline sign at the base of the tower. • Install (1) Caution sign at the base of the tower. • Install (1) 911 Emergency sign at the base of the tower.
Alpha Sector	• No Action Needed.
Beta Sector	• No Action Needed.
Gamma Sector	• No Action Needed.
Notes:	• If there is a fixed climbing point located on this site, a Guideline, 911 Emergency sign and Caution sign should be installed at that location.

APPENDIX B: RF Signage Description Table

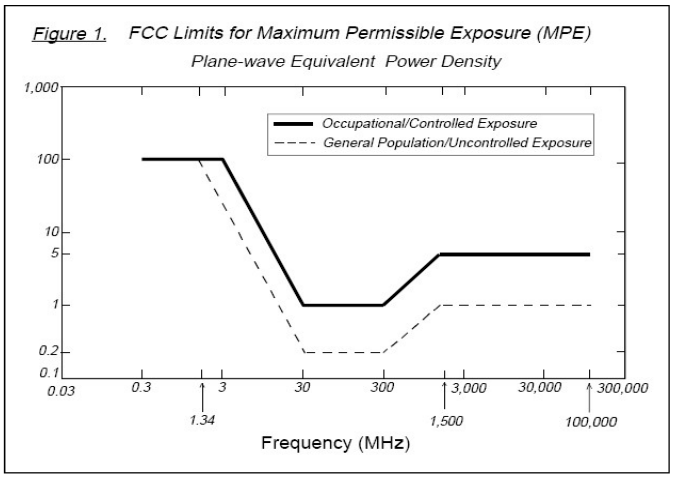
Sign	Description
	**RF Guideline Sign** Gives guidelines on how to proceed in areas that may exceed either the FCC's General Population or Occupational emissions limits.
 	**Blue Notice Sign** Used to inform individuals that they are entering an area that may exceed the FCC's General Population limits. Must be placed anywhere the public can get within 30 feet vertically or horizontally of an antenna.
 	**Yellow Caution Sign** Used to inform individuals that they are entering an area that may exceed the either the FCC's General Population or Occupational Emissions limits. It must be placed so it is visible from all approachable sides. It must also be just outside of the area predicted to exceed the MPE limits so it can be read without standing within the affected area.
 	**Orange Warning Sign (Previously Red)** Used to inform individuals that they are entering an area that may exceed 5x the FCC's Occupational emissions limit. It must be placed so it is visible from all approachable sides. It must also be just outside of the area predicted to exceed the MPE limits so it can be read without standing within the affected area.

APPENDIX C: FCC Emissions Threshold Limits

Table 1: Limits for Maximum Permissible Exposure (MPE)				
(A) Limits for Occupational/Controlled Exposure				
Frequency Range (MHz)	**Electric Field Strength (E) (V/m)**	**Magnetic Field Strength (H) (A/m)**	**Power Density (S) (mW/cm^2)**	**Averaging Time $[E]^2$, $[H]^2$, or S (minutes)**
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-I,500	--	--	f/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Public/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (E) (V/m)**	**Magnetic Field Strength (H) (A/m)**	**Power Density (S) (mW/cm^2)**	**Averaging Time $[E]^2$, $[H]^2$, or S (minutes)**
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-I,500	--	--	f/1,500	30
1,500-100,000	--	--	1.0	30

f = Frequency in (MHz)

* Plane-wave equivalent power density



APPENDIX D: Certifications

I, Michelle Stone, preparer of this report certify that I am fully trained and aware of the Rules and Regulations of both the Federal Communications Commissions (FCC) and the Occupational Safety and Health Administration (OSHA) with regard to Human Exposure to Radio Frequency Radiation. I have been trained in the procedures and requirements outlined in T-Mobile's FCC Regulatory Compliance Manual.

Michelle Stone

5/27/2021

I, Dane Folie, reviewer and approver of this report certify that I am fully trained and aware of the Rules and Regulations of both the Federal Communications Commissions (FCC) and the Occupational Safety and Health Administration (OSHA) with regard to Human Exposure to Radio Frequency Radiation. I have been trained in the procedures and requirements outlined in T-Mobile's FCC Regulatory Compliance Manual.

Dane Folie

5/27/2021

Exhibit F

Mailing Receipts/ Proof Postage

UPS CampusShip: 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.

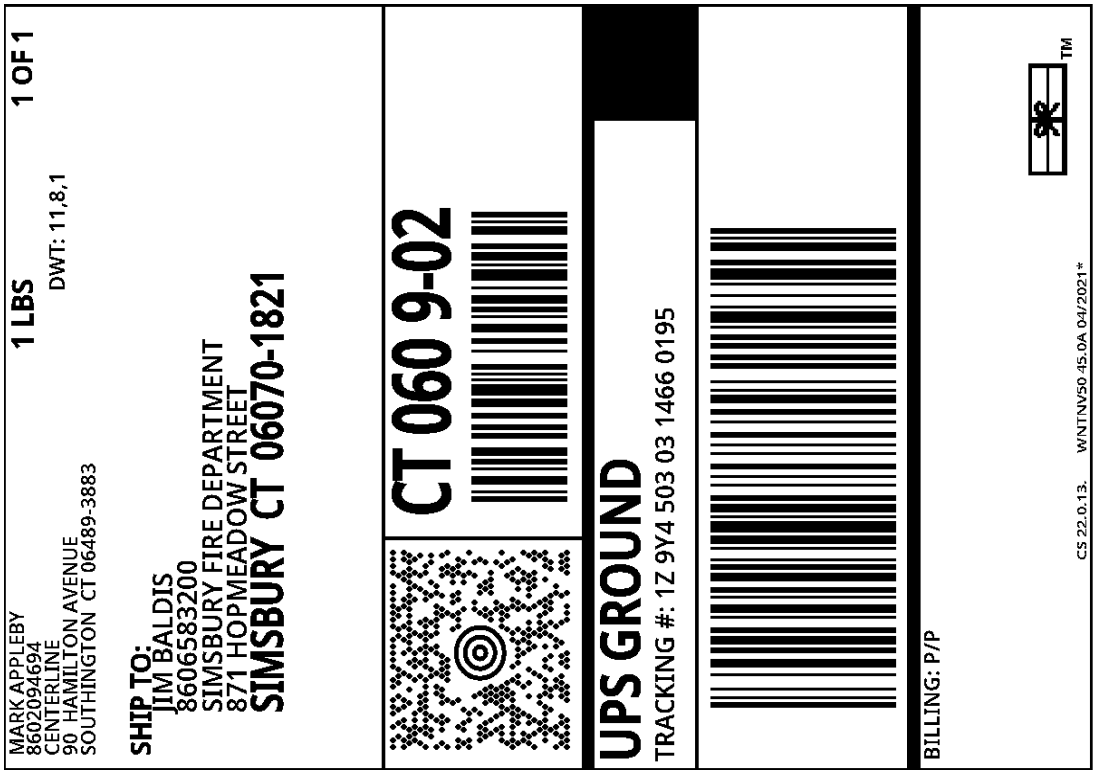
   Customers without a Daily Pickup
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To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

UPS Access Point™
CVS STORE # 1060
326 MAIN ST
SOUTHINGTON ,CT 06489

UPS Access Point™
MICHAELS STORE # 1279
99 EXECUTIVE BLVD
SOUTHINGTON ,CT 06489

UPS Access Point™
ADVANCE AUTO PARTS STORE 8525
151 QUEEN ST
SOUTHINGTON ,CT 06489

FOLD HERE



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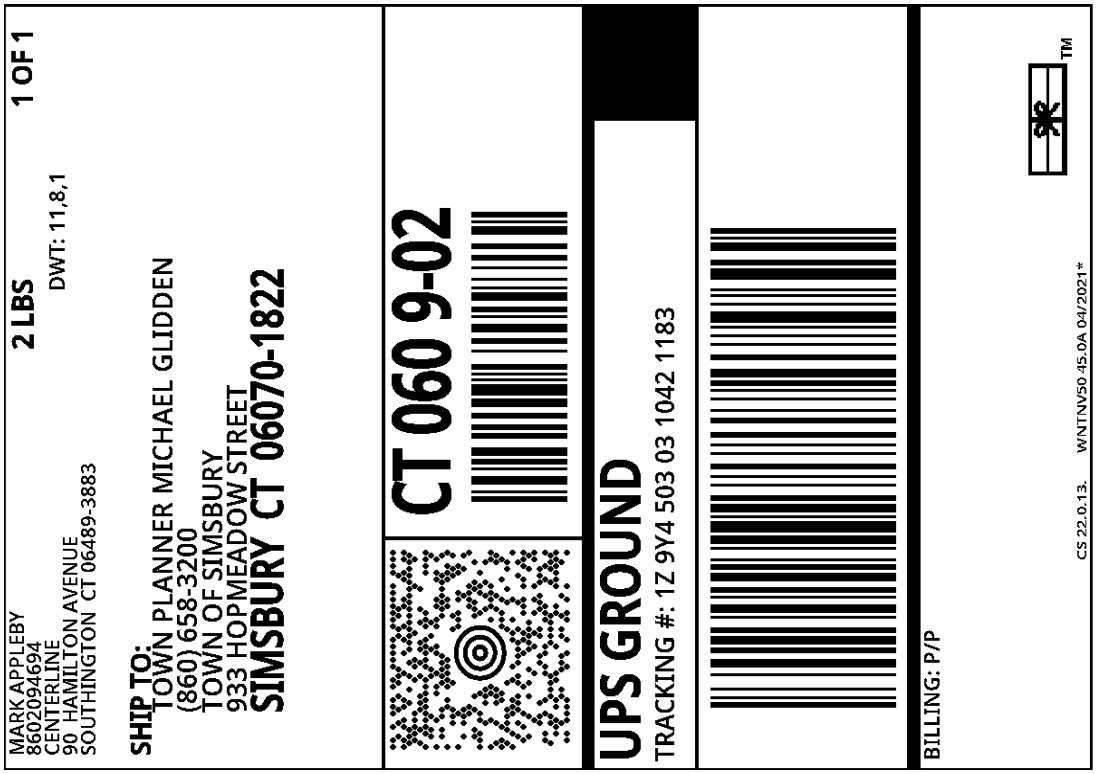

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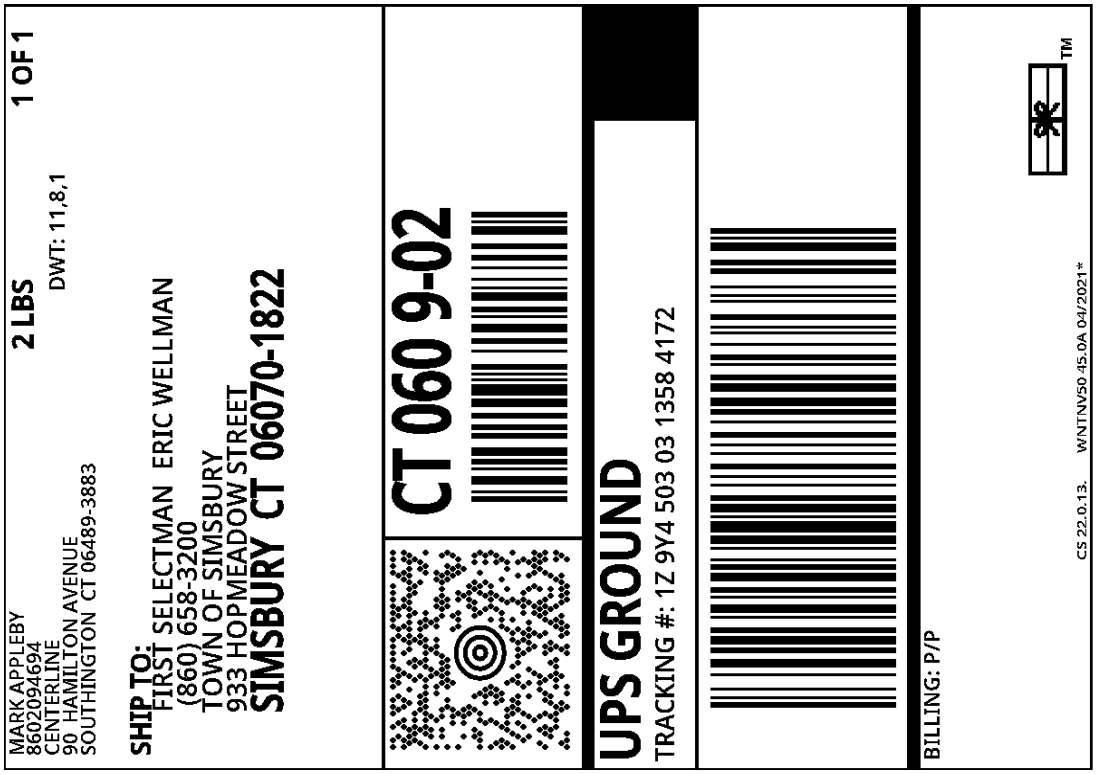

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