Northeast Site Solutions
Victoria Masse
420 Main St Unit 1 Box 2
Sturbridge, MA 01566
victoria@northeastsitesolutions.com

July 13, 2023

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

RE: Tower Share Application
280 Morehouse Drive, Fairfield, CT 06824
Latitude: 41.20998700 N
Longitude: -73.26153900 W
Site#: CT11317B_L600

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 95-foot level of the existing 86-foot transmission pole (#876) located at 280 Morehouse Drive, Fairfield CT. The electric transmission pole (#876) is owned by CL&P d/b/a Eversource. The property which holds the utility easement is owned by Zhang Chijian & Hu Yuzhi. T-Mobile now intends to replace three (3) existing antennas with three (3) new 600/700MHz antenna and relocate all existing equipment to the new tower per Petition No. 1549. The new antennas would be installed at the 121-foot level of the new 125-foot transmission pole. This modification includes B2, B5 hardware that is both 4G (LTE), and 5G capable.

T-Mobile Planned Modifications:
Remove:
N/A

Remove and Replace:
(3) Andrew-LNX-6515DS-A1M Antenna (Remove) - (3) RFS APXVAALL24 600/700/1900 MHz Antenna (Replace)

Install New:
(6) Smart Bias-T
(6) Coax

Existing to Remain:
(3) RFS APX16DWV-16DWVS-E-A20 2100 MHz Antenna (Relocate)
(18) Coax (Relocate)

Ground Work:
(3) RRUS11 B12 Radio (Remove) - (3) Radio 4480 B71+B85 (Replace)

This facility was approved by the CT Siting Council Petition No. 1549, dated February 16, 2023. Please see attached.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to First Selectwoman, Brenda L. Kupchick and Jim Wendt, Planning Director for the Town of Fairfield, as well as the property owner and the tower owner.

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,

Victoria Masse
Mobile: 860-306-2326
Fax: 413-521-0558
Office: 420 Main Street, Unit 2, Sturbridge MA 01566
Email: victoria@northeastsitesolutions.com

Attachments cc:

The Honorable Brenda Kupchick- First Selectwomen
Sullivan Independence Hall, Second Floor
725 Old Post Road
Fairfield, CT 06824

Jim Wendt- Planning Director
Sullivan Independence Hall
725 Old Post Road
Fairfield, CT 06824

CL&P d/b/a Eversource - as tower owner
56 Prospect St., First Floor
Hartford, CT 06103

Zhang Chijian & Hu Yuzhi- Utility Easement
280 Morehouse Drive
Fairfield, CT 06824

# Exhibit A

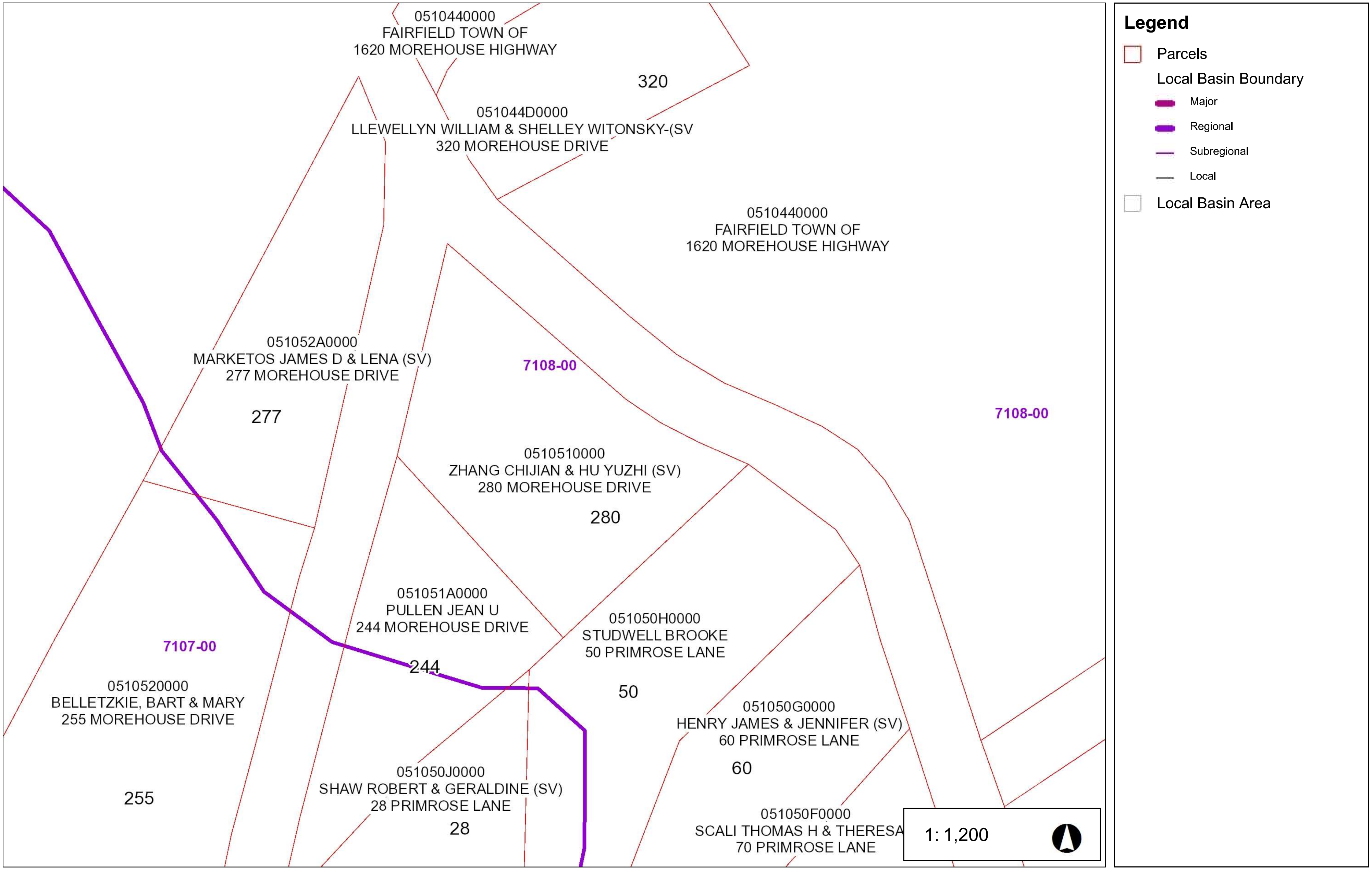
**Original Facility Approval**

# Exhibit B

**Property Card**

# Town of Fairfield

# Title




200.0 0 100.00 200.0 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere
Created by Greater Bridgeport Regional Council

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.
THIS MAP IS NOT TO BE USED FOR NAVIGATION

METROCOG
Connecticut Metropolitan Council of Governments

# 280 MOREHOUSE DRIVE

**Location** 280 MOREHOUSE DRIVE

**Mblu** 51/ 51/ / /

**Acct#** 17416

**Owner** ZHANG CHIJIAN & HU YUZHI (SV)

**Assessment** $362,950

**Appraisal** $518,500

**PID** 5101

**Building Count** 1

## Current Value

| Appraisal | | | |
|---|---|---|---|
| **Valuation Year** | **Improvements** | **Land** | **Total** |
| 2017 | $232,900 | $285,600 | $518,500 |

| Assessment | | | |
|---|---|---|---|
| **Valuation Year** | **Improvements** | **Land** | **Total** |
| 2017 | $163,030 | $199,920 | $362,950 |

## Owner of Record

**Owner** ZHANG CHIJIAN & HU YUZHI (SV)
**Co-Owner**
**Address** 280 MOREHOUSE DRIVE
FAIRFIELD, CT 06824-2374

**Sale Price** $300,000
**Certificate**
**Book & Page** 2095/ 192
**Sale Date** 03/06/2000
**Instrument** 07

## Ownership History

| Ownership History | | | | | |
|---|---|---|---|---|---|
| **Owner** | **Sale Price** | **Certificate** | **Book & Page** | **Instrument** | **Sale Date** |
| ZHANG CHIJIAN & HU YUZHI (SV) | $300,000 | | 2095/ 192 | 07 | 03/06/2000 |
| FLEET BANK,N.A. | $0 | | 2060/ 112 | | 11/10/1999 |
| STONE WILLIAM & SANDRA | $0 | | 620/ 360 | | 08/06/1976 |

## Building Information

### Building 1 : Section 1

**Year Built:** 1976
**Living Area:** 2,172
**Replacement Cost:** $362,258
**Building Percent Good:** 63

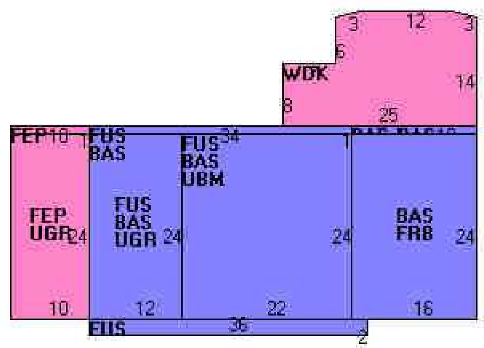
**Replacement Cost**
**Less Depreciation:** $228,200

| Building Attributes | |
|---|---|
| **Field** | **Description** |
| Style | Colonial |
| Stories: | 2 Stories |
| Occupancy | 1 |
| Exterior Wall 1 | Vinyl Siding |
| Exterior Wall 2 | |
| Roof Structure: | Gable/Hip |
| Roof Cover | Asphalt |
| Interior Wall 1 | Drywall |
| Interior Wall 2 | |
| Interior Flr 1 | Linoleum |
| Interior Flr 2 | Hardwood |
| Heat Fuel | Gas |
| Heat Type: | Hot Water |
| AC Type: | Central |
| Total Bedrooms: | 4 Bedrooms |
| Total Bthrms: | 2 |
| Total Half Baths: | 1 |
| Total Xtra Fixtrs: | |
| Total Rooms: | 9 Rooms |
| Bath Style: | Average |
| Kitchen Style: | Average |
| FCPZ | |

## Building Photo

(http://images.vgsi.com/photos2/FairfieldCTPhotos//\02\03\80/6

## Building Layout




(http://images.vgsi.com/photos2/FairfieldCTPhotos//Sketches/51

| Building Sub-Areas (sq ft) | | | |
|---|---|---|---|
| **Code** | **Description** | **Gross Area** | **Living Area** |
| BAS | First Floor | 1,250 | 1,250 |
| FUS | Upper Story, Finished | 922 | 922 |
| FEP | Porch, Enclosed, Finished | 250 | 0 |
| FRB | Finished Raised Bsmt | 384 | 0 |
| UBM | Basement, Unfinished | 534 | 0 |
| UGR | Garage, Under | 528 | 0 |
| WDK | Deck, Wood | 323 | 0 |
| | | 4,191 | 2,172 |

## Extra Features

| Extra Features | | | | |
|---|---|---|---|---|
| **Code** | **Description** | **Size** | **Value** | **Bldg #** |
| FPL3 | 2.0 STORY FIREPLACE | 1 UNITS | $4,700 | 1 |

## Land

### Land Use

**Use Code** 1010
**Description** Single Fam MDL-01
**Zone** R3
**Neighborhood** 0085
**Alt Land Appr** No
**Category**

### Land Line Valuation

**Size (Acres)** 0.79
**Depth** 0
**Assessed Value** $199,920
**Appraised Value** $285,600

## Outbuildings

| Outbuildings | Legend |
|---|---|
| No Data for Outbuildings | |

## Valuation History

| Appraisal | | | |
|---|---|---|---|
| **Valuation Year** | **Improvements** | **Land** | **Total** |
| 2018 | $232,900 | $285,600 | $518,500 |
| 2017 | $232,900 | $285,600 | $518,500 |
| 2016 | $232,900 | $285,600 | $518,500 |

| Assessment | | | |
|---|---|---|---|
| **Valuation Year** | **Improvements** | **Land** | **Total** |
| 2018 | $163,030 | $199,920 | $362,950 |
| 2017 | $163,030 | $199,920 | $362,950 |
| 2016 | $163,030 | $199,920 | $362,950 |

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# Exhibit C

## Construction Drawings

# T-Mobile

# SITE NAME: FAIRFIELD/MP/X44&X42
# SITE ID: CT11317B
# NEW EVERSOURCE STRUCT. #19725
## 280 MOREHOUSE DR
## FAIRFIELD, CT 06824

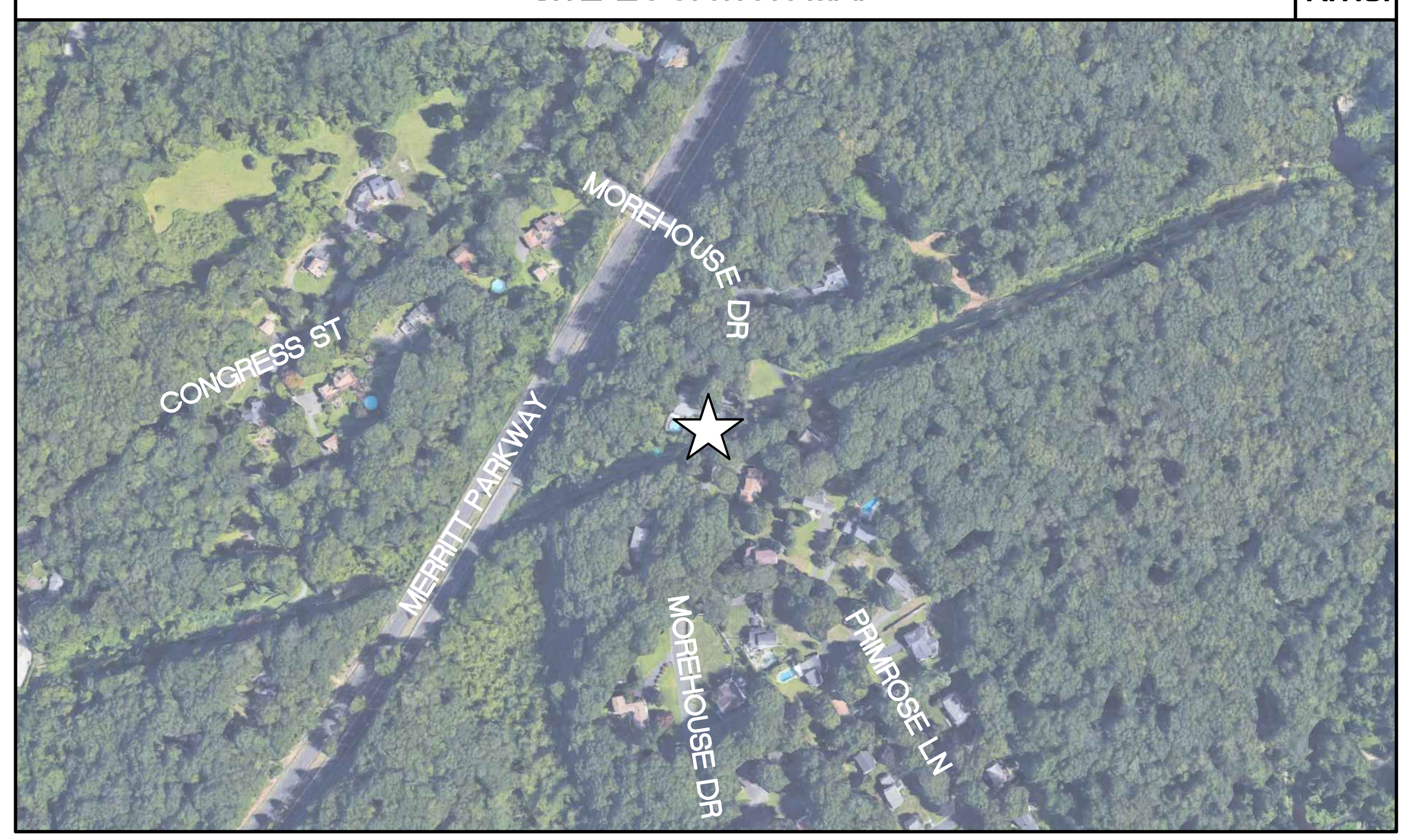
| T-MOBILE A+L TEMPLATE (PROVIDED BY RFDS) |
|---|
| 67D94B_1DP+1QP+1OP |

| T-MOBILE RAN TEMPLATE (PROVIDED BY RFDS) |
|---|
| 67D94B_FLAGPOLE OUTDOOR |

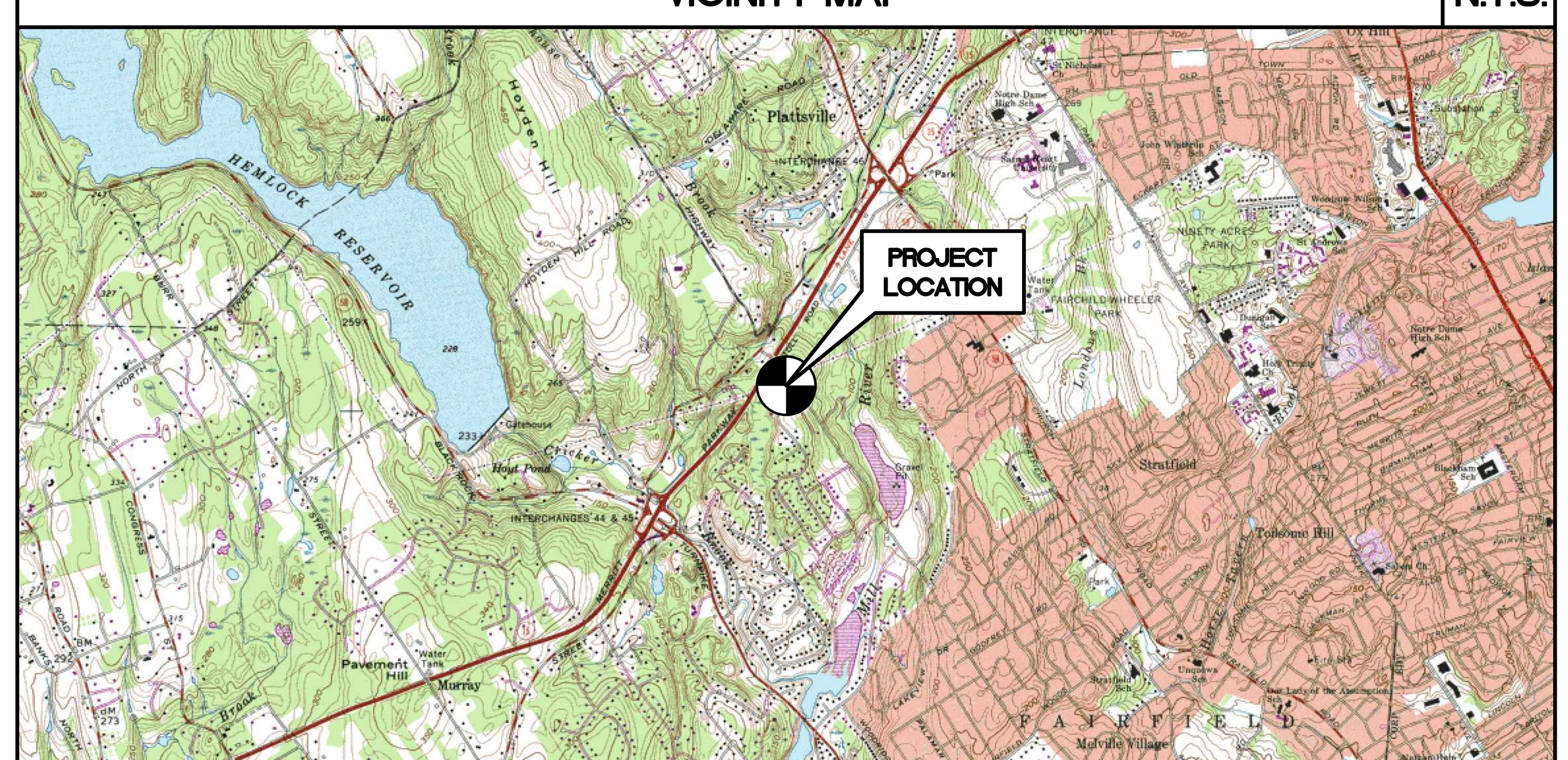
## GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2021 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2022 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2022 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.
3. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
4. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE, WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
5. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS AND ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
6. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS, AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
7. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
8. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
9. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL, AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
10. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
11. LOCATION OF EQUIPMENT AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS, SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
12. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
13. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
14. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
15. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
16. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
17. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED' ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T-MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
18. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
19. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
20. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
21. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUITS AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND CONFIRMED WITH THE PROJECT MANAGER AND OWNER PRIOR TO THE COMMENCEMENT OF ANY WORK
22. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
23. THE CONTRACTOR SHALL CONTACT 'CALL BEFORE YOU DIG' AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
24. CONTRACTOR SHALL COMPLY WITH THE OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.
25. THE COUNTY/CITY/TOWN MAY MAKE PERIODIC FIELD INSPECTIONS TO ENSURE COMPLIANCE WITH THE DESIGN PLANS, SPECIFICATIONS, AND CONTRACT DOCUMENTS.
26. THE COUNTY/CITY/TOWN MUST BE NOTIFIED (2) WORKING DAYS PRIOR TO CONCEALMENT/BURIAL OF ANY SYSTEM OR MATERIAL THAT WILL PREVENT THE DIRECT INSPECTION OF MATERIALS, METHODS OR WORKMANSHIP. EXAMPLES OF THESE PROCESSES ARE BACKFILLING A GROUND RING OR TOWER FOUNDATION, POURING TOWER FOUNDATIONS, BURYING GROUND RODS, PLATES OR GRIDS, ETC. THE CONTRACTOR MAY PROCEED WITH THE SCHEDULED PROCESS (2) WORKING DAYS AFTER PROVIDING NOTICE UNLESS NOTIFIED OTHERWISE BY THE COUNTY/CITY/TOWN.
27. PRIOR TO THE SUBMISSION OF BIDS, THE CONTRACTOR SHALL VISIT THE 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 ENGINEER ON RECORD, PRIOR TO THE COMMENCEMENT OF ANY WORK.

## SITE LOCATION MAP
N.T.S.




## VICINITY MAP
N.T.S.




COORDINATES AND GROUND ELEVATION ARE REFERENCED FROM GOOGLE EARTH.

SITE COORDINATES: LATITUDE: 41°-12'-35" N
LONGITUDE: 73°-15'-41" W
GROUND ELEVATION: ±223' AMSL

NORTH

## PROJECT SUMMARY

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

1. REMOVAL OF EXISTING UTILITY TOWER AND INSTALLATION OF NEW TOWER TO BE DONE (BY OTHERS)
2. REMOVE EXISTING ANDREW: LNX-6515DS-A1M ANTENNAS, TYP. (1) PER SECTOR; TOTAL OF (3)
3. REMOVE EXISTING TMAs
4. RELOCATE EXISTING T-MOBILE RFS: APX16DWV-16DWV-S-E-A20 ANTENNAS TO NEW ANTENNA FRAME, TYP (1) PER SECTOR; TOTAL OF (3)
5. INSTALL RADIO 4480 AT GRADE, TYP. (1) PER SECTOR; TOTAL OF (3)
6. INSTALL (1) BB6648 FOR L600/L700/5G N600
7. INSTALL (6) 1-1/4" COAX CABLES PER SECTOR FOR NEW TOTAL OF (24)
8. INSTALL RFS: APXVAALL24_43-U-NA20 ANTENNA, TYP. (1) PER SECTOR; TOTAL OF (3)
9. INSTALL SMART BIAS-T: ATSBT-TOP-MF-4G TMA, TYP. (2) PER SECTOR; TOTAL OF (6)
10. INSTALL NEW ANTENNA MOUNT PLATFORM SITE PRO: RMQLP-496-HK
11. INSTALL NEW ANTENNA ICE-BRIDGE AS SHOWN HEREIN.

## PROJECT INFORMATION

| | |
|---|---|
| SITE NAME: | FAIRFIELD/MP/X44&X42 |
| SITE ID: | CT11317B |
| SITE ADDRESS: | 280 MOREHOUSE DR<br>FAIRFIELD, CT 06824 |
| APPLICANT: | T-MOBILE NORTHEAST, LLC<br>35 GRIFFIN ROAD SOUTH<br>BLOOMFIELD, CT. 06002 |
| CONTACT PERSON: | MATT BANDLE (PROJECT MANAGER)<br>NORTHEAST SITE SOLUTIONS<br>(508) 642-8801 |
| ENGINEER OF RECORD: | CENTEK ENGINEERING, INC.<br>63-2 NORTH BRANFORD ROAD<br>BRANFORD, CT. 06405<br><br>CARLO F. CENTORE, PE<br>(203) 488-0580 EXT. 122 |
| SITE COORDINATES: | LATITUDE: 41°-12'-35" N<br>LONGITUDE: 73°-15'-41" W<br>GROUND ELEVATION: ±223' AMSL<br><br>SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH. |

## SHEET INDEX



| REV. | DATE | DRAWN BY | CHECKED BY | DESCRIPTION |
|---|---|---|---|---|
| 1 | 06/21/23 | ASC | TJR | CONSTRUCTION DRAWINGS - REVISED PER CLIENT COMMENTS |
| 0 | 06/05/23 | ASC | TJR | CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION |
| C | 05/24/23 | ASC | TJR | CONSTRUCTION DRAWINGS - REVISED PER CLIENT COMMENTS |
| B | 04/14/23 | ASC | TJR | CONSTRUCTION DRAWINGS - ISSUED FOR CLIENT REVIEW |
| A | 07/28/22 | JLD | TJR | CONSTRUCTION DRAWINGS - ISSUED FOR CLIENT REVIEW |

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT · CARLO F. CENTORE · No. 16694 · LICENSED PROFESSIONAL ENGINEER

T-Mobile
NSS NORTHEAST SITE SOLUTIONS

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

T-MOBILE NORTHEAST LLC
SITE NAME: FAIRFIELD/MP/X44+X42
SITE ID: CT11317B
280 MOREHOUSE DR
FAIRFIELD, CT 06824

| | |
|---|---|
| DATE: | 07/28/22 |
| SCALE: | AS NOTED |
| JOB NO. | 22073.03 |

TITLE SHEET

T-1

SHEET NO. 1 OF 12

## NOTES AND SPECIFICATIONS:

### DESIGN BASIS:

GOVERNING CODE: 2021 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2022 CONNECTICUT STATE BUILDING CODE.

1. DESIGN CRITERIA:

- RISK CATEGORY II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED: 97 MPH (Vult) (EXPOSURE B/ IMPORTANCE FACTOR 1.0 BASED ON ASCE 7–10).

### SITE NOTES

1. THE CONTRACTOR SHALL CALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ACTIVE EXISTING UTILITIES, WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY, PRIOR TO PROCEEDING, SHOULD ANY UNCOVERED EXISTING UTILITY PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
3. THE AREAS OF THE COMPOUND DISTURBED BY THE WORK SHALL BE RETURNED TO THEIR ORIGINAL CONDITION.
4. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
5. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.

### GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2021 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2022 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA–222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2022 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
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9. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL, AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
10. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS–BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
11. LOCATION OF EQUIPMENT AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS, SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
12. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
13. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB–CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
14. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
15. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
16. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
17. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED' ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T–MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
18. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON–SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
19. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
20. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
21. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUITS AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND CONFIRMED WITH THE PROJECT MANAGER AND OWNER PRIOR TO THE COMMENCEMENT OF ANY WORK
22. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
23. THE CONTRACTOR SHALL CONTACT 'CALL BEFORE YOU DIG' AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1–800–922–4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
24. CONTRACTOR SHALL COMPLY WITH THE OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.
25. THE COUNTY/CITY/TOWN MAY MAKE PERIODIC FIELD INSPECTIONS TO ENSURE COMPLIANCE WITH THE DESIGN PLANS, SPECIFICATIONS, AND CONTRACT DOCUMENTS.
26. THE COUNTY/CITY/TOWN MUST BE NOTIFIED (2) WORKING DAYS PRIOR TO CONCEALMENT/BURIAL OF ANY SYSTEM OR MATERIAL THAT WILL PREVENT THE DIRECT INSPECTION OF MATERIALS, METHODS OR WORKMANSHIP. EXAMPLES OF THESE PROCESSES ARE BACKFILLING A GROUND RING OR TOWER FOUNDATION, POURING TOWER FOUNDATIONS, BURYING GROUND RODS, PLATES OR GRIDS, ETC. THE CONTRACTOR MAY PROCEED WITH THE SCHEDULED PROCESS (2) WORKING DAYS AFTER PROVIDING NOTICE UNLESS NOTIFIED OTHERWISE BY THE COUNTY/CITY/TOWN.
27. PRIOR TO THE SUBMISSION OF BIDS, THE CONTRACTOR SHALL VISIT THE 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 ENGINEER ON RECORD, PRIOR TO THE COMMENCEMENT OF ANY WORK.

## ANTENNA/APPURTENANCE SCHEDULE

| SECTOR | EXISTING/PROPOSED | ANTENNA – AT TOWER | SIZE (INCHES) (L x W x D) | ANTENNA ℄ HEIGHT | AZIMUTH | (E/P) RRU (QTY) – AT CABINET | (E/P) TMA (QTY) – AT TOWER | (QTY) PROPOSED HYBRID/COAX |
|---|---|---|---|---|---|---|---|---|
| A1 | EXISTING | RFS (APX16DWV–16DWV–S–E–A20) | 55.9 x 13 x 3.15 | 121' | 60° | (P) RADIO 4480 B71+B85 (1) | (P) (SMART BIAST–ATSBT–TOP–MF–4G) (1) | (2) 1–1/4" COAX CABLES (TOWER) |
| A2 | PROPOSED | RFS (APXVAALL24_43–U_NA20) | 95.9 x 24 x 8.5 | 121' | 60° | | (P) (SMART BIAST–ATSBT–TOP–MF–4G) (1) | |
| B1 | EXISTING | RFS (APX16DWV–16DWV–S–E–A20) | 55.9 x 13 x 3.15 | 121' | 180° | (P) RADIO 4480 B71+B85 (1) | (P) (SMART BIAST–ATSBT–TOP–MF–4G) (1) | (2) 1–1/4" COAX CABLES (TOWER) |
| B2 | PROPOSED | RFS (APXVAALL24_43–U_NA20) | 95.9 x 24 x 8.5 | 121' | 180° | | (P) (SMART BIAST–ATSBT–TOP–MF–4G) (1) | |
| C1 | EXISTING | RFS (APX16DWV–16DWV–S–E–A20) | 55.9 x 13 x 3.15 | 121' | 300° | (P) RADIO 4480 B71+B85 (1) | (P) (SMART BIAST–ATSBT–TOP–MF–4G) (1) | (2) 1–1/4" COAX CABLES (TOWER) |
| C2 | PROPOSED | RFS (APXVAALL24_43–U_NA20) | 95.9 x 24 x 8.5 | 121' | 300° | | (P) (SMART BIAST–ATSBT–TOP–MF–4G) (1) | |

NOTE:
ALL HYBRID/COAX LENGTHS TO BE MEASURED AND VERIFIED IN FIELD BEFORE ORDERING

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|---|---|---|---|---|
| 1 | 06/21/23 | ASC | TJR | CONSTRUCTION DRAWINGS – REVISED PER CLIENT COMMENTS |
| 0 | 06/05/23 | ASC | TJR | CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION |
| C | 05/24/23 | ASC | TJR | CONSTRUCTION DRAWINGS – REVISED PER CLIENT COMMENTS |
| B | 04/14/23 | ASC | TJR | CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW |
| A | 07/28/22 | JLD | TJR | CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW |

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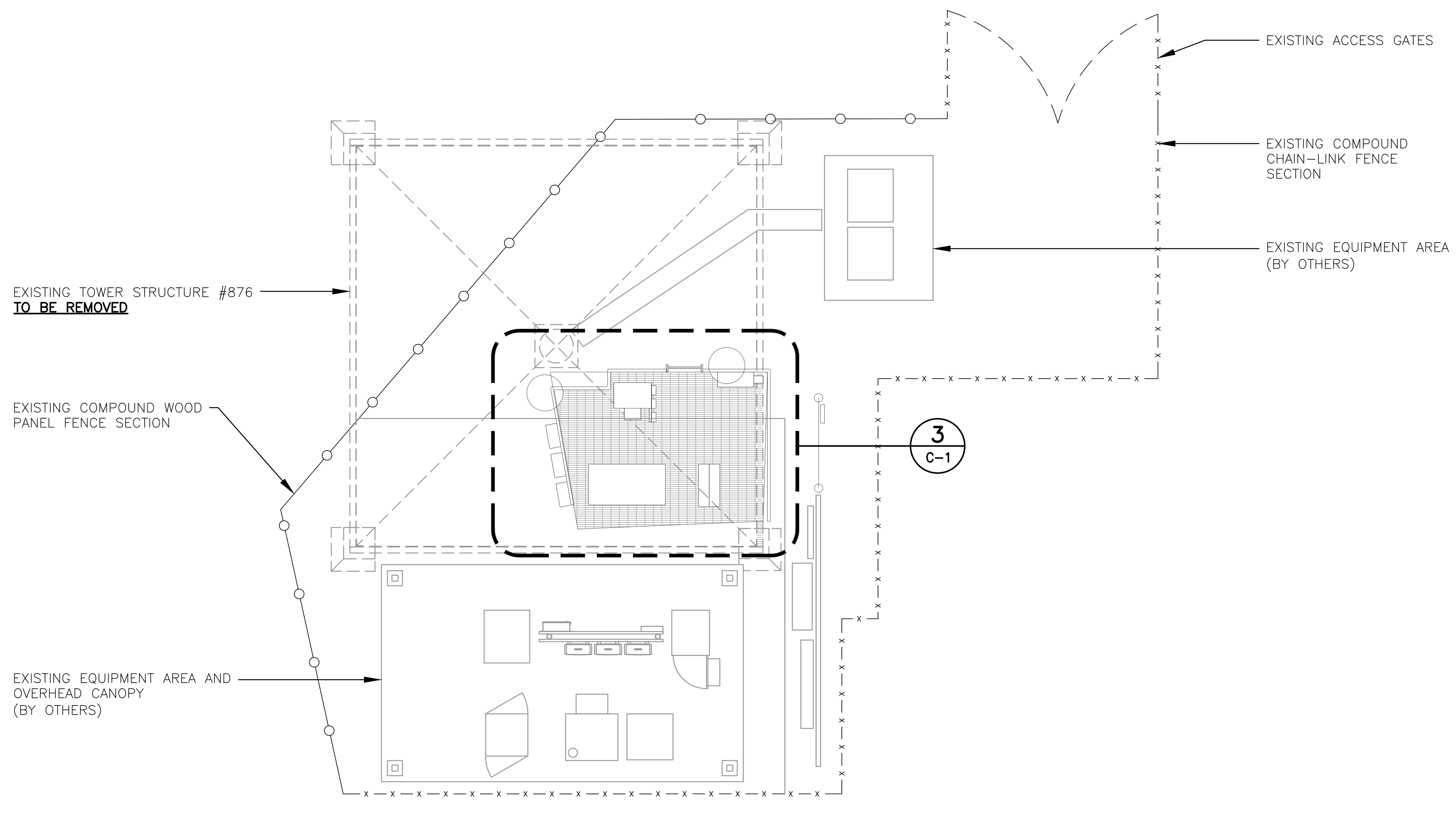
T-MOBILE NORTHEAST LLC
SITE NAME: FAIRFIELD/MP/X44+X42
SITE ID: CT11317B
280 MOREHOUSE DR
FAIRFIELD, CT 06824

DATE: 07/28/22
SCALE: AS NOTED
JOB NO. 22073.03

SPECIFICATIONS, NOTES, AND ANT. SCHEDULE

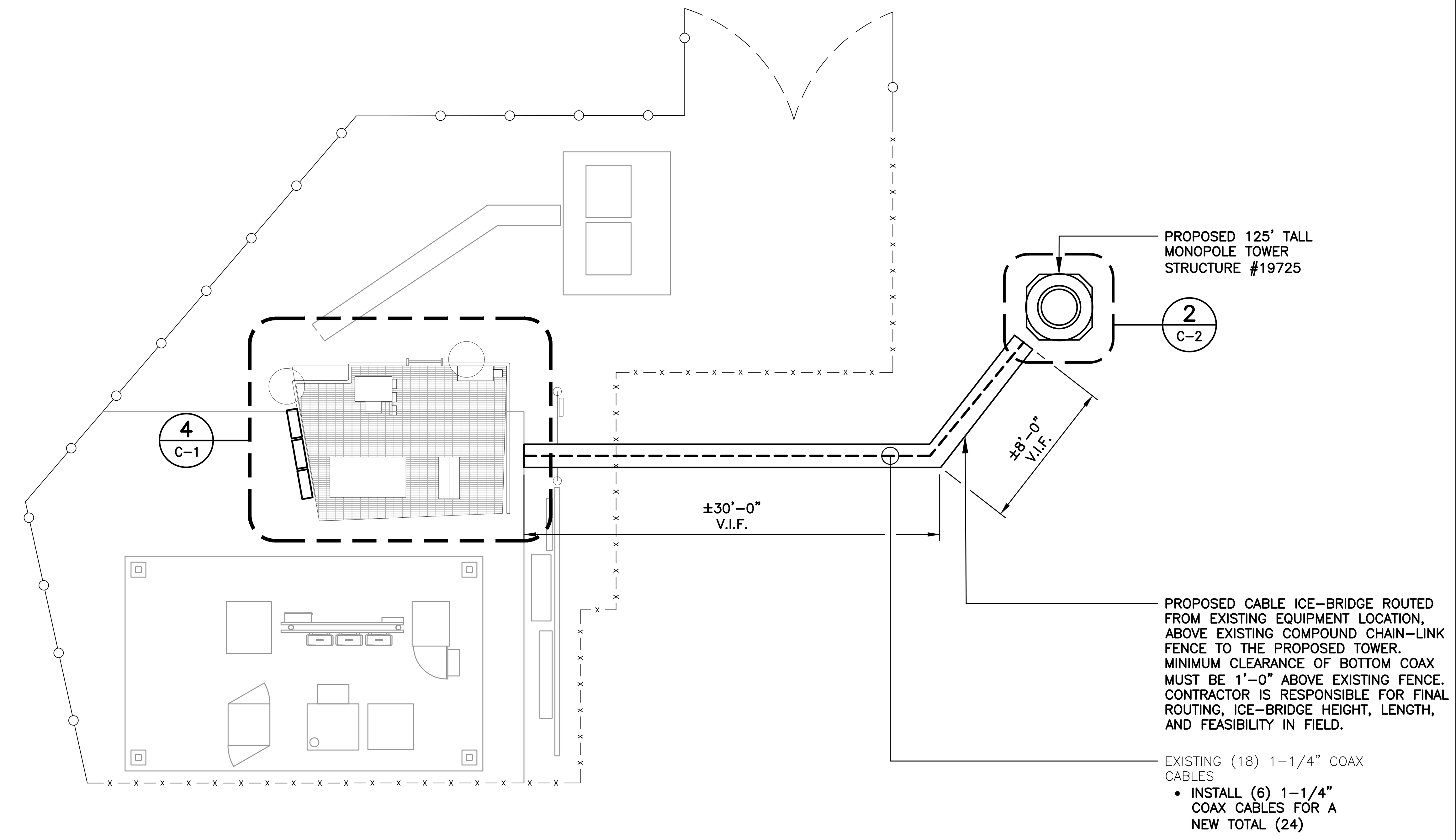
N–1




## 1 C-1 COMPOUND PLAN – EXISTING

SCALE: 3/16" = 1'

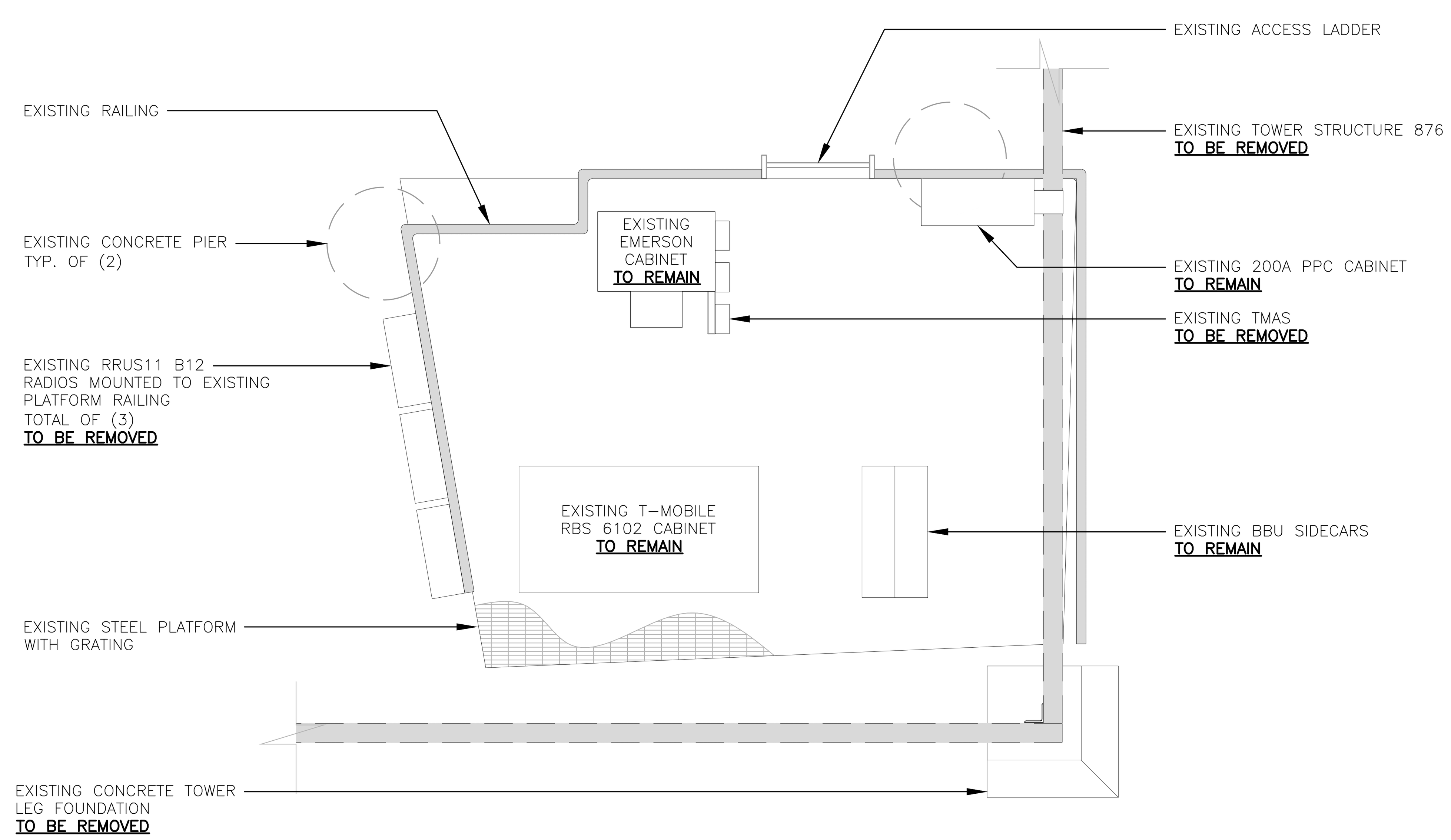
TRUE NORTH




## 2 C-1 COMPOUND PLAN – PROPOSED

SCALE: 3/16" = 1'

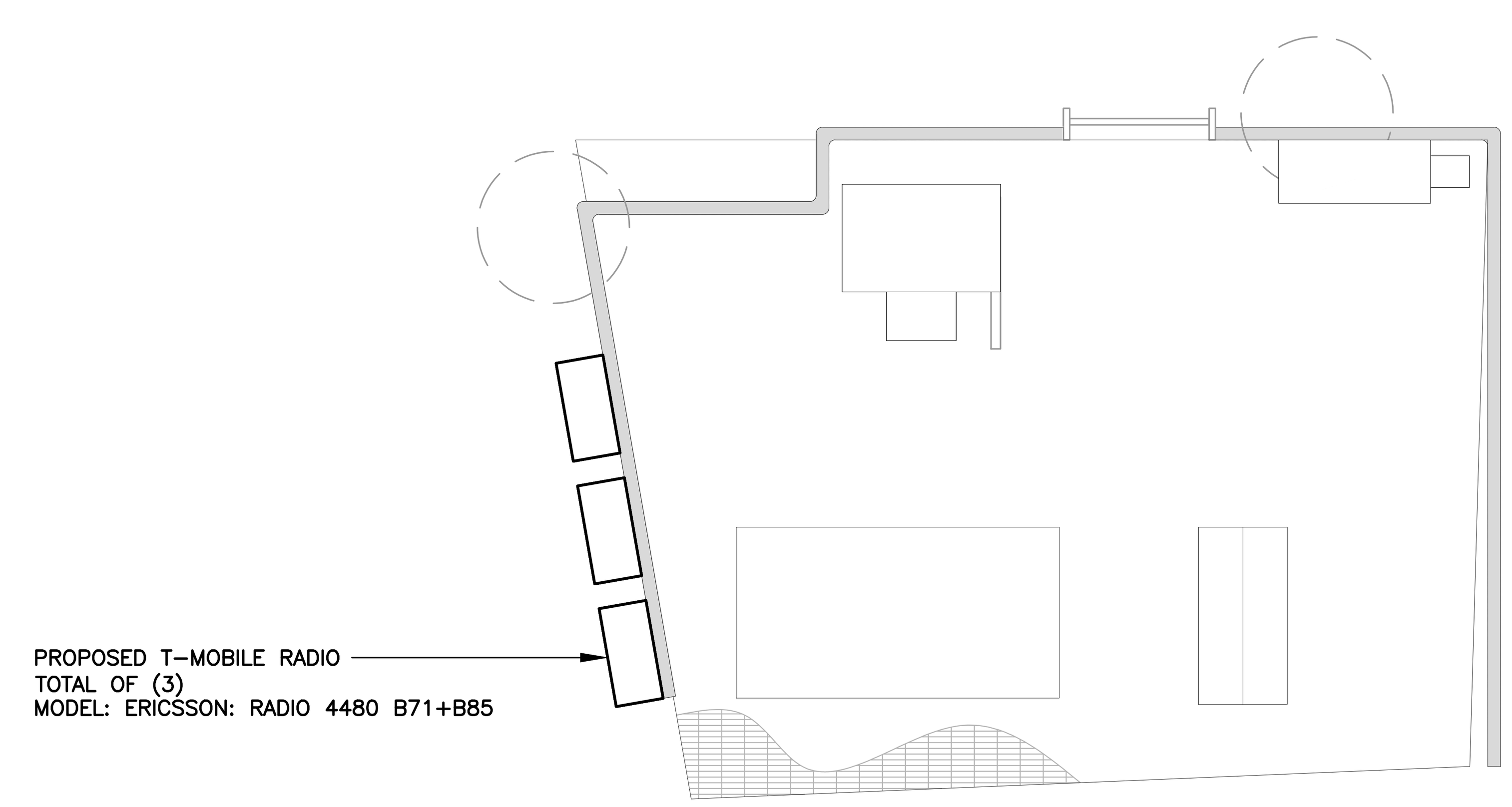
TRUE NORTH




## 3 C-1 EQUIPMENT PLAN – EXISTING

SCALE: 1/2" = 1'

TRUE NORTH




## 4 C-1 EQUIPMENT PLAN – PROPOSED

SCALE: 1/2" = 1'

TRUE NORTH

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SITE ID: CT11317B

280 MOREHOUSE DR

FAIRFIELD, CT 06824

DATE: 07/28/22

SCALE: AS NOTED

JOB NO. 22073.03

COMPOUND AND EQUIPMENT PLANS

C-1

SHEET NO. 3 OF 12

## STRUCTURAL COMPLIANCE

ANTENNA MOUNTS

A STRUCTURAL ANALYSIS OF THE ANTENNA MOUNTS WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING..

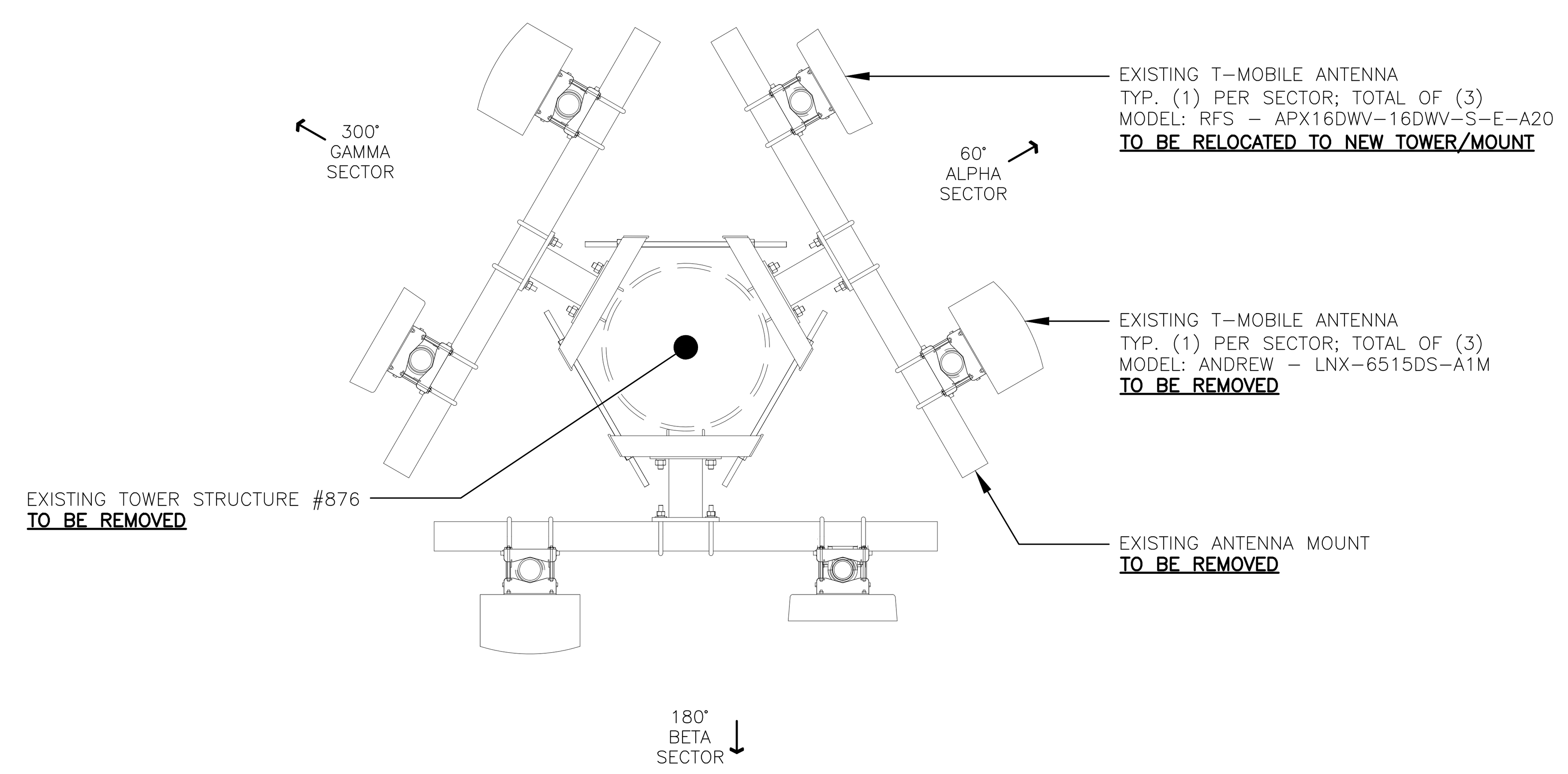
REFER TO THE ANTENNA MOUNT ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 22073.03) DATED 05/18/23 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

TOWER AND TOWER FOUNDATION

A STRUCTURAL ANALYSIS OF THE TOWER AND TOWER FOUNDATION WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING.

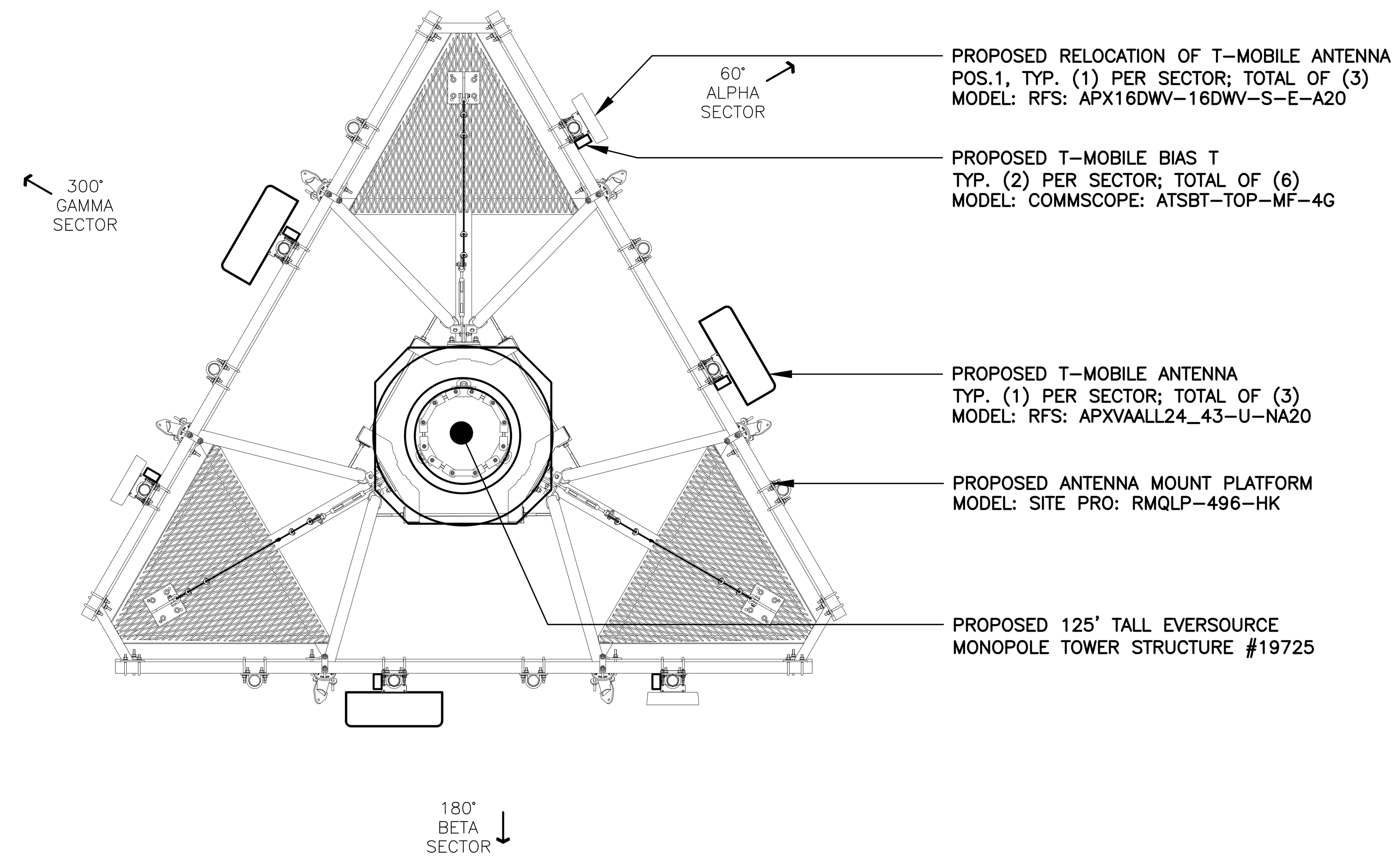
REFER TO THE STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 22073.03) DATED 05/05/23 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

NOTE: NO EQUIPMENT SHALL BE INSTALLED ON THE HOSTING STRUCTURE WITHOUT A PASSING STRUCTURAL ANALYSIS REPORT AND CONTRACTOR PRIOR CONFIRMATION THAT ANY AND ALL REQUISITE MODIFICATIONS HAVE BEEN COMPLETED.



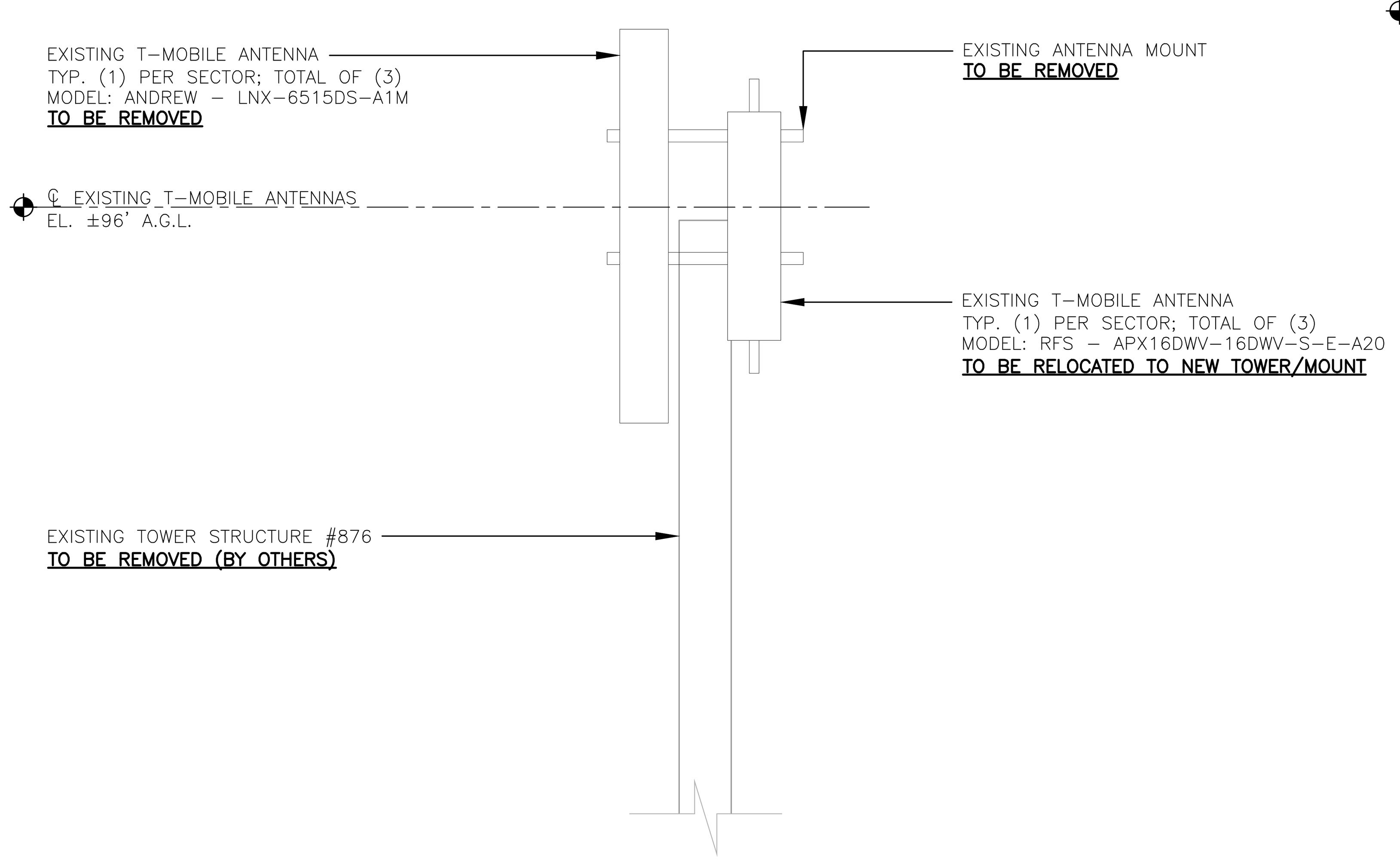

1 / C-2 **ANTENNA PLAN – EXISTING** TRUE NORTH

SCALE: 3/4" = 1'



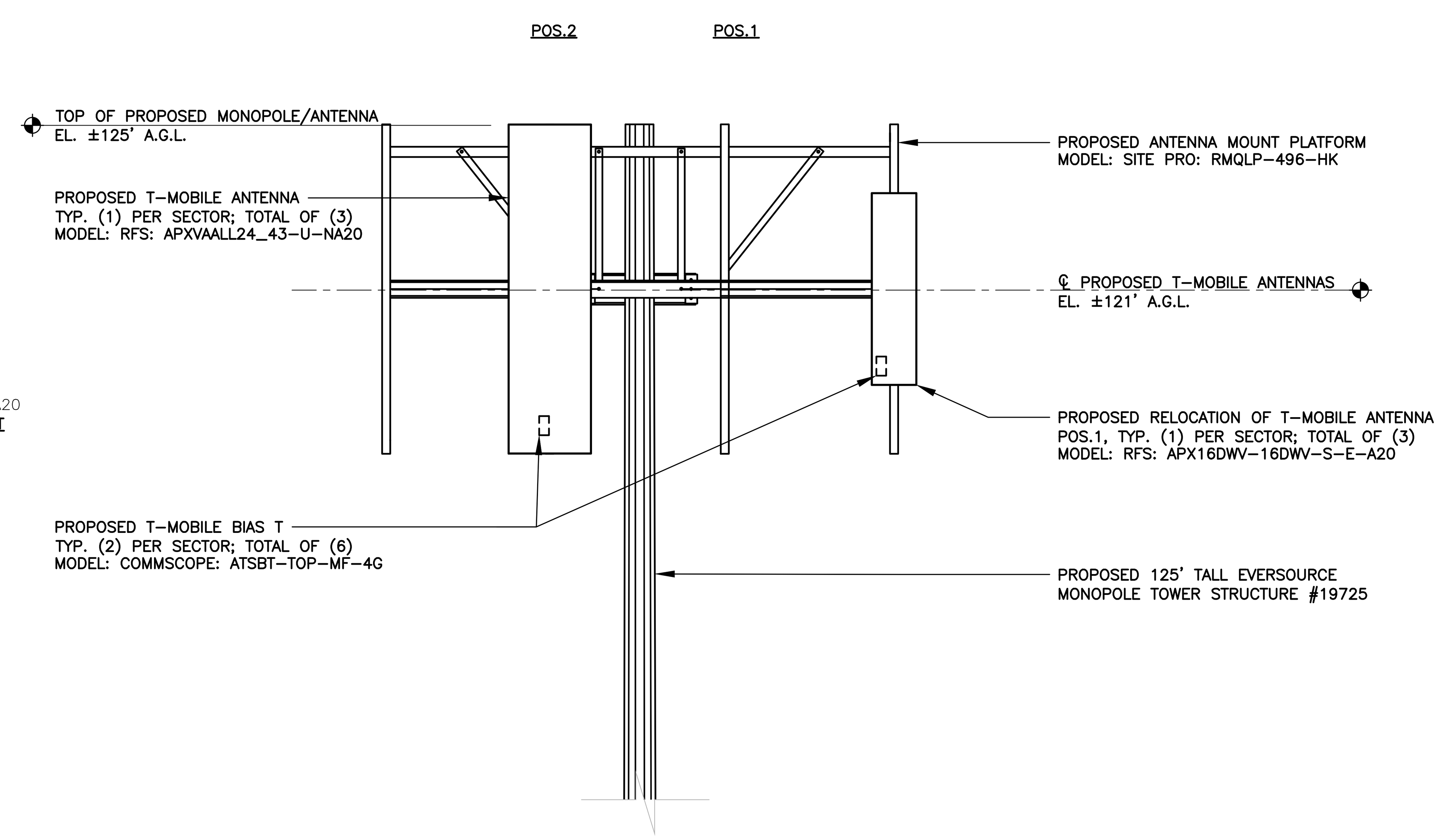

2 / C-2 **ANTENNA PLAN – PROPOSED** TRUE NORTH

SCALE: 3/8" = 1'



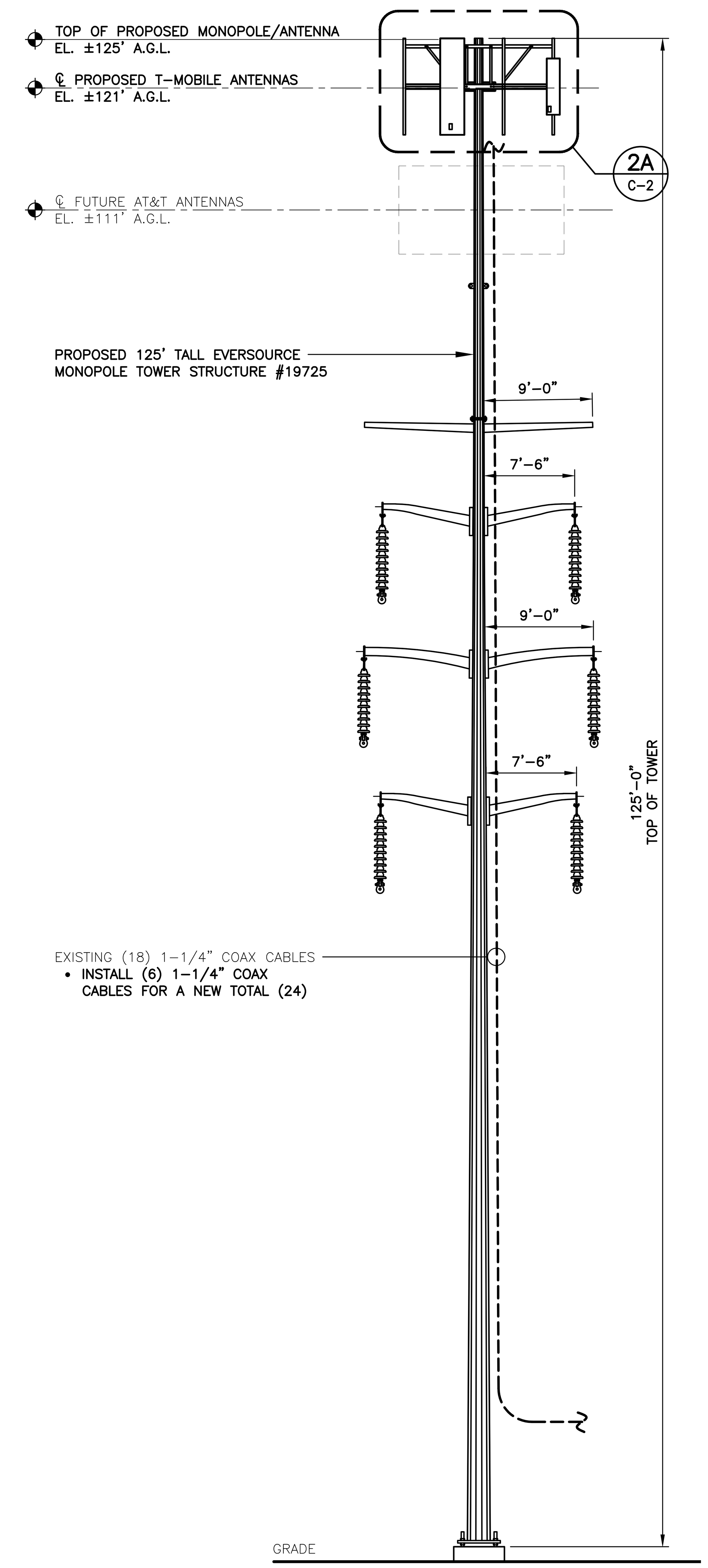

1A / C-2 **ANTENNA ELEVATION – EXISTING**

SCALE: 3/8" = 1'




2A / C-2 **ANTENNA ELEVATION – PROPOSED**

SCALE: 3/8" = 1'




3 / C-2 **TOWER ELEVATION – PROPOSED**

SCALE: 1" = 8'

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SITE ID: CT11317B

280 MOREHOUSE DR

FAIRFIELD, CT 06824

DATE: 07/28/22

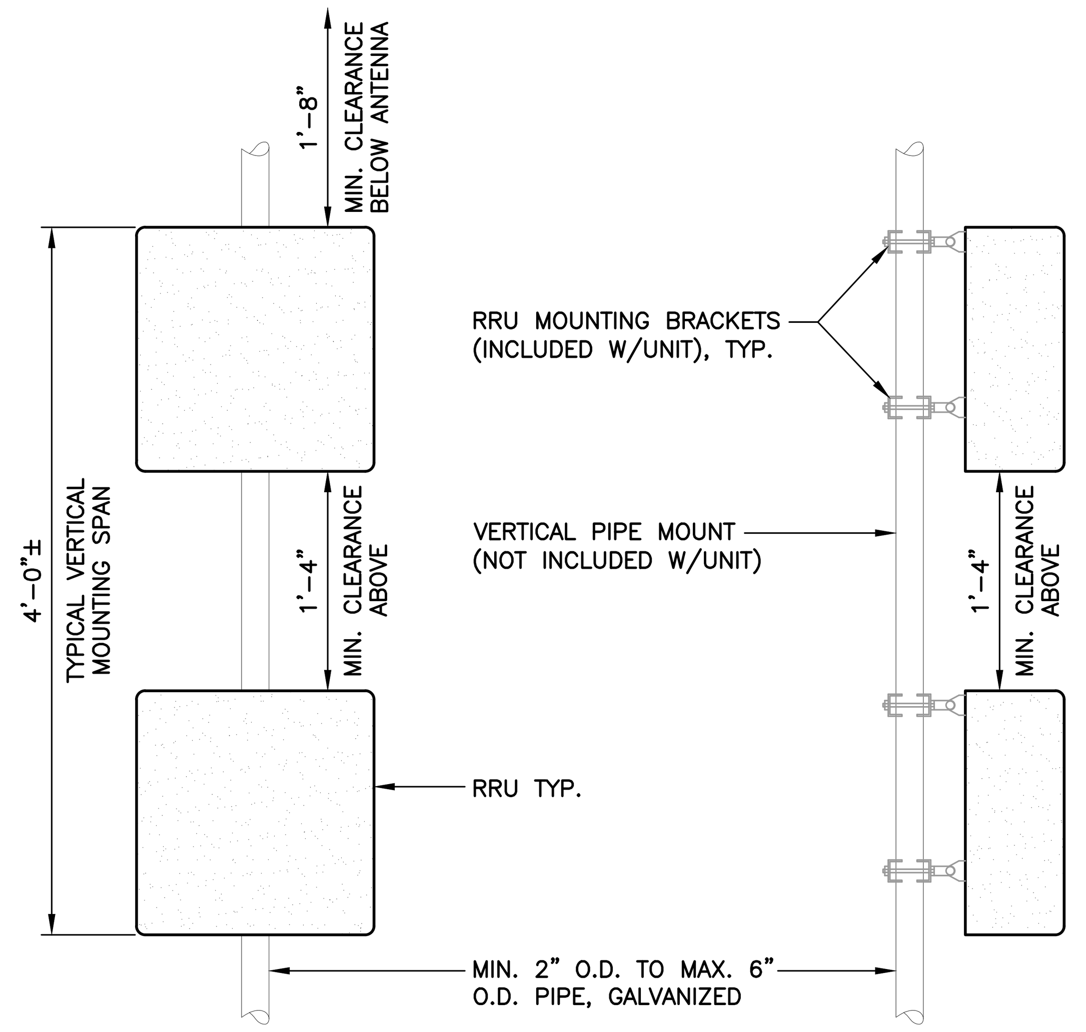
SCALE: AS NOTED

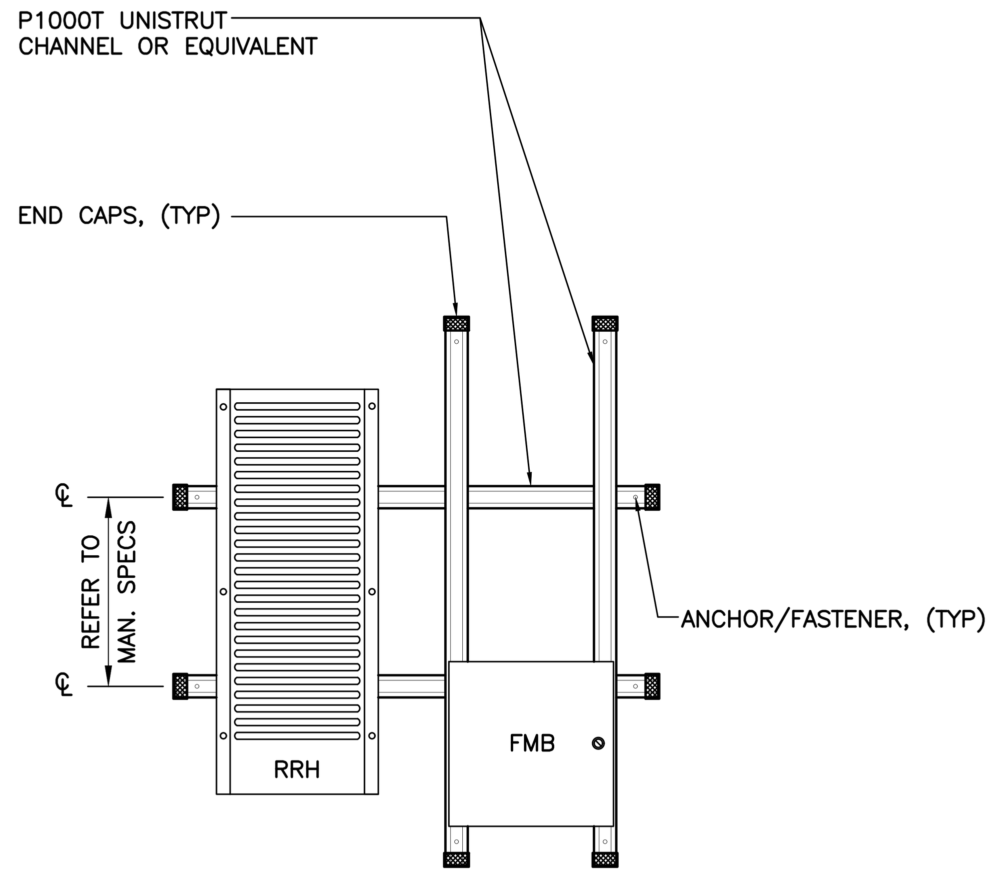
JOB NO. 22073.03

ANTENNA PLANS AND ELEVATIONS

C-2

SHEET NO. 4 OF 12




NOTES: (PIPE MOUNTING)

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

NOTES: (UNISTRUT MOUNTING)

1. INSTALL A MINIMUM OF (2) ANCHORS PER UNISTRUT (± 16"o/c MIN).
2. MOUNT RRU TO UNISTRUT WITH 3/8"ø UNISTRUT BOLTING HARDWARE AND SPRING NUTS. TYPICAL FOUR PER BRACKET.
3. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

## 1 C-3 TYPICAL RRU MOUNTING DETAILS
SCALE: NOT TO SCALE

APXVAALL24_43-U-NA20

| ALPHA/BETA/GAMMA ANTENNA | | |
|---|---|---|
| EQUIPMENT | DIMENSIONS | WEIGHT |
| MAKE: RFS<br>MODEL: APXVAALL24_43-U-NA20 | 95.9"L x 24.0"W x 8.5"D | ±150 LBS. |

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

## 2 C-3 PROPOSED ANTENNA DETAIL
SCALE: NOT TO SCALE

RADIO 4480 B71+B85

| RRU (REMOTE RADIO UNIT) | | | |
|---|---|---|---|
| EQUIPMENT | DIMENSIONS | WEIGHT | CLEARANCES |
| MAKE: ERICSSON<br>MODEL: RADIO 4480 B71+B85 | 21.8"L x 15.7"W x 7.5"D | ±84 LBS. | BEHIND ANT.: 8" MIN.<br>BELOW ANT.: 20" MIN.<br>BELOW RRU: 16" MIN. |

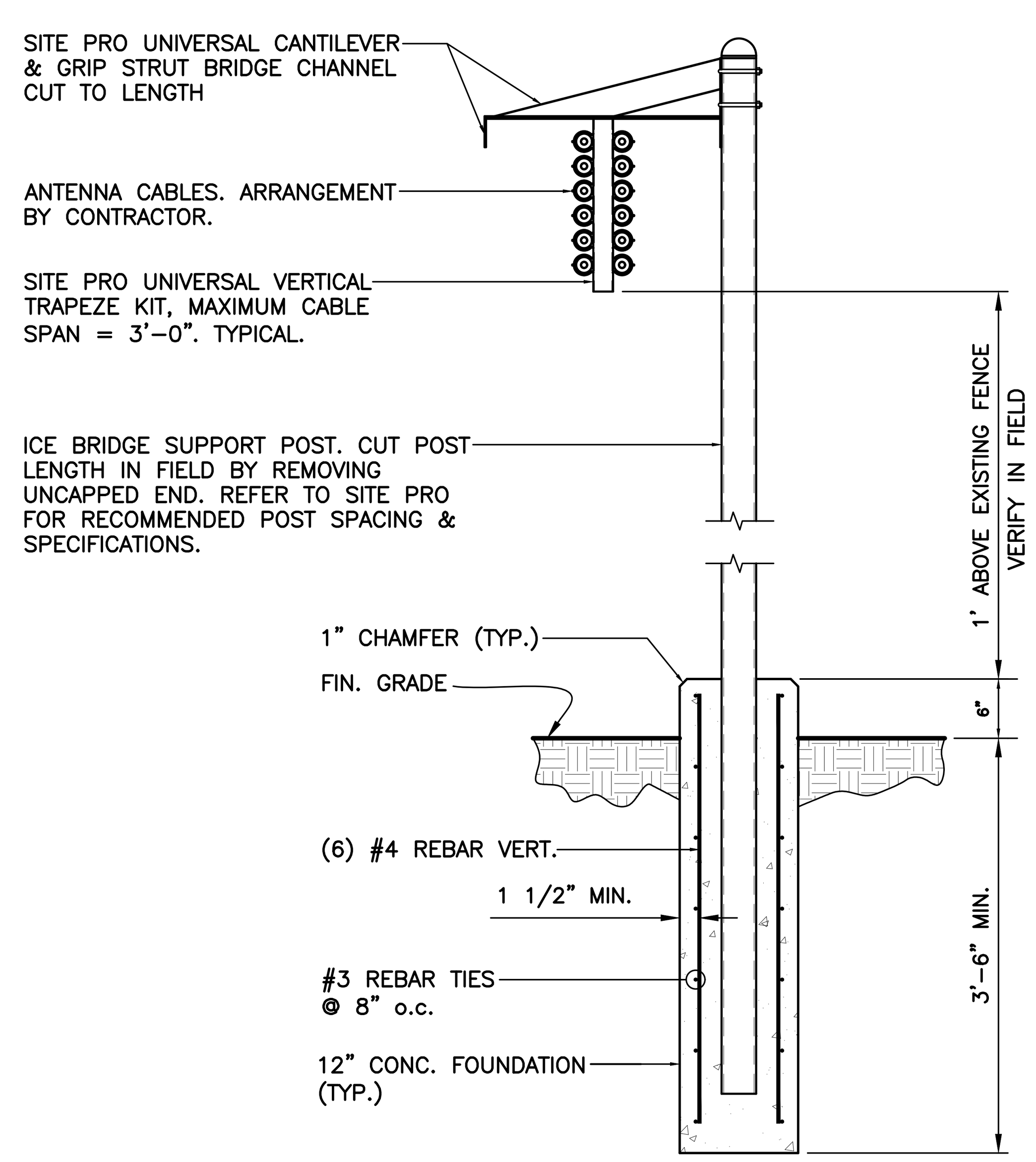
NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T-MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.

## 3 C-3 PROPOSED RRU DETAIL
SCALE: NOT TO SCALE

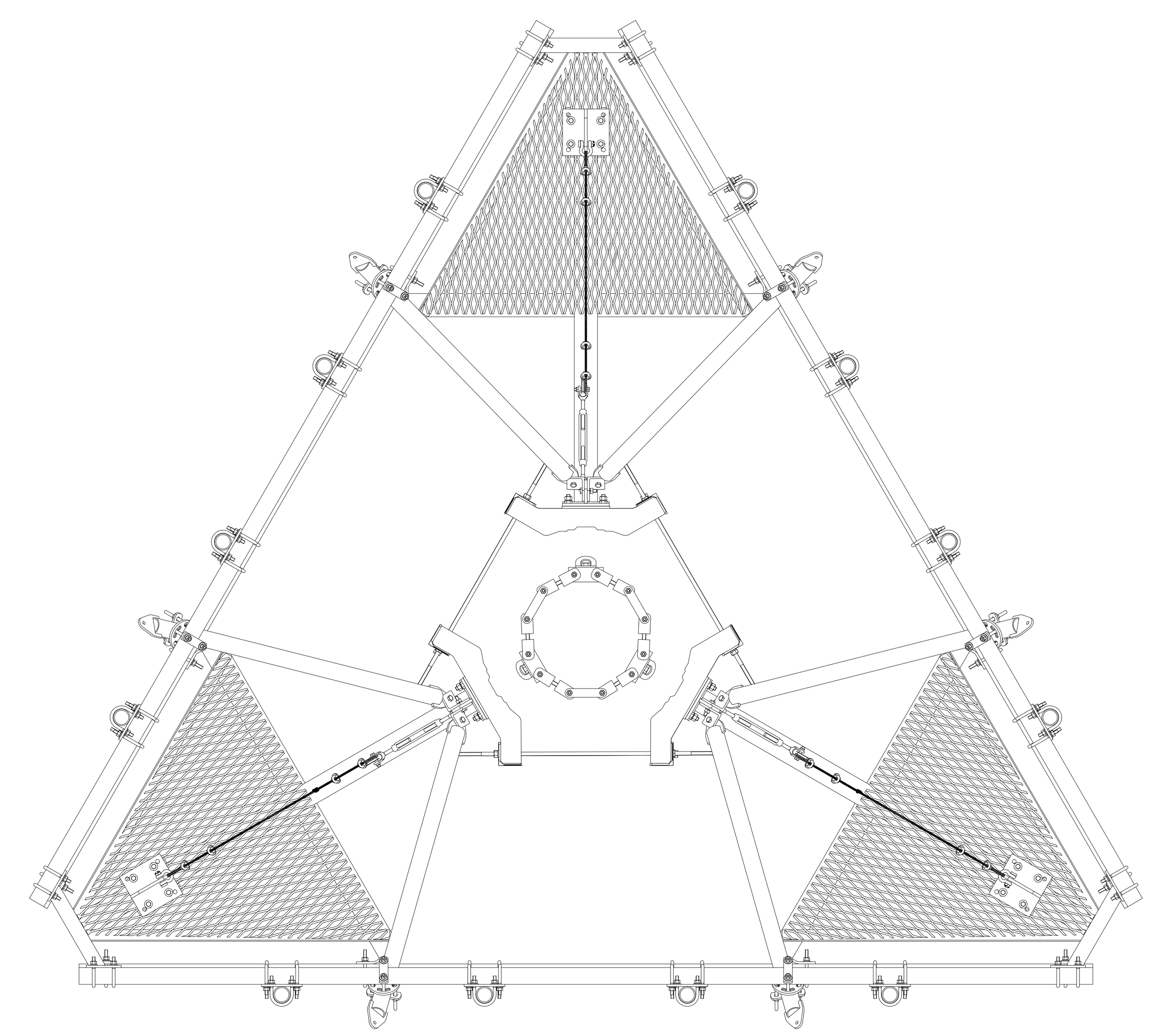

| ANDREW SMART BIAS-T | | |
|---|---|---|
| EQUIPMENT | DIMENSIONS | WEIGHT |
| MAKE: COMMSCOPE<br>MODEL: ATSBT-TOP-MF-4G | 5.63"L x 3.7"W x 2"D | ±1.7 LBS. |

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

## 4 C-3 PROPOSED BIAS-T DETAIL
SCALE: NOT TO SCALE

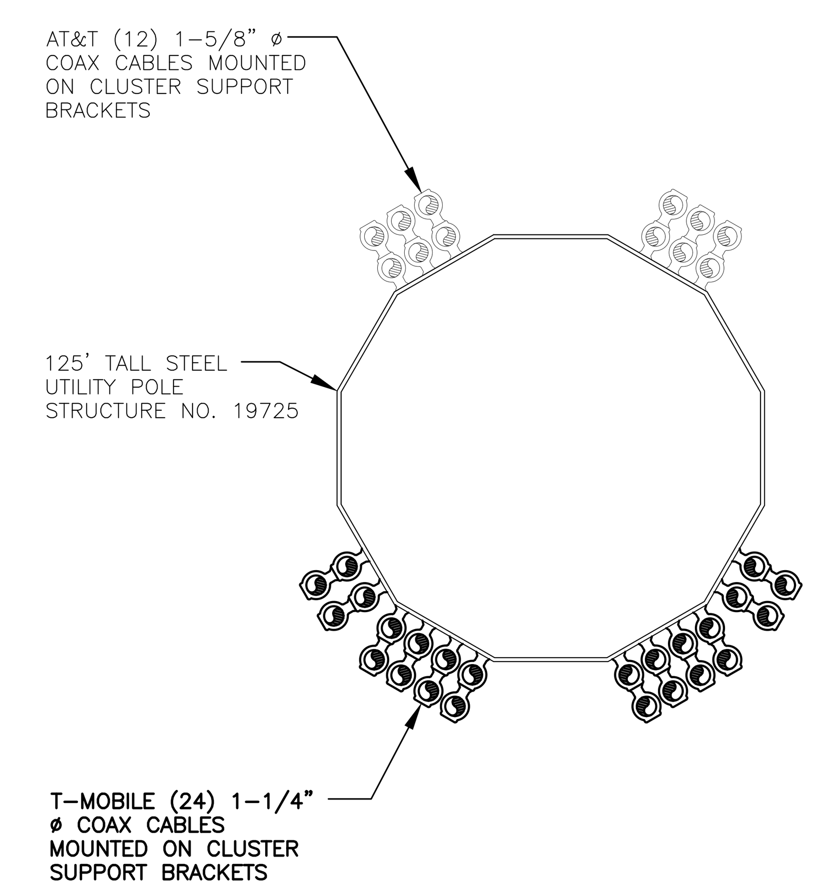



## 5 C-3 TYPICAL ICE-BRIDGE DETAIL
SCALE: NOT TO SCALE



SITEPRO1:
RMQLP-496-HK

## 6 C-3 PLATFORM ANTENNA MOUNT DETAIL
SCALE: NOT SCALE




## 7 C-3 COAX CABLE PLAN
SCALE: NOT SCALE

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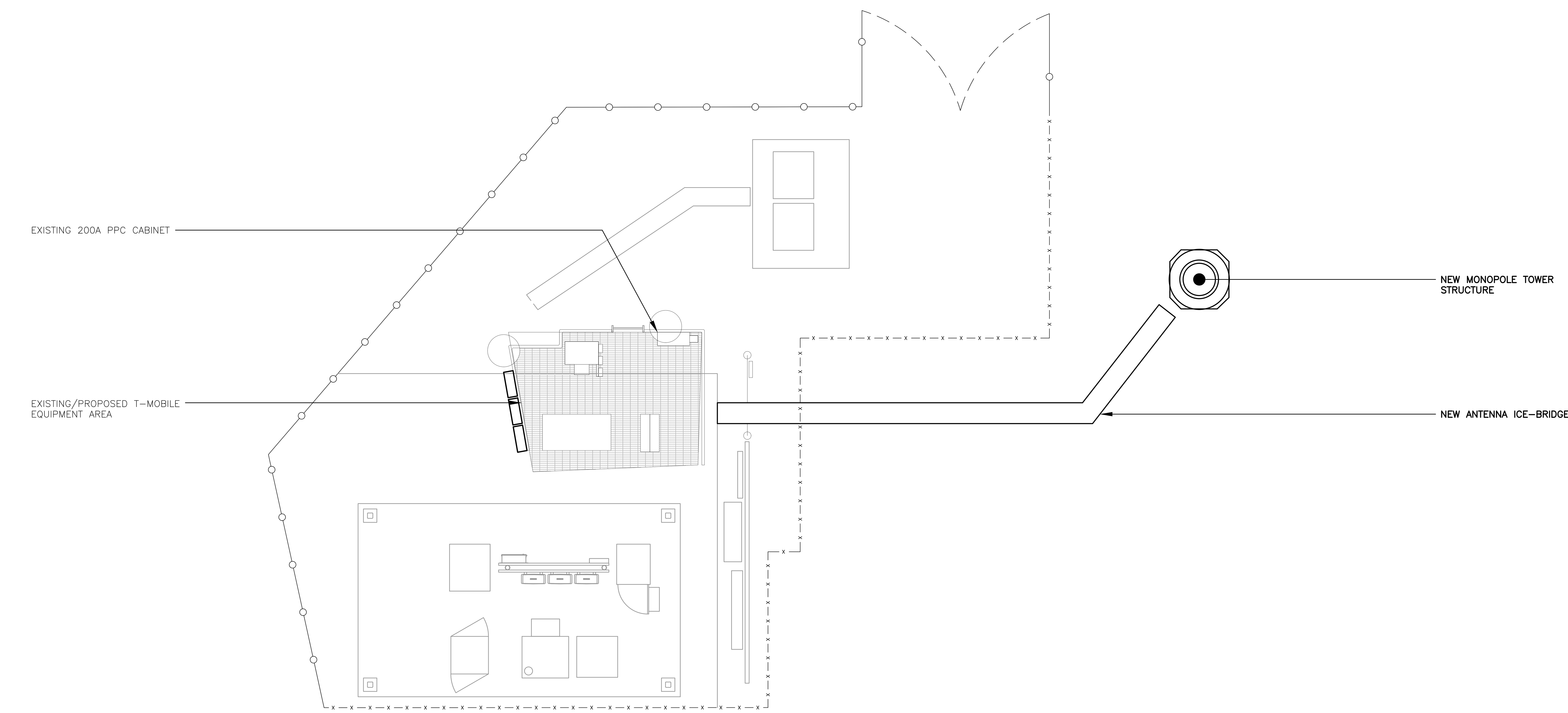
JOB NO. 22073.03

TYPICAL EQUIPMENT DETAILS

C-3

SHEET NO. 5 OF 12




1
E-1
## ELECTRICAL COMPOUND PLAN
SCALE: NOT TO SCALE

| REV. | DATE | DRAWN BY | CHECKED BY | DESCRIPTION |
|---|---|---|---|---|
| A | 07/28/22 | JLD | TJR | CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW |
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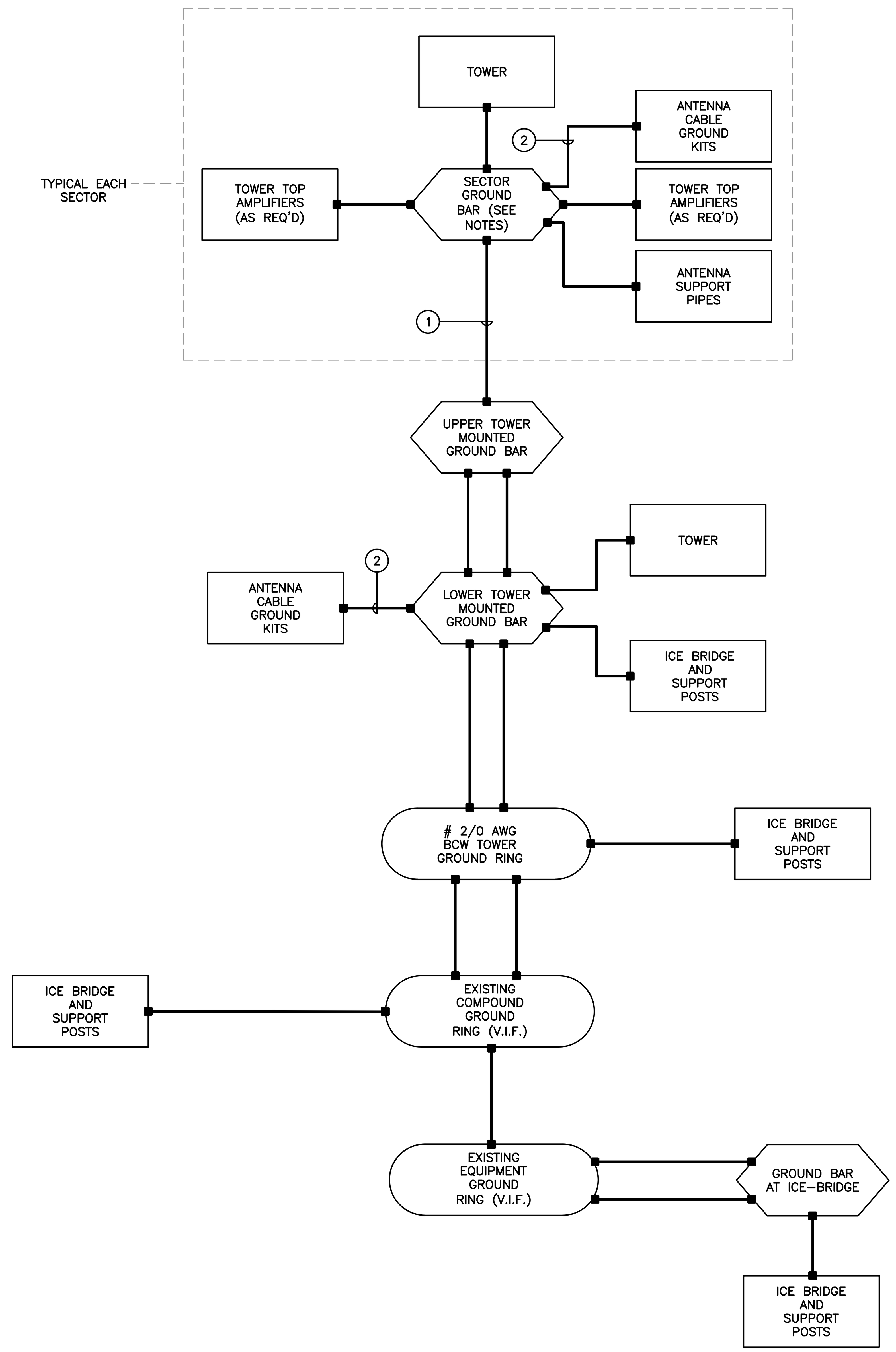
| | |
|---|---|
| DATE: | 07/28/22 |
| SCALE: | AS NOTED |
| JOB NO. | 22073.03 |

ELECTRICAL RISER DIAGRAM AND CONDUIT ROUTING

E-1

SHEET NO. 6 OF 12




1 / E-2 **ELECTRICAL GROUNDING SCHEMATIC**

SCALE: NOT TO SCALE

## GROUNDING SCHEMATIC NOTES

(1) #2/0 GREEN INSULATED

(2) #6 AWG

GENERAL NOTES:

1. ALL SURGE SUPPRESSION EQUIPMENT SHALL BE BONDED TO GROUND PER MANUFACTURER'S SPECIFICATIONS
2. UNLESS OTHERWISE NOTED OR REQUIRED BY CODE, GROUND CONDUCTORS SHOWN SHALL BE #2 AWG (SOLID TINNED BCW – EXTERIOR; STRANDED GREEN INSULATED – INTERIOR).
3. BOND CABLE TRAY AND ICE BRIDGE SECTIONS TOGETHER WITH #6 AWG STRANDED GREEN INSULATED JUMPERS.
4. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.
5. BOND ALL EQUIPMENT CABINETS AND BATTERY CABINETS TO GROUND PER MANUFACTURER'S SPECIFICATIONS.
6. ALL BONDS TO TOWER SHALL BE MADE IN STRICT ACCORDANCE WITH SPECIFICATIONS OF TOWER MANUFACTURER OR STRUCTURAL ENGINEER.
7. REFER TO GROUNDING PLAN FOR LOCATION OF GROUNDING DEVICES.
8. REFER TO ALL ELECTRICAL AND GROUNDING DETAILS.
9. COORDINATE ALL TOWER MOUNTED EQUIPMENT WITH OWNER.
10. ALL TOWER MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
11. ALL GROUNDING SHALL BE IN ACCORDANCE WITH NEC AND OWNER'S REQUIREMENTS.

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SITE ID: CT11317B

280 MOREHOUSE DR

FAIRFIELD, CT 06824

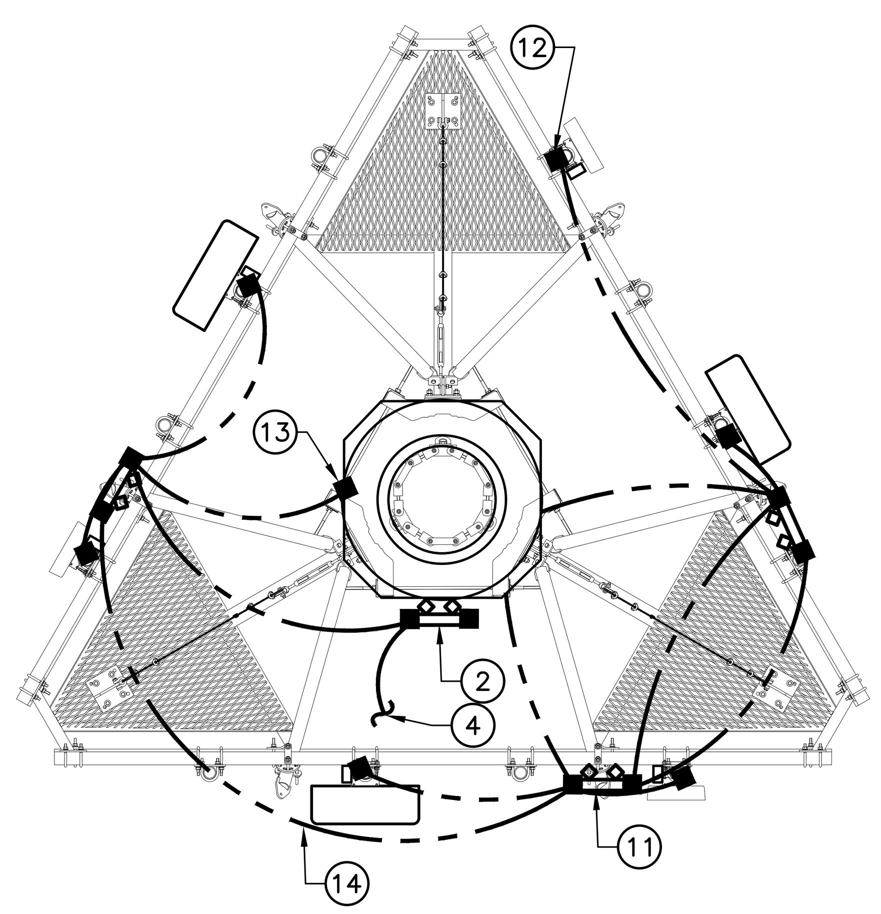
| | |
|---|---|
| DATE: | 07/28/22 |
| SCALE: | AS NOTED |
| JOB NO. | 22073.03 |

ELECTRICAL SCHEMATIC DIAGRAM

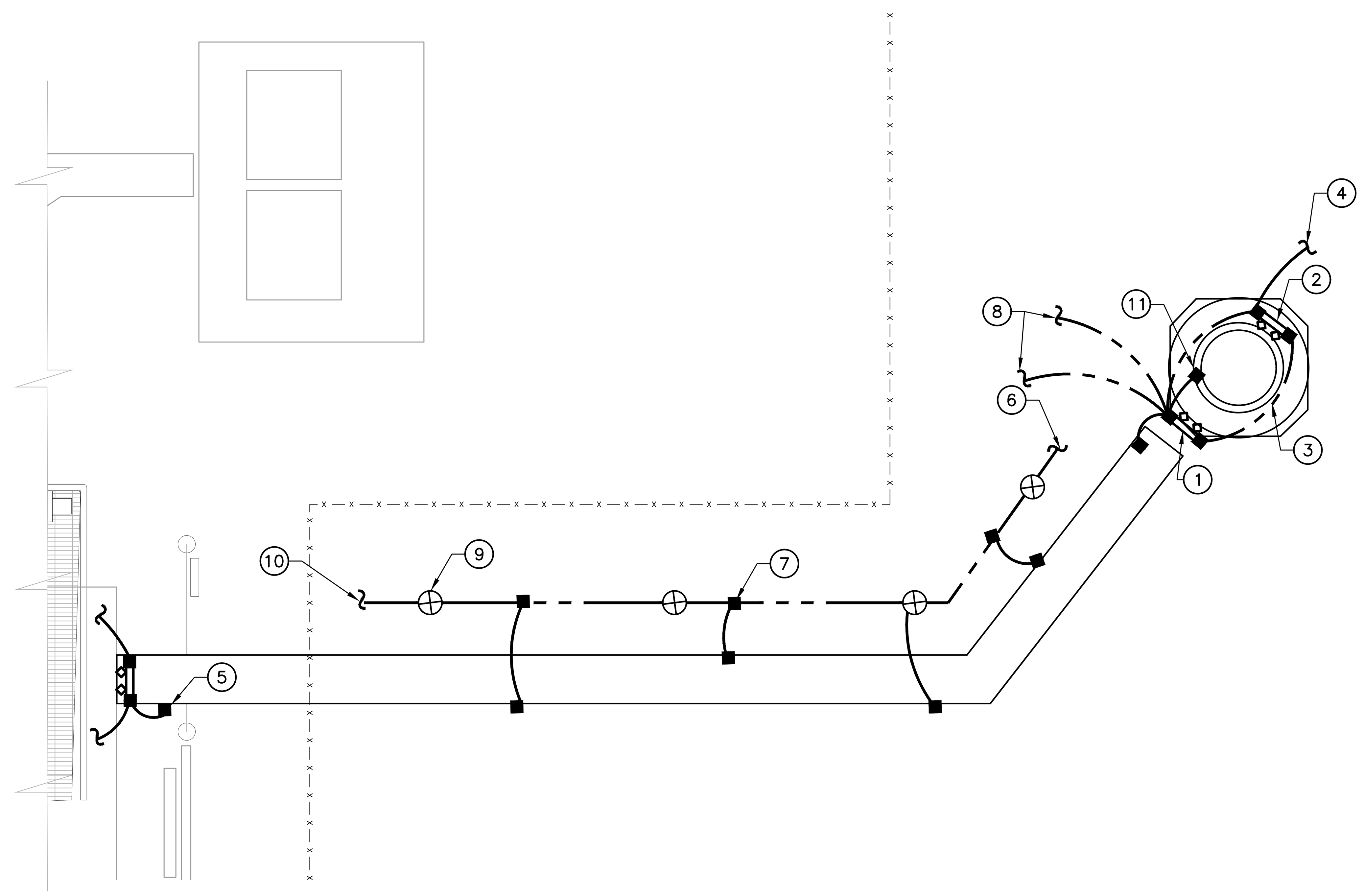
E-2

## GROUNDING PLAN NOTES

1. LOWER TOWER MOUNTED GROUND BAR.
2. UPPER TOWER MOUNTED GROUND BAR.
3. BOND UPPER TOWER MOUNTED GROUND BAR TO LOWER TOWER MOUNTED GROUND BAR (2) # 2/0 GROUND LEADS.
4. BOND UPPER TOWER MOUNTED GROUND BAR TO SECTOR GROUND BAR TYP.
5. BOND GROUND BAR TO ICE–BRIDGE TYP.
6. BOND GROUND RING TO EXISTING TOWER GROUND RING. VERIFY LOCATION OF EXISTING GROUND RING IN FIELD.
7. ICE BRIDGE POST AND COVER. BOND EACH SECTION AND SUPPORT TO GROUND RING.
8. BOND LOWER TOWER MOUNTED GROUND BAR TO GROUND RING TYP 2 PLACES.
9. GROUNDING ROD TYP.
10. BOND GROUND RING TO EXISTING COMPOUND GROUND RING. VERIFY LOCATION OF EXISTING GROUND RING IN FIELD.
11. SECTOR GROUND BAR TYP.
12. BOND ANTENNA MOUNTING PIPES TO SECTOR GROUND BAR. (TYPICAL)
13. BOND SECTOR GROUND BAR TO TOWER STEEL.
14. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.




1 / E-3 **ELECTRICAL GROUNDING PLAN - ANTENNA**
SCALE: NOT TO SCALE




2 / E-3 **ELECTRICAL GROUNDING PLAN - TOWER**
SCALE: NOT TO SCALE

| REV. | DATE | DRAWN BY | CHECKED BY | DESCRIPTION |
|---|---|---|---|---|
| 1 | 06/21/23 | ASC | TJR | CONSTRUCTION DRAWINGS – REVISED PER CLIENT COMMENTS |
| 0 | 06/05/23 | ASC | TJR | CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION |
| C | 05/24/23 | ASC | TJR | CONSTRUCTION DRAWINGS – REVISED PER CLIENT COMMENTS |
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**T-MOBILE NORTHEAST LLC**

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**FAIRFIELD, CT 06824**

| | |
|---|---|
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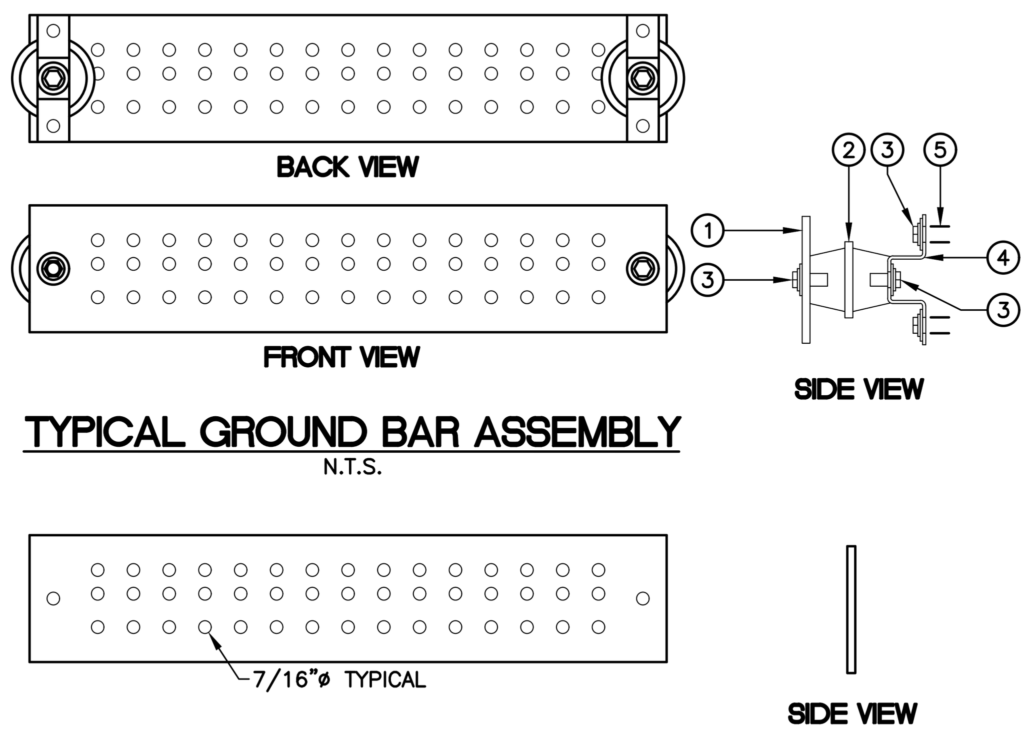
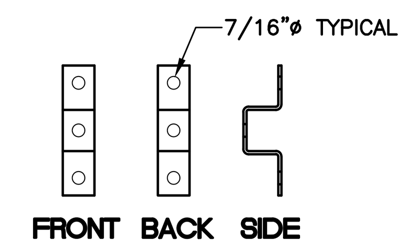
ELECTRICAL GROUNDING PLANS

# E-3



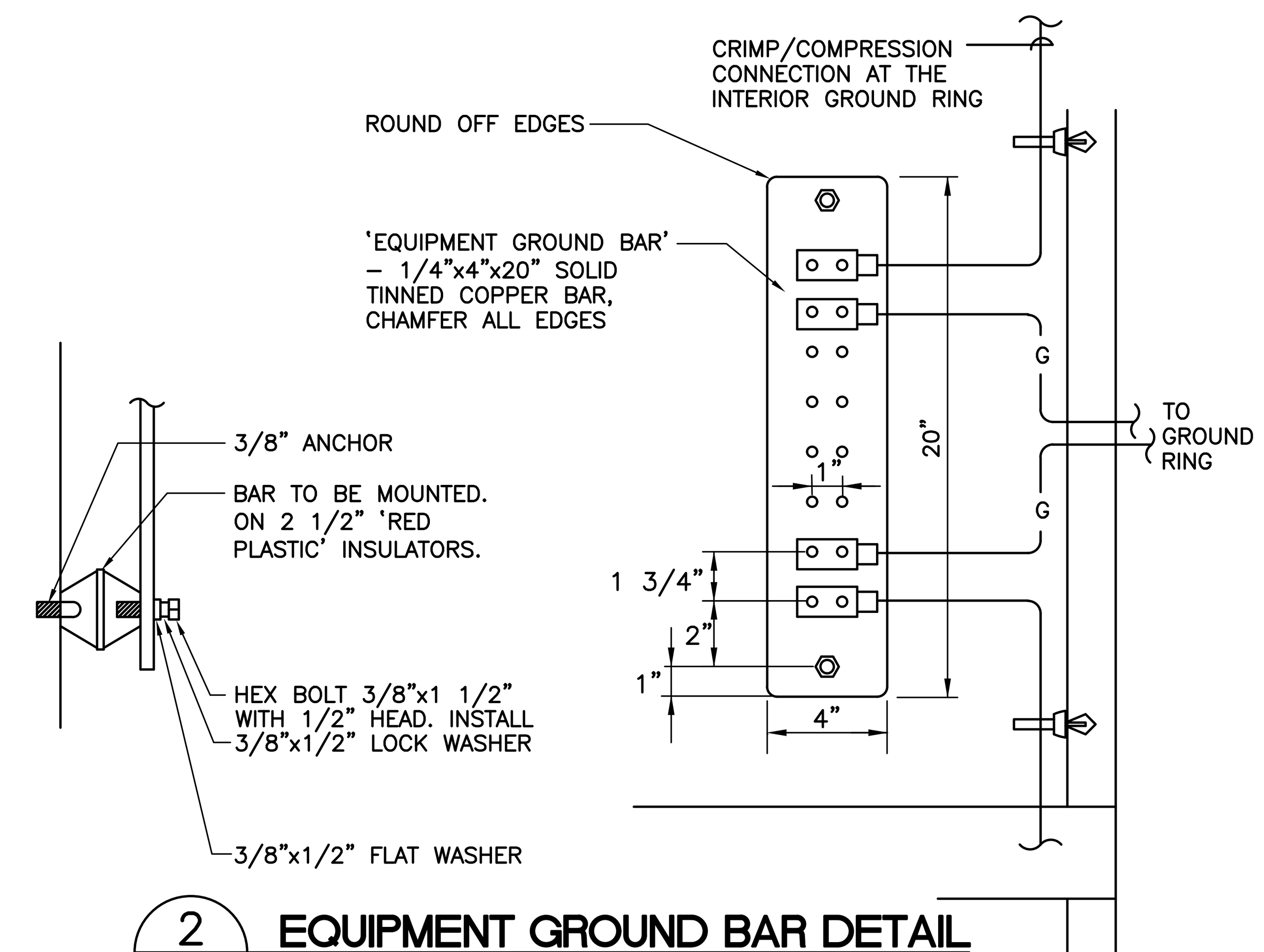

## NOTES

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

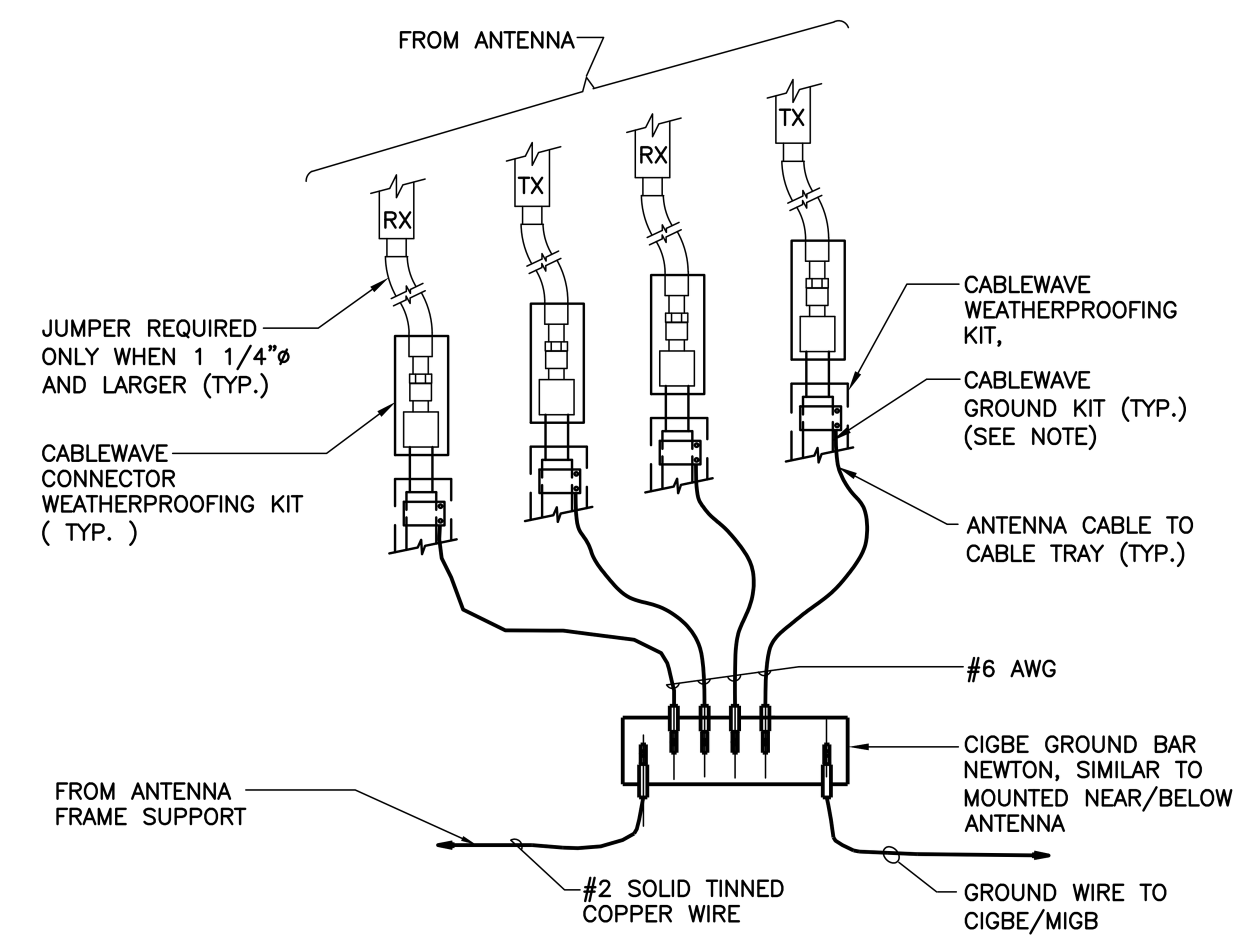



BRACKET FOR GROUND BAR-DIMENSIONS
N.T.S.

1 / E-4 **MASTER/EQUIPMENT GROUND BAR DETAILS**
SCALE: NOT TO SCALE



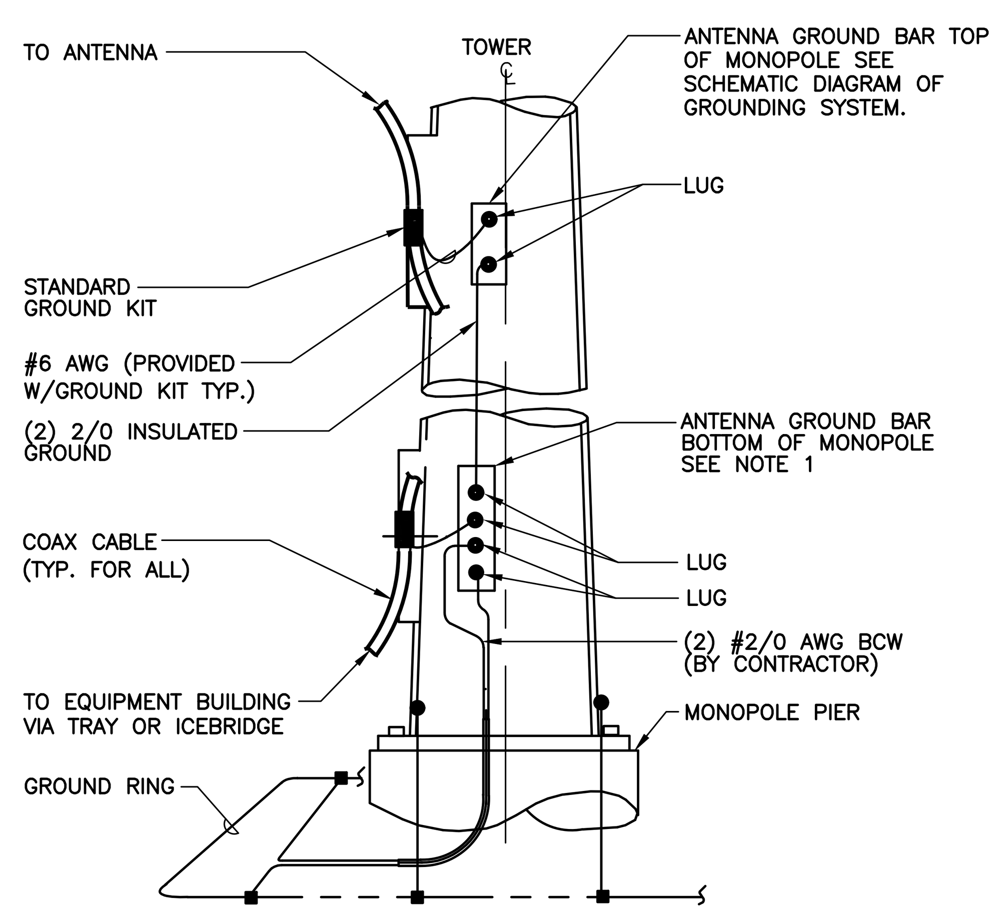

2 / E-4 **EQUIPMENT GROUND BAR DETAIL**
SCALE: NOT TO SCALE




**NOTES:**

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

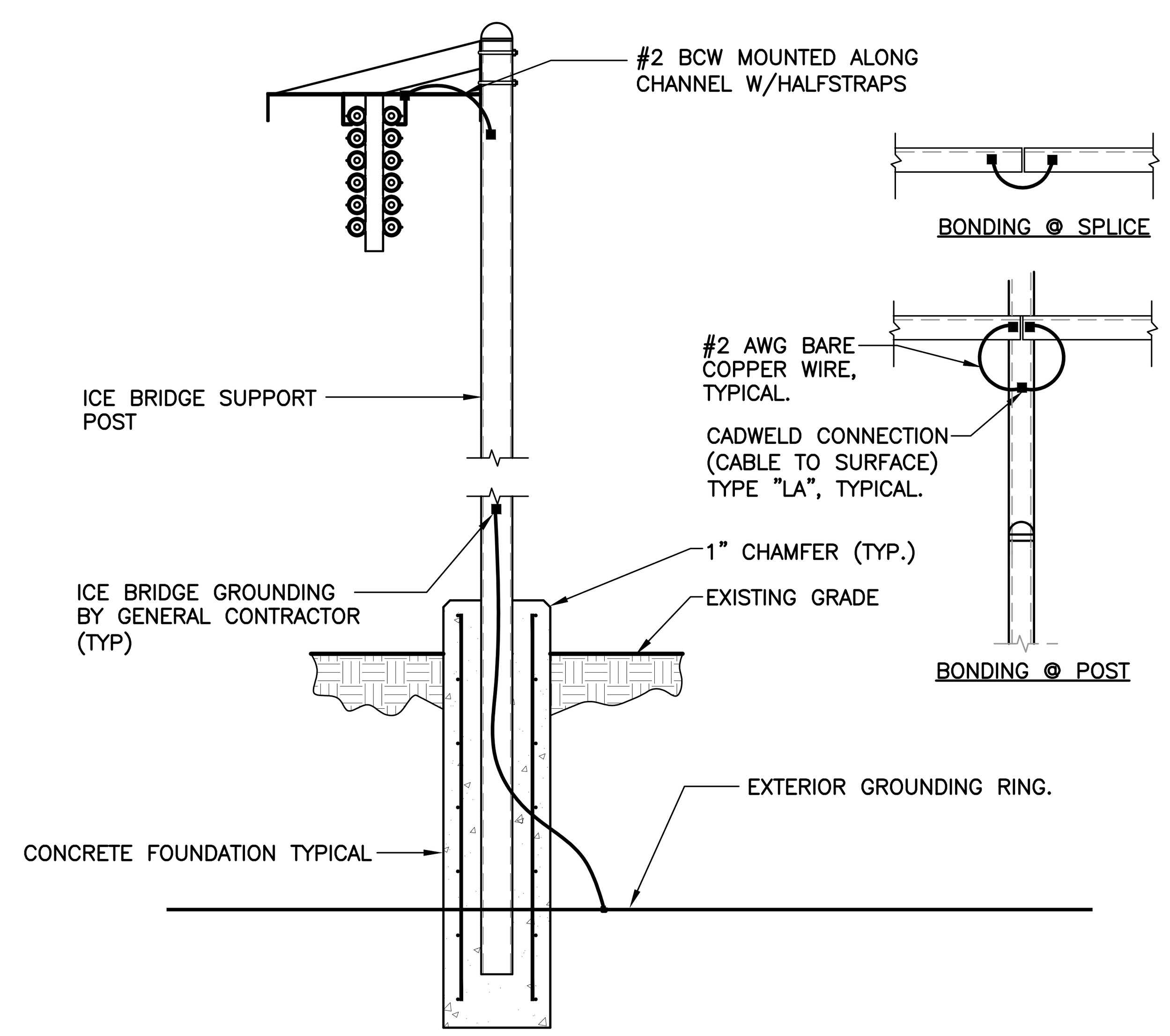
3 / E-4 **CONNECTION OF GROUND WIRES TO GROUND BAR**
SCALE: NOT TO SCALE




**NOTES:**

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

4 / E-4 **ANTENNA CABLE GROUNDING**
SCALE: NOT TO SCALE




5 / E-4 **ICE BRIDGE BONDING DETAIL**
SCALE: NOT TO SCALE

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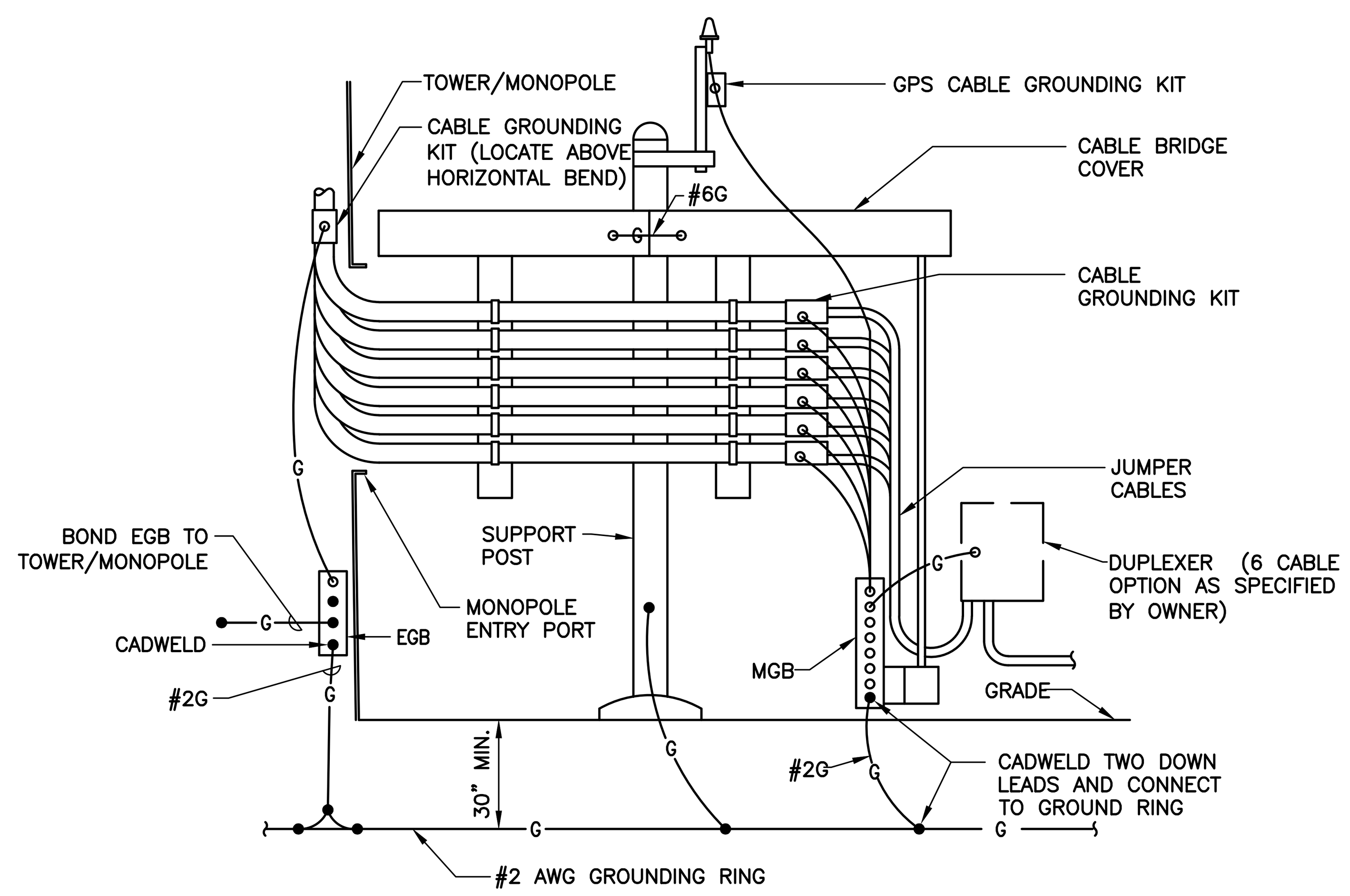
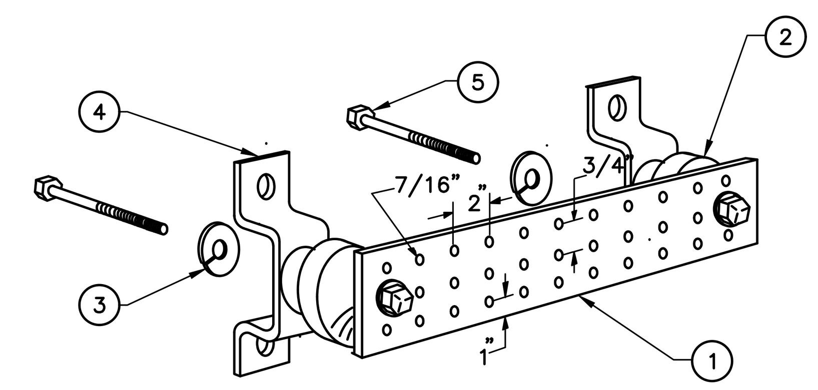
TYPICAL ELECTRICAL DETAILS

E-4

SHEET NO. 9 OF 12



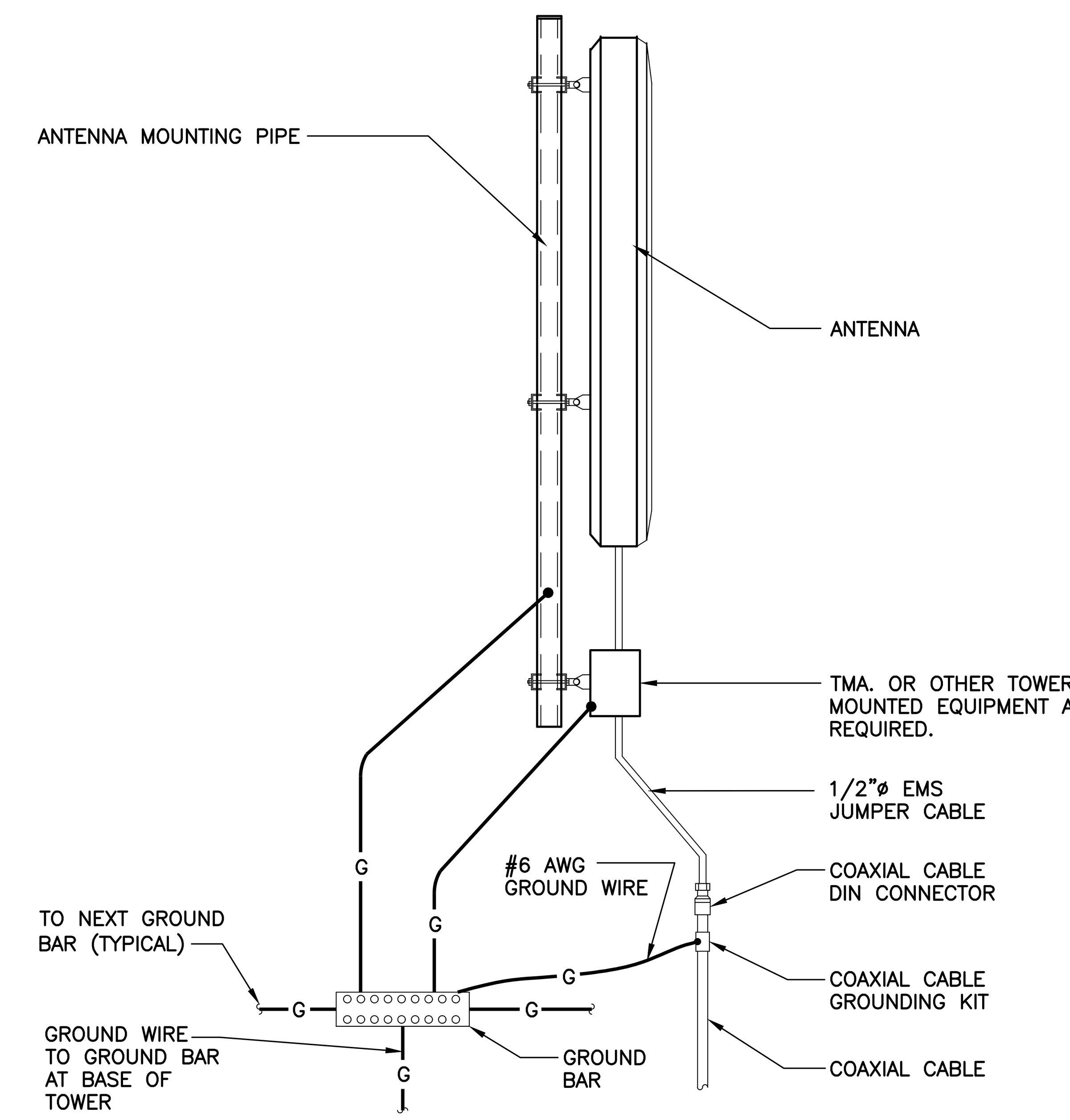

## 1 CABLE BRIDGE GROUNDING DIAGRAM
E-5
SCALE: NOT TO SCALE



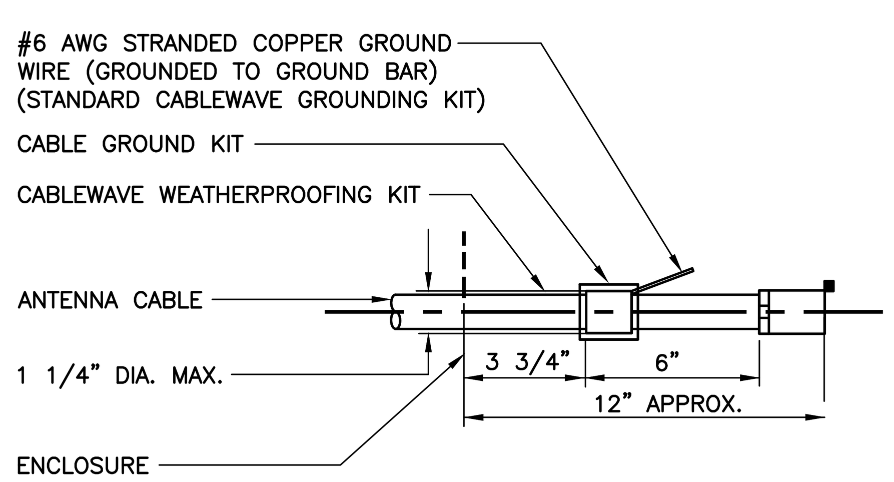

### NOTES

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

## 2 GROUND BAR DETAIL
E-5
SCALE: NOT TO SCALE



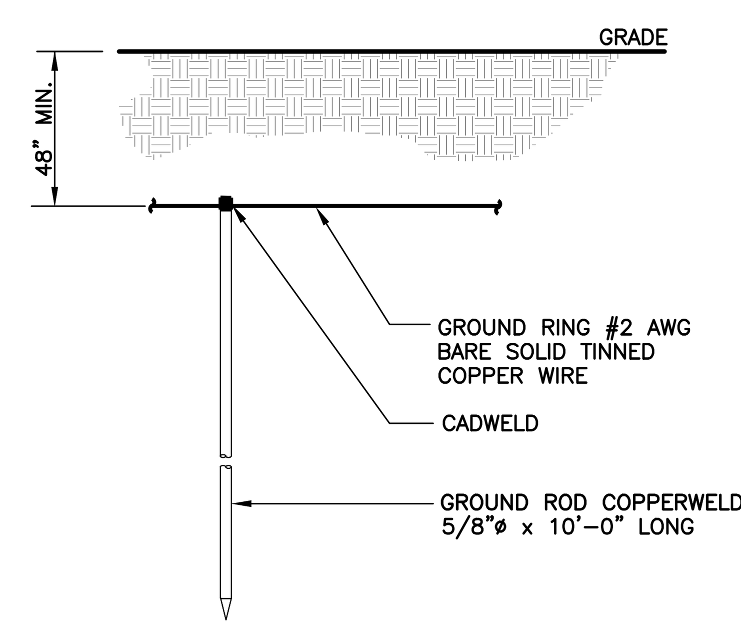

## 3 TYPICAL ANTENNA GROUNDING DETAIL
E-5
SCALE: NOT TO SCALE




**NOTES:**

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

## 4 ANTENNA CABLE GROUNDING DETAIL
E-5
SCALE: NOT TO SCALE

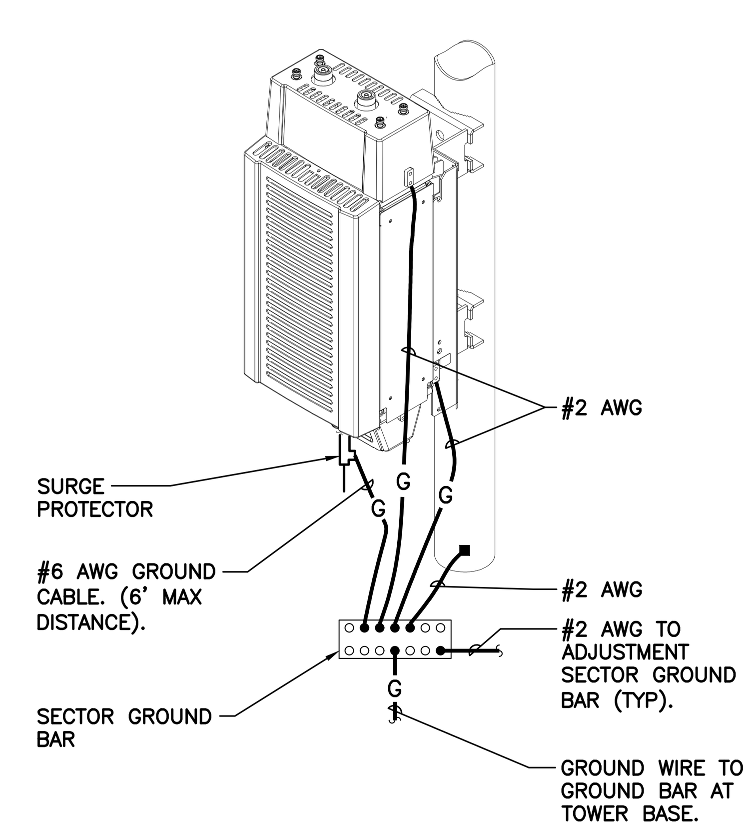



**NOTES:**

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

## 5 GROUND ROD DETAIL
E-5
SCALE: NOT TO SCALE

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




## 6 RRH POLE MOUNT GROUNDING
E-5
SCALE: NOT TO SCALE

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TYPICAL ELECTRICAL DETAILS

E-5

# ELECTRICAL SPECIFICATIONS

## SECTION 16010

1.02. GENERAL REQUIREMENTS

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

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

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

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

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

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

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

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

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

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

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

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

M. SHOP DRAWINGS:

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

2. CONTRACTOR SHALL SUBMIT SIX (6) COPIES OF ALL TEST REPORTS CALLED FOR IN THE SPECIFICATIONS AND DRAWINGS.

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

## SECTION 16111

1.01. CONDUITS

A. MINIMUM CONDUIT SIZE FOR BRANCH CIRCUITS, LOW VOLTAGE CONTROL AND ALARM CIRCUITS SHALL BE 3/4". CONDUITS SHALL BE PROPERLY FASTENED AS REQUIRED BY THE N.E.C.

B. THE INTERIOR OF RACEWAYS/ENCLOSURES INSTALLED UNDERGROUND SHALL BE CONSIDERED TO BE WET LOCATION, INSULATED CONDUCTORS SHALL BE LISTED FOR USE IN WET LOCATIONS. PROVIDE WEATHERPROOF CONSTRUCTION IN WET LOCATIONS.

C. CONDUIT INSTALLED UNDERGROUND SHALL BE INSTALLED TO MEET MINIMUM COVER REQUIREMENTS OF TABLE 300.5.

D. PROVIDE RIGID GALVANIZED STEEL CONDUIT (RMC) FOR THE FIRST 10 FOOT SECTION WHEN LEAVING A BUILDING OR SECTIONS PASSING THROUGH FLOOR SLABS

E. ONLY LISTED PVC CONDUIT AND FITTINGS ARE PERMITTED FOR THE INSTALLATION OF ELECTRICAL CONDUCTORS, SUITABLE FOR UNDERGROUND APPLICATIONS.

### CONDUIT SCHEDULE SECTION 16111

| CONDUIT TYPE | NEC REFERENCE | APPLICATION | MIN. BURIAL DEPTH (PER NEC TABLE 300.5) [2,3] |
|---|---|---|---|
| EMT | ARTICLE 358 | INTERIOR CIRCUITING, EQUIPMENT ROOMS, SHELTERS | N/A |
| RMC, RIGID GALV. STEEL | ARTICLE 344, 300.5, 300.50 | ALL INTERIOR/ EXTERIOR CIRCUITING, ALL UNDERGROUND INSTALLATIONS. | 6 INCHES |
| PVC, SCHEDULE 40 | ARTICLE 352, 300.5, 300.50 | INTERIOR/ EXTERIOR CIRCUITING AND GROUNDING SYSTEMS, UNDERGROUND INSTALLATIONS, WHERE NOT SUBJECT TO PHYSICAL DAMAGE. [1] | 18 INCHES |
| PVC, SCHEDULE 80 | ARTICLE 352, 300.5, 300.50 | INTERIOR/ EXTERIOR CIRCUITING AND GROUNDING SYSTEMS, UNDERGROUND INSTALLATIONS, WHERE SUBJECT TO PHYSICAL DAMAGE. [1] | 18 INCHES |
| LIQUID TIGHT FLEX. METAL | ARTICLE 350 | SHORT LENGTHS (MAX. 3FT.) WIRING TO VIBRATING EQUIPMENT IN WET LOCATIONS. | N/A |
| FLEX. METAL | ARTICLE 348 | SHORT LENGTHS (MAX. 3FT.) WIRING TO VIBRATING EQUIPMENT IN WET LOCATIONS. | N/A |

[1] PHYSICAL DAMAGE IS SUBJECT TO THE AUTHORITY HAVING JURISDICTION.

[2] UNDERGROUND CONDUIT INSTALLED UNDER ROADS, HIGHWAYS, DRIVEWAYS, PARKING LOTS SHALL HAVE MINIMUM DEPTH OF 24".

[3] WHERE SOLID ROCK PREVENTS COMPLIANCE WITH MINIMUM COVER DEPTHS, WIRING SHALL BE INSTALLED IN PERMITTED RACEWAY FOR DIRECT BURIAL. THE RACEWAY SHALL BE COVERED BY A MINIMUM OF 2" OF CONCRETE EXTENDING DOWN TO ROCK.

## SECTION 16123

1.01. CONDUCTORS

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

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

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

## SECTION 16130

1.01. BOXES

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

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

## SECTION 16140

1.01. WIRING DEVICES

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

1. 15 MINUTE TIMER SWITCH – INTERMATIC #FF15M (INTERIOR LIGHTS)

2. DUPLEX RECEPTACLE – P&S #2095 (GFCI) SPECIFICATION GRADE

3. SINGLE POLE SWITCH – P&S #CSB20AC2 (20A-120V HARD USE) SPECIFICATION GRADE

4. DUPLEX RECEPTACLE – P&S #5362 (20A-120V HARD USE) SPECIFICATION GRADE

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

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

## SECTION 16170

1.01. DISCONNECT SWITCHES

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

## SECTION 16190

1.01. SEISMIC RESTRAINT

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

## SECTION 16195

1.01. LABELING AND IDENTIFICATION NOMENCLATURE FOR ELECTRICAL EQUIPMENT

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

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

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

## SECTION 16450

1.01. GROUNDING

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

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

C. GROUNDING OF PANELBOARDS:

1. PANELBOARD SHALL BE GROUNDED BY TERMINATING THE PANELBOARD FEEDER'S EQUIPMENT GROUND CONDUCTOR TO THE EQUIPMENT GROUND BAR KIT(S) LUGGED TO THE CABINET. ENSURE THAT THE SURFACE BETWEEN THE KIT AND CABINET ARE BARE METAL TO BARE METAL. PRIME AND PAINT OVER TO PREVENT CORROSION.

2. CONDUIT(S) TERMINATING INTO THE PANELBOARD SHALL HAVE GROUNDING TYPE BUSHINGS. THE BUSHINGS SHALL BE BONDED TOGETHER WITH BARE #10 AWG COPPER CONDUCTOR WHICH IN TURN IS TERMINATED INTO THE PANELBOARD'S EQUIPMENT GROUND BAR KIT(S).

D. EQUIPMENT GROUNDING CONDUCTOR:

1. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122.

2. THE MINIMUM SIZE OF EQUIPMENT GROUND CONDUCTOR SHALL BE #12 AWG COPPER.

3. EACH FEEDER OR BRANCH CIRCUIT SHALL HAVE EQUIPMENT GROUND CONDUCTOR(S) INSTALLED IN THE SAME RACEWAY(S).

E. CELLULAR GROUNDING SYSTEM:

CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 10 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16960).

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

1. GROUND BARS

2. EXTERIOR GROUNDING (WHERE REQUIRED DUE TO MEASURED AC RESISTANCE GREATER THAN SPECIFIED).

3. ANTENNA GROUND CONNECTIONS AND PLATES.

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

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

## SECTION 16470

1.01. DISTRIBUTION EQUIPMENT

A. REFER TO CONTRACT DRAWINGS FOR DETAILS AND SCHEDULES.

## SECTION 16477

1.01. FUSES

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

## SECTION 16960

1.01. TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

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

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

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

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

1. TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.

2. CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.

3. GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.

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

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

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

## SECTION 16961

1.01. TESTS BY CONTRACTOR

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

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

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

| REV. | DATE | DRAWN BY | CHECKED BY | DESCRIPTION |
|---|---|---|---|---|
| 1 | 06/21/23 | ASC | TJR | CONSTRUCTION DRAWINGS – REVISED PER CLIENT COMMENTS |
| 0 | 06/05/23 | ASC | TJR | CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION |
| C | 05/24/23 | ASC | TJR | CONSTRUCTION DRAWINGS – REVISED PER CLIENT COMMENTS |
| B | 04/14/23 | ASC | TJR | CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW |
| A | 07/28/22 | JLD | TJR | CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW |

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT
CARLO F. CENTORE
No.16694
LICENSED PROFESSIONAL ENGINEER

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

NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

T-MOBILE NORTHEAST LLC

SITE NAME: FAIRFIELD/MP/X44+X42
SITE ID: CT11317B
280 MOREHOUSE DR
FAIRFIELD, CT 06824

DATE: 07/28/22
SCALE: AS NOTED
JOB NO. 22073.03

ELECTRICAL SPECIFICATIONS

E-6

# Exhibit D

**Structural Analysis Report**

CENTEK engineering

Centered on Solutions℠

# Structural Analysis of Utility Pole

T-Mobile Site Ref: CT11317B

Eversource Structure No. 19725

125' Tall Electric Transmission Pole

280 Morehouse Road

Fairfield, CT

CENTEK Project No. 22073.03

Date: April 6, 2023

Max Stress Ratio = 88.7%

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

**Prepared for:**
T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

# Table of Contents

## *Introduction*

The purpose of this report is to analyze the 125' utility pole located in Fairfield, CT for the proposed antenna and equipment upgrade by T-Mobile.

The loads consist of the following:

- AT&T (Final Configuration):
  Antennas: Three (3) CCI TPA65R-BU4D panel antennas and six (6) Commscope TMAT192123B68-31 TMAs mounted on one (1) Platform (SitePro p/n RMQLP-4120-H10) to the utility pole with a RAD center elevation of 111-ft above grade.
  Cables: Twelve (12) 1-5/8" ∅ coax cables mounted to the outside of the pole as indicated in Section 4 of this report.

- **T-MOBILE (Final Configuration):**
  **Antennas: Three (3) RFS APXVAALL24_43 panel antennas, three (3) RFS APX16DWV-16DWVS panel antennas and six (6) Commscope ATSBT-TOP-MF-4G Bias Tees mounted on one (1) Platform (SitePro p/n RMQLP-496-HK) to the utility pole with a RAD center elevation of 121-ft above grade.**
  **Cables: Twenty-four (24) 1-1/4" ∅ coax cables mounted to the outside of the pole as indicated in Section 4 of this report.**

## *Primary assumptions used in the analysis*

- Design steel stresses are defined by AISC-LRFD 14th edition for design of the antenna Mast and antenna supporting elements.
- ASCE Manual No. 48-19, "Design of Steel Transmission Pole Structures", defines allowable steel stresses for evaluation of the utility pole.
- All utility pole members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- Pipe mast will be properly installed and maintained.
- No residual stresses exist due to incorrect pole erection.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds conform to the requirements of AWS D1.1.
- Pipe mast and utility pole will be in plumb condition.
- Utility pole was properly installed and maintained and all members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
- Any deviation from the analyzed loading will require a new analysis for verification of structural adequacy.

## Analysis

Structural analysis of the utility pole was independently completed using the current version of PLSPole computer program licensed to CENTEK Engineering, Inc.

NESC prescribed loads for the proposed wireless equipment were calculated to analyze the utility tower. Section 5 of this report details these loads.

## Design Basis

Our analysis was performed in accordance with ASCE 48-19, "Design of Steel Transmission Pole Structures", NESC C2-2023 and Eversource Design Criteria.

- UTILITY POLE ANALYSIS

  The purpose of this analysis is to determine the adequacy of the existing utility pole to support the proposed antenna loads. The loading and design requirements were analyzed in accordance with the Eversource Design Criteria Table, NESC C2-2023 ~ Construction Grade B, and ASCE Manual No. 48-19.

  Load cases considered:

  Load Case 1: NESC Heavy Wind
  Wind Pressure.................................. 4.0 psf
  Radial Ice Thickness............................ 0.5"
  Vertical Overload Capacity Factor............ 1.50
  Wind Overload Capacity Factor................ 2.50
  Wire Tension Overload Capacity Factor...... 1.65

  Load Case 2: NESC Extreme Wind
  Wind Speed.................................... 110 mph [(1)]
  Radial Ice Thickness............................ 0"

  Load Case 3: NESC Extreme Ice w/ Wind
  Wind Pressure.................................. 6.4 psf
  Radial Ice Thickness............................ 0.75"
  Vertical Overload Capacity Factor............ 1.0
  Wind Overload Capacity Factor................ 1.0

*Note 1: NESC C2-2023, Section25, Rule 250C: Extreme Wind Loading, 1.25 x Gust Response Factor (wind speed: 3-second gust)*

## *Results*

- UTILITY POLE

This analysis finds that the subject utility pole is adequate to support the proposed antenna mast and related appurtenances. The pole stresses meet the requirements set forth by the ASCE Manual No. 48-19, "Design of Steel Transmission Pole Structures", for the applied NESC Heavy and Hi-Wind load cases. The detailed analysis results are provided in Section 6 of this report. The analysis results are summarized as follows:

A maximum usage of **88.66%** occurs in the utility pole base plate under the **NESC Extreme** loading condition.

POLE SECTION:

The utility pole was found to be within allowable limits.

| Tower Section | Elevation | Stress Ratio (% of capacity) | Result |
|---|---|---|---|
| Section 3 | 53.00' -100.00' (AGL) | 57.96% | **PASS** |

BASE PLATE:

The base plate was found to be within allowable limits from the PLS output.

| Tower Component | Design Limit | Stress Ratio (percentage of capacity) | Result |
|---|---|---|---|
| Base Plate | Bending | 88.66% | **PASS** |

FLANGE:

The flange bolts and flange plate were found to be within allowable limits.

| Tower Component | Design Limit | Stress Ratio (% of capacity) | Result |
|---|---|---|---|
| Flange Bolts | Tension | 54.6% | **PASS** |
| Flange Plate | Bending | 50.1% | **PASS** |

- FOUNDATION AND ANCHORS

The base of the tower is connected to the foundation by means of (24) 2.25"∅, ASTM A615-75 anchor bolts embedded into the concrete foundation structure. Review of the foundation consisted of a comparison of the base reactions obtained from the proposed tower analysis and the original foundation design.

BASE REACTIONS:

From PLS-Pole analysis of utility pole based on NESC/NU prescribed loads.

| Load Case | Shear | Axial | Moment |
|---|---|---|---|
| NESC Heavy Wind | 29.48 kips | 115.65 kips | 2386.79 ft-kips |
| NESC Extreme Wind | 53.61 kips | 57.99 kips | 4344.25 ft-kips |
| NESC Extreme Ice w/ Wind | 22.73 kips | 101.83 kips | 1854.34 ft-kips |

Note 1 – 10% increase to be applied to tower base reactions for foundation verification per OTRM 051

ANCHOR BOLTS:

The anchor bolts were found to be within allowable limits.

| Tower Component | Design Limit | Stress Ratio (% of capacity) | Result |
|---|---|---|---|
| Anchor Bolts | Tension | 50.9% | **PASS** |

FOUNDATION:

| Force | Original Design Loading | Proposed Loading | Result |
|---|---|---|---|
| Moment | 7,478 ft-kips | 4,779 ft-kips | **PASS** |
| Shear | 97.3 kips | 59.0 kips | **PASS** |

*Note 1: Taken from Sabre design calculations.*

## Conclusion

This analysis shows that the subject utility pole **is adequate** to support the proposed equipment upgrade.

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

# *S T A N D A R D  C O N D I T I O N S  F O R  F U R N I S H I N G  O F  P R O F E S S I O N A L  E N G I N E E R I N G  S E R V I C E S  O N  E X I S T I N G  S T R U C T U R E S*

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

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.

- Information from the field and/or drawings in the possession of CENTEK engineering, Inc. or generated by field inspections or measurements of the structure.

- It is the responsibility of the client to ensure that the information provided to CENTEK engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.

- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222.

- All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. CENTEK engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

## *GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ PLS-POLE*

PLS-POLE provides all of the capabilities a structural engineer requires to design transmission, substation or communications structures. It does so using a simple easy to use graphical interface that rests upon our time tested finite element engine. Regardless of whether you want to model a simple wood pole or a guyed steel X-Frame; PLS-POLE can handle the job simply, reliably and efficiently.

Modeling Features:

- Structures are made of standard reusable components that are available in libraries. You can easily create your own libraries or get them from a manufacturer
- Structure models are built interactively using interactive menus and graphical commands
- Automatic generation of underlying finite element model of structure
- Steel poles can have circular, 4, 6, 8, 12, 16, or 18-sided, regular, elliptical or user input cross sections (flat-to-flat or tip-to-tip orientations)
- Steel and concrete poles can be selected from standard sizes available from manufacturers
- Automatic pole class selection
- Cross brace position optimizer
- Capability to specify pole ground line rotations
- Capability to model foundation displacements
- Can optionally model foundation stiffness
- Guys are easily handled (modeled as exact cable elements in nonlinear analysis)
- Powerful graphics module (members color-coded by stress usage)
- Graphical selection of joints and components allows graphical editing and checking
- Poles can be shown as lines, wire frames or can be rendered as 3-d polygon surfaces

Analysis Features:

- Automatic distribution of loads in 2-part suspension insulators (v-strings, horizontal vees, etc.)
- Design checks for ASCE, ANSI/TIA/EIA 222 (Revisions F and G) or other requirements
- Automatic calculation of dead and wind loads
- Automated loading on structure (wind, ice and drag coefficients) according to:
    - ASCE 74-1991
    - NESC 2002
    - NESC 2007
    - IEC 60826:2003
    - EN50341-1:2001 (CENELEC)
    - EN50341-3-9:2001 (UK NNA)
    - EN50341-3-17:2001 (Portugal NNA)
    - ESAA C(b)1-2003 (Australia)
    - TPNZ (New Zealand)
    - REE (Spain)
    - EIA/TIA 222-F
    - ANSI/TIA 222-G
    - CSA S37-01
- Automated microwave antenna loading as per EIA/TIA 222-F and ANSI/TIA 222-G
- Detects buckling by nonlinear analysis

Results Features:

- Detects buckling by nonlinear analysis
- Easy to interpret text, spreadsheet and graphics design summaries
- Automatic determination of allowable wind and weight spans
- Automatic determination of interaction diagrams between allowable wind and weight spans
- Automatic tracking of part numbers and costs

# *Criteria for Design of PCS Facilities On or Extending Above Metal Electric Transmission Towers & Analysis of Transmission Towers Supporting PCS Masts* [(1)]

## *Introduction*

This criteria is the result from an evaluation of the methods and loadings specified by the separate standards, which are used in designing telecommunications towers and electric transmission towers. That evaluation is detailed elsewhere, but in summary; the methods and loadings are significantly different. This criteria specifies the manner in which the appropriate standard is used to design PCS facilities including masts and brackets (hereafter referred to as “masts”), and to evaluate the electric transmission towers to support PCS masts. The intent is to achieve an equivalent level of safety and security under the extreme design conditions expected in Connecticut and Massachusetts.

ANSI Standard TIA-222 covering the design of telecommunications structures specifies a limit state design approach. This approach applies the loads from extreme weather loading conditions, and designs the structure so that the design strength exceeds the required strength.

ANSI Standard C2-2023 (National Electrical Safety Code) covering the design of electric transmission metal structures is based upon an ultimate strength/yield stress design approach. This approach applies a multiplier (overload capacity factor) to the loads possible from extreme weather loading conditions, and designs the structure so that it does not exceed its ultimate strength (yield stress).

Each standard defines the details of how loads are to be calculated differently. Most of the NU effort in “unifying” both codes was to establish what level of strength each approach would provide, and then increasing the appropriate elements of each to achieve a similar level of security under extreme weather loadings.

Two extreme weather conditions are considered. The first is an extreme wind condition (hurricane) based upon a 50-year recurrence (2% annual probability). The second is a winter condition combining wind and ice loadings.

The following sections describe the design criteria for any PCS mast extending above the top of an electric transmission tower, and the analysis criteria for evaluating the loads on the transmission tower from such a mast from the lower portions of such a mast, and loads on the pre-existing electric lower portions of such a mast, and loads on the pre-existing electric transmission tower and the conductors it supports.

*Note 1: Prepared from documentation provide from Northeast Utilities.*

## *P C S   M a s t*

The PCS facility (mast, external cable/trays, including the initial and any planned future support platforms, antennas, etc. extending the full height above the top level of the electric transmission structure) shall be designed in accordance with the provisions of TIA 222-H:

## *E L E C T R I C   T R A N S M I S S I O N   T O W E R*

The electric transmission tower shall be analyzed using yield stress theory in accordance with the attached table titled "Eversource Design Criteria". This specifies uniform loadings (different from the TIA loadings) on the each of the following components of the installed facility:

- PCS mast for its total height above ground level, including the initial and planned future support platforms, antennas, etc. above the top of an electric transmission structure.
- Conductors are related devices and hardware.
- Electric transmission structure. The loads from the PCS facility and from the electric conductors shall be applied to the structure at conductor and PCS mast attachment points, where those load transfer to the tower.

The uniform loadings and factors specified for the above components in the table are based upon the National Electrical Safety Code 2023 Edition Extreme Wind (Rule 250C), Combined Ice and Wind (Rule 250B-Heavy) and Extreme Ice w/ Wind (Rule 250D) Loadings. These provide equivalent loadings compared to TIA and its loads and factors with the exceptions noted above. (Note that the NESC does not require the projected wind surfaces of structures and equipment to be increased by the ice covering.)

In the event that the electric transmission tower is not sufficient to support the additional loadings of the PCS mast, reinforcement will be necessary to upgrade the strength of the overstressed members.

### Attachment A
### Eversource Design Criteria

<table>
<tr><th></th><th></th><th>Attachment A<br>ES Design Criteria</th><th>Basic Wind Speed</th><th>Pressure</th><th>Height Factor</th><th>Gust Factor</th><th>Load or Stress Factor</th><th>Force Coef. - Shape Factor</th></tr>
<tr><td></td><td></td><td></td><td>V (MPH)</td><td>Q (PSF)</td><td>Kz</td><td>Gh</td><td></td><td></td></tr>
<tr><td rowspan="4">Ice Condition</td><td>TIA/EIA</td><td>Antenna Mount</td><td>TIA</td><td>TIA<br>(0.75Wi)</td><td>TIA</td><td>TIA</td><td>TIA, Section 3.1.1.1 disallowed for connection design</td><td>TIA</td></tr>
<tr><td rowspan="3">NESC Heavy</td><td>Tower/Pole Analysis with antennas extending above top of Tower/Pole (Yield Stress)</td><td>-----</td><td>4</td><td>1</td><td>1</td><td>2.5</td><td>1.6 Flat Surfaces<br>1.3 Round Surfaces</td></tr>
<tr><td>Tower/Pole Analysis with antennas below top of Tower/Pole (on two faces)</td><td>-----</td><td>4</td><td>1</td><td>1</td><td>2.5</td><td>1.6 Flat Surfaces<br>1.3 Round Surfaces</td></tr>
<tr><td>Conductors:</td><td colspan="6">Conductor Loads Provided by ES</td></tr>
<tr><td rowspan="4">High Wind Condition</td><td>TIA/EIA</td><td>Antenna Mount</td><td>85</td><td>TIA</td><td>TIA</td><td>TIA</td><td>TIA, Section 3.1.1.1 disallowed for connection design</td><td>TIA</td></tr>
<tr><td rowspan="3">NESC Extreme Wind</td><td>Tower/Pole Analysis with antennas extending above top of Tower/Pole</td><td colspan="5">For wind speed use OTRM 060 Map 1,<br>Rule 250C: Extreme Wind Loading<br>Apply a 1.25 x Gust Response Factor to all telecommunication equipment projected above top of tower/pole and apply a 1.0 x Gust Response Factor to the tower/pole structure</td><td>1.6 Flat Surfaces<br>1.3 Round Surfaces</td></tr>
<tr><td>Tower/Pole Analysis with antennas below top of Tower/Pole</td><td colspan="5">For wind speed use OTRM 060 Map 1,<br>Rule 250C: Extreme Wind Loading<br>Height above ground is based on overall height to top of tower/pole</td><td>1.6 Flat Surfaces<br>1.3 Round Surfaces</td></tr>
<tr><td>Conductors:</td><td colspan="6">Conductor Loads Provided by ES</td></tr>
<tr><td rowspan="4" colspan="2">NESC Extreme Ice with Wind Condition*</td><td>Tower/Pole Analysis with antennas extending above top of Tower/Pole</td><td colspan="5">For wind speed use OTRM 060 Map 1,<br>Rule 250D: Extreme Ice with Wind Loading<br>4 PSF Wind Load 1.25 x Gust Response Factor<br>Apply a 1.25 x Gust Response Factor to all telecommunication equipment projected above top of tower/pole and apply a 1.0 x Gust Response Factor to the tower/pole structure</td><td>1.6 Flat Surfaces<br>1.3 Round Surfaces</td></tr>
<tr><td>Tower/Pole Analysis with antennas below top of Tower/Pole</td><td colspan="5">For wind speed use OTRM 060 Map 1,<br>Rule 250D: Extreme Ice with Wind Loading<br>4 PSF Wind Load<br>Height above ground is based on overall height to top of tower/pole</td><td>1.6 Flat Surfaces<br>1.3 Round Surfaces</td></tr>
<tr><td>Conductors:</td><td colspan="6">Conductor Loads Provided by ES</td></tr>
<tr><td colspan="7">*Only for structures installed after 2007</td></tr>
</table>

determined from NESC applied loading conditions (not TIA Loads) on the structure and mount as specified below, and shall include the wireless communication mast and antenna loads per NESC criteria)

The strength reduction factor obtained from the field investigation shall be applied to the members or connections that are showing signs of deterioration from their original condition With the written approval of Eversource Transmission Line Engineering on a case by case the existing structures may be analyzed initially using the current NESC code, then it is permitted to use the original design code with the original conductor load should the existing tower fail the current NESC code.

The structure shall be analyzed using yield stress theory in accordance with Attachment A, "Eversource Design Criteria." This specifies uniform loadings (different from the TIA loadings) on each of the following components of the installed facility:

a) Wireless communication mast for its total height above ground level, including the initial and any planned future equipment (Support Platforms, Antennas, TMA's etc.) above the top of an electric transmission structure.

b) Conductors and related devices and hardware (wire loads will be provided by Eversource).

c) Electric Transmission Structure

i) The loads from the wireless communication equipment components based on NESC and Eversource Criteria in Attachment A, and from the electric conductors shall be applied to the structure at conductor and wireless communication mast attachment points, where those loads transfer to the tower. ii)

ii) Shape Factor Multiplier:

| NESC Structure Shape | Cd |
|---|---|
| Polyround (for polygonal steel poles) | 1.3 |
| Flat | 1.6 |
| Open Lattice | 3.2 |
| Pole with Coaxial Cable | See Below Table |

iii) When Coaxial Cables are mounted alongside the pole structure, the shape multiplier shall be:

| Mount Type | Cable Cd | Pole Cd |
|---|---|---|
| Coaxial Cables on outside periphery (One layer) | 1.45 | 1.45 |
| Coaxial Cables mounted on stand offs | 1.6 | 1.6 |

d) The uniform loadings and factors specified for the above components in Attachment A, "Eversource Design Criteria" are based upon the National Electric Safety Code 2007 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to the TIA and its loads and factors with the exceptions noted above.

| Northeast Utilities System | Wire Loads |
|---|---|

| | | | |
|---|---|---|---|
| Project Name | 1714/1720/1222 Line Rebuild | | |
| Work Order | 80060915 | | |
| Structure # | PCS-2 (19766 & 19725) | | |
| Line # | 1714/1720 | | |
| Prepared By | GJG | Date | 6/3/2022 |
| Checked By | JFAP | Date | 6/3/2022 |

**Structure Data**

| | | | |
|---|---|---|---|
| Structure Height (AGL) | 125 | Load Zone | Central CT |
| # of Circuits | 2 | Insulation Type | Suspension (Concrete Foundation |
| Insulator Weight | 150 | Broken Wire Side | Back |
| Broken Wire Side | Left | Structure Type | Double Circuit Steel Pole |

**Wire Data**

| Circuit # | Left | Right |
|---|---|---|
| Shield Wire | FOCAS-120 | FOCAS-120 |
| Conductor | FALCON/ACSS | FALCON/ACSS |
| # of Conductors | 1 | 1 |

**Line Geometry**

| | Circuit 1 | | | Circuit 2 | | |
|---|---|---|---|---|---|---|
| | Ahead | Back | Total | Ahead | Back | Total |
| Wind Span | 300 | 300 | 600 | 300 | 300 | 600 |
| Weight Span | 650 | 650 | 1300 | 650 | 650 | 1300 |
| Minimum Line Angle | 0 | 0 | 0 | 0 | 0 | 0 |
| Maximum Line Angle | 2.5 | 2.5 | 5 | 2.5 | 2.5 | 5 |

**Wire Tensions**

| | Left Circuit | | Right Circuit | | |
|---|---|---|---|---|---|
| | Ahead | Back | Ahead | Back | |
| NESC Rule 250B | 14000 | 14000 | 14000 | 14000 | Conductor |
| NESC Rule 250C | 13447 | 13447 | 13447 | 13447 | Conductor |
| NESC Rule 250D | 17202 | 17202 | 17202 | 17202 | Conductor |
| 60°F, No wind or ice | 7271 | 7271 | 7271 | 7271 | Conductor |
| NESC Rule 250B | 6000 | 6000 | 6000 | 6000 | Shield Wire |
| NESC Rule 250C | 6236 | 6236 | 6236 | 6236 | Shield Wire |
| NESC Rule 250D | 7829 | 7829 | 7829 | 7829 | Shield Wire |
| 60°F, No wind or ice | 2429 | 2429 | 2429 | 2429 | Shield Wire |

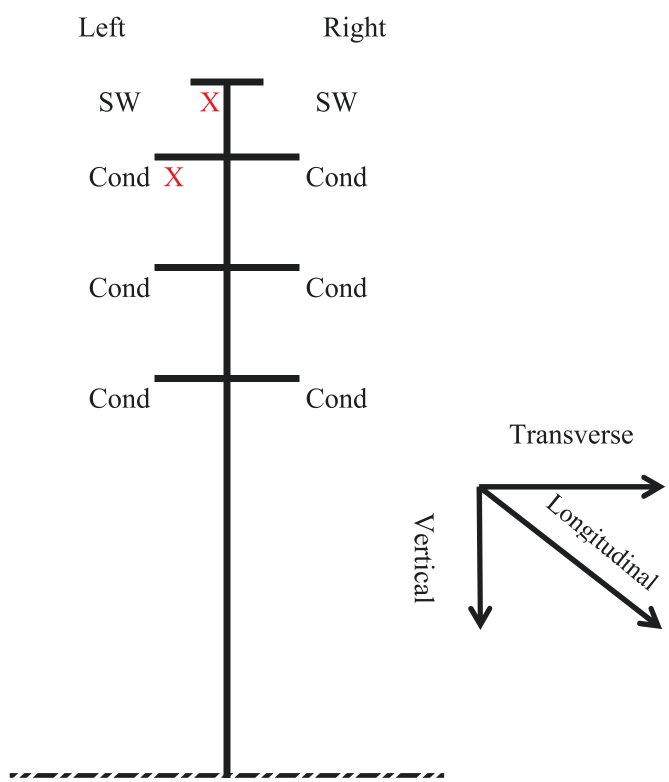
All Loads include Overload Factors but not Pole Shape Factors

| Load Case | Description |
|---|---|
| 1 | NESC Rule 250B; 0°F, ½" of ice, 4 psf wind |
| 2 | NESC Rule 250C; (Extreme Wind Loading) |
| 3 | NESC Rule 250C; Extreme Wind Longtitudinal On The Pole Only |
| 4 | NESC Rule 250D; 15°F 1" of ice, 4 psf or NU Ice Case; 32°F 1" Ice |
| 5 | NESC Rule 250B with no OLFs (Service Load) |
| 6 | 60°F, No wind or Ice (Deflection) |
| 7a | NESC Rule 250B/261C Broken Wire Case (Broken SW and Borken Conductor) |
| 7b | NESC Rule 250B/261C Broken Wire Case (Broken SW or Broken Phase) |

Northeast
Utilities System

# Wire Loads
# Load Tree

| | |
|---|---|
| Project Number | |
| 1714/1720/1222 Line Re | |
| Structure Number | |
| PCS-2 (19766 & 19725) | |
| Line Number | |
| 1714/1720 | |



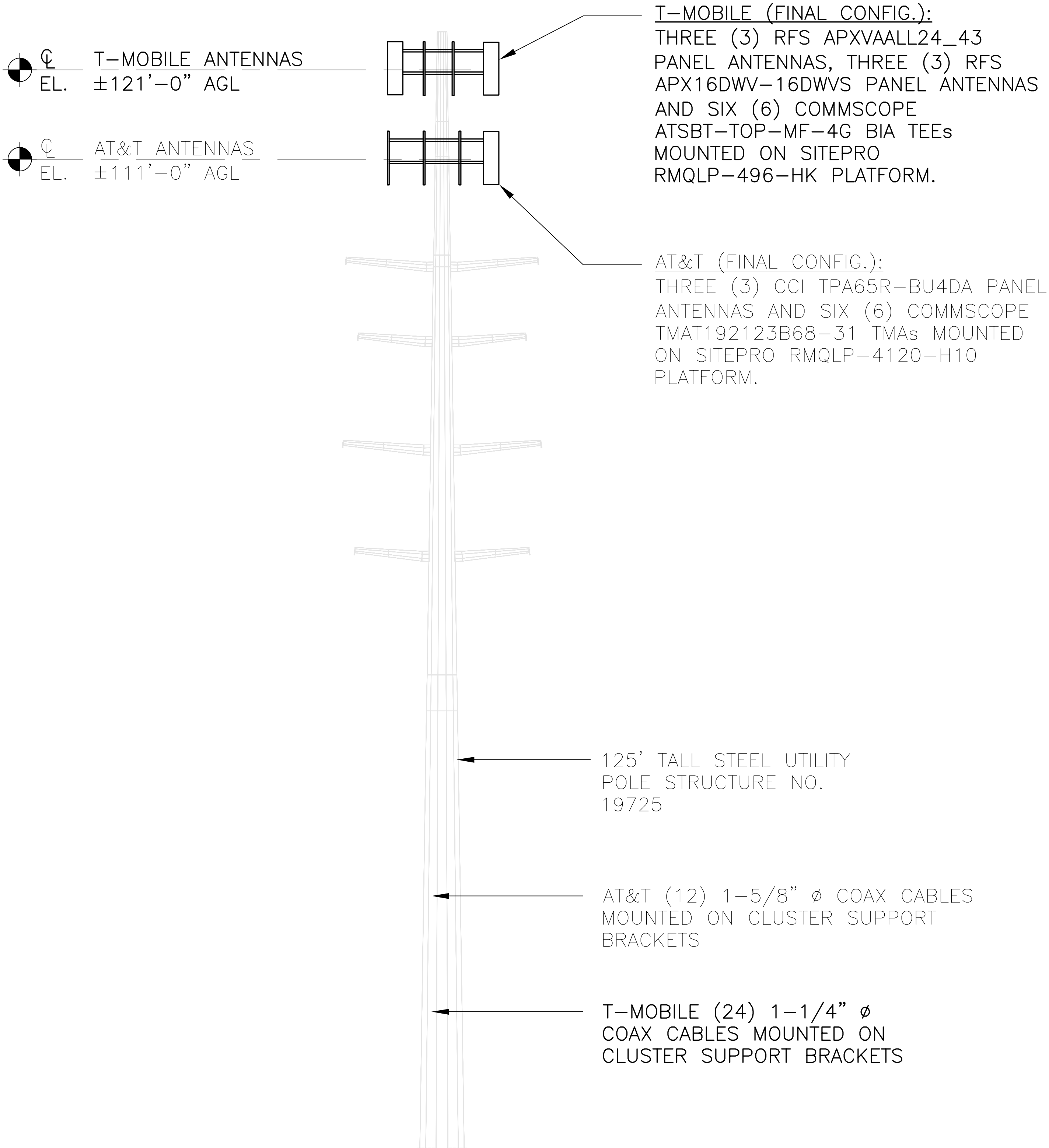

Double Circuit Steel Pole Configuration
X Denotes Broken Wire Location. This attachment receives case 7 loads. All others receive Case 1 Loads for Case 7

**Left Circuit**

| | Case | Vertical | Transverse | Longitudinal |
|---|---|---|---|---|
| Conductor | 1 | 6911.1105 | 2715.9771 | 0 |
| | 2 | 2953.82 | 3965.0998 | 0 |
| | 3 | 2953.82 | 634.31313 | 0 |
| | 4 | 7069.594 | 2249.6814 | 0 |
| | 5 | 4607.407 | 1770.3428 | 0 |
| | 6 | 2953.82 | 634.31313 | 0 |
| | 7a | 3455.5553 | 1357.9886 | 15400 |
| | 7b | 3455.5553 | 1357.9886 | 15400 |
| | Case | Vertical | Transverse | Longitudinal |
| Shield Wire | 1 | 2511.6702 | 1444.7759 | 0 |
| | 2 | 673.4 | 1724.821 | 0 |
| | 3 | 673.4 | 211.90298 | 0 |
| | 4 | 3484.0936 | 1230.5924 | 0 |
| | 5 | 1674.4468 | 871.03265 | 0 |
| | 6 | 673.4 | 211.90298 | 0 |
| | 7a | 1255.8351 | 722.38796 | 6600 |
| | 7b | 1255.8351 | 722.38796 | 6600 |

**Right Circuit**

| | Case | Vertical | Transverse | Longitudinal |
|---|---|---|---|---|
| Conductor | 1 | 6911.1105 | 2715.9771 | 0 |
| | 2 | 2953.82 | 3965.0998 | 0 |
| | 3 | 2953.82 | 634.31313 | 0 |
| | 4 | 7069.594 | 2249.6814 | 0 |
| | 5 | 4607.407 | 1770.3428 | 0 |
| | 6 | 2953.82 | 634.31313 | 0 |
| | 7a | 3455.5553 | 1357.9886 | 15400 |
| | 7b | 3455.5553 | 1357.9886 | 15400 |
| | Case | Vertical | Transverse | Longitudinal |
| Shield Wire | 1 | 2511.6702 | 1444.7759 | -6.281738 |
| | 2 | 673.4 | 1724.821 | -5.93529 |
| | 3 | 673.4 | 211.90298 | -2.31187 |
| | 4 | 3484.0936 | 1230.5924 | -7.451473 |
| | 5 | 1674.4468 | 871.03265 | -5.710671 |
| | 6 | 673.4 | 211.90298 | -2.31187 |
| | 7a | 1255.8351 | 722.38796 | 6593.7183 |
| | 7b | 1255.8351 | 722.38796 | 6593.7183 |




1
SK-1

# TOWER ELEVATION

SCALE: NOT TO SCALE

| REVISIONS | | |
|---|---|---|
| 00 | 4/6/23 | ISSUED FOR REVIEW |
| 01 | 5/5/23 | ISSUED FOR REVIEW |
| | | |
| | | |
| | | |

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(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road, Branford, CT 06405

CT11317B
STRUCTURE 19725

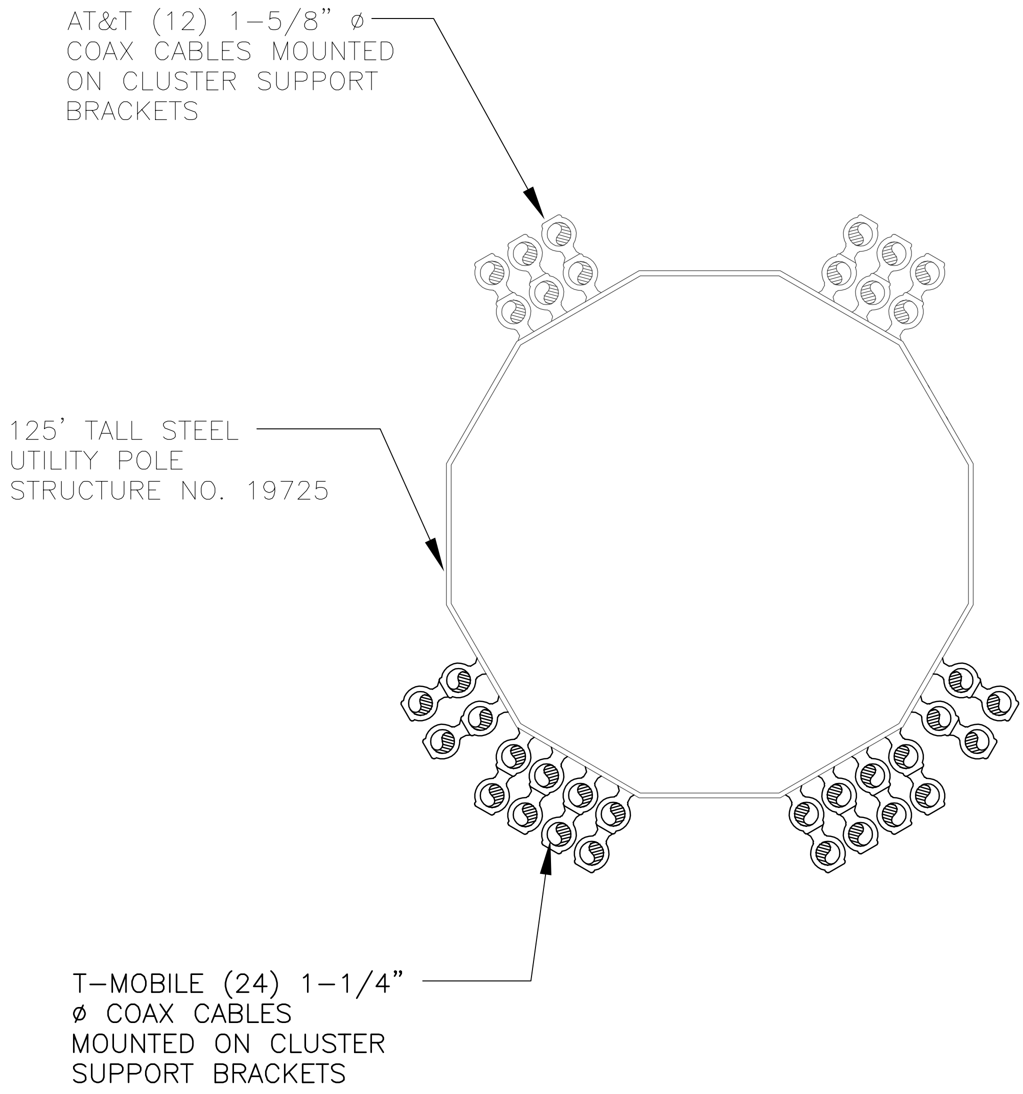
280 MOREHOUSE ROAD
FAIRFIELD, CT

| | |
|---|---|
| PROJECT NO: | 22073.03 |
| DRAWN BY: | TJL |
| CHECKED BY: | CFC |
| SCALE: | AS NOTED |
| DATE: | 4/6/23 |

TOWER ELEVATION

SK-1

DWG. 1 OF 2




1 SK-2

# COAX CABLE PLAN

SCALE: NOT TO SCALE

| REVISIONS | | |
|---|---|---|
| 00 | 4/6/23 | ISSUED FOR REVIEW |
| 01 | 5/5/23 | ISSUED FOR REVIEW |
| | | |
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(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road, Branford, CT 06405


CT11317B
STRUCTURE 19725

280 MOREHOUSE ROAD
FAIRFIELD, CT

| | |
|---|---|
| PROJECT NO: | 22073.03 |
| DRAWN BY: | TJL |
| CHECKED BY: | CFC |
| SCALE: | AS NOTED |
| DATE: | 4/6/23 |

FEELINE PLAN

SK-2

DWG. 2 OF 2

## Basic Components

| | | |
|---|---|---|
| Heavy Wind Pressure = | $p := 4.00 \cdot psf$ | (User Input NESC 2023 Figure 250-1 & Table 250-1) |
| Basic Windspeed = | $V := 110$ mph | (User Input) |
| Radial Ice Thickness = | $Ir := 0.50 \cdot in$ | (User Input NESC 2023 Figure 250-1 & Table 250-1) |
| Radial Ice Density = | $Id := 56.0 \cdot pcf$ | (User Input) |

## Factors for Extreme Wind Calculation

Elevation of Top of Mast Above Grade = $TME := 125$ ft (User Input)

Multiplier Gust Response Factor = $m := 1.25$ (User Input - Only for NESC Extreme wind case)

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.326$ (NESC 2023 Table 250-2)

Turbulence Intensity Constant = $C_{exp} := 0.2$ (NESC 2023 Table 250-3)

Integral Length Scale of Turbulence Constant = $L_s := 220$ (NESC 2023 Table 250-3)

Effective Height = $z_s := 0.67 \cdot TME = 83.75$ (NESC 2023 Table 250-3)

Turbulence Intensity = $I_z := C_{exp} \cdot \left(\frac{33}{z_s}\right)^{\frac{1}{6}} = 0.171$ (NESC 2023 Table 250-3)

Response Term = $B_t := \left[\frac{1}{\left[1 + \left(0.56 \cdot \frac{z_s}{L_s}\right)\right]}\right]^{0.5} = 0.908$ (NESC 2023 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(4.61 \cdot I_z \cdot B_t\right)\right]}{\left(1 + 6.1 \cdot I_z\right)} = 0.84$ (NESC 2023 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot psf = 34.5 \cdot psf$ (NESC 2023 Section 250.C.1)

## NESC Extreme Ice w/ Wind Components

| | | |
|---|---|---|
| Heavy Wind Pressure = | $p_{ex} := 6.4 \cdot psf$ | (User Input NESC 2023 Figure 250-3 & Table 250-4) |
| Radial Ice Thickness = | $Ir_{ex} := 0.75 \cdot in$ | (User Input NESC 2023 Figure 250-3) |

## Shape Factors

| | | |
|---|---|---|
| Shape Factor for Round Members = | $Cd_R := 1.3$ | (User Input) |
| Shape Factor for Flat Members = | $Cd_F := 1.6$ | (User Input) |
| Shape Factor for Coax Cables Attached to Outside of Pole = | $Cd_{coax} := 1.6$ | (User Input) |

## Overload Factors

**Overload Factors for Wind Loads:**

| | | |
|---|---|---|
| **NESC Heavy Loading =** | **2.5** | (User Input) |
| **NESC Extreme Loading =** | **1.0** | (User Input) |
| **NESC Extreme Ice with Wind Loading =** | **1.0** | (User Input) |

**Overload Factors for Vertical Loads:**

| | | |
|---|---|---|
| **NESC Heavy Loading =** | **1.5** | (User Input) |
| **NESC Extreme Loading =** | **1.0** | (User Input) |
| **NESC Extreme Ice with Wind Loading =** | **1.0** | (User Input) |

## Development of Wind & Ice Load on Antennas

**Antenna Data:** (AT&T)

Antenna Model = CCI TPA65-BU4D

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 48 \cdot in$ (User Input)

Antenna Width = $W_{ant} := 20.7 \cdot in$ (User Input)

Antenna Thickness = $T_{ant} := 7.7 \cdot in$ (User Input)

Antenna Weight = $WT_{ant} := 60 \cdot lb$ (User Input)

Number of Antennas = $N_{ant} := 3$ (User Input)

### Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant1} := WT_{ant} \cdot N_{ant} = 180 lb$

### Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 7651 \cdot in^3$

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 1600 \cdot in^3$

Weight of Ice on Each Antenna = $W_{ICEant} := V_{ice} \cdot Id = 52 lb$

Weight of Ice on All Antennas = $Wt_{ice.ant1} := W_{ICEant} \cdot N_{ant} = 156 lb$

### Gravity Load (Extreme ice only)

Volume of Extreme Ice on Each Antenna = $V_{ice.ex} := (L_{ant} + 2 \cdot Ir_{ex})(W_{ant} + 2 \cdot Ir_{ex})(T_{ant} + 2 \cdot Ir_{ex}) - V_{ant} = 2459 \cdot in^3$

Weight of Extreme Ice on Each Antenna = $W_{ICE.exant} := V_{ice.ex} \cdot Id = 80 lb$

Weight of Extreme Ice on All Antennas = $Wt_{ice.ex.ant1} := W_{ICE.exant} \cdot N_{ant} = 239 lb$

### Wind Load (NESC Heavy)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) = 7.4 ft^2$

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 22.2 ft^2$

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot A_{ICEant} = 142 lb$

### Wind Load (NESC Extreme)

Surface Area for One Antenna = $SA_{ant} := L_{ant} \cdot W_{ant} = 6.9 ft^2$

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 20.7 ft^2$

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1428 lb$

### Wind Load (NESC Extreme Ice w/ Wind)

Surface Area for One Antenna w/ Extreme Ice = $SA_{ICE.exant} := (L_{ant} + 2 \cdot Ir_{ex}) \cdot (W_{ant} + 2 \cdot Ir_{ex}) = 7.6 ft^2$

Antenna Projected Surface Area w/ Extreme Ice = $A_{ICE.exant} := SA_{ICE.exant} \cdot N_{ant} = 22.9 ft^2$

Total Antenna Wind Force w/ Extreme Ice = $Fi_{ex.ant1} := p_{ex} \cdot Cd_F \cdot A_{ICE.exant} = 234 lb$

## Development of Wind & Ice Load on Antennas

**Antenna Data:** (AT&T)

Antenna Model = Commscope TMAT192123B68-31

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 9.37 \cdot in$ (User Input)

Antenna Width = $W_{ant} := 11.142 \cdot in$ (User Input)

Antenna Thickness = $T_{ant} := 3.819 \cdot in$ (User Input)

Antenna Weight = $WT_{ant} := 21 \cdot lb$ (User Input)

Number of Antennas = $N_{ant} := 6$ (User Input)

**Gravity Load (without ice)**

Weight of All Antennas = $Wt_{ant2} := WT_{ant} \cdot N_{ant} = 126 lb$

**Gravity Load (ice only)**

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 399 \cdot in^3$

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 208 \cdot in^3$

Weight of Ice on Each Antenna = $W_{ICEant} := V_{ice} \cdot Id = 7 lb$

Weight of Ice on All Antennas = $Wt_{ice.ant2} := W_{ICEant} \cdot N_{ant} = 40 lb$

**Gravity Load (Extreme ice only)**

Volume of Extreme Ice on Each Antenna = $V_{ice.ex} := (L_{ant} + 2 \cdot Ir_{ex})(W_{ant} + 2 \cdot Ir_{ex})(T_{ant} + 2 \cdot Ir_{ex}) - V_{ant} = 332 \cdot in^3$

Weight of Extreme Ice on Each Antenna = $W_{ICE.exant} := V_{ice.ex} \cdot Id = 11 lb$

Weight of Extreme Ice on All Antennas = $Wt_{ice.ex.ant2} := W_{ICE.exant} \cdot N_{ant} = 65 lb$

**Wind Load (NESC Heavy)**

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) = 0.9 ft^2$

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 5.2 ft^2$

Total Antenna Wind Force w/ Ice = $Fi_{ant2} := p \cdot Cd_F \cdot A_{ICEant} = 34 lb$

**Wind Load (NESC Extreme)**

Surface Area for One Antenna = $SA_{ant} := L_{ant} \cdot W_{ant} = 0.7 ft^2$

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 4.4 ft^2$

Total Antenna Wind Force = $F_{ant2} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 300 lb$

**Wind Load (NESC Extreme Ice w/ Wind)**

Surface Area for One Antenna w/ Extreme Ice = $SA_{ICE.exant} := (L_{ant} + 2 \cdot Ir_{ex}) \cdot (W_{ant} + 2 \cdot Ir_{ex}) = 1 ft^2$

Antenna Projected Surface Area w/ Extreme Ice = $A_{ICE.exant} := SA_{ICE.exant} \cdot N_{ant} = 5.7 ft^2$

Total Antenna Wind Force w/ Extreme Ice = $Fi_{ex.ant2} := p_{ex} \cdot Cd_F \cdot A_{ICE.exant} = 59 lb$

**Development of Wind & Ice Load on Mounts**

**Mount Data:** (AT&T)

Mount Type: SitePro RMQLP-4120-H10

Mount EPA (no ice) = $EPA := 28.15 \cdot ft^2$ (User Input from SitePro Document)

Mount EPA (0.5" ice) = $EPA_{ice} := 34.10 \cdot ft^2$ (User Input from SitePro Document)

Mount EPA (0.75" ice) = $EPA_{ice.ex} := 37.10 \cdot ft^2$ (User Input from SitePro Document/Interpolation)

Weight (no ice) = $W := 3265 \cdot lb$ (User Input from SitePro Document)

Weight (0.5" ice) = $W_{ice} := 3657 \cdot lb$ (User Input from SitePro Document)

Weight (0.75" ice) = $W_{ice.ex} := 3920 \cdot lb$ (User Input from SitePro Document/Interpolation)

Weight 0.5" ice on Antenna Pipes = $Wap_{ice} := \left[\left[(3.375)^2 - (2.375)^2\right] \cdot 120 \cdot 12\right] \cdot in^3 \cdot \frac{\pi}{4} \cdot (Id) = 211 \cdot lb$

Weight 0.75" ice on Antenna Pipes = $Wap_{ice.ex} := \left[\left[(3.875)^2 - (2.375)^2\right] \cdot 120 \cdot 12\right] \cdot in^3 \cdot \frac{\pi}{4} \cdot (Id) = 344 \cdot lb$

Total Pipe Length = $TPL := 12 \cdot 10 \cdot ft = 120 ft$

Total Antenna Length = $TAL := 48 \cdot in \cdot 3 = 12 ft$

Exposed Pipe Area = $ExPA := (TPL - TAL) 2.375 \cdot in = 21.375 ft^2$

Exposed Pipe Area (0.5" Ice) = $ExPA_{ice} := (TPL - TAL) 3.375 \cdot in = 30.375 ft^2$

Exposed Pipe Area (0.75' Ice) = $ExPA_{ice.ex} := (TPL - TAL) 3.875 \cdot in = 34.875 ft^2$

Mount Projected Surface Area = $CdAa := 1.3 \cdot ExPA + EPA = 55.9 ft^2$

Mount Projected Surface Area w/ Ice = $CdAa_{ice} := 1.3 \cdot ExPA_{ice} + EPA_{ice} = 73.6 ft^2$

Mount Projected Surface Area w/ Extreme Ice = $CdAa_{ice.ex} := 1.3 \cdot ExPA_{ice.ex} + EPA_{ice.ex} = 82.4 ft^2$

**Gravity Loads (without ice)**

Weight of All Mounts = $Wt_{mnt1} := W = 3265 lb$

**Gravity Load (ice only)**

Weight of Ice on All Mounts = $Wt_{ice.mnt1} := W_{ice} - W + Wap_{ice} = 603 lb$

**Gravity Load (extreme ice only)**

Weight of Ice on All Mounts = $Wt_{ice.ex.mnt1} := W_{ice.ex} - W + Wap_{ice.ex} = 999 lb$

**Wind Load (NESC Heavy)**

Total Mount Wind Force w/ Ice = $Fi_{mnt1} := p \cdot CdAa_{ice} = 294 lb$

**Wind Load (NESC Extreme)**

Total Mount Wind Force = $F_{mnt1} := qz \cdot CdAa \cdot m = 2412 lb$

**Wind Load (NESC Extreme Ice w/ Wind)**

Total Mount Wind Force w/ Extreme Ice = $Fi_{ex.mnt1} := p_{ex} \cdot CdAa_{ice.ex} = 528 lb$

## Development of Wind & Ice Load on Antennas

**Antenna Data:** (T-Mobile)

Antenna Model = RFSAPXVAALL24_43

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 95.9 \cdot in$ (User Input)

Antenna Width = $W_{ant} := 24 \cdot in$ (User Input)

Antenna Thickness = $T_{ant} := 8.5 \cdot in$ (User Input)

Antenna Weight = $WT_{ant} := 150 \cdot lb$ (User Input)

Number of Antennas = $N_{ant} := 3$ (User Input)

**Gravity Load (without ice)**

Weight of All Antennas = $Wt_{ant3} := WT_{ant} \cdot N_{ant} = 450 lb$

**Gravity Load (ice only)**

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 19564 \cdot in^3$

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 3450 \cdot in^3$

Weight of Ice on Each Antenna = $W_{ICEant} := V_{ice} \cdot Id = 112 lb$

Weight of Ice on All Antennas = $Wt_{ice.ant3} := W_{ICEant} \cdot N_{ant} = 335 lb$

**Gravity Load (Extreme ice only)**

Volume of Extreme Ice on Each Antenna = $V_{ice.ex} := (L_{ant} + 2 \cdot Ir_{ex})(W_{ant} + 2 \cdot Ir_{ex})(T_{ant} + 2 \cdot Ir_{ex}) - V_{ant} = 5273 \cdot in^3$

Weight of Extreme Ice on Each Antenna = $W_{ICE.exant} := V_{ice.ex} \cdot Id = 171 lb$

Weight of Extreme Ice on All Antennas = $Wt_{ice.ex.ant3} := W_{ICE.exant} \cdot N_{ant} = 513 lb$

**Wind Load (NESC Heavy)**

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) = 16.8 ft^2$

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 50.5 ft^2$

Total Antenna Wind Force w/ Ice = $Fi_{ant3} := p \cdot Cd_F \cdot A_{ICEant} = 323 lb$

**Wind Load (NESC Extreme)**

Surface Area for One Antenna = $SA_{ant} := L_{ant} \cdot W_{ant} = 16 ft^2$

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 47.9 ft^2$

Total Antenna Wind Force = $F_{ant3} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 3309 lb$

**Wind Load (NESC Extreme Ice w/ Wind)**

Surface Area for One Antenna w/ Extreme Ice = $SA_{ICE.exant} := (L_{ant} + 2 \cdot Ir_{ex}) \cdot (W_{ant} + 2 \cdot Ir_{ex}) = 17.2 ft^2$

Antenna Projected Surface Area w/ Extreme Ice = $A_{ICE.exant} := SA_{ICE.exant} \cdot N_{ant} = 51.7 ft^2$

Total Antenna Wind Force w/ Extreme Ice = $Fi_{ex.ant3} := p_{ex} \cdot Cd_F \cdot A_{ICE.exant} = 530 lb$

## Development of Wind & Ice Load on Antennas

**Antenna Data:** (T-Mobile)

Antenna Model = RFSAPX16DWV-16DWVS

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 55.9 \cdot in$ (User Input)

Antenna Width = $W_{ant} := 13 \cdot in$ (User Input)

Antenna Thickness = $T_{ant} := 3.15 \cdot in$ (User Input)

Antenna Weight = $WT_{ant} := 45 \cdot lb$ (User Input)

Number of Antennas = $N_{ant} := 3$ (User Input)

**Gravity Load (without ice)**

Weight of All Antennas = $Wt_{ant4} := WT_{ant} \cdot N_{ant} = 135 lb$

**Gravity Load (ice only)**

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2289 \cdot in^3$

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 1017 \cdot in^3$

Weight of Ice on Each Antenna = $W_{ICEant} := V_{ice} \cdot Id = 33 lb$

Weight of Ice on All Antennas = $Wt_{ice.ant4} := W_{ICEant} \cdot N_{ant} = 99 lb$

**Gravity Load (Extreme ice only)**

Volume of Extreme Ice on Each Antenna = $V_{ice.ex} := (L_{ant} + 2 \cdot Ir_{ex})(W_{ant} + 2 \cdot Ir_{ex})(T_{ant} + 2 \cdot Ir_{ex}) - V_{ant} = 1581 \cdot in^3$

Weight of Extreme Ice on Each Antenna = $W_{ICE.exant} := V_{ice.ex} \cdot Id = 51 lb$

Weight of Extreme Ice on All Antennas = $Wt_{ice.ex.ant4} := W_{ICE.exant} \cdot N_{ant} = 154 lb$

**Wind Load (NESC Heavy)**

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) = 5.5 ft^2$

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 16.6 ft^2$

Total Antenna Wind Force w/ Ice = $Fi_{ant4} := p \cdot Cd_F \cdot A_{ICEant} = 106 lb$

**Wind Load (NESC Extreme)**

Surface Area for One Antenna = $SA_{ant} := L_{ant} \cdot W_{ant} = 5 ft^2$

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 15.1 ft^2$

Total Antenna Wind Force = $F_{ant4} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1045 lb$

**Wind Load (NESC Extreme Ice w/ Wind)**

Surface Area for One Antenna w/ Extreme Ice = $SA_{ICE.exant} := (L_{ant} + 2 \cdot Ir_{ex}) \cdot (W_{ant} + 2 \cdot Ir_{ex}) = 5.8 ft^2$

Antenna Projected Surface Area w/ Extreme Ice = $A_{ICE.exant} := SA_{ICE.exant} \cdot N_{ant} = 17.3 ft^2$

Total Antenna Wind Force w/ Extreme Ice = $Fi_{ex.ant4} := p_{ex} \cdot Cd_F \cdot A_{ICE.exant} = 178 lb$

## Development of Wind & Ice Load on Antennas

**Antenna Data:** (T-Mobile)

Antenna Model = Commscope ATSBT-TOP-MF-4G

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 5.63 \cdot in$ (User Input)

Antenna Width = $W_{ant} := 3.701 \cdot in$ (User Input)

Antenna Thickness = $T_{ant} := 1.969 \cdot in$ (User Input)

Antenna Weight = $WT_{ant} := 2 \cdot lb$ (User Input)

Number of Antennas = $N_{ant} := 6$ (User Input)

**Gravity Load (without ice)**

Weight of All Antennas = $Wt_{ant5} := WT_{ant} \cdot N_{ant} = 12\,lb$

**Gravity Load (ice only)**

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 41 \cdot in^3$

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 52 \cdot in^3$

Weight of Ice on Each Antenna = $W_{ICEant} := V_{ice} \cdot Id = 2\,lb$

Weight of Ice on All Antennas = $Wt_{ice.ant5} := W_{ICEant} \cdot N_{ant} = 10\,lb$

**Gravity Load (Extreme ice only)**

Volume of Extreme Ice on Each Antenna = $V_{ice.ex} := (L_{ant} + 2 \cdot Ir_{ex})(W_{ant} + 2 \cdot Ir_{ex})(T_{ant} + 2 \cdot Ir_{ex}) - V_{ant} = 88 \cdot in^3$

Weight of Extreme Ice on Each Antenna = $W_{ICE.exant} := V_{ice.ex} \cdot Id = 3\,lb$

Weight of Extreme Ice on All Antennas = $Wt_{ice.ex.ant5} := W_{ICE.exant} \cdot N_{ant} = 17\,lb$

**Wind Load (NESC Heavy)**

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) = 0.2\,ft^2$

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 1.3\,ft^2$

Total Antenna Wind Force w/ Ice = $Fi_{ant5} := p \cdot Cd_F \cdot A_{ICEant} = 8\,lb$

**Wind Load (NESC Extreme)**

Surface Area for One Antenna = $SA_{ant} := L_{ant} \cdot W_{ant} = 0.1\,ft^2$

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 0.9\,ft^2$

Total Antenna Wind Force = $F_{ant5} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 60\,lb$

**Wind Load (NESC Extreme Ice w/ Wind)**

Surface Area for One Antenna w/ Extreme Ice = $SA_{ICE.exant} := (L_{ant} + 2 \cdot Ir_{ex}) \cdot (W_{ant} + 2 \cdot Ir_{ex}) = 0.3\,ft^2$

Antenna Projected Surface Area w/ Extreme Ice = $A_{ICE.exant} := SA_{ICE.exant} \cdot N_{ant} = 1.5\,ft^2$

Total Antenna Wind Force w/ Extreme Ice = $Fi_{ex.ant5} := p_{ex} \cdot Cd_F \cdot A_{ICE.exant} = 16\,lb$

## Development of Wind & Ice Load on Mounts

**Mount Data:** (T-Mobile)

Mount Type: SitePro RMQLP-496-HK

Mount EPA (no ice) = $EPA := 26.29 \cdot ft^2$ (User Input from SitePro Document)

Mount EPA (0.5" ice) = $EPA_{ice} := 32.25 \cdot ft^2$ (User Input from SitePro Document)

Mount EPA (0.75" ice) = $EPA_{ice.ex} := 35.12 \cdot ft^2$ (User Input from SitePro Document/Interpolation)

Weight (no ice) = $W := 2130 \cdot lb$ (User Input from SitePro Document)

Weight (0.5" ice) = $W_{ice} := 2580 \cdot lb$ (User Input from SitePro Document)

Weight (0.75" ice) = $W_{ice.ex} := 2873 \cdot lb$ (User Input from SitePro Document/Interpolation)

Weight 0.5" ice on Antenna Pipes = $Wap_{ice} := \left[\left[(3.375)^2 - (2.375)^2\right] \cdot 96 \cdot 12\right] \cdot in^3 \cdot \frac{\pi}{4} \cdot (Id) = 169 \cdot lb$

Weight 0.75" ice on Antenna Pipes = $Wap_{ice.ex} := \left[\left[(3.875)^2 - (2.375)^2\right] \cdot 96 \cdot 12\right] \cdot in^3 \cdot \frac{\pi}{4} \cdot (Id) = 275 \cdot lb$

Total Pipe Length = $TPL := 12 \cdot 8 \cdot ft = 96\,ft$

Total Antenna Length = $TAL := 95.9 \cdot in \cdot 3 + 55.9 \cdot in \cdot 3 = 37.95\,ft$

Exposed Pipe Area = $ExPA := (TPL - TAL)2.375 \cdot in = 11.489\,ft^2$

Exposed Pipe Area (0.5" Ice) = $ExPA_{ice} := (TPL - TAL)3.375 \cdot in = 16.327\,ft^2$

Exposed Pipe Area (0.75" Ice) = $ExPA_{ice.ex} := (TPL - TAL)3.875 \cdot in = 18.745\,ft^2$

Mount Projected Surface Area = $CdAa := 1.3 \cdot ExPA + EPA = 41.2\,ft^2$

Mount Projected Surface Area w/ Ice = $CdAa_{ice} := 1.3 \cdot ExPA_{ice} + EPA_{ice} = 53.5\,ft^2$

Mount Projected Surface Area w/ Extreme Ice = $CdAa_{ice.ex} := 1.3 \cdot ExPA_{ice.ex} + EPA_{ice.ex} = 59.5\,ft^2$

**Gravity Loads (without ice)**

Weight of All Mounts = $Wt_{mnt2} := W = 2130\,lb$

**Gravity Load (ice only)**

Weight of Ice on All Mounts = $Wt_{ice.mnt2} := W_{ice} - W + Wap_{ice} = 619\,lb$

**Gravity Load (extreme ice only)**

Weight of Ice on All Mounts = $Wt_{ice.ex.mnt2} := W_{ice.ex} - W + Wap_{ice.ex} = 1018\,lb$

**Wind Load (NESC Heavy)**

Total Mount Wind Force w/ Ice = $Fi_{mnt2} := p \cdot CdAa_{ice} = 214\,lb$

**Wind Load (NESC Extreme)**

Total Mount Wind Force = $F_{mnt2} := qz \cdot CdAa \cdot m = 1778\,lb$

**Wind Load (NESC Extreme Ice w/ Wind)**

Total Mount Wind Force w/ Extreme Ice = $Fi_{ex.mnt2} := p_{ex} \cdot CdAa_{ice.ex} = 381\,lb$

# Total Equipment Loads:

## AT&T Loads:

NESC Heavy Wind Vertical =

$$Wt_{tot} := (Wt_{ant1} + Wt_{ant2} + Wt_{mnt1}) = 3571\,lb$$

$$Wt_{ice.tot} := (Wt_{ice.ant1} + Wt_{ice.ant2} + Wt_{ice.mnt1}) = 799\,lb$$

$$(Wt_{tot} + Wt_{ice.tot}) \cdot 1.5 = 6555\,lb$$

NESC Heavy Wind Trasnsverse = $(Fi_{ant1} + Fi_{ant2} + Fi_{mnt1}) \cdot 2.5 = 1174\,lb$

NESC Extreme Wind Vertical = $(Wt_{ant1} + Wt_{ant2} + Wt_{mnt1}) = 3571\,lb$

NESC Extreme Wind Trasnsverse = $(F_{ant1} + F_{ant2} + F_{mnt1}) = 4141\,lb$

NESC Extreme Ice w/ Wind Vertical =

$$Wt_{ice.ex.tot} := (Wt_{ice.ex.ant1} + Wt_{ice.ex.ant2} + Wt_{ice.ex.mnt1}) = 1302\,lb$$

$$(Wt_{tot} + Wt_{ice.ex.tot}) = 4873\,lb$$

NESC Extreme Ice w/ Wind Transverse = $(Fi_{ex.ant1} + Fi_{ex.ant2} + Fi_{ex.mnt1}) = 821\,lb$

## T-Mobile Loads:

NESC Heavy Wind Vertical =

$$Wt_{tot} := (Wt_{ant3} + Wt_{ant4} + Wt_{ant5} + Wt_{mnt2}) = 2727\,lb$$

$$Wt_{ice.tot} := (Wt_{ice.ant3} + Wt_{ice.ant4} + Wt_{ice.ant5} + Wt_{ice.mnt2}) = 1063\,lb$$

$$(Wt_{tot} + Wt_{ice.tot}) \cdot 1.5 = 5685\,lb$$

NESC Heavy Wind Trasnsverse = $(Fi_{ant3} + Fi_{ant4} + Fi_{ant5} + Fi_{mnt2}) \cdot 2.5 = 1629\,lb$

NESC Extreme Wind Vertical = $(Wt_{ant3} + Wt_{ant4} + Wt_{ant5} + Wt_{mnt2}) = 2727\,lb$

NESC Extreme Wind Trasnsverse = $(F_{ant3} + F_{ant4} + F_{ant5} + F_{mnt2}) = 6191\,lb$

NESC Extreme Ice w/ Wind Vertical =

$$Wt_{ice.ex.tot} := (Wt_{ice.ex.ant3} + Wt_{ice.ex.ant4} + Wt_{ice.ex.ant5} + Wt_{ice.ex.mnt2}) = 1701\,lb$$

$$(Wt_{tot} + Wt_{ice.ex.tot}) = 4428\,lb$$

NESC Extreme Ice w/ Wind Transverse = $(Fi_{ex.ant3} + Fi_{ex.ant4} + Fi_{ex.ant5} + Fi_{ex.mnt2}) = 1104\,lb$

## Coax Cable on CL&P Pole

| | | |
|---|---|---|
| Coaxial Cable Span | $Coax_{Span} := 10ft$ | *(User Input)* |
| Heavy Wind Pressure = | $p := 4 \cdot psf$ | *(User Input)* |
| Radial Ice Thickness = | $Ir := 0.5 \cdot in$ | *(User Input)* |
| Radial Ice Density = | $Id := 56 \cdot pcf$ | *(User Input)* |
| Extreme Ice w/ Wind Pressure = | $p_{ex} := 6.4 \cdot psf$ | *(User Input)* |
| Extreme Radial Ice Thickness = | $Ir_{ex} := 0.75 \cdot in$ | *(User Input)* |
| Basic Windspeed = | $V := 110$ mph | (User Input) |
| Height to Top of Coax Above Grade = | $TC := 125$ ft | (User Input) |
| Multiplier Gust Response Factor = | $m := 1.00$ | (User Input - Only for NESC Extreme wind case) |

| | | |
|---|---|---|
| Velocity Pressure Coefficient = | $Kz := 2.01 \cdot \left(\frac{0.67TC}{900}\right)^{\frac{2}{9.5}} = 1.219$ | (NESC 2023 Table 250-2) |
| Turbulence Intensity Constant = | $C_{exp} := 0.2$ | (NESC 2023 Table 250-3) |
| Integral Length Scale of Turbulence Constant = | $L_s := 220$ | (NESC 2023 Table 250-3) |
| Effective Height = | $z_s := 0.67 \cdot TC = 83.75$ | (NESC 2023 Table 250-3) |
| Turbulence Intensity = | $I_z := C_{exp} \cdot \left(\frac{33}{z_s}\right)^{\frac{1}{6}} = 0.171$ | (NESC 2023 Table 250-3) |
| Response Term = | $B_t := \left[\frac{1}{\left[1 + \left(0.56 \cdot \frac{z_s}{L_s}\right)\right]}\right]^{0.5} = 0.908$ | (NESC 2023 Table 250-3) |
| Gust Response Factor = | $Grf := \frac{\left[1 + \left(4.61 \cdot I_z \cdot B_t\right)\right]}{\left(1 + 6.1 \cdot I_z\right)} = 0.84$ | (NESC 2023 Table 250-3) |
| Wind Pressure = | $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf = 31.7$ psf | (NESC 2023 Section 250.C.1) |

| | | | |
|---|---|---|---|
| Diameter of Coax Cable = | $D_{coax} := 1.98 \cdot in$ | *(User Input)* | |
| Weight of Coax Cable = | $W_{coax} := 1.04 \cdot plf$ | *(User Input)* | |
| Number of Coax Cables = | $N_{coax} := 36$ | *(User Input)* | (12) AT&T Coax Cables (24) T-Mobile Coax Cables {1-5/8 size conservatively used for all} |
| Number of Projected Coax Cables = | $NP_{coax} := 4$ | *(User Input)* | |

Shape Factor = $Cd_{coax} := 1.6$ *(User Input)*

Overload Factor for NESC Heavy Wind Transverse Load = $OF_{HWT} := 2.5$ *(User Input)*

Overload Factor for NESC Heavy Wind Vertical Load = $OF_{HWV} := 1.5$ *(User Input)*

Overload Factor for NESC Extreme Wind Transverse Load = $OF_{EWT} := 1.0$ *(User Input)*

Overload Factor for NESC Extreme Wind Vertical Load = $OF_{EWV} := 1.0$ *(User Input)*

Overload Factor for NESC Extreme Ice w/ Wind Transverse Load = $OF_{EIT} := 1.0$ *(User Input)*

Overload Factor for NESC Extreme Ice w/ Wind Vertical Load = $OF_{EIV} := 1.0$ *(User Input)*

Wind Area without Ice = $A := \left(NP_{coax} \cdot D_{coax}\right) = 7.92 \cdot in$

Wind Area with Ice = $A_{ice} := \left(NP_{coax} \cdot D_{coax} + 2 \cdot Ir\right) = 8.92 \cdot in$

Wind Area with Extreme Ice = $A_{ice.ex} := \left(NP_{coax} \cdot D_{coax} + 2 \cdot Ir_{ex}\right) = 9.42 \cdot in$

Ice Area per Liner Ft = $Ai_{coax} := \frac{\pi}{4} \cdot \left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}^2\right] = 0.027\,ft^2$

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 54.538 \cdot plf$

Extreme Ice Area per Liner Ft = $Ai_{coax.ex} := \frac{\pi}{4} \cdot \left[\left(D_{coax} + 2 \cdot Ir_{ex}\right)^2 - D_{coax}^2\right] = 0.045\,ft^2$

Weight of Extreme Ice on All Coax Cables = $W_{ice.ex} := Ai_{coax.ex} \cdot Id \cdot N_{coax} = 90.054 \cdot plf$

Heavy Wind Vertical Load =

$$Heavy\_WInd_{Vert} := \overrightarrow{\left[\left(N_{coax} \cdot W_{coax} + W_{ice}\right) \cdot Coax_{Span} \cdot OF_{HWV}\right]}$$

Heavy Wind Transverse Load =

$$Heavy\_Wind_{Trans} := \overrightarrow{\left(p \cdot A_{ice} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{HWT}\right)}$$

$Heavy\_WInd_{Vert} = 1380\,lb$ $Heavy\_Wind_{Trans} = 119\,lb$

Extreme Wind Vertical Load =

$$Extreme\_Wind_{Vert} := \overrightarrow{\left(N_{coax} \cdot W_{coax} \cdot Coax_{Span} \cdot OF_{EWV}\right)}$$

Extreme Wind Transverse Load =

$$Extreme\_Wind_{Trans} := \overrightarrow{\left[\left(qz \cdot psf \cdot A \cdot Cd_{coax}\right) \cdot Coax_{Span} \cdot OF_{EWT}\right]}$$

$Extreme\_Wind_{Vert} = 374\,lb$ $Extreme\_Wind_{Trans} = 335\,lb$

Extreme Ice w/ Wind Vertical Load =

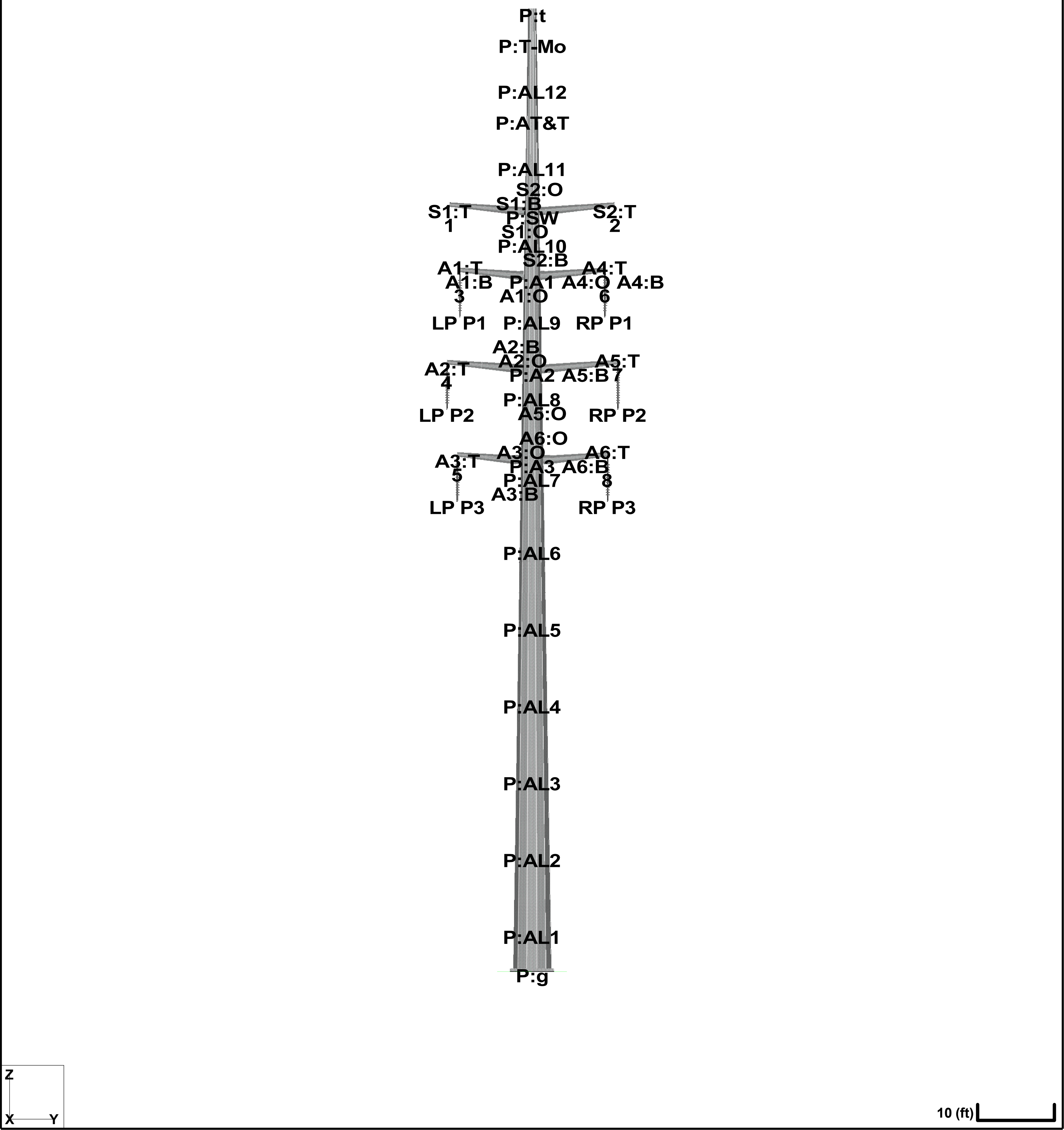
$$Extreme\_Ice_{Vert} := \overrightarrow{\left[\left(N_{coax} \cdot W_{coax} + W_{ice.ex}\right) \cdot Coax_{Span} \cdot OF_{EIV}\right]}$$

Extreme Ice w/ Wind Transverse Load =

$$Extreme\_Ice_{Trans} := \overrightarrow{\left(p_{ex} \cdot A_{ice.ex} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{EIT}\right)}$$

$Extreme\_Ice_{Vert} = 1275\,lb$ $Extreme\_Ice_{Trans} = 80\,lb$

Centek Engineering Inc, Project: "039-23-23422-125FT"
PLS-POLE Version 17.50, 10:13:14 AM Friday, May 05, 2023
Undeformed geometry displayed



## Anchor Bolt Analysis:

### Input Data:

Bolt Force:

| | | |
|---|---|---|
| Maximum Tensile Force = | $T_{Max} := 124 \cdot kips$ | (User Input from PLS-Pole) |
| Maximum Shear Force at Base = | $V_{base} := 54 \cdot kips$ | (User Input from PLS-Pole) |

Anchor Bolt Data:

Use ASTM A615 Grade 75

| | | |
|---|---|---|
| Number of Anchor Bolts = | $N := 24$ | (User Input) |
| Bolt "Column" Distance = | $l := 3.0 \cdot in$ | (User Input) |
| Bolt Ultimate Strength = | $F_u := 100 \cdot ksi$ | (User Input) |
| Bolt Yeild Strength= | $F_y := 75 \cdot ksi$ | (User Input) |
| Bolt Modulus = | $E := 29000 \cdot ksi$ | (User Input) |
| Diameter of Anchor Bolts = | $D := 2.25 \cdot in$ | (User Input) |
| Threads per Inch = | $n := 4.5$ | (User Input) |

## Anchor Bolt Analysis:

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

Maximum Shear Force per Bolt =
$$V_{Max} := \frac{V_{base}}{N} = 2.3 \times 10^3 \, lbf$$

Shear Stress per Bolt =
$$f_v := \frac{V_{Max}}{A_s} = 692.8 \, psi$$

Tensile Stress Permitted =
$$F_t := 0.75 \cdot F_u = 75 \cdot ksi$$

Shear Stress Permitted =
$$F_v := 0.35 F_u = 35 \cdot ksi$$

Permitted Axial Tensile Stress in Conjuction with Shear =
$$F_{tv} := F_t \cdot \sqrt{1 - \left(\frac{f_v}{F_v}\right)^2} = 74.99 \cdot ksi$$

Bolt Tension % of Capacity =
$$\frac{T_{Max}}{F_{tv} \cdot A_s} = 50.92 \cdot \%$$

Condition1 =
$$Condition1 := if\left(\frac{T_{Max}}{F_{tv} \cdot A_s} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$$

Condition1 = "OK"

## Flange Bolt and Flange Plate Analysis:

**Input Data:** Flange @ 115-ft

Tower Reactions:

| | | |
|---|---|---|
| Overturning Moment = | $OM := 41 \cdot ft \cdot kips$ | (User Input) |
| Shear Force = | $Shear := 7 \cdot kips$ | (User Input) |
| Axial Force = | $Axial := 3 \cdot kips$ | (User Input) |

Flange Bolt Data:

Use ASTM A325

| | | |
|---|---|---|
| Number of Flange Bolts = | $N := 8$ | (User Input) |
| Diameter of Bolt Circle = | $D_{bc} := 20 \cdot in$ | (User Input) |
| Bolt Minimum Tensile Strength = | $F_{ub} := 120 \cdot ksi$ | (User Input) |
| Bolt Modulus = | $E := 29000 \cdot ksi$ | (User Input) |
| Diameter of Flange Bolts = | $D := 1.00 \cdot in$ | (User Input) |
| Threads per Inch = | $n := 8$ | (User Input) |

Flange Plate Data:

Use ASTM A871 Grade 65

| | | |
|---|---|---|
| Plate Yield Strength = | $Fy_{bp} := 65 \cdot ksi$ | (User Input) |
| Flange Plate Thickness = | $t_{bp} := 1 \cdot in$ | (User Input) |
| Flange Plate Diameter = | $D_{bp} := 22.75 \cdot in$ | (User Input) |
| Outer Pole Diameter = | $D_{pole} := 16.67 \cdot in$ | (User Input) |

## Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 10 \cdot in$

Distance to Bolts = $i := 1..N$

$$d_i := \begin{array}{|l} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N}\right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{array}$$

$d_1 = 7.07 \cdot in$ $d_7 = -7.07 \cdot in$

$d_2 = 10.00 \cdot in$ $d_8 = -0.00 \cdot in$

$d_3 = 7.07 \cdot in$ $d_9 = ■ \cdot in$

$d_4 = 0.00 \cdot in$ $d_{10} = ■ \cdot in$

$d_5 = -7.07 \cdot in$ $d_{11} = ■ \cdot in$

$d_6 = -10.00 \cdot in$ $d_{12} = ■ \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 8.335 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := if\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$ $MA_7 = 0.00 \cdot in$

$MA_2 = 1.66 \cdot in$ $MA_8 = 0.00 \cdot in$

$MA_3 = 0.00 \cdot in$ $MA_9 = ■ \cdot in$

$MA_4 = 0.00 \cdot in$ $MA_{10} = ■ \cdot in$

$MA_5 = 0.00 \cdot in$ $MA_{11} = ■ \cdot in$

$MA_6 = 0.00 \cdot in$ $MA_{12} = ■ \cdot in$

Effective Width of Flangeplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 12.4 \cdot in$

## Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 400 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.785 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.606 \cdot in^2$

Check Flange Bolts:

Maximum Shear Stress = $V_{Max} := \frac{Shear}{N \cdot A_g} = 1.1 \cdot ksi$

Permitted Shear Stress = $F_v := \left(0.35 \cdot F_{ub}\right) = 42 \cdot ksi$

Condition1 = Condition1 := if$\left(V_{Max} \le F_v, \text{"OK"}, \text{"Overstressed"}\right)$ $\frac{V_{Max}}{F_v} = 2.65 \cdot \%$

Condition1 = "OK"

Maximum Tensile Stress = $T_{Max} := \frac{\left(OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N}\right)}{A_n} = 19.7 \cdot ksi$

Permitted Tensile Stress = $F_t := \left(0.75 \cdot F_{ub}\right) = 90 \cdot ksi$

Condition2 = Condition2 := if$\left(\frac{T_{Max}}{F_t} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$ $\frac{T_{Max}}{F_t} = 21.87 \cdot \%$

Condition2 = "OK"

Permitted Tensile Stress with Shear = $F_{t.v} := F_t \cdot \sqrt{1 - \left(\frac{V_{Max}}{F_v}\right)^2} = 90 \cdot ksi$

Condition3 = Condition3 := if$\left(\frac{T_{Max}}{F_{t.v}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$ $\frac{T_{Max}}{F_{t.v}} = 21.88 \cdot \%$

Condition3 = "OK"

## Flange Plate Analysis:

Force from Bolts = $C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$

| | |
|---|---|
| $C_1 = 9.1 \cdot kips$ | $C_7 = -8.3 \cdot kips$ |
| $C_2 = 12.7 \cdot kips$ | $C_8 = 0.4 \cdot kips$ |
| $C_3 = 9.1 \cdot kips$ | $C_9 = \blacksquare \cdot kips$ |
| $C_4 = 0.4 \cdot kips$ | $C_{10} = \blacksquare \cdot kips$ |
| $C_5 = -8.3 \cdot kips$ | $C_{11} = \blacksquare \cdot kips$ |
| $C_6 = -11.9 \cdot kips$ | $C_{12} = \blacksquare \cdot kips$ |

Maximum Bending Stress in Plate =

$$f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^{\,2}\right)} = 10.2 \cdot ksi$$

Allowable Bending Stress in Plate = $F_{bp} := 0.9 \cdot Fy_{bp} = 58.5 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 17.5 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, \text{"Ok"}, \text{"Overstressed"}\right)$

Condition1 = "Ok"

## Flange Bolt and Flange Plate Analysis:

**Input Data:** Flange @ 100-ft

Tower Reactions:

Overturning Moment = $OM := 203 \cdot ft \cdot kips$ (User Input)

Shear Force = $Shear := 13 \cdot kips$ (User Input)

Axial Force = $Axial := 7.5 \cdot kips$ (User Input)

Flange Bolt Data:

Use ASTM A325

Number of Flange Bolts = $N := 12$ (User Input)

Diameter of Bolt Circle = $D_{bc} := 26.75 \cdot in$ (User Input)

Bolt Minimum Tensile Strength = $F_{ub} := 120 \cdot ksi$ (User Input)

Bolt Modulus = $E := 29000 \cdot ksi$ (User Input)

Diameter of Flange Bolts = $D := 1.00 \cdot in$ (User Input)

Threads per Inch = $n := 8$ (User Input)

Flange Plate Data:

Use ASTM A871 Grade 65

Plate Yield Strength = $Fy_{bp} := 65 \cdot ksi$ (User Input)

Flange Plate Thickness = $t_{bp} := 1.25 \cdot in$ (User Input)

Flange Plate Diameter = $D_{bp} := 29.5 \cdot in$ (User Input)

Outer Pole Diameter = $D_{pole} := 22.17 \cdot in$ (User Input)

## Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 13.375 \cdot in$

Distance to Bolts = $i := 1 .. N$

$$d_i := \begin{vmatrix} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N}\right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{vmatrix}$$

$d_1 = 6.69 \cdot in$ $d_7 = -6.69 \cdot in$

$d_2 = 11.58 \cdot in$ $d_8 = -11.58 \cdot in$

$d_3 = 13.38 \cdot in$ $d_9 = -13.38 \cdot in$

$d_4 = 11.58 \cdot in$ $d_{10} = -11.58 \cdot in$

$d_5 = 6.69 \cdot in$ $d_{11} = -6.69 \cdot in$

$d_6 = 0.00 \cdot in$ $d_{12} = -0.00 \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 11.085 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := if\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$ $MA_7 = 0.00 \cdot in$

$MA_2 = 0.50 \cdot in$ $MA_8 = 0.00 \cdot in$

$MA_3 = 2.29 \cdot in$ $MA_9 = 0.00 \cdot in$

$MA_4 = 0.50 \cdot in$ $MA_{10} = 0.00 \cdot in$

$MA_5 = 0.00 \cdot in$ $MA_{11} = 0.00 \cdot in$

$MA_6 = 0.00 \cdot in$ $MA_{12} = 0.00 \cdot in$

Effective Width of Flangeplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 15.6 \cdot in$

## Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i (d_i)^2 = 1.073 \times 10^3 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.785 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.606 \cdot in^2$

Check Flange Bolts:

Maximum Shear Stress = $V_{Max} := \frac{Shear}{N \cdot A_g} = 1.4 \cdot ksi$

Permitted Shear Stress = $F_v := (0.35 \cdot F_{ub}) = 42 \cdot ksi$

Condition1 = Condition1 := if$(V_{Max} \le F_v$, "OK" , "Overstressed") $\frac{V_{Max}}{F_v} = 3.28 \cdot \%$

Condition1 = "OK"

Maximum Tensile Stress = $T_{Max} := \frac{\left(OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N}\right)}{A_n} = 49.1 \cdot ksi$

Permitted Tensile Stress = $F_t := (0.75 \cdot F_{ub}) = 90 \cdot ksi$

Condition2 = Condition2 := if$\left(\frac{T_{Max}}{F_t} \le 1.00\right.$, "OK" , "Overstressed") $\frac{T_{Max}}{F_t} = 54.53 \cdot \%$

Condition2 = "OK"

Permitted Tensile Stress with Shear = $F_{t.v} := F_t \cdot \sqrt{1 - \left(\frac{V_{Max}}{F_v}\right)^2} = 90 \cdot ksi$

Condition3 = Condition3 := if$\left(\frac{T_{Max}}{F_{t.v}} \le 1.00\right.$, "OK" , "Overstressed") $\frac{T_{Max}}{F_{t.v}} = 54.56 \cdot \%$

Condition3 = "OK"

## Flange Plate Analysis:

Force from Bolts = $C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$

| | |
|---|---|
| $C_1 = 15.8 \cdot kips$ | $C_7 = -14.6 \cdot kips$ |
| $C_2 = 26.9 \cdot kips$ | $C_8 = -25.7 \cdot kips$ |
| $C_3 = 31.0 \cdot kips$ | $C_9 = -29.7 \cdot kips$ |
| $C_4 = 26.9 \cdot kips$ | $C_{10} = -25.7 \cdot kips$ |
| $C_5 = 15.8 \cdot kips$ | $C_{11} = -14.6 \cdot kips$ |
| $C_6 = 0.6 \cdot kips$ | $C_{12} = 0.6 \cdot kips$ |

Maximum Bending Stress in Plate =

$$f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^{\,2}\right)} = 24.1 \cdot ksi$$

Allowable Bending Stress in Plate = $F_{bp} := 0.9 \cdot Fy_{bp} = 58.5 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 41.2 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, \text{"Ok"}, \text{"Overstressed"}\right)$

Condition1 = "Ok"

## Flange Bolt and Flange Plate Analysis:

### Input Data:

Flange @ 53-ft

Tower Reactions:

| | | |
|---|---|---|
| Overturning Moment = | $OM := 1712 \cdot ft \cdot kips$ | (User Input) |
| Shear Force = | $Shear := 46 \cdot kips$ | (User Input) |
| Axial Force = | $Axial := 38 \cdot kips$ | (User Input) |

Flange Bolt Data:

Use ASTM A325

| | | |
|---|---|---|
| Number of Flange Bolts = | $N := 40$ | (User Input) |
| Diameter of Bolt Circle = | $D_{bc} := 45.5 \cdot in$ | (User Input) |
| Bolt Minimum Tensile Strength = | $F_{ub} := 120 \cdot ksi$ | (User Input) |
| Bolt Modulus = | $E := 29000 \cdot ksi$ | (User Input) |
| Diameter of Flange Bolts = | $D := 1.25 \cdot in$ | (User Input) |
| Threads per Inch = | $n := 7$ | (User Input) |

Flange Plate Data:

Use ASTM A588 Grade 50

| | | |
|---|---|---|
| Plate Yield Strength = | $Fy_{bp} := 50 \cdot ksi$ | (User Input) |
| Flange Plate Thickness = | $t_{bp} := 2.5 \cdot in$ | (User Input) |
| Flange Plate Diameter = | $D_{bp} := 48.875 \cdot in$ | (User Input) |
| Outer Pole Diameter = | $D_{pole} := 39.92 \cdot in$ | (User Input) |

## Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 22.75 \cdot in$

Distance to Bolts = $i := 1 .. N$

$$d_i := \begin{vmatrix} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N}\right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{vmatrix}$$

$d_1 = 3.56 \cdot in$ $d_7 = 20.27 \cdot in$

$d_2 = 7.03 \cdot in$ $d_8 = 21.64 \cdot in$

$d_3 = 10.33 \cdot in$ $d_9 = 22.47 \cdot in$

$d_4 = 13.37 \cdot in$ $d_{10} = 22.75 \cdot in$

$d_5 = 16.09 \cdot in$ $d_{11} = 22.47 \cdot in$

$d_6 = 18.41 \cdot in$ $d_{12} = 21.64 \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 19.96 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := if\left(d_i \ge R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$ $MA_7 = 0.31 \cdot in$

$MA_2 = 0.00 \cdot in$ $MA_8 = 1.68 \cdot in$

$MA_3 = 0.00 \cdot in$ $MA_9 = 2.51 \cdot in$

$MA_4 = 0.00 \cdot in$ $MA_{10} = 2.79 \cdot in$

$MA_5 = 0.00 \cdot in$ $MA_{11} = 2.51 \cdot in$

$MA_6 = 0.00 \cdot in$ $MA_{12} = 1.68 \cdot in$

Effective Width of Flangeplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 22.6 \cdot in$

## Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i (d_i)^2 = 1.035 \times 10^4 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 1.227 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.969 \cdot in^2$

Check Flange Bolts:

Maximum Shear Stress = $V_{Max} := \frac{Shear}{N \cdot A_g} = 0.9 \cdot ksi$

Permitted Shear Stress = $F_v := (0.35 \cdot F_{ub}) = 42 \cdot ksi$

Condition1 = Condition1 := if($V_{Max} \le F_v$, "OK" , "Overstressed") $\frac{V_{Max}}{F_v} = 2.23 \cdot \%$

Condition1 = "OK"

Maximum Tensile Stress = $T_{Max} := \frac{\left(OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N}\right)}{A_n} = 45.6 \cdot ksi$

Permitted Tensile Stress = $F_t := (0.75 \cdot F_{ub}) = 90 \cdot ksi$

Condition2 = Condition2 := if($\frac{T_{Max}}{F_t} \le 1.00$, "OK" , "Overstressed") $\frac{T_{Max}}{F_t} = 50.68 \cdot \%$

Condition2 = "OK"

Permitted Tensile Stress with Shear = $F_{t.v} := F_t \cdot \sqrt{1 - \left(\frac{V_{Max}}{F_v}\right)^2} = 90 \cdot ksi$

Condition3 = Condition3 := if($\frac{T_{Max}}{F_{t.v}} \le 1.00$, "OK" , "Overstressed") $\frac{T_{Max}}{F_{t.v}} = 50.69 \cdot \%$

Condition3 = "OK"

**Flange Plate Analysis:**

Force from Bolts = $C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$

| | |
|---|---|
| $C_1 = 8.0 \cdot kips$ | $C_7 = 41.2 \cdot kips$ |
| $C_2 = 14.9 \cdot kips$ | $C_8 = 43.9 \cdot kips$ |
| $C_3 = 21.4 \cdot kips$ | $C_9 = 45.5 \cdot kips$ |
| $C_4 = 27.5 \cdot kips$ | $C_{10} = 46.1 \cdot kips$ |
| $C_5 = 32.9 \cdot kips$ | $C_{11} = 45.5 \cdot kips$ |
| $C_6 = 37.5 \cdot kips$ | $C_{12} = 43.9 \cdot kips$ |

Maximum Bending Stress in Plate =

$$f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(B_{eff} t_{bp}^{\ 2}\right)} = 22.6 \cdot ksi$$

Allowable Bending Stress in Plate = $F_{bp} := 0.9 \cdot Fy_{bp} = 45 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 50.1 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

Condition1 = "Ok"

| RAN Template: | A&L Template: |
|---|---|
| 67D94B_Flagpole Outdoor | 67D94B_1DP+1QP+1OP |

CT11317B_L600_5

**Print Name:** Standard
**PORs:** L600_L600 Coverage

## Section 1 - Site Information

**Site ID:** CT11317B
**Status:** Final
**Version:** 5
**Project Type:** L600
**Approved:** 03/13/2023 6:23:55 PM
**Approved By:** Farhan.Badar@T-Mobile.com
**Last Modified:** 03/13/2023 6:23:55 PM
**Last Modified By:** Farhan.Badar@T-Mobile.com

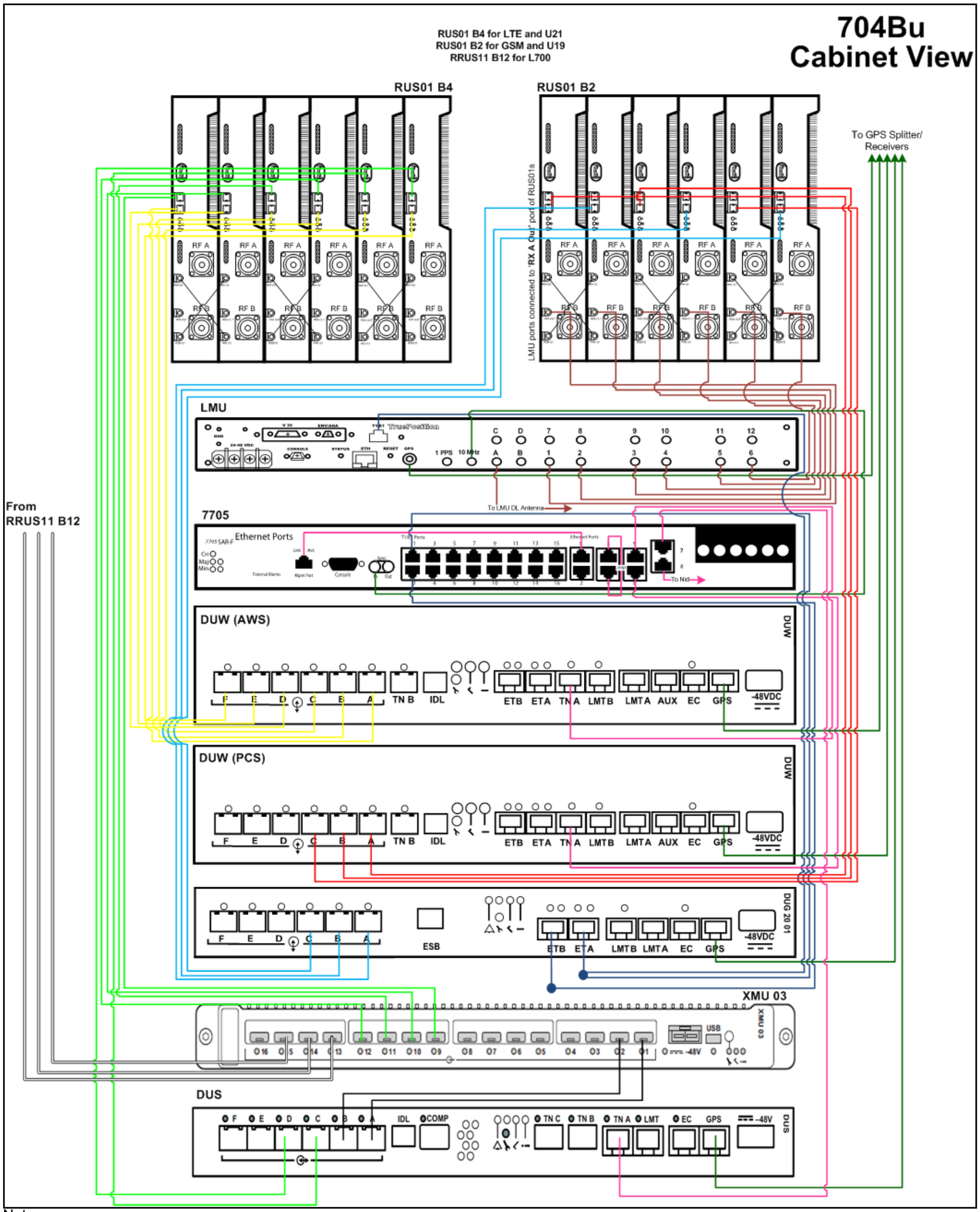
**Site Name:** Fairfield/MP/X44&X42
**Site Class:** Utility Lattice Tower
**Site Type:** Structure Non Building
**Plan Year:**
**Market:** CONNECTICUT CT
**Vendor:** Ericsson
**Landlord:** Northeast Utilities

**Latitude:** 41.209987
**Longitude:** -73.261539
**Address:** 280 Morehouse Drive (Tower 876 Line 1730)
**City, State:** Fairfield, CT
**Region:** NORTHEAST

| **RAN Template:** 67D94B_Flagpole Outdoor | | **AL Template:** 67D94B_1DP+1QP+1OP | | |
|---|---|---|---|---|
| **Sector Count:** 3 | **Antenna Count:** 6 | **Coax Line Count:** 22 | **TMA Count:** 0 | **RRU Count:** 0 |

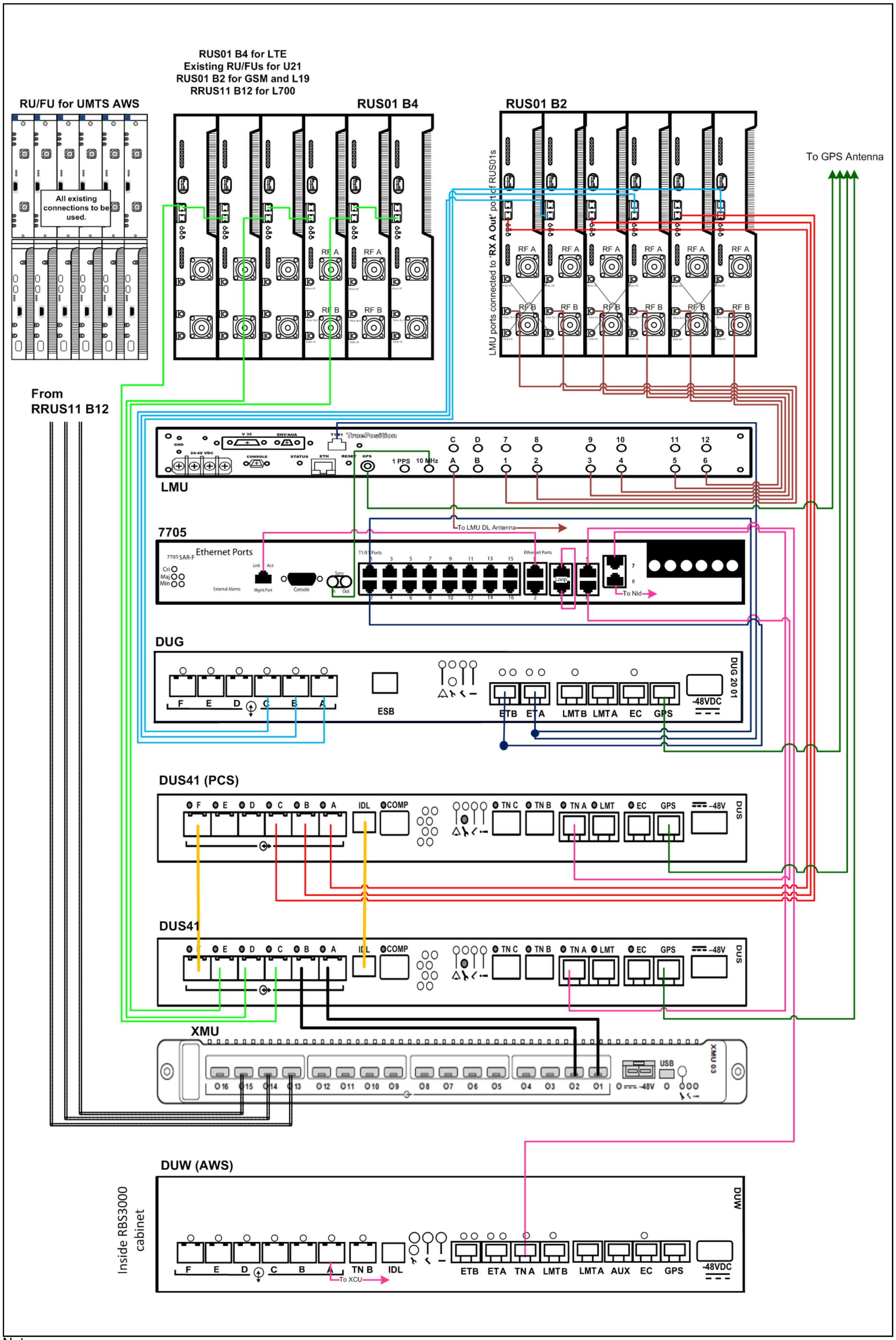
## Section 2 - Existing Template Images

704Bu.png




Notes:

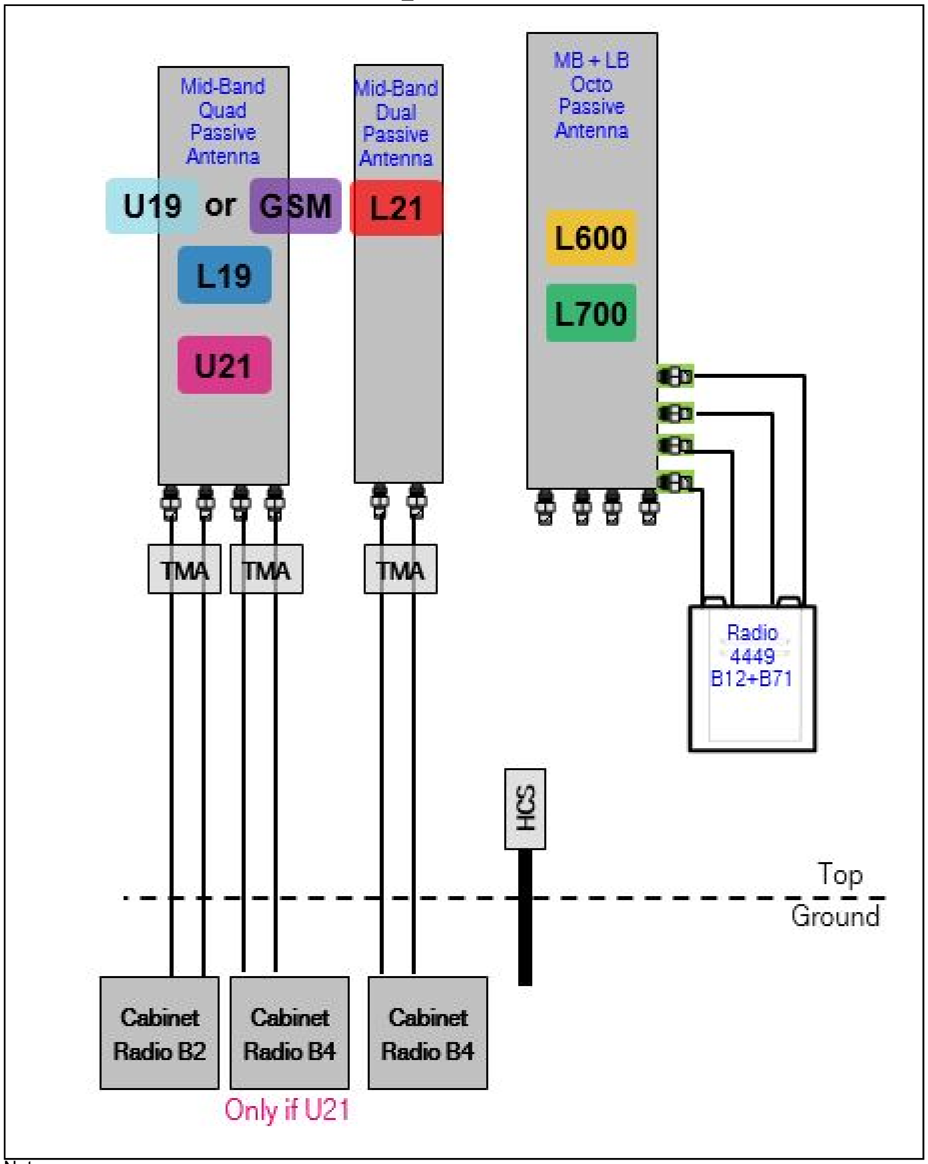
794A Outdoor.png


RUS01 B4 for LTE
Existing RU/FUs for U21
RUS01 B2 for GSM and L19
RRUS11 B12 for L700
RU/FU for UMTS AWS
All existing connections to be used.
RUS01 B4
RUS01 B2
LMU ports connected to 'RX A Out' port of RUS01s
To GPS Antenna
From RRUS11 B12
LMU
To LMU DL Antenna
7705
Ethernet Ports
To Nid
DUG
ESB
ETB ETA LMTB LMTA EC GPS
-48VDC
DUG 20 01
DUS41 (PCS)
DUS41
XMU
DUW (AWS)
Inside RBS3000 cabinet
To XCU
ETB ETA TN A LMTB LMTA AUX EC GPS

Notes:

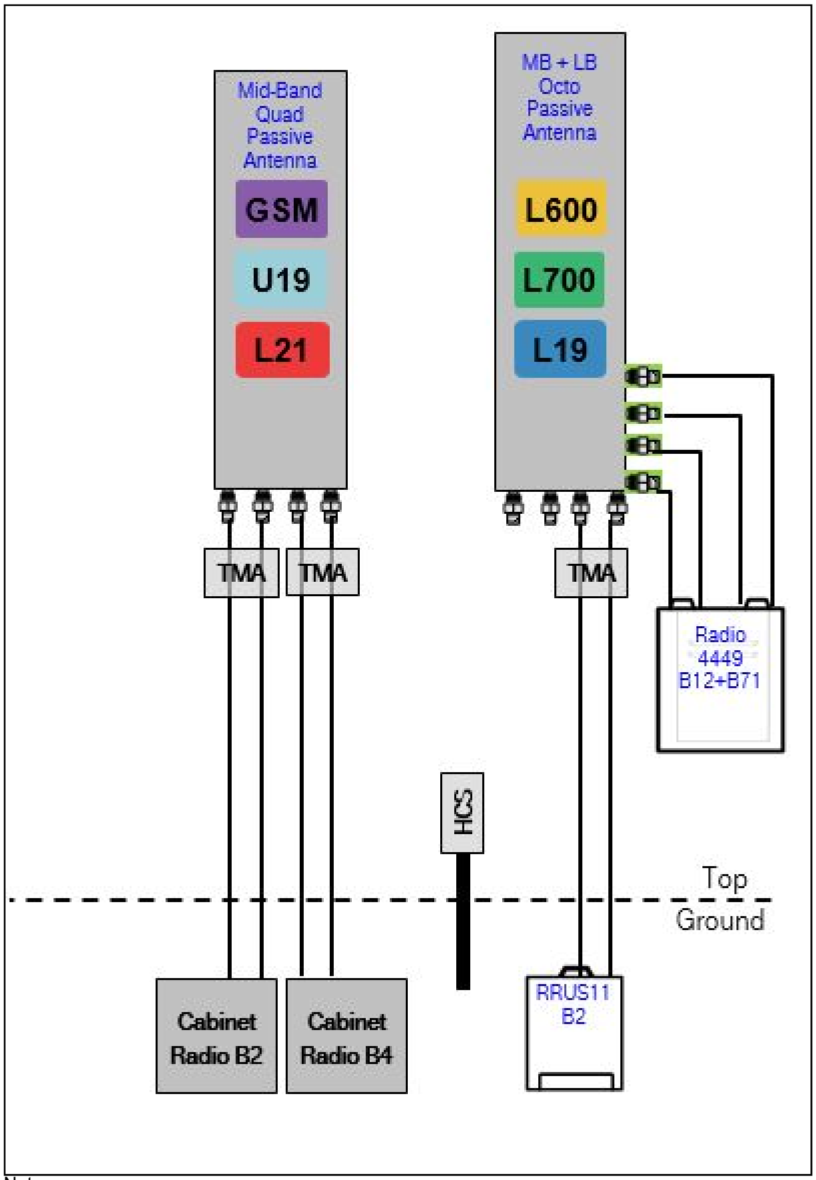
## Section 3 - Proposed Template Images

67D94B_1DP+1QP+1OP.JPG




Notes:

67D94BR_1QP+1OP.JPG


Mid-Band
Quad
Passive
Antenna
GSM
U19
L21
MB + LB
Octo
Passive
Antenna
L600
L700
L19
TMA
TMA
TMA
Radio
4449
B12+B71
HCS
Top
Ground
Cabinet
Radio B2
Cabinet
Radio B4
RRUS11
B2

Notes:

## Section 4 - Siteplan Images

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

| RAN Template: | A&L Template: |
|---|---|
| 67D94B_Flagpole Outdoor | 67D94B_1DP+1QP+1OP |

CT11317B_L600_5

**Print Name:** Standard
**PORs:** L600_L600 Coverage

## Section 5 - RAN Equipment

### Existing RAN Equipment

**Template:** 794B GSM Shutdown Outdoor

| Enclosure | 1 | 2 |
|---|---|---|
| Enclosure Type | Ground Mount (Ericsson) | RBS 6102 |
| Radio | RRUS11 B12 **(x3)**: L700 | RUS01 B2 **(x3)**: L1900; RUS01 B2 **(x3)**: G1900; RUS01 B4 **(x3)**: L2100; RUS01 B4 **(x3)**: U2100 (DECOMMISSIONED) |
| Baseband | | BB 6630: L700, L1900, L2100; DUG20; DUW30 |

### Proposed RAN Equipment

**Template:** 67D94B_Flagpole Outdoor

| Enclosure | 1 | 2 |
|---|---|---|
| Enclosure Type | Ground Mount (Ericsson) | RBS 6102 |
| Radio | Radio 4480 B71+B85 **(x3)**: L600, L700 | RUS01 B2 **(x6)**: L1900; RUS01 B4 **(x6)**: L2100 |
| Baseband | | BB 6630: L1900, L2100; DUG20; DUW30; RP 6651: N600, L600, L700 |

**RAN Scope of Work:**

Install (1) BB6648 for L6/ L7/5G N600.

Remove existing TMA

Existing: (18) Coaxial Lines
Add (6) Coaxial Lines for new total of (24).

| **RAN Template:** | **A&L Template:** |
|---|---|
| 67D94B_Flagpole Outdoor | 67D94B_1DP+1QP+1OP |

CT11317B_L600_5

**Print Name:** Standard
**PORs:** L600_L600 Coverage

## Section 6 - A&L Equipment

**Existing Template:** 794B_1HP U19 shutdown
**Proposed Template:** 67D94B_1DP+1QP+1OP

### Sector 1 (Existing) view from behind

| | | | |
|---|---|---|---|
| **Coverage Type** | A - Outdoor Macro | | |
| **Antenna** | 1 | | 2 |
| **Antenna Model** | RFS - APX16DWV-16DWV-S-E-A20 (Quad) | | Andrew - LNX-6515DS-A1M (Dual) |
| **Azimuth** | 60 | | 60 |
| **M. Tilt** | 0 | | 0 |
| **Height (ft)** | 95 | | 95 |
| **Ports** | P1 | P2 | P3 |
| **Active Tech** | L1900 G1900 | L2100 | L700 |
| **Dark Tech** | | | |
| **Restricted Tech** | | | |
| **Decomm. Tech** | | U2100 | |
| **E. Tilt** | 2 | | 2 |
| **Cables** | 1-1/4" Coax - 125 ft. **(x2)** | 1-1/4" Coax - 125 ft. **(x2)** | 1-1/4" Coax - 125 ft. **(x2)** |
| **TMAs** | Generic Twin Style 1A - PCS (At Cabinet) | Generic Twin Style 1B - AWS (At Cabinet) | |
| **Diplexer / Combiners** | | | |
| **Radio** | | | |
| **Sector Equipment** | | | Andrew Smart Bias T (Ericsson) (At Antenna) |

**Unconnected Equipment:**

**Scope of Work:**

Ground TMA's

| RAN Template: | A&L Template: |
|---|---|
| 67D94B_Flagpole Outdoor | 67D94B_1DP+1QP+1OP |

CT11317B_L600_5

**Print Name:** Standard
**PORs:** L600_L600 Coverage

| Sector 1 (Proposed) view from behind | | | | | | |
|---|---|---|---|---|---|---|
| Coverage Type | A - Outdoor Macro | | | | | |
| Antenna | 1 | | 2 | | | |
| Antenna Model | RFS - APX16DWV-16DWV-S-E-A20 (Quad) | | RFS - APXVAALL24_43-U-NA20 (Octo) | | | |
| Azimuth | 60 | | 60 | | | |
| M. Tilt | | | | | | |
| Height (ft) | 95 | | 95 | | | |
| Ports | P1 | P2 | P3 | P4 | P5 | P6 |
| Active Tech | G1900 L1900 N1900 | L2100 | L700 L600 N600 | L700 L600 N600 | | |
| Dark Tech | | | | | | |
| Restricted Tech | | | | | | |
| Decomm. Tech | | | | | | |
| E. Tilt | | | | | | |
| Cables | 1-1/4" Coax - 126 ft. **(x2)** | 1-1/4" Coax - 126 ft. **(x2)** | 1-1/4" Coax - 126 ft. **(x2)** | 1-1/4" Coax - 126 ft. **(x2)** | | |
| TMAs | | | | | | |
| Diplexer / Combiners | | | | | | |
| Radio | | | | | | |
| Sector Equipment | Andrew Smart Bias T (Ericsson) (At Antenna) | | Andrew Smart Bias T (Ericsson) (At Antenna) | | | |

**Unconnected Equipment:**

**Scope of Work:**

| RAN Template: | A&L Template: |
|---|---|
| 67D94B_Flagpole Outdoor | 67D94B_1DP+1QP+1OP |

CT11317B_L600_5

**Print Name:** Standard
**PORs:** L600_L600 Coverage

## Sector 2 (Existing) view from behind

| | | | |
|---|---|---|---|
| **Coverage Type** | A - Outdoor Macro | | |
| **Antenna** | 1 | | 2 |
| **Antenna Model** | RFS - APX16DWV-16DWV-S-E-A20 (Quad) | | Andrew - LNX-6515DS-A1M (Dual) |
| **Azimuth** | 180 | | 180 |
| **M. Tilt** | 0 | | 0 |
| **Height (ft)** | 95 | | 95 |
| **Ports** | P1 | P2 | P3 |
| **Active Tech** | G1900 L1900 | L2100 | L700 |
| **Dark Tech** | | | |
| **Restricted Tech** | | | |
| **Decomm. Tech** | | U2100 | |
| **E. Tilt** | 2 | | 2 |
| **Cables** | 1-1/4" Coax - 125 ft. **(x2)** | 1-1/4" Coax - 125 ft. **(x2)** | 1-1/4" Coax - 125 ft. **(x2)** |
| **TMAs** | Generic Twin Style 1A - PCS (At Cabinet) | Generic Twin Style 1B - AWS (At Cabinet) | |
| **Diplexer / Combiners** | | | |
| **Radio** | | | |
| **Sector Equipment** | | | Andrew Smart Bias T (Ericsson) (At Antenna) |

**Unconnected Equipment:**

**Scope of Work:**

| RAN Template: | A&L Template: |
|---|---|
| 67D94B_Flagpole Outdoor | 67D94B_1DP+1QP+1OP |

CT11317B_L600_5

**Print Name:** Standard
**PORs:** L600_L600 Coverage

## Sector 2 (Proposed) view from behind

| | | | | | | |
|---|---|---|---|---|---|---|
| Coverage Type | A - Outdoor Macro | | | | | |
| Antenna | 1 | | 2 | | | |
| Antenna Model | RFS - APX16DWV-16DWV-S-E-A20 (Quad) | | RFS - APXVAALL24_43-U-NA20 (Octo) | | | |
| Azimuth | 180 | | 180 | | | |
| M. Tilt | | | | | | |
| Height (ft) | 95 | | 95 | | | |
| Ports | P1 | P2 | P3 | P4 | P5 | P6 |
| Active Tech | G1900 L1900 N1900 | L2100 | L700 L600 N600 | L700 L600 N600 | | |
| Dark Tech | | | | | | |
| Restricted Tech | | | | | | |
| Decomm. Tech | | | | | | |
| E. Tilt | | | | | | |
| Cables | 1-1/4" Coax - 126 ft. **(x2)** | 1-1/4" Coax - 126 ft. **(x2)** | 1-1/4" Coax - 126 ft. **(x2)** | 1-1/4" Coax - 126 ft. | | |
| TMAs | | | | | | |
| Diplexer / Combiners | | | | | | |
| Radio | | | | | | |
| Sector Equipment | Andrew Smart Bias T (Ericsson) (At Antenna) | | Andrew Smart Bias T (Ericsson) (At Antenna) | | | |

**Unconnected Equipment:**

**Scope of Work:**

| RAN Template: | A&L Template: |
|---|---|
| 67D94B_Flagpole Outdoor | 67D94B_1DP+1QP+1OP |

CT11317B_L600_5

**Print Name:** Standard
**PORs:** L600_L600 Coverage

## Sector 3 (Existing) view from behind

| | | | |
|---|---|---|---|
| **Coverage Type** | A - Outdoor Macro | | |
| **Antenna** | 1 | | 2 |
| **Antenna Model** | RFS - APX16DWV-16DWV-S-E-A20 (Quad) | | Andrew - LNX-6515DS-A1M (Dual) |
| **Azimuth** | 300 | | 300 |
| **M. Tilt** | 0 | | 0 |
| **Height (ft)** | 95 | | 95 |
| **Ports** | P1 | P2 | P3 |
| **Active Tech** | G1900 L1900 | L2100 | L700 |
| **Dark Tech** | | | |
| **Restricted Tech** | | | |
| **Decomm. Tech** | | U2100 | |
| **E. Tilt** | 2 | | 2 |
| **Cables** | 1-1/4" Coax - 125 ft. **(x2)** | 1-1/4" Coax - 125 ft. **(x2)** | 1-1/4" Coax - 125 ft. **(x2)** |
| **TMAs** | Generic Twin Style 1A - PCS (At Cabinet) | Generic Twin Style 1B - AWS (At Cabinet) | |
| **Diplexer / Combiners** | | | |
| **Radio** | | | |
| **Sector Equipment** | | | Andrew Smart Bias T (Ericsson) (At Antenna) |

**Unconnected Equipment:**

**Scope of Work:**

| RAN Template: | A&L Template: |
|---|---|
| 67D94B_Flagpole Outdoor | 67D94B_1DP+1QP+1OP |

CT11317B_L600_5

**Print Name:** Standard
**PORs:** L600_L600 Coverage

## Sector 3 (Proposed) view from behind

| Coverage Type | A - Outdoor Macro | | | | | |
|---|---|---|---|---|---|---|
| Antenna | 1 | | 2 | | | |
| Antenna Model | RFS - APX16DWV-16DWV-S-E-A20 (Quad) | | RFS - APXVAALL24_43-U-NA20 (Octo) | | | |
| Azimuth | 300 | | 300 | | | |
| M. Tilt | | | | | | |
| Height (ft) | 95 | | 95 | | | |
| Ports | P1 | P2 | P3 | P4 | P5 | P6 |
| Active Tech | L1900 N1900 G1900 | L2100 | L700 L600 N600 | L700 L600 N600 | | |
| Dark Tech | | | | | | |
| Restricted Tech | | | | | | |
| Decomm. Tech | | | | | | |
| E. Tilt | | | | | | |
| Cables | 1-1/4" Coax - 126 ft. **(x2)** | 1-1/4" Coax - 126 ft. **(x2)** | 1-1/4" Coax - 126 ft. **(x2)** | 1-1/4" Coax - 126 ft. | | |
| TMAs | | | | | | |
| Diplexer / Combiners | | | | | | |
| Radio | | | | | | |
| Sector Equipment | Andrew Smart Bias T (Ericsson) (At Antenna) | | Andrew Smart Bias T (Ericsson) (At Antenna) | | | |

**Unconnected Equipment:**

**Scope of Work:**

RADIO FREQUENCY SYSTEMS

# Dual Slant Polarized Quad Band (8 Port) Antenna, 617-894/617-894/1695-2690/1695-2690MHz, 65deg, 16.2/16.1/18.9/18.7dBi, 2.4m (8ft), VET, RET, 2-12°/2-12°/2-12°/2-12°

## FEATURES / BENEFITS

This antenna provides a 8 Port multi-band flexible platform for advanced use for flexible use in deployment scenarios for encompassing 600, 700, 800, AWS, PCS & BRS applications.

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

## Technical Features

### LOW BAND LEFT ARRAY (617-894 MHZ) [R1]

| | | | | |
|---|---|---|---|---|
| **Frequency Band** | MHz | 617-698 | 698-806 | 806-894 |
| **Gain Typical** | dBi | 15.5 | 16.1 | 16.2 |
| **Gain Over All Tilts** | dBi | 15.2 +/- .3 | 15.6 +/- .5 | 15.8 +/- .4 |
| **Horizontal Beamwidth @3dB** | Deg | 65 +/-3 | 64 +/-2 | 62 +/-3 |
| **Vertical Beamwidth @3dB** | Deg | 9.9 +/- .7 | 8.6 +/- .7 | 7.6 +/-.4 |
| **Electrical Downtilt Range** | Deg | 2 to 12 | | |
| **Upper Side Lobe Suppression Peak to +20** | dB | 15 | 14 | 14 |
| **Front-to-Back, at +/-30°, Copolar** | dB | 25 | 25 | 29 |
| **Cross Polar Discrimination (XPD) @ Boresight** | dB | 18 | 18 | 17 |
| **Cross Polar Discrimination (XPD) @ +/-60** | dB | 5 | 5 | 6 |
| **3rd Order PIM 2 x 43dBm** | dBc | -153 | | |
| **VSWR** | - | 1.5:1 | | |
| **Cross Polar Isolation** | dB | 25 | | |
| **Maximum Effective Power per Port** | Watt | 400 | | |



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

RADIO FREQUENCY SYSTEMS

# Dual Slant Polarized Quad Band (8 Port) Antenna, 617-894/617-894/1695-2690/1695-2690MHz, 65deg, 16.2/16.1/18.9/18.7dBi, 2.4m (8ft), VET, RET, 2-12°/2-12°/2-12°/2-12°

## HIGH BAND RIGHT ARRAY (1695-2690 MHZ) [Y2]

| **Frequency Band** | MHz | 1695-1880 | 1850-1990 | 1920-2200 | 2200-2490 | 2490-2690 |
|---|---|---|---|---|---|---|
| **Gain Typical** | dBi | 17.7 | 18.1 | 18.7 | 18.5 | 18.0 |
| **Gain Over All Tilts** | dBi | 17.1 +/- .6 | 17.6 +/- .5 | 18 +/- .7 | 17.9 +/- .6 | 17.4 +/- .6 |
| **Horizontal Beamwidth @3dB** | Deg | 67 +/- 5 | 64 +/- 5 | 65 +/- 5 | 62 +/- 7 | 60 +/- 9 |
| **Vertical Beamwidth @3dB** | Deg | 5.7 +/- .5 | 5.2 +/- .3 | 4.7 +/- .6 | 4.2 +/- .3 | 4.2 +/- .3 |
| **Electrical Downtilt Range** | Deg | 2 to 12 | | | | |
| **Upper Side Lobe Suppression Peak to +20** | dB | 15 | 15 | 14 | 14 | 13 |
| **Front-to-Back, at +/-30°, Copolar** | dB | 27 | 28 | 26 | 23 | 21 |
| **Cross Polar Discrimination (XPD) @ Boresight** | dB | 21 | 17 | 14 | 16 | 18 |
| **Cross Polar Discrimination (XPD) @ +/-60** | dB | 10 | 8 | 7 | 4 | 1 |
| **3rd Order PIM 2 x 43dBm** | dBc | -153 | | | | |
| **VSWR** | - | 1.5:1 | | | | |
| **Cross Polar Isolation** | dB | 25 | | | | |
| **Maximum Effective Power per Port** | Watt | 300 | | | | |

## ELECTRICAL SPECIFICATIONS

| | | |
|---|---|---|
| **Impedance** | Ohm | 50.0 |
| **Polarization** | Deg | ±45° |

## MECHANICAL SPECIFICATIONS

| | | |
|---|---|---|
| **Dimensions - H x W x D** | mm (in) | 2436 x 609 x 215 (95.9 x 24 x 8.5) |
| **Weight (Antenna Only)** | kg (lb) | 55.7 (122.8) |
| **Weight (Mounting Hardware only)** | kg (lb) | 12.3 (27.1) |
| **Packing size- HxWxD** | mm (in) | 2565 x 735 x 390 (101 x 28.9 x 15.4) |
| **Shipping Weight** | kg (lb) | 77.9 (171.7) |
| **Connector type** | | 8 x 4.3-10 female at bottom + 6 AISG connectors (3 male, 3 female) |
| **Adjustment mechanism** | | Integrated RET solution AISG compliant (Field Replaceable) + Manual Override + External Tilt Indicator |
| **Radome Material / Color** | | Fiber Glass / Light Grey RAL7035 |

## TESTING AND ENVIRONMENTAL

| | | |
|---|---|---|
| **Temperature Range** | °C (°F) | -40 to 60 (-40 to 140 ) |
| **Grounding type** | | DC Grounded |
| **Lightning protection** | | IEC 61000-4-5 |
| **Survival/Rated Wind Velocity** | km/h | 240 (150 ) |
| **Wind Load @Rated Wind Front** | N | 1428.0 |
| **Wind Load @Rated Wind Side** | N | 434.0 |
| **Wind Load @Rated Wind Rear** | N | 1544.0 |
| **Environmental** | | ETSI 300-019-2-4 Class 4.1E |



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

# Product Data Sheet APX16DWV-16DWVS-E-A20

Optimizer® Side-by-Side Dual Polarized Antenna, 1710-2200, 65deg, 18.4dBi, 1.4m, VET, 0-10deg RET

## Product Description

A combination of two X-Polarized antennas in a single radome, this pair of variable tilt antennas provides exceptional suppression of all upper sidelobes at all downtilt angles. It also features a wide downtilt range. This antenna is optimized for performance across the entire frequency band (1710-2200 MHz). The antenna comes pre-connected with two antenna control units (ACU).

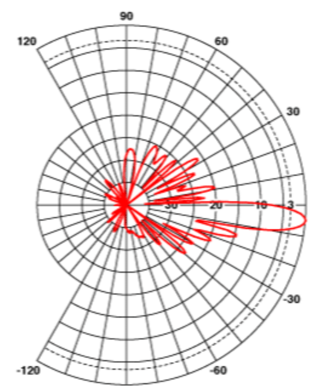
## Features/Benefits

- **Variable electrical downtilt - provides enhanced precision in controlling intercell interference. The tilt is infield adjustable 0-10 deg.**
- **High Suppression of all Upper Sidelobes (Typically <-20dB).**
- **Gain tracking – difference between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz) <1dB.**
- **Two X-Polarised panels in a single radome.**
- **Azimuth horizontal beamwidth difference <4deg between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz).**
- **Low profile for low visual impact.**
- **Dual polarization; Broadband design.**
- **Includes (2) AISG 2.0 Compatible ACU-A20-N antenna control units.**

## Technical Specifications

### Electrical Specifications

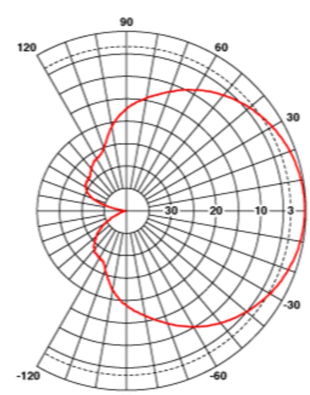
| | |
|---|---|
| Frequency Range, MHz | 1710-2200 |
| Horizontal Beamwidth, deg | 65 |
| Vertical Beamwidth, deg | 5.9 to 7.7 |
| Electrical Downtilt, deg | 0-10 |
| Gain, dBi (dBd) | 18.4 (16.3) |
| 1st Upper Sidelobe Suppression, dB | > 18 (typically > 20) |
| Upper Sidelobe Suppression, dB | > 18 all (typically > 20) |
| Front-To-Back Ratio, dB | >26 (typically 28) |
| Polarization | Dual pol +/-45° |
| VSWR | < 1.5:1 |
| Isolation between Ports, dB | > 30 |
| 3rd Order IMP @ 2 x 43 dBm, dBc | > 150 (155 Typical) |
| Impedance, Ohms | 50 |
| Maximum Power Input, W | 300 |
| Lightning Protection | Direct Ground |
| Connector Type | (4) 7-16 Long Neck Female |




Vertical Pattern

### Mechanical Specifications

| | |
|---|---|
| Dimensions - HxWxD, mm (in) | 1420 x 331 x 80 (55.9 x 13 x 3.15) |
| Weight w/o Mtg Hardware, kg (lb) | 18.5 (40.7) |
| Survival Wind Speed, km/h (mph) | 200 (125) |
| Rated Wind Speed, km/h (mph) | 160 (100) |
| Max Wind Loading Area, m² (ft²) | 0.47 (5.03) |
| Front Thrust @ Rated Wind, N (lbf) | 756 (170) |
| Maximum Thrust @ Rated Wind, N (lbf) | 756 (170) |
| Wind Load - Side @ Rated Wind, N (lbf) | 231 (52) |
| Wind Load - Rear @ Rated Wind, N (lbf) | 408 (92) |
| Radome Material | Fiberglass |
| Radome Color | Light Grey RAL7035 |
| Mounting Hardware Material | Diecasted Aluminum |
| Shipping Weight, kg (lb) | 24.5 (53.9) |
| Packing Dimensions, HxWxD, mm (in) | 1520 x 408 x 198 (59.8 x 16 x 7.8) |




Horizontal Pattern

### Ordering Information

| | |
|---|---|
| Mounting Hardware | APM40-2 + APM40-E2 |

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

# ATSBT-TOP-MF-4G

## Top Smart Bias Tee

- Reduces cable and site lease costs by eliminating the need for AISG home run cables
- AISG 1.1 and 2.0 compliant
- Operates at 10-30 Vdc
- Weatherproof AISG connectors
- Intuitive schematics simplify and ensure proper installation
- Enhanced lightning protection plus grounding stud for additional surge protection
- 7-16 DIN female connector (ANT)
- 7-16 DIN male connector (BTS)

## Product Classification

| | |
|---|---|
| **Product Type** | RET bias tee |

## General Specifications

| | |
|---|---|
| **AISG Input Connector** | 8-pin DIN Female |
| **Antenna Interface** | 7-16 DIN Female |
| **Antenna Interface Signal** | RF \| dc Blocked |
| **BTS Interface** | 7-16 DIN Male |
| **BTS Interface Signal** | AISG data \| RF \| dc |
| **Color** | Silver |
| **EU Certification** | CE |
| **Grounding Lug Thread Size** | M8 |
| **Smart Bias Tee Type** | 10–30 V Top |

## Dimensions

| | |
|---|---|
| **Height** | 143 mm \| 5.63 in |
| **Width** | 94 mm \| 3.701 in |
| **Depth** | 50 mm \| 1.969 in |

## Electrical Specifications

| | |
|---|---|
| **3rd Order IMD** | -158 dBc |
| **3rd Order IMD Test Method** | Two +43 dBm carriers |
| **Insertion Loss, typical** | 0.1 dB |
| **Electromagnetic Compatibility (EMC)** | CFR 47 Part 15, Subpart B, Class B \| EN 55022, Class B \| ICES-003 Issue 4 CAN |



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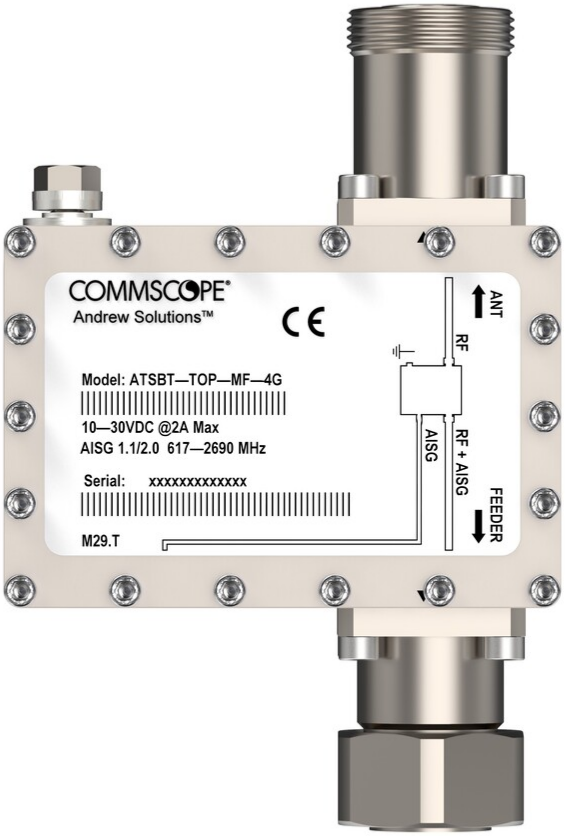
# ATSBT-TOP-MF-4G




## Material Specifications

| | |
|---|---|
| **Material Type** | Aluminum |

## Environmental Specifications

| | |
|---|---|
| **Operating Temperature** | -40 °C to +70 °C (-40 °F to +158 °F) |
| **Ingress Protection Test Method** | IEC 60529:2001, IP66 |

## Packaging and Weights

| | |
|---|---|
| **Weight, net** | 0.8 kg \| 1.764 lb |

## Regulatory Compliance/Certifications

| **Agency** | **Classification** |
|---|---|



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COMMSCOPE®

1545 Pidco Drive
Plymouth, IN 46563
Phone: 574.936.4221
Fax: 574.936.8925
Email: SP1Engineering@valmont.com
www.sitepro1.com

June 15, 2020

## Site Pro 1 / Valmont Mounting System:

Part Number = RMQLP-xxx-HK / RMQLP-xxx + PRK-1245L + HRK14
Part Description = 14’ Low Pro-Platform with Reinforcement and Handrail System

## Mount EPA (no antenna pipes, walkway included, (0.67*EPA)):

| | | | | | |
|---|---|---|---|---|---|
| $EPA_N$ | = 39.24(26.29) sq-Ft | $EPA_{N\ (0.5'' Ice)}$ | = 48.14(32.25) sq-Ft | $EPA_{N\ (1'' Ice)}$ | = 56.69(37.98) sq-Ft |
| $EPA_T$ | = 38.48(25.78) sq-Ft | $EPA_{T\ (0.5'' Ice)}$ | = 47.60(31.89) sq-Ft | $EPA_{T(1'' Ice)}$ | = 56.46(37.82) sq-Ft |
| Weight | = 2130 lb | $Weight_{(0.5'' Ice)}$ | =2580 lb | $Weight_{(1'' Ice)}$ | = 3165 lb |

## Classification Rating:

Heavy 10

## Design Standards

ANSI/TIA-222-G-2012
ANSI/TIA-222-H-2018
ASCE 7-16
AT&T Mount Classification
International Building Code 2018
TIA-5053

## Analysis and Modeling Technique

An elastic, three-dimensional, frame, truss model was developed to examine the structural behavior of the mount. All orientations in the engineering model correspond with the assembly drawing constraints. The mount was analyzed with four (4) mounting locations (antenna, mount pipe, radio, dish, and any other appurtenance) evenly spaced across the face of the mount, with no vertical eccentricity. Wind directions considered were perpendicular (normal) to the face of the frame and at 30 degree increments up to 90 degrees (tangential) to the face of the frame. Wind, dead weight and ice weight on the mount was also included in the model.

## Modeling Software

Autodesk Inventor
RISA-3D
ANSYS Workbench

# Exhibit E

**Mount Analysis**

CENTEK engineering

Centered on Solutions℠

# Antenna Mount Analysis Report

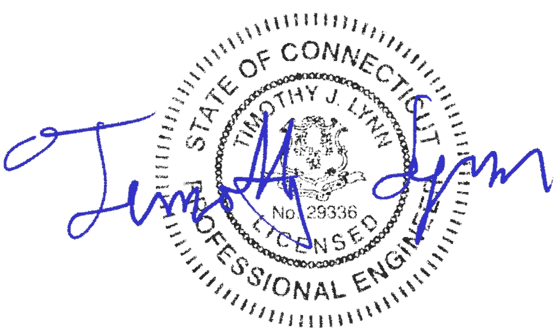
Site Ref: CT11317B

280 Morehouse Road
Fairfield, CT

Centek Project No. 22073.03

Date: May 18, 2023

Max Stress Ratio = 45%




**Prepared for:**
T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

# ***Table of Contents***

CENTEK engineering

Centered on Solutions℠

May 18, 2023

Mr. Matthew Bandle
Northeast Site Solutions
1053 Farmington Ave, Unit G
Farmington, CT 06032

*Re: Structural Letter ~ Antenna Mount*
*T-Mobile – Site Ref: CT11317B*
*280 Morehouse Road*
*Fairfield, CT*

*Centek Project No. 22073.03*

Dear Mr. Bandle,

Centek Engineering, Inc. has reviewed the T-Mobile antenna installation at the above referenced site. The purpose of the review is to determine the structural adequacy of the **proposed mount, consisting of one (1) platform mount (SitePro P/N: RMQLP-496-HK)** to support the proposed equipment configuration. The review considered the effects of wind load, dead load and ice load in accordance with the 2021 International Building Code as modified by the 2022 Connecticut State Building Code (CTBC) including ASCE 7-16 and ANSI/TIA-222-H *Structural Standard for Antenna Supporting Structures, Antennas and Small Wind Turbine Support Structures"*.

The loads considered in this analysis consist of the following:

- <u>**T-Mobile:**</u>
  **<u>Platform:</u> Three (3) RFS APXVAALL24_43 panel antennas, three (3) RFS APX16DWV-16DWVS panel antennas and six (6) Commscope ATSBT-TOP-MF-4G Bias Tees mounted on one (1) Platform to the utility pole with a RAD center elevation of 121-ft above grade.**

The antenna mount was analyzed per the requirements of the 2021 International Building Code as modified by the 2022 Connecticut State Building Code considering a Ultimate design wind speed of 130 mph for Fairfield as required in Appendix P of the 2022 Connecticut State Building Code.

Based on our review of the installation, it is our opinion that the **subject antenna mount has sufficient capacity** to support the aforementioned antenna configuration.

If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

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

63-2 North Branford Road, Branford, CT 06405 203.488.0580 Fax 203.488.8587 www.CentekEng.com

| RAN Template: | A&L Template: |
|---|---|
| 67D94B_Flagpole Outdoor | 67D94B_1DP+1QP+1OP |

CT11317B_L600_5

**Print Name:** Standard
**PORs:** L600_L600 Coverage

## Section 1 - Site Information

**Site ID:** CT11317B
**Status:** Final
**Version:** 5
**Project Type:** L600
**Approved:** 03/13/2023 6:23:55 PM
**Approved By:** Farhan.Badar@T-Mobile.com
**Last Modified:** 03/13/2023 6:23:55 PM
**Last Modified By:** Farhan.Badar@T-Mobile.com

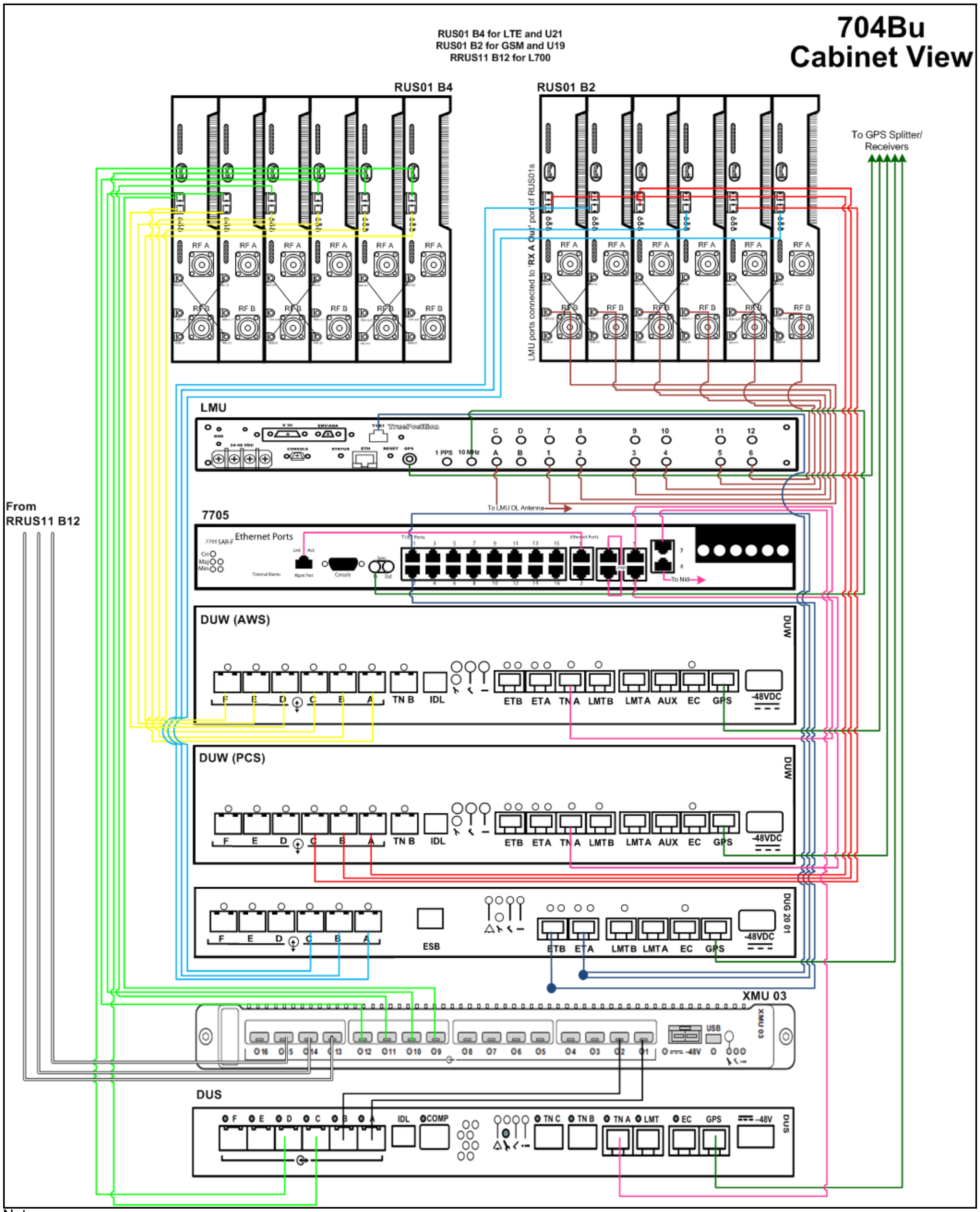
**Site Name:** Fairfield/MP/X44&X42
**Site Class:** Utility Lattice Tower
**Site Type:** Structure Non Building
**Plan Year:**
**Market:** CONNECTICUT CT
**Vendor:** Ericsson
**Landlord:** Northeast Utilities

**Latitude:** 41.209987
**Longitude:** -73.261539
**Address:** 280 Morehouse Drive (Tower 876 Line 1730)
**City, State:** Fairfield, CT
**Region:** NORTHEAST

| RAN Template: 67D94B_Flagpole Outdoor | | AL Template: 67D94B_1DP+1QP+1OP | | |
|---|---|---|---|---|
| Sector Count: 3 | Antenna Count: 6 | Coax Line Count: 22 | TMA Count: 0 | RRU Count: 0 |

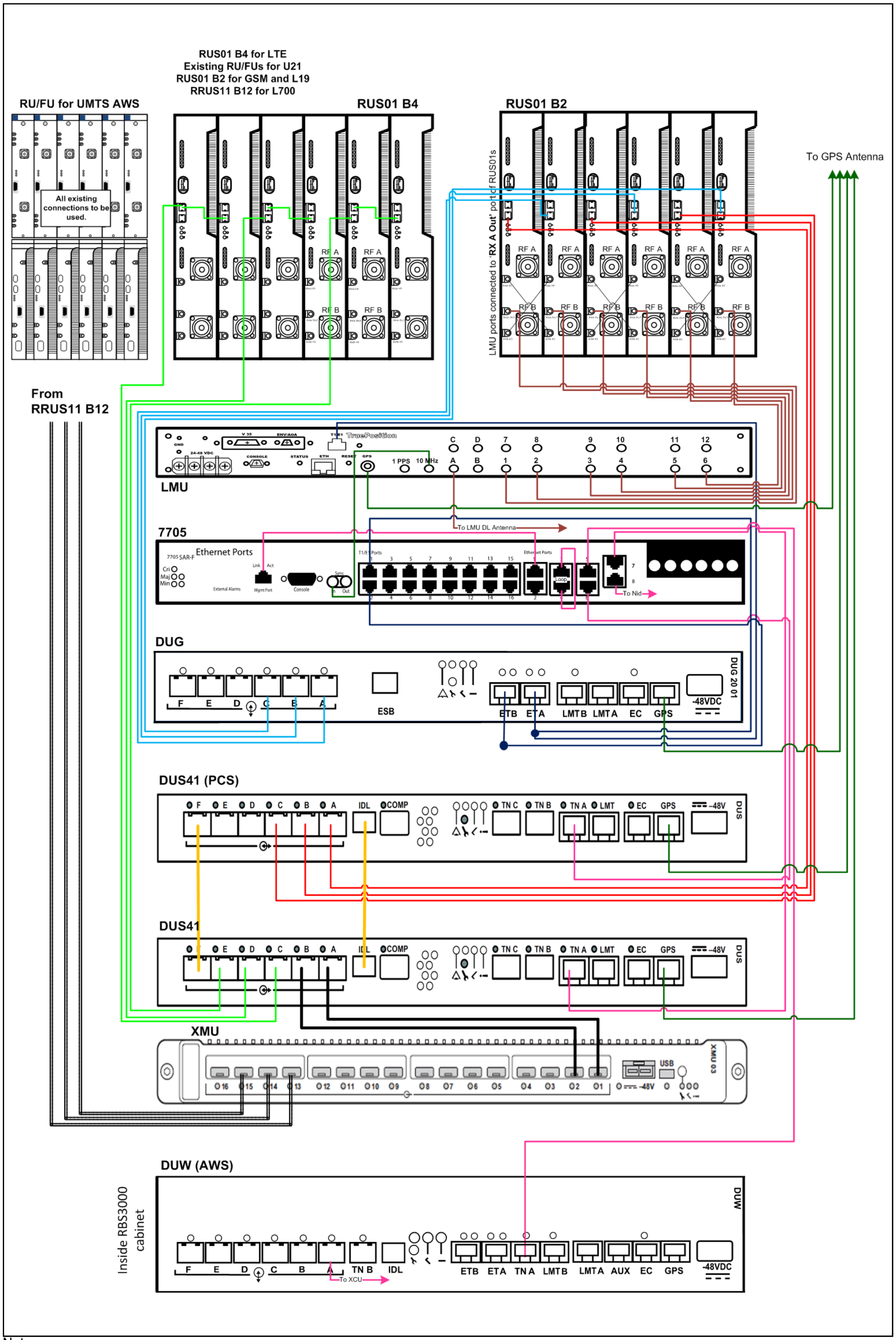
## Section 2 - Existing Template Images

704Bu.png




Notes:

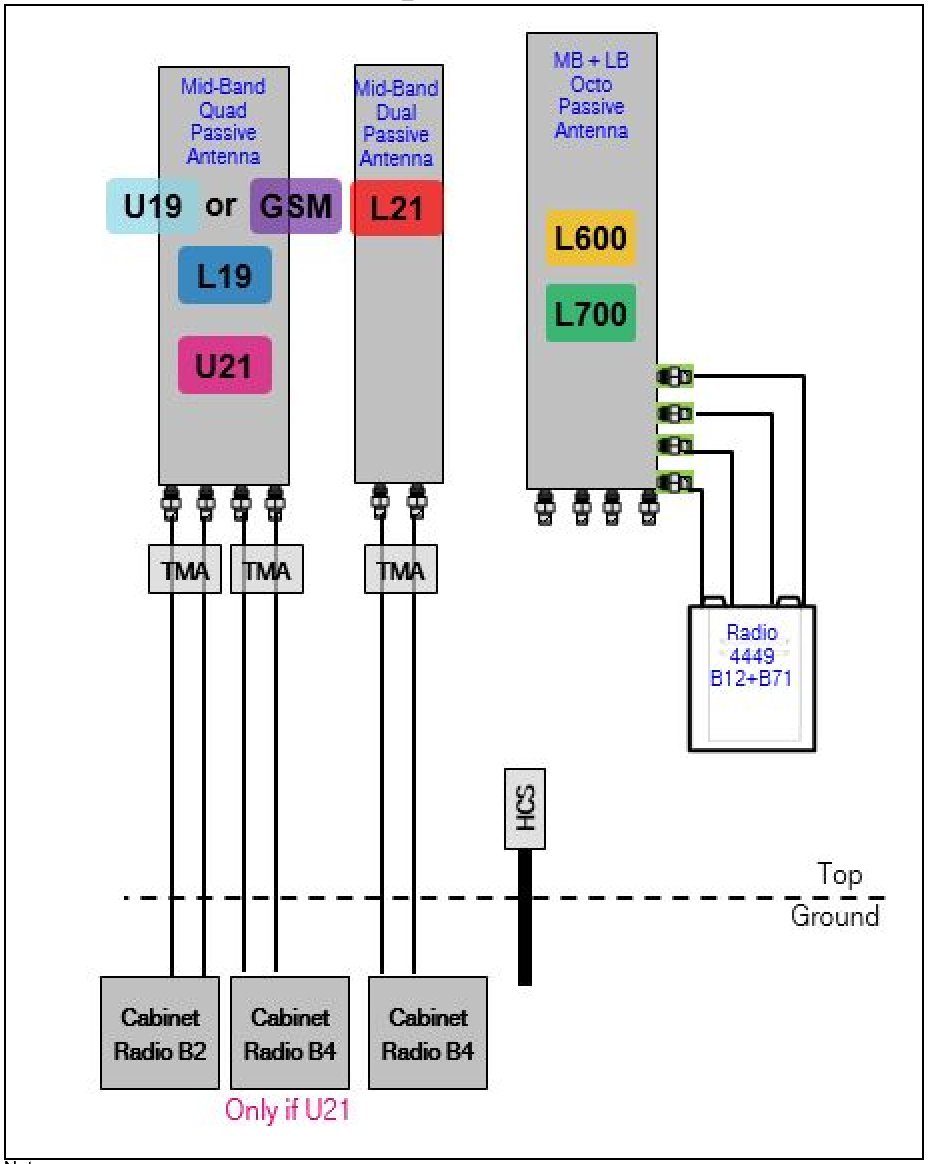
794A Outdoor.png


RUS01 B4 for LTE
Existing RU/FUs for U21
RUS01 B2 for GSM and L19
RRUS11 B12 for L700
RU/FU for UMTS AWS
All existing connections to be used.
RUS01 B4
RUS01 B2
To GPS Antenna
LMU ports connected to 'RX A Out' port of RUS01s
RF A
RF B
From RRUS11 B12
LMU
7705
Ethernet Ports
To LMU DL Antenna
To Nid
DUG
ESB
ETB ETA LMTB LMTA EC GPS
-48VDC
DUG 20 01
DUS41 (PCS)
F E D C B A IDL COMP
TN C TN B TN A LMT EC GPS -48V
DUS41
XMU
XMU 03
USB
DUW (AWS)
Inside RBS3000 cabinet
F E D C B A TN B IDL
ETB ETA TN A LMTB LMTA AUX EC GPS
-48VDC
To XCU
DUW

Notes:

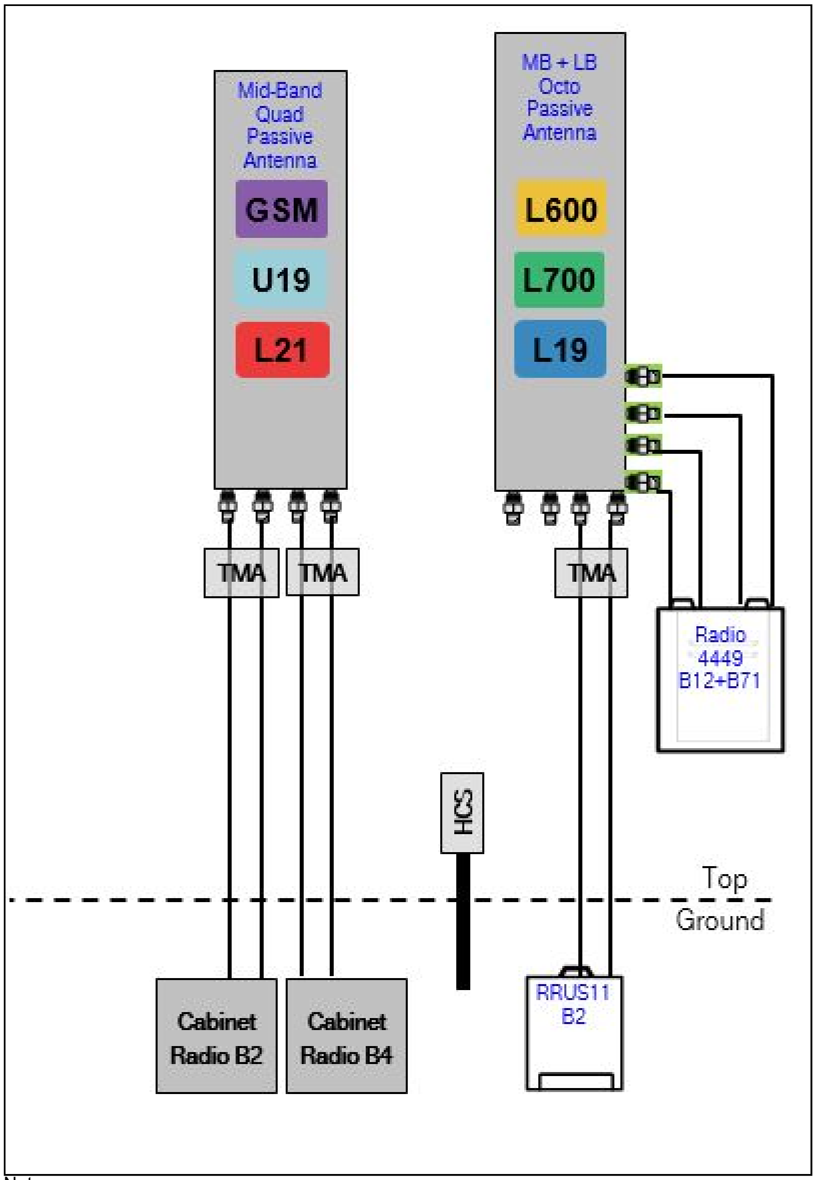
Section 3 - Proposed Template Images

67D94B_1DP+1QP+1OP.JPG




Notes:

67D94BR_1QP+1OP.JPG


Mid-Band
Quad
Passive
Antenna
GSM
U19
L21
MB + LB
Octo
Passive
Antenna
L600
L700
L19
TMA
TMA
TMA
Radio
4449
B12+B71
HCS
Top
Ground
Cabinet
Radio B2
Cabinet
Radio B4
RRUS11
B2

Notes:

## Section 4 - Siteplan Images

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

| RAN Template: | A&L Template: |
|---|---|
| 67D94B_Flagpole Outdoor | 67D94B_1DP+1QP+1OP |

CT11317B_L600_5

**Print Name:** Standard
**PORs:** L600_L600 Coverage

## Section 5 - RAN Equipment

### Existing RAN Equipment

**Template:** 794B GSM Shutdown Outdoor

| Enclosure | 1 | 2 |
|---|---|---|
| Enclosure Type | Ground Mount (Ericsson) | RBS 6102 |
| Radio | RRUS11 B12 **(x3)**: L700 | RUS01 B2 **(x3)**: L1900; RUS01 B2 **(x3)**: G1900; RUS01 B4 **(x3)**: L2100; RUS01 B4 **(x3)**: U2100 (DECOMMISSIONED) |
| Baseband | | BB 6630: L700, L1900, L2100; DUG20; DUW30 |

### Proposed RAN Equipment

**Template:** 67D94B_Flagpole Outdoor

| Enclosure | 1 | 2 |
|---|---|---|
| Enclosure Type | Ground Mount (Ericsson) | RBS 6102 |
| Radio | Radio 4480 B71+B85 **(x3)**: L600, L700 | RUS01 B2 **(x6)**: L1900; RUS01 B4 **(x6)**: L2100 |
| Baseband | | BB 6630: L1900, L2100; DUG20; DUW30; RP 6651: N600, L600, L700 |

**RAN Scope of Work:**

Install (1) BB6648 for L6/ L7/5G N600.

Remove existing TMA

Existing: (18) Coaxial Lines
Add (6) Coaxial Lines for new total of (24).

| **RAN Template:** | **A&L Template:** |
|---|---|
| 67D94B_Flagpole Outdoor | 67D94B_1DP+1QP+1OP |

CT11317B_L600_5

**Print Name:** Standard
**PORs:** L600_L600 Coverage

## Section 6 - A&L Equipment

**Existing Template:** 794B_1HP U19 shutdown
**Proposed Template:** 67D94B_1DP+1QP+1OP

### Sector 1 (Existing) view from behind

| | | | |
|---|---|---|---|
| **Coverage Type** | A - Outdoor Macro | | |
| **Antenna** | 1 | | 2 |
| **Antenna Model** | RFS - APX16DWV-16DWV-S-E-A20 (Quad) | | Andrew - LNX-6515DS-A1M (Dual) |
| **Azimuth** | 60 | | 60 |
| **M. Tilt** | 0 | | 0 |
| **Height (ft)** | 95 | | 95 |
| **Ports** | P1 | P2 | P3 |
| **Active Tech** | L1900 G1900 | L2100 | L700 |
| **Dark Tech** | | | |
| **Restricted Tech** | | | |
| **Decomm. Tech** | | U2100 | |
| **E. Tilt** | 2 | | 2 |
| **Cables** | 1-1/4" Coax - 125 ft. **(x2)** | 1-1/4" Coax - 125 ft. **(x2)** | 1-1/4" Coax - 125 ft. **(x2)** |
| **TMAs** | Generic Twin Style 1A - PCS (At Cabinet) | Generic Twin Style 1B - AWS (At Cabinet) | |
| **Diplexer / Combiners** | | | |
| **Radio** | | | |
| **Sector Equipment** | | | Andrew Smart Bias T (Ericsson) (At Antenna) |

**Unconnected Equipment:**

**Scope of Work:**

Ground TMA's

| RAN Template: | A&L Template: |
|---|---|
| 67D94B_Flagpole Outdoor | 67D94B_1DP+1QP+1OP |

CT11317B_L600_5

**Print Name:** Standard
**PORs:** L600_L600 Coverage

## Sector 1 (Proposed) view from behind

| | | | | | | |
|---|---|---|---|---|---|---|
| **Coverage Type** | A - Outdoor Macro | | | | | |
| **Antenna** | 1 | | 2 | | | |
| **Antenna Model** | RFS - APX16DWV-16DWV-S-E-A20 (Quad) | | RFS - APXVAALL24_43-U-NA20 (Octo) | | | |
| **Azimuth** | 60 | | 60 | | | |
| **M. Tilt** | | | | | | |
| **Height (ft)** | 95 | | 95 | | | |
| **Ports** | P1 | P2 | P3 | P4 | P5 | P6 |
| **Active Tech** | G1900 L1900 N1900 | L2100 | L700 L600 N600 | L700 L600 N600 | | |
| **Dark Tech** | | | | | | |
| **Restricted Tech** | | | | | | |
| **Decomm. Tech** | | | | | | |
| **E. Tilt** | | | | | | |
| **Cables** | 1-1/4" Coax - 126 ft. **(x2)** | 1-1/4" Coax - 126 ft. **(x2)** | 1-1/4" Coax - 126 ft. **(x2)** | 1-1/4" Coax - 126 ft. **(x2)** | | |
| **TMAs** | | | | | | |
| **Diplexer / Combiners** | | | | | | |
| **Radio** | | | | | | |
| **Sector Equipment** | Andrew Smart Bias T (Ericsson) (At Antenna) | | Andrew Smart Bias T (Ericsson) (At Antenna) | | | |

**Unconnected Equipment:**

**Scope of Work:**

| RAN Template: | A&L Template: |
|---|---|
| 67D94B_Flagpole Outdoor | 67D94B_1DP+1QP+1OP |

CT11317B_L600_5

**Print Name:** Standard
**PORs:** L600_L600 Coverage

| Sector 2 (Existing) view from behind | | | |
|---|---|---|---|
| Coverage Type | A - Outdoor Macro | | |
| Antenna | 1 | | 2 |
| Antenna Model | RFS - APX16DWV-16DWV-S-E-A20 (Quad) | | Andrew - LNX-6515DS-A1M (Dual) |
| Azimuth | 180 | | 180 |
| M. Tilt | 0 | | 0 |
| Height (ft) | 95 | | 95 |
| Ports | P1 | P2 | P3 |
| Active Tech | G1900 L1900 | L2100 | L700 |
| Dark Tech | | | |
| Restricted Tech | | | |
| Decomm. Tech | | U2100 | |
| E. Tilt | 2 | | 2 |
| Cables | 1-1/4" Coax - 125 ft. **(x2)** | 1-1/4" Coax - 125 ft. **(x2)** | 1-1/4" Coax - 125 ft. **(x2)** |
| TMAs | Generic Twin Style 1A - PCS (At Cabinet) | Generic Twin Style 1B - AWS (At Cabinet) | |
| Diplexer / Combiners | | | |
| Radio | | | |
| Sector Equipment | | | Andrew Smart Bias T (Ericsson) (At Antenna) |

**Unconnected Equipment:**

**Scope of Work:**

| RAN Template: | A&L Template: |
|---|---|
| 67D94B_Flagpole Outdoor | 67D94B_1DP+1QP+1OP |

CT11317B_L600_5

**Print Name:** Standard
**PORs:** L600_L600 Coverage

**Sector 2 (Proposed) view from behind**

| | | | | | | |
|---|---|---|---|---|---|---|
| **Coverage Type** | A - Outdoor Macro | | | | | |
| **Antenna** | 1 | | 2 | | | |
| **Antenna Model** | RFS - APX16DWV-16DWV-S-E-A20 (Quad) | | RFS - APXVAALL24_43-U-NA20 (Octo) | | | |
| **Azimuth** | 180 | | 180 | | | |
| **M. Tilt** | | | | | | |
| **Height (ft)** | 95 | | 95 | | | |
| **Ports** | **P1** | **P2** | **P3** | **P4** | **P5** | **P6** |
| **Active Tech** | G1900 L1900 N1900 | L2100 | L700 L600 N600 | L700 L600 N600 | | |
| **Dark Tech** | | | | | | |
| **Restricted Tech** | | | | | | |
| **Decomm. Tech** | | | | | | |
| **E. Tilt** | | | | | | |
| **Cables** | 1-1/4" Coax - 126 ft. **(x2)** | 1-1/4" Coax - 126 ft. **(x2)** | 1-1/4" Coax - 126 ft. **(x2)** | 1-1/4" Coax - 126 ft. | | |
| **TMAs** | | | | | | |
| **Diplexer / Combiners** | | | | | | |
| **Radio** | | | | | | |
| **Sector Equipment** | Andrew Smart Bias T (Ericsson) (At Antenna) | | Andrew Smart Bias T (Ericsson) (At Antenna) | | | |

**Unconnected Equipment:**

**Scope of Work:**

| RAN Template: | A&L Template: |
|---|---|
| 67D94B_Flagpole Outdoor | 67D94B_1DP+1QP+1OP |

CT11317B_L600_5

**Print Name:** Standard
**PORs:** L600_L600 Coverage

## Sector 3 (Existing) view from behind

| | | | |
|---|---|---|---|
| **Coverage Type** | A - Outdoor Macro | | |
| **Antenna** | 1 | | 2 |
| **Antenna Model** | RFS - APX16DWV-16DWV-S-E-A20 (Quad) | | Andrew - LNX-6515DS-A1M (Dual) |
| **Azimuth** | 300 | | 300 |
| **M. Tilt** | 0 | | 0 |
| **Height (ft)** | 95 | | 95 |
| **Ports** | P1 | P2 | P3 |
| **Active Tech** | G1900 L1900 | L2100 | L700 |
| **Dark Tech** | | | |
| **Restricted Tech** | | | |
| **Decomm. Tech** | | U2100 | |
| **E. Tilt** | 2 | | 2 |
| **Cables** | 1-1/4" Coax - 125 ft. **(x2)** | 1-1/4" Coax - 125 ft. **(x2)** | 1-1/4" Coax - 125 ft. **(x2)** |
| **TMAs** | Generic Twin Style 1A - PCS (At Cabinet) | Generic Twin Style 1B - AWS (At Cabinet) | |
| **Diplexer / Combiners** | | | |
| **Radio** | | | |
| **Sector Equipment** | | | Andrew Smart Bias T (Ericsson) (At Antenna) |

**Unconnected Equipment:**

**Scope of Work:**

| RAN Template: | A&L Template: |
|---|---|
| 67D94B_Flagpole Outdoor | 67D94B_1DP+1QP+1OP |

CT11317B_L600_5

**Print Name:** Standard
**PORs:** L600_L600 Coverage

## Sector 3 (Proposed) view from behind

| | | | | | | |
|---|---|---|---|---|---|---|
| **Coverage Type** | A - Outdoor Macro | | | | | |
| **Antenna** | 1 | | 2 | | | |
| **Antenna Model** | RFS - APX16DWV-16DWV-S-E-A20 (Quad) | | RFS - APXVAALL24_43-U-NA20 (Octo) | | | |
| **Azimuth** | 300 | | 300 | | | |
| **M. Tilt** | | | | | | |
| **Height (ft)** | 95 | | 95 | | | |
| **Ports** | P1 | P2 | P3 | P4 | P5 | P6 |
| **Active Tech** | L1900 N1900 G1900 | L2100 | L700 L600 N600 | L700 L600 N600 | | |
| **Dark Tech** | | | | | | |
| **Restricted Tech** | | | | | | |
| **Decomm. Tech** | | | | | | |
| **E. Tilt** | | | | | | |
| **Cables** | 1-1/4" Coax - 126 ft. **(x2)** | 1-1/4" Coax - 126 ft. **(x2)** | 1-1/4" Coax - 126 ft. **(x2)** | 1-1/4" Coax - 126 ft. | | |
| **TMAs** | | | | | | |
| **Diplexer / Combiners** | | | | | | |
| **Radio** | | | | | | |
| **Sector Equipment** | Andrew Smart Bias T (Ericsson) (At Antenna) | | Andrew Smart Bias T (Ericsson) (At Antenna) | | | |

**Unconnected Equipment:**

**Scope of Work:**

# Exhibit F

## Power Density/RF Emissions Report

FOX HILL TELECOM

# Radio Frequency Emissions Analysis Report

T Mobile

## Site ID: CT11317B

Fairfield/MP/X44&X42
280 Morehouse Drive (Tower 876 Line 1730)
Fairfield, CT 06824

May 15, 2023

Fox Hill Telecom Project Number: 230531

| Site Compliance Summary | |
|---|---|
| Compliance Status: | COMPLIANT |
| Site total MPE% of FCC general population allowable limit: | 1.69 % |

Fox Hill Telecom, Inc Worcester MA 01609

May 15, 2023

T-MOBILE
Attn: RF Manager
35 Griffin Road South
Bloomfield, CT 06009

Emissions Analysis for Site: **CT11317B – Fairfield/MP/X44&X42**

Fox Hill Telecom, Inc ("Fox Hill") was directed to analyze the proposed upgrades to the T-MOBILE facility located at **280 Morehouse Drive (Tower 876 Line 1730), Fairfield, CT**, for the purpose of determining whether the emissions from the Proposed T-MOBILE Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

# CALCULATIONS

Calculations were performed for the proposed upgrades to the T-MOBILE antenna facility located at **280 Morehouse Drive (Tower 876 Line 1730), Fairfield, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65 for far field modeling calculations.

In OET-65, plane wave power densities in the Far Field of an antenna are calculated by considering antenna gain and reflective waves that would contribute to exposure.

Since the radiation pattern of an antenna has developed in the **Far Field** region the power gain in specific directions needs to be considered in exposure predictions to yield an Effective Radiated Power (ERP) in each specific direction from the antenna. Also, since the vertical radiation pattern of the antenna is considered, the exposure calculations would most likely be reduced significantly at ground level, resulting in a more realistic estimate of the actual exposure levels. To determine a worst-case scenario at each point along the calculation radials, each point was calculated using the antenna gain value at each angle of incident and compared against the result using an isotropic radiator at the antenna height with the greater of the two used to yield the more pessimistic far field value for each point along the calculation radial.

Additionally, to model a truly "worst case" prediction of exposure levels at or near a surface, such as at ground-level or on a rooftop, reflection off the surface of antenna radiation power can be assumed, resulting in a potential 1.6 times increase in power density in calculating far field power density values.

With these factors Considered, the worst case **Far Field prediction model** utilized in this analysis is determined by the following equation:

Equation 9 per FCC OET65 for Far Field Modeling

$$S = \frac{33.4\ ERP}{R^2}$$

S = Power Density (in $\mu$w/cm$^2$)
ERP = Effective Radiated Power from antenna (watts)
R = Distance from the antenna (meters)

Predicted far field power density values for all carriers identified in this report were calculated 6 feet above the ground level and are displayed as a percentage of the applicable FCC standards. All emissions values for other carriers were calculated using the same Far Field model outlined above, using industry standard radio configurations and frequency band selection based upon available licenses in this geographic area for emissions contribution estimates.

For each T-Mobile sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

| Technology | Frequency Band | Channel Count | Transmit Power per Channel (W) |
|---|---|---|---|
| GSM | 1900 MHz (PCS) | 1 | 15 |
| LTE / 5G NR | 1900 MHz (PCS) | 4 | 40 |
| LTE | 2100 MHz (AWS) | 4 | 40 |
| LTE / 5G NR | 600 MHz | 2 | 40 |
| LTE | 700 MHz | 2 | 20 |

*Table 1: Channel Data Table*

The following T-Mobile antennas listed in *Table 2* were used in the modeling for transmission in the 600 MHz, 700 MHz, 1900 MHz (PCS) and 2100 MHz (AWS) frequency bands.  This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below.

| Sector | Antenna Number | Antenna Make / Model | Antenna Centerline (ft) |
|---|---|---|---|
| A | 1 | RFS APX16DWV-16DWV-S-E-A20 | 121 |
| A | 2 | RFS APXVAALL24_43-U-NA20 | 121 |
| B | 1 | RFS APX16DWV-16DWV-S-E-A20 | 121 |
| B | 2 | RFS APXVAALL24_43-U-NA20 | 121 |
| C | 1 | RFS APX16DWV-16DWV-S-E-A20 | 121 |
| C | 2 | RFS APXVAALL24_43-U-NA20 | 121 |

*Table 2: Antenna Data*

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

## RESULTS

Per the calculations completed for the proposed T-MOBILE configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

| Antenna ID | Antenna Make / Model | Frequency Bands | Antenna Gain (dBd) | Channel Count | Total TX Power (W) | ERP (W) | MPE % |
|---|---|---|---|---|---|---|---|
| Antenna A1 | RFS APX16DWV-16DWV-S-E-A20 | 1900 MHz (PCS) / 2100 MHz (AWS) | 15.9 | 9 | 335 | 13,033.01 | 0.92 |
| Antenna A2 | RFS APXVAALL24_43-U-NA20 | 600 MHz / 700 MHz | 13.65 / 13.85 | 4 | 120 | 2,824.56 | 0.77 |
| | | | | | | Sector A Composite MPE% | **1.69** |
| Antenna B1 | RFS APX16DWV-16DWV-S-E-A20 | 1900 MHz (PCS) / 2100 MHz (AWS) | 15.9 | 9 | 335 | 13,033.01 | 0.92 |
| Antenna B2 | RFS APXVAALL24_43-U-NA20 | 600 MHz / 700 MHz | 13.65 / 13.85 | 4 | 120 | 2,824.56 | 0.77 |
| | | | | | | Sector B Composite MPE% | **1.69** |
| Antenna C1 | RFS APX16DWV-16DWV-S-E-A20 | 1900 MHz (PCS) / 2100 MHz (AWS) | 15.9 | 9 | 335 | 13,033.01 | 0.92 |
| Antenna C2 | RFS APXVAALL24_43-U-NA20 | 600 MHz / 700 MHz | 13.65 / 13.85 | 4 | 120 | 2,824.56 | 0.77 |
| | | | | | | Sector C Composite MPE% | **1.69** |

*Table 3: T-MOBILE Emissions Levels*

The Following table (*table 4*) shows all additional identified carriers on site and their emissions contribution estimates, along with the newly calculated maximum T-MOBILE MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, all three T-Mobile sectors have the same configuration yielding the same results for all three sectors. *Table 5* below shows a summary for each T-MOBILE Sector as well as the composite estimated MPE value for the site.

| **Site Composite MPE%** | |
|---|---|
| **Carrier** | **MPE%** |
| T-MOBILE – Max Per Sector Value | **1.69 %** |
| No Additional Carriers | NA |
| **Site Total MPE %:** | **1.69 %** |

*Table 4: All Carrier MPE Contributions*

| | |
|---|---|
| T-MOBILE Sector A Total: | 1.69 % |
| T-MOBILE Sector B Total: | 1.69 % |
| T-MOBILE Sector C Total: | 1.69 % |
| | |
| Site Total: | 1.69 % |

*Table 5: Site MPE Summary*

*Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated T-MOBILE sector(s). For this site, all three T-Mobile sectors have the same configuration yielding the same results for all three sectors.

| **T-MOBILE _ Frequency Band / Technology Max Power Values (Per Sector)** | **# Channels** | **Watts ERP (Per Channel)** | **Height (feet)** | **Total Power Density (µW/cm²)** | **Frequency (MHz)** | **Allowable MPE (µW/cm²)** | **Calculated % MPE** |
|---|---|---|---|---|---|---|---|
| T-Mobile 1900 MHz (PCS) GSM | 1 | 583.57 | 121 | 0.40 | 1900 MHz (PCS) | 1000 | 0.04% |
| T-Mobile 1900 MHz (PCS) LTE / 5G NR | 4 | 1,556.18 | 121 | 4.40 | 1900 MHz (PCS) | 1000 | 0.44% |
| T-Mobile 2100 MHz (AWS) LTE | 4 | 1,556.18 | 121 | 4.40 | 2100 MHz (AWS) | 1000 | 0.44% |
| T-Mobile 600 MHz LTE / 5G NR | 2 | 926.96 | 121 | 2.16 | 600 MHz | 400 | 0.54% |
| T-Mobile 700 MHz LTE | 2 | 485.32 | 121 | 1.07 | 700 MHz | 467 | 0.23% |
| | | | | | | **Total:** | **1.69 %** |

*Table 6: T-MOBILE Maximum Sector MPE Power Values*

## Summary

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

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

| T-MOBILE Sector | Power Density Value (%) |
|---|---|
| Sector A: | 1.69 % |
| Sector B: | 1.69 % |
| Sector C: | 1.69 % |
| T-MOBILE Maximum Total (per sector): | 1.69 % |
| | |
| Site Total: | 1.69 % |
| | |
| Site Compliance Status: | **COMPLIANT** |

The estimated composite MPE value for this site assuming all carriers present is **1.69 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon the far field calculations performed for all carriers identified in this report.

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

Scott Heffernan
Principal RF Engineer
**Fox Hill Telecom, Inc**
Worcester, MA 01609
(978)660-3998

# Exhibit G

## Letter of Authorization

56 Prospect Street,
Hartford, CT 06103

P.O. Box 270
Hartford, CT 06141-0270
(860) 665-5000

November 8, 2021

Mr. Sheldon Freincle
Northeast Site Solutions
420 Main St,
Sturbridge, MA 01566

RE: T-Mobile Antenna Site CT11317B, Morehouse Drive, Fairfield CT, Eversource Structure 876

Dear Mr. Freincle:

Based on our reviews of the site drawings, the structural analysis and foundation review provided by Centek Engineering, along with a third party review performed by Paul J. Ford and Company, we accept the proposed modification.

Please work with Christopher Gelinas of Eversource Real Estate to process the site lease amendment. Please do not hesitate to contact us with questions or concerns. Christopher can be contacted at 860-665-2008, and I can be contacted at (203) 623-0409.

Sincerely,

*Richard Badon*

Richard Badon
Transmission Line Engineering

Ref: 2021-1004 - CT11317B Structural Analysis Rev2 (21051.10)
2021-0709 - CT11317B Mount Analysis Rev0 (21051.10)
2021-1102_21051.10 CT11317B Fairfield_MP - Rev2 CDs (S&S)

# Exhibit H

**Recipient Mailings**

UNITED STATES POSTAL SERVICE®

**Click-N-Ship®**

9405 5036 9930 0576 7094 05 0096 5000 0020 6824

**P**

usps.com
**$9.65**
**US POSTAGE**
Flat Rate Env

**U.S. POSTAGE PAID**
Click-N-Ship®

07/17/2023 Mailed from 01566 986752149224954

**PRIORITY MAIL®**

Expected Delivery Date: 07/19/23
Ref#: CT11317B

**0001**

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
STE 1
420 MAIN ST
STURBRIDGE MA 01566-1359

**C005**

BRENDA L KUPCHICK
FIRST SELECTWOMAN- TOWN OF FAIRFIELD
725 OLD POST RD
FAIRFIELD CT 06824-6684

**USPS TRACKING #**

**9405 5036 9930 0576 7094 05**

Electronic Rate Approved #038555749

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## Instructions

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3. **Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.**
4. **To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.**
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**9405 5036 9930 0576 7094 05**

| | |
|---|---|
| Trans. #: | 591852791 |
| Print Date: | 07/17/2023 |
| Ship Date: | 07/17/2023 |
| Expected Delivery Date: | 07/19/2023 |

| | |
|---|---|
| Priority Mail® Postage: | **$9.65** |
| Total: | **$9.65** |

**From:** DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
STE 1
420 MAIN ST
STURBRIDGE MA 01566-1359

Ref#: CT11317B

**To:** BRENDA L KUPCHICK
FIRST SELECTWOMAN- TOWN OF FAIRFIELD
725 OLD POST RD
FAIRFIELD CT 06824-6684

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Ref#: CT11317B
**0001**

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
STE 1
420 MAIN ST
STURBRIDGE MA 01566-1359

**C005**

JIM WENDT
PLANNING DIRECTOR-TOWN OF FAIRFIELD
SULLIVAN INDEPENDENCE HALL
725 OLD POST RD
FAIRFIELD CT 06824-6684

**USPS TRACKING #**

**9405 5036 9930 0576 7094 29**

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| | |
|---|---|
| Trans. #: | 591852791 |
| Print Date: | 07/17/2023 |
| Ship Date: | 07/17/2023 |
| Expected Delivery Date: | 07/19/2023 |

| | |
|---|---|
| Priority Mail® Postage: | **$9.65** |
| Total: | **$9.65** |

**From:** DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
STE 1
420 MAIN ST
STURBRIDGE MA 01566-1359

Ref#: CT11317B

**To:** JIM WENDT
PLANNING DIRECTOR-TOWN OF FAIRFIELD
SULLIVAN INDEPENDENCE HALL
725 OLD POST RD
FAIRFIELD CT 06824-6684

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.

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07/17/2023 Mailed from 01566 986752149222275

PRIORITY MAIL®

Expected Delivery Date: 07/19/23
Ref#: CT11317B
**0001**

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
STE 1
420 MAIN ST
STURBRIDGE MA 01566-1359

C021

CONNECTICUT LIGHT & POWER C/O
# 1
56 PROSPECT ST
HARTFORD CT 06103-2818

**USPS TRACKING #**

**9405 5036 9930 0576 7094 36**

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## Click-N-Ship® Label Record

**USPS TRACKING # :**
**9405 5036 9930 0576 7094 36**

| | | | |
|---|---|---|---|
| Trans. #: | 591852791 | Priority Mail® Postage: | **$9.65** |
| Print Date: | 07/17/2023 | Total: | **$9.65** |
| Ship Date: | 07/17/2023 | | |
| Expected Delivery Date: | 07/19/2023 | | |

**From:** DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
STE 1
420 MAIN ST
STURBRIDGE MA 01566-1359

Ref#: CT11317B

**To:** CONNECTICUT LIGHT & POWER C/O EVERSOURCE
# 1
56 PROSPECT ST
HARTFORD CT 06103-2818

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usps.com 9405 5036 9930 0576 7094 43 0096 5000 0020 6825
**$9.65**
**US POSTAGE**
Flat Rate Env

**U.S. POSTAGE PAID**
Click-N-Ship®

07/17/2023 Mailed from 01566 986752149220090

**PRIORITY MAIL®**

Expected Delivery Date: 07/19/23
Ref#: CT11317B
**0001**

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
STE 1
420 MAIN ST
STURBRIDGE MA 01566-1359

**C025**

CHIJIAN ZHANG
280 MOREHOUSE DR
FAIRFIELD CT 06825-2374

**USPS TRACKING #**

**9405 5036 9930 0576 7094 43**

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| | | | |
|---|---|---|---|
| Trans. #: | 591852791 | Priority Mail® Postage: | **$9.65** |
| Print Date: | 07/17/2023 | Total: | **$9.65** |
| Ship Date: | 07/17/2023 | | |
| Expected Delivery Date: | 07/19/2023 | | |

**From:** DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
STE 1
420 MAIN ST
STURBRIDGE MA 01566-1359

Ref#: CT11317B

**To:** CHIJIAN ZHANG
280 MOREHOUSE DR
FAIRFIELD CT 06825-2374

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(800)275-8777

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| Product | Qty | Unit Price | Price |
|---|---|---|---|
| Prepaid Mail<br>Fairfield, CT 06824<br>Weight: 1 lb 8.20 oz<br>Acceptance Date:<br>Mon 07/17/2023<br>Tracking #:<br>9405 5036 9930 0576 7094 29 | 1 | | $0.00 |
| Prepaid Mail<br>Fairfield, CT 06824<br>Weight: 1 lb 8.50 oz<br>Acceptance Date:<br>Mon 07/17/2023<br>Tracking #:<br>9405 5036 9930 0576 7094 05 | 1 | | $0.00 |
| Prepaid Mail<br>Fairfield, CT 06825<br>Weight: 1 lb 8.00 oz<br>Acceptance Date:<br>Mon 07/17/2023<br>Tracking #:<br>9405 5036 9930 0576 7094 43 | 1 | | $0.00 |
| Prepaid Mail<br>Hartford, CT 06103<br>Weight: 1 lb 7.90 oz<br>Acceptance Date:<br>Mon 07/17/2023<br>Tracking #:<br>9405 5036 9930 0576 7094 36 | 1 | | $0.00 |

Grand Total: $0.00

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