

INDUSTRIAL AVE,
STATE 3
NEW BRITAIN NJ 07430
PHONE: 201.684.0055
FAX: 201.684.0066



December 17, 2021

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

RE: Notice of Exempt Modification
150 E. Aurora Street, Waterbury, CT 06708
Latitude: 41.5750000
Longitude: -73.0583000
T-Mobile Site#: CTNH334A - Anchor

Dear Ms. Bachman:

T-Mobile currently maintains three (3) antennas at the 95' level and six (6) antennas at the 105' level of the 110' stamstack. The Smokestack is managed by American Tower and the property is owned by 50 East Aurora Storage & Light MFG LLC. T-Mobile now intends to replace six (6) of its existing antennas with three (3) L2500/N2500 antennas. The new antennas would be installed at the 105' level of the tower. The new antennas support 5G services.

Planned Modifications:

Tower:

Install New:

- (3) AIR6449 Antennas
- (3) Radio 4460 B25 / B66
- (2) 6x24 Hybrid Cables

To Be Removed:

- (3) AIR21 Antennas
- (3) AIR32 Antennas
- (1) 9x18 Hybrid Cable

Existing to Remain:

- (3) RFS APXAARR24 Antennas
- (3) Radio 449 B71 B85

This tower was approved by the City of Waterbury. This was approved on June 27, 2006. The approval is enclosed.

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 Mayor Neil O'Leary, Elected Official, and Robert Nerney, Town Planner of Waterbury, as well as the property and tower owner.

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

1. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

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

Sincerely,

Eric Breun

Transcend Wireless

Cell: 201-658-7728

Email: ebreun@transcendwireless.com

Attachments

cc: Neil O'Leary - Mayor of Waterbury

Robert Nerney - Town Planner

50 East Aurora Storage & Light MFG LLC - Property Owner

American Tower - Smokestack Manager

ERIC BREUN
2016587728
10 INDUSTRIAL AVE
MAHWAH NJ 07430

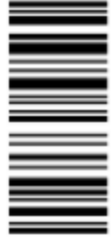
1 LBS

1 OF 1

SHIP TO:
50 E AURORA STORAGE & LIGHT MFG LLC
25350 BUDDER ROAD
SPRING TX 77380



TX 776 5-03



UPS 3 DAY SELECT

3

TRACKING #: 1Z V25 742 12 9921 6951



BILLING: P/P

Reference #1: CTNH334A

XOL 21.11.24 NV45 51.0A 12/2021*



TM

ERIC BREUN
2016587728
10 INDUSTRIAL AVE
MAHWAH NJ 07430

1 LBS

1 OF 1

SHIP TO:
CONTACTS MANAGEMENT
AMERICAN TOWER CORPORATION
10 PRESIDENTIAL WAY
WOBURN MA 01801



MA 018 9-04



UPS GROUND

TRACKING #: 1Z V25 742 03 9091 9814



BILLING: P/P

Reference #1: CTNH334A

XOL 21.11.24 NV45 51.0A 12/2021*



TM

ERIC BREUN
2016587728
10 INDUSTRIAL AVE
MAHWAH NJ 07430

1 LBS

1 OF 1

SHIP TO:
NEIL O'LEARY
2ND FLOOR
235 GRAND STREET
WATERBURY CT 06702



CT 067 9-05



UPS GROUND

TRACKING #: 1Z V25 742 03 9709 6978



BILLING: P/P

Reference #1: CTNH334A

XOL 21.11.24 NV45 51.0A 12/2021*



TM

ERIC BREUN
2016587728
10 INDUSTRIAL AVE
MAHWAH NJ 07430

1 LBS

1 OF 1

SHIP TO:
ROBERT NERNEY
5TH FLOOR
185 SOUTH MAIN STREET
WATERBURY CT 06706

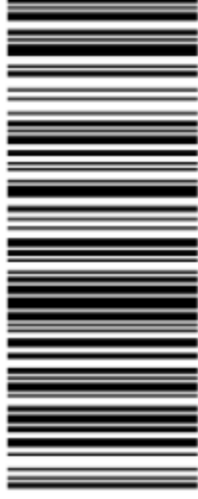


CT 067 9-05



UPS GROUND

TRACKING #: 1Z V25 742 03 9814 6966



BILLING: P/P

Reference #1: CTNH334A

XOL 21.11.24 NV45 51.0A 12/2021*



TM

Hello, your package has been delivered.

Delivery Date: Wednesday, 12/15/2021

Delivery Time: 10:29 AM

Left At: MAIL ROOM

Signed by: JAY

TRANSCEND WIRELESS

Tracking Number: [1ZV257420397096978](#)

Ship To: NEIL O'LEARY
235 GRAND STREET
2ND FLOOR
WATERBURY, CT 06702
US

Number of Packages: 1

UPS Service: UPS Ground

Package Weight: 1.0 LBS

Reference Number: CTNH334A

Hello, your package has been delivered.

Delivery Date: Wednesday, 12/15/2021

Delivery Time: 10:32 AM

Left At: RECEIVER

Signed by: MULLEN

TRANSCEND WIRELESS

Tracking Number: [1ZV257420398146966](#)

Ship To: ROBERT NERNEY
185 SOUTH MAIN STREET
5TH FLOOR
WATERBURY, CT 06706
US

Number of Packages: 1

UPS Service: UPS Ground

Package Weight: 1.0 LBS

Reference Number: CTNH334A

Hello, your package has been delivered.

Delivery Date: Wednesday, 12/15/2021

Delivery Time: 11:31 AM

Left At: FRONT DESK

Signed by: ANCRI

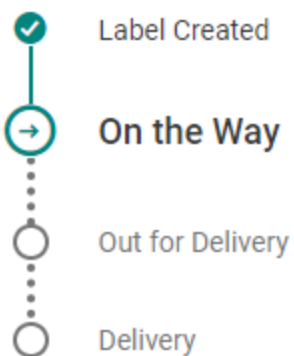
TRANSCEND WIRELESS

Tracking Number:	1ZV257420390919814
Ship To:	AMERICAN TOWER CORPORATION 10 PRESIDENTIAL WAY WOBURN, MA 01801 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.0 LBS
Reference Number:	CTNH334A

Your shipment
1ZV257421299216951

Estimated delivery

Friday, December 17 by 9:00 P.M.



Ship To
SPRING, TX US

Location: 150 EAST AURORA ST Owner: 150 EAST AURORA STORAGE AND LIGHT MFG LL

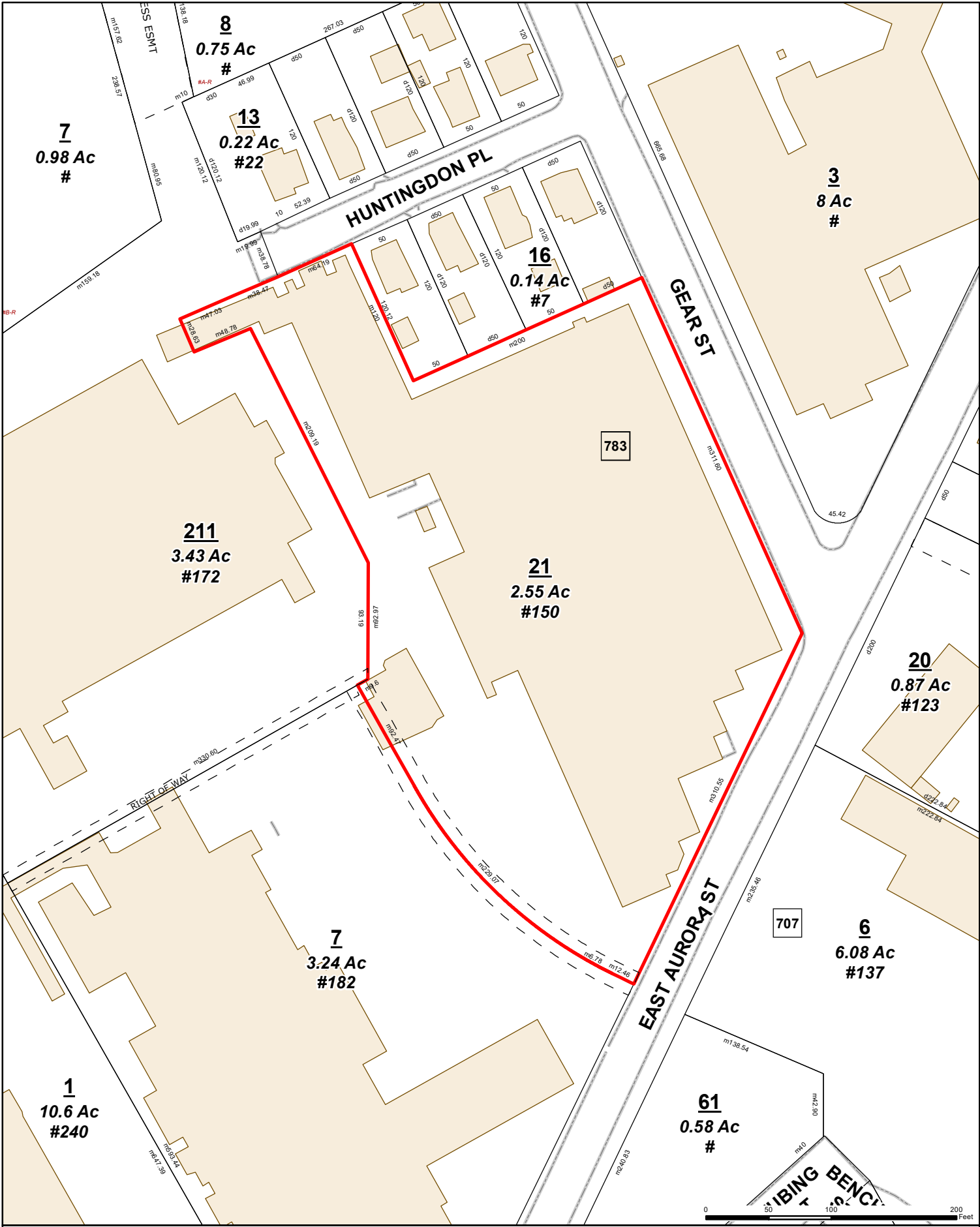
Property Information:			
Map Block Lot:	0143-0783-0021	Acres:	2.55
Primary Use:	Light Industrial	Zone:	IG
Neighborhood:	80000-Industrial General	Vol/Page:	5612
Mailing Address:	150 EAST AURORA STORAGE AND LIGHT MFG LL 25350 BUDDE RD SPRING TX 77380		
Property Values:			
	Appraised Value	Assessed Value (70%)	
Building	679372	475560	
Land	235620	164930	
OutBuilding	17882	12520	
Total	932874	653010	
Building Information:			
Bldg Style:		Living Area:	87293sq.ft
Construction:	Average	Year Built:	1942
Exterior Wall:	Brick Solid	Stories:	1
Roof Cover:		Heating:	Forced Air
Condition:	Average	Heat Fuel:	Gas
Rooms:	0	Bedrooms:	0
Full Baths:	0	Half Baths:	0

Building Information:

Bldg Style:		Living Area:	2562sq.ft
Construction:	Average	Year Built:	1976
Exterior Wall:	Wood Siding	Stories:	1
Roof Cover:		Heating:	Hot Water
Condition:	Average	Heat Fuel:	Gas
Rooms:	0	Bedrooms:	0
Full Baths:	0	Half Baths:	0

Outbuilding Information:

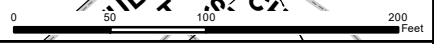
Type	Area (sq.ft)	Year Built	Condition
Loading Dock Dock	600sq.ft	1976	Average
Metal Shed	242sq.ft	1942	Average
Asphalt Paving	14000sq.ft	1942	Average
Chain Link Fencing	1440sq.ft	1942	Average
Loading Dock Steel Dock	100sq.ft	1942	Average



City of Waterbury
Public Works Department

MBL: **0143-0783-0021**
ADDRESS: **150 EAST AURORA ST**

This map is for informational purposes only and has not been prepared for, or suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to verify the usability of the information. The City of Waterbury makes no warranties, express or implied, as to the use of the information obtained herein.





DEPARTMENT OF PLANNING

CITY OF WATERBURY
235 GRAND STREET
WATERBURY, CONNECTICUT 06702
Tel. (203) 574-6818 Fax (203) 346-3949

no wetlands

James A. Sequin, AICP
City Planner

APPLICATION FOR A CERTIFICATE OF ZONING COMPLIANCE

(SHADED AREAS FOR STAFF USE)

ADDRESS: 150 E AURORA ST
TAX ID:

DATE: 1-7-08

APPLICANT:

Name: T-MOBILE / OMN. +
Address: 100 Filley ST
City, State, Zip: Bloomfield CT 06002
Phone: 516-807-1983 - Nick

PROPERTY OWNER:

Name: 150 E AURORA ST Storage
Address: 25350 Budd Rd
City, State, Zip: Spring TX 77380

AS BUILT PLAN ATTACHED? YES NO
A-2 SURVEY REQUIRED? YES NO
SITE VISIT REQUIRED? YES NO

ZONING DISTRICT: Fee: \$

CHANGE OF USE:

EXISTING USE:
PROPOSED USE:

\$75
called 1/9

TYPE OF IMPROVEMENT

- NEW PRINCIPAL STRUC
ADDITION
DECK
POOL
GARAGE
FENCE
SHED
SIGN
OTHER

Call center 110'

EARTH EXCAVATION

- CUT
FILL
REGRAVING

Cubic Yards

**COSTROTTA CONSTRUCTION
MANAGEMENT INC.**

office (516) 223-5404
fax (516) 223-5406
cell (516) 807-1983

DEVELOPMENT STANDARDS:

- LOT SIZE (Sq. Ft.)
- FRONTAGE ON PAVED CITY STREET (Feet)
- BUILDING COVERAGE (Sq. Ft.)
- SIDE YARD (Feet)
- SIDE YARD (Feet)
- FRONT YARD (Feet)
- REAR YARD (Feet)
- NUMBER OF ONSITE PARKING SPACES

Provided	

COMMISSION ACTIONS:

VARIANCE Type:	<input checked="" type="checkbox"/> Not Needed	<input type="checkbox"/> Approved	<input type="checkbox"/> Pending
SPECIAL PERMIT Type:	<input checked="" type="checkbox"/> Not Needed	<input type="checkbox"/> Approved	<input type="checkbox"/> Pending
SPECIAL EXCEPTION Type:	<input checked="" type="checkbox"/> Not Needed	<input type="checkbox"/> Approved	<input type="checkbox"/> Pending

IMPORTANT INFORMATION

An application for a Certificate of Zoning compliance must be accompanied by a plot plan containing all the information necessary to enable the Zoning Administrator to decide whether the proposed building, alteration, addition, or use complies with all the provisions of these regulations.

The Zoning Administrator may rely on the information submitted above in making a determination of compliance. It is the responsibility of the applicant to assure the accuracy of all information submitted.

NOTICE OF RIGHT TO ADVERTISE (CGS 8-3 (f))

No building permit or certificate of occupancy shall be issued for a building, use or structure subject to the zoning regulations of a municipality without certification in writing by the official charged with the enforcement of such regulations that such building, use or structure is in conformity with such regulations or is a valid nonconforming use under such regulations. Such official shall inform the applicant for any such certification that such applicant may provide notice of such certification by either (1) publication in a newspaper having substantial circulation in such municipality stating that the certification has been issued, or (2) any other method provided for by local ordinance. Any such notice shall contain (A) a description of the building, use or structure, (B) the location of the building, use or structure, (C) the identity of the applicant, and (D) a statement that an aggrieved person may appeal to the zoning board of appeals in accordance within thirty days of the publication of the notice.

I certify that the information submitted herein is accurate to the best of my knowledge and that I have been informed of my right to advertise, at my own expense, notice of any certification received.

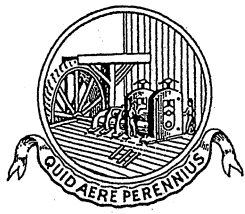
Signature: _____

Date: 1-7-08

Office Use Only

CERTIFICATION:	
Date Rec'd: _____	Date Completed: _____
<input checked="" type="checkbox"/> Approved	<input type="checkbox"/> Denied
Reason for denial: _____	
Signature: _____	Date: _____
Land Use Officer: _____	

08



The City of Waterbury
 DEPARTMENT OF INSPECTION
 235 Grand Street, Waterbury, CT 06702
 (203) 574-6832

PERMIT NUMBER
 7285D

Building Permit

Date: 6-27-06

Applicant:
 Company Name: Omnipoint Communications
 Address: 100 Filley St
 City/State/Zip: Bloomfield CT 06002

Location of Work:
 Address: 150 East Aurora St

Location of Owner:
 Owner's Name: 150 East Aurora Storage
 Address: 25350 Budde Rd
 City/State/Zip: Spring TX 77380

Leave is hereby granted to M. Omnipoint Communications
 to erect a T-Mobile Antenna
 as follows: Length ft.; Width ft.; No. of Stories ; No. of Rooms
 Building to be used as Commercial
 Construction Classification Use Group
 Designed Live Load: 1st 2nd 3rd Roof
 Remarks:

The conditions on which this permit is granted are, that the said building shall be erected in accordance with the laws of the State of Connecticut, and the ordinances of the City of Waterbury. If any of the statements of said applicant be not true, or if any change is made in said plans or specifications without the consent of the Building Inspector or his duly appointed agents, this permit shall be revocable.

Limited to six months from date. This permit may be sooner revoked for any violation of any ordinance, statute or order of constituted authority. This permit is subject to the condition that should there be any change in the ordinance or statutes or institution of proceedings to establish any building line or other improvements, before said building is completed, then no further work shall be done on said building thereafter conflicting with such new statute, order, ordinance, or institution of proceedings.

E. Bill Maveline
 Building Official

ESTIMATED COST: \$ 150,000.00
 Permit Fee: \$ 3,005.00
 State Ed Fee: \$ 24.00
 CO: \$ 25.00
 CA: \$
 Penalty Fee: \$
 TOTAL AMOUNT: \$ 3,054.00





The City of Waterbury
 DEPARTMENT OF INSPECTION
 235 Grand Street, Waterbury, CT 06702
 (203) 574-6832

Certificate Number

32492

Certificate of Use and Occupancy

Date: _____

This Certificate Must be Signed Before Building Can be Occupied.

This is to certify that address 150 East Aurora St may be used for
T-Mobile antenna and is in compliance with the
 provisions of the State of Connecticut Basic Building Code.

Use Group (in accordance with provisions of Article 3): _____

Fire Grading (as defined in Table 902): _____

Maximum Live Load (as prescribed in Table 1106, p.s.f.): 1st _____ 2nd _____ 3rd _____

Permit No. 7285D

Date: 6-27-06


Special Building Permit Stipulations and Conditions:

Building Official

REQUIRED?

- Yes No
- Yes No
- Yes No
- Yes No
- Yes No
- Yes No
- Yes No
- Yes No
- Yes No

DEPARTMENT

- Zoning: 
- Engineering: _____
- City Plan: _____
- Fire Marshal: Chris Bennett 1-7-08
- Inland Wetlands: _____
- Health Dept: _____
- Traffic Dept: _____
- Delinquent Tax: _____
- Water Dept: _____
- Waste Disposal: _____



T-Mobile

NH334/E AURORA SMOKESTACK

SITE ID: CTNH334A

150 E AURORA ST

WATERBURY, CT 06708

T-MOBILE A&L TEMPLATE (PROVIDED BY RFDS)

67D5998E_1xAIR+1OP

RAN TEMPLATE (PROVIDED BY RFDS)

67D5998E HYBRID

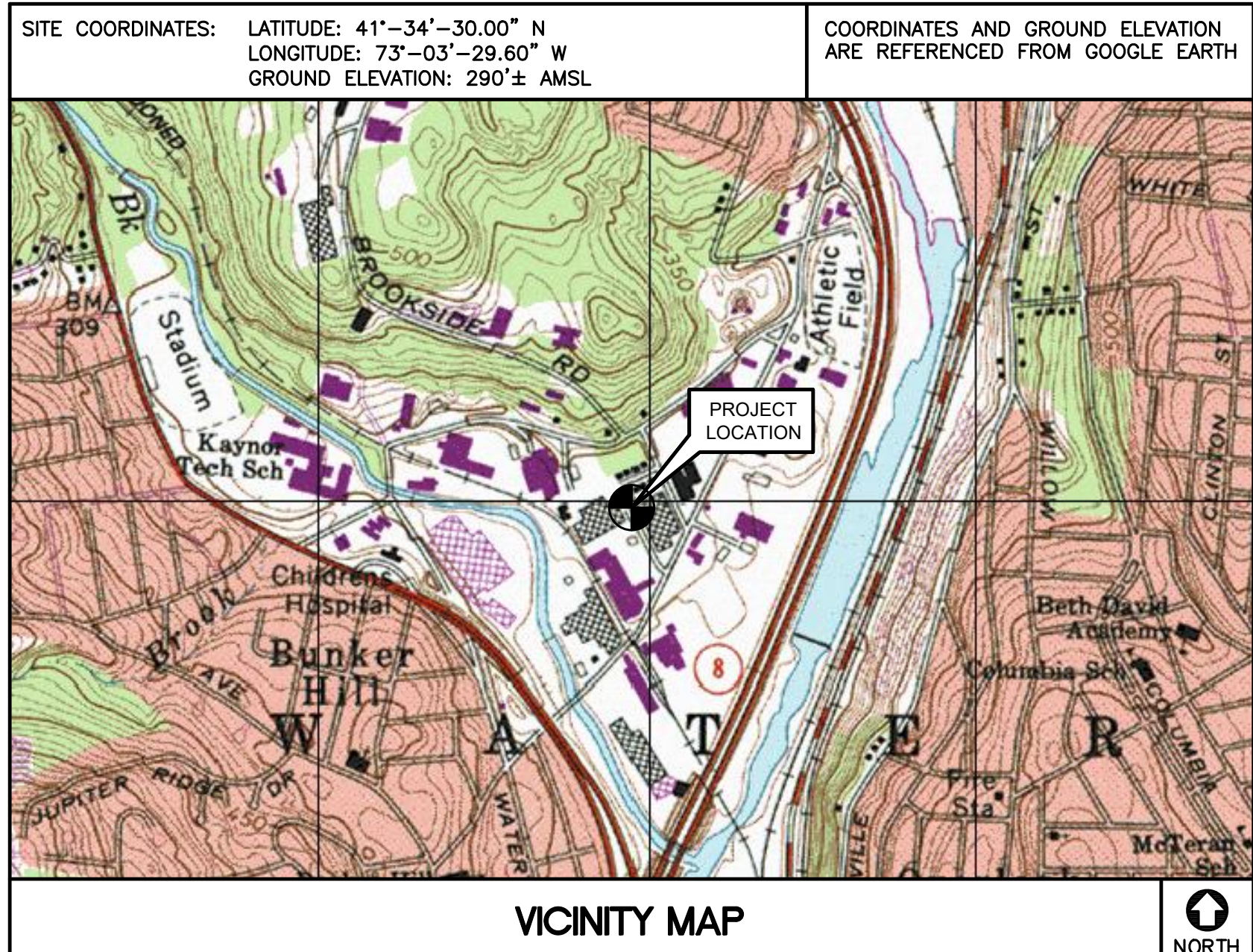
GENERAL NOTES

- ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT SUPPLEMENT, INCLUDING THE IA/EIA-222 REVISION "G" STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES. 2017 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
- 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.
- 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.
- 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.
- 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.
- CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION 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.
- 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.
- 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.
- 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.
- ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.

SITE DIRECTIONS

FROM:	TO:
35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002	150 E AURORA ST WATERBURY, CT 06708

- HEAD NORTHEAST ON GRIFFIN ROAD S TOWARD NEWBERRY RD. 0.6 MI.
- TURN RIGHT ONTO DAY HILL RD. 3.6 MI.
- USE THE RIGHT LANE TO MERGE ONTO I-91 S VIA THE RAMP TO HARTFORD. 0.4 MI.
- MERGE ONTO I-91 S. 6.9 MI.
- TAKE EXIT 32A-32B FOR I-84 W TOWARD. 0.5 MI.
- MERGE ONTO I-84. 30.0 MI.
- TAKE EXIT 20 TO MERGE ONTO CT-8 N TOWARD TORRINGTON. 1.1 MI.
- USE THE 2ND FROM THE LEFT LANE TO TAKE EXIT 35 FOR CT-73 TOWARD OAKVILLE/WATERTOWN. 0.4 MI.
- TURN RIGHT ONTO E AURORA ST. 0.1 MI.



PROJECT SUMMARY

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

- REMOVE (3) AIR21 ANTENNAS, (1) PER SECTOR
- REMOVE (3) AIR32 ANTENNAS, (1) PER SECTOR
- REMOVE (1) 9x18 HYBRID CABLE
- REMOVE EXISTING EQUIPMENT AND BATTERY RACKS.
- INSTALL (3) AIR6449 ANTENNAS TO POS. 1, (1) PER SECTOR
- INSTALL (3) RADIO 4460 B25+B66 FOR POS 2, (1) PER SECTOR
- INSTALL (1) ERICSSON 19" RACK
- INSTALL (1) 6230 BATTERY RACK AND POWER CABINET
- INSTALL (3) DUAL SWIVEL MOUNTS, TYP (1) PER SECTOR
- INSTALL (2) 6x24 HYBRID CABLES

PROJECT INFORMATION

SITE NAME:	NH334/E AURORA SMOKESTACK
SITE ID:	CTNH334A
SITE ADDRESS:	150 E AURORA ST WATERBURY, CT 06708
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	DAN REID (PROJECT MANAGER) TRANSCEND WIRELESS, LLC (203) 592-8291
ENGINEER OF RECORD:	CEN TEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405 CARLO F. CENTORE, PE (203) 488-0580 EXT. 122
PROJECT COORDINATES:	LATITUDE: 41°-34'-30.00" N LONGITUDE: 73°-03'-29.60" W GROUND ELEVATION: 290'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	GENERAL NOTES AND SPECIFICATIONS	0
C-1	SITE LOCATION PLAN	0
C-2	PARTIAL COMPOUND PLAN AND ELEVATION	0
C-3	EQUIPMENT PLANS	0
C-4	ANTENNA PLANS AND ELEVATIONS	0
C-5	TYPICAL EQUIPMENT DETAILS	0
E-1	ELECTRICAL RISER AND CONDUIT ROUTING	0
E-2	TYPICAL ELECTRICAL DETAILS	0
E-3	ELECTRICAL SPECIFICATIONS	0

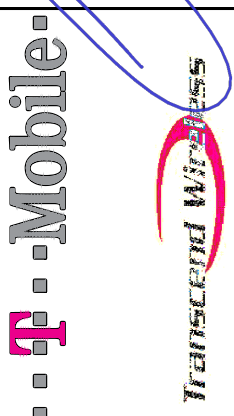
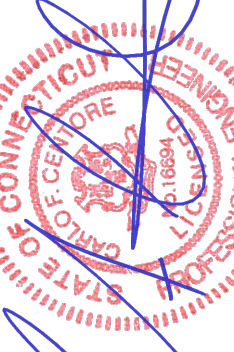
DATE: 09/24/21
SCALE: AS NOTED
JOB NO. 21022.33

TITLE SHEET

T-1

Sheet No. 1 of 10

PROFESSIONAL ENGINEER SEAL



CEN TEK 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
NH334/E AURORA SMOKESTACK
SITE ID: CTNH334A
150 E AURORA STREET
WATERBURY, CT 06708

CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION
DATE 12/06/21
DRAWN BY: JLV
CHECKED BY: TJR

NOTES AND SPECIFICATIONS

DESIGN BASIS:

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

1. DESIGN CRITERIA:
 - RISK CATEGORY II (BASED ON IBC TABLE 1604.5)
 - ULTIMATE DESIGN SPEED: 125 MPH (V₉₀) (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.

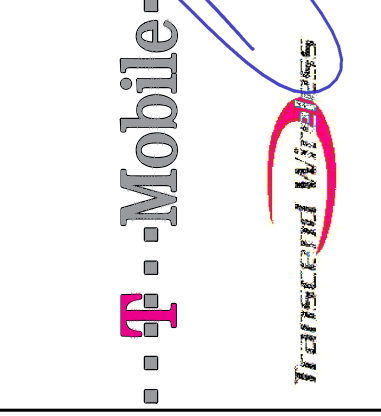
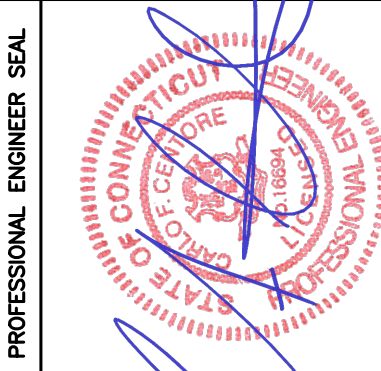
GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2017 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS, SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND IT'S COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND "MISSED" ITEMS, ARE TO BE BROUGHT TO THE ATTENTION OF THE SITE OWNER'S CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT 'CALL BEFORE YOU DIG' AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
18. CONTRACTOR SHALL COMPLY WITH 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.
19. THE COUNTY/CITY/TOWN WILL MAKE PERIODIC FIELD OBSERVATION AND INSPECTIONS TO MONITOR THE INSTALLATION, MATERIALS, WORKMANSHIP AND EQUIPMENT INCORPORATED INTO THE PROJECT TO ENSURE COMPLIANCE WITH THE DESIGN PLANS, SPECIFICATIONS, CONTRACT DOCUMENTS AND APPROVED SHOP DRAWINGS.
20. 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.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)
 - A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
 - B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
 - C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
 - D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
 - E. PIPE---ASTM A53 (FY = 35 KSI)
 - F. CONNECTION BOLTS---ASTM A325-N
 - G. U-BOLTS---ASTM A36
 - H. ANCHOR RODS---ASTM F 1554
 - I. WELDING ELECTRODE---ASTM E 70XX
2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

NO.	DATE	REV.	DESCRIPTION
0	12/06/21	JLW	TJR
			CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION
			BY/CHK'D BY



CENTEX engineering
 Centered on Solutions
 (203) 488-0380
 (203) 488-8387 Fax
 63-2 North Branford Road
 Branford, CT 06405
 www.CentexEng.com

T-MOBILE NORTHEAST LLC
NH334/E AURORA SMOKESTACK
SITE ID: CTNH334A
 150 E AURORA STREET
 WATERBURY, CT 06708

DATE: 09/24/21
 SCALE: AS NOTED
 JOB NO. 21022.33

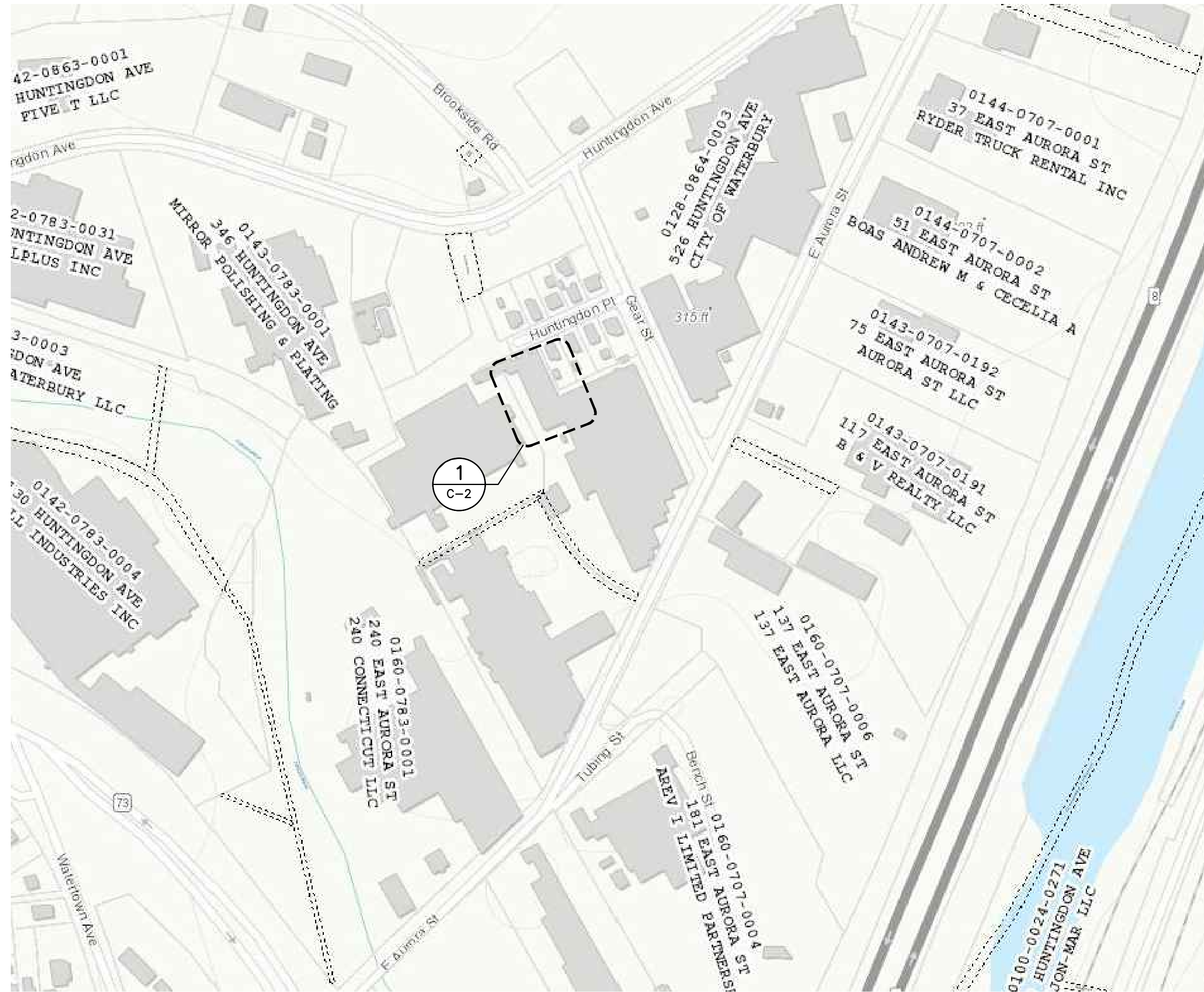
GENERAL NOTES AND SPECIFICATIONS

N-1
 Sheet No. 2 of 10

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

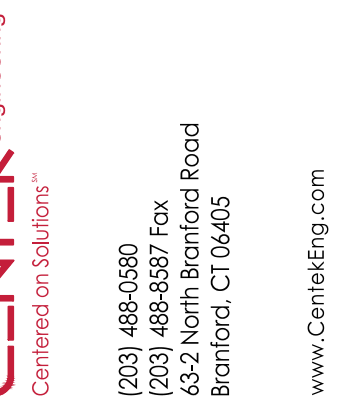
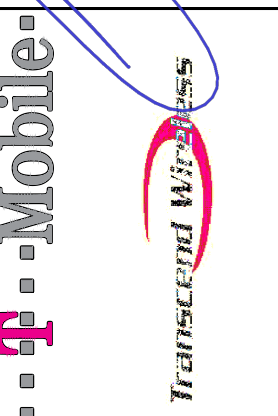
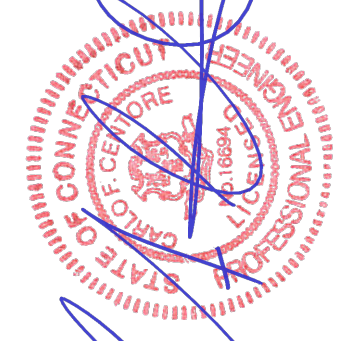
ANTENNA SCHEDULE

SECTOR	EXISTING/PROPOSED	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA ϕ HEIGHT	AZIMUTH	(E/P) RRU (QTY)	(E/P) TMA (QTY)	(QTY) PROPOSED COAX (LENGTH)
A1	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	105'	60°			(2) 6x24 HYBRID CABLE (\pm 180')
A2	EXISTING	RFS (APXVAARR24_43-U_NA20)	95.9 x 24 x 8.7	95'	60°	(E) RADIO 4449 B71+B85 (1), (P) RADIO 4460 B25+B66 (1)		
B1	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	105'	180°			
B2	EXISTING	RFS (APXVAARR24_43-U_NA20)	95.9 x 24 x 8.7	95'	180°	(E) RADIO 4449 B71+B85 (1), (P) RADIO 4460 B25+B66 (1)		
C1	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	105'	300°			
C2	EXISTING	RFS (APXVAARR24_43-U_NA20)	95.9 x 24 x 8.7	95'	300°	(E) RADIO 4449 B71+B85 (1), (P) RADIO 4460 B25+B66 (1)		



1 C-1 SITE LOCATION PLAN
SCALE: NOT TO SCALE
TRUE NORTH

REV.	DATE	DRAWN BY	CHECKED BY	DESCRIPTION
0	12/06/21	JLW	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

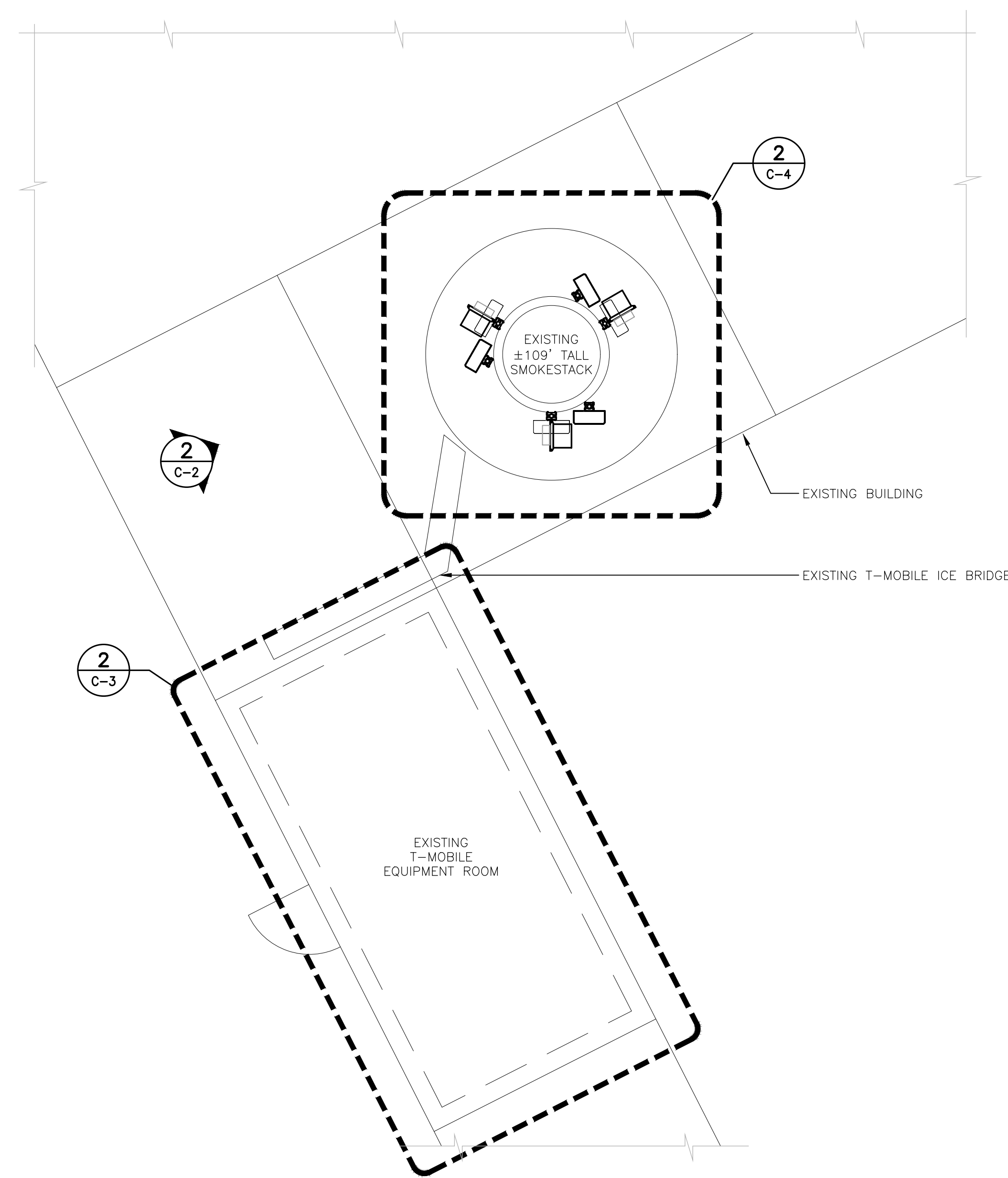


T-MOBILE NORTHEAST LLC
NH334/E AURORA SMOKESTACK
SITE ID: CTNH334A
150 E AURORA STREET
WATERBURY, CT 06708

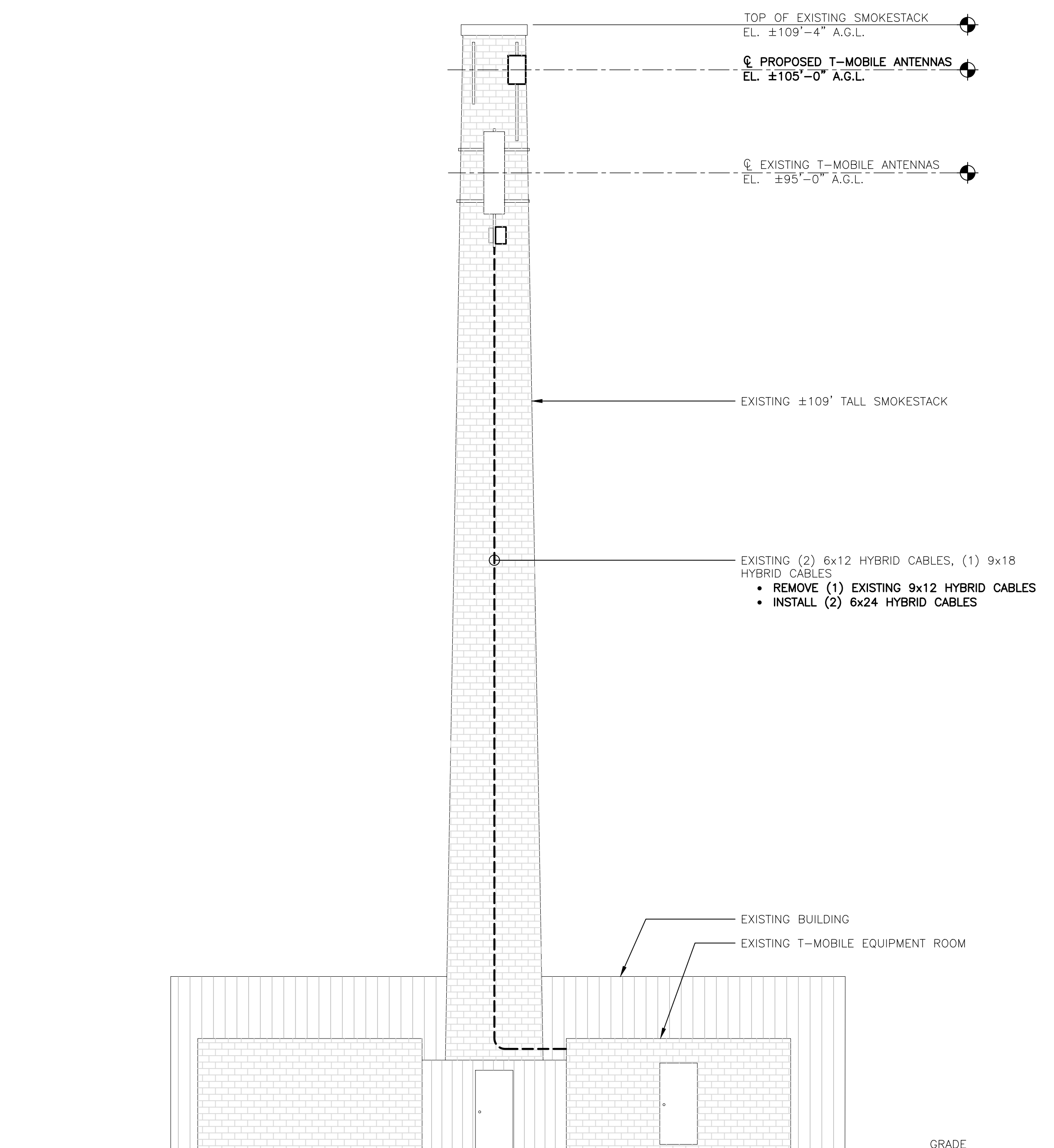
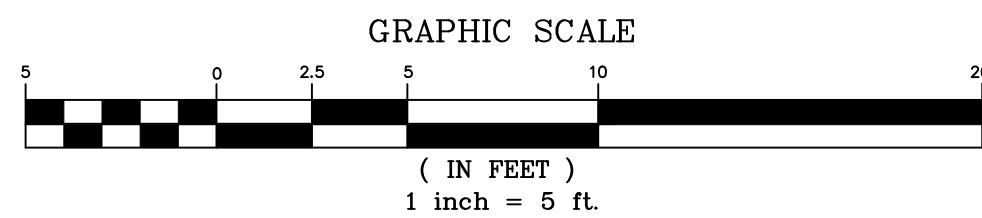
DATE: 09/24/21
SCALE: AS NOTED
JOB NO. 21022.33

SITE LOCATION
PLAN

C-1



1 PARTIAL COMPOUND PLAN - PROPOSED
 SCALE: 1" = 5'



2 SMOKESTACK ELEVATION - PROPOSED
 SCALE: 1/8" = 1'

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 # 21022.33) DATED 11/23/21 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

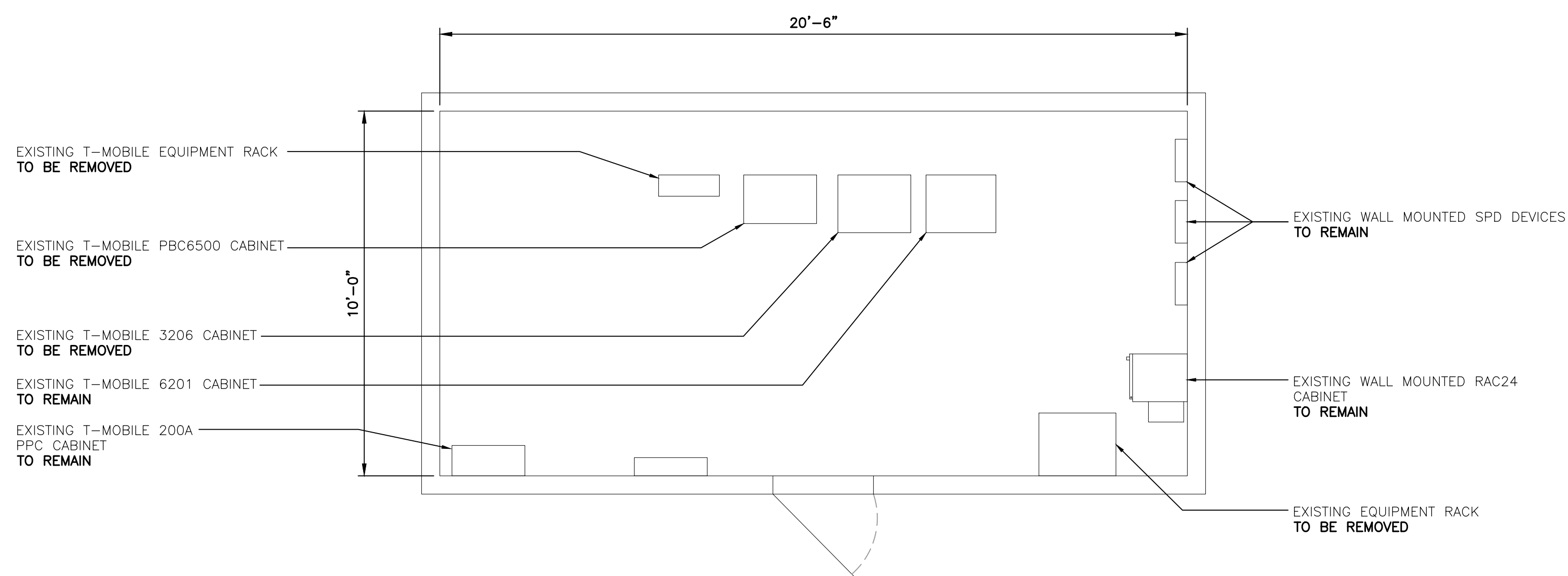
HOST STRUCTURE

A STRUCTURAL EVALUATION OF THE HOST STRUCTURE WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND WAS FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING.

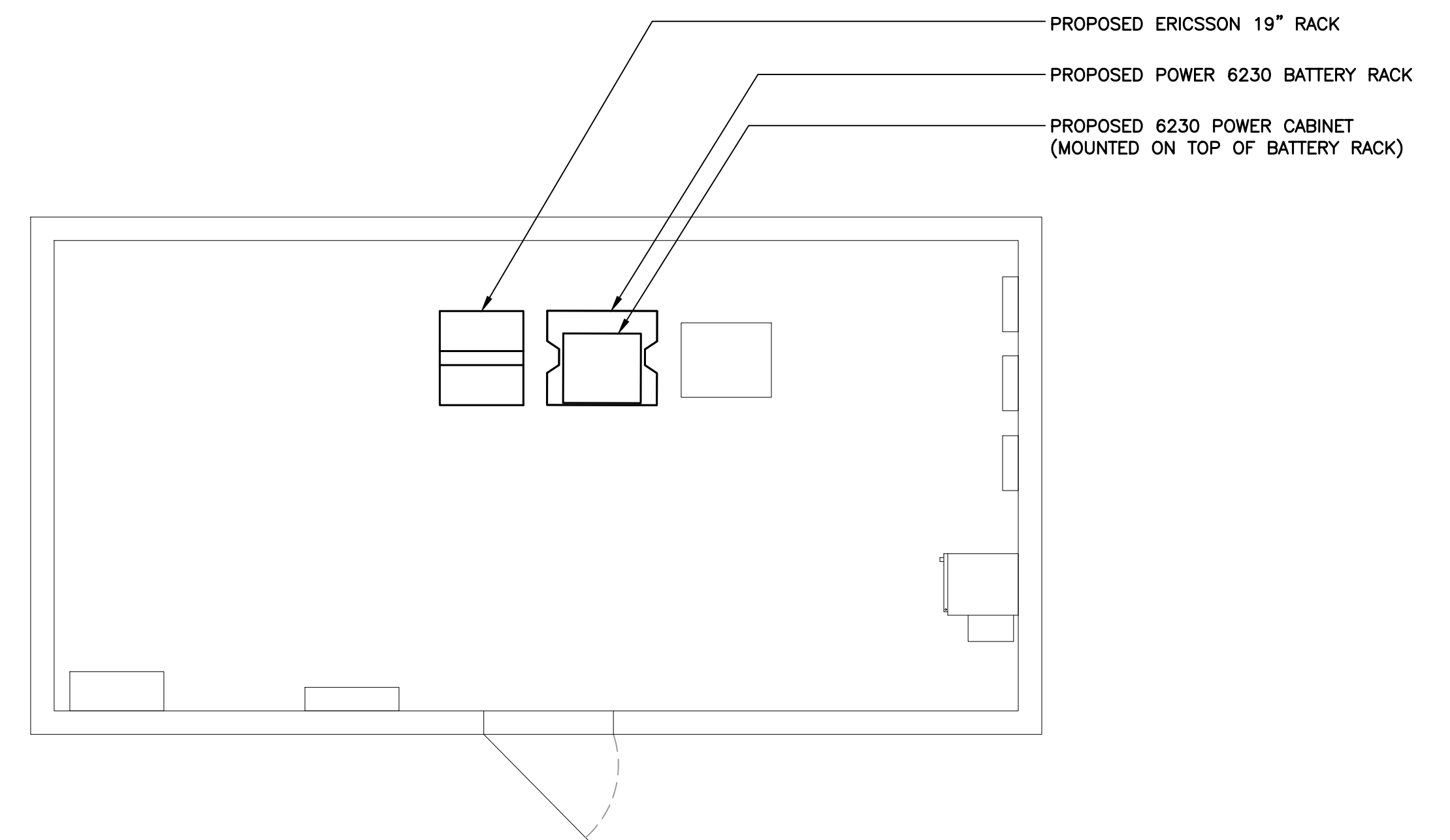
REFER TO THE STRUCTURAL LETTER PREPARED BY CENTEK ENGINEERING (PROJECT # 21022.33) DATED 11/23/21 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

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.

PROFESSIONAL ENGINEER SEAL	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION
	TJR
	DATE
	12/06/21
	REV.
<p>203) 488-0380 203) 488-8587 Fax 63-2 North Branford Road Branford, CT 06405 www.CentekEng.com</p>	<p>0</p>
<p>T-MOBILE NORTHEAST LLC NH334/E AURORA SMOKESTACK SITE ID: CTNH334A 150 E AURORA STREET WATERBURY, CT 06708</p>	<p>DATE: 09/24/21 SCALE: AS NOTED JOB NO. 21022.33</p>
<p>PARTIAL COMPOUND PLAN AND ELEVATION</p>	<p>Sheet No. 4 of 10</p>

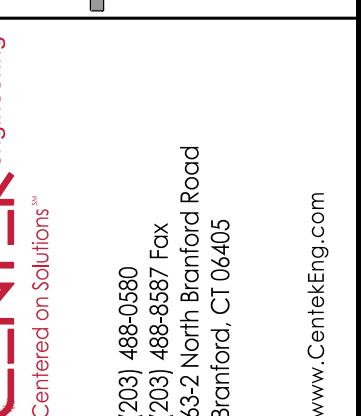
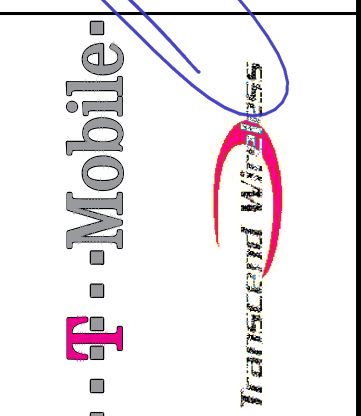
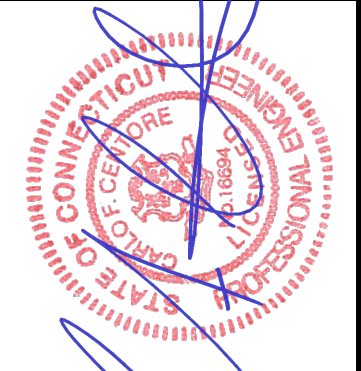


1
C-3 **EQUIPMENT PLAN - EXISTING**
SCALE: 3/8" = 1'



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

REV.	DATE	DRAWN BY	CHECK'D BY	DESCRIPTION
0	12/06/21	JLW	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION



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NH334/E AURORA SMOKESTACK
SITE ID: CTNH334A
 150 E AURORA STREET
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EQUIPMENT PLANS

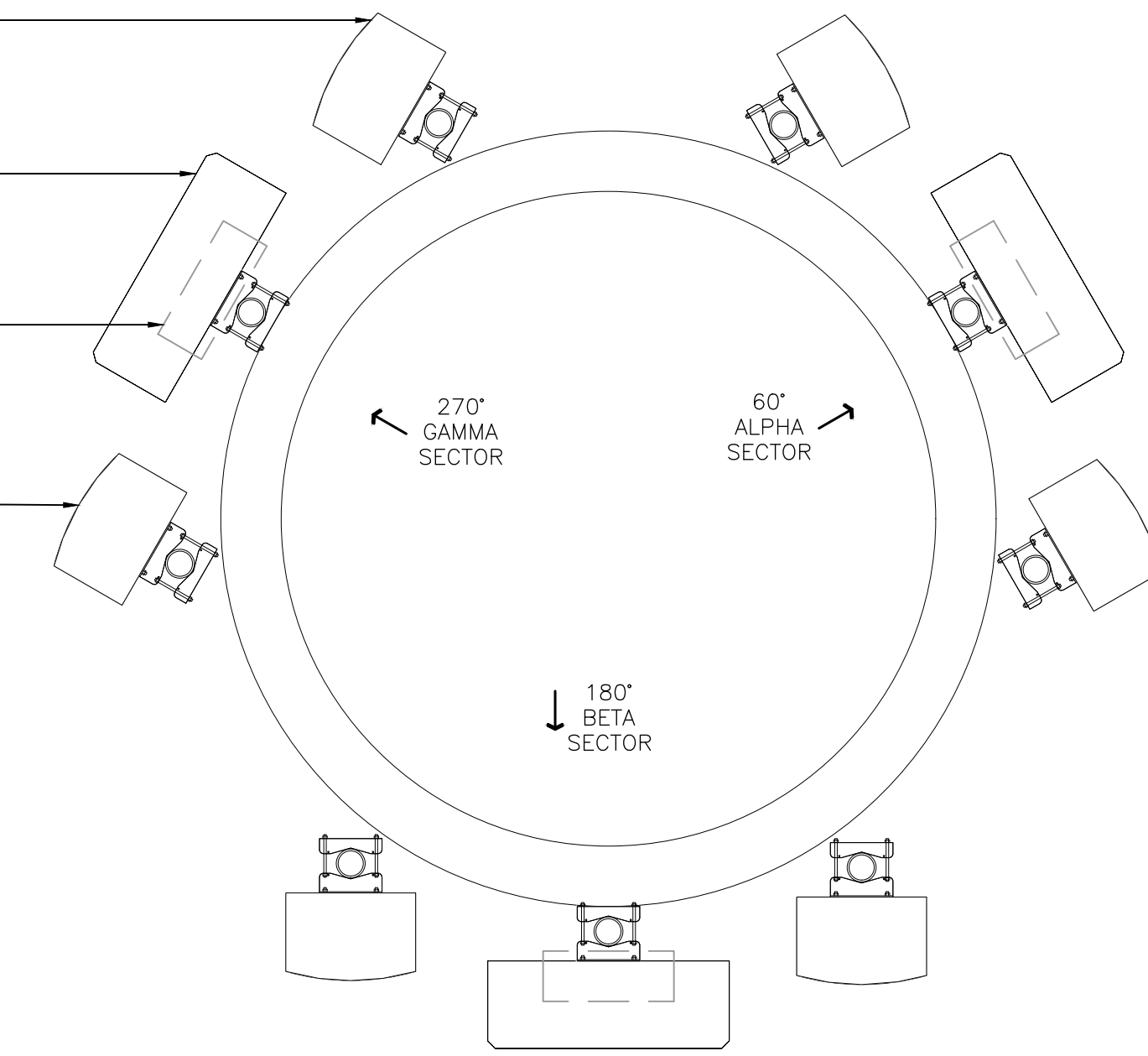
C-3
 Sheet No. 5 of 10

EXISTING T-MOBILE ANTENNA POS.3,
TYP. (1) PER SECTOR. TOTAL (3) @105' AGL
(MODEL: AIR32_KRD901146-1_B66A_B2A)
TO BE REMOVED

EXISTING T-MOBILE ANTENNA POS.2,
TYP. (1) PER SECTOR. TOTAL (3) @95' AGL
(MODEL: RFS-APXVAARR24_43-U-NA20)
TO REMAIN

EXISTING T-MOBILE RADIO POS.2, TYP.
(1) PER SECTOR. TOTAL (3)
(MODEL: RADIO 4449 B71+B85)
(MOUNTED BELOW ANTENNA)
**TO BE RELOCATED TO PROPOSED
DUAL SWIVEL MOUNT**

EXISTING T-MOBILE ANTENNA POS.1,
TYP. (1) PER SECTOR. TOTAL (3) @105' AGL
(MODEL: AIR21_KRC118023-1_B2P_B4A)
TO BE REMOVED

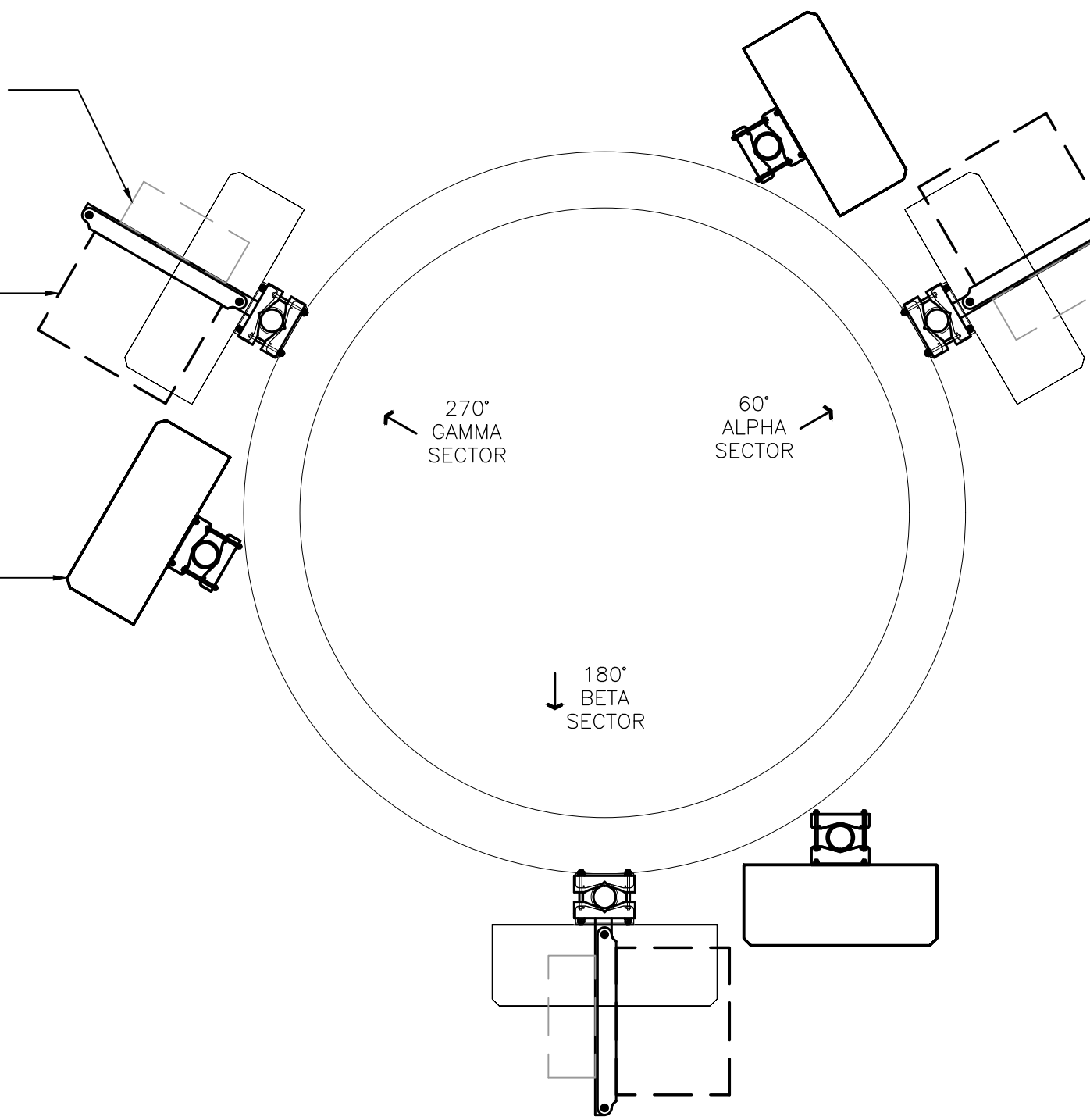


1 ANTENNA PLAN - EXISTING
C-4 SCALE: 1/2" = 1' TRUE NORTH

PROPOSED RELOCATION OF T-MOBILE RADIO POS.2,
TYP. (1) PER SECTOR. TOTAL (3)
(MODEL: RADIO 4449 B71+ B85)
**MOUNTED TO NEW DUAL SWIVEL MOUNT
SITEPRO P/N: RRUDSM**

PROPOSED T-MOBILE RADIO POS.2,
TYP. (1) PER SECTOR. TOTAL (3)
(MODEL: RADIO 4460 B25+B66)
**MOUNTED TO NEW DUAL SWIVEL MOUNT
SITEPRO P/N: RRUDSM**

PROPOSED T-MOBILE ANTENNA POS.1,
TYP. (1) PER SECTOR. TOTAL (3)
(MODEL: ERICSSON-AIR6449 B41)



2 ANTENNA PLAN - PROPOSED
C-4 SCALE: 1/2" = 1' TRUE NORTH

EXISTING T-MOBILE ANTENNAS
EL. ±105' A.G.L.

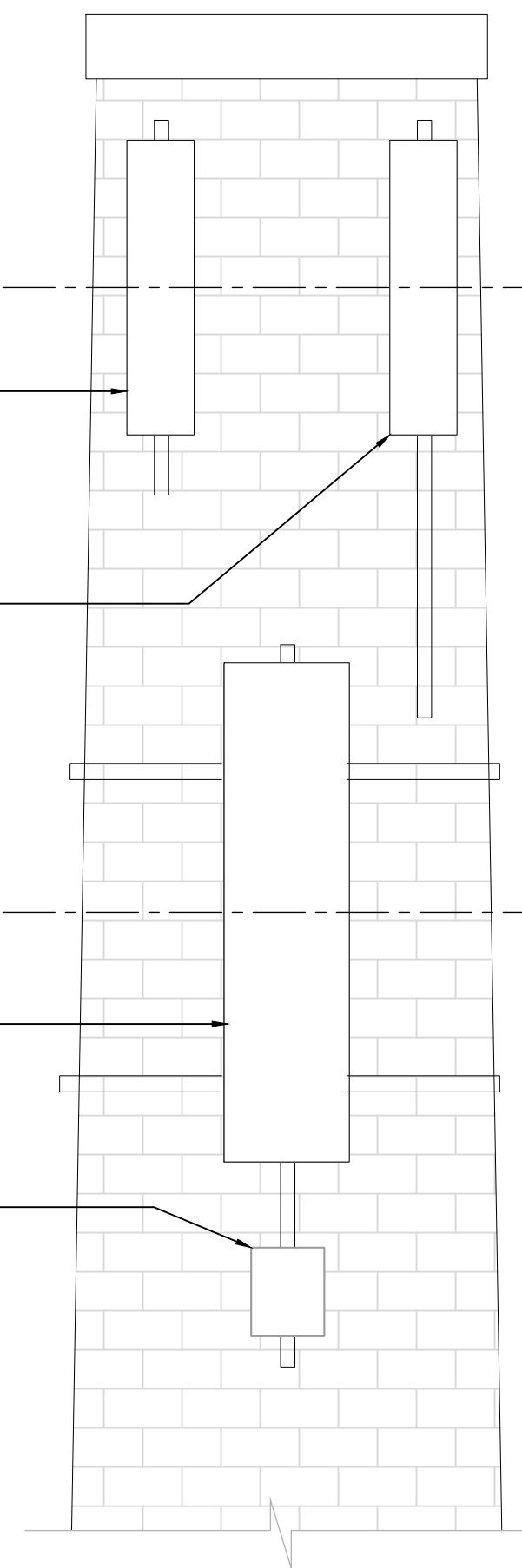
EXISTING T-MOBILE ANTENNA POS.3,
TYP. (1) PER SECTOR. TOTAL (3)
(MODEL: AIR32_KRD901146-1_B66A_B2A)
TO BE REMOVED

EXISTING T-MOBILE ANTENNA POS.1,
TYP. (1) PER SECTOR. TOTAL (3)
(MODEL: AIR21_KRC118023-1_B2P_B4A)
TO BE REMOVED

EXISTING T-MOBILE ANTENNAS
EL. ±95' A.G.L.

EXISTING T-MOBILE ANTENNA POS.2,
TYP. (1) PER SECTOR. TOTAL (3)
(MODEL: RFS-APXVAARR24_43-U-NA20)
TO REMAIN

EXISTING T-MOBILE RADIO POS.2,
TYP. (1) PER SECTOR. TOTAL (3)
(MODEL: RADIO 4449 B71+B85)
(MOUNTED BELOW ANTENNA)
**TO BE RELOCATED TO PROPOSED
DUAL SWIVEL MOUNT**



1A ANTENNA ELEVATION - EXISTING
C-4 SCALE: 3/8" = 1'

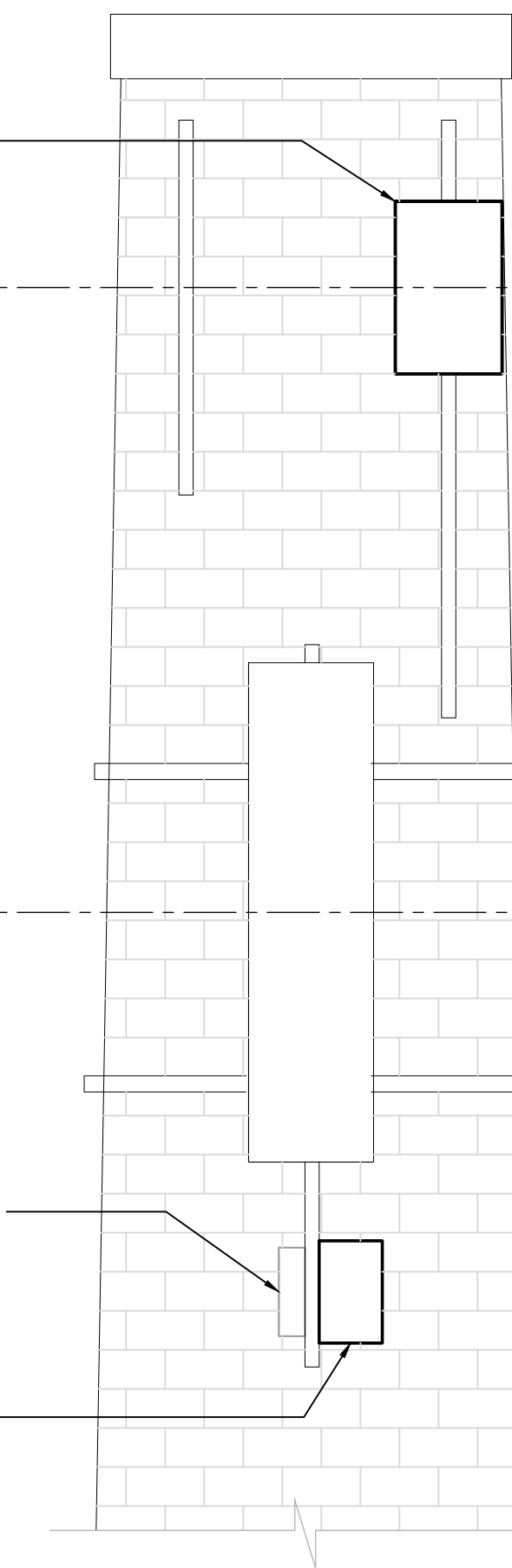
PROPOSED T-MOBILE ANTENNA POS.1,
TYP. (1) PER SECTOR. TOTAL (3)
(MODEL: ERICSSON-AIR6449 B41)

PROPOSED T-MOBILE ANTENNAS
EL. ±105' A.G.L.

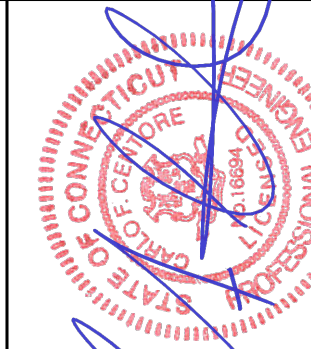
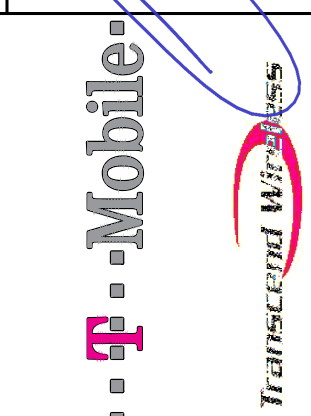

EXISTING T-MOBILE ANTENNAS
EL. ±95' A.G.L.

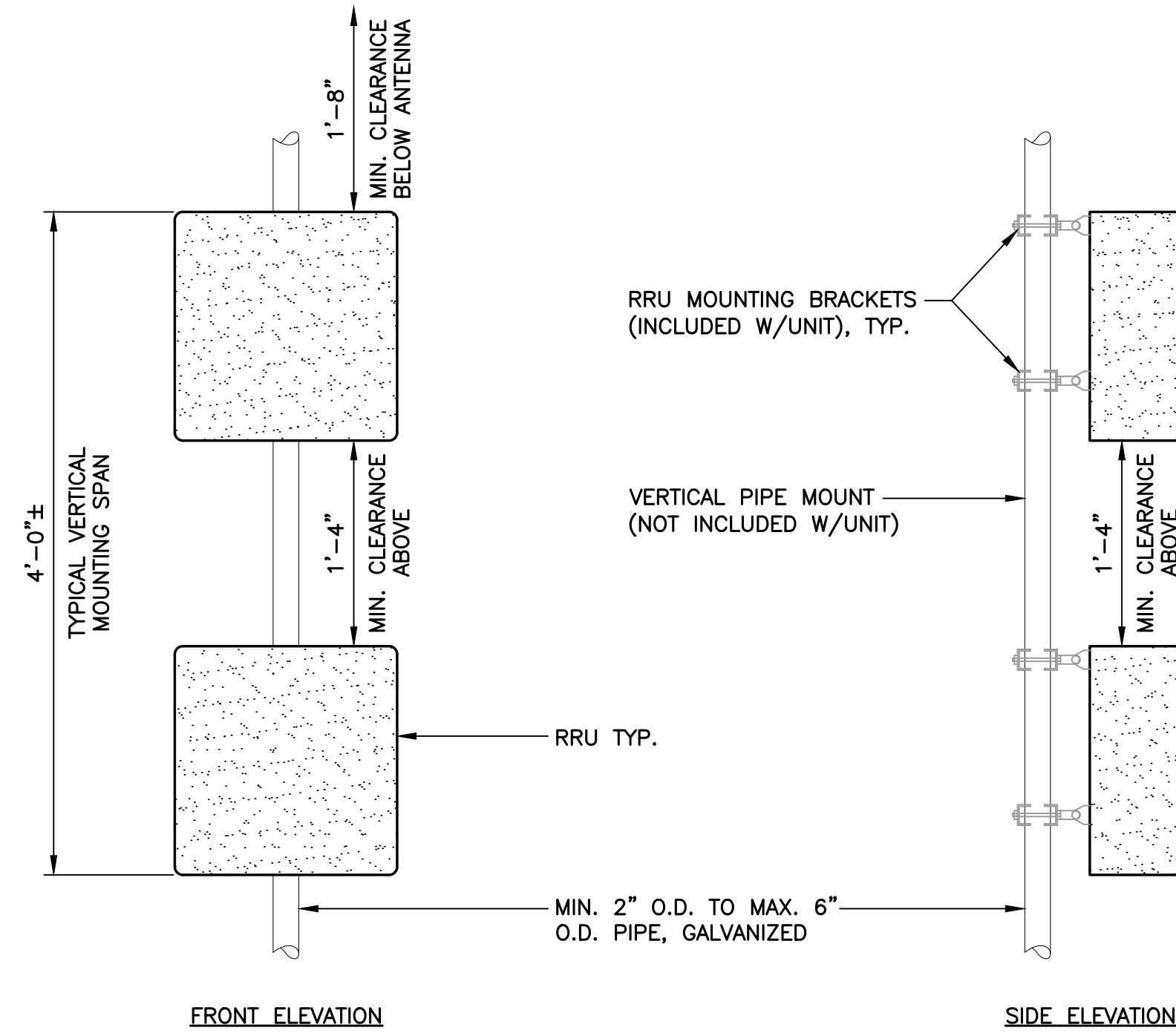
PROPOSED RELOCATION OF T-MOBILE RADIO POS.2,
TYP. (1) PER SECTOR. TOTAL (3)
(MODEL: RADIO 4449 B71+ B85)
**MOUNTED TO NEW DUAL SWIVEL MOUNT
SITEPRO P/N: RRUDSM**

PROPOSED T-MOBILE RADIO POS.2,
TYP. (1) PER SECTOR. TOTAL (3)
(MODEL: RADIO 4460 B25+B66)
**MOUNTED TO NEW DUAL SWIVEL MOUNT
SITEPRO P/N: RRUDSM**



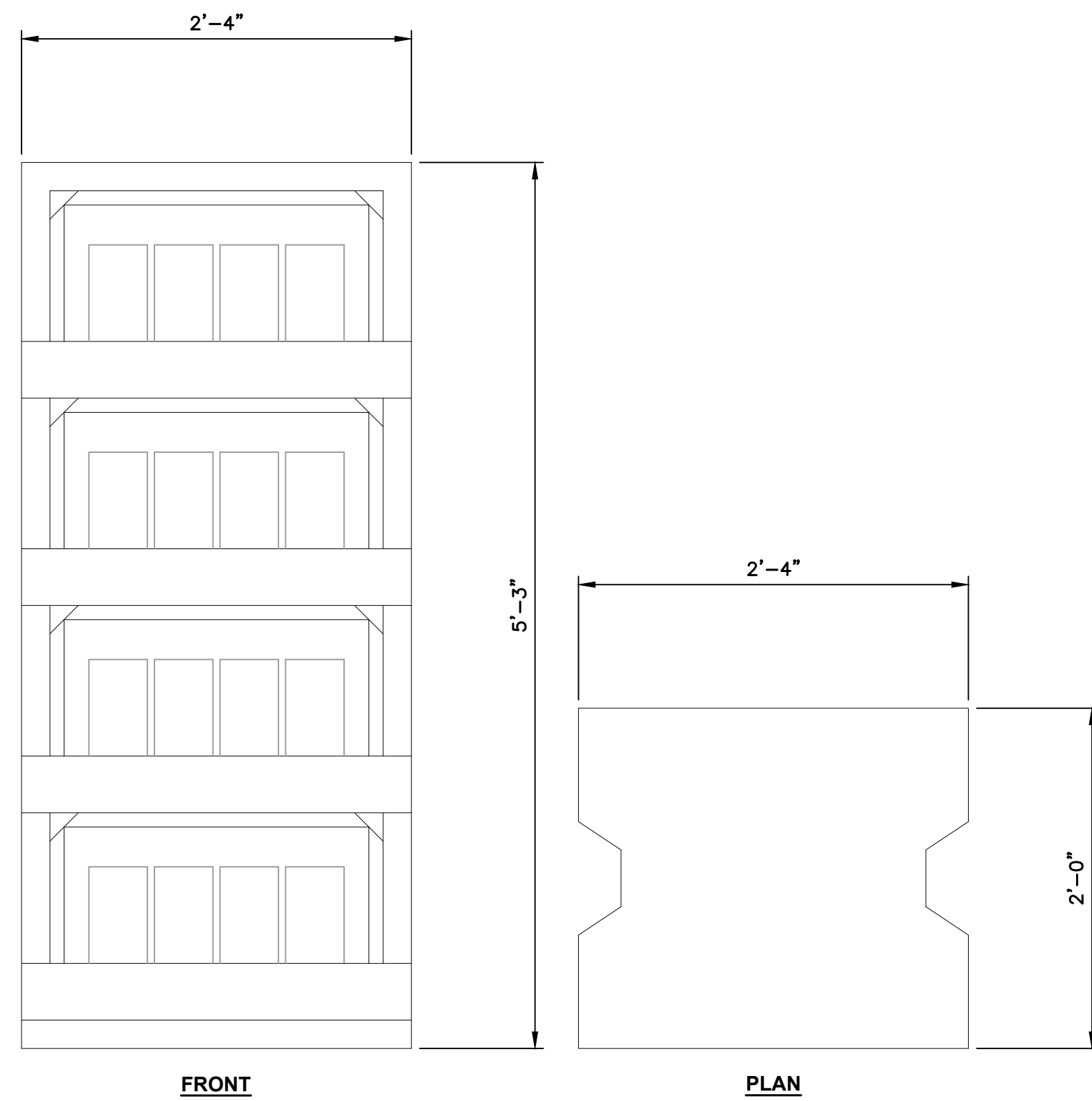
2A ANTENNA ELEVATION - PROPOSED
C-4 SCALE: 3/8" = 1'

 PROFESSIONAL ENGINEER SEAL STATE OF CONNECTICUT LICENSE NO. 19742 T. J. R.		CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION T.J.R. DRAWN BY/CHK'D BY
0 REV.	12/06/21 DATE	J.L.W. DRAWN BY
 T-Mobile Treat Us Like Local 1-800-435-1175		
 CEN-TEK engineering Centered on Solutions (203) 488-0380 (203) 488-8387 Fax 63-2 North Branford Road Branford, CT 06405 www.CentelEng.com		
T-MOBILE NORTHEAST LLC NH334/E AURORA SMOKESTACK SITE ID: CTNH334A 150 E AURORA STREET WATERBURY, CT 06708		
DATE:	09/24/21	
SCALE:	AS NOTED	
JOB NO.	21022.33	
ANTENNA PLANS AND ELEVATIONS		
C-4 Sheet No. 6 of 10		



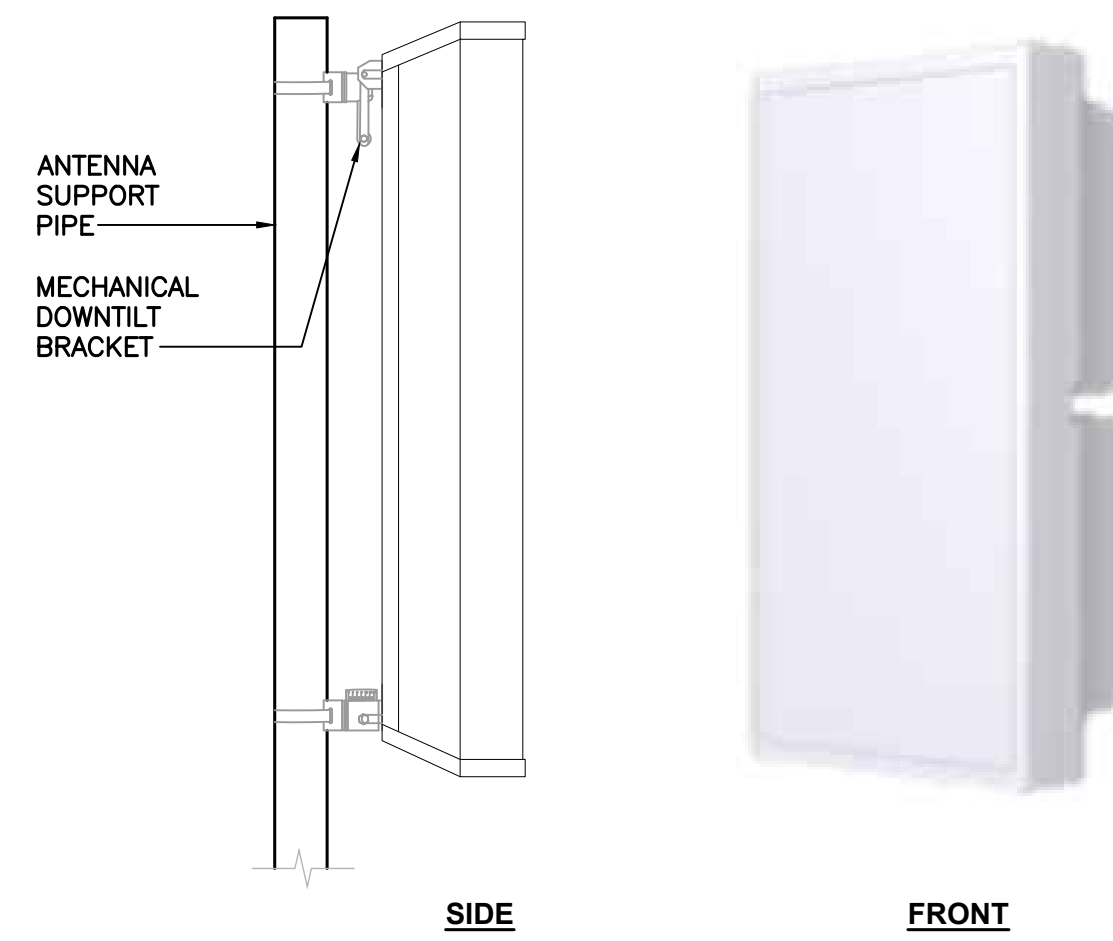
- NOTES:**
- T-MOBILE SHALL SUPPLY RRU, AND RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL INSTALLS RRU AND MAKES CABLE TERMINATIONS.
 - NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

1 TYPICAL RRU MOUNTING DETAIL
C-5 SCALE: NOT TO SCALE



6230 BATTERY RACK		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: POWER 6230 BATTERY RACK	63.0"H x 28.0"W x 24."D	±2400 LBS.

4 POWER 6230 BATTERY RACK
C-5 SCALE: NOT TO SCALE



ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: AIR6449 B41	33.1"L x 20.6"W x 8.6"D	±104 LBS.

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

2 PROPOSED ANTENNA DETAIL
C-5 SCALE: NOT TO SCALE



POWER ENCLOSURE		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: POWER 6230	14.0"H x 19.0"W x 16.0"D	53 LBS

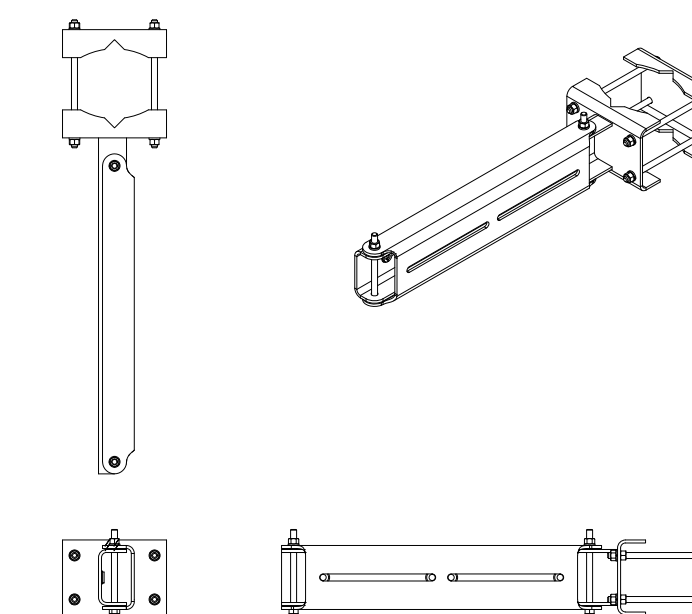
5 6230 POWER CABINET DETAIL
C-5 SCALE: NOT TO SCALE



RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4460 B25+B66	19.6"L x 15.7"W x 12.1"D	±109 LBS.	BEHIND ANT.: 8" MIN. BELOW ANT.: 20" MIN. BELOW RRU: 16" MIN.

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

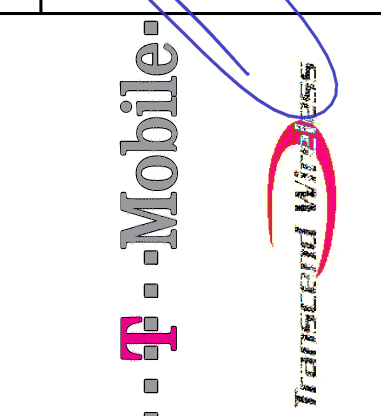
3 PROPOSED RRU DETAIL
C-5 SCALE: NOT TO SCALE



RRH DUAL SWIVEL MOUNT		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: SITE PRO 1 PART NO.: RRUSM	27.75"L x 6.5"W x 4.7"D	39.4 LBS.

6 RRH DUAL SWIVEL MOUNT DETAIL
C-5 SCALE: NOT TO SCALE

REV.	DATE	BY	DESCRIPTION
0	12/06/21	JLW	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION



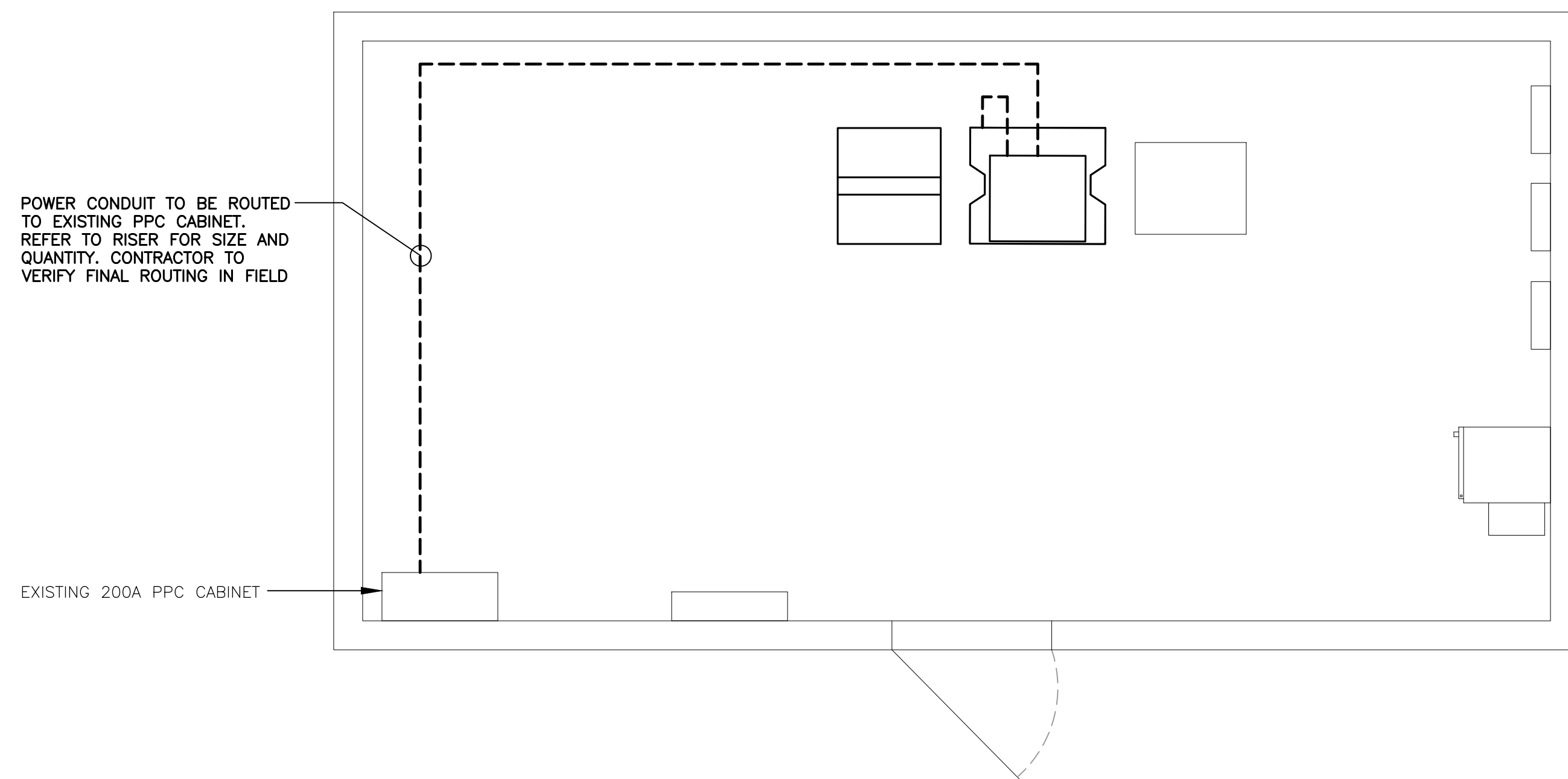
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T-MOBILE NORTHEAST LLC
NH334/E AURORA SMOKESTACK
SITE ID: CTNH334A
150 E AURORA STREET
WATERBURY, CT 06708

DATE: 09/24/21
SCALE: AS NOTED
JOB NO. 21022.33

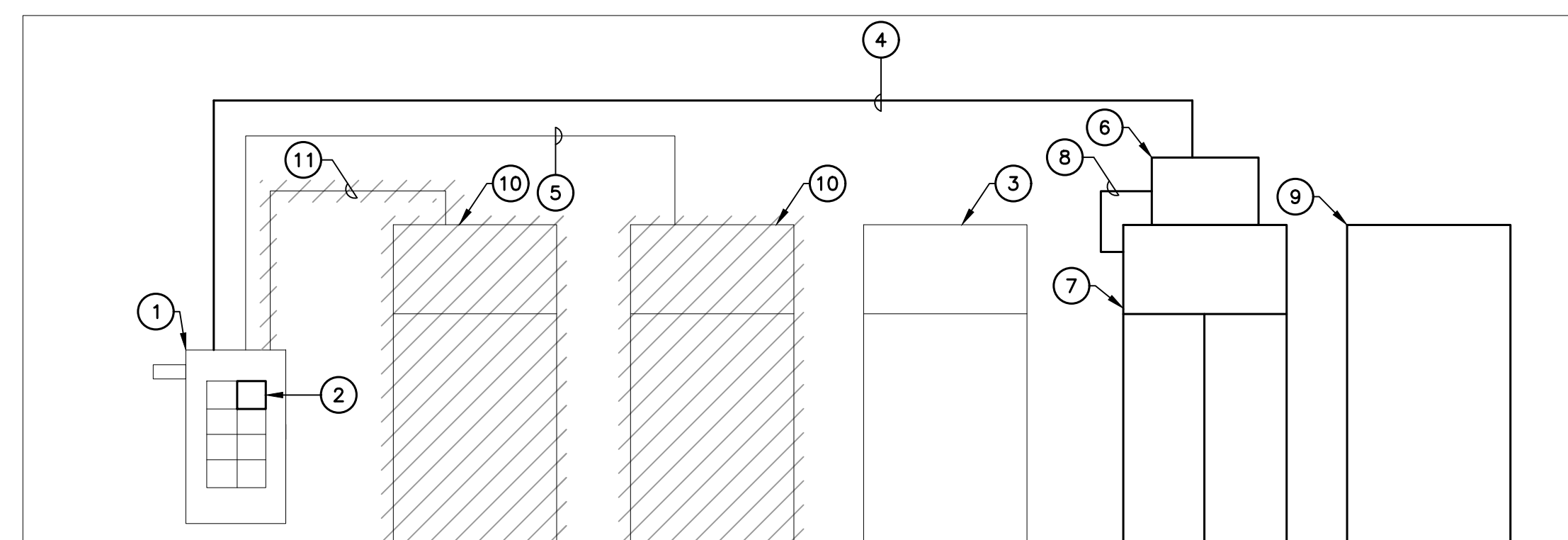
TYPICAL
EQUIPMENT
DETAILS

C-5
Sheet No. 7 of 10



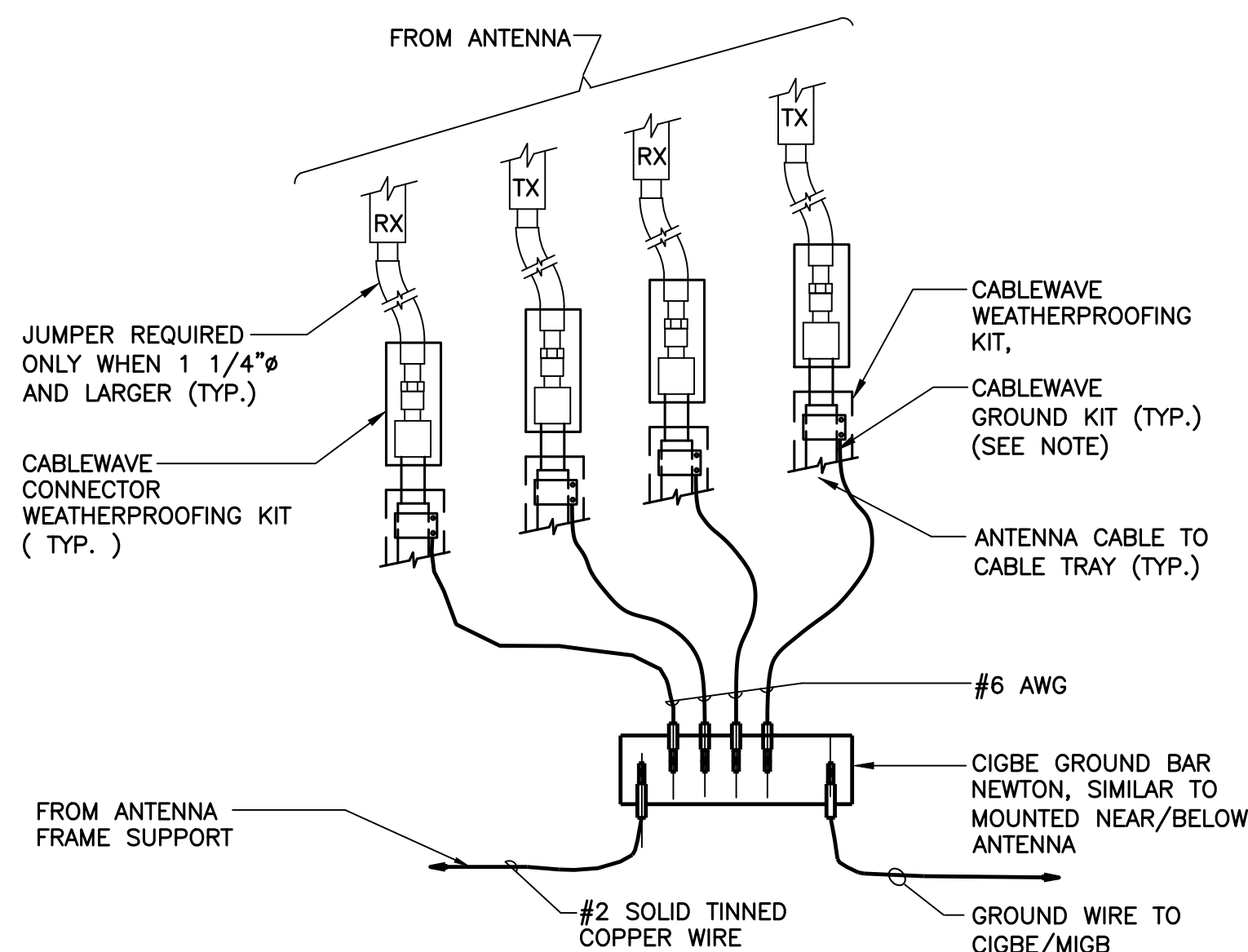
1 ELECTRICAL CONDUIT ROUTING PLAN
 E-1 SCALE: 1/4" = 1'

- RISER DIAGRAM NOTES**
- ① EXISTING 200A, PPC CABINET TO REMAIN.
 - ② NEW 100A/2P CIRCUIT BREAKER TO SERVE NEW EQUIPMENT CABINET.
 - ③ EXISTING CABINETS TO REMAIN.
 - ④ (3) #1 AWG, (1) #8 AWG GROUND, 1-1/4" CONDUIT.
 - ⑤ EXISTING CONDUITS AND CONDUCTORS TO REMAIN.
 - ⑥ NEW T-MOBILE 6230 CABINET
 - ⑦ NEW T-MOBILE 6230 BATTERY RACK
 - ⑧ DC CONDUIT AND CONDUCTORS FOR BATTERY CABINET CONNECTION PER MANUFACTURERS SPECIFICATIONS.
 - ⑨ NEW T-MOBILE FIF RACK
 - ⑩ EXISTING CABINETS TO BE REMOVED
 - ⑪ EXISTING CONDUITS, CONDUCTORS AND ASSOCIATED CIRCUIT BREAKERS TO BE REMOVED



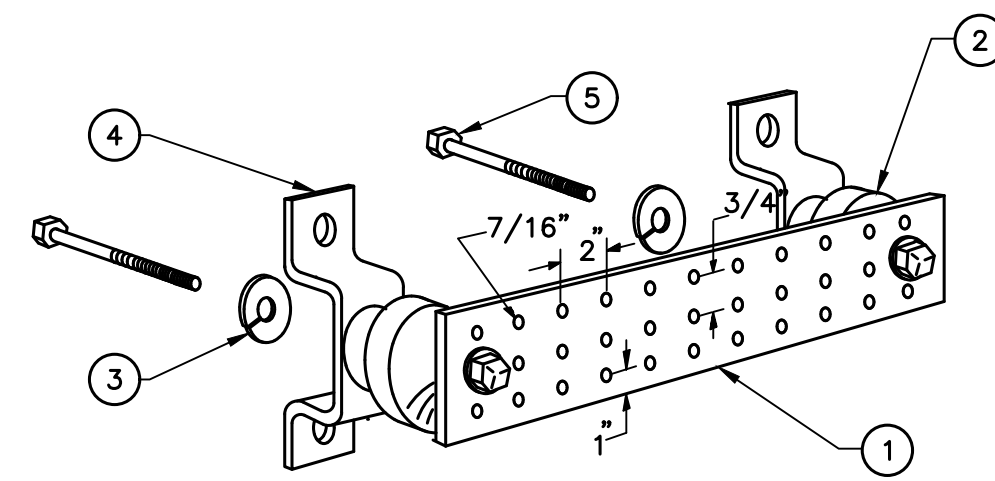
2 ELECTRICAL POWER RISER DIAGRAM
 E-1 SCALE: NOT TO SCALE

			T-MOBILE NORTHEAST LLC NH334/E AURORA SMOKESTACK SITE ID: CTNH334A 150 E AURORA STREET WATERBURY, CT 06708				
<small>PROFESSIONAL ENGINEER SEAL</small> <small>STATE OF CONNECTICUT</small> <small>T. J. R.</small> <small>12000</small> <small>12000</small>	<small>TRAFFIC ENGINEER</small> <small>12/23/2015</small>	<small>Centered on Solutions</small> <small>(203) 488-0580</small> <small>(203) 488-8587 Fax</small> <small>65-2 North Branford Road</small> <small>Branford, CT 06405</small> <small>www.CentekEng.com</small>					
<small>0</small> <small>12/06/21</small> <small>JLW</small> <small>TJR</small> <small>DATE</small> <small>REV.</small> <small>DESCRPTION</small> <small>CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION</small>							
ELECTRICAL RISER AND CONDUIT ROUTING							
E-1							
<small>Sheet No. 8 of 10</small>							



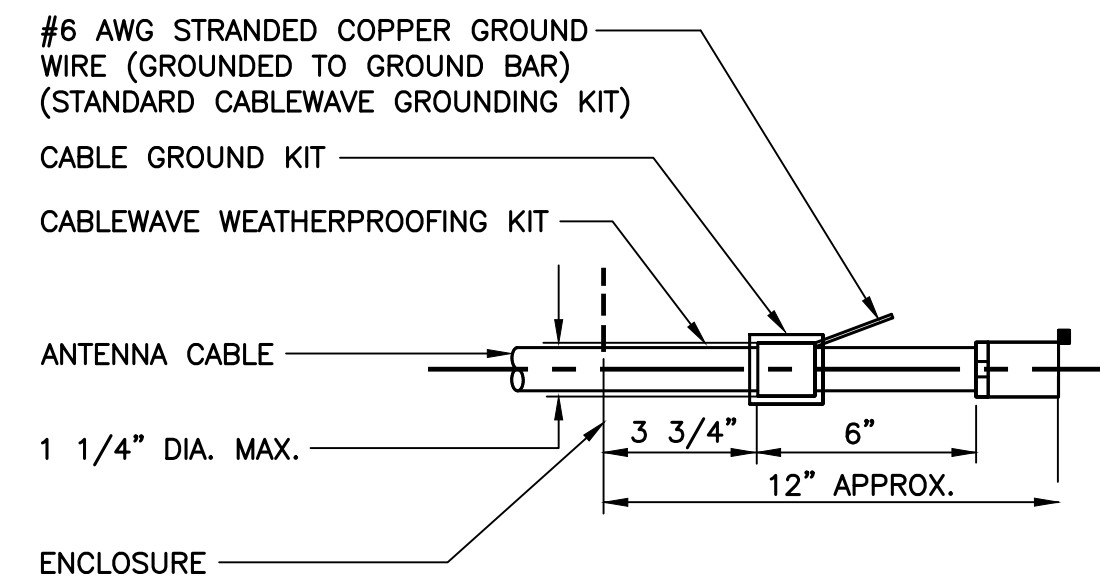
- NOTES:**
- DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE

1 CONNECTION OF GROUND WIRES TO GROUND BAR
E-2 SCALE: NOT TO SCALE



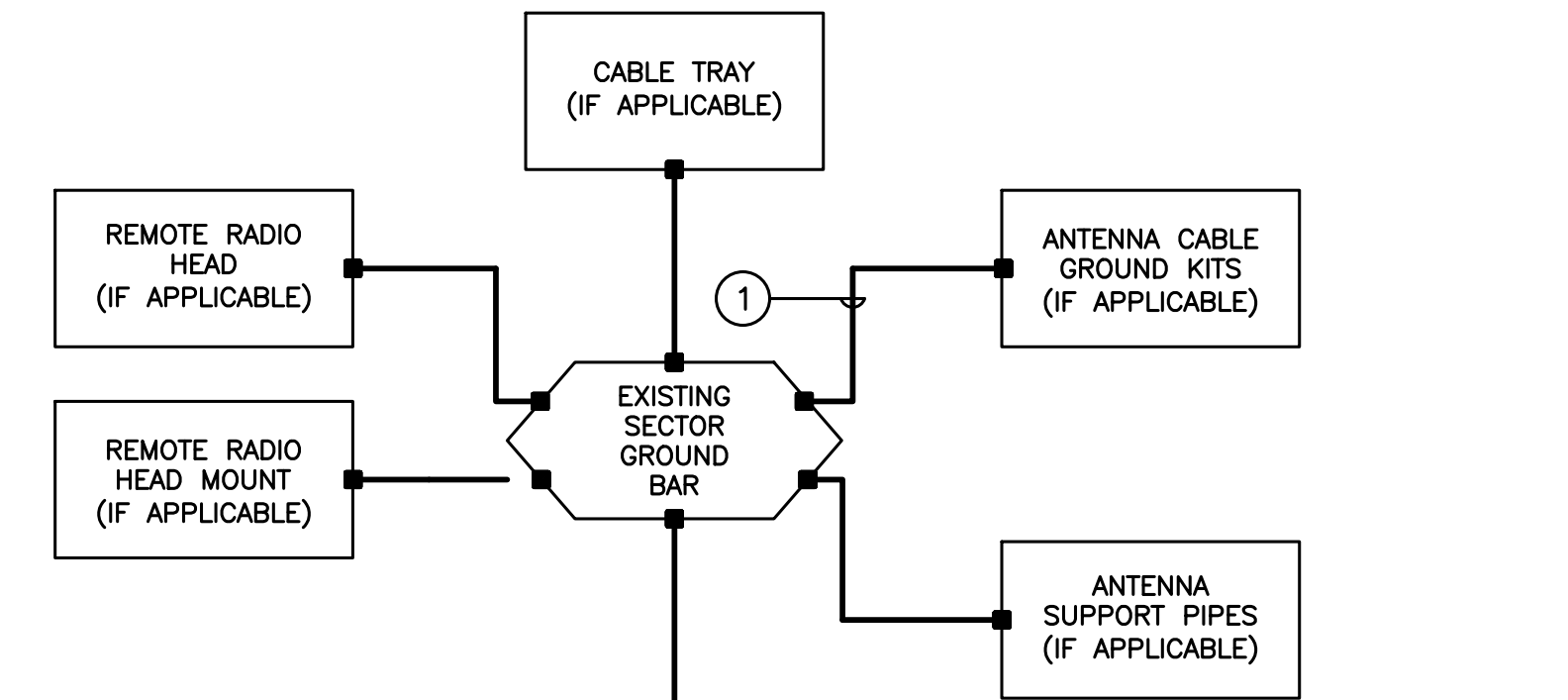
- NOTES**
- TINNED COPPER GROUND BAR, 1/4" x 4" x 20", NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION.
 - INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4.
 - 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8.
 - WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056.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

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



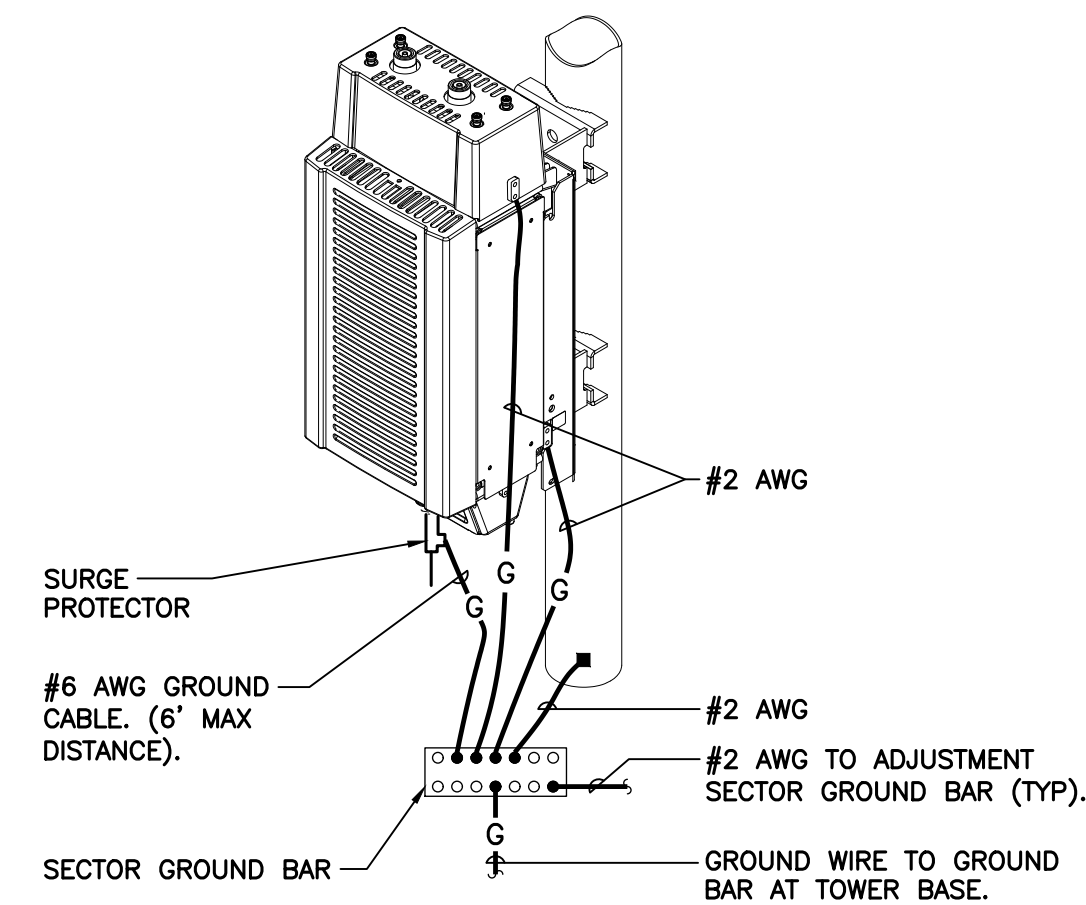
- NOTES:**
- DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

3 ANTENNA CABLE GROUNDING DETAIL
E-2 SCALE: NOT TO SCALE

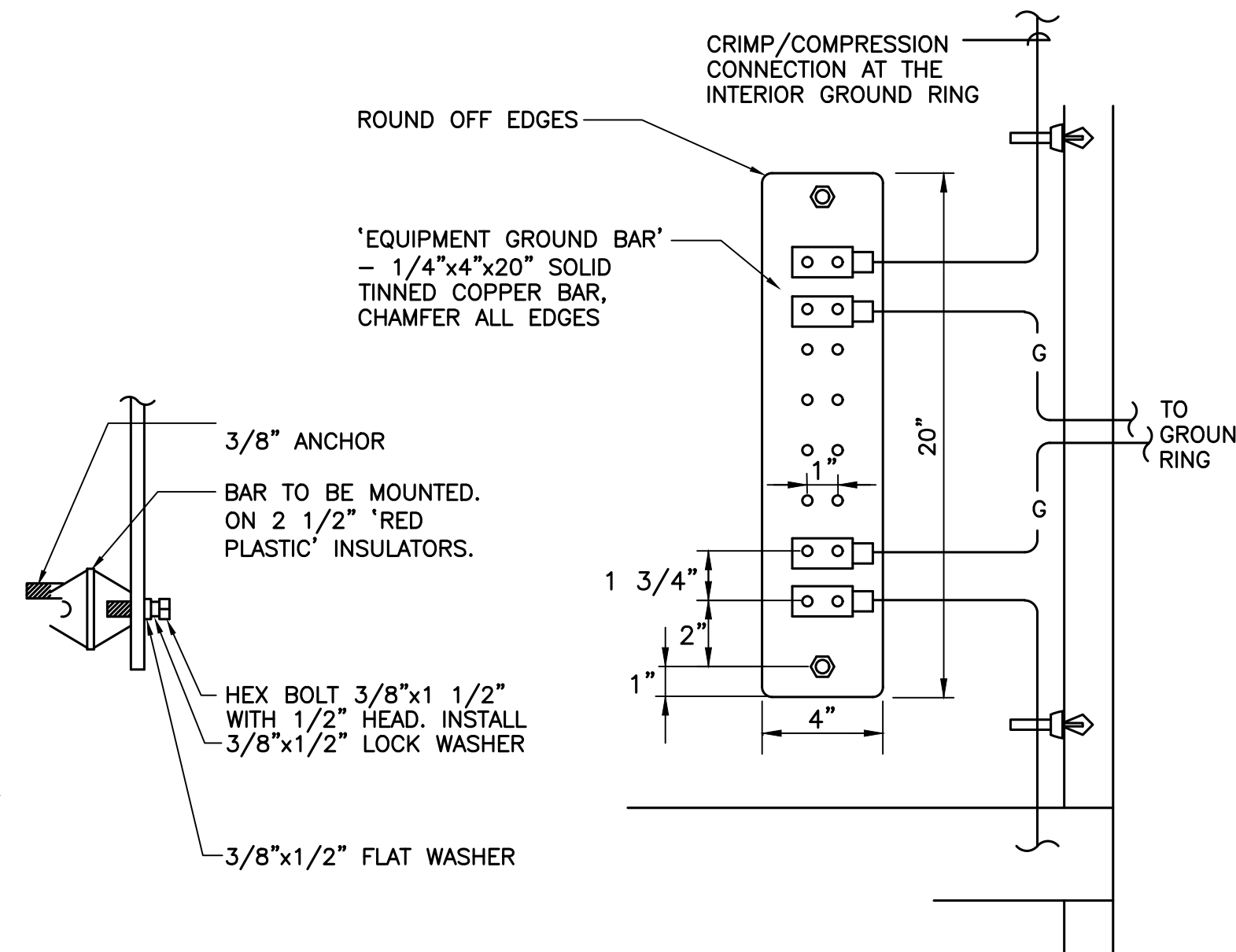


4 TYPICAL ANTENNA GROUNDING DETAIL
E-2 SCALE: NOT TO SCALE

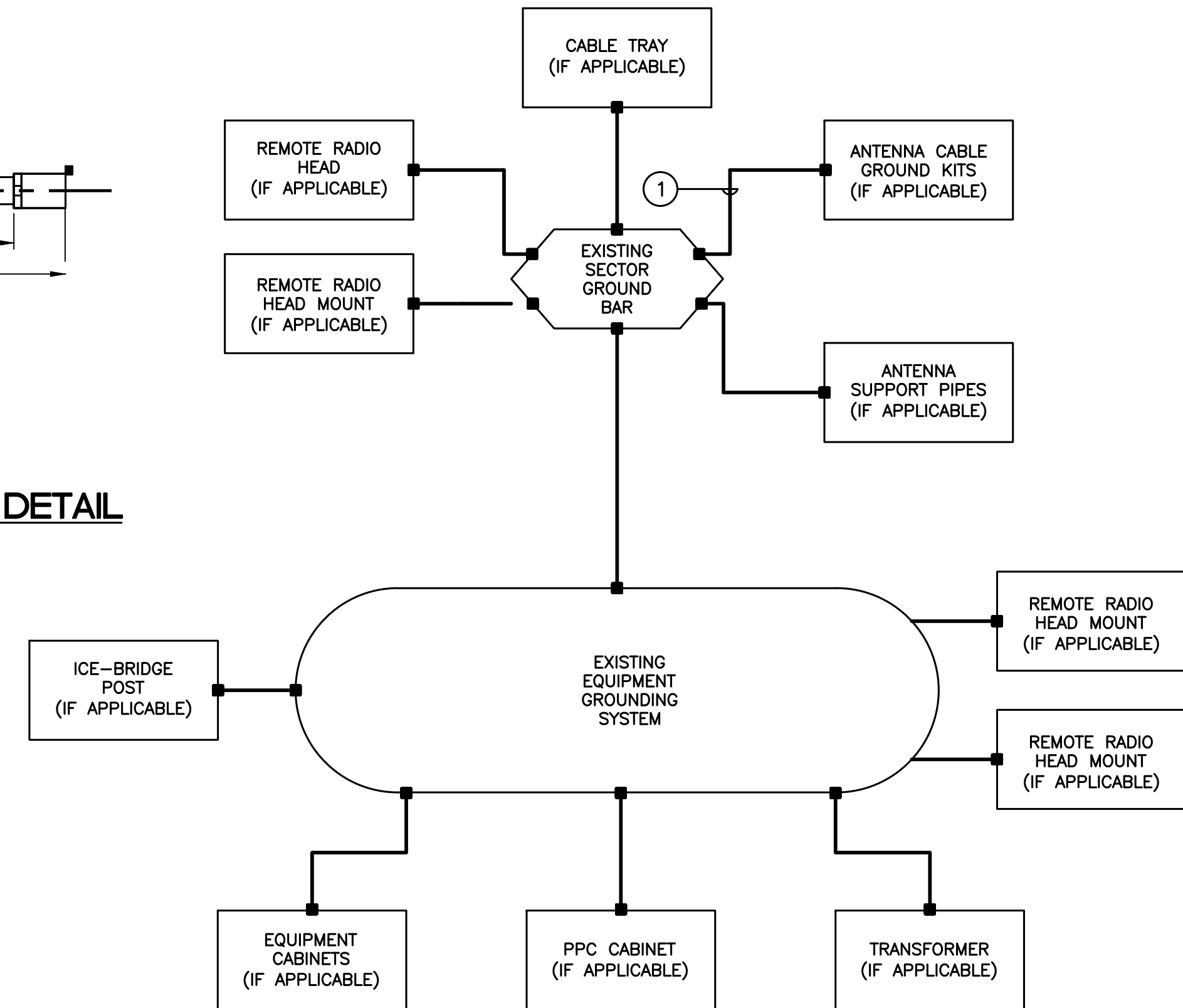
EACH RRH CABINET SHALL BE GROUNDED IN THE FOLLOWING MANNER:
1. AT TOP OF THE CABINET
2. AT RIGHT SIDE OF THE CABINET.



5 RRH POLE MOUNT GROUNDING
E-2 SCALE: NOT TO SCALE



6 EQUIPMENT GROUND BAR DETAIL
E-2 SCALE: NOT TO SCALE



GROUNDING SCHEMATIC NOTES

- #6 AWG**
GENERAL NOTES:
 - ALL SURGE SUPPRESSION EQUIPMENT SHALL BE BONDED TO GROUND PER MANUFACTURER'S SPECIFICATIONS
 - UNLESS OTHERWISE NOTED OR REQUIRED BY CODE, GROUND CONDUCTORS SHOWN SHALL BE #2 AWG (SOLID TINNED BCW - EXTERIOR; STRANDED GREEN INSULATED - INTERIOR).
 - BOND CABLE TRAY SECTIONS TOGETHER WITH #6 AWG STRANDED GREEN INSULATED JUMPERS.
 - ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.
 - BOND ALL EQUIPMENT CABINETS AND BATTERY CABINETS TO GROUND PER MANUFACTURER'S SPECIFICATIONS.
 - REFER TO ALL ELECTRICAL AND GROUNDING DETAILS.
 - COORDINATE ALL ROOF MOUNTED EQUIPMENT WITH OWNER.
 - ALL ROOF MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
 - ALL GROUNDING SHALL BE IN ACCORDANCE WITH NEC AND OWNER'S REQUIREMENTS.

7 ELECTRICAL SCHEMATIC DIAGRAM
E-2 SCALE: NOT TO SCALE

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SITE ID: CTNH334A
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WATERBURY, CT 06708

DATE: 09/24/21
SCALE: AS NOTED
JOB NO. 21022.33

TYPICAL ELECTRICAL DETAILS

E-2

Sheet No. 9 of 10

CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION
TJR
DATE 12/06/21
DRAWN BY/CHK'D BY
REV.

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) ^{1,2}
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
A	BLACK
B	BROWN
C	RED
N	BLUE
G	CONTINUOUS WHITE
	CONTINUOUS GREEN
	277/480V
	COLOR
	BROWN
	ORANGE
	YELLOW
	GREY
	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.

CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION
TJR
DATE

12/06/21
JLW
DATE

0
REV.

PROFESSIONAL ENGINEER SEAL
DATE

Centek on Solutions
 (203) 488-0380
 (203) 488-8387 Fax
 63-2 North Branford Road
 Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC
 NH334/E AURORA SMOKESTACK
 SITE ID: CTNH334A
 150 E AURORA STREET
 WATERBURY, CT 06708

DATE: 09/24/21

SCALE: AS NOTED

JOB NO. 21022.33

ELECTRICAL
SPECIFICATIONS

E-3

Sheet No. 10
of 10

Structural Analysis Report

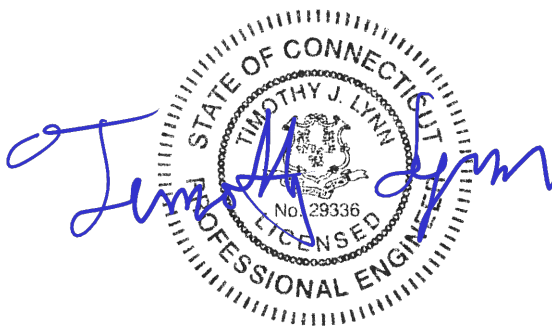
109-ft Existing Masonry Smokestack

T-Mobile Site Ref: CTNH334A

*150 East Aurora Street
Waterbury, CT 06708*

Centek Project No. 21022.33

Date: October 7, 2021



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

CEN TEK Engineering, Inc.

Structural Analysis – 109-ft Existing Masonry Smokestack

T-Mobile Site Ref ~ CTNH334A

Waterbury, CT

October 7, 2021

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- INTRODUCTION
- PRIMARY ASSUMPTIONS USED IN THE ANALYSIS
- ANTENNA AND EQUIPMENT SUMMARY
- DESIGN LOADING
- RESULTS
- CONCLUSION

SECTION 2 – CONDITIONS & SOFTWARE

- STANDARD ENGINEERING CONDITIONS
- GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

SECTION 3 – CALCULATIONS

- WIND LOADING
- SMOKESTACK ANALYSIS

SECTION 4 – REFERENCES

- RF DATA SHEET

CEN TEK Engineering, Inc.

Structural Analysis – 109-ft Existing Masonry Smokestack

T-Mobile Site Ref ~ CTNH334A

Waterbury, CT

October 7, 2021

Introduction

The purpose of this report is to summarize the results of the structural analysis of the equipment upgrade proposed by T-Mobile on the existing host masonry smokestack located in Waterbury, CT.

The host structure is a 109-ft tall masonry smokestack. The smokestack geometry and structural information was obtained from a structural report prepared by Infinigy dated March 9, 2016.

Primary Assumptions Used in the Analysis

- The host structure's theoretical capacity not including any assessment of the condition of the host structure.
- The existing elevated steel antenna frames carry the horizontal and vertical loads due to the weight of equipment, and wind and transfers into host structure.
- Proposed reinforcement and support steel will be properly installed and maintained.
- Structure is in plumb condition.
- Loading for equipment and enclosure as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as observed during roof framing mapping.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.

Antenna and Equipment Summary

Location	Appurtenance / Equipment	Rad Center Elevation (AGL)	Mount Type
Alpha Sector	(1) Ericsson AIR21 antennas (1) Ericsson AIR32 antennas (1) RFS-APXVAALL24_43 antenna (1) Ericsson AIR6449 B41 antenna (1) Ericsson 4449 RRU (1) Ericsson 4460 RRU (1) TMA	±95-ft ±105-ft	Antenna mount on smokestack
Beta Sector	(1) Ericsson AIR21 antennas (1) Ericsson AIR32 antennas (1) RFS-APXVAALL24_43 antenna (1) Ericsson AIR6449 B41 antenna (1) Ericsson 4449 RRU (1) Ericsson 4460 RRU (1) TMA	±95-ft ±105-ft	Antenna mount on smokestack
Gamma Sector	(1) Ericsson AIR21 antennas (1) Ericsson AIR32 antennas (1) RFS-APXVAALL24_43 antenna (1) Ericsson AIR6449 B41 antenna (1) Ericsson 4449 RRU (1) Ericsson 4460 RRU (1) TMA	±95-ft ±105-ft	Antenna mount on smokestack

Design Loading

Loading was determined per the requirements of the 2015 International Building Code and ASCE 7-10 “Minimum Design Loads for Buildings and Other Structures”.

Wind Speed:	$V_{ult} = 125$ mph	<i>Appendix N of the 2018 CT State Building Code</i>
Risk Category:	II	<i>2015 IBC; Table 1604.05</i>
Exposure Category:	Surface Roughness B	<i>ASCE 7-10; Section 26.7.2</i>
Dead Load	50psf + equipment and framing self-weight	<i>Identified within SAR design calculations</i>

CENTEK Engineering, Inc.

Structural Analysis – 109-ft Existing Masonry Smokestack

T-Mobile Site Ref ~ CTNH334A

Waterbury, CT

October 7, 2021

Results

Smokestack:

Component	Stress Ratio (percentage of capacity)	Result
Compression	35.0%	PASS
Tension of Mortar	94.0%	PASS

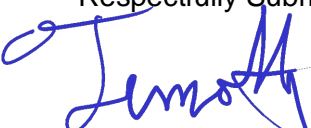
Conclusion and Recommendations

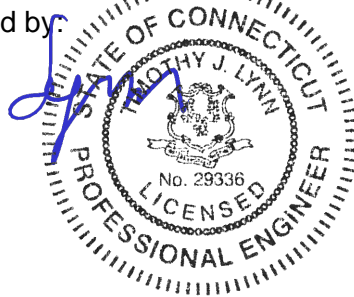
This analysis shows that the subject smokestack **is adequate** to support the proposed T-Mobile equipment upgrade.

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


Please feel free to call with any questions or comments.

Respectfully Submitted by:


Timothy J. Lynn, PE
Structural Engineer



Prepared by:


Fernando J. Palacios
Engineer

CENTEK Engineering, Inc.

Structural Analysis – 109-ft Existing Masonry Smokestack

T-Mobile Site Ref ~ CTNH334A

Waterbury, CT

October 7, 2021

*Standard Conditions for Furnishing of
Professional Engineering Services on
Existing Structures*

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

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

Design Wind Load on Other Structures:

(Based on IBC 2015, CSBC 2018 and ASCE 7-10)

Wind Speed =	V := 125	mph	(User Input)	(CSBC Appendix-N)
Risk Category =	BC := II		(User Input)	(IBC Table 1604.5)
Exposure Category =	Exp := B		(User Input)	
Structure Type =	Structuretype := Round_Chimney		(User Input)	
Structure Height =	Height := 110	ft	(User Input)	
Horizontal Dimension of Structure =	Width := 7.81	ft	(User Input)	

Terrain Exposure Constants:

Nominal Height of the Atmospheric Boundary Layer =

$$z_g := \begin{cases} \text{if Exp = B} \\ \quad \parallel \\ \quad 1200 \\ \text{if Exp = C} \\ \quad \parallel \\ \quad 900 \\ \text{if Exp = D} \\ \quad \parallel \\ \quad 700 \end{cases} = 1.2 \cdot 10^3 \quad \text{(Table 26.9-1)}$$

3-Sec Gust Speed Power Law Exponent =

$$\alpha := \begin{cases} \text{if Exp = B} \\ \quad \parallel \\ \quad 7 \\ \text{if Exp = C} \\ \quad \parallel \\ \quad 9.5 \\ \text{if Exp = D} \\ \quad \parallel \\ \quad 11.5 \end{cases} = 7 \quad \text{(Table 26.9-1)}$$

Integral Length Scale Factor =

$$l := \begin{cases} \text{if Exp = B} \\ \quad \parallel \\ \quad 320 \\ \text{if Exp = C} \\ \quad \parallel \\ \quad 500 \\ \text{if Exp = D} \\ \quad \parallel \\ \quad 650 \end{cases} = 320 \quad \text{(Table 26.9-1)}$$

Integral Length Scale Power Law Exponent =

$$E := \begin{cases} \text{if Exp = B} \\ \quad \parallel \\ \quad \frac{1}{3} \\ \text{if Exp = C} \\ \quad \parallel \\ \quad \frac{1}{5} \\ \text{if Exp = D} \\ \quad \parallel \\ \quad \frac{1}{8} \end{cases} = 0.333 \quad \text{(Table 26.9-1)}$$

Turbulence Intensity Factor =

$$c := \begin{cases} \text{if Exp = B} \\ \quad \parallel \\ \quad 0.3 \\ \text{if Exp = C} \\ \quad \parallel \\ \quad 0.2 \\ \text{if Exp = D} \\ \quad \parallel \\ \quad 0.15 \end{cases} = 0.3 \quad \text{(Table 26.9-1)}$$

Exposure Constant =	$Z_{min} := \begin{cases} \text{if Exp} = B \\ 30 \\ \text{if Exp} = C \\ 15 \\ \text{if Exp} = D \\ 7 \end{cases} = 30$	(Table 26.9-1)
Topographic Factor =	$K_{zt} := 1$	(Eq. 26.8-2)
Wind Directionality Factor =	$K_d = 0.95$	(Table 26.6-1)
Peak Factor for Background Response =	$g_O := 3.4$	(Sec 26.9.4)
Peak Factor for Wind Response =	$g_v := 3.4$	(Sec 26.9.4)
Equivalent Height of Structure =	$z := \begin{cases} \text{if } Z_{min} > 0.6 \cdot \text{Height} \\ Z_{min} \\ \text{else} \\ 0.6 \cdot \text{Height} \end{cases} = 66$	(Sec 26.9.4)
Intensity of Turbulence =	$I_z := c \cdot \left(\frac{33}{z}\right)^{\left(\frac{1}{6}\right)} = 0.267$	(Eq. 26.9-7)
Integral Length Scale of Turbulence =	$L_z := 1 \cdot \left(\frac{z}{33}\right)^E = 403.175$	(Eq. 26.9-9)
Background Response Factor =	$Q := \sqrt{\frac{1}{1 + 0.63 \cdot \left(\frac{\text{Width} + \text{Height}}{L_z}\right)^{0.63}}} = 0.88$	(Eq. 26.9-8)
Gust Response Factor =	$G := 0.925 \cdot \left(\frac{(1 + 1.7 \cdot g_O \cdot I_z \cdot Q)}{1 + 1.7 \cdot g_v \cdot I_z}\right) = 0.858$	(Eq. 26.9-6)
Velocity Pressure =	$q_z := 0.00256 \cdot K_{zt} \cdot K_d \cdot V^2 = 38$	(Eq. 29.3-1)
Force Coefficient =	$C_f = 0.639$	(Fig 29.5-1 - 29.5-3)
Wind Force =	$F := q_z \cdot G \cdot C_f = 21$	psf
Height Above Grade =	$Z := 55 \text{ ft}$	(User Input)
Exposure Coefficient =	$K_z := \begin{cases} \text{if } 15 \leq Z \leq z_g \\ 2.01 \cdot \left(\frac{Z}{z_g}\right)^{\left(\frac{2}{\alpha}\right)} \\ \text{if } Z < 15 \\ 2.01 \cdot \left(\frac{15}{z_g}\right)^{\left(\frac{2}{\alpha}\right)} \end{cases} = 0.83$	(Table 29.3-1)
	$K_z = 0.83$	

Job : CTNH334A
 Address: 150 East Aurora Waterbury, CT 06708
 Description: Smokestack Evaluation

Project No. 21022.33 Sheet 1 of 2
 Computed by TJL Date 10/13/21
 Checked by FJP Date

	Wind Force (lb)	Weight (lb)	Height Above Base (ft)	Height (in)
T-Mobile	1444.65	1312	105	1260

Section	Top Dia (in)	Bot Dia (in)	Average Wall Thk (in)	Wall Thk @ Base (in)	Sect Height (in)	Area At Base (in ²)	Tot. Vol (ft ³)	Unit Weight (pcf)	Weight of Section (lb)	Total Weight (lb)	Axial Stress fa (psi)
1	77	110.4	13	17	1312.5	4985.692	2500.6382	125	312579.7697	313891.7697	63.0

Job : CTNH334A
 Address: 150 East Aurora Waterbury, CT 06708
 Description: Smokestack Evaluation

Project No. 18058.51
 Computed by TJL
 Checked by CAG
 Sheet 2 of 2
 Date 10/13/21

Ultimate Wind Pressure (psf)	ASD Wind Pressure (psf)	KZ	Wind Area (sf)	Wind Force (lb)	Moment @ Base	Section Modulus @ Base	Bending Stress fb (psi)	Allowable Fa (psi)	Allowable Fb (psi)	fa/Fa+fb/Fb		ft	Ft	ft/Ft	
21	16	0.833	854.0	11382.6	9290088.883	101752.3738	91.3	375	500	0.35	OK	28.3	30	0.94	OK

RAN Template: 67D5A998E Hybrid	A&L Template: 67D5998E_1xAIR+1OP
--	--

Section 1 - Site Information

Site ID: CTNH334A
Status: Draft
Version: 5
Project Type: Anchor
Approved: Not Approved
Approved By: Not Approved
Last Modified: 9/13/2021 2:35:19 PM
Last Modified By: Hansraj.Rana4@T-Mobile.com

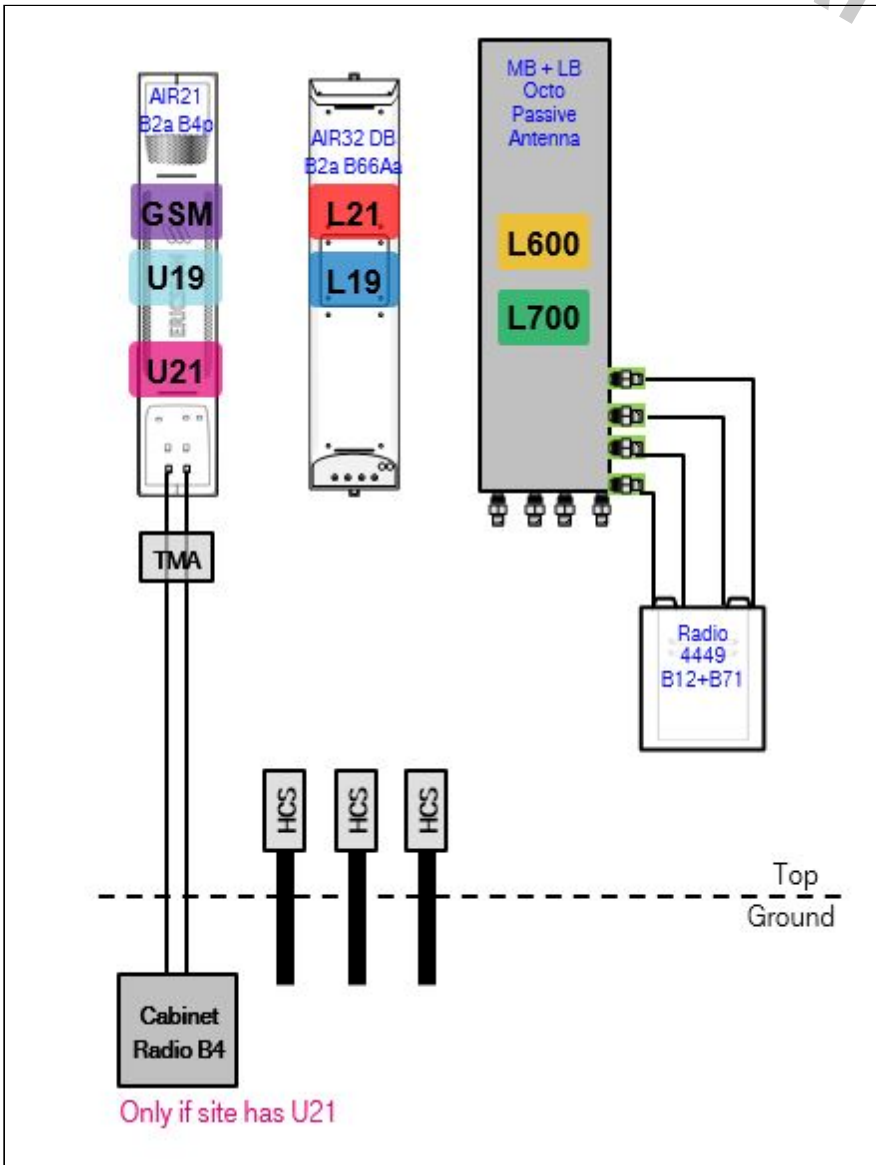
Site Name: NH334/E Aurora Smokestack
Site Class: Smokestack
Site Type: Structure Non Building
Plan Year: 2021
Market: CONNECTICUT CT
Vendor: Ericsson
Landlord: Stein Trustee

Latitude: 41.57500000
Longitude: -73.05830000
Address: 150 E. Aurora Street
City, State: Waterbury, CT
Region: NORTHEAST

RAN Template: 67D5A998E Hybrid		AL Template: 67D5998E_1xAIR+1OP		
Sector Count: 3	Antenna Count: 6	Coax Line Count: 0	TMA Count: 0	RRU Count: 6

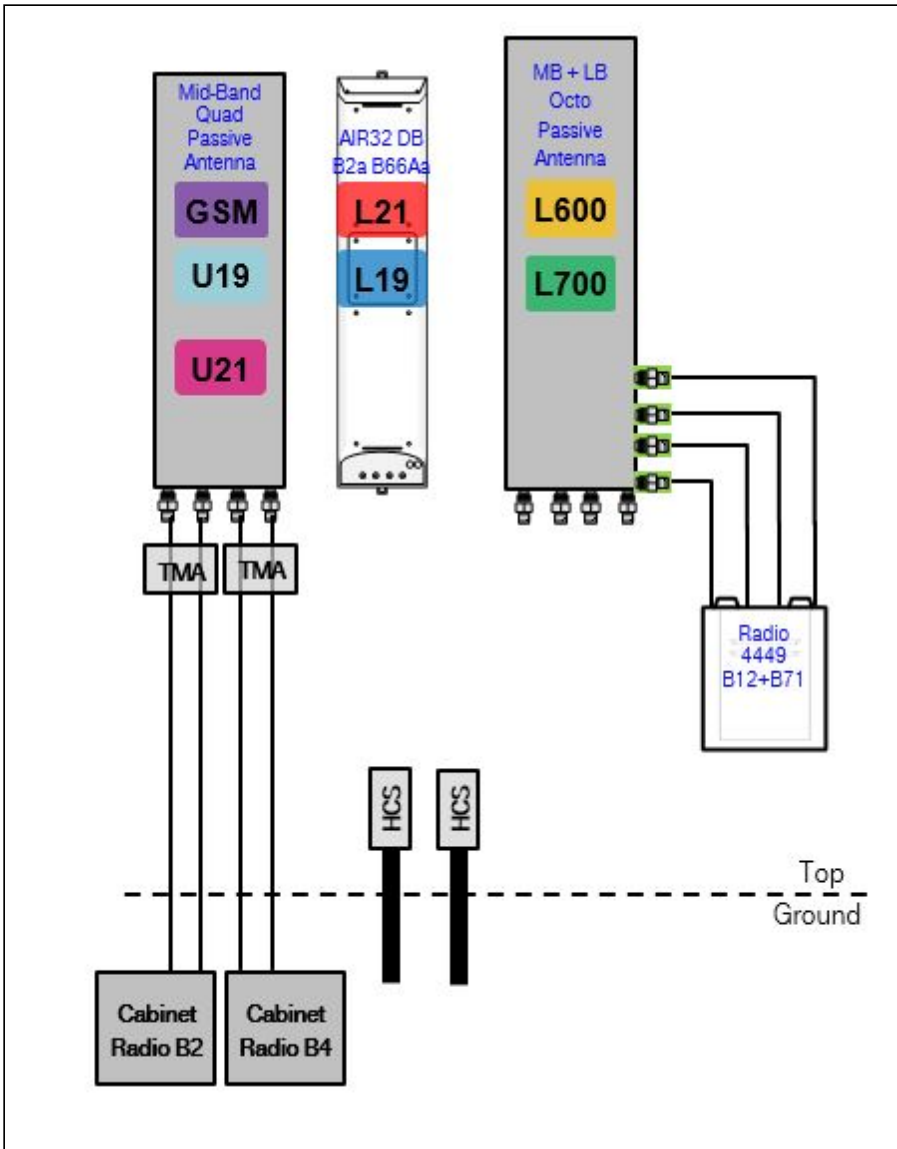
Section 2 - Existing Template Images

67D92DB_2xAIR+1OP.JPG



Notes:

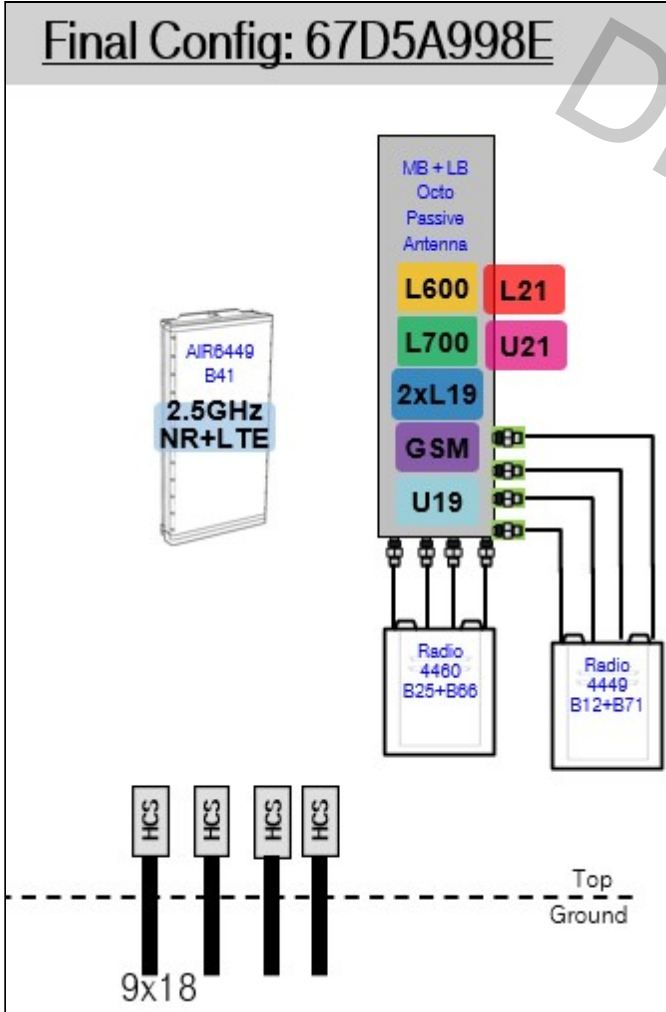
67D94DB_1xAIR+1QP+1OP.JPG



Notes:

Section 3 - Proposed Template Images

67D5A998E.jpg



Notes:

DRAFT

Section 4 - Siteplan Images

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

DRAFT

RAN Template: 67D5A998E Hybrid	A&L Template: 67D5998E_1xAIR+1OP
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Section 5 - RAN Equipment

Existing RAN Equipment

Template: 67D92DB Hybrid

Enclosure	1	2
Enclosure Type	RBS 6201	Ancillary Equipment (Ericsson)
Baseband	DUW30 U2100 DUW30 U1900 DUG20 G1900 BB 5216 L2100 L1900 BB 6630 L700 L600 N600	
Hybrid Cable System		Ericsson 9x18 HCS *Select Length* Ericsson 6x12 HCS *Select Length & AWG* Ericsson 6x12 HCS *Select AWG & Length*
Multiplexer	XMU L2100 L1900	
Radio	RUS01 B4 (x 6) U2100	

Proposed RAN Equipment

Template: 67D5A998E Hybrid

Enclosure	1	2	3	4
Enclosure Type	RBS 6201	Ancillary Equipment (Ericsson)	19 Inch Rack (Ericsson)	Power 6230
Baseband	BB 6648 L2100 L1900 BB 6630 L700 L600 N600 DUW30 U2100 DUW30 U1900 DUG20 G1900		BB 6648 L2500 N2500	
Hybrid Cable System		Ericsson 6x12 HCS *Select Length & AWG* (x 2)	PSU 4813 vR2A (Kit) Ericsson Hybrid Trunk 6/24 4AWG 100m (x 2)	
Transport System			CSR IXRe V2 (Gen2)	

RAN Scope of Work:

- Remove and return all cabinet radios from existing base station cabinet.
- Remove BB5216 and XMU from existing cabinet.
- Add (1) BB6648 for L1900 and L2100 to existing cabinet 6201.
- Add (1) 19 inch rack.
- Add (1) iXRe Router to new 19 Inch Rack.
- Add (1) BB6648 for L2500 and N2500 (MMBB - Mixed Mode Baseband) to new 19 Inch Rack.
- Add (1) PSU4813 Voltage Booster to new 19 Inch Rack.
- Existing : (2) 6X12 , (1) 9x18
- Remove (1) 9x18.
- Add (2) 6X24 HCS terminating at the Enclosure 6160. Connect DC for the AIR6449 B41 to the PSU4813 Voltage Booster.

RAN Template: 67D5A998E Hybrid	A&L Template: 67D5998E_1xAIR+1OP
--	--

Section 6 - A&L Equipment

Existing Template: 67D92DB_2xAIR+1OP
Proposed Template: 67D5998E_1xAIR+1OP

Sector 1 (Existing) view from behind

Coverage Type	A - Outdoor Macro											
Antenna	1			2				3				
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)			RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				
Azimuth	60			60				60				
M. Tilt	0			0				0				
Height	105			105				105				
Ports	P1		P2		P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	U1900	G1900	U2100		L700	L700			L2100	L2100	L1900	L1900
Dark Tech.												
Restricted Tech.												
Decomm. Tech.												
E. Tilt	2		2		2		2		2		2	
Cables			CABLE 1 5/8IN FOAM PREMIUM (x2)		Coax Jumper (x2)	Coax Jumper (x2)						
TMA's			Generic Twin Style 1B - AWS (AtAntenna)									
Diplexers / Combiners												
Radio					Radio 4449 B71+B8 5 (At Antenna)							
Sector Equipment												

Unconnected Equipment:

Scope of Work:

RAN Template: 67D5A998E Hybrid	A&L Template: 67D5998E_1xAIR+1OP
--	--

Sector 1 (Proposed) view from behind						
Coverage Type	A - Outdoor Macro					
Antenna	1			2		
Antenna Model	Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)			RFS - APXVAARR24_43-U-NA20 (Octo)		
Azimuth	60			60		
M. Tilt	0			0		
Height	105			95		
Ports	P1	P2	P3	P4	P5	P6
Active Tech.	L2500 N2500	L2500 N2500	L700 L600 N600	L700 L600 N600	U2100 G1900 U1900 L2100 L1900	U2100 G1900 U1900 L2100 L1900
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt	2			2		
Cables	Fiber Jumper	Fiber Jumper	Coax Jumper (x2) Fiber Jumper (x2)	Coax Jumper (x2)	Coax Jumper (x2) Fiber Jumper (x2)	Coax Jumper (x2) Fiber Jumper (x2)
TMA's						
Diplexers / Combiners						
Radio			Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)
Sector Equipment						

Unconnected Equipment:

Scope of Work:

There will be Two antennae per sector.
 Remove all TMA's.
 Remove all Coaxial Lines.
 Remove AIR21 B2A/B4P from Position 1.
 Install (1) AIR6449 B41 for L2500 and N2500 in Position 1.
 Add (1) Radio 4460 B25+B66 for L2100, L1900 (Both carriers), U2100, U1900 and GSM to Position 2 at antenna.
 Remove AIR32DB B2A/B66A from Position 3.
 Ensure RET control is enabled for all technology layers according to the Design Documents

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

RAN Template: 67D5A998E Hybrid	A&L Template: 67D5998E_1xAIR+1OP
--	--

Sector 2 (Existing) view from behind												
Coverage Type	A - Outdoor Macro											
Antenna	1			2				3				
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)			RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				
Azimuth	180			180				180				
M. Tilt	0			0				0				
Height	105			105				105				
Ports	P1		P2		P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	U1900	G1900	U2100		L700	L700			L2100	L2100	L1900	L1900
					L600	L600						
					N600	N600						
Dark Tech.												
Restricted Tech.												
Decomm. Tech.												
E. Tilt	2		2		2		2		2		2	
Cables		CABLE 1 5/8IN FOAM PREMIUM (x2)		Coax Jumper (x2)	Coax Jumper (x2)							
TMAS		Generic Twin Style 1B - AWS (AtAntenna)										
Diplexers / Combiners												
Radio				Radio 4449 B71+B8 5 (At Antenna)								
Sector Equipment												
Unconnected Equipment:												
Scope of Work:												

RAN Template: 67D5A998E Hybrid	A&L Template: 67D5998E_1xAIR+1OP
--	--

Sector 2 (Proposed) view from behind						
Coverage Type	A - Outdoor Macro					
Antenna	1			2		
Antenna Model	Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)			RFS - APXVAARR24_43-U-NA20 (Octo)		
Azimuth	180			180		
M. Tilt	0			0		
Height	105			95		
Ports	P1	P2	P3	P4	P5	P6
Active Tech.	L2500 N2500	L2500 N2500	L700 L600 N600	L700 L600 N600	U2100 L2100 L1900 G1900 U1900	U2100 L2100 L1900 G1900 U1900
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt	2	2	2	2	2	2
Cables	Fiber Jumper	Fiber Jumper	Coax Jumper (x2) Fiber Jumper (x2)	Coax Jumper (x2)	Coax Jumper (x2) Fiber Jumper (x2)	Coax Jumper (x2) Fiber Jumper (x2)
TMA's						
Diplexers / Combiners						
Radio			Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)
Sector Equipment						

Unconnected Equipment:

Scope of Work:

There will be Two antennae per sector.
 Remove all TMA's.
 Remove all Coaxial Lines.
 Remove AIR21 B2A/B4P from Position 1.
 Install (1) AIR6449 B41 for L2500 and N2500 in Position 1.
 Add (1) Radio 4460 B25+B66 for L2100, L1900 (Both carriers), U2100, U1900 and GSM to Position 2 at antenna.
 Remove AIR32DB B2A/B66A from Position 3.
 Ensure RET control is enabled for all technology layers according to the Design Documents

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

RAN Template: 67D5A998E Hybrid	A&L Template: 67D5998E_1xAIR+1OP
--	--

Sector 3 (Existing) view from behind												
Coverage Type	A - Outdoor Macro											
Antenna	1			2				3				
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)			RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				
Azimuth	300			300				300				
M. Tilt	0			0				0				
Height	105			105				105				
Ports	P1		P2		P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	U1900	G1900	U2100	L700	L700				L2100	L2100	L1900	L1900
				L600	L600							
				N600	N600							
Dark Tech.												
Restricted Tech.												
Decomm. Tech.												
E. Tilt	2		2	2			2		2		2	
Cables		CABLE 1 5/8IN FOAM PREMIUM (x2)		Coax Jumper (x2)	Coax Jumper (x2)							
TMAS		Generic Twin Style 1B - AWS (AtAntenna)										
Diplexers / Combiners												
Radio				Radio 4449 B71+B8 5 (At Antenna)								
Sector Equipment												
Unconnected Equipment:												
Scope of Work:												

RAN Template: 67D5A998E Hybrid	A&L Template: 67D5998E_1xAIR+1OP
--	--

Sector 3 (Proposed) view from behind						
Coverage Type	A - Outdoor Macro					
Antenna	1			2		
Antenna Model	Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)			RFS - APXVAARR24_43-U-NA20 (Octo)		
Azimuth	300			300		
M. Tilt	0			0		
Height	105			95		
Ports	P1	P2	P3	P4	P5	P6
Active Tech.	L2500 N2500	L2500 N2500	L700 L600 N600	L700 L600 N600	U2100 L2100 L1900 G1900 U1900	U2100 L2100 L1900 G1900 U1900
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt	2	2	2	2	2	2
Cables	Fiber Jumper	Fiber Jumper	Coax Jumper (x2) Fiber Jumper (x2)	Coax Jumper (x2)	Coax Jumper (x2) Fiber Jumper (x2)	Coax Jumper (x2) Fiber Jumper (x2)
TMA's						
Diplexers / Combiners						
Radio			Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)
Sector Equipment						

Unconnected Equipment:

Scope of Work:

There will be Two antennae per sector.
 Remove all TMA's.
 Remove all Coaxial Lines.
 Remove AIR21 B2A/B4P from Position 1.
 Install (1) AIR6449 B41 for L2500 and N2500 in Position 1.
 Add (1) Radio 4460 B25+B66 for L2100, L1900 (Both carriers), U2100, U1900 and GSM to Position 2 at antenna.
 Remove AIR32DB B2A/B66A from Position 3.
 Ensure RET control is enabled for all technology layers according to the Design Documents

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

RAN Template: 67D5A998E Hybrid	A&L Template: 67D5998E_1xAIR+1OP
--	--

Section 7 - Power Systems Equipment

Existing Power Systems Equipment

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

Proposed Power Systems Equipment

Enclosure	1
Enclosure Type	Power 6230

Structural Analysis Report

Antenna Mount Analysis

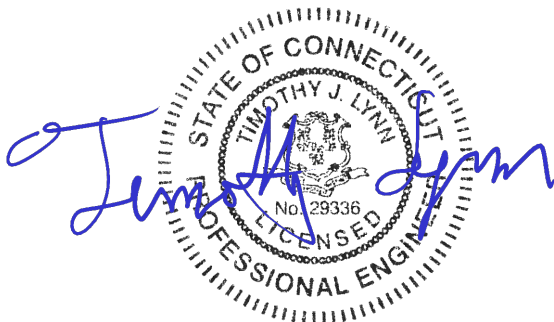
Site Ref: CTNH334A

*150 E. Aurora Street
Waterbury, CT*

Centek Project No. 21022.33

Date: October 6, 2021

Max Stress Ratio 46.5%



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

Table of Contents

SECTION 1 – REPORT

- ANTENNA AND APPURTENANCE SUMMARY
- STRUCTURE LOADING
- CONCLUSION

SECTION 2 – CALCULATIONS

- WIND LOAD ON APPURTENANCES
- RISA3D OUTPUT REPORT

SECTION 3 – REFERENCE MATERIALS (NOT INCLUDED WITHIN REPORT)

- RF DATA SHEET, DATED 09/13/2021

October 6, 2021

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

Re: *Structural Letter ~ Antenna Mount*
T-Mobile – Site Ref: CTNH334A
150 E. Aurora Street
Waterbury, CT 06708

Centek Project No. 21022.33

Dear Mr. Reid,

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

The loads considered in this analysis consist of the following:

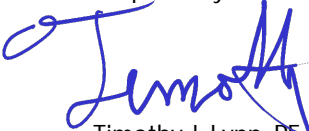
- T-Mobile:
Pipe Frames: Three (3) RFS APXVAALL24_43-U-NA20 panel antennas, three (3) Ericsson AIR6449 B41 panel antennas, three (3) Ericsson 4460 B25+B66 remote radio units and three (3) Ericsson 4449 B71+B85 remote radio units mounted on existing/proposed antenna mounts with a RAD center elevation of 105-ft & 95-ft +/- AGL.

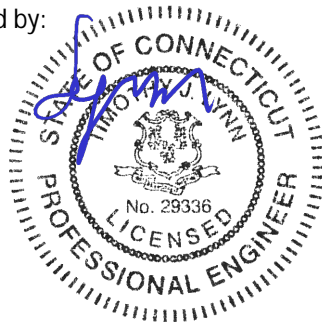
The antenna mount was analyzed per the requirements of the 2015 International Building Code as modified by the 2018 Connecticut State Building Code considering a nominal design wind speed of 97 mph for Waterbury as required in Appendix N of the 2018 Connecticut State Building Code.

A structural analysis of smokestack needs to be completed prior to any work.

Based on our review of the installation, it is our opinion that the subject antenna frames have 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



Prepared by:


Fernando J. Palacios
Engineer

CEN TEK Engineering, Inc.
Structural Analysis – Mount Analysis
T-Mobile Site Ref. ~ CTNH334A
Waterbury, CT
October 6, 2021

Section 2 - Calculations



Figure 1 Typical Antenna Mount

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

Wind Speeds

Basic Wind Speed	V := 97	mph	(User Input - 2018 CSBC Appendix N)
Basic Wind Speed with Ice	V _i := 50	mph	(User Input per Annex B of TIA-222-G)

Input

Structure Type =	Structure_Type := Pole		(User Input)
Structure Category =	SC := 11		(User Input)
Exposure Category =	Exp := B		(User Input)
Structure Height =	h := 110	ft	(User Input)
Height to Center of Antennas =	z := 105	ft	(User Input)
Radial Ice Thickness =	t _i := 0.75	in	(User Input per Annex B of TIA-222-G)
Radial Ice Density =	I _d := 56.00	pcf	(User Input)
Topographic Factor =	K _{zt} := 1.0		(User Input)
	K _a := 1.0		(User Input)
Gust Response Factor =	G _H = 1.1		(User Input)

Output

Wind Direction Probability Factor =	$K_d := \begin{cases} \text{if Structure_Type = Pole} & 0.95 \\ \text{if Structure_Type = Lattice} & 0.85 \end{cases} = 0.95$	(Per Table 2-2 of TIA-222-G)
-------------------------------------	---	------------------------------

Importance Factors =	$I_{Wind} := \begin{cases} \text{if SC = 1} & 0.87 \\ \text{if SC = 2} & 1.00 \\ \text{if SC = 3} & 1.15 \end{cases} = 1$	(Per Table 2-3 of TIA-222-G)
----------------------	---	------------------------------

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

$$K_{iz} := \left(\frac{z}{33}\right)^{0.1} = 1.123$$

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

Velocity Pressure Coefficient Antennas = $t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.684$

$$K_z := 2.01 \cdot \left(\frac{z}{zg}\right)^{\alpha} = 1.002$$

Velocity Pressure w/o Ice Antennas = $q_z := 0.00256 \cdot K_d \cdot K_z \cdot V^2 \cdot I_{Wind} = 23$ psf

Velocity Pressure with Ice Antennas = $q_{z_{ice}} := 0.00256 \cdot K_d \cdot K_z \cdot V_i^2 \cdot I_{Wind} = 6$ psf

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APXVAALL24_43-U-NA20	
Antenna Shape =	Flat	(User Input)
Antenna Height =	$L_{ant} := 95.9$	in (User Input)
Antenna Width =	$W_{ant} := 24.0$	in (User Input)
Antenna Thickness =	$T_{ant} := 8.5$	in (User Input)
Antenna Weight =	$WT_{ant} := 150$	lbs (User Input)
Number of Antennas =	$N_{ant} := 1$	(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.0$	
Antenna Force Coefficient =	$Ca_{ant} = 1.27$	

Wind Load (without ice)

Surface Area for One Antenna = $SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$ sf

Total Antenna Wind Force Front = $F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 511$ lbs

Surface Area for One Antenna = $SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.7$ sf

Total Antenna Wind Force Side = $F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 181$ lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 18.9$ sf

Total Antenna Wind Force w/ Ice Front = $F_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 160$ lbs

Surface Area for One Antenna w/ Ice = $SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 8.2$ sf

Total Antenna Wind Force w/ Ice Side = $F_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 69$ lbs

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 150$ lbs

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \cdot 10^4$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 1 \cdot 10^4$

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot \rho_d = 411$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 411$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR6449 B41	
Antenna Shape =	Flat	(User Input)
Antenna Height =	$L_{ant} := 33.1$	in (User Input)
Antenna Width =	$W_{ant} := 20.6$	in (User Input)
Antenna Thickness =	$T_{ant} := 8.5$	in (User Input)
Antenna Weight =	$WT_{ant} := 104$	lbs (User Input)
Number of Antennas =	$N_{ant} := 1$	(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.6$	
Antenna Force Coefficient =	$Ca_{ant} = 1.2$	

Wind Load (without ice)

Surface Area for One Antenna = $SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.7$ sf

Total Antenna Wind Force Front = $F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 143$ lbs

Surface Area for One Antenna = $SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 2$ sf

Total Antenna Wind Force Side = $F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 59$ lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.1$ sf

Total Antenna Wind Force w/ Ice Front = $F_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 49$ lbs

Surface Area for One Antenna w/ Ice = $SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 3$ sf

Total Antenna Wind Force w/ Ice Side = $F_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 24$ lbs

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 104$ lbs

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5796$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 4578$

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 148$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 148$ lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model =	Ericsson 4460 B25+B66	
RRUS Shape =	Flat	(User Input)
RRUS Height =	$L_{RRUS} := 19.6$	in (User Input)
RRUS Width =	$W_{RRUS} := 15.7$	in (User Input)
RRUS Thickness =	$T_{RRUS} := 12.1$	in (User Input)
RRUS Weight =	$WT_{RRUS} := 109$	lbs (User Input)
Number of RRUS's =	$N_{RRUS} := 1$	
RRUS Aspect Ratio =	$Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.2$	
RRUS Force Coefficient =	$Ca_{RRUS} = 1.2$	

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 2.1$ sf

Total RRUS Wind Force = $F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 65$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.6$ sf

Total RRUS Wind Force = $F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 50$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 3$ sf

Total RRUS Wind Force w/ Ice = $F_{IRRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 24$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 2.5$ sf

Total RRUS Wind Force w/ Ice = $F_{IRRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 20$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 109$ lbs

Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 3723$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 3051$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 99$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 99$ lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model =	Ericsson 44449 B71+B85
RRUS Shape =	Flat (User Input)
RRUS Height =	$L_{RRUS} := 14.9$ in (User Input)
RRUS Width =	$W_{RRUS} := 13.2$ in (User Input)
RRUS Thickness =	$T_{RRUS} := 5.4$ in (User Input)
RRUS Weight =	$WT_{RRUS} := 74$ lbs (User Input)
Number of RRUS's =	$N_{RRUS} := 1$
RRUS Aspect Ratio =	$Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.1$
RRUS Force Coefficient =	$Ca_{RRUS} = 1.2$

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.4$ sf

Total RRUS Wind Force = $F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 41$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 0.6$ sf

Total RRUS Wind Force = $F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 17$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.1$ sf

Total RRUS Wind Force w/ Ice = $F_{IRRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 17$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.1$ sf

Total RRUS Wind Force w/ Ice = $F_{IRRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 9$ lbs

Gravity Load (without ice)

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

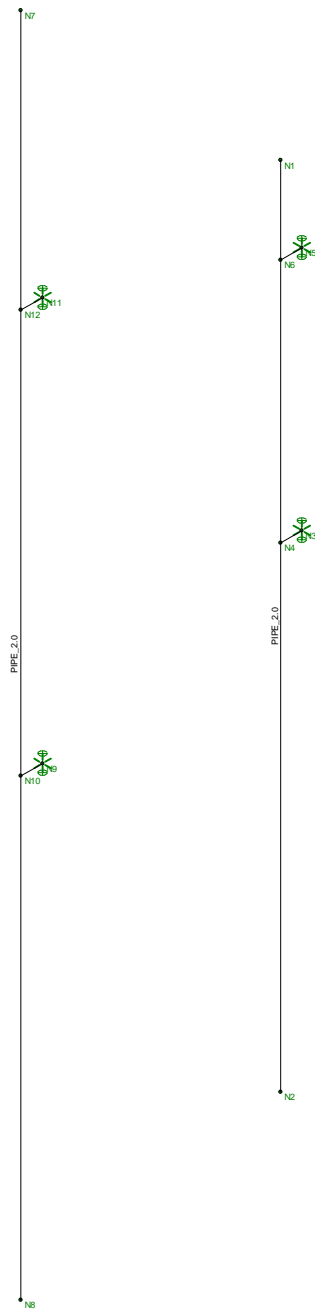
Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 1062$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 1592$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 52$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 52$ lbs



Centek Engineering.
FJP
21022.33

CTNH334A - Alpha, Beta & Gamma Sectors - Mount
Member Framing

Oct 6, 2021 at 8:30 PM
CTNH334A_AMA.r3d

(Global) Model Settings

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

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

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

(Global) Model Settings, Continued

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

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Ru... A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	(E)Ant.Mast_Pipe 2.0 ...	PIPE_2.0	Column	Pipe	A53 Grade B	Typical	1.02	.627	.627 1.25

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...Lcomp bot[...L-torq...	Kyy	Kzz	Cb	Functi...
1	PS.1	(E)Ant.Mast_Pipe 2...	9.333			Lbyy				Lateral
2	PS.2	(E)Ant.Mast_Pipe 2...	12.917			Lbyy				Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
1	PS.1	N1	N2			(E)Ant.Mast_Pipe 2.0 SSTDColumn	Pipe	Pipe	A53 Grade B	Typical
2	M2	N5	N6			RIGID	None	None	RIGID	Typical
3	M3	N3	N4			RIGID	None	None	RIGID	Typical
4	PS.2	N7	N8			(E)Ant.Mast_Pipe 2.0 SSTDColumn	Pipe	Pipe	A53 Grade B	Typical
5	M5	N11	N12			RIGID	None	None	RIGID	Typical
6	M6	N9	N10			RIGID	None	None	RIGID	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N8	-3	-10.333333	0	0	
2	N2	0	-6.75	0	0	
3	N3	0	-1.25	-.25	0	
4	N4	0	-1.25	0	0	
5	N9	-3	-5.083333	-.25	0	
6	N10	-3	-5.083333	0	0	
7	N5	0	1.583333	-.25	0	
8	N6	0	1.583333	0	0	
9	N11	-3	-0.416667	-.25	0	
10	N12	-3	-0.416667	0	0	
11	N1	0	2.583333	0	0	
12	N7	-3	2.583333	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N3	Reaction	Reaction	Reaction		Reaction	
2	N5	Reaction	Reaction	Reaction		Reaction	
3	N9	Reaction	Reaction	Reaction		Reaction	
4	N11	Reaction	Reaction	Reaction		Reaction	

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PS.2	Y	-.075	1
2	PS.2	Y	-.075	5.75
3	PS.1	Y	-.052	2.125

Member Point Loads (BLC 2 : Weight of Appurtenances) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
4	PS.1	Y	-.052	4.875
5	PS.2	Y	-.074	10.333
6	PS.2	Y	-.109	10.667

Member Point Loads (BLC 3 : Weight of Ice Only)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PS.2	Y	-.206	1
2	PS.2	Y	-.206	5.75
3	PS.1	Y	-.074	2.125
4	PS.1	Y	-.074	4.875
5	PS.2	Y	-.052	10.333
6	PS.2	Y	-.099	10.667

Member Point Loads (BLC 4 : (x) TIA Wind with Ice (6 psf))

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PS.2	X	.035	1
2	PS.2	X	.035	5.75
3	PS.1	X	.012	2.125
4	PS.1	X	.012	4.875
5	PS.2	X	.017	10.333
6	PS.2	X	.024	10.667

Member Point Loads (BLC 5 : (x) TIA Wind (23 psf))

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PS.2	X	.091	1
2	PS.2	X	.091	5.75
3	PS.1	X	.03	2.125
4	PS.1	X	.03	4.875
5	PS.2	X	.041	10.333
6	PS.2	X	.065	10.667

Member Point Loads (BLC 6 : (z) TIA Wind with Ice (6 psf))

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PS.2	Z	.08	1
2	PS.2	Z	.08	5.75
3	PS.1	Z	.025	2.125
4	PS.1	Z	.025	4.875
5	PS.2	Z	.009	10.333
6	PS.2	Z	.02	10.667

Member Point Loads (BLC 7 : (z) TIA Wind (23 psf))

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PS.2	Z	.256	1
2	PS.2	Z	.256	5.75
3	PS.1	Z	.072	2.125
4	PS.1	Z	.072	4.875
5	PS.2	Z	.017	10.333
6	PS.2	Z	.05	10.667



Member Distributed Loads (BLC 4 : (x) TIA Wind with Ice (6 psf))

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...]	Start Location[ft,%]	End Location[ft,%]
1	PS.1	X	.00098	.00098	0	0
2	PS.2	X	.00098	.00098	0	8

Member Distributed Loads (BLC 5 : (x) TIA Wind (23 psf))

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...]	Start Location[ft,%]	End Location[ft,%]
1	PS.1	X	.004	.004	0	0
2	PS.2	X	.004	.004	0	8

Member Distributed Loads (BLC 6 : (z) TIA Wind with Ice (6 psf))

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...]	Start Location[ft,%]	End Location[ft,%]
1	PS.1	Z	.00098	.00098	0	2.125
2	PS.1	Z	.00098	.00098	4.875	0
3	PS.2	Z	.00098	.00098	0	1
4	PS.2	Z	.00098	.00098	8	0

Member Distributed Loads (BLC 7 : (z) TIA Wind (23 psf))

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...]	Start Location[ft,%]	End Location[ft,%]
1	PS.1	Z	.004	.004	0	2.125
2	PS.1	Z	.004	.004	4.875	0
3	PS.2	Z	.004	.004	0	1
4	PS.2	Z	.004	.004	8	0

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Gra...	Joint	Point	Distrib..	Area(... Surfa...
1	Self Weight	DL		-1					
2	Weight of Appurtenances	None					6		
3	Weight of Ice Only	None					6		
4	(x) TIA Wind with Ice (6 psf)	None					6	2	
5	(x) TIA Wind (23 psf)	None					6	2	
6	(z) TIA Wind with Ice (6 psf)	None					6	4	
7	(z) TIA Wind (23 psf)	None					6	4	

Load Combinations

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

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N3	max	0	6	.343	4	.027	3	0	6	0	6	0	6
2		min	-.165	2	.063	2	-.256	5	0	1	-.041	2	0	1
3	N5	max	.007	2	.152	3	-.011	2	0	6	.002	2	0	6
4		min	0	3	-.199	5	-.03	6	0	1	0	3	0	1
5	N9	max	0	6	1.685	4	.054	3	0	6	0	6	0	6
6		min	-.307	2	.174	2	-.27	5	0	1	-.077	2	0	1
7	N11	max	0	6	.501	3	-.018	2	0	6	0	6	0	6
8		min	-.207	1	-1.287	5	-.702	4	0	1	-.052	1	0	1
9	Totals:	max	0	6	1.328	6	0	3						
10		min	-.672	1	.463	2	-1.24	4						

Envelope Joint Displacements

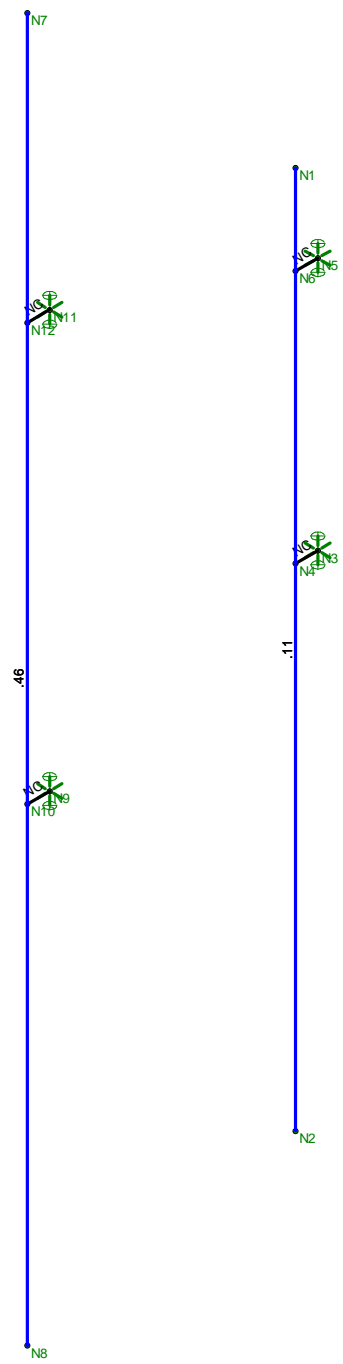
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotation [rad]	LC
1	N8	max	.83	2	-.001	2	.193	5	9.826e-04	3	0	6	1.438e-02	2
2		min	0	4	-.006	4	-.062	3	-4.282e-03	5	0	1	0	4
3	N2	max	.182	2	.002	5	.163	5	1.983e-04	3	0	6	3.219e-03	2
4		min	0	4	0	3	-.013	3	-2.953e-03	5	0	1	0	4
5	N3	max	0	6	0	6	0	6	2.006e-04	3	0	6	1.151e-03	2
6		min	0	1	0	1	0	1	-5.353e-04	5	0	1	0	4
7	N4	max	0	6	.002	5	0	6	2.006e-04	3	0	6	1.151e-03	2
8		min	0	1	0	3	0	1	-5.353e-04	5	0	1	0	4
9	N9	max	0	6	0	6	0	6	1.906e-03	4	0	6	7.602e-03	2
10		min	0	1	0	1	0	1	3.511e-04	2	0	1	0	4
11	N10	max	0	6	-.001	2	0	6	1.906e-03	4	0	6	7.602e-03	2
12		min	0	1	-.006	4	0	1	3.511e-04	2	0	1	0	4
13	N5	max	0	6	0	6	0	6	1.722e-04	3	0	6	0	6
14		min	0	1	0	1	0	1	-4.227e-04	5	0	1	-4.168e-04	2
15	N6	max	0	6	.001	5	0	6	1.722e-04	3	0	6	0	6
16		min	0	1	0	3	0	1	-4.227e-04	5	0	1	-4.168e-04	2
17	N11	max	0	6	0	6	0	6	2.995e-03	4	0	6	0	6
18		min	0	1	0	1	0	1	3.085e-04	2	0	1	-6.595e-03	2
19	N12	max	0	6	0	2	0	6	2.995e-03	4	0	6	0	6
20		min	0	1	-.009	4	0	1	3.085e-04	2	0	1	-6.595e-03	2
21	N1	max	.005	2	.001	5	.002	3	1.722e-04	3	0	6	0	6
22		min	0	4	0	3	-.005	5	-4.117e-04	5	0	1	-4.278e-04	2
23	N7	max	.327	2	-.001	2	.343	4	1.133e-02	4	0	6	0	6
24		min	0	4	-.009	4	.011	2	3.09e-04	2	0	1	-9.789e-03	2

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

	Memb...	Shape	Code Check	L...	LC	Sh...L...	Dir	...phi*P...	phi*Pn...	phi*Mn y-y [k-ft]	phi*...Cb	Eqn
1	PS.1	PIPE 2.0	.113	3...	4	.0153...		5	11.292	32.13	1.872	1 H1...
2	PS.2	PIPE 2.0	.465	3...	4	.0431...		4	5.896	32.13	1.872	1 H1...



Code Check (Env)	
Black	No Calc
Red	> 1.0
Magenta	.90-1.0
Green	.75-.90
Cyan	.50-.75
Blue	0-.50



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek Engineering.	CTNH334A - Alpha, Beta & Gamma Sectors - Mount Unity Check	
FJP		Oct 13, 2021 at 8:48 AM
21022.33		CTNH334A_AMA.r3d

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

T-Mobile Existing Facility

Site ID: CTNH334A

NH334/E Aurora Smokestack
150 E. Aurora Street
Waterbury, Connecticut 06708

December 16, 2021

EBI Project Number: 6221007677

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	23.78%

December 16, 2021

T-Mobile

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

Emissions Analysis for Site: CTNH334A - NH334/E Aurora Smokestack

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **150 E. Aurora Street** in **Waterbury, Connecticut** for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 150 E. Aurora Street in Waterbury, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower. For power density calculations, the broadcast footprint of the AIR6449 antenna has been considered. Due to the beamforming nature of this antenna, the actual beam locations vary depending on demand and are narrow in nature. Using the broadcast footprint accounts for the potential location of beams at any given time.

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

- 1) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 2) 1 NR channel (600 MHz Band) was considered for each sector of the proposed installation. This Channel has a transmit power of 80 Watts.
- 3) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 4) 4 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 5) 2 UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

- 6) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 7) 2 UMTS channels (AWS Band - 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 8) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 9) 1 LTE Traffic channel (LTE 1C and 2C BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 60 Watts.
- 10) 1 LTE Broadcast channel (LTE 1C and 2C BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 20 Watts.
- 11) 1 NR Traffic channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 120 Watts.
- 12) 1 NR Broadcast channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 40 Watts.
- 13) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 14) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 15) The antennas used in this modeling are the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 1900 MHz / 2100 MHz / 2100 MHz channel(s) in Sector A, the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 1900 MHz / 2100 MHz / 2100 MHz channel(s) in Sector B, the Ericsson

AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 1900 MHz / 2100 MHz / 2100 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

- 16) The antenna mounting height centerline of the proposed antennas is 105 feet above ground level (AGL).
- 17) Emissions from additional carriers were not included because emissions data for the site location are not available.
- 18) All calculations were done with respect to uncontrolled / general population threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449
Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz
Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd	Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd	Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd
Height (AGL):	105 feet	Height (AGL):	105 feet	Height (AGL):	105 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts
ERP (W):	36,356.09	ERP (W):	36,356.09	ERP (W):	36,356.09
Antenna AI MPE %:	13.34%	Antenna BI MPE %:	13.34%	Antenna CI MPE %:	13.34%
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz / 2100 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 15.65 dBd / 16.35 dBd / 16.35 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 15.65 dBd / 16.35 dBd / 16.35 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 15.65 dBd / 16.35 dBd / 16.35 dBd
Height (AGL):	105 feet	Height (AGL):	105 feet	Height (AGL):	105 feet
Channel Count:	17	Channel Count:	17	Channel Count:	17
Total TX Power (W):	680 Watts	Total TX Power (W):	680 Watts	Total TX Power (W):	680 Watts
ERP (W):	22,844.84	ERP (W):	22,844.84	ERP (W):	22,844.84
Antenna A2 MPE %:	10.44%	Antenna B2 MPE %:	10.44%	Antenna C2 MPE %:	10.44%

Site Composite MPE %	
Carrier	MPE %
T-Mobile (Max at Sector A):	23.78%
no additional carriers	N/A
Site Total MPE % :	23.78%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	23.78%
T-Mobile Sector B Total:	23.78%
T-Mobile Sector C Total:	23.78%
Site Total MPE % :	23.78%

T-Mobile Maximum MPE Power Values (Sector A)							
T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
T-Mobile 2500 MHz LTE IC & 2C Traffic	1	11044.63	105.0	40.51	2500 MHz LTE IC & 2C Traffic	1000	4.05%
T-Mobile 2500 MHz LTE IC & 2C Broadcast	1	1074.06	105.0	3.94	2500 MHz LTE IC & 2C Broadcast	1000	0.39%
T-Mobile 2500 MHz NR Traffic	1	22089.26	105.0	81.03	2500 MHz NR Traffic	1000	8.10%
T-Mobile 2500 MHz NR Broadcast	1	2148.13	105.0	7.88	2500 MHz NR Broadcast	1000	0.79%
T-Mobile 600 MHz LTE	2	591.73	105.0	4.34	600 MHz LTE	400	1.09%
T-Mobile 600 MHz NR	1	1577.94	105.0	5.79	600 MHz NR	400	1.45%
T-Mobile 700 MHz LTE	2	648.82	105.0	4.76	700 MHz LTE	467	1.02%
T-Mobile 1900 MHz GSM	4	1101.85	105.0	16.17	1900 MHz GSM	1000	1.62%
T-Mobile 1900 MHz UMTS	2	1101.85	105.0	8.08	1900 MHz UMTS	1000	0.81%
T-Mobile 1900 MHz LTE	2	2203.69	105.0	16.17	1900 MHz LTE	1000	1.62%
T-Mobile 2100 MHz UMTS	2	1294.56	105.0	9.50	2100 MHz UMTS	1000	0.95%
T-Mobile 2100 MHz LTE	2	2589.11	105.0	18.99	2100 MHz LTE	1000	1.90%
						Total:	23.78%

• NOTE: Totals may vary by approximately 0.01% due to summation of remainders in calculations.

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector A:	23.78%
Sector B:	23.78%
Sector C:	23.78%
T-Mobile Maximum MPE % (Sector A):	23.78%
Site Total:	23.78%
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **23.78%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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