Transcend Wireless
10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

June 24, 2020

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

RE: Notice of Exempt Modification
39 Cherry Street, Waterbury, CT 06702
Latitude: 41.55952300
Longitude: -73.03427500
T-Mobile Site#: CTNH332C – Anchor

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 137-foot level of the existing 143-foot smokestack at 39 Cherry Street, Waterbury, CT. The 143-foot smokestack and property is owned by New Opportunities Economic Development. T-Mobile now intends to add three (3) new 2500 MHz antennas. The new antennas will be installed at the same 137-foot level of the smokestack.

Planned Modifications:
Tower:

Remove
(3) TMA
(6) 1-5/8" Coax
(1) 1-5/8" Hybrid

Remove and Replace:
N/A

Install New:
(3) AIR 6449 B41 2500 MHz
(3) Ericsson Radio 4415 B25
(3) Commscope CBC1923Q-43 Diplexers
(2) 1-5/8" Hybrid

Existing to Remain:
(3) AIR 32 1900/2100 MHz
(3) APXVARR24_43 600/700/1900/2100 MHz
(3) Radio 4449 B71

(3) TMA
(6) 1-5/8” coax
(1) 1-5/8” Hybrid

Ground:
Remove: 3106 Cabinet
Install New: 6160 Cabinet

This facility was approved by the City of Waterbury Zoning Board of Appeals on December 21, 2005. The approval did not come with conditions that would be violated by this proposed modification.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to Mayor -Neil O’Leary, Elected Official, and Clifford Brammer III, Land Use Officer for the City of Waterbury, as well as the 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,

Kyle Richers
Transcend Wireless
Cell: 908-447-4716
Email: krichers@transcendwireless.com

Attachments
cc: Neil O’Leary – Mayor of City of Waterbury
Clifford Brammer III – Land Use Officer of City of Waterbury
New Opportunities Economic Development – Owner

Exhibit A

Original Facility Approval

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

James A. Sequin, AICP
City Planner

December 22, 2005

To whom it may concern:

THIS IS TO CERTIFY THAT at the regular meeting of the Zoning Board of Appeals held on Wednesday, December 21, 2005 the Board approved the application of Omnipoint Communications, Inc. for a VARIANCE of 5.13-9 (c) of the Zoning Regulations requiring a 50 foot setback from residential property, to permit wireless telecommunications/utility equipment to be located 34 feet from the northerly property boundary, 35 feet from the easterly boundary and 25 feet from the northeasterly boundary, in the RH District, for a property located at **39 Cherry Avenue (aka 215 Cherry Street).**

ATTEST: ____________________

James A. Sequin
City Planner

Exhibit B

Property card

Location: 39 CHERRY AVE **Owner:** NEW OPPORTUNITIES ECONOMIC DEVELOPMENT

Property Information:

Map Block Lot:	0255-0167-0125	**Acres:**	0.65
Primary Use:	Light Industrial	**Zone:**	RH
Neighborhood:	73500-Lower North End	**Vol/Page:**	6727
Mailing Address:	NEW OPPORTUNITIES ECONOMIC DEVELOPMENT 232 NORTH ELM ST WATERBURY CT 06702		

Property Values:

	Appraised Value	**Assessed Value (70%)**
Building	25604	17920
Land	213830	149680
OutBuilding	0	0
Total	239434	167600

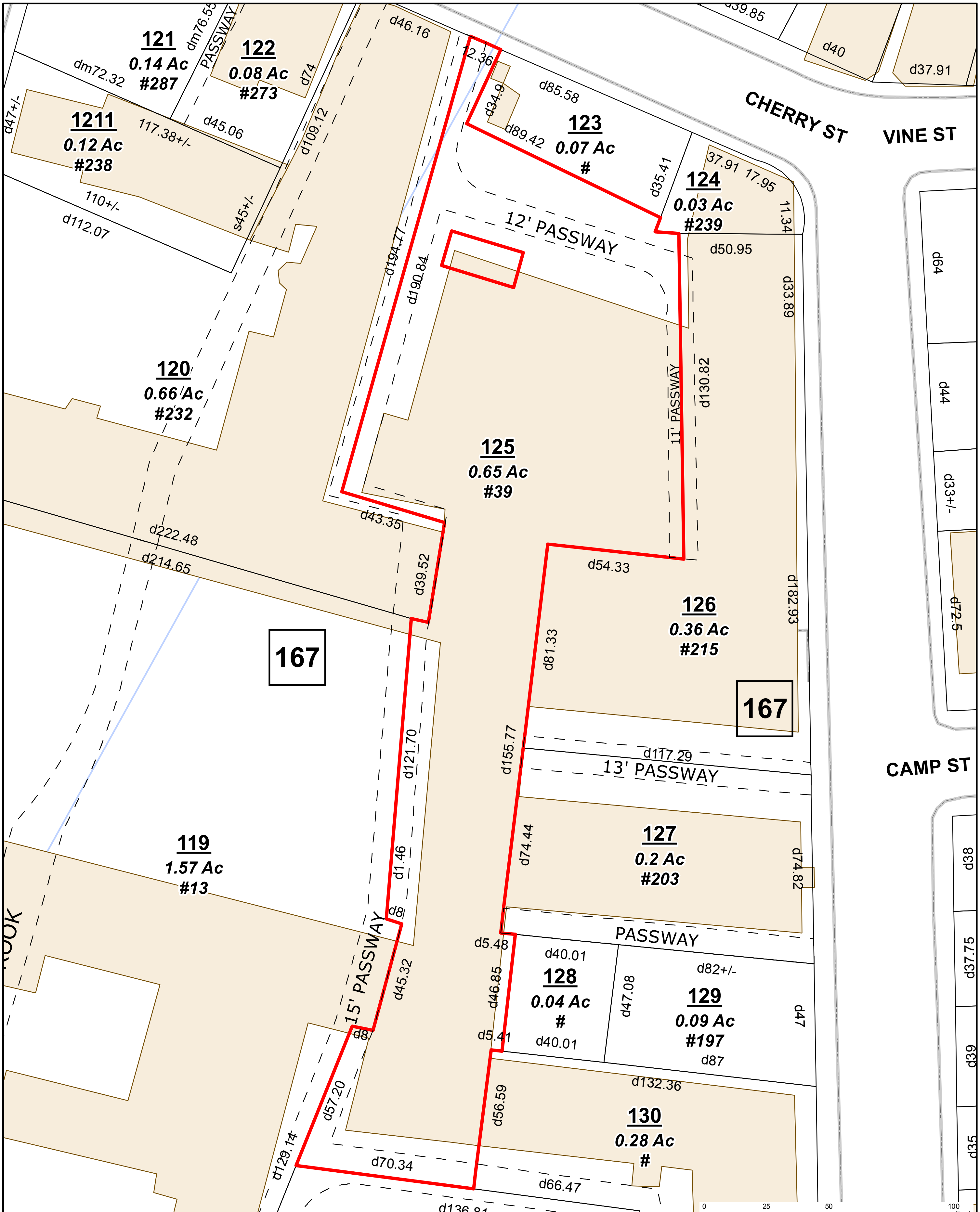
Building Information:

Bldg Style:		**Living Area:**	61969sq.ft
Construction:	Average	**Year Built:**	1900
Exterior Wall:	Brick Solid	**Stories:**	5
Roof Cover:		**Heating:**	Steam
Condition:	Poor	**Heat Fuel:**	Oil
Rooms:	0	**Bedrooms:**	0
Full Baths:	0	**Half Baths:**	0

Outbuilding Information:

Type	**Area (sq.ft)**	**Year Built**	**Condition**

Close



City of Waterbury
Public Works Department

MBL: **0255-0167-0125**

ADDRESS: 39 CHERRY AVE

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.

Exhibit C
Construction Drawings

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

NH332/CHERRY SMOKESTACK

SITE ID: CTNH332C

39 CHERRY STREET

WATERBURY, CT 06702

T-MOBILE RF CONFIGURATION

67D5997DB_2xAIR+1OP

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 CONSTRUCTON, 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 AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED' ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T-MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUITS AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT 'CALL BEFORE YOU DIG' AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH 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.

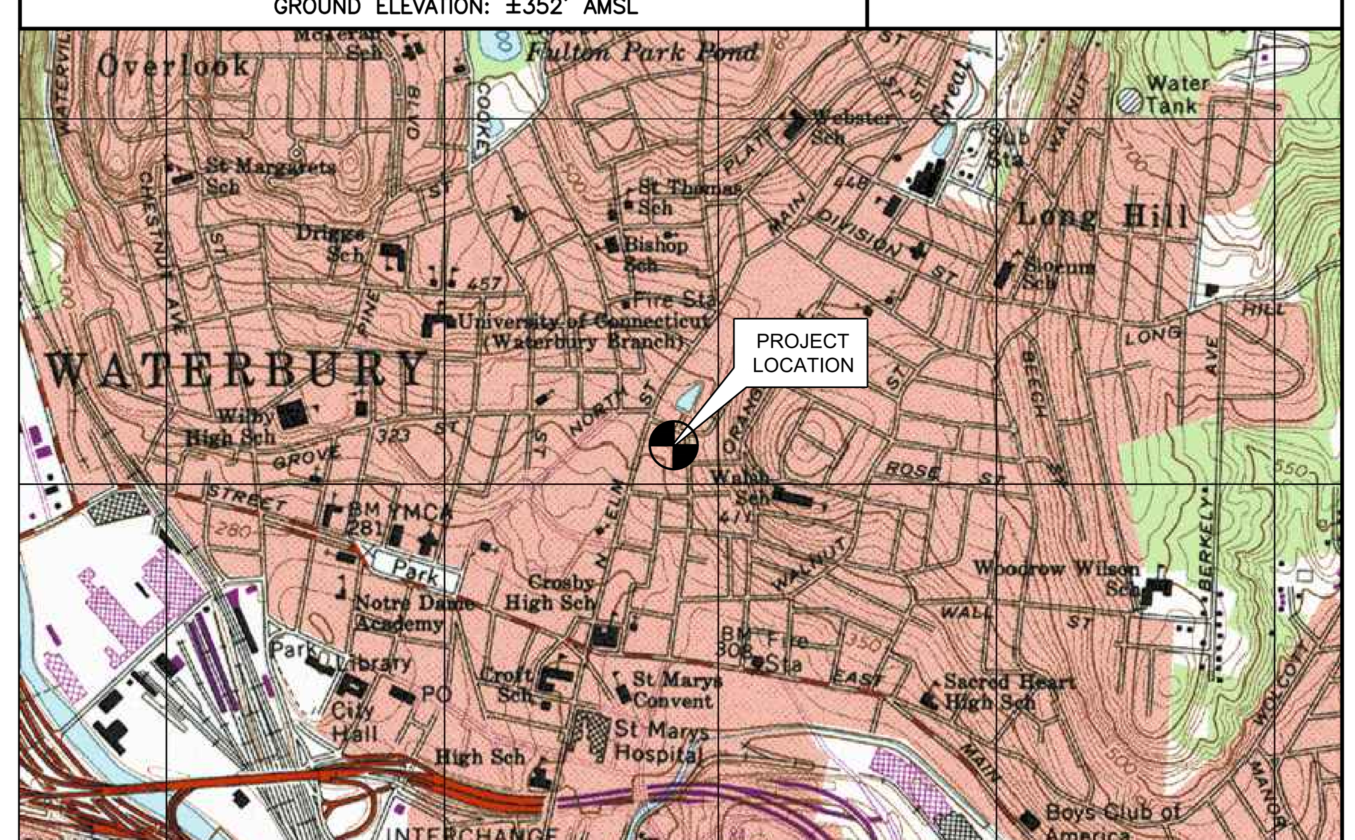
SITE DIRECTIONS

FROM: 35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

TO: 39 CHERRY STREET
WATERBURY, CT 06702

1.	START OUT GOING SOUTH ON GRIFFIN RD TOWARD W NEWBERRY RD.	0.07 MI.
2.	TURN LEFT ONTO W NEWBERRY RD.	0.51 MI.
3.	TURN RIGHT ONTO WOODLAND AVE.	2.49 MI.
4.	TURN LEFT ONTO TUNXIS AVE/CT-189. CONTINUE TO FOLLOW CT-189.	1.03 MI.
5.	TURN RIGHT ONTO COTTAGE GROVE RD/CT-218. CONTINUE TO FOLLOW CT-218.	1.84 MI.
6.	TURN LEFT ONTO OLD MEADOW RD.	0.12 MI.
7.	TAKE THE 1ST RIGHT ONTO KING PHILIP DR.	0.88 MI.
8.	KING PHILIP DR BECOMES TROUT BROOK DR.	2.30 MI.
9.	TURN RIGHT ONTO PARK ROAD	0.10 MI.
10.	MERGE ONTO I-84 W VIA THE RAMP ON THE LEFT TOWARD HARTFORD/WATERBURY.	25.08 MI.
11.	TAKE THE UNION ST EXIT, EXIT 22, TOWARD DOWNTOWN WATERBURY.	0.30 MI.
12.	KEEP LEFT AT THE FORK IN THE RAMP.	0.03 MI.
13.	TURN SLIGHT RIGHT ONTO BRASS MILL DR.	0.16 MI.
14.	TURN LEFT ONTO E MAIN ST.	0.19 MI.
15.	TURN RIGHT ONTO CHERRY ST.	0.06 MI.

SITE COORDINATES: LATITUDE: 41° 33' 33.70" N LONGITUDE: 73° 02' 02.99" W GROUND ELEVATION: ±352' AMSL	COORDINATES AND GROUND ELEVATION ARE REFERENCED FROM GOOGLE EARTH



VICINITY MAP

NORTH

PROJECT SUMMARY

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

1. REMOVE RBS3166, AND RELOCATE AAV
2. ADD (1) ENCLOSURE 6160
3. ADD (1) BATTERY CABINET B160
4. ADD (1) iXRe ROUTER TO NEW ENCLOSURE 6160
5. ADD (3) BB6630 FOR L2500 TO NEW ENCLOSURE 6160
6. ADD (1) BB6648 FOR N2500 TO NEW ENCLOSURE 6160
7. REMOVE (6) COAXIAL LINES FOR A NEW TOTAL OF (6) COAXIAL LINES
8. ADD (2) 6x12 HCS (LENGTH TO MATCH EXISTING HCS)
9. REMOVE (1) 9x18 HCS
10. INSTALL (1) AIR6649 B41 ANTENNA PER SECTOR AT POS.2 (TOTAL OF 3)
11. INSTALL (1) RADIO 4415 B25 PER SECTOR (TOTAL OF 3)
12. INSTALL BBU AND EMERSON CABINET

PROJECT INFORMATION

SITE NAME:	NH332/CHERRY SMOKESTACK
SITE ID:	CTNH332C
SITE ADDRESS:	39 CHERRY STREET WATERBURY, CT 06702
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:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405 CARLO F. CENTORE, PE (203) 488-0580 EXT. 122
PROJECT COORDINATES:	LATITUDE: 41°-33'-33.70" N LONGITUDE: 73°-02'-02.99" W GROUND ELEVATION: 352'± 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	COMPOUND PLAN, EQUIPMENT PLAN, AND ELEVATION	0
C-3	ANTENNA PLANS	0
C-4	TYPICAL EQUIPMENT DETAILS	0
C-5	TYPICAL EQUIPMENT DETAILS	0
E-1	TYPICAL ELECTRICAL DETAILS	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	06/18/20	KAB	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

Transcend Wireless

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

T-MOBILE NORTHEAST LLC

WIRELESS COMMUNICATIONS FACILITY

NH332/CHERRY SMOKESTACK

SITE ID: CTNH332C

39 CHERRY STREET
WATERBURY, CT 06702

DATE:	06/01/20
SCALE:	AS NOTED
JOB NO.	20074.25

TITLE SHEET

T-1

Sheet No. 1 of 8

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 III (BASED ON IBC TABLE 1604.5)
- ULTIMATE DESIGN SPEED (OTHER STRUCTURE): 129 MPH (Vasd) (EXPOSURE C/ 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.
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18. THE CONTRACTOR SHALL CONTACT "DIG SAFE" (DIAL 811) AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. 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.
20. 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.
21. 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.

PAINT NOTES

PAINTING SCHEDULE:

1. FERROUS METAL :

   A. CLEAN SURFACE IN CONFORMANCE TO SSPC–SP–3 STANDARDS, POWER TOOL CLEANING.

   PRIMER: APPLY ONE SPOT COAT OF TENEMEC SERIES 1 PRIMER @ 2.5–3.0 MILS DRY.

   FINISH COAT: APPLY TWO SPOT COATS OF TENEMEC SERIES 1029 (COLOR) AT 2.5 MILS PER COAT.

   COLOR TO MATCH EXISTING BUILDING COLOR. OWNER TO APPROVE COLOR MATCH.

2. ZINC COATED METAL: PROVIDE THE FOLLOWING FINISH SYSTEM OVER ZINC COATED METAL:

   A. SEMIGLOSS ACYLIC–ENAMEL FINISH: 2 FINISH COATS OVER A PRIMER.

   PRIMER: GALVANIZED METAL PRIMER APPLIED AT SPREADING RATE RECOMMENDED BY THE MANUFACTURER TO ACHIEVE A TOTAL DRY FILM THICKNESS OF NOT LESS THAN 1.2 MILS. BENJAMIN MOOR IRON CLAD GALVANIZED METAL LATEX PRIMER #155 OR APPROVED EQUAL.

   FIRST AND SECOND COAT: SEMIGLOSS, ACYLIC EXTRIOR ENAMEL APPLIED AT SPREADING RATE RECOMMENDED BY THE MANUFACTURER TO ACHIEVE A TOTAL DRY FILM THICKNESS OF NOT LESS THAN 2.6 MILS. BENJAMIN MOORE REGAL AQUAGLO VINYL–ACYLIC LATEX ENAMEL #333 OR APPROVED EQUAL.

3. ANTENNA PANELS:

   A. SHERWIN WILLIAMS POLANE–B
   B. COLOR TO BE MATCHED WITH EXISTING STRUCTURE.

4. COAXIAL CABLES:

   A. ONE COAT OF DTM BONDING PRIMER (2–5 MILS. DRY FINISH)
   B. TWO COATS OF DTM ACRYLIC PRIMER/FINISH (2.5–5 MILS. DRY FINISH)
   C. COLOR TO BE FIELD MATCHED WITH EXISTING STRUCTURE.

EXAMINATION AND PREPARATION:

1. DO NOT APPLY PAINT IN SNOW, RAIN, FOG OR MIST OR WHEN RELATIVE HUMIDITY EXCEEDS 85%. DO NOT APPLY PAINT TO DAMP OR WET SURFACES.
2. VERIFY THAT SUBSTRATE CONDITIONS ARE READY TO RECEIVE WORK. EXAMINE SURFACE SCHEDULED TO BE FINISHED PRIOR TO COMMENCEMENT OF WORK. REPORT ANY CONDITION THAT MAY POTENTIALLY AFFECT PROPER APPLICATION.
3. TEST SHOP APPLIED PRIMER FOR COMPATIBILITY WITH SUBSEQUENT COVER MATERIALS.
4. PERFORM PREPARATION AND CLEANING PROCEDURE IN STRICT ACCORDANCE WITH COATING MANUFACTURER'S INSTRUCTIONS FOR EACH SUBSTRATE CONDITION.
5. CORRECT DEFECTS AND CLEAN SURFACES WHICH AFFECT WORK OF THIS SECTION. REMOVE EXISTING COATINGS THAT EXHIBIT LOOSE SURFACE DEFECTS.
6. IMPERVIOUS SURFACE: REMOVE MILDEW BY SCRUBBING WITH SOLUTION OF TRI–SODIUM PHOSPHATE AND BLEACH. RINSE WITH CLEAN WATER AND ALLOW SURFACE TO DRY.
7. ALUMINUM SURFACE SCHEDULED FOR PAINT FINISH: REMOVE SURFACE CONTAMINATION BY STEAM OR HIGH–PRESSURE WATER. REMOVE OXIDATION WITH ACID ETCH AND SOLVENT WASHING. APPLY ETCHING PRIMER IMMEDIATELY FOLLOWING CLEANING.
8. FERROUS METALS: CLEAN UNGALVANIZED FERROUS METAL SURFACES THAT HAVE NOT BEEN SHOP COATED; REMOVE OIL, GREASE, DIRT, LOOSE MILL SCALE, AND OTHER FOREIGN SUBSTANCES. USE SOLVENT OR MECHANICAL CLEANING METHODS THAT COMPLY WITH THE STEEL STRUCTURES PAINTING COUNCIL'S (SSPC) RECOMMENDATIONS. TOUCH UP BARE AREAS AND SHOP APPLIED PRIME COATS THAT HAVE BEEN DAMAGED. WIRE BRUSH, CLEAN WITH SOLVENTS RECOMMENDED BY PAINT MANUFACTURER, AND TOUCH UP WITH THE SAME PRIMER AS THE SHOP COAT.
9. GALVANIZED SURFACES: CLEAN GALVANIZED SURFACES WITH NON–PETROLEUM–BASED SOLVENTS SO SURFACE IS FREE OF OIL AND SURFACE CONTAMINANTS. REMOVE PRETREATMENT FROM GALVANIZED SHEET METAL FABRICATED FROM COIL STOCK BY MECHANICAL METHODS.
10. ANTENNA PANELS: REMOVE ALL OIL, DUST, GREASE, DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION. PANELS MUST BE WIPED WITH METHYL ETHYL KETONE (MEK).
11. COAXIAL CABLES: REMOVE ALL OIL, DUST, GREASE. DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION.

CLEANING:

1. COLLECT WASTE MATERIAL, WHICH MAY CONSTITUTE A FIRE HAZARD, PLACE IN CLOSED METAL CONTAINERS AND REMOVE DAILY FROM SITE.

APPLICATION:

1. APPLY PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. DO NOT APPLY FINISHES TO SURFACES THAT ARE NOT DRY.
3. APPLY EACH COAT TO UNIFORM FINISH.
4. APPLY EACH COAT OF PAINT SLIGHTLY DARKER THAN PRECEDING COAT UNLESS OTHERWISE APPROVED.
5. SAND METAL LIGHTLY BETWEEN COATS TO ACHIEVE REQUIRED FINISH.
6. VACUUM CLEAN SURFACES FREE OF LOOSE PARTICLES. USE TACK CLOTH JUST PRIOR TO APPLYING NEXT COAT.
7. ALLOW APPLIED COAT TO DRY BEFORE NEXT COAT IS APPLIED.

COMPLETED WORK:

1. SAMPLES: PREPARE 24" X 24" SAMPLE AREA FOR REVIEW.
2. MATCH APPROVED SAMPLES FOR COLOR, TEXTURE AND COVERAGE. REMOVE REFINISH OR REPAINT WORK NOT IN COMPLIANCE WITH SPECIFIED REQUIREMENTS.

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GENERAL NOTES AND SPECIFICATIONS

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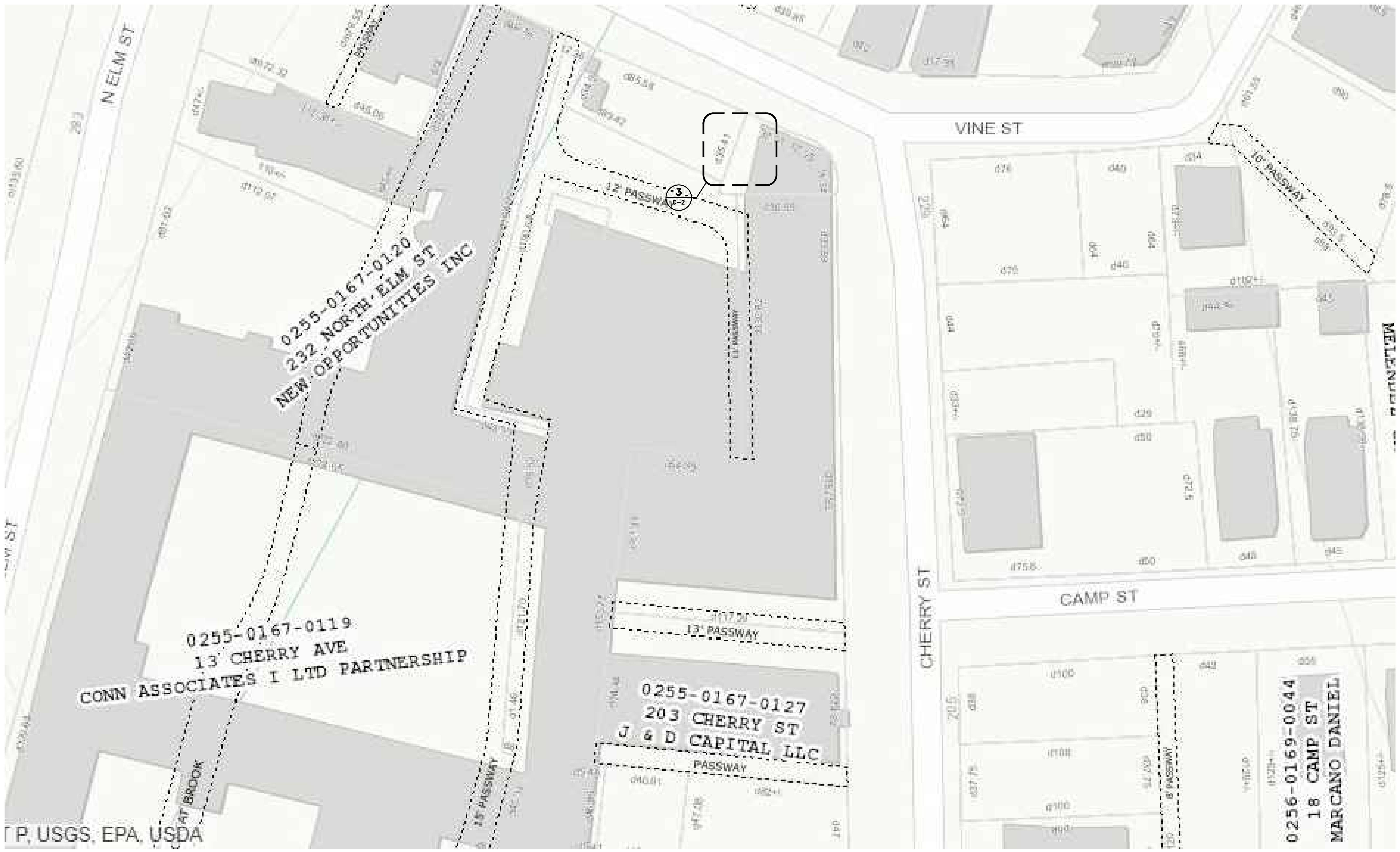
ANTENNA SCHEDULE

SECTOR	EXISTING/PROPOSED	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA ℄ HEIGHT	AZIMUTH	(E/P) RRU (QTY)	(E/P) TMA (QTY)	(QTY) PROPOSED COAX (LENGTH)
A1	EXISTING	RFS APXVAARR24_43-U-NA20	95.9 x 24.0 x 8.7	137'	40°	(E) RRU 4449 B71+B85 (1), (P) RRU 4415 B25 (1)	(E) TWIN STYLE TMAs (1), (P) DIPLEXER CBC1923Q-43 (1)	(2) 6x12 HYBRID CABLE (±175')
A2	EXISTING	ERICSSON AIR32 KRD901146-1_BGGA_B2A	56.6 x 12.8 x 8.6	137'	40°			
A3	PROPOSED	ERICSSON AIR6449 B41	33.1 x 20.6 x 8.6	137'	40°			
B1	EXISTING	RFS APXVAARR24_43-U-NA20	95.9 x 24.0 x 8.7	137'	140°	(E) RRU 4449 B71+B85 (1), (P) RRU 4415 B25 (1)	(E) TWIN STYLE TMAs (1), (P) DIPLEXER CBC1923Q-43 (1)	
B2	EXISTING	ERICSSON AIR32 KRD901146-1_BGGA_B2A	56.6 x 12.8 x 8.6	137'	140°			
B3	PROPOSED	ERICSSON AIR6449 B41	33.1 x 20.6 x 8.6	137'	140°			
C1	EXISTING	RFS APXVAARR24_43-U-NA20	95.9 x 24.0 x 8.7	137'	250°	(E) RRU 4449 B71+B85 (1), (P) RRU 4415 B25 (1)	(E) TWIN STYLE TMAs (1), (P) DIPLEXER CBC1923Q-43 (1)	
C2	EXISTING	ERICSSON AIR32 KRD901146-1_BGGA_B2A	56.6 x 12.8 x 8.6	137'	250°			
C3	PROPOSED	ERICSSON AIR6449 B41	33.1 x 20.6 x 8.6	137'	250°			



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

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SITE LOCATION PLAN

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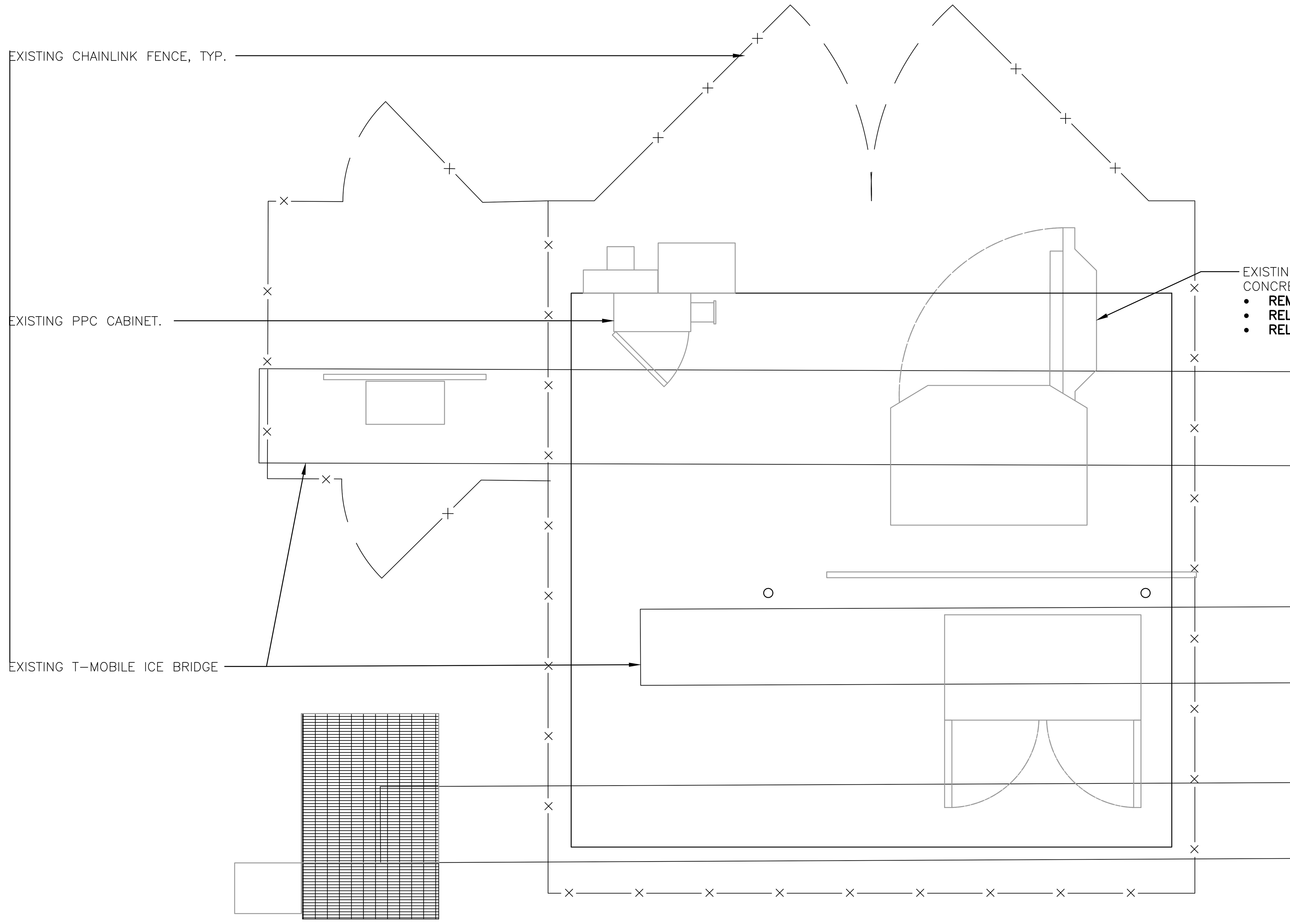
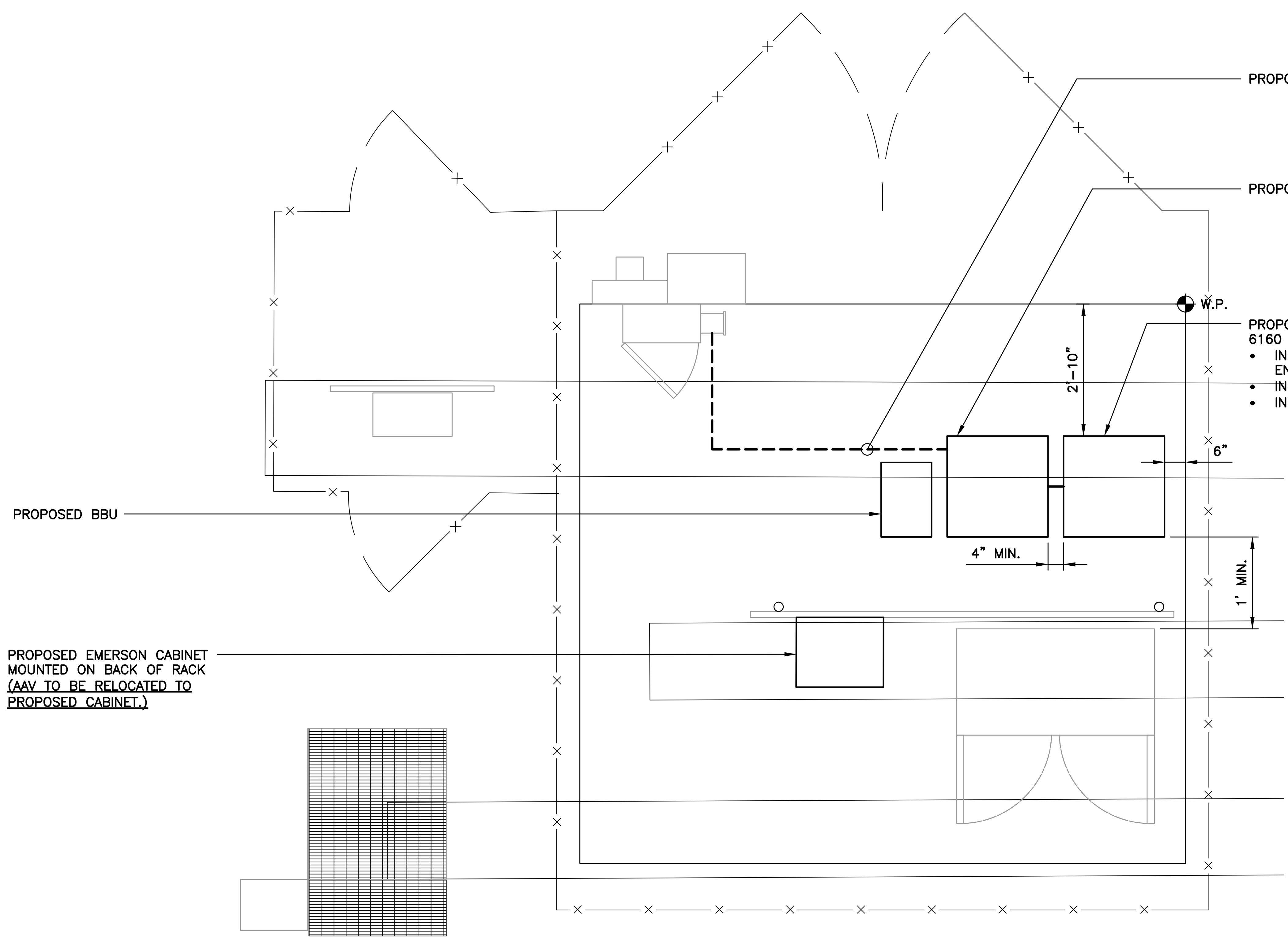
Sheet No. 3 of 8

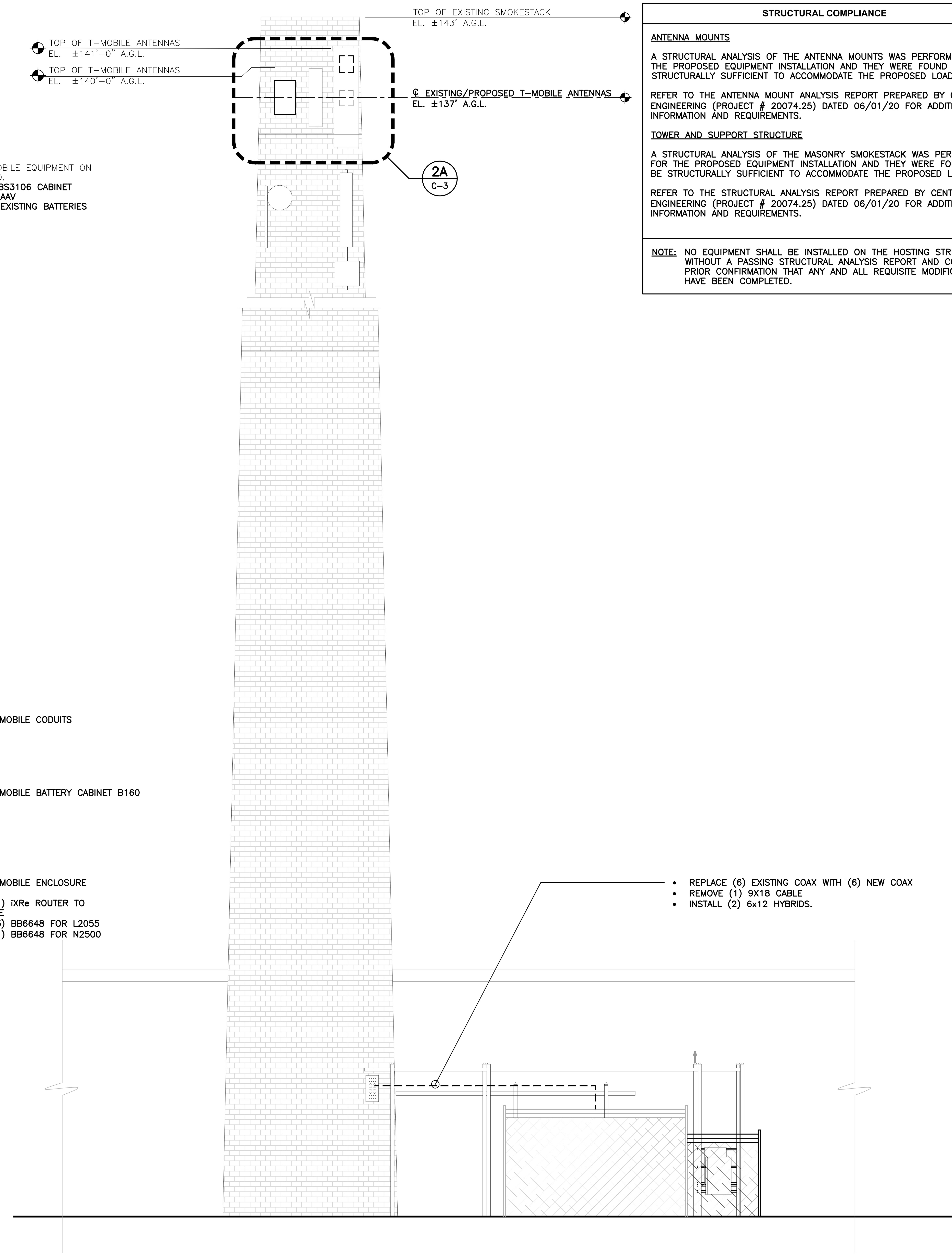


LEGEND
W.P. DENOTES WORKING POINT.

1 C-2 **EQUIPMENT PLAN - EXISTING**
SCALE: 1" = 5'
APPROXIMATE NORTH



2 C-2 **EQUIPMENT PLAN - PROPOSED**
SCALE: 1" = 5'
APPROXIMATE NORTH



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 # 20074.25) DATED 06/01/20 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

TOWER AND SUPPORT STRUCTURE

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

REFER TO THE STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 20074.25) DATED 06/01/20 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.

3 C-2 **SMOKESTACK ELEVATION - PROPOSED**
SCALE: 1" = 5'

GRAPHIC SCALE
5 0 2.5 5 10 20
1" = 5'-0"

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COMPOUND PLAN, EQUIPMENT PLAN, AND ELEVATION

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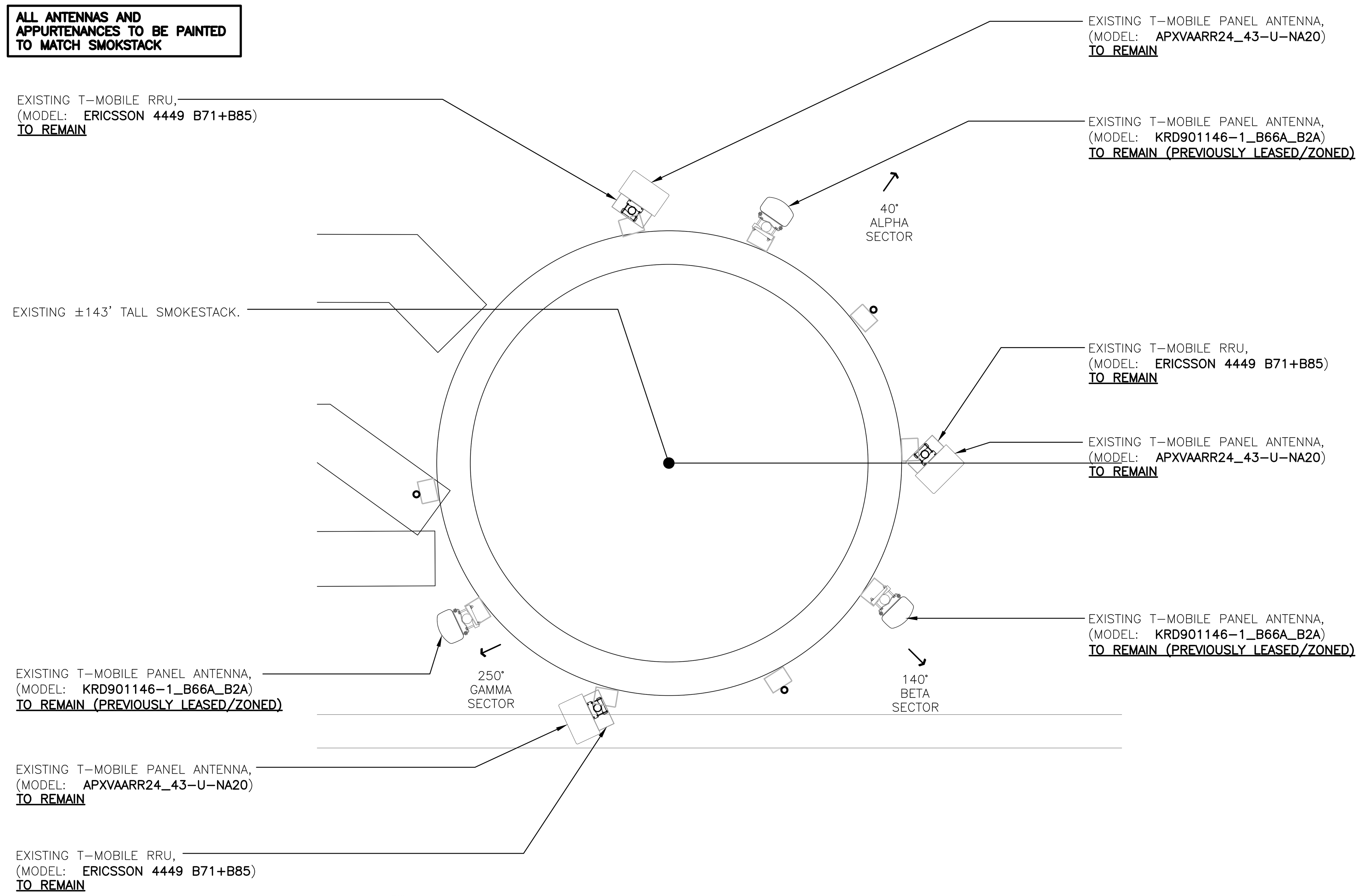
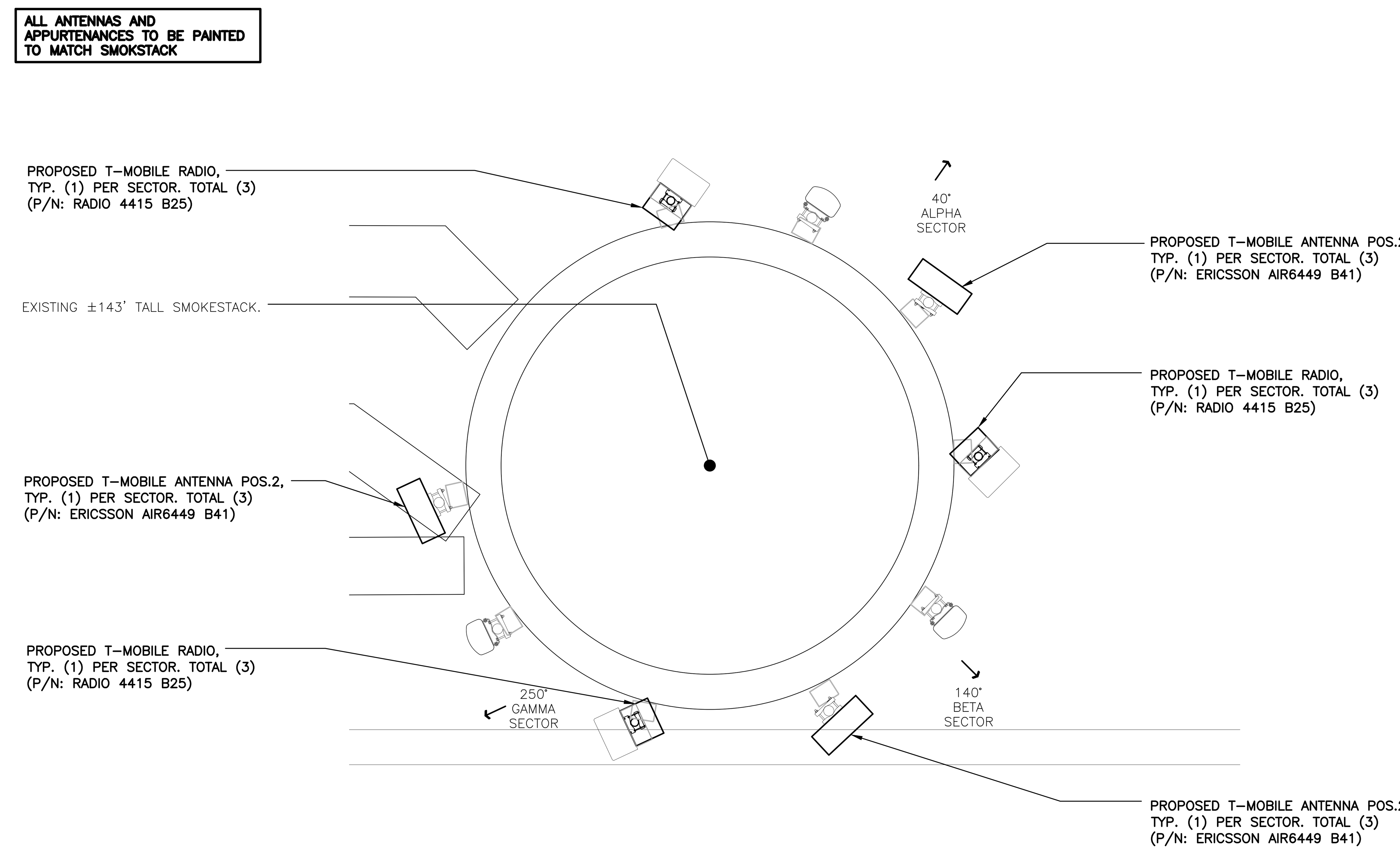


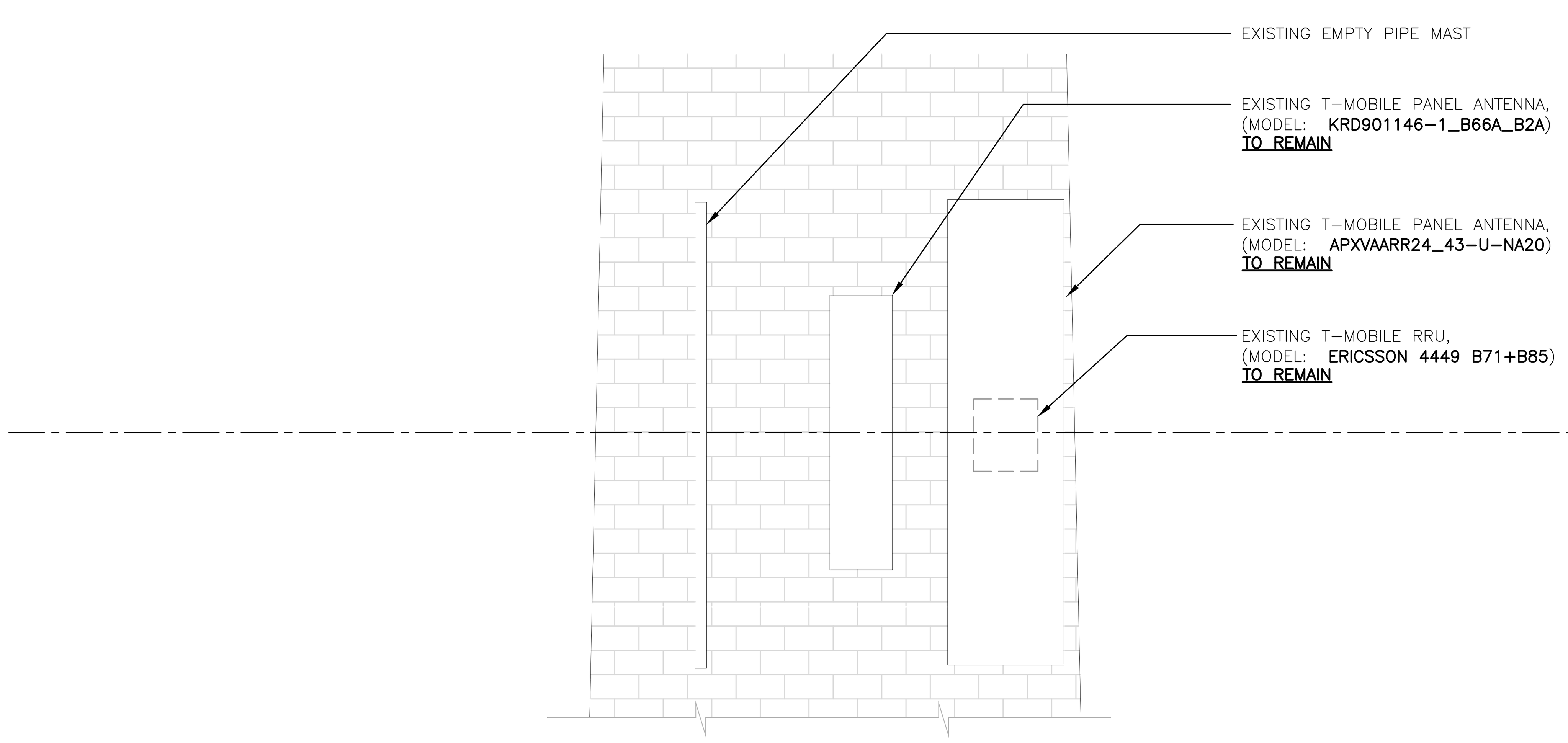
1 C-3 EQUIPMENT AND ANTENNA PLAN - EXISTING

SCALE: 3/8" = 1'



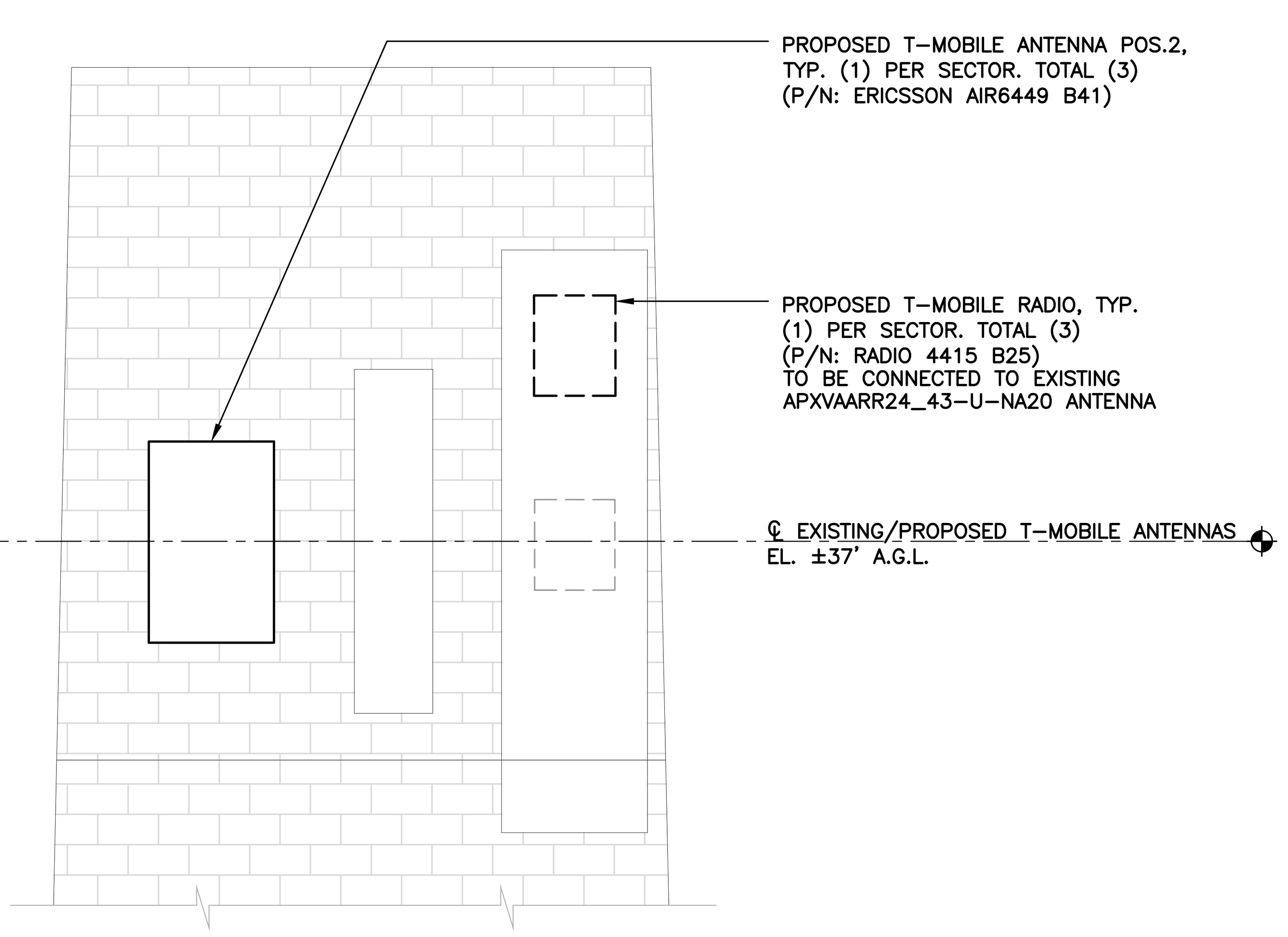
2 C-3 EQUIPMENT AND ANTENNA PLAN - PROPOSED

SCALE: 1/2" = 1'



1A C-3 ANTENNA ELEVATION - EXISTING

SCALE: 1/2" = 1'



2A C-3 ANTENNA ELEVATION - PROPOSED

SCALE: 1/2" = 1'

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ANTENNA PLANS

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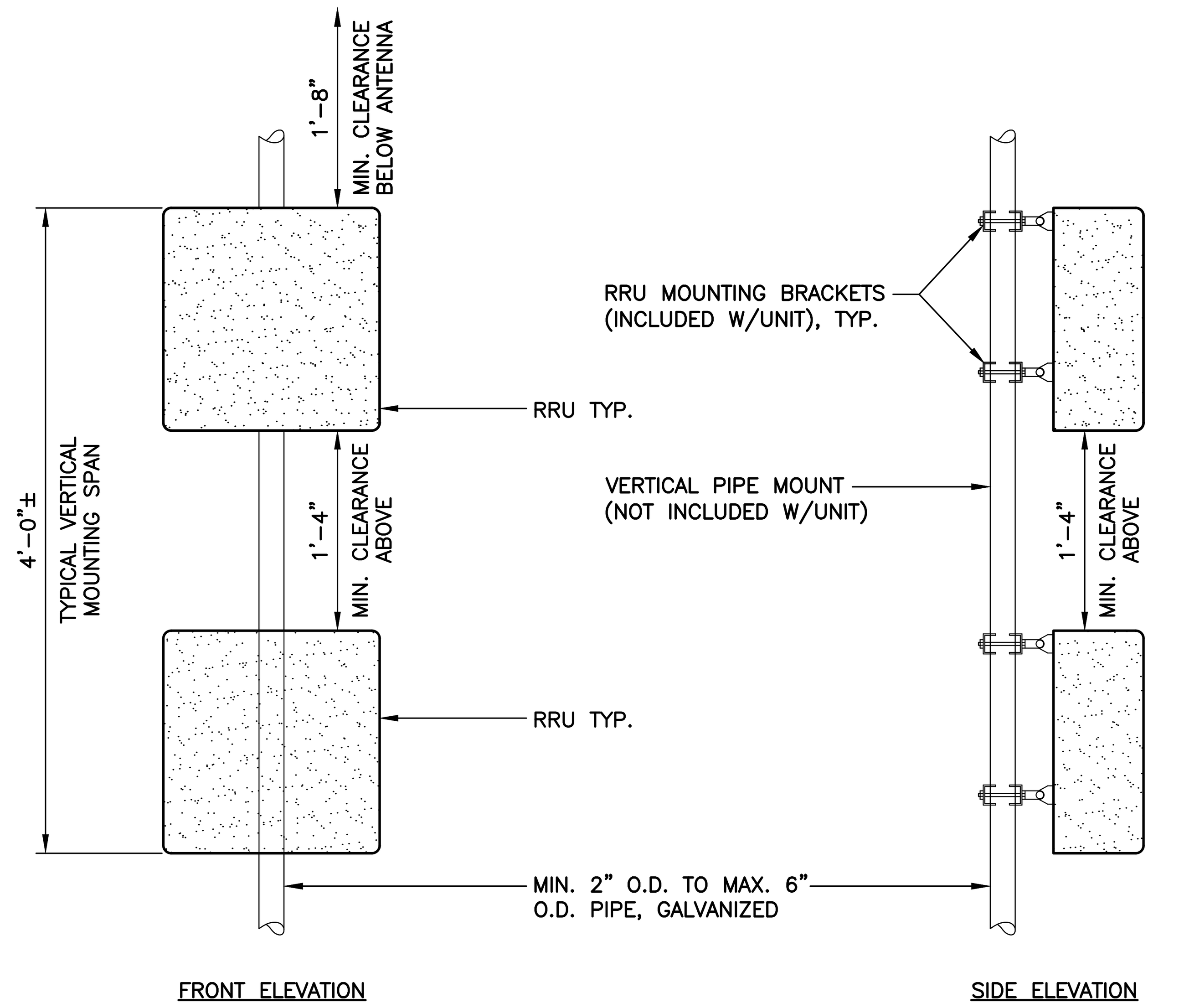
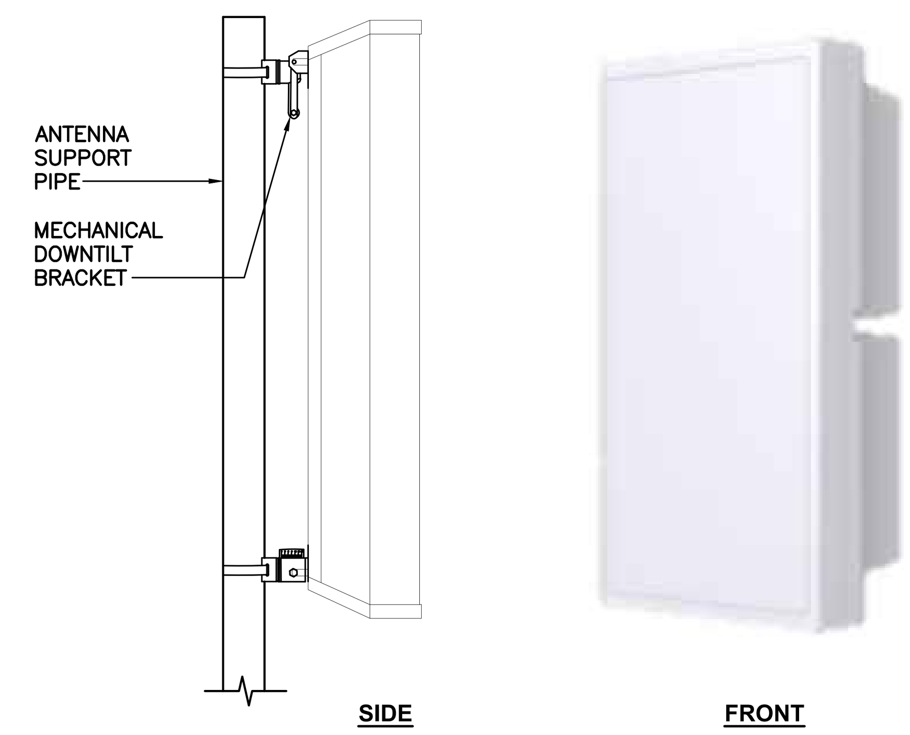


NOTES:

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

1 C-4 **TYPICAL RRUS MOUNTING DETAILS**
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 C-4 **PROPOSED ANTENNA DETAIL**
SCALE: NOT TO SCALE

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4415 B25	14.9"L x 13.2"W x 5.4"D	±46 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 C-4 **PROPOSED RRU DETAIL**
SCALE: NOT TO SCALE

EQUIPMENT CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: ENCLOSURE 6160	62.0"H x 26.0"W x 26.0"D	±1200 LBS

4 C-4 **ENCLOSURE 6160 (OUTDOOR)**
SCALE: NOT TO SCALE

EQUIPMENT CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: BATTERY CABINET B160	62.0"H x 26.0"W x 26.0"D	±1883 LBS

5 C-4 **BATTERY CABINET DETAIL**
NOT TO SCALE

Specifications

Maximum Battery Size	190Ah
Maximum Number of Batteries	4
Internal Circuit Breaker Rating (Optional)	200 Amperes Max
Input Circuit Breaker Rating	200 Amperes Max
Input Connections	1/4" inch 2 hole 5/8 inch Spacing
Expansion	Modular / Stringable
Temp Control	Direct Contact Heater Mat Convection Cooled
Local Safety Ground Connection	1/4" inch 2 hole 5/8 inch Spacing
Enclosure Rating	Outdoor
Access Restriction	Front Hatch 5/32 Allen
Dimensions Height Width Depth	Body 32.245" 14.040" 26.306"
Unit Weight / Shipping Weight	60 lbs / 65 lbs
Paint	Almond Powder Coat
Construction	Aluminum

6 C-4 **BATTERY CABINET DETAIL**
NOT TO SCALE

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TYPICAL EQUIPMENT DETAILS

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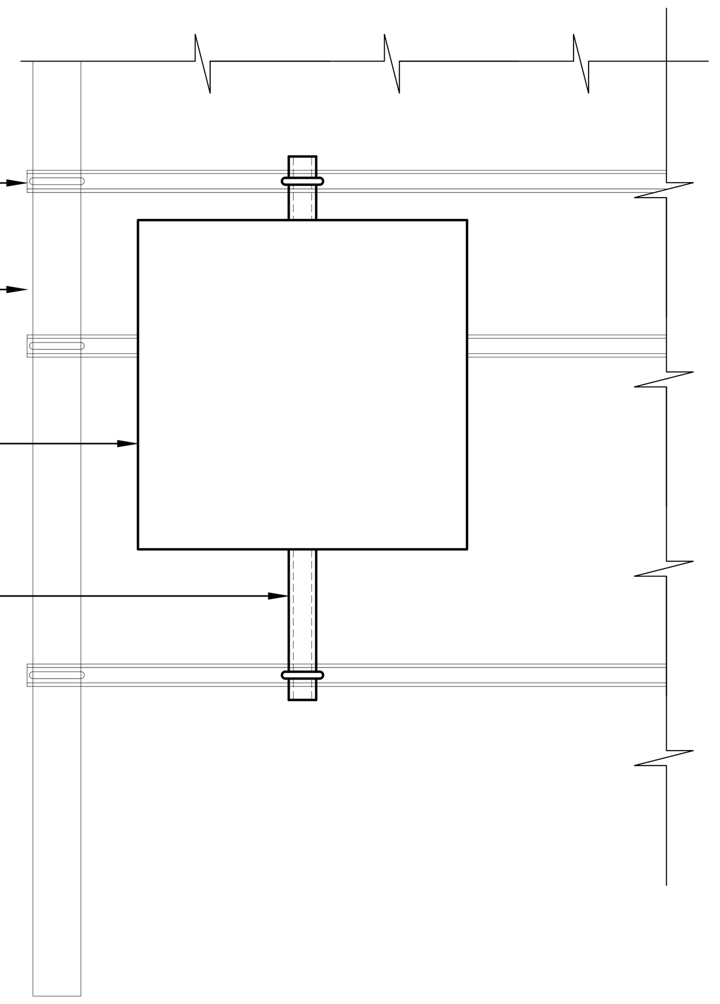
Sheet No. 6 of 8

EXISTING UNISTRUT, TYP.

EXISTING ICE BRIDGE POST.

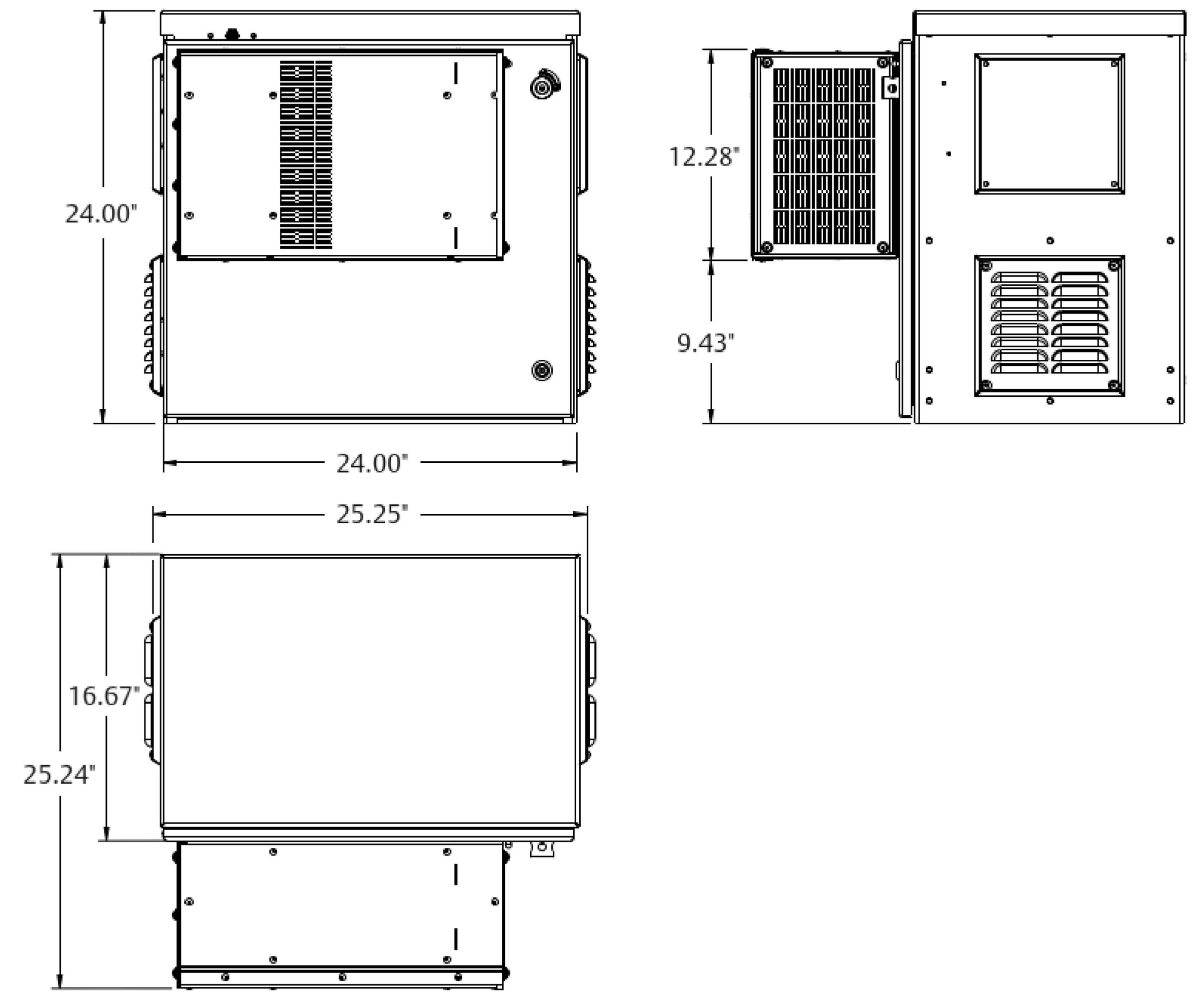
PROPOSED EMERSON CABINET

PROPOSED PIPE 2.0 STD MAST U-BOLTED TO EXISTING UNISTRUT



1 C-5 **TYPICAL EMERSON CABINET MOUNTING DETAIL**

SCALE: NOT TO SCALE



EMERSON CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: EMERSON MODEL: COMPACT 2416	24"L x 24"W x 16"D	±64 LBS.

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

2 C-5 **PROPOSED EMERSON CABINET**

SCALE: NOT TO SCALE

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TYPICAL EQUIPMENT DETAILS

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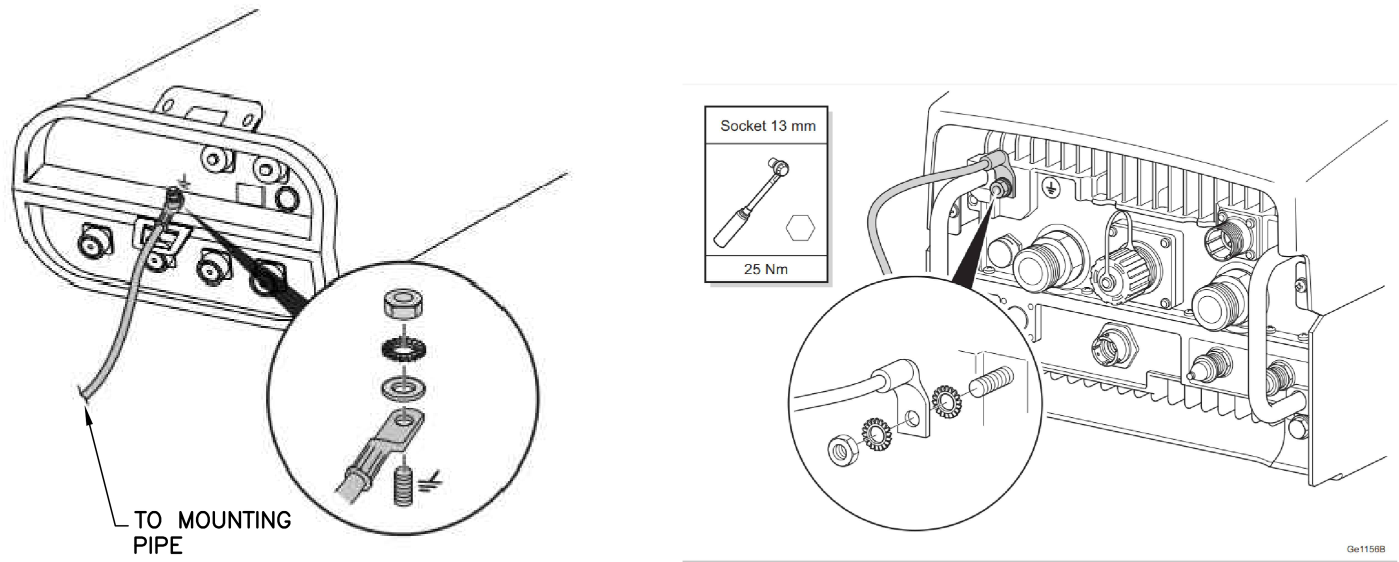
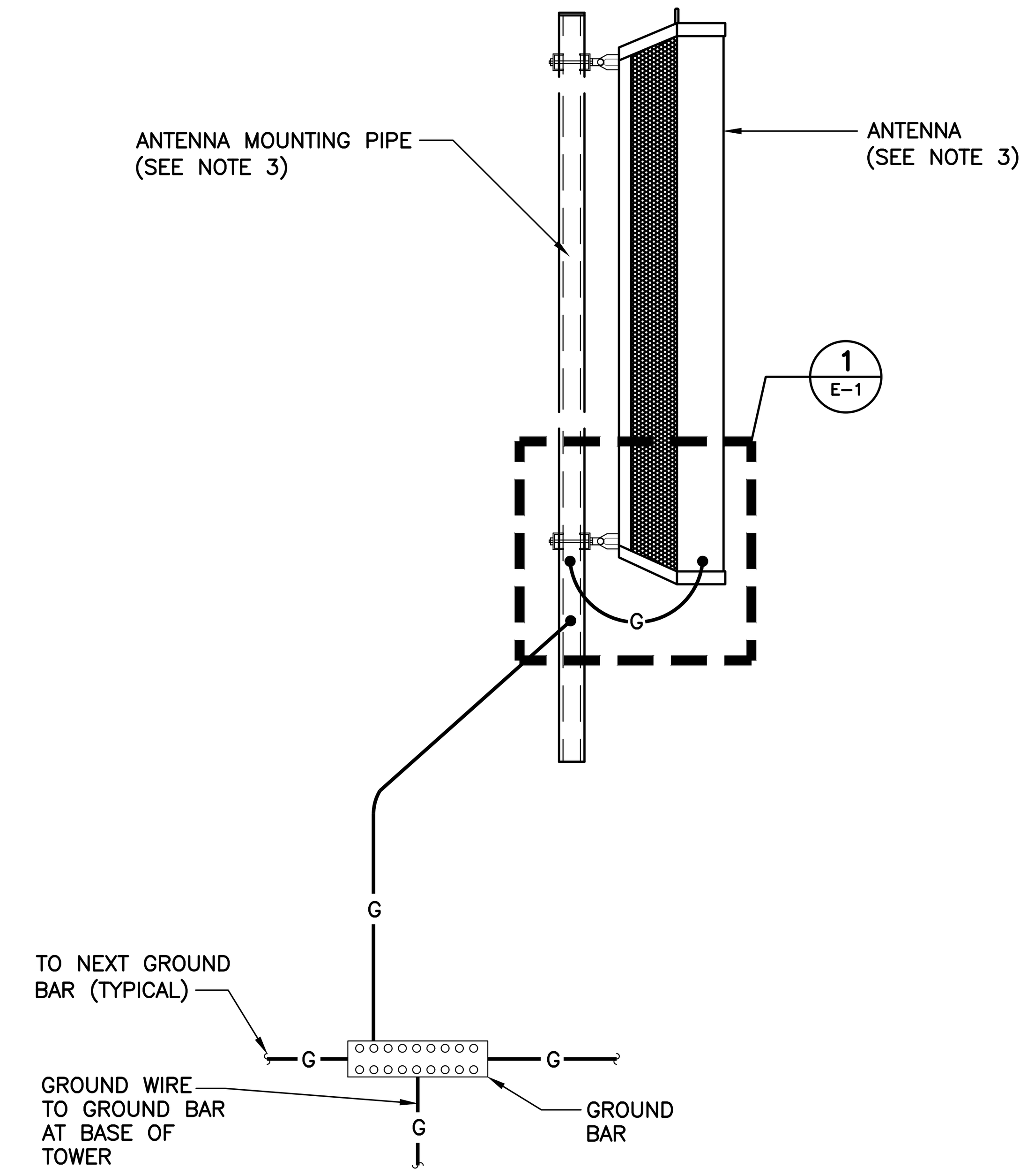


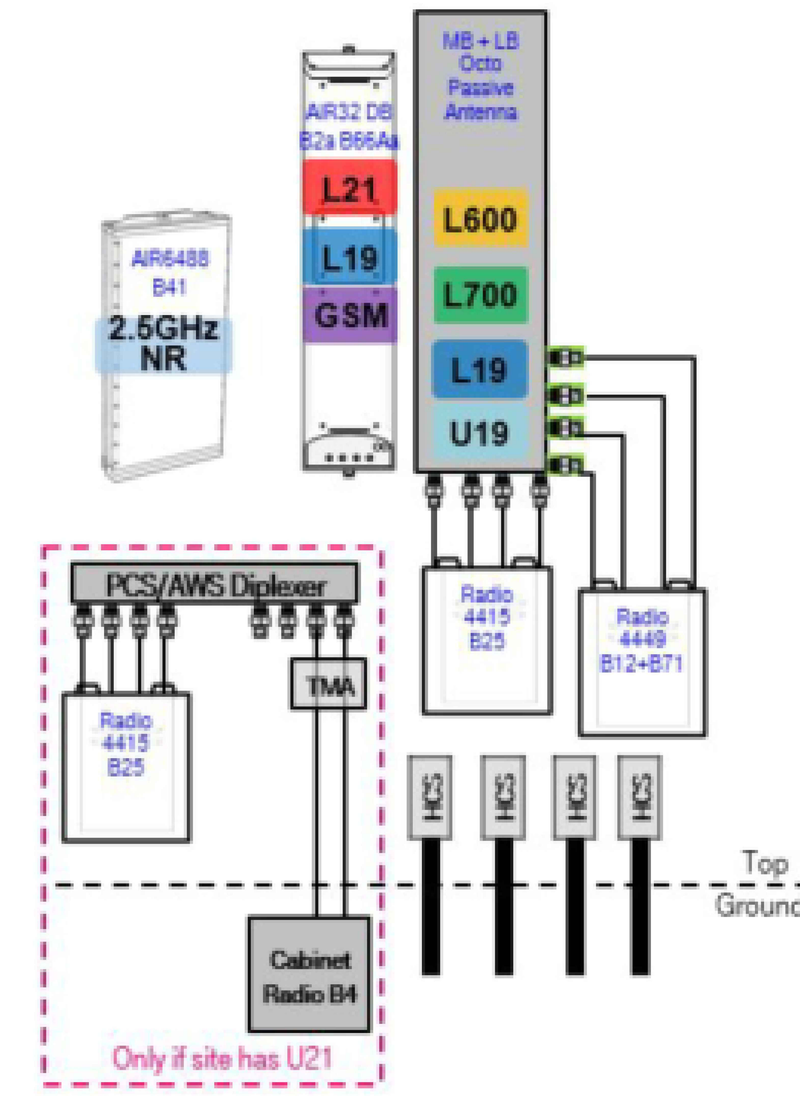
1 E-1 **TYPICAL ANTENNA/RRU GROUNDING DETAILS**
SCALE: NOT TO SCALE



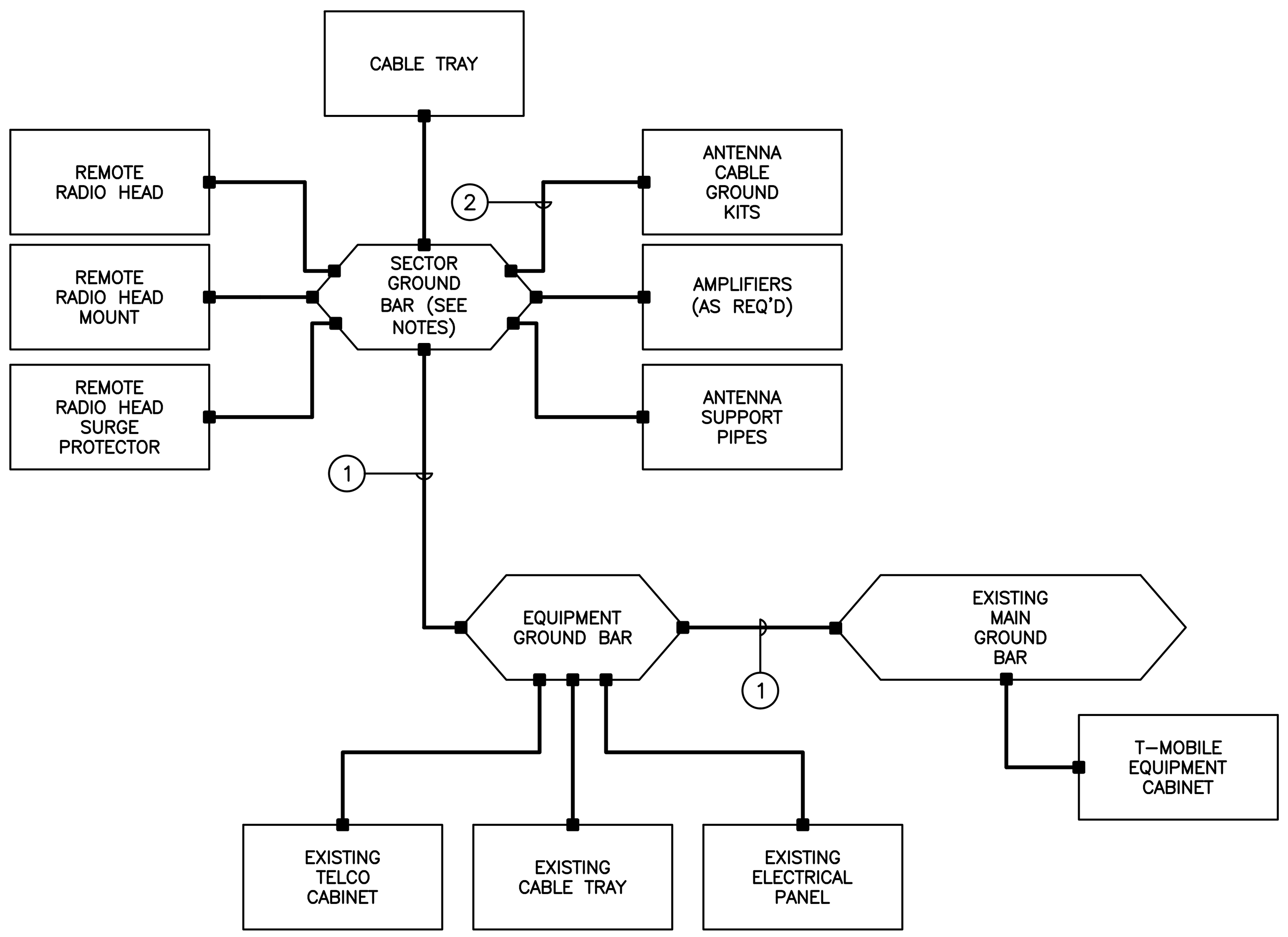
NOTES:

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

2 E-1 **TYPICAL ANTENNA GROUNDING DETAIL**
SCALE: NOT TO SCALE



3 E-1 **PROPOSED PLUMBING DIAGRAM**
SCALE: NOT TO SCALE



GROUNDING SCHEMATIC NOTES

1. #2 AWG
2. #6 AWG

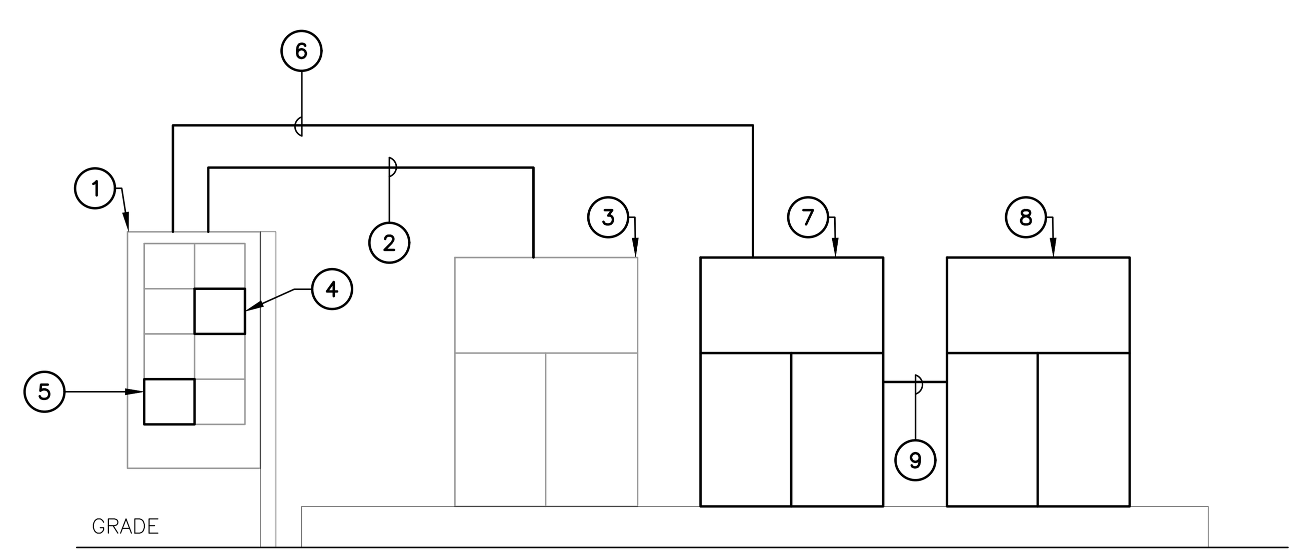
GENERAL NOTES:

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

4 E-1 **TYPICAL GROUNDING SCHEMATIC DETAIL**
SCALE: NOT TO SCALE

RISER DIAGRAM NOTES

1. EXISTING 200A PPC CABINET TO REMAIN.
2. EXISTING CONDUITS AND CONDUCTORS TO REMAIN.
3. EXISTING EQUIPMENT CABINET TO REMAIN.
4. EXISTING 125A/2P CIRCUIT BREAKER SERVING EXISTING EQUIPMENT CABINET TO BE REMOVED AND REPLACED WITH NEW 100A/2P CIRCUIT BREAKER. COORDINATE CABINET DOWNGRADE WITH CONSTRUCTION MANAGER.
5. NEW 100A/2P CIRCUIT BREAKER TO SERVE NEW EQUIPMENT CABINET.
6. (3) #1 AWG, (1) #8 AWG GROUND, 1-1/4" CONDUIT.
7. NEW RADIO EQUIPMENT CABINET.
8. NEW BATTERY CABINET.
9. DC CONDUIT AND CONDUCTORS FOR BATTERY CABINET CONNECTION PER MANUFACTURERS SPECIFICATIONS.



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

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TYPICAL ELECTRICAL DETAILS

E-1

Sheet No. 8 of 8

Exhibit D

Structural Analysis Report

Centered on Solutions℠

Structural Analysis Report

143-ft Existing Masonry Smokestack

T-Mobile Site Ref: CTNH332C

39 Cherry Street
Waterbury, CT 06702

Centek Project No. 20074.25

Date: June 1, 2020

Max Stress Ratio = 31.0%

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

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

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- GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

SECTION 3 – CALCULATIONS

- WIND LOADING
- SMOKESTACK ANALYSIS

SECTION 4 – REFERENCES

- RF DATA SHEET

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 143-ft tall masonry smokestack. The smokestack geometry and structural information was obtained from a structural report prepared by International Chimney Corporation dated May 3, 2006.

Equipment Installation Summary

- T-MOBILE (Existing to Remain):
  Antennas: Three (3) Ericsson AIR32 panel antennas, three (3) RFS APXVAARR24-43-U-NA20 panel antennas, three (3) Ericsson 4449 B71 B12 remote radio heads and three (3) TMAs mounted on steel pipe frames attached to the smokestack with a RAD center elevation of +/- 137-ft AGL.
  Cables: Six (6) 1-5/8" diameter coax cables and one (1) 6x12 hybrid cable routed within the existing smokestack.
- **T-MOBILE (Existing to Remove):**
  Antennas: Three (3) TMAs mounted on steel pipe frames attached to the smokestack with a RAD center elevation of +/- 137-ft AGL.
  Cables: Six (6) 1-5/8" diameter coax cables and one (1) 9x18 hybrid cable routed within the existing smokestack.
- **T-MOBILE (Proposed):**
  Antennas: Three (3) Ericsson AIR6449 panel antennas, three (3) Ericsson 4415 remote radio units and three (3) Commscope CBC1923Q-43 diplexers mounted on steel pipe frames attached to the smokestack with a RAD center elevation of +/- 137-ft AGL.
  Cables: Two (2) 6x12 hybrid cables routed within the existing 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:	Vult = 125 mph	*[Appendix N of the 2016 CT Building Code]*
Exposure Category:	B	
Risk Category	II	*[ASCE 7-10, Table 1.5-1]*

Results

Smokestack:

Component	Stress Ratio (percentage of capacity)	Result
Compression	31.0%	**PASS**
Tension of Mortar	27.0%	**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

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 2012, CSBC 2016 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 =	$Height := 143$ ft	(User Input)	
Horizontal Dimension of Structure =	$Width := 11$ ft	(User Input)	

Terrain Exposure Constants:

Nominal Height of the Atmospheric Boundary Layer = $zg := \begin{cases} 1200 & \text{if } Exp = B \\ 900 & \text{if } Exp = C \\ 700 & \text{if } Exp = D \end{cases} = 1.2 \times 10^3$ (Table 26.9-1)

3-Sec Gust Speed Power Law Exponent = $\alpha := \begin{cases} 7 & \text{if } Exp = B \\ 9.5 & \text{if } Exp = C \\ 11.5 & \text{if } Exp = D \end{cases} = 7$ (Table 26.9-1)

Integral Length Scale Factor = $l := \begin{cases} 320 & \text{if } Exp = B \\ 500 & \text{if } Exp = C \\ 650 & \text{if } Exp = D \end{cases} = 320$ (Table 26.9-1)

Integral Length Scale Power Law Exponent = $E := \begin{cases} \frac{1}{3} & \text{if } Exp = B \\ \frac{1}{5} & \text{if } Exp = C \\ \frac{1}{8} & \text{if } Exp = D \end{cases} = 0.333$ (Table 26.9-1)

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

Exposure Constant = $z_{min} := \begin{cases} 30 & \text{if } Exp = B \\ 15 & \text{if } Exp = C \\ 7 & \text{if } Exp = D \end{cases} = 30$ (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 =	$g_Q := 3.4$	(Sec 26.9.4)
Peak Factor for Wind Response =	$g_v := 3.4$	(Sec 26.9.4)

Equivalent Height of Structure =	$z := \begin{cases} Z_{min} & \text{if } Z_{min} > 0.6 \cdot Height \\ 0.6 \cdot Height & \text{otherwise} \end{cases} = 85.8$	(Sec 26.9.4)
Intensity of Turbulence =	$I_z := c \cdot \left(\frac{33}{z}\right)^{\left(\frac{1}{6}\right)} = 0.256$	(Eq. 26.9-7)
Integral Length Scale of Turbulence =	$L_z := l \cdot \left(\frac{z}{33}\right)^{E} = 440.022$	(Eq. 26.9-9)
Background Response Factor =	$Q := \sqrt{\frac{1}{1 + 0.63\left(\frac{Width + Height}{L_z}\right)^{0.63}}} = 0.869$	(Eq. 26.9-8)
Gust Response Factor =	$G := 0.925 \cdot \left[\frac{(1 + 1.7 \cdot g_Q \cdot I_z \cdot Q)}{1 + 1.7 \cdot g_v \cdot I_z}\right] = 0.853$	(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 =	$C_f = 0.833$	(Fig 29.5-1 - 29.5-3)
Ultimate Wind Pressure =	$F := q_z \cdot G \cdot C_f = 27$ psf	

Height Above Grade = $Z := 132$ ft (User Input)

Exposure Coefficient =

$$K_z := \begin{cases} 2.01\left(\frac{Z}{zg}\right)^{\left(\frac{2}{\alpha}\right)} & \text{if } 15 \le Z \le zg \\ 2.01\left(\frac{15}{zg}\right)^{\left(\frac{2}{\alpha}\right)} & \text{if } Z < 15 \end{cases} = 1.07$$

(Table 29.3-1)

$K_z = 1.07$

Height Above Grade = $Z := 105$ ft (User Input)

Exposure Coefficient =

$$K_z := \begin{cases} 2.01\left(\frac{Z}{zg}\right)^{\left(\frac{2}{\alpha}\right)} & \text{if } 15 \le Z \le zg \\ 2.01\left(\frac{15}{zg}\right)^{\left(\frac{2}{\alpha}\right)} & \text{if } Z < 15 \end{cases} = 1$$

(Table 29.3-1)

$K_z = 1.002$

Height Above Grade = $Z := 80$ ft (User Input)

Exposure Coefficient = $K_z := \begin{cases} 2.01\left(\frac{Z}{zg}\right)^{\left(\frac{2}{\alpha}\right)} & \text{if } 15 \le Z \le zg \\ 2.01\left(\frac{15}{zg}\right)^{\left(\frac{2}{\alpha}\right)} & \text{if } Z < 15 \end{cases} = 0.93$ (Table 29.3-1)

$K_z = 0.927$

Height Above Grade = $Z := 5$ ft (User Input)

Exposure Coefficient = $K_z := \begin{cases} 2.01\left(\frac{Z}{zg}\right)^{\left(\frac{2}{\alpha}\right)} & \text{if } 15 \le Z \le zg \\ 2.01\left(\frac{15}{zg}\right)^{\left(\frac{2}{\alpha}\right)} & \text{if } Z < 15 \end{cases} = 0.57$ (Table 29.3-1)

$K_z = 0.575$

Height Above Grade = $Z := 30$ ft (User Input)

Exposure Coefficient = $K_z := \begin{cases} 2.01\left(\frac{Z}{zg}\right)^{\left(\frac{2}{\alpha}\right)} & \text{if } 15 \le Z \le zg \\ 2.01\left(\frac{15}{zg}\right)^{\left(\frac{2}{\alpha}\right)} & \text{if } Z < 15 \end{cases} = 0.7$ (Table 29.3-1)

$K_z = 0.701$

Height Above Grade = $Z := 10$ ft (User Input)

Exposure Coefficient = $K_z := \begin{cases} 2.01\left(\frac{Z}{zg}\right)^{\left(\frac{2}{\alpha}\right)} & \text{if } 15 \le Z \le zg \\ 2.01\left(\frac{15}{zg}\right)^{\left(\frac{2}{\alpha}\right)} & \text{if } Z < 15 \end{cases} = 0.57$ (Table 29.3-1)

$K_z = 0.575$

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63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Job :	CTNH332C	Project No.	20074.25	Sheet	1 of 2
Address:	39 Cherry Street Waterbury, CT 06702	Computed by	TJL	Date	6/1/20
Description:	Smokestack Evaluation	Checked by	CAG	Date	

	Wind Force (lb)	Weight (lb)	Height Above Base (ft)	Height (in)
T-Mobile	2300	2750	137	1644
Clearwire	500	800	127	1524
MetroPCS	350	350	110	1320

Section	Top Dia (in)	Bot Dia (in)	Wall Thk (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	95.3	107.5	10	288	3061.5	478.05002	120	57366.00208	60916.00208	19.9
2	107.5	123	11	360	3868.48	749.73175	120	89967.81029	151233.8124	39.1
3	123	133.4	13	240	4914.728	652.74226	120	78329.07068	229562.8831	46.7
4	133.4	149	17	360	7046.16	1380.4087	120	165649.0383	395211.9213	56.1
5	149	159.3	20	240	8748.04	1169.4094	120	140329.1243	535541.0457	61.2
6	159.3	169.7	24	240	10979.952	1469.7161	120	176365.9364	711906.9821	64.8

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Job :	CTNH332C	Project No.	18058.50	Sheet	2 of 2
Address:	39 Cherry Street Waterbury, CT 06702	Computed by	TJL	Date	6/1/20
Description:	Smokestack Evaluation	Checked by	CAG	Date	

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	
27	16.2	1.07	202.8	3515.3	1017408.269	68394.26599	14.9	375	500	0.08	OK	-5.0	30	-0.17	OK
27	16.2	1.002	288.1	4677.0	4216781.786	99581.90894	42.3	375	500	0.19	OK	3.3	30	0.11	OK
27	16.2	0.927	213.7	3208.7	7323978.83	135073.5991	54.2	375	500	0.23	OK	7.5	30	0.25	OK
27	16.2	0.833	353.0	4763.6	13419790.48	209410.4565	64.1	375	500	0.28	OK	8.0	30	0.27	OK
27	16.2	0.701	256.9	2917.6	18405407.82	271893.3941	67.7	375	500	0.30	OK	6.5	30	0.22	OK
27	16.2	0.575	274.2	2553.9	24047600.31	352699.254	68.2	375	500	0.31	OK	3.3	30	0.11	OK

RAN Template: 67D5997DB Hybrid	**A&L Template:** 67D5997DB_2xAIR+1OP

CTNH332C_Anchor_4_draft

Print Name: Preliminary (RFDS_for_scoping)
PORs: Anchor_Phase 3

Section 1 - Site Information

Site ID: CTNH332C
Status: Draft
Version: 4
Project Type: Anchor
Approved: Not Approved
Approved By: Not Approved
Last Modified: 5/18/2020 10:44:23 AM
Last Modified By: Michael.Lucey@T-Mobile.com

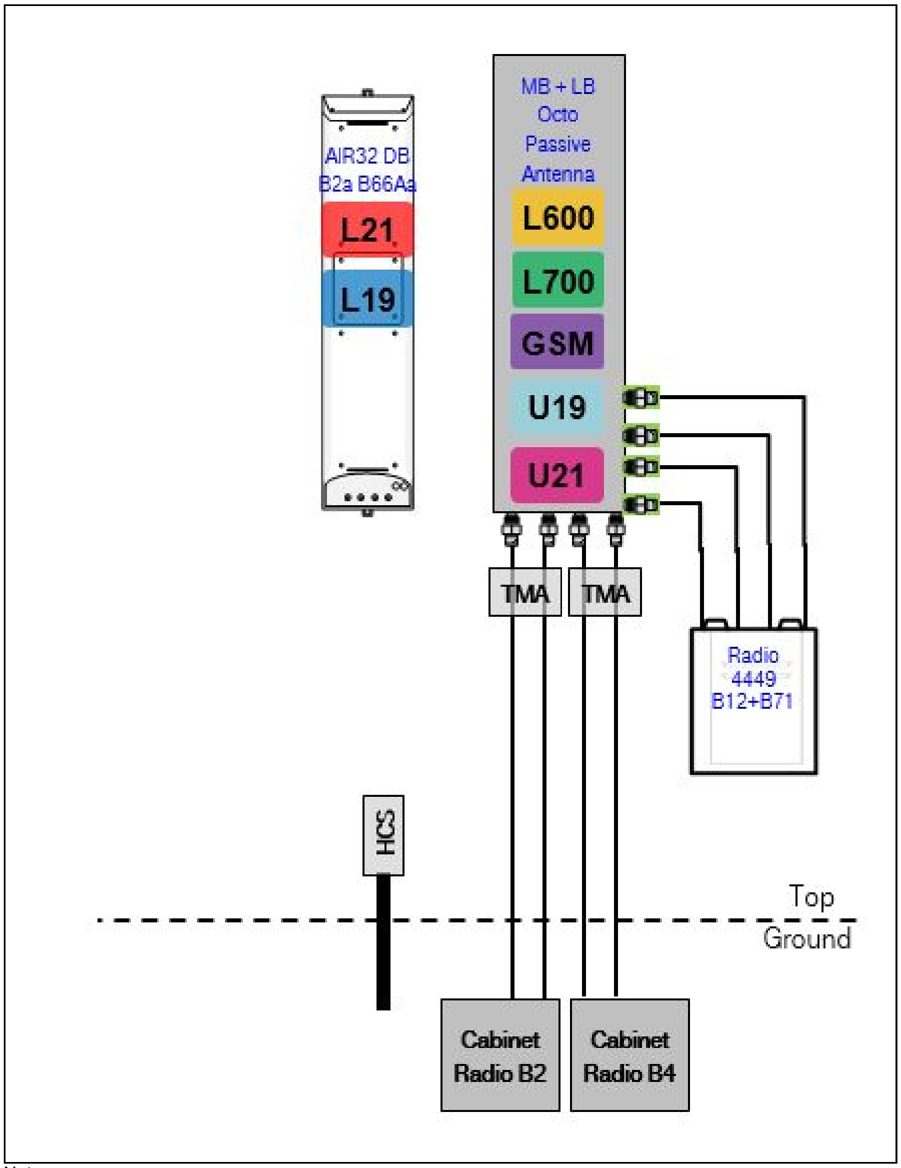
Site Name: NH332/CherrySmokestack
Site Class: Smokestack
Site Type: Structure Non Building
Plan Year: 2020
Market: CONNECTICUT CT
Vendor: Ericsson
Landlord: Yogi Shaw

Latitude: 41.55952300
Longitude: -73.03427500
Address: 39 Cherry Street
City, State: Waterbury, CT
Region: NORTHEAST

RAN Template: 67D5997DB Hybrid	**AL Template:** 67D5997DB_2xAIR+1OP			
Sector Count: 3	**Antenna Count:** 9	**Coax Line Count:** 6	**TMA Count:** 3	**RRU Count:** 6

Section 2 - Existing Template Images

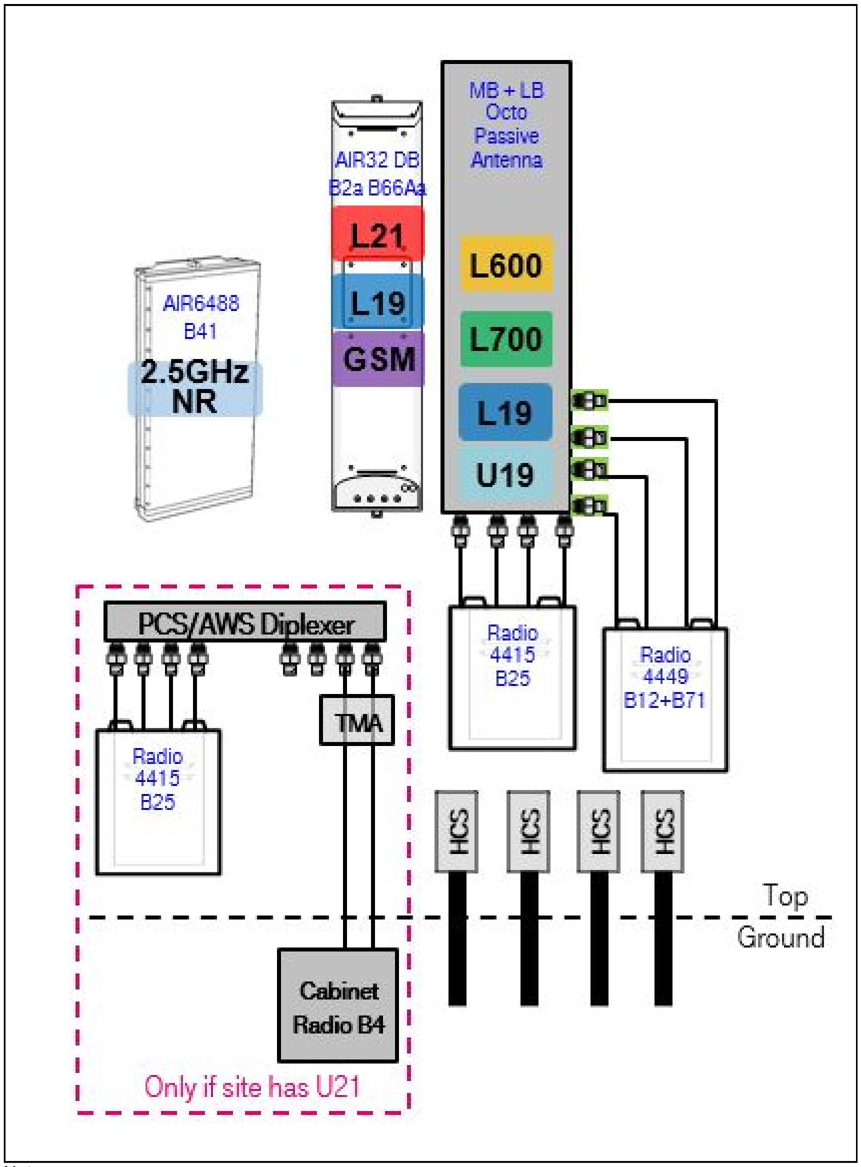
67D94DB_1xAIR+1OP.JPG



Notes:

Section 3 - Proposed Template Images

67D5997DB_2xAIR+1OP.JPG



Notes:

Section 4 - Siteplan Images

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

RAN Template:	A&L Template:
67D5997DB Hybrid	67D5997DB_2xAIR+1OP

CTNH332C_Anchor_4_draft

Print Name: Preliminary (RFDS_for_scoping)
PORs: Anchor_Phase 3

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 67D94DB Hybrid (evolved from 4B)

Enclosure	1	2
Enclosure Type	RBS 6102	Ancillary Equipment (Ericsson)
Baseband	DUW30 (U2100); DUW30 (U1900); DUG20 (G1900); BB 6630 (L700, L600, L2100, L1900); BB 6630 (N600)	
Hybrid Cable System		Ericsson 6x12 HCS *Select Length & AWG* Ericsson 9x18 HCS *Select Length*
Multiplexer	XMU	
Radio	RUS01 B2 **(x 3)** (G1900); RUS01 B2 **(x 3)** (U1900); RUS01 B4 **(x 6)** (U2100)	

Proposed RAN Equipment

Template: 67D5997DB Hybrid

Enclosure	1	2	3	4
Enclosure Type	RBS 6102	Ancillary Equipment (Ericsson)	Enclosure 6160	B160
Baseband	DUW30 (U2100); DUW30 (U1900); DUG20 (G1900); BB 6630 (L2100, L1900, L700, L600); BB 6630 (N600)		BB 6630 **(x 3)** (L2500); BB 6648 (N2500)	
Hybrid Cable System		Ericsson 6x12 HCS *Select Length & AWG*	Ericsson 6x12 HCS *Select AWG & Length* **(x 2)**	
Radio	RUS01 B2 **(x 6)**; RUS01 B4 **(x 6)** (U2100)			

RAN Scope of Work:

Remove RBS3106, and relocate AAV.

Relocate existing equipment to accommodate new cabinets.

RUS01 B2 for GSM and U1900 will become dark. GSM will move to the B2 Radios in the AIR32 DB, which will be shared with L1900 1st Carrier. U1900 will move to the new Radio 4415 B25, which will be shared with L1900 2nd Carrier.

Add (1) Enclosure 6160.

Add (1) Battery Cabinet B160.

Add (1) iXRe Router to new Enclosure 6160.

Add (3) BB6630 for L2500 to new Enclosure 6160.

Add (1) BB6648 for N2500 to new Enclosure 6160.

Existing: (12) 1 5/8 coax and (1) 6x12 HCS and (1) 9X18 HCS.

Remove (6) Coaxial Lines for new total of (6) Coaxial Lines.

Remove 9X18 HCS.

Add (2) 6X12 HCS. Length of new HCS will match that of existing HCS.

RAN Template:	A&L Template:
67D5997DB Hybrid	67D5997DB_2xAIR+1OP

CTNH332C_Anchor_4_draft

Print Name: Preliminary (RFDS_for_scoping)
PORs: Anchor_Phase 3

Section 6 - A&L Equipment

Existing Template: 67D94DB_1xAIR+1OP
Proposed Template: 67D5997DB_2xAIR+1OP

Sector (Existing) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1				2			
Antenna Model	RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	40				40			
M. Tilt								
Height	137				137			
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L700 L600 N600	L700 L600 N600	U1900 G1900	U2100	L2100	L2100	L1900	L1900
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt	2	2	2	2	2		2	
Cables	Coax Jumper **(x2)**	Coax Jumper **(x2)**	1-5/8" Coax - 175 ft. **(x2)** Coax Jumper **(x2)**	1-5/8" Coax - 175 ft. **(x2)** Coax Jumper **(x2)**				
TMAs			Generic Twin Style 1A - PCS (AtAntenna)	Generic Twin Style 1B - AWS (AtAntenna)				
Diplexers / Combiners								
Radio	Radio 4449 B71+B85 (At Antenna)							
Sector Equipment								

Unconnected Equipment:

Scope of Work:

RAN Template:	**A&L Template:**
67D5997DB Hybrid	67D5997DB_2xAIR+1OP

CTNH332C_Anchor_4_draft

Print Name: Preliminary (RFDS_for_scoping)
PORs: Anchor_Phase 3

Sector (Proposed) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1				2				3	
Antenna Model	RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	40				40				40	
M. Tilt	0				0				0	
Height	137				137				137	
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**
Active Tech.	L700 L600 N600	L700 L600 N600	L1900 U1900	U2100 L1900	L2100	L2100	G1900 L1900	L1900	L2500 N2500	L2500 N2500
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt	2	2	2	2	2	2	2	2	2	2
Cables	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**	1-5/8" Coax - 175 ft. **(x2)** Coax Jumper **(x2)**						
TMAs				Generic Twin Style 1B - AWS (AtAntenna)						
Diplexers / Combiners			CommScope - CBC1923Q-43 (AtAntenna)	SHARED CommScope - CBC1923Q-43 (AtAntenna)						
Radio	Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4415 B25 (At Antenna)	SHARED Radio 4415 B25 (At Antenna)						
Sector Equipment										

Unconnected Equipment:

Scope of Work:

Move GSM to AIR32 DB in Position 2. GSM will share B2 Radios in AIR32 DB with L1900 1st Carrier. Remove PCS TMA and (2) Coaxial Lines for GSM and U1900 from Position 1.

Add (1) PCS/AWS 8:4 diplexer to Position 1 at antenna, and connect its four output ports to the Mid-Band Ports of the Octo antenna.

Add (1) Radio 4415 B25 for L1900 2nd Carrier and U1900 to Position 1 at antenna, and connect its ports to the four PCS input ports of the diplexer.

Connect AWS TMA for U2100 to two of the AWS input ports of the diplexer.

Make sure to place metal caps on the unused ports of the diplexer.

Add new mount for New Position 3.

Add (1) AIR6449 B41 for L2500 and N2500 to New 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: 67D5997DB Hybrid	**A&L Template:** 67D5997DB_2xAIR+1OP

CTNH332C_Anchor_4_draft

Print Name: Preliminary (RFDS_for_scoping)
PORs: Anchor_Phase 3

Sector (Existing) view from behind								
Coverage Type	A - Outdoor Macro							
Antenna	1				2			
Antenna Model	RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	140				140			
M. Tilt								
Height	137				137			
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L700 L600 N600	L700 L600 N600	U1900 G1900	U2100	L2100	L2100	L1900	L1900
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt	2	2	2	2	2		2	
Cables	Coax Jumper **(x2)**	Coax Jumper **(x2)**	1-5/8" Coax - 175 ft. **(x2)** Coax Jumper **(x2)**	1-5/8" Coax - 175 ft. **(x2)** Coax Jumper **(x2)**				
TMAs			Generic Twin Style 1A - PCS (AtAntenna)	Generic Twin Style 1B - AWS (AtAntenna)				
Diplexers / Combiners								
Radio	Radio 4449 B71+B85 (At Antenna)							
Sector Equipment								

Unconnected Equipment:

Scope of Work:

RAN Template: 67D5997DB Hybrid	**A&L Template:** 67D5997DB_2xAIR+1OP

CTNH332C_Anchor_4_draft

Print Name: Preliminary (RFDS_for_scoping)
PORs: Anchor_Phase 3

Sector (Proposed) view from behind										
Coverage Type	A - Outdoor Macro									
Antenna	1				2				3	
Antenna Model	RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	140				140				140	
M. Tilt	0				0				0	
Height	137				137				137	
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**
Active Tech.	L700 L600 N600	L700 L600 N600	L1900 U1900	U2100 L1900	L2100	L2100	G1900 L1900	L1900	L2500 N2500	L2500 N2500
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt	2	2	2	2	2	2	2	2	2	2
Cables	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**	1-5/8" Coax - 175 ft. **(x2)** Coax Jumper **(x2)**						
TMAs				Generic Twin Style 1B - AWS (AtAntenna)						
Diplexers / Combiners			CommScope - CBC1923Q-43 (AtAntenna)	SHARED CommScope - CBC1923Q-43 (AtAntenna)						
Radio	Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4415 B25 (At Antenna)	SHARED Radio 4415 B25 (At Antenna)						
Sector Equipment										

Unconnected Equipment:

Scope of Work:

Move GSM to AIR32 DB in Position 2. GSM will share B2 Radios in AIR32 DB with L1900 1st Carrier. Remove PCS TMA and (2) Coaxial Lines for GSM and U1900 from Position 1.

Add (1) PCS/AWS 8:4 diplexer to Position 1 at antenna, and connect its four output ports to the Mid-Band Ports of the Octo antenna.

Add (1) Radio 4415 B25 for L1900 2nd Carrier and U1900 to Position 1 at antenna, and connect its ports to the four PCS input ports of the diplexer.

Connect AWS TMA for U2100 to two of the AWS input ports of the diplexer.

Make sure to place metal caps on the unused ports of the diplexer.

Add new mount for New Position 3.

Add (1) AIR6449 B41 for L2500 and N2500 to New 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:	A&L Template:
67D5997DB Hybrid	67D5997DB_2xAIR+1OP

CTNH332C_Anchor_4_draft

Print Name: Preliminary (RFDS_for_scoping)
PORs: Anchor_Phase 3

Sector (Existing) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1				2			
Antenna Model	RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	250				250			
M. Tilt								
Height	137				137			
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L700 L600 N600	L700 L600 N600	U1900 G1900	U2100	L2100	L2100	L1900	L1900
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt	2	2	2	2	2		2	
Cables	Coax Jumper **(x2)**	Coax Jumper **(x2)**	1-5/8" Coax - 175 ft. **(x2)** Coax Jumper **(x2)**	1-5/8" Coax - 175 ft. **(x2)** Coax Jumper **(x2)**				
TMAs			Generic Twin Style 1A - PCS (AtAntenna)	Generic Twin Style 1B - AWS (AtAntenna)				
Diplexers / Combiners								
Radio	Radio 4449 B71+B85 (At Antenna)							
Sector Equipment								

Unconnected Equipment:

Scope of Work:

RAN Template: 67D5997DB Hybrid	**A&L Template:** 67D5997DB_2xAIR+1OP

CTNH332C_Anchor_4_draft

Print Name: Preliminary (RFDS_for_scoping)
PORs: Anchor_Phase 3

Sector (Proposed) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1				2				3	
Antenna Model	RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	250				250				250	
M. Tilt	0				0				0	
Height	137				137				137	
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**
Active Tech.	L700 L600 N600	L700 L600 N600	U1900 L1900	U2100 L1900	L2100	L2100	G1900 L1900	L1900	L2500 N2500	L2500 N2500
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt	2	2	2	2	2	2	2	2	2	2
Cables	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**	1-5/8" Coax - 175 ft. **(x2)** Coax Jumper **(x2)**						
TMAs				Generic Twin Style 1B - AWS (AtAntenna)						
Diplexers / Combiners			CommScope - CBC1923Q-43 (AtAntenna)	SHARED CommScope - CBC1923Q-43 (AtAntenna)						
Radio	Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4415 B25 (At Antenna)	SHARED Radio 4415 B25 (At Antenna)						
Sector Equipment										

Unconnected Equipment:

Scope of Work:

Move GSM to AIR32 DB in Position 2. GSM will share B2 Radios in AIR32 DB with L1900 1st Carrier. Remove PCS TMA and (2) Coaxial Lines for GSM and U1900 from Position 1.

Add (1) PCS/AWS 8:4 diplexer to Position 1 at antenna, and connect its four output ports to the Mid-Band Ports of the Octo antenna.

Add (1) Radio 4415 B25 for L1900 2nd Carrier and U1900 to Position 1 at antenna, and connect its ports to the four PCS input ports of the diplexer.

Connect AWS TMA for U2100 to two of the AWS input ports of the diplexer.

Make sure to place metal caps on the unused ports of the diplexer.

Add new mount for New Position 3.

Add (1) AIR6449 B41 for L2500 and N2500 to New 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: 67D5997DB Hybrid	**A&L Template:** 67D5997DB_2xAIR+1OP

CTNH332C_Anchor_4_draft

Print Name: Preliminary (RFDS_for_scoping)
PORs: Anchor_Phase 3

Section 7 - Power Systems Equipment

Existing Power Systems Equipment
----- This section is intentionally blank. -----

Proposed Power Systems Equipment

Exhibit E

Mount Analysis

Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

T-Mobile Site #: CTNH332C

39 Cherry Street
Waterbury, CT

Centek Project No. 20074.25

Date: June 1, 2020

Max Stress Ratio = 67.5%

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

Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

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- ANTENNA AND APPURTENANCE SUMMARY
- STRUCTURE LOADING
- CONCLUSION

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- RISA3D OUTPUT REPORT

SECTION 3 – REFERENCE MATERIALS (NOT INCLUDED WITHIN REPORT)

- RF DATA SHEET, DATED 05/19/20

CENTEK engineering

Centered on Solutions℠

June 1, 2020

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

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CTNH332C
39 Cherry Street
Waterbury, CT 06702

Centek Project No. 20074.25

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 three (3) 9-ft pipe frame sector mounts 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 APXVAARR24-43-NA20 panel antennas, three (3) Ericsson AIR32 panel antennas, three (3) Ericsson AIR6449 panel antennas, three (3) TMAs, three (3) Ericsson 4449 remote radio units, three (3) Ericsson 4415 remote radio units and three (3) Commscope CBC1923Q-43 diplexers mounted on three (3) pipe frames with a RAD center elevation of 137-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

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

Section 2 - Calculations

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 := II		(User Input)
Exposure Category =	Exp := B		(User Input)
Structure Height =	$h := 143$	ft	(User Input)
Height to Center of Antennas =	$z_{Ant} := 137$	ft	(User Input)
Radial Ice Thickness =	$t_i := 0.75$	in	(User Input per Annex B of TIA-222-G)
Radial Ice Density =	$Id := 56.00$	pcf	(User Input)
Topograpic Factor =	$K_{zt} := 1.0$		(User Input)
	$K_a := 1.0$		(User Input)
Gust Response Factor =	$G_H = 1.1$		(User Input)

Output

Wind Direction Probability Factor =

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

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

Importance Factors =

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

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

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

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

$$K_{iz} := \left(\frac{z_{Ant}}{33}\right)^{0.1} = 1.153 \qquad t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.729$$

Velocity Pressure Coefficient Antennas =

$$Kz_{Ant} := 2.01 \left(\left(\frac{z_{Ant}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.081$$

Velocity Pressure w/o Ice Antennas =

$$qz_{Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V^2 \cdot I_{Wind} = 24.742$$

Velocity Pressure with Ice Antennas =

$$qz_{ice.Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V_i^2 \cdot I_{Wind} = 6.574$$

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFSAPXVAARR24-43		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 24$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 153$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.0$		
Antenna Force Coefficient =	$Ca_{ant} = 1.27$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 551$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.8$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 200$	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 =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 174$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 8.4$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 77$	lbs

Gravity Load (without ice)

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

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \times 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 1 \times 10^4$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 426$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 426$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR32		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 56.6$	in	(User Input)
Antenna Width =	$W_{ant} := 12.9$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 132$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.4$		
Antenna Force Coefficient =	$Ca_{ant} = 1.28$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.1$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 177$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 3.4$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 119$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.8$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 63$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 5.1$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 47$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 132$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6352$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 5594$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 181$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 181$	lbs

CENTEK engineering Centered on Solutions™ www.centekeng.com 63-2 North Branford Road P: (203) 488-0580 Branford, CT 06405 F: (203) 488-8587	Subject:	TIA-222-G Loads
	Location:	Waterbury, CT
	Rev. 0: 6/1/20	Prepared by: T.J.L. Checked by: C.A.G. Job No. 20074.25

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR6449		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 33.1$	in	(User Input)
Antenna Width =	$W_{ant} := 20.5$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.3$	in	(User Input)
Antenna Weight =	$WT_{ant} := 103$	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 =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 154$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.9$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 62$	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 =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 53$	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 =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 26$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 103$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5632$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 4668$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 151$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 151$	lbs

Development of Wind & Ice Load on RRUS

RRUS Data:

RRUS Model = Ericsson 4449 B71B12

RRUS Shape = Flat (User Input)

RRUS Height = $L_{RRUS} := 14.9$ in (User Input)

RRUS Width = $W_{RRUS} := 13.2$ in (User Input)

RRUS Thickness = $T_{RRUS} := 10.4$ in (User Input)

RRUS Weight = $WT_{RRUS} := 74$ lbs (User Input)

Number of RRUS's = $N_{RRUS} := 1$ (User Input)

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 = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 45$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.1$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 35$ 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 = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 18$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.8$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 15$ lbs

Gravity Load (without ice)

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

Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2045$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2193$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 71$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 71$ lbs

Development of Wind & Ice Load on RRUS

RRUS Data:

RRUS Model =	Ericsson 4415 B25		
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 =	$WT_{RRUS} := 47$	lbs	(User Input)
Number of RRUS's =	$N_{RRUS} := 1$		(User Input)
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 = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 45$ lbs

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

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 18$ 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 = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 18$ 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 = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 10$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 47$ 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 = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 1647$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 53$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 53$ lbs

Development of Wind & Ice Load on TMA

TMA Data:

TMA Model = Ericsson KRY112 TMA

TMA Shape = Flat (User Input)

TMA Height = $L_{TMA} := 7.7$ in (User Input)

TMA Width = $W_{TMA} := 7.5$ in (User Input)

TMA Thickness = $T_{TMA} := 3.4$ in (User Input)

TMA Weight = $WT_{TMA} := 11$ lbs (User Input)

Number of TMA's = $N_{TMA} := 1$ (User Input)

TMA Aspect Ratio = $Ar_{TMA} := \frac{L_{TMA}}{W_{TMA}} = 1$

TMA Force Coefficient = $Ca_{TMA} = 1.2$

Wind Load (without ice)

Surface Area for One TMA = $SA_{TMAF} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.4$ sf

Total TMA Wind Force = $F_{TMA} := qz_{Ant} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAF} = 13$ lbs

Surface Area for One TMA = $SA_{TMAS} := \frac{L_{TMA} \cdot T_{TMA}}{144} = 0.2$ sf

Total TMA Wind Force = $F_{TMA} := qz_{Ant} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAS} = 6$ lbs

Wind Load (with ice)

Surface Area for One TMA w/ Ice = $SA_{ICETMAF} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (W_{TMA} + 2 \cdot t_{iz})}{144} = 0.8$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA} := qz_{ice.Ant} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAF} = 7$ lbs

Surface Area for One TMA w/ Ice = $SA_{ICETMAS} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz})}{144} = 0.5$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA} := qz_{ice.Ant} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAS} = 5$ lbs

Gravity Load (without ice)

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

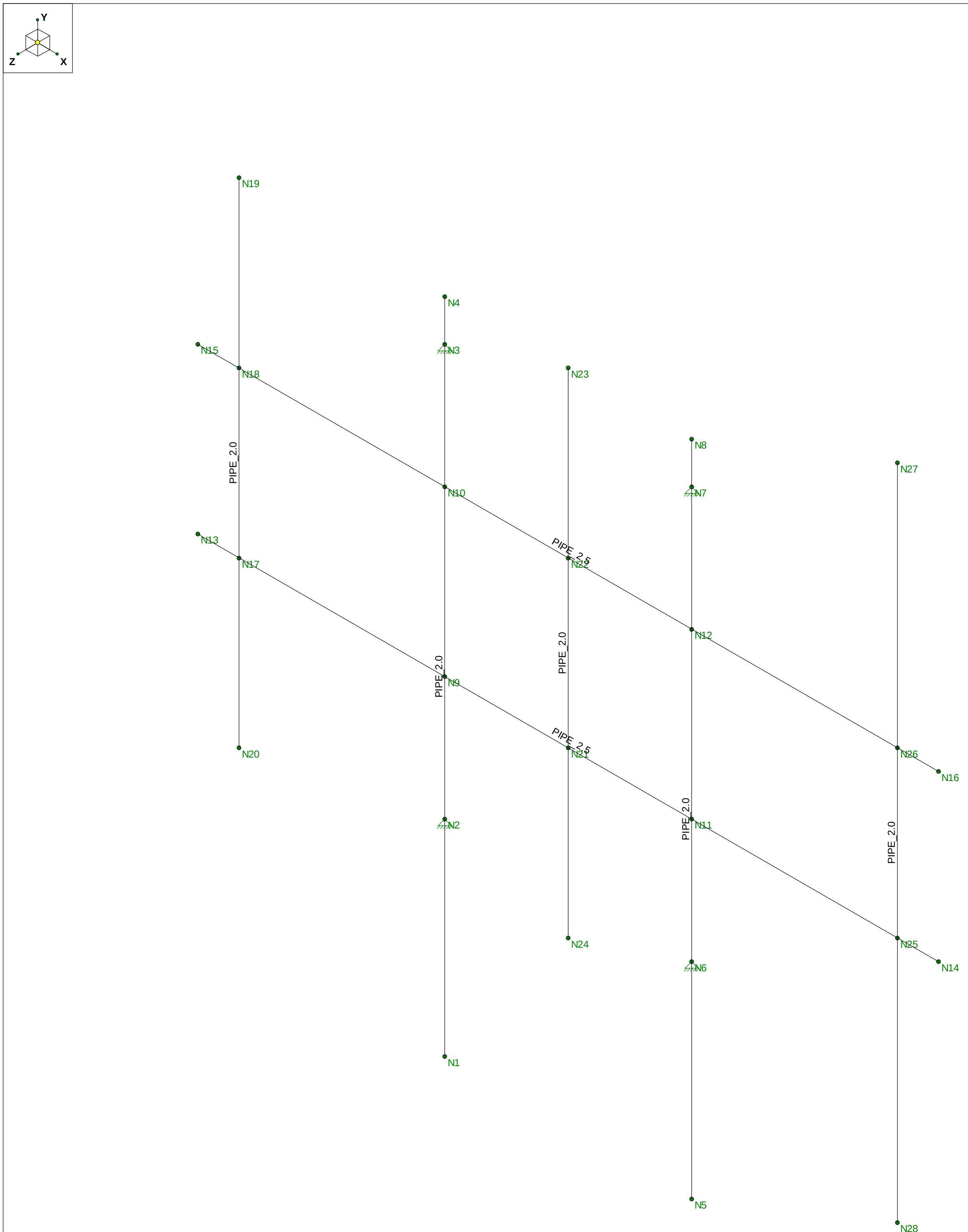
Gravity Loads (ice only)

Volume of Each TMA = $V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 196$ cu in

Volume of Ice on Each TMA = $V_{ice} := (L_{TMA} + 2 \cdot t_{iz})(W_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz}) - V_{TMA} = 642$ cu in

Weight of Ice on Each TMA = $W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 21$ lbs

Weight of Ice on All TMAs = $W_{ICETMA} \cdot N_{TMA} = 21$ lbs



Envelope Only Solution

Centek	CTNH332C	
TJL		June 1, 2020 at 11:42 AM
20074.25	Member Framing	Antenna Mount.r3d

(Global) Model Settings

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

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

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

(Global) Model Settings, Continued

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

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rul...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Horz	PIPE_2.5	Beam	Pipe	A53 Grade B	Typical	1.61	1.45	1.45	2.89
2	Vert	PIPE_2.0	Column	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
3	Antenna Mast	PIPE_2.0	Column	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
4	Stabilizer Arm	PIPE_2.0	Beam	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
1	M1	Vert	8									Lateral
2	M2	Vert	8									Lateral
3	M3	Horz	9			Lbyy						Lateral
4	M4	Horz	9			Lbyy						Lateral
5	M5	Antenna Mast	6									Lateral
6	M6	Antenna Mast	6									Lateral
7	M7	Antenna Mast	8									Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	N4	N1			Vert	Column	Pipe	A53 Gra...	Typical
2	M2	N8	N5			Vert	Column	Pipe	A53 Gra...	Typical
3	M3	N15	N16			Horz	Beam	Pipe	A53 Gra...	Typical
4	M4	N13	N14			Horz	Beam	Pipe	A53 Gra...	Typical
5	M5	N19	N20			Antenna Mast	Column	Pipe	A53 Gra...	Typical
6	M6	N23	N24			Antenna Mast	Column	Pipe	A53 Gra...	Typical
7	M7	N27	N28			Antenna Mast	Column	Pipe	A53 Gra...	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	0	0	0	0	
2	N2	0	2.5	0	0	
3	N3	0	7.5	0	0	
4	N4	0	8	0	0	
5	N5	3	0	0	0	
6	N6	3	2.5	0	0	
7	N7	3	7.5	0	0	
8	N8	3	8	0	0	
9	N9	0	4	0	0	
10	N10	0	6	0	0	
11	N11	3	4	0	0	
12	N12	3	6	0	0	
13	N13	-3	4	0	0	
14	N14	6	4	0	0	
15	N15	-3	6	0	0	
16	N16	6	6	0	0	
17	N17	-2.5	4	0	0	
18	N18	-2.5	6	0	0	
19	N19	-2.5	8	0	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
20	N20	-2.5	2	0	0	
21	N21	1.5	4	0	0	
22	N22	1.5	6	0	0	
23	N23	1.5	8	0	0	
24	N24	1.5	2	0	0	
25	N25	5.5	4	0	0	
26	N26	5.5	6	0	0	
27	N27	5.5	9	0	0	
28	N28	5.5	1	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	N2	Reaction	Reaction	Reaction			
2	N6	Reaction	Reaction	Reaction			
3	N7	Reaction	Reaction	Reaction			
4	N3	Reaction	Reaction	Reaction			

Member Point Loads (BLC 2 : Dead Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M7	Y	-.077	.5
2	M7	Y	-.077	7.5
3	M6	Y	-.066	.5
4	M6	Y	-.066	5.5
5	M5	Y	-.052	.5
6	M5	Y	-.052	3.5
7	M7	Y	-.074	%50
8	M7	Y	-.047	2
9	M2	Y	-.011	7

Member Point Loads (BLC 3 : Ice Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M7	Y	-.213	.5
2	M7	Y	-.213	7.5
3	M6	Y	-.091	.5
4	M6	Y	-.091	5.5
5	M5	Y	-.076	.5
6	M5	Y	-.076	3.5
7	M7	Y	-.071	%50
8	M7	Y	-.053	2
9	M2	Y	-.021	7

Member Point Loads (BLC 4 : Wind with Ice X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M7	X	.039	.5
2	M7	X	.039	7.5
3	M6	X	.024	.5
4	M6	X	.024	5.5
5	M5	X	.013	.5

Member Point Loads (BLC 4 : Wind with Ice X) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
6	M5	X	.013	3.5
7	M7	X	.015	%50
8	M7	X	.01	2
9	M2	X	.005	7

Member Point Loads (BLC 5 : Wind X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M7	X	.1	.5
2	M7	X	.1	7.5
3	M6	X	.06	.5
4	M6	X	.06	5.5
5	M5	X	.031	.5
6	M5	X	.031	3.5
7	M7	X	.035	%50
8	M7	X	.018	2
9	M2	X	.006	7

Member Point Loads (BLC 6 : Wind with Ice Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M7	Z	.087	.5
2	M7	Z	.087	7.5
3	M6	Z	.032	.5
4	M6	Z	.032	5.5
5	M5	Z	.027	.5
6	M5	Z	.027	3.5
7	M2	Z	.007	7

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M7	Z	.276	.5
2	M7	Z	.276	7.5
3	M6	Z	.089	.5
4	M6	Z	.089	5.5
5	M5	Z	.077	.5
6	M5	Z	.077	3.5
7	M2	Z	.013	7

Member Distributed Loads (BLC 4 : Wind with Ice X)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M5	X	.002	.002	0	0
2	M1	X	.002	.002	0	0
3	M6	X	.002	.002	0	0
4	M2	X	.002	.002	0	0
5	M7	X	.002	.002	0	0

Member Distributed Loads (BLC 5 : Wind X)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M5	X	.007	.007	0	0

Member Distributed Loads (BLC 5 : Wind X) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
2	M1	X	.007	.007	0	0
3	M6	X	.007	.007	0	0
4	M2	X	.007	.007	0	0
5	M7	X	.007	.007	0	0

Member Distributed Loads (BLC 6 : Wind with Ice Z)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.002	.002	0	0
2	M2	Z	.002	.002	0	0
3	M3	Z	.002	.002	0	0
4	M4	Z	.002	.002	0	0

Member Distributed Loads (BLC 7 : Wind Z)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.007	.007	0	0
2	M2	Z	.007	.007	0	0
3	M3	Z	.007	.007	0	0
4	M4	Z	.007	.007	0	0

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Gra...	Joint	Point	Distrib..	Area(...	Surfa...
1	Self Weight	DL		-1						
2	Dead Load	None					9			
3	Ice Load	None					9			
4	Wind with Ice X	None					9	5		
5	Wind X	None					9	5		
6	Wind with Ice Z	None					7	4		
7	Wind Z	None					7	4		

Load Combinations

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

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N2	max	-.008	5	.155	6	.007	4	0	6	0	6	0	6
2		min	-.304	1	.057	2	-.002	6	0	1	0	1	0	1
3	N6	max	.15	6	.802	3	0	3	0	6	0	6	0	6
4		min	-.256	2	.254	5	-.916	5	0	1	0	1	0	1
5	N7	max	-.044	5	.728	6	0	3	0	6	0	6	0	6
6		min	-.308	1	.156	2	-.852	4	0	1	0	1	0	1

Envelope Joint Reactions (Continued)

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
7	N3	max	.01	4	.146	6	0	3	0	6	0	6	0	6
8		min	-.259	2	.075	2	-.055	4	0	1	0	1	0	1
9	Totals:	max	0	6	1.8	6	0	3						
10		min	-1.109	1	.671	2	-1.816	4						

Envelope Joint Displacements

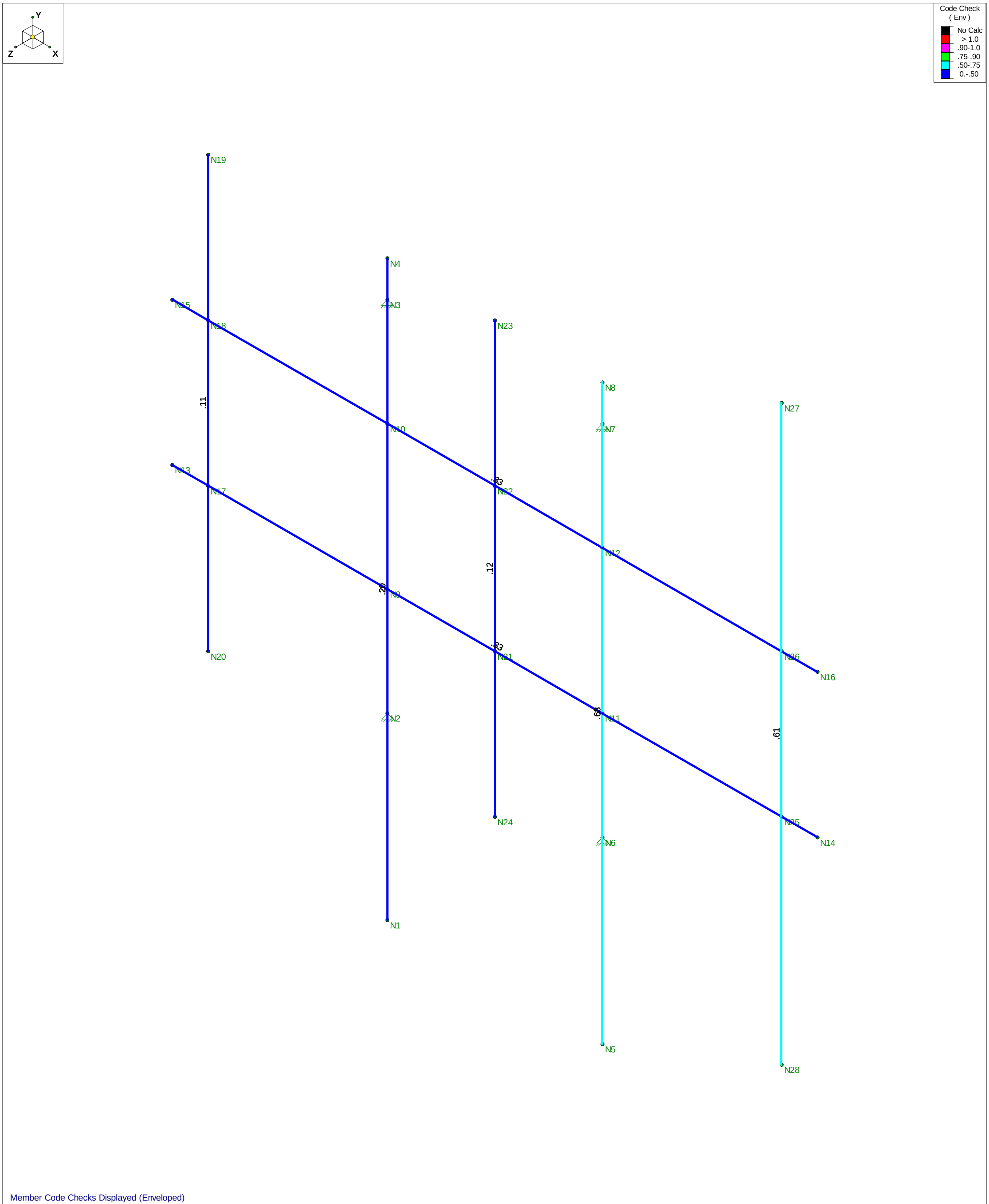
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
1	N1	max	.006	6	0	5	.025	4	0	3	0	3	1.891e-04	6
2		min	-.08	2	0	1	0	1	-9.172e-04	4	-1.086e-03	5	-2.589e-03	2
3	N2	max	0	6	0	6	0	6	0	3	0	3	1.892e-04	6
4		min	0	1	0	1	0	1	-6.286e-04	4	-1.086e-03	5	-2.878e-03	2
5	N3	max	0	6	0	6	0	6	0	3	0	3	3.321e-03	1
6		min	0	1	0	1	0	1	-3.015e-04	4	-6.73e-04	5	3.087e-05	5
7	N4	max	0	5	0	5	0	3	0	3	0	3	3.318e-03	1
8		min	-.02	1	0	1	-.002	4	-2.992e-04	4	-6.73e-04	5	3.087e-05	5
9	N5	max	.023	6	0	5	0	3	1.087e-02	5	0	3	7.796e-04	6
10		min	-.068	2	0	3	-.329	5	0	1	-9.804e-03	4	-2.179e-03	2
11	N6	max	0	6	0	6	0	6	1.139e-02	5	0	3	7.801e-04	6
12		min	0	1	0	1	0	1	0	1	-9.804e-03	4	-2.575e-03	2
13	N7	max	0	6	0	6	0	6	0	3	0	3	3.516e-03	1
14		min	0	1	0	1	0	1	-1.191e-02	5	-9.794e-03	5	2.222e-04	5
15	N8	max	-.001	5	0	5	0	3	0	3	0	3	3.513e-03	1
16		min	-.021	1	0	1	-.071	5	-1.191e-02	5	-9.794e-03	5	2.222e-04	5
17	N9	max	.039	2	0	2	0	6	3.411e-04	5	0	3	2.996e-04	6
18		min	-.004	6	0	6	-.004	4	0	1	-1.086e-03	5	-4.163e-04	2
19	N10	max	.044	1	0	2	.003	4	1.681e-04	4	0	3	6.118e-04	1
20		min	.001	5	0	6	0	1	0	1	-6.73e-04	5	1.152e-04	5
21	N11	max	.039	2	0	5	.159	5	2.761e-03	5	0	3	-2.706e-04	5
22		min	-.004	6	0	3	0	1	0	1	-9.804e-03	4	-1.051e-03	3
23	N12	max	.044	1	0	2	.161	5	0	3	0	3	3.301e-04	2
24		min	.001	5	0	6	0	1	-2.596e-03	5	-9.794e-03	5	-8.939e-04	6
25	N13	max	.039	2	-.007	2	.004	6	9.077e-04	4	6.473e-04	5	3.675e-04	3
26		min	-.004	6	-.023	6	0	1	0	1	0	1	1.735e-04	5
27	N14	max	.039	2	-.023	2	.672	5	0	3	0	3	4.693e-04	2
28		min	-.005	6	-.09	6	0	1	-4.45e-03	4	-1.593e-02	4	-2.044e-03	6
29	N15	max	.044	1	-.004	2	.033	5	1.555e-03	4	1.321e-03	5	3.555e-04	6
30		min	0	5	-.023	6	0	1	0	1	0	1	-3.116e-04	2
31	N16	max	.045	1	-.027	5	.674	5	4.627e-03	4	0	3	-6.174e-04	5
32		min	.001	5	-.092	3	0	1	0	1	-1.592e-02	5	-2.379e-03	3
33	N17	max	.039	2	-.005	2	.003	6	9.077e-04	4	6.463e-04	5	3.669e-04	3
34		min	-.004	6	-.021	6	-.003	4	0	1	0	1	1.73e-04	5
35	N18	max	.044	1	-.005	2	.025	4	1.555e-03	4	1.32e-03	5	3.55e-04	6
36		min	0	5	-.021	6	0	1	0	1	0	1	-3.121e-04	2
37	N19	max	.064	2	-.005	2	.087	4	2.929e-03	4	1.32e-03	5	3.555e-04	6
38		min	-.005	6	-.021	6	0	1	0	1	0	1	-1.013e-03	2
39	N20	max	.049	1	-.005	2	0	3	9.076e-04	4	6.463e-04	5	4.669e-04	1
40		min	.003	5	-.021	6	-.025	4	0	1	0	1	1.73e-04	5
41	N21	max	.039	2	.003	3	.039	5	6.433e-04	4	0	3	3.604e-04	1
42		min	-.004	6	0	5	0	1	0	1	-4.102e-03	4	5.816e-06	5
43	N22	max	.044	1	.003	6	.042	5	0	3	0	3	2.224e-05	6

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
44		min	.001	5	0	2	0	1	-3.533e-04	5	-4.021e-03	5	-3.663e-04	2
45	N23	max	.075	1	.003	6	.063	4	1.234e-03	4	0	3	2.227e-05	6
46		min	0	5	0	2	0	1	0	1	-4.021e-03	5	-1.584e-03	2
47	N24	max	.07	2	.003	3	.053	5	0	3	0	3	1.576e-03	1
48		min	-.004	6	0	5	0	1	-9.422e-04	5	-4.102e-03	4	5.813e-06	5
49	N25	max	.039	2	-.024	5	.577	5	0	3	0	3	4.698e-04	2
50		min	-.005	6	-.078	3	0	1	-4.45e-03	4	-1.593e-02	4	-2.043e-03	6
51	N26	max	.045	1	-.024	5	.579	5	4.627e-03	4	0	3	-6.17e-04	5
52		min	.001	5	-.078	3	0	1	0	1	-1.592e-02	5	-2.378e-03	3
53	N27	max	.271	1	-.024	5	1.104	4	1.834e-02	4	0	3	-6.187e-04	5
54		min	.024	5	-.079	3	0	1	0	1	-1.592e-02	5	-7.774e-03	1
55	N28	max	.199	2	-.024	5	1.094	5	0	3	0	3	5.911e-03	2
56		min	-.078	6	-.079	3	0	1	-1.809e-02	5	-1.593e-02	4	-2.029e-03	6

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

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	...	...	phi*P...	phi*P...	phi*...	phi*...	Cb	Eqn
1	M1	PIPE_2.0	.198	4	1	.029	5.5		1	14.916	32.13	1.872	1.872	1.2...	H1-...
2	M2	PIPE_2.0	.675	2	4	.090	5.5		4	14.916	32.13	1.872	1.872	1.3...	H1-...
3	M3	PIPE_2.5	.333	6	4	.238	6		4	26.137	50.715	3.596	3.596	2.6...	H1-...
4	M4	PIPE_2.5	.335	6	4	.238	6		4	26.137	50.715	3.596	3.596	2.6...	H1-...
5	M5	PIPE_2.0	.114	2	4	.033	3.5		4	20.867	32.13	1.872	1.872	4.9...	H1-...
6	M6	PIPE_2.0	.118	2	4	.017	2		4	20.867	32.13	1.872	1.872	5	H1-...
7	M7	PIPE_2.0	.606	3	4	.051	3		3	14.916	32.13	1.872	1.872	4.99	H1-...



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek		
TJL	CTNH332C	June 1, 2020 at 11:42 AM
20074.25	Unity Check	Antenna Mount.r3d

Exhibit F

Power Density/RF Emissions Report

EBI Consulting

environmental | engineering | due diligence

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

T-Mobile Existing Facility

<u>Site ID: CTNH332C</u>

NH332/CherrySmokestack
39 Cherry Street
Waterbury, Connecticut 06702

June 23, 2020

EBI Project Number: 6220002661

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**17.24%**

EBI Consulting

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June 23, 2020

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

Emissions Analysis for Site: CTNH332C - NH332/CherrySmokestack

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **39 Cherry 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 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu W/cm^2$). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits; therefore, it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 39 Cherry 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 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/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.

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) 2 LTE channels (BRS Band - 2500 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

10) 2 NR channels (BRS Band - 2500 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

11) 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.

12) 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.

13) The antennas used in this modeling are the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 32 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s) in Sector A, the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 32 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s) in Sector B, the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 32 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 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.

14) The antenna mounting height centerline of the proposed antennas is 137 feet above ground level (AGL).

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

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

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T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	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 / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 16.35 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 16.35 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 16.35 dBd
Height (AGL):	137 feet	Height (AGL):	137 feet	Height (AGL):	137 feet
Channel Count:	9	Channel Count:	9	Channel Count:	9
Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts
ERP (W):	13,259.22	ERP (W):	13,259.22	ERP (W):	13,259.22
Antenna A1 MPE %:	**3.62%**	Antenna B1 MPE %:	**3.62%**	Antenna C1 MPE %:	**3.62%**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR 32	Make / Model:	Ericsson AIR 32	Make / Model:	Ericsson AIR 32
Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz
Gain:	15.35 dBd / 15.35 dBd / 15.85 dBd	Gain:	15.35 dBd / 15.35 dBd / 15.85 dBd	Gain:	15.35 dBd / 15.35 dBd / 15.85 dBd
Height (AGL):	137 feet	Height (AGL):	137 feet	Height (AGL):	137 feet
Channel Count:	8	Channel Count:	8	Channel Count:	8
Total TX Power (W):	360 Watts	Total TX Power (W):	360 Watts	Total TX Power (W):	360 Watts
ERP (W):	12,841.53	ERP (W):	12,841.53	ERP (W):	12,841.53
Antenna A2 MPE %:	**2.46%**	Antenna B2 MPE %:	**2.46%**	Antenna C2 MPE %:	**2.46%**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449
Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz
Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd
Height (AGL):	137 feet	Height (AGL):	137 feet	Height (AGL):	137 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	160 Watts	Total TX Power (W):	160 Watts	Total TX Power (W):	160 Watts
ERP (W):	25,651.93	ERP (W):	25,651.93	ERP (W):	25,651.93
Antenna A3 MPE %:	**4.91%**	Antenna B3 MPE %:	**4.91%**	Antenna C3 MPE %:	**4.91%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	10.99%
Sprint	4.34%
Clearwire	0.19%
Metro PCS	1.72%
Site Total MPE % :	17.24%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	10.99%
T-Mobile Sector B Total:	10.99%
T-Mobile Sector C Total:	10.99%
Site Total MPE % :	17.24%

T-Mobile Maximum MPE Power Values (Sector A)

T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile 600 MHz LTE	2	591.73	137.0	2.27	600 MHz LTE	400	0.57%
T-Mobile 600 MHz NR	1	1577.94	137.0	3.02	600 MHz NR	400	0.76%
T-Mobile 700 MHz LTE	2	648.82	137.0	2.49	700 MHz LTE	467	0.53%
T-Mobile 1900 MHz UMTS/LTE	2	3305.54	137.0	12.66	1900 MHz UMTS/LTE	1000	1.27%
T-Mobile 2100 MHz UMTS	2	1294.56	137.0	4.96	2100 MHz UMTS	1000	0.50%
T-Mobile 1900 MHz GSM	4	1028.30	137.0	7.88	1900 MHz GSM	1000	0.79%
T-Mobile 1900 MHz LTE	2	2056.61	137.0	7.88	1900 MHz LTE	1000	0.79%
T-Mobile 2100 MHz LTE	2	2307.55	137.0	8.84	2100 MHz LTE	1000	0.88%
T-Mobile 2500 MHz LTE	2	6412.98	137.0	24.57	2500 MHz LTE	1000	2.46%
T-Mobile 2500 MHz NR	2	6412.98	137.0	24.57	2500 MHz NR	1000	2.46%
						Total:	**10.99%**

• 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:	10.99%
Sector B:	10.99%
Sector C:	10.99%
T-Mobile Maximum MPE % (Sector A):	10.99%
Site Total:	17.24%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **17.24%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Exhibit G

Mailing Receipts/Proof of Notice

UPS Internet Shipping: View/Print Label

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

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

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

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

UPS Access Point[TM] MICHAELS STORE # 7773 75 INTERSTATE SHOP CTR RAMSEY ,NJ 07446	UPS Access Point[TM] THE UPS STORE 115 FRANKLIN TPKE MAHWAH ,NJ 07430	UPS Access Point[TM] THE UPS STORE 120 E MAIN ST RAMSEY ,NJ 07446

FOLD HERE

NEIL GUERRIERO
3473040176
TRANSCEND WIRELESS
10 INDUSTRIAL AVE
MAHWAH NJ 07430

1 LBS 1 OF 1

SHIP TO:
NEIL O'LEARY
TOWN OF WATERBURY
2ND FLOOR
235 GRAND STREET
WATERBURY CT 06702-1915

CT 067 9-05

UPS GROUND
TRACKING #: 1Z V25 742 42 9415 2875

BILLING: P/P
SIGNATURE REQUIRED

Reference#1: CTNH332C CSC EO

UIS 22.0.11. WNTNV50 28.0A 04/2020

UPS Internet Shipping: View/Print Label

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

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

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

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

UPS Access Point™
MICHAELS STORE # 7773
75 INTERSTATE SHOP CTR
RAMSEY ,NJ 07446

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

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

FOLD HERE

NEIL GUERRIERO
3473040176
TRANSCEND WIRELESS
10 INDUSTRIAL AVE
MAHWAH NJ 07430

1 LBS 1 OF 1

SHIP TO:
CLIFFORD C. BRAMMER
CITY OF WATERBURY
5TH FLOOR
185 SOUTH MAIN STREET
WATERBURY CT 06706-1012

CT 067 9-05

UPS GROUND
TRACKING #: 1Z V25 742 42 9030 6886

BILLING: P/P
SIGNATURE REQUIRED

Reference#1: CTNH332C CSC ZO

UIS 22.0.11. WNTNV50 28.0A 04/2020

UPS Internet Shipping: View/Print Label

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

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

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

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

UPS Access Point[TM]
MICHAELS STORE # 7773
75 INTERSTATE SHOP CTR
RAMSEY ,NJ 07446

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

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

FOLD HERE

1 LBS 1 OF 1

NEIL GUERRIERO
3473040176
TRANSCEND WIRELESS
10 INDUSTRIAL AVE
MAHWAH NJ 07430

SHIP TO:
NEW OPPORTUNITIES ECONOMIC DEVELOP.
232 NORTH ELM STREET
WATERBURY CT 06702-1516

CT 067 9-05

UPS GROUND
TRACKING #: 1Z V25 742 42 9306 4892

BILLING: P/P
SIGNATURE REQUIRED

Reference#1: CTNH332C CSC Owner

UIS 22.0.11. WNTNV50 28.0A 04/2020