May 9, 2022

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

Regarding: Notice of Exempt Modification – AT&T Site CT5448 / FA# 10071105
Address: 239 Middle Turnpike East, Manchester, CT 06040

Dear Ms. Bachman:

New Cingular Wireless, PCS, LLC ("AT&T") currently maintains a wireless telecommunications facility on an existing +/- 185' monopole at the above-referenced address, latitude 41.7843919, longitude -72.5116989. Said monopole is owned by the Town of Manchester.

AT&T desires to modify its existing telecommunications facility by swapping twelve (12) antennae, removing three (3) remote radio units, swapping six (6) remote radio units, swapping surge arrestors, accompanying feedlines and installing a mount replacement as more particularly detailed and described on the enclosed Construction Drawings prepared by Hudson Design Group, LLC, last revised May 5, 2022. The centerline height of the existing antennas is and will remain at 143 feet. This modification may include B2, B5, B17, B14, B29, B30, B66, & n77 hardware that is 4G(LTE) and/or 5GNR capable through remote configuration and either or both services may be turned off at various times.

Please accept this letter as notification pursuant to R.C.S.A §16-50j-73 for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the following individuals: The Honorable Jay Moran, Mayor of the Town of Manchester, elected official. Jim Davis, Zoning Enforcement Officer and Gary Anderson as Director of Planning of the Town of Manchester. Town of Manchester, as tower/property 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). Specifically:

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

2. The proposed modifications will not require an 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 modified facility will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard. *Please see the RF emissions calculation for AT&T's modified facility enclosed herewith.*

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

6. The existing structure and its foundation can support the proposed loading. *Please see the structural analysis dated November 15, 2021, and prepared by Hudson Design Group LLC, enclosed herewith.*

For the foregoing reasons, AT&T 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,

Evan Renwick

Evan Renwick
Site Acquisition Specialist
Centerline Communications, LLC
750 West Center Street, Suite 301
West Bridgewater, MA 02379
erenwick@clinellc.com

Enclosures:
Exhibit 1 – Construction Drawings
Exhibit 2 – Property Card and GIS
Exhibit 3 – Structural Analysis
Exhibit 4 – Mount Analysis
Exhibit 5 – RF Emissions Analysis Report Evaluation
Exhibit 6 – Original Tower Approval
Exhibit 7 – Notice Delivery Confirmations

cc:
The Honorable Jay Moran, Mayor, Town of Manchester, elected official
Jim Davis, Zoning Enforcement Officer
Gary Anderson as Director of Planning, Town of Manchester
Town of Manchester, as tower/property owner

EXHIBIT 1

PROJECT INFORMATION

SCOPE OF WORK:

ITEMS TO BE MOUNTED ON THE EXISTING MONOPOLE:
- INSTALL AT&T ANTENNA (QD6616-7) @ POS. 2 (TOTAL OF 1 FOR ALPHA SECTOR).
- INSTALL AT&T ANTENNA (QD8616-7) @ POS. 2 (TYP. OF 1 PER BETA & GAMMA SECTOR, TOTAL OF 2).
- INSTALL PROPOSED AT&T LTE ANTENNAS (AIR6419 N77G) @ POS. 3 (TYP. OF 1 PER SECTOR, TOTAL OF 3)(STACKED).
- INSTALL PROPOSED AT&T LTE ANTENNAS (AIR6449 N77D) @ POS. 3 (TYP. 1 PER SECTOR, TOTAL OF 3) (STACKED).
- INSTALL AT&T ANTENNA (DMP65R-BU6D) @ POS. 4 (TOTAL OF 1 FOR ALPHA SECTOR).
- INSTALL AT&T ANTENNA (DMP65R-BU8D) @ POS. 4 (TYP. OF 1 PER BETA & GAMMA SECTOR, TOTAL OF 2).
- PROPOSED NEW MOUNT SITE PRO 1 P/N RMQLP-4120-H10 (TOTAL OF 1).
- INSTALL AT&T RRUS 4449 B5/B12 (850/700) & Y-CABLE (TYP. OF 1 PER SECTOR, TOTAL OF 3) & ADD (3) Y CABLES.
- INSTALL AT&T DC SURGE ARRESTOR DC6-48-60-18-8C-EV (TOTAL OF 3) WITH (2) #6 AWG DC TRUNK & (1) #18 PAIR FIBER.
- INSTALL AT&T RRUS 4415 B25 (1900) (TYP. OF 1 PER SECTOR, TOTAL OF 3).

ITEMS TO BE MOUNTED AT EQUIPMENT LOCATION:
- INSTALL 6648 WITH XCEED CABLES.

ITEMS TO BE REMOVED:
- EXISTING AT&T ANTENNA 800-10121 @ POS.1 (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- EXISTING AT&T ANTENNA OPA-65R-LCUU-H6 @ POS.2 (TOTAL OF 1 PER ALPHA).
- EXISTING AT&T ANTENNA NNH4-65B-R6 @ POS.3 (TOTAL OF 1 PER ALPHA).
- EXISTING AT&T ANTENNA OPA-65R-LCUU-H6 @ POS.4 (TOTAL OF 1 PER ALPHA).
- EXISTING AT&T ANTENNA OPA-65R-LCUU-H8 @ POS.2 (TYP. OF 1 PER BETA & GAMMA, TOTAL OF 2).
- EXISTING AT&T ANTENNA NNH4-65C-R6 @ POS.3 (TYP. OF 1 PER BETA & GAMMA, TOTAL OF 2)
- EXISTING AT&T ANTENNA OPA-65R-LCUU-H8 @ POS.4 (TYP. OF 1 PER BETA & GAMMA, TOTAL OF 2).
- EXISTING AT&T RRH: RRUS-11 B12 (TYP. OF 1 PER SECTOR, TOTAL OF 3)
- EXISTING AT&T RRH: RRUS-11 B12 (TYP. OF 1 PER SECTOR, TOTAL OF 3)
- EXISTING AT&T RRH: RRUS-A2 B25 (TYP. OF 1 PER SECTOR, TOTAL OF 3)
- EXISTING AT&T RRH: 4478 B5 (TYP. OF 1 PER SECTOR, TOTAL OF 3)
- EXISTING AT&T DIPLEXERS: LGP21901 (TYP. OF 2 PER SECTOR, TOTAL OF 6)
- EXISTING AT&T TMAS: LGP21401 (TYP. OF 2 PER SECTOR, TOTAL OF 6)

ITEMS TO REMAIN:
- (12) RRU'S, & (3) SURGE ARRESTOR, (6) #8 AWG DC TRUNKS & (2) #18 PAIR FIBER CABLES.

SITE ADDRESS:	239 MIDDLE TURNPIKE EAST MANCHESTER, CT 06040
LATITUDE:	41.784388° N, 41° 47' 03.8" N
LONGITUDE:	72.511694° W, 72° 30' 42.1" W
TYPE OF SITE:	MONOPOLE / OUTDOOR EQUIPMENT
STRUCTURE HEIGHT:	185'-0"±
RAD CENTER:	143'-0"±
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY

DRAWING INDEX

SHEET NO.	DESCRIPTION	REV.
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GN-1	GENERAL NOTES	1
A-1	COMPOUND & EQUIPMENT PLANS	1
A-2	ANTENNA LAYOUTS & ELEVATION	1
A-3	DETAILS	1
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SITE NUMBER: CT5448

SITE NAME: MANCHESTER CENTRAL

FA CODE: 10071105

PACE ID: MRCTB052248, MRCTB051203, MRCTB050938, MRCTB050884, MRCTB054192

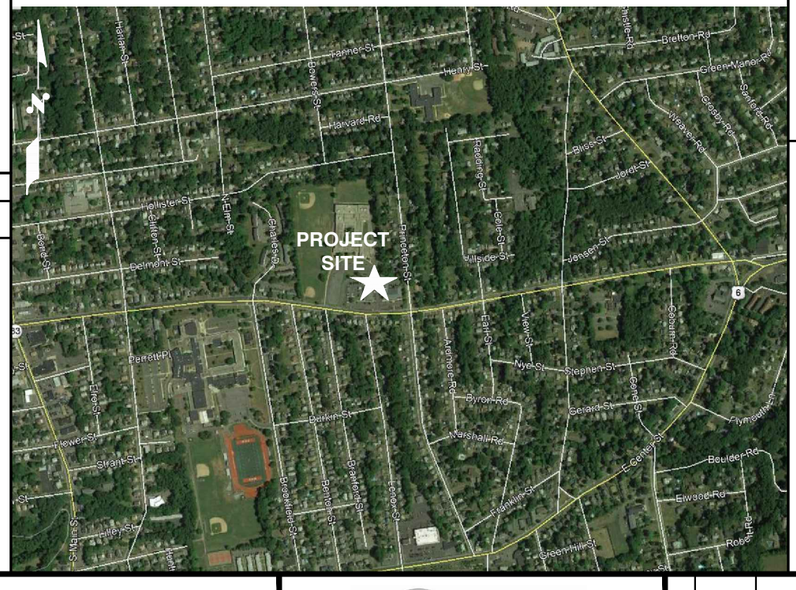
PROJECT: 5G NR, BWE TOWER TOP, BBU RECONFIG., 1SR CBAND, ANTENNA MOD RETROFIT 2021 UPGRADE

ISSUED FOR PERMITTING

VICINITY MAP

DIRECTIONS TO SITE:

HEAD SOUTH TOWARD ENTERPRISE DR. TURN LEFT ONTO ENTERPRISE DR. TURN LEFT ONTO CAPITAL BLVD. TURN LEFT ONTO STATE HWY 411. TURN LEFT TO MERGE ONTO I-91 N. MERGE ONTO I-91 N. TAKE EXIT 29 TO MERGE ONTO CT-15 N/US-5 N TOWARD I-84 E/E HARTFORD/BOSTON. CONTINUE ONTO CT-15 N, TAKE EXIT ON THE LEFT ONTO I-84 TOWARD BOSTON/ TAKE EXIT 60 FOR US-6/US-44/MIDDLE TURNPIKE W. TURN RIGHT TO STAY ON MIDDLE TURNPIKE W. CONTINUE STRAIGHT ONTO MIDDLE TURNPIKE E. TURN LEFT. TURN RIGHT.



GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T MOBILITY REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.
4. CONSTRUCTION DRAWINGS ARE VALID FOR SIX MONTHS AFTER ENGINEER OF RECORD'S STAMPED AND SIGNED SUBMITTAL DATE LISTED HEREIN.

72 HOURS

CALL
BEFORE YOU DIG
CALL TOLL FREE 1-800-922-4455
OR CALL 811

UNDERGROUND SERVICE ALERT

STATE OF CONNECTICUT DANIEL P. DAMM LICENSED PROFESSIONAL ENGINEER No. 24178

HUDSON Design Group LLC
45 BEECHWOOD DRIVE
NORTH ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

CENTERLINE COMMUNICATIONS
750 WEST CENTER STREET, SUITE #301
WEST BRIDGEWATER, MA 02379

SITE NUMBER: CT5448
SITE NAME: MANCHESTER CENTRAL
239 MIDDLE TURNPIKE EAST
MANCHESTER, CT 06040
HARTFORD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
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0	04/25/22	ISSUED FOR REVIEW	MB	AT	DPH
A	10/12/21	ISSUED FOR REVIEW	SG	AT	DPH

SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: SG

AT&T

TITLE SHEET
5G NR, BWE TOWER TOP, BBU RECONFIG., 1SR CBAND, ANTENNA MOD RETROFIT 2021 UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CT5448	T-1	1

GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.

2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.

3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81 STANDARDS) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.

4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.

5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS AND #2 AWG STRANDED COPPER FOR OUTDOOR BTS.

6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.

7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.

8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO GROUND BAR.

9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.

10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.

11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

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

   CONTRACTOR – CENTERLINE
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – AT&T MOBILITY

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

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

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

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

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

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

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

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

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

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

12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

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

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

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

16. CONSTRUCTION SHALL COMPLY WITH SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T SITES."

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

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

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

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

    BUILDING CODE: IBC 2015 WITH 2018 CT STATE BUILDING CODE AMENDMENTS
    ELECTRICAL CODE: 2017 NATIONAL ELECTRICAL CODE (NFPA 70-2017)

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

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

    AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) MANUAL OF STEEL CONSTRUCTION, ASD, FOURTEENTH EDITION;

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

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

ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	EQ	EQUAL	REQ	REQUIRED
AWG	AMERICAN WIRE GAUGE	GC	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
BBU	BATTERY BACKUP UNIT	GRC	GALVANIZED RIGID CONDUIT	TBD	TO BE DETERMINED
BTCW	BARE TINNED SOLID COPPER WIRE	MGB	MASTER GROUND BAR	TBR	TO BE REMOVED
BGR	BURIED GROUND RING	MIN	MINIMUM	TBRR	TO BE REMOVED AND REPLACED
BTS	BASE TRANSCEIVER STATION	P	PROPOSED	TYP	TYPICAL
E	EXISTING	NTS	NOT TO SCALE	UG	UNDER GROUND
EGB	EQUIPMENT GROUND BAR	RAD CL	RADIATION CENTER LINE (ANTENNA)	VIF	VERIFY IN FIELD
EGR	EQUIPMENT GROUND RING	REF	REFERENCE		

HUDSON Design Group LLC
45 BEECHWOOD DRIVE
NORTH ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

CENTERLINE COMMUNICATIONS
750 WEST CENTER STREET, SUITE #301
WEST BRIDGEWATER, MA 02379

SITE NUMBER: CT5448
SITE NAME: MANCHESTER CENTRAL

239 MIDDLE TURNPIKE EAST
MANCHESTER, CT 06040
HARTFORD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

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A	10/12/21	ISSUED FOR REVIEW	SG	AT	DPH

SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: SG

STATE OF CONNECTICUT · DANIEL P. HAMM · No. 24178 · LICENSED PROFESSIONAL ENGINEER

AT&T

GENERAL NOTES
5G NR, BWE TOWER TOP, BBU RECONFIG., 1SR
SBAND, ANTENNA MOD RETROFIT 2021 UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CT5448	GN-1	1

NOTE:

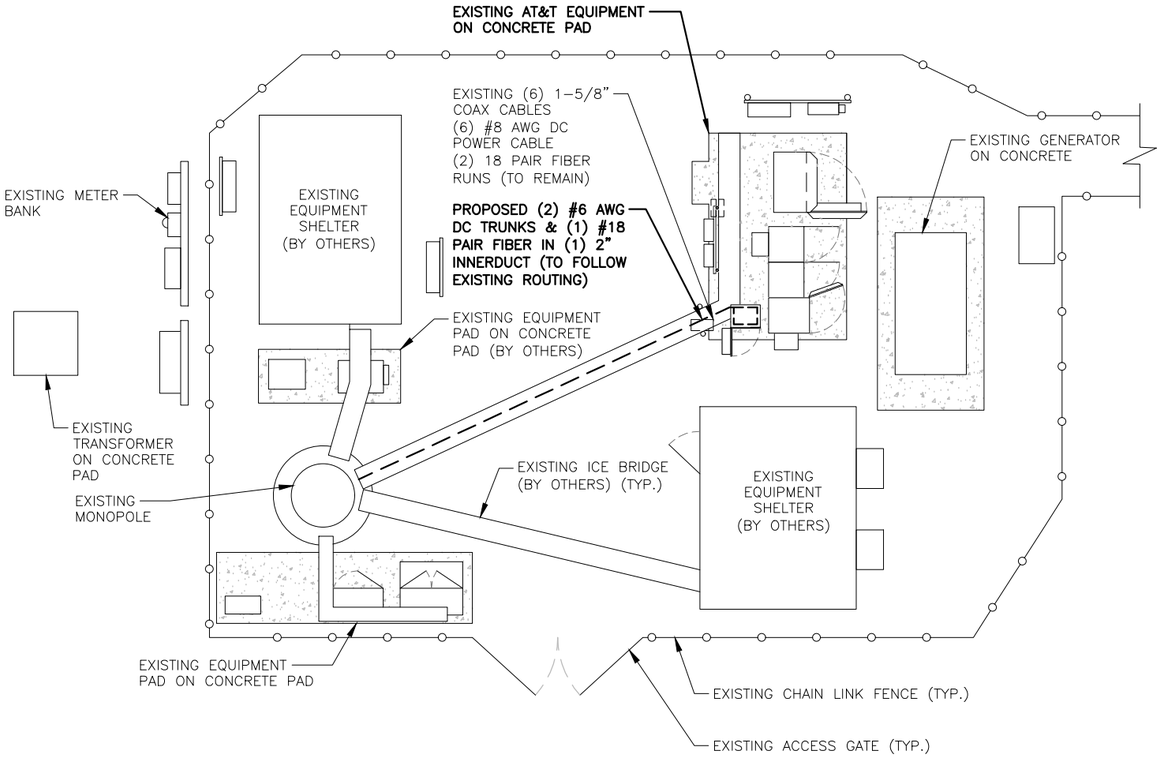
REFER TO THE FINAL RFDS V5.0 DATED: 03/25/2022 FOR FINAL ANTENNA SETTINGS.

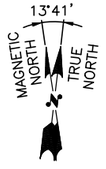
NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT HAS BEEN COMPLETED HUDSON DESIGN GROUP, LLC. DATED: 01/11/2022

NOTE:

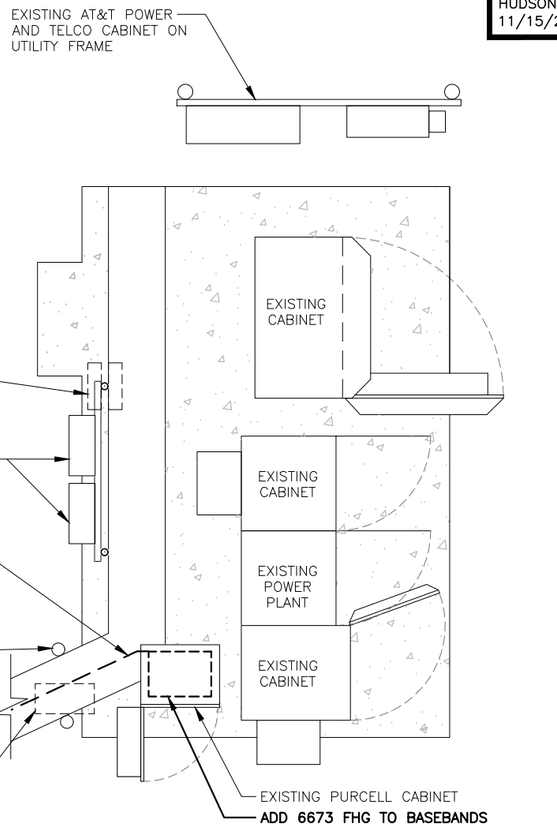
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING TOWER TO SUPPORT THE PROPOSED EQUIPMENT HAS BEEN COMPLETED HUDSON DESIGN GROUP, LLC. DATED: 11/15/2021

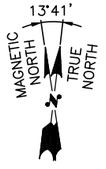




COMPOUND PLAN (1 / A-1)
22x34 SCALE: 3/16"=1'-0"
11x17 SCALE: 3/32"=1'-0"

0 2'-8" 5'-4" 10'-8" 16'-0"





EQUIPMENT PLAN (2 / A-1)
22x34 SCALE: 1/2"=1'-0"
11x17 SCALE: 1/4"=1'-0"

0 2'-0" 4'-0" 6'-0"

HUDSON Design Group LLC
45 BEECHWOOD DRIVE
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STATE OF CONNECTICUT
DANIEL P. HAMM
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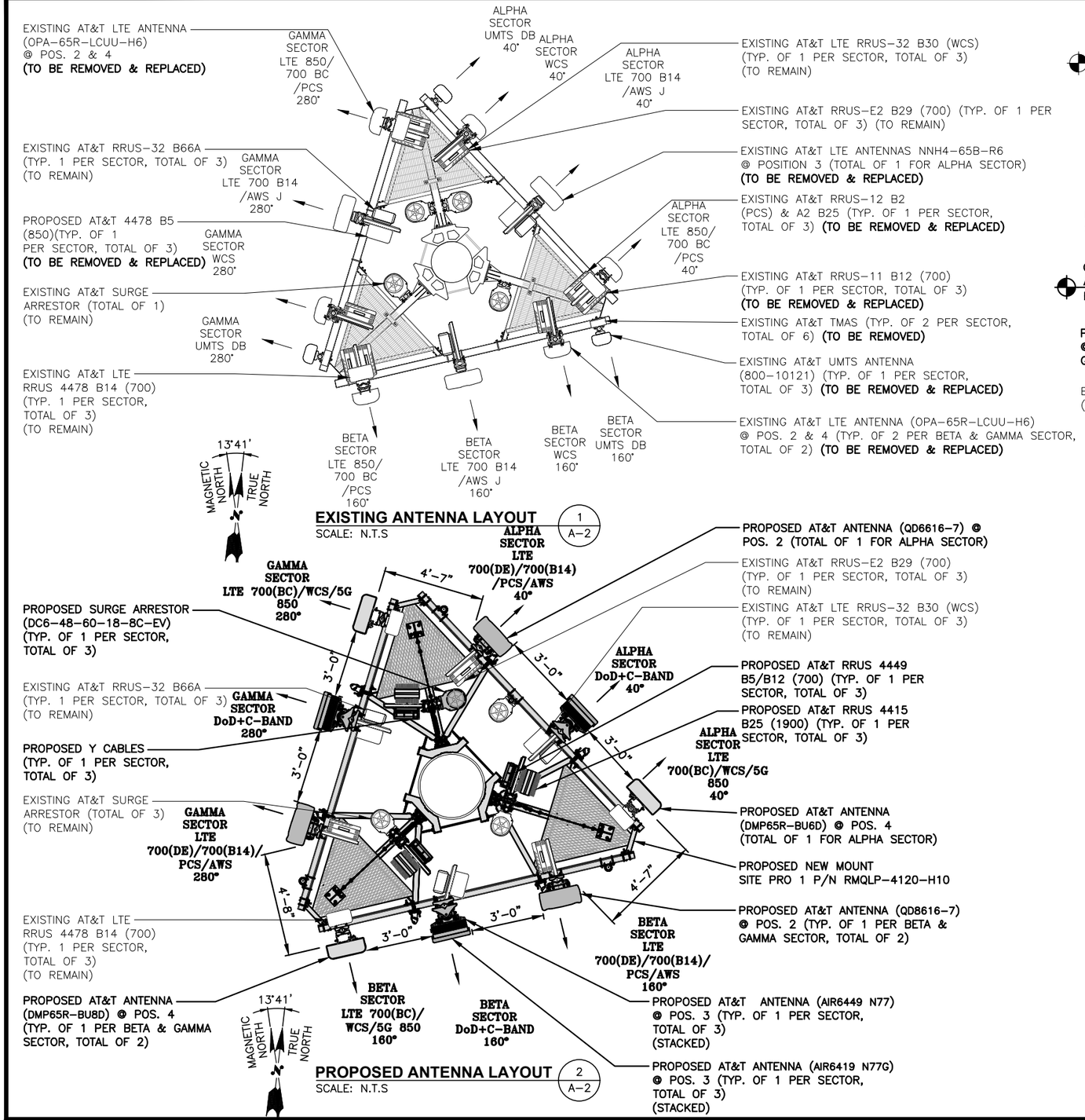
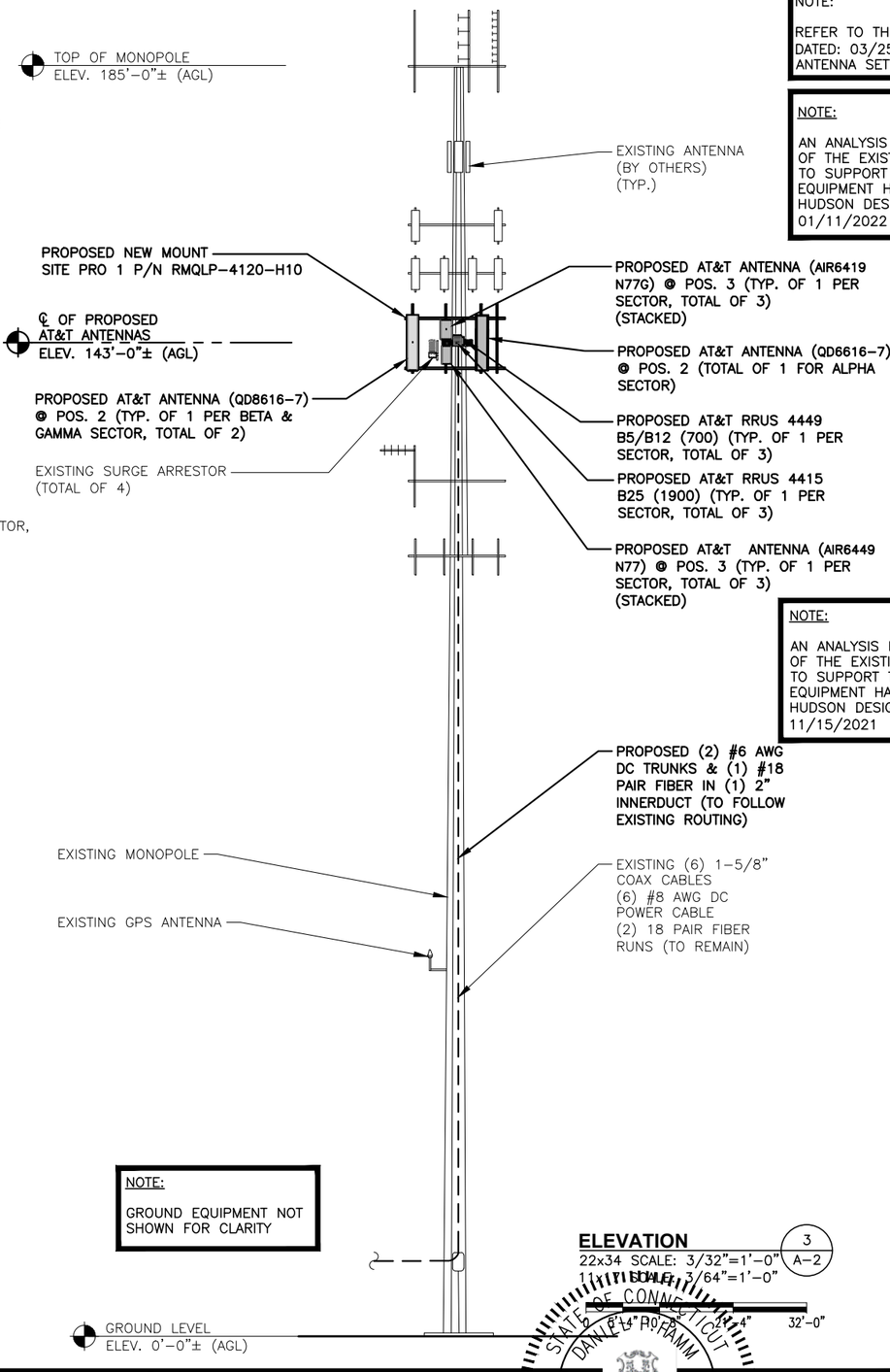
AT&T

5G NR, BWE TOWER TOP, BBU RECONFIG., 1SR 1SBAND, ANTENNA MOD RETROFIT 2021 UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CT5448	A-1	1





NOTE:

REFER TO THE FINAL RFDS V5.0 DATED: 03/25/2022 FOR FINAL ANTENNA SETTINGS.

NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT HAS BEEN COMPLETED HUDSON DESIGN GROUP, LLC. DATED: 01/11/2022

NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING TOWER TO SUPPORT THE PROPOSED EQUIPMENT HAS BEEN COMPLETED HUDSON DESIGN GROUP, LLC. DATED: 11/15/2021

NOTE:

GROUND EQUIPMENT NOT SHOWN FOR CLARITY

HUDSON Design Group LLC
45 BEECHWOOD DRIVE
NORTH ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

CENTERLINE COMMUNICATIONS
750 WEST CENTER STREET, SUITE #301
WEST BRIDGEWATER, MA 02379

SITE NUMBER: CT5448
SITE NAME: MANCHESTER CENTRAL

239 MIDDLE TURNPIKE EAST
MANCHESTER, CT 06040
HARTFORD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
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A	10/12/21	ISSUED FOR REVIEW	SG	AT	DPH

SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: SG

STATE OF CONNECTICUT
DANIEL P. D'AMMA
No. 24178
LICENSED PROFESSIONAL ENGINEER

AT&T

ANTENNA LAYOUTS & ELEVATION
5G NR, BWE TOWER TOP, BBU RECONFIG., 1SR
SBAND, ANTENNA MOD RETROFIT 2021 UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CT5448	A-2	1

ANTENNA SCHEDULE

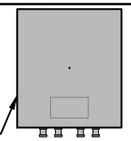
SECTOR	EXISTING/ PROPOSED	BAND	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA ℄ HEIGHT	AZIMUTH	TMA/ DIPLEXER	RRU	SIZE (INCHES) (L x W x D)	FEEDER	RAYCAP
A1	–	–	–	–	–	–	–	–	–	(2)(E)1-5/8 COAX	(E) (1) RAYCAP DC6-48-60-18-8F (P) (1) RAYCAP DC6-48-60-18-8C-EV
A2	PROPOSED	LTE 700(DE)/700(B14)/ PCS/AWS	QD6616-7	72"X22"X9.6"	143'-0"±	40°	–	(P)(1) 4415 B25 (1900) (E)(1) 4478 B14 (700) (E)(1) RRUS-32 B66A (AWS) (E)(1) RRUS-E2 B29 (700)	16.5"X13.4"X5.9" – – –	(E)(2) #8 AWG DC TRUNK & (1)(E) 18 PAIR FIBER	
A3	PROPOSED	DoD C-BAND	AIR 6419 N77G AIR 6449 N77D	30.4"X15.9"X8.1" 31.1"X16.1X7.3"	144'-9"± 141'-2"±	40°	–	–	– –	(P)(2) #6 AWG DC TRUNK & (1)(P) #18 PAIR FIBER	
A4	PROPOSED	LTE 700(BC)/WCS/ 5G 850	DMP65R-BU6DA	71.2"X20.7X7.7"	143'-0"±	40°	–	(P)(1) 4449 B5/B12 (850/700) (E)(1) RRUS-32 B30 (WCS)	17.9"X13.9"X9.4" –	(P)(1) Y CABLE	
B1	–	–	–	–	–	–	–	–	–	(2)(E)1-5/8 COAX	(E) (1) RAYCAP DC6-48-60-18-8F
B2	PROPOSED	LTE 700(DE)/700(B14)/ PCS/AWS	QD8616-7	96"X22"X9.6"	143'-0"±	160°	–	(P)(1) 4415 B25 (1900) (E)(1) 4478 B14 (700) (E)(1) RRUS-32 B66A (AWS) (E)(1) RRUS-E2 B29 (700)	16.5"X13.4"X5.9" – – –	(E)(2) #8 AWG DC TRUNK & (1)(E) 18 PAIR FIBER	
B3	PROPOSED	DoD C-BAND	AIR 6419 N77G AIR 6449 N77D	30.4"X15.9"X8.1" 31.1"X16.1X7.3"	144'-9"± 141'-2"±	160°	–	–	– –	–	
B4	PROPOSED	LTE 700(BC)/WCS/ 5G 850	DMP65R-BU8DA	96.0"X20.7X7.7"	143'-0"±	160°	–	(P)(1) 4449 B5/B12 (850/700) (E)(1) RRUS-32 B30 (WCS)	17.9"X13.9"X9.4" –	(P)(1) Y CABLE	
C1	–	–	–	–	–	–	–	–	–	(2)(E)1-5/8 COAX	(E) (1) RAYCAP DC6-48-60-18-8F
C2	PROPOSED	LTE 700(DE)/700(B14)/ PCS/AWS	QD8616-7	96"X22"X9.6"	143'-0"±	280°	–	(P)(1) 4415 B25 (1900) (E)(1) 4478 B14 (700) (E)(1) RRUS-32 B66A (AWS) (E)(1) RRUS-E2 B29 (700)	16.5"X13.4"X5.9" – – –	(E)(2) #8 AWG DC TRUNK	
C3	PROPOSED	DoD C-BAND	AIR 6419 N77G AIR 6449 N77D	31.1"X16.1X7.3" 30.4"X15.9"X8.1"	144'-9"± 141'-2"±	280°	–	–	– –	–	
C4	PROPOSED	LTE 700(BC)/WCS/ 5G 850	DMP65R-BU8DA	96.0"X20.7X7.7"	143'-0"±	280°	–	(P)(1) 4449 B5/B12 (850/700) (E)(1) RRUS-32 B30 (WCS)	17.9"X13.9"X9.4" –	(P)(1) Y CABLE	

RRU CHART

QUANTITY	MODEL	SIZE (L x W x D)
3(E)	RRUS-E2 B29 (700)	20.4"x18.5"x7.5"
3(E)	RRUS-32 B66A (AWS)	27.2"X12.1"X7.0"
3(E)	RRUS-32 B30 (WCS)	27.2"X12.1"X7.0"
3(E)	4478 B5/B14 (700)	18.1"X13.4"X8.3"
3(P)	RRUS-4449 B5/B12 (850/700)	17.9"X13.9"X9.44"
3(P)	RRUS-4415 B25 (1900)	16.5"X13.4"X5.9"

NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS

NOTE:
SEE RFDS FOR RRH FREQUENCY AND MODEL NUMBER



PROPOSED RRU REFER TO THE FINAL RFDS AND CHART FOR QUANTITY, MODEL AND DIMENSIONS

NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

NOTE:
REFER TO THE FINAL RFDS V5.0 DATED: 03/25/2022 FOR FINAL ANTENNA SETTINGS.

NOTE:
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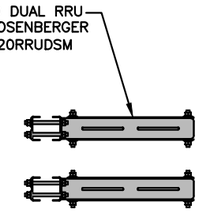
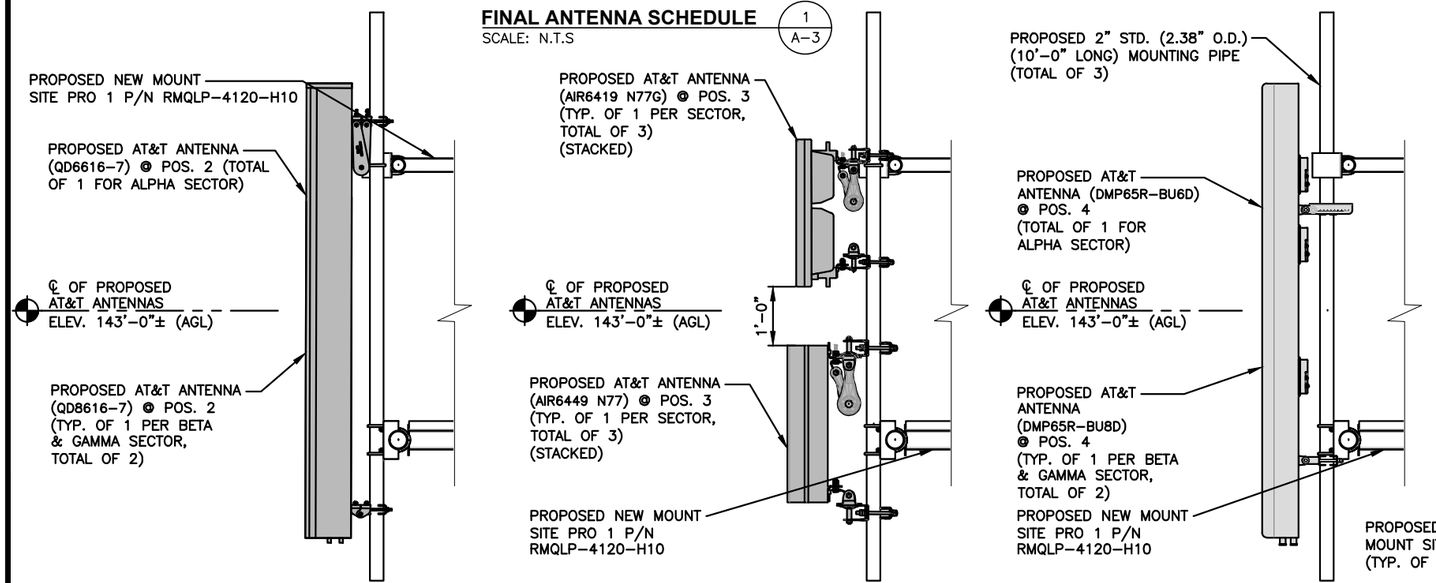
NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING TOWER TO SUPPORT THE PROPOSED EQUIPMENT HAS BEEN COMPLETED HUDSON DESIGN GROUP, LLC. DATED: 11/15/2021

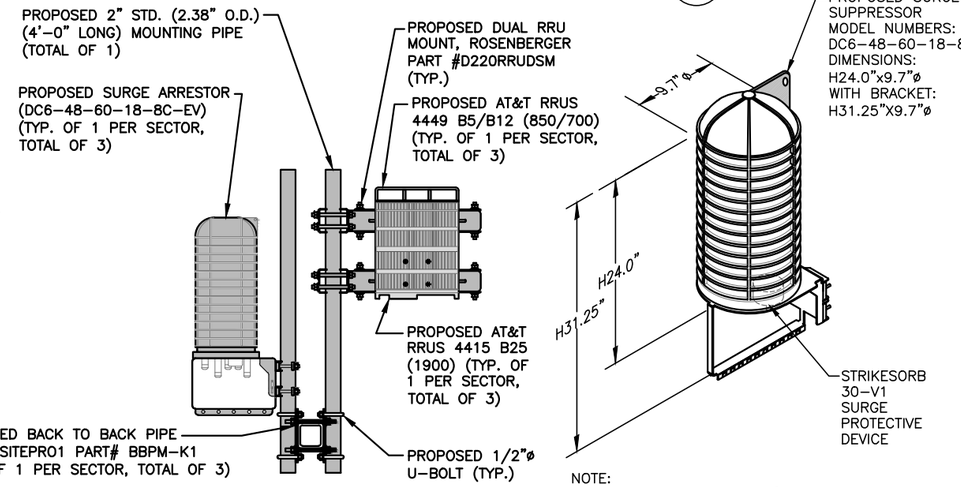
PROPOSED RRUS DETAIL (2 / A-3)
SCALE: N.T.S



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



BACK TO BACK RRU MOUNT DETAIL (3 / A-3)
SCALE: N.T.S



NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

PROPOSED LTE ANTENNA @ POS. 2 (4 / A-3)
22x34 SCALE: 3/4"=1'-0"
11x17 SCALE: 3/8"=1'-0"

0 8" 1'-4" 2'-8" 4'-0"

PROPOSED LTE ANTENNA @ POS. 3 (5 / A-3)
22x34 SCALE: 3/4"=1'-0"
11x17 SCALE: 3/8"=1'-0"

0 8" 1'-4" 2'-8" 4'-0"

PROPOSED LTE ANTENNA @ POS. 4 (6 / A-3)
22x34 SCALE: 3/4"=1'-0"
11x17 SCALE: 3/8"=1'-0"

0 8" 1'-4" 2'-8" 4'-0"

SURGE ARRESTOR MOUNTING DETAIL (7 / A-3)
SCALE: N.T.S

PROPOSED SURGE SUPPRESSOR DETAIL (8 / A-3)
SCALE: N.T.S

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NORTH ANDOVER, MA 01845
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CENTERLINE COMMUNICATIONS
750 WEST CENTER STREET, SUITE #301
WEST BRIDGEWATER, MA 02379

SITE NUMBER: CT5448
SITE NAME: MANCHESTER CENTRAL

239 MIDDLE TURNPIKE EAST
MANCHESTER, CT 06040
HARTFORD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
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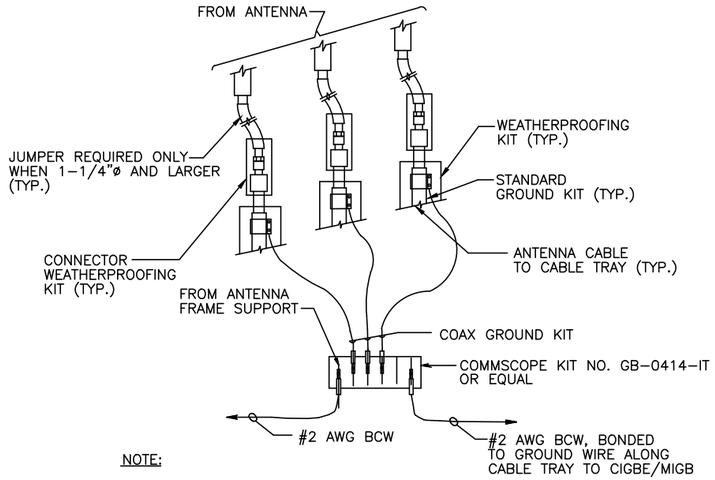
SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: SG

STATE OF CONNECTICUT DANIEL P. HAMM No. 24178 LICENSED PROFESSIONAL ENGINEER

AT&T

DETAILS
5G NR, BWE TOWER TOP, BBU RECONFIG., 1SR CBAND, ANTENNA MOD RETROFIT 2021 UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CT5448	A-3	1

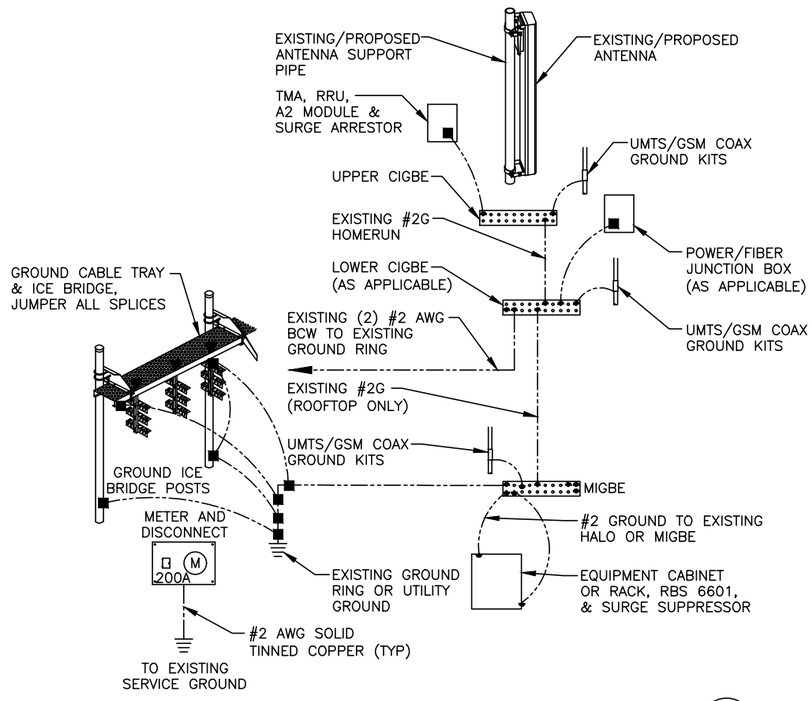


NOTE:

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

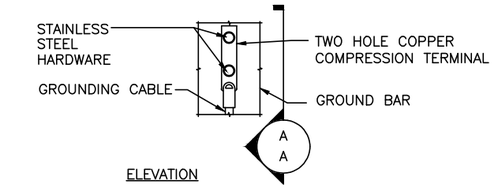
GROUND WIRE TO GROUND BAR CONNECTION DETAIL (1 / G-1)

SCALE: N.T.S



GROUNDING RISER DIAGRAM (2 / G-1)

SCALE: N.T.S



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

TYPICAL GROUND BAR CONNECTION DETAIL (3 / G-1)

SCALE: N.T.S

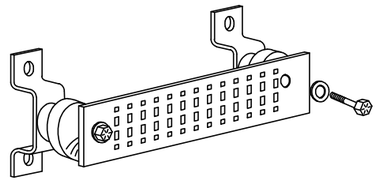
EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

SECTION "P" – SURGE PRODUCERS

CABLE ENTRY PORTS (HATCH PLATES) (#2 AWG)
GENERATOR FRAMEWORK (IF AVAILABLE) (#2 AWG)
TELCO GROUND BAR
COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2 AWG)
+24V POWER SUPPLY RETURN BAR (#2 AWG)
-48V POWER SUPPLY RETURN BAR (#2 AWG)
RECTIFIER FRAMES.

SECTION "A" – SURGE ABSORBERS

INTERIOR GROUND RING (#2 AWG)
EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2 AWG)
METALLIC COLD WATER PIPE (IF AVAILABLE) (#2 AWG)
BUILDING STEEL (IF AVAILABLE) (#2 AWG)



GROUND BAR - DETAIL (AS REQUIRED)

SCALE: N.T.S

HUDSON Design Group LLC
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NORTH ANDOVER, MA 01845
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WEST BRIDGEWATER, MA 02379

SITE NUMBER: CT5448
SITE NAME: MANCHESTER CENTRAL

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HARTFORD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

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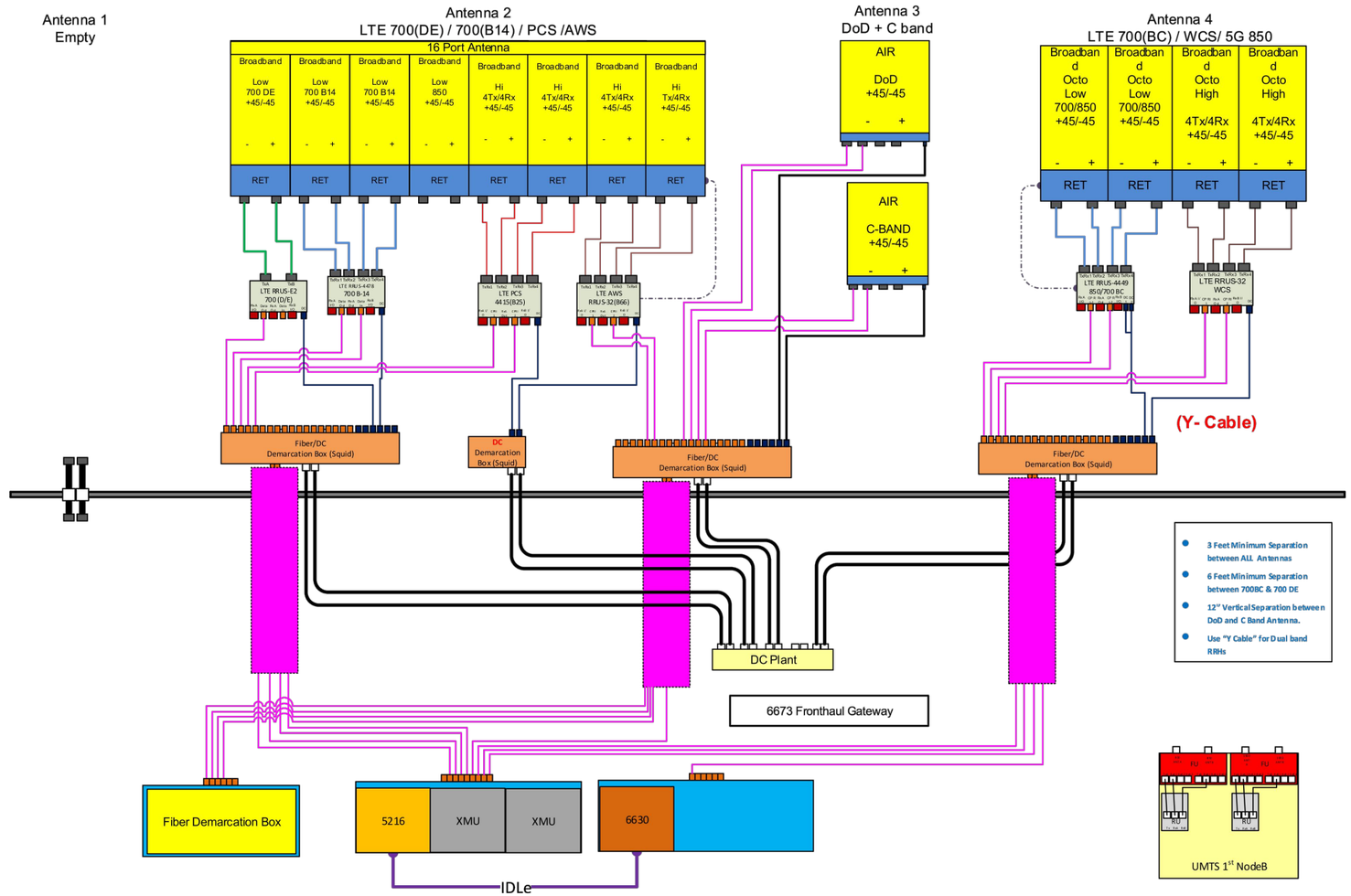
SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: SG

STATE OF CONNECTICUT · DANIEL P. HAMM · No. 24178 · LICENSED PROFESSIONAL ENGINEER

AT&T

GROUNDING DETAILS
5G NR, BWE TOWER TOP, BBU RECONFIG., 1SR
SBAND, ANTENNA MOD RETROFIT 2021 UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CT5448	G-1	1



RF PLUMBING DIAGRAM 1 RF–1
SCALE: N.T.S

NOTE:
1. CONTRACTOR TO CONFIRM ALL PARTS.
2. INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS

NOTE:

REFER TO THE FINAL RFDS V5.0 DATED: 03/25/2022 FOR FINAL ANTENNA SETTINGS.

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SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: SG

AT&T

RF PLUMBING DIAGRAM
5G NR, BWE TOWER TOP, BBU RECONFIG., 1SR CBAND, ANTENNA MOD RETROFIT 2021 UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CT5448	RF–1	1

EXHIBIT 2

239 MIDDLE TURNPIKE EAST

Location	239 MIDDLE TURNPIKE EAST	**Mblu**	92/ 3950/ 239/ /
Acct#	395000239	**Owner**	MANCHESTER TOWN OF
Assessment	$4,361,200	**Appraisal**	$6,230,200
PID	10705	**Building Count**	2
DISTRICT	X	**CONCRETE**	

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2021	$5,721,500	$508,700	$6,230,200
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2021	$4,005,100	$356,100	$4,361,200

Owner of Record

Owner	MANCHESTER TOWN OF	**Sale Price**	$0
Address	41 CENTER ST MANCHESTER, CT 06040-5096	**Certificate**	C
		Book & Page	/0
		Sale Date	
		Instrument	

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
MANCHESTER TOWN OF	$0	C	/0		

Building Information

Building 1 : Section 1

Year Built:	1995
Living Area:	46,701
Replacement Cost:	$6,429,454

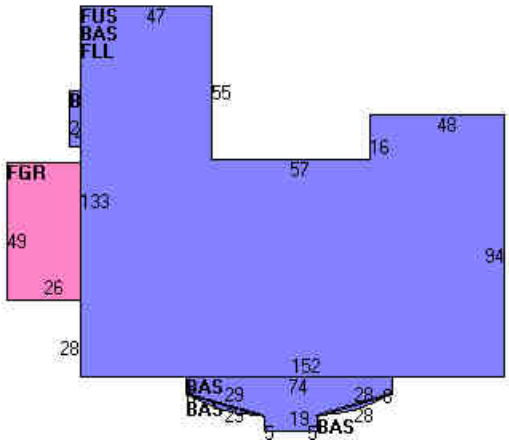
Replacement Cost Less Depreciation: $5,143,600

Building Attributes	
Field	**Description**
Style:	Other Municip
Model	Ind/Comm
Grade	Average +10
Stories:	2
Occupancy	1.00
Exterior Wall 1	Brick Veneer
Exterior Wall 2	Stucco/Masonry
Roof Structure	Gable/Hip
Roof Cover	Asphalt Shingl
Interior Wall 1	Minim/Masonry
Interior Wall 2	Drywall/Sheetr
Interior Floor 1	Carpet
Interior Floor 2	Tile/Vinyl Cmp
Heating Fuel	Gas
Heating Type	Forced Air-Duc
AC Type	Central
Struct Class	
Bldg Use	Municipal 96
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	901I
Heat/AC	Heat/AC Packag
Frame Type	Steel
Baths/Plumbing	Average
Ceiling/Wall	Susp Ceil & Wl
Rooms/Prtns	Average
Wall Height	10.00
% Comn Wall	0.00

Building Photo

(http://images.vgsi.com/photos2/ManchesterCTPhotos//\00\03\29\13.jpg)

Building Layout



(http://images.vgsi.com/photos2/ManchesterCTPhotos//Sketches/10705_1

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	16,283	16,283
FLL	Finished Lower Level	15,209	15,209
FUS	Upper Story, Finished	15,209	15,209
FGR	Garage	1,274	0
		47,975	46,701

Building 2 : Section 1

Year Built: 1975
Living Area: 7,000
Replacement Cost: $586,748
Replacement Cost Less Depreciation: $357,900

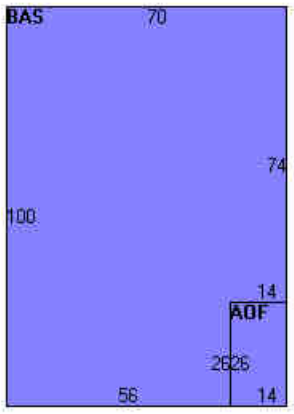
Building Attributes : Bldg 2 of 2	
Field	**Description**

Style:	Service Shop
Model	Ind/Comm
Grade	Average +10
Stories:	1
Occupancy	1.00
Exterior Wall 1	Brick Veneer
Exterior Wall 2	
Roof Structure	Gable/Hip
Roof Cover	Asphalt Shingl
Interior Wall 1	Minim/Masonry
Interior Wall 2	
Interior Floor 1	Concr-Finished
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Forced Air-Duc
AC Type	None
Struct Class	
Bldg Use	Municipal 96
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	901I
Heat/AC	Heat/AC Packag
Frame Type	Masonry
Baths/Plumbing	Average
Ceiling/Wall	Ceil & Min Wl
Rooms/Prtns	Average
Wall Height	19.00
% Comn Wall	0.00

Building Photo

(http://images.vgsi.com/photos2/ManchesterCTPhotos//\00\03\29\14.jpg)

Building Layout



(http://images.vgsi.com/photos2/ManchesterCTPhotos//Sketches/10705_1

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	6,636	6,636
AOF	Office, (Average)	364	364
		7,000	7,000

Extra Features

Extra Features				Legend
Code	Description	Size	Value	Bldg #
MEZ1	Mezzanine-Unfin	1900.00 S.F.	$13,300	2
SPR1	Sprinklers-Wet	47975.00 S.F.	$54,000	1

Land

Land Use

Use Code 901I

Land Line Valuation

Size (Acres) 3.97

Description	Municipal 96	**Frontage**	0
Zone	RA	**Depth**	0
Neighborhood	4000	**Assessed Value**	$356,100
Alt Land Appr	No	**Appraised Value**	$508,700
Category			

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
PAV1	Paving Asphalt			97700.00 S.F.	$122,100	1
FN4	Fence 8' Chain			128.00 L.F.	$1,900	1
LT1	Lights 1Fix			15.00 UNITS	$12,900	1
CNP1	Canopy Ave			360.00 S.F.	$7,800	1
SHD2	Shed W/Imp			120.00 S.F.	$1,300	1
SHD1	Shed			168.00 S.F.	$1,500	1
FN3	Fence 6' Chain			160.00 L.F.	$3,700	1
SHD2	Shed W/Imp			140.00 S.F.	$1,500	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2020	$5,573,900	$488,200	$6,062,100
2015	$4,365,100	$488,200	$4,853,300
2010	$4,125,100	$423,400	$4,548,500

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2020	$3,901,900	$341,800	$4,243,700
2015	$3,055,600	$341,800	$3,397,400
2010	$2,887,500	$296,400	$3,183,900

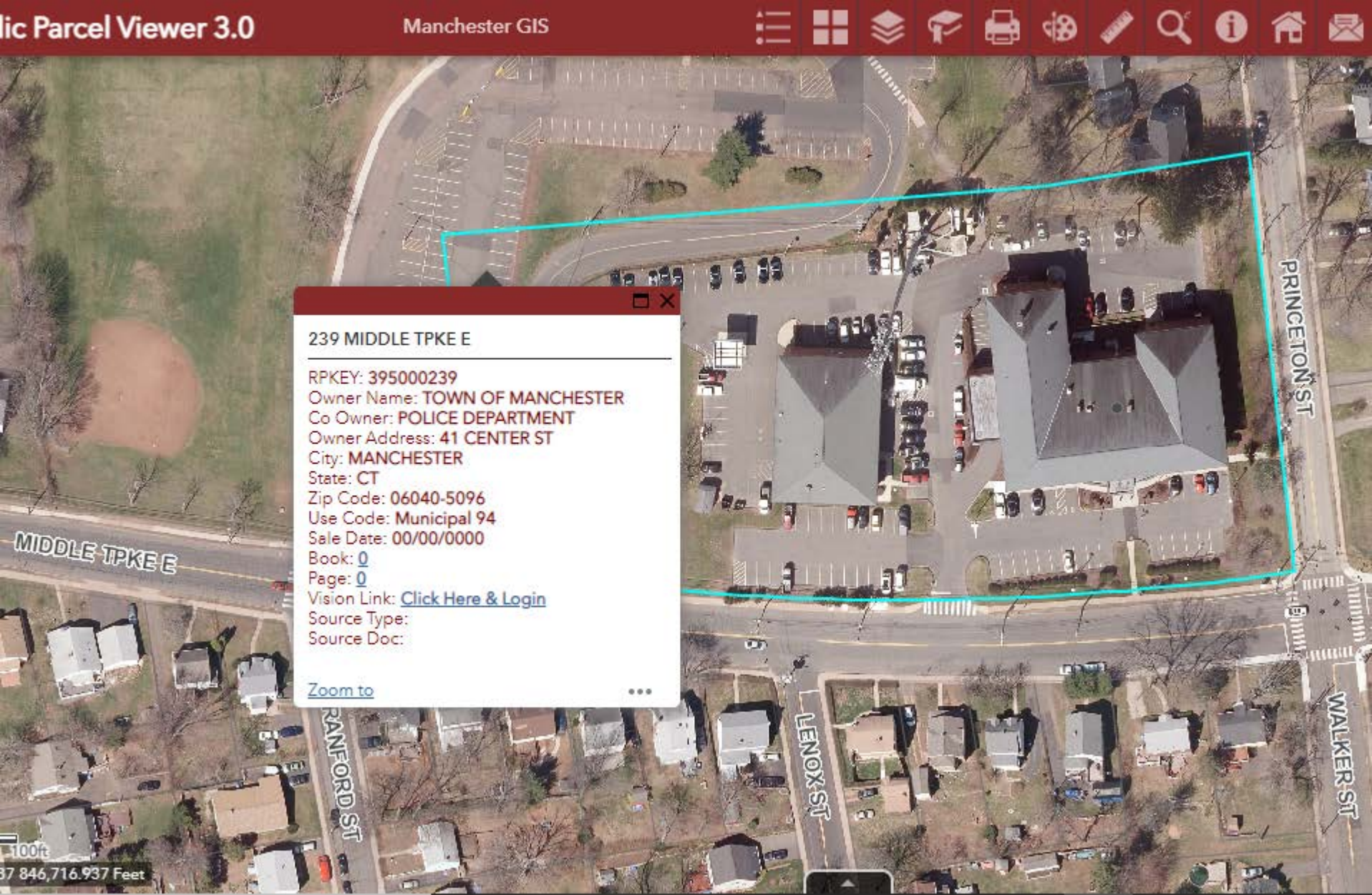

lic Parcel Viewer 3.0
Manchester GIS
239 MIDDLE TPKE E
RPKEY: 395000239
Owner Name: TOWN OF MANCHESTER
Co Owner: POLICE DEPARTMENT
Owner Address: 41 CENTER ST
City: MANCHESTER
State: CT
Zip Code: 06040-5096
Use Code: Municipal 94
Sale Date: 00/00/0000
Book: 0
Page: 0
Vision Link: Click Here & Login
Source Type:
Source Doc:
Zoom to
MIDDLE TPKE E
PRINCETON ST
LENOX ST
WALKER ST
RANFORD ST
100ft
37 846,716.937 Feet

EXHIBIT 3

STRUCTURAL ANALYSIS REPORT

For

SITE NUMBER: CT5448 (C-BAND)
SITE NAME: MANCHESTER CENTRAL

239 Middle Turnpike East
Manchester, CT 06040

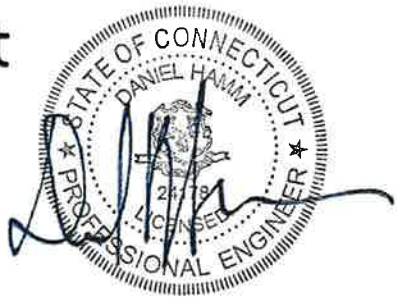
Antennas Mounted on the Monopole

Prepared for:

CENTERLINE COMMUNICATIONS

at&t

Dated: November 15, 2021



Prepared by:

HDG HUDSON Design Group LLC

45 Beechwood Drive
North Andover, MA 01845
(P) 978.557.5553 (F) 978.336.5586
www.hudsondesigngroupllc.com

SCOPE OF WORK:

Hudson Design Group LLC (HDG) has been authorized by AT&T to conduct a structural evaluation of the 183' monopole supporting the proposed AT&T's antennas located at elevation 143' above the ground level.

This report represents this office's findings, conclusions and recommendations pertaining to the support of AT&T's existing and proposed antennas listed below.

The following documents were used for our reference:

- Tower Design Drawings prepared by Engineering Endeavors Inc. dated September 17, 2012
- Tower Mapping Report prepared by Provertic LLC dated October 15, 2019.
- Previous HDG Structural Analysis dated October 31, 2019.
- Structural Analysis report prepared by EFI Global dated March 21, 2021.

CONCLUSION SUMMARY:

Based on our evaluation, we have determined that the existing tower **is in conformance** with the ANSI/TIA-222-H Standard for the loading considered under the criteria listed in this report. The tower structure is rated at **88.0%** - (Pole Section-L5 from EL.43.91' to EL.87.99' Controlling).

FOUNDATION SUMMARY:

Based on our evaluation, we have determined that the existing foundation **is in conformance** with the ANSI/TIA-222-H Standard for the loading considered under the criteria listed in this report. The foundation is rated at **86.4 %** - (Moment Capacity Controlling).

APPURTENANCES CONFIGURATION:

Tenant	Appurtenances	Elev.	Mount
	Lightning Rod w/ Pipe Extension	191'	Low Profile Platform
	(2) 2' Dish Antennas	190'	Low Profile Platform
	(2) SODU 48VDC XALT	188'	Low Profile Platform
	(2) 20' Dipoles	185'	Low Profile Platform
	(3) AIR3246 B66 Antennas	163'	Low Profile Platform
	(3) AIR6449 B41 Antennas	163'	Low Profile Platform
	(3) AIR 32 Antennas	163'	Low Profile Platform
	(3) APXVAA24-43-U-A20 Antennas	163'	Low Profile Platform
	(3) 4449 B71+B85 RRH's	163'	Low Profile Platform
	(3) 4415 B25 RRH's	163'	Low Profile Platform
	(3) APXVSPP18 Antennas	156'	Low Profile Platform
	(3) APXVTM14-C-120 Antennas	156'	Low Profile Platform
	(3) RRH8x20-25	159'	Low Profile Platform
	(3) RRH-800	156'	Low Profile Platform
	(3) RRH-1900	157'	Ring Mount
	(3) RRH-1900	156'	Ring Mount
	Panel Antenna	154'	Low Profile Platform
	(2) 2' Dish Antennas	152'	Low Profile Platform
	3' Dish Antenna	151'	Low Profile Platform
AT&T	(3) RRUS-32 B66A RRH's	143'	Platform
AT&T	(3) RRUS-32 B30 RRH's	143'	Platform
AT&T	(3) RRUS-E2 B29 RRH's	143'	Platform
AT&T	(3) B14 4478 RRH's	143'	Platform
AT&T	(1) Squid Surge Arrestor	143'	Platform
AT&T	**(2) DMP65R-BU8DA Antennas**	143'	Platform
AT&T	**(1) DMP65R-BU6DA Antennas**	143'	Platform
AT&T	**(2) QD8616-7 Antennas**	143'	Platform
AT&T	**(1) QD6616-7 Antennas**	143'	Platform
AT&T	**(3) AIR 6419 Antennas**	143'	Platform
AT&T	**(3) AIR 6449 Antennas**	143'	Platform
AT&T	**(3) 4415 B25 RRH's**	143'	Platform
AT&T	**(3) B5/B12 4449 RRH's**	143'	Platform
AT&T	**(3) Squid Surge Arrestors**	143'	Platform
	6' Omni	135'	Low Profile Platform
	6' Omni	129'-6"	Low Profile Platform
	Dipole	128'-6"	Low Profile Platform
	24" Yagi	128'-6"	Low Profile Platform
	15" Yagi	125'-6"	Low Profile Platform
	2'-6" Yagi	121'-6"	Low Profile Platform
	(6) LNX 6514DS-VTM Antennas	113'	Platform
	(6) NNHH-65B-R4 Antennas	113'	Platform
	(3) B5/B13 RRH-BRO4C RRH's	113'	Platform
	(3) B2/B66A RRH-BRO49 RRH's	113'	Platform
	(2) OVP	113'	Platform
	GPS	54'-6"	Side Mount Standoff

Proposed AT&T Appurtenances shown in Bold.

AT&T EXISTING/PROPOSED COAX CABLES:

Tenant	Coax Cables	Elev.	Mount
AT&T	(6) 1 5/8" Cables	143'	Inside Monopole
AT&T	***(8) DC Power Cables***	143'	Inside Monopole
AT&T	***(3) Fiber Cable***	143'	Inside Monopole

Proposed AT&T Coax Cables shown in Bold.

ANALYSIS RESULTS SUMMARY:

Component	Max. Stress Ratio	Elev. of Component (ft)	Pass/Fail	Comments
Pole Section-L1	16.0 %	166.5 – 184	PASS	
Pole Section-L2	73.9 %	133.08 – 166.5	PASS	
Pole Section-L3	78.2 %	112.99 – 133.08	PASS	
Pole Section-L4	86.0 %	87.99 – 112.99	PASS	
Pole Section-L5	**88.0 %**	43.91 – 87.99	PASS	**Controlling**
Pole Section-L6	83.6 %	1 – 43.91	PASS	
Base Plate	84.7 %	1	PASS	

FOUNDATION RESULTS SUMMARY:

	Stress Ratio	Pass/Fail	Comments
Bearing	7.0 %	PASS	
Moment Capacity	**86.4 %**	PASS	**Controlling**

DESIGN CRITERIA:

1. EIA/TIA-222-H Structural Standards for Steel Antenna Towers and Antenna Supporting Structures

   County: Hartford
   Ultimate Wind Speed: 135 mph (3 second gust)
   Structural Class: IV
   Exposure Category: B
   Topographic Category: 1
   Nominal Ice Thickness: 1.5 inch

2. Approximate height above grade to proposed antennas: 143'

***Calculations and referenced documents are attached.**

ASSUMPTIONS:

1. The appurtenances configuration is as stated in this report. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer's requirements.

2. The tower and foundation are properly constructed and maintained. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.

3. The support mounts and platforms are not analyzed and are considered adequate to support the loading. The analysis is limited to the primary support structure itself.

SUPPORT RECOMMENDATIONS:

HDG recommends that the proposed antennas, RRHs and surge arrestors be mounted on the existing platform supported by the monopole.

Reference HDG's Latest Construction Drawings for all component and connection requirements (attached).

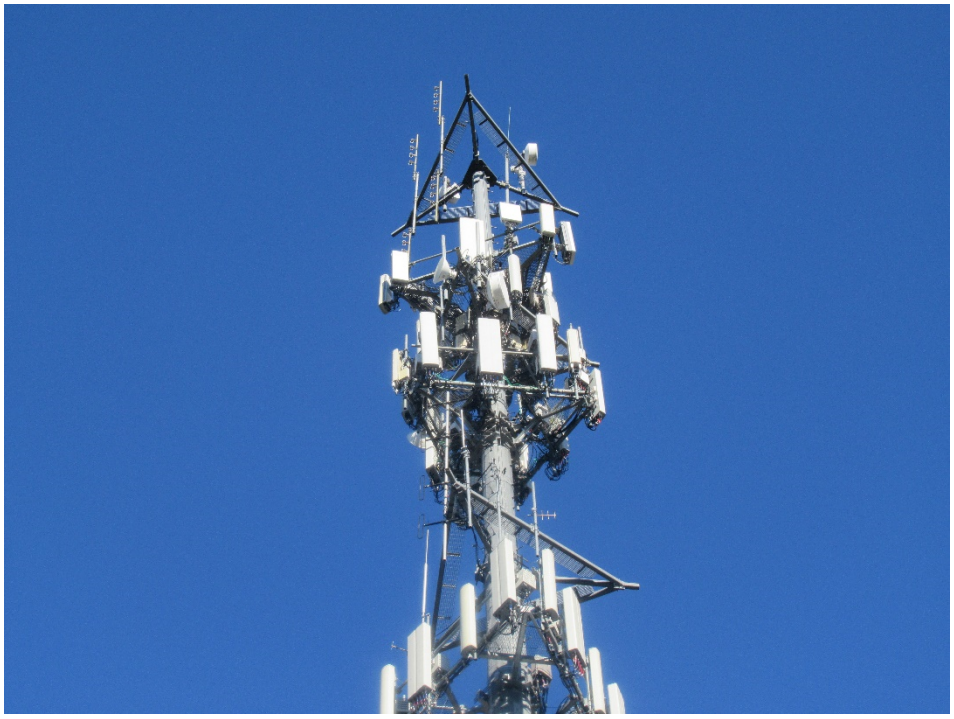
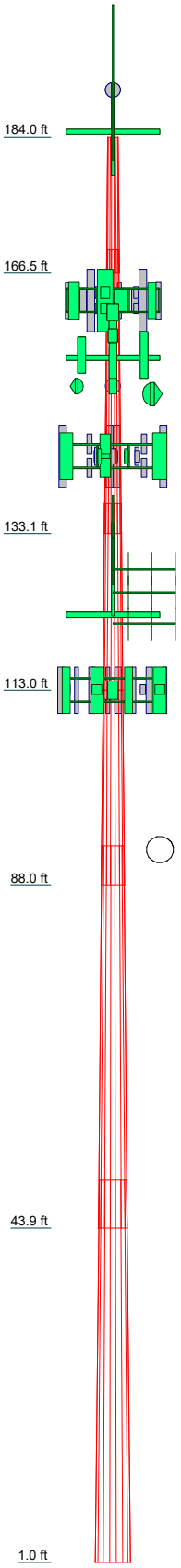


Photo 1: Photo illustrating the Tower with Appurtenances shown.

HUDSON
Design Group LLC

CALCULATIONS

Section	1	2	3	4	5	6		
Length (ft)	17.50	36.42	23.92	25.00	49.08	49.08		
Number of Sides	18	18	18	18	18	18		
Thickness (in)	0.1875	0.2500	0.3750	0.4150	0.4850	0.5400		
Socket Length (ft)	3.00	3.83		5.00	6.17			
Top Dia (in)	15.5000	18.3556	25.0549	30.2850	33.9406	42.5549		
Bot Dia (in)	19.3990	26.4010	30.2850	35.8920	44.9030	53.5000		
Grade							A572-65	
Weight (lb)	611.7	2176.1	2644.3	3661.2	10010.3	13593.1		32696.8



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod w/ Pipe Extension	191	RRUS 32 B66A RRH	143
2' Dish Antenna w/ Shroud	190	RRUS-E2 B29 RRH	143
2' Dish Antenna w/ Shroud	190	RRUS-E2 B29 RRH	143
SODU 48VDC XALT	188	RRUS-E2 B29 RRH	143
SODU 48VDC XALT	188	B14 4478 RRH	143
20' 4-Bay Dipole	185	B14 4478 RRH	143
PiROD 13' Low Profile Platform Top (Monopole)	185	B14 4478 RRH	143
		Squid Surge Arrestor	143
20' 4-Bay Dipole	185	DMP65R-BU8DA Antenna w/ Mounting Pipe	143
12'-6" Platform w/ Handrail + Lift Kit	163		
APXVAARR24_43-U-NA20 Antenna w/ Mounting Pipe	163	DMP65R-BU8DA Antenna w/ Mounting Pipe	143
APXVAARR24_43-U-NA20 Antenna w/ Mounting Pipe	163	DMP65R-BU6DA Antenna w/ Mounting Pipe	143
APXVAARR24_43-U-NA20 Antenna w/ Mounting Pipe	163	QD8616-7 Antenna w/ Mounting Pipe	143
		QD8616-7 Antenna w/ Mounting Pipe	143
AIR 32 B66A B2A Antenna w/ Mounting Pipe	163	QD6616-7 Antenna w/ Mounting Pipe	143
AIR 32 B66A B2A Antenna w/ Mounting Pipe	163	AIR 6419 Antenna w/ Mounting Pipe (ATI)	143
AIR 32 B66A B2A Antenna w/ Mounting Pipe	163	AIR 6419 Antenna w/ Mounting Pipe (ATI)	143
AIR 3246 B66 Antenna w/ Mounting Pipe	163	AIR 6419 Antenna w/ Mounting Pipe (ATI)	143
AIR 3246 B66 Antenna w/ Mounting Pipe	163	AIR 6449 Antenna (ATI)	143
AIR 3246 B66 Antenna w/ Mounting Pipe	163	AIR 6449 Antenna (ATI)	143
AIR6449 B41 Antenna w/ Mounting Pipe	163	AIR 6449 Antenna (ATI)	143
		4415 B25 RRH	143
AIR6449 B41 Antenna w/ Mounting Pipe	163	4415 B25 RRH	143
AIR6449 B41 Antenna w/ Mounting Pipe	163	4415 B25 RRH	143
4449 B71+B85 RRH	163	4449 B5/B12 RRH	143
4449 B71+B85 RRH	163	4449 B5/B12 RRH	143
4449 B71+B85 RRH	163	4449 B5/B12 RRH	143
4415 B25 RRH	163	Squid Surge Arrestor	143
4415 B25 RRH	163	Squid Surge Arrestor	143
4415 B25 RRH	163	Squid Surge Arrestor	143
RRH 8X20-25	159	Omni 2"X6'	135
RRH 8X20-25	159	Omni 2"X6'	129.5
RRH 8X20-25	159	20' 4-Bay Dipole	128.5
1900 4x45 RRH	157	24" Yagi Antena	128.5
1900 4x45 RRH	157	15" Yagi Antena	125.5
1900 4x45 RRH	157	PiROD 13' Low Profile Platform	123
PiROD 13' Low Profile Platform	156	2'-6" Yagi Antena	121.5
APXVSPP18-C Antenna w/ Mounting Pipe	156	B2/B66A RRH-BR049 RRH	113
		B2/B66A RRH-BR049 RRH	113
APXVSPP18-C Antenna w/ Mounting Pipe	156	B2/B66A RRH-BR049 RRH	113
APXVSPP18-C Antenna w/ Mounting Pipe	156	B5/B13 RRH-BR04C RRH	113
		B5/B13 RRH-BR04C RRH	113
APXVTM14-C Antenna w/ Mounting Pipe	156	B5/B13 RRH-BR04C RRH	113
APXVTM14-C Antenna w/ Mounting Pipe	156	OVP	113
APXVTM14-C Antenna w/ Mounting Pipe	156	OVP	113
		NNHH-65B-R4 Antenna w/ Mounting Pipe	113
Junction Box	156	LNX-6514DS-VTM Antenna w/ Mounting Pipe	113
Ring Mount	156	NNHH-65B-R4 Antenna w/ Mounting Pipe	113
1900 4x45 RRH	156	12'-6" Platform w/ Handrail	113
1900 4x45 RRH	156	LNX-6514DS-VTM Antenna w/ Mounting Pipe	113
1900 4x45 RRH	156	LNX-6514DS-VTM Antenna w/ Mounting Pipe	113
RRH-2X50-800	156	LNX-6514DS-VTM Antenna w/ Mounting Pipe	113
RRH-2X50-800	156	LNX-6514DS-VTM Antenna w/ Mounting Pipe	113
RRH-2X50-800	156	LNX-6514DS-VTM Antenna w/ Mounting Pipe	113
Panel Antenna (CT5448)	154	NNHH-65B-R4 Antenna w/ Mounting Pipe	113
2' Dish Antenna w/ Radome	152	NNHH-65B-R4 Antenna w/ Mounting Pipe	113
2' Dish Antenna w/ Radome	152	NNHH-65B-R4 Antenna w/ Mounting Pipe	113
3' Dish Antenna w/ Radome	151	NNHH-65B-R4 Antenna w/ Mounting Pipe	113
12'-6" Platform w/ Handrail + Lift Kit	143	GPS	54.5
RRUS 32 B30 RRH	143	3' Side Mount Standoff	53
RRUS 32 B30 RRH	143		
RRUS 32 B30 RRH	143		
RRUS 32 B66A RRH	143		
RRUS 32 B66A RRH	143		

MATERIAL STRENGTH

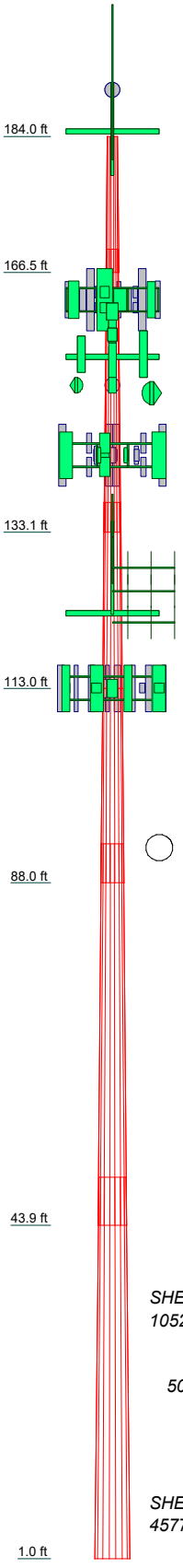
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

Hudson Design Group LLC
45 Beechwood Drive
North Andover, MA
Phone: (978) 557-5553
FAX: (978) 336-5586

Job: ***CT5448***			
Project: ***183 ft Monopole***			
Client: AT&T	Drawn by: ideandrade		App'd:
Code: TIA-222-H	Date: 11/17/21		Scale: NTS
Path: W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\TnxTower\Tnx Projects\AT&T\CT\CT5448\C-BAND\CT5448 (MP).eri			Dwg No. E-1

Section	1	2	3	4	5	6
Length (ft)	17.50	36.42	23.92	25.00	49.08	49.08
Number of Sides	18	18	18	18	18	18
Thickness (in)	0.1875	0.2500	0.3750	0.4150	0.4850	0.5400
Socket Length (ft)	3.00	3.83		5.00	6.17	
Top Dia (in)	15.5000	18.3556	25.0549	30.2850	33.9406	42.5549
Bot Dia (in)	19.3990	26.4010	30.2850	35.8920	44.9030	53.5000
Grade				A572-65		
Weight (lb)	611.7	2176.1	2644.3	3661.2	10010.3	13593.1

Total Weight (lb): 32696.8



ALL REACTIONS ARE FACTORED

AXIAL 129906 lb

SHEAR 10525 lb — *MOMENT 1553702 lb-ft*

TORQUE 1415 lb-ft
50.0 mph WIND - 1.5000 in ICE

AXIAL 70831 lb

SHEAR 45772 lb — *MOMENT 5946515 lb-ft*

TORQUE 5820 lb-ft
REACTIONS - 135.0 mph WIND

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 135.0 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50.0 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.0 mph wind.
6. Tower Risk Category IV.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 88%

Hudson Design Group LLC
45 Beechwood Drive
North Andover, MA
Phone: (978) 557-5553
FAX: (978) 336-5586

Job: ***CT5448***			
Project: ***183 ft Monopole***			
Client: AT&T	Drawn by: ideandrade		App'd:
Code: TIA-222-H	Date: 11/17/21		Scale: NTS
Path: W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\TnxTower\Tnx Projects\AT&T\CT\CT5448\C-BAND\CT5448 (MP).eri			Dwg No. E-1

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
Tower base elevation above sea level: 1.00 ft.
Basic wind speed of 135.0 mph.
Risk Category IV.
Exposure Category B.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.00 ft.
Nominal ice thickness of 1.5000 in.
Ice thickness is considered to increase with height.
Ice density of 56.0 pcf.
A wind speed of 50.0 mph is used in combination with ice.
Temperature drop of 50.0 °F.
Deflections calculated using a wind speed of 60.0 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	184.00-166.50	17.50	3.00	18	15.5000	19.3990	0.1875	0.7500	A572-65 (65 ksi)
L2	166.50-133.08	36.42	3.83	18	18.3556	26.4010	0.2500	1.0000	A572-65 (65 ksi)
L3	133.08-112.99	23.92	0.00	18	25.0549	30.2850	0.3750	1.5000	A572-65 (65 ksi)
L4	112.99-87.99	25.00	5.00	18	30.2850	35.8920	0.4150	1.6600	A572-65 (65 ksi)
L5	87.99-43.91	49.08	6.17	18	33.9406	44.9030	0.4850	1.9400	A572-65 (65 ksi)
L6	43.91-1.00	49.08		18	42.5549	53.5000	0.5400	2.1600	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	15.7102	9.1129	269.9504	5.4359	7.8740	34.2838	540.2560	4.5573	2.3980	12.789
	19.6693	11.4332	533.1255	6.8201	9.8547	54.0986	1066.9525	5.7177	3.0842	16.449

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L2	19.2731	14.3668	595.0085	6.4275	9.3246	63.8103	1190.7999	7.1848	2.7906	11.162
	26.7697	20.7508	1792.8720	9.2836	13.4117	133.6796	3588.1031	10.3774	4.2066	16.826
L3	26.2339	29.3753	2260.5151	8.7614	12.7279	177.6031	4524.0046	14.6904	3.7497	9.999
	30.6943	35.6004	4023.6934	10.6181	15.3848	261.5373	8052.6813	17.8036	4.6702	12.454
L4	30.6882	39.3451	4435.0461	10.6039	15.3848	288.2749	8875.9279	19.6763	4.5998	11.084
	36.3817	46.7307	7430.7583	12.5943	18.2331	407.5414	14871.2941	23.3698	5.5866	13.462
L5	35.5234	51.5012	7282.7027	11.8767	17.2418	422.3858	14574.9881	25.7555	5.1199	10.557
	45.5209	68.3766	17043.6698	15.7684	22.8107	747.1779	34109.7660	34.1948	7.0493	14.535
L6	44.5252	72.0118	16060.0753	14.9153	21.6179	742.9070	32141.2828	36.0128	6.5393	12.11
	54.2420	90.7713	32164.8894	18.8008	27.1780	1183.4899	64372.1021	45.3943	8.4656	15.677

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 184.00-166.50				1	1	1			
L2 166.50-133.08				1	1	1			
L3 133.08-112.99				1	1	1			
L4 112.99-87.99				1	1	1			
L5 87.99-43.91				1	1	1			
L6 43.91-1.00				1	1	1			

Monopole Base Plate Data

Base Plate Data	
Base plate is square	
Base plate is grouted	√
Anchor bolt grade	A615-75
Anchor bolt size	2.2500 in
Number of bolts	18
Embedment length	84.0000 in
f'_c	4.0 ksi
Grout space	4.0000 in
Base plate grade	A572-60
Base plate thickness	2.0000 in
Bolt circle diameter	62.0000 in
Outer diameter	68.0000 in
Inner diameter	43.0000 in
Base plate type	Stiffened Plate
Bolts per stiffener	1
Stiffener thickness	0.7500 in
Stiffener height	12.0000 in

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
1/2	B	No	Surface Ar (CaAa)	53.00 - 6.00	1	1	0.000 0.000	0.5800		0.25
1/2	B	No	Surface Ar (CaAa)	155.00 - 6.00	3	3	0.000 0.000	0.5800		0.25
2-1/2" Innerduct	B	No	Surface Ar (CaAa)	155.00 - 6.00	2	2	0.000 0.000	2.8600		2.00
***										
Hybrid Cable (1-1/2") (VERIZON)	B	No	Surface Ar (CaAa)	113.00 - 6.00	2	2	0.000 0.000	1.5000		2.00

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1/2	B	No	No	Inside Pole	124.00 - 6.00	8	No Ice	0.00	0.25
							1/2" Ice	0.00	0.25
							1" Ice	0.00	0.25
							2" Ice	0.00	0.25
3/8	B	No	No	Inside Pole	124.00 - 6.00	2	No Ice	0.00	0.25
							1/2" Ice	0.00	0.25
							1" Ice	0.00	0.25
							2" Ice	0.00	0.25
3/8	B	No	No	Inside Pole	124.00 - 6.00	2	No Ice	0.00	0.25
							1/2" Ice	0.00	0.25
							1" Ice	0.00	0.25
							2" Ice	0.00	0.25
7/8	B	No	No	Inside Pole	124.00 - 6.00	4	No Ice	0.00	0.54
							1/2" Ice	0.00	0.54
							1" Ice	0.00	0.54
							2" Ice	0.00	0.54
3/8	B	No	No	Inside Pole	184.00 - 6.00	2	No Ice	0.00	0.25
							1/2" Ice	0.00	0.25
							1" Ice	0.00	0.25
							2" Ice	0.00	0.25
7/8	B	No	No	Inside Pole	184.00 - 6.00	4	No Ice	0.00	0.54
							1/2" Ice	0.00	0.54
							1" Ice	0.00	0.54
							2" Ice	0.00	0.54
***									
LDF7-50A (1-5/8) (T-MOBILE)	C	No	No	Inside Pole	162.00 - 6.00	21	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
9x18 MLE Hybrid Line - 40 mm	C	No	No	Inside Pole	162.00 - 6.00	1	No Ice	0.00	0.75
							1/2" Ice	0.00	0.75
							1" Ice	0.00	0.75
							2" Ice	0.00	0.75
HCS 6X12 4 AWG (1-5/8)	C	No	No	Inside Pole	162.00 - 6.00	3	No Ice	0.00	0.95
							1/2" Ice	0.00	0.95
							1" Ice	0.00	0.95
							2" Ice	0.00	0.95
***									
Hybrid Cable (1-1/2") (SPRINT)	B	No	No	Inside Pole	155.00 - 6.00	4	No Ice	0.00	2.00
							1/2" Ice	0.00	2.00
							1" Ice	0.00	2.00

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
							2" Ice	0.00	2.00
1/2	B	No	No	Inside Pole	155.00 - 6.00	1	No Ice	0.00	0.25
							1/2" Ice	0.00	0.25
							1" Ice	0.00	0.25
							2" Ice	0.00	0.25
***									
1 5/8 (AT&T - Existing)	B	No	No	Inside Pole	143.00 - 6.00	6	No Ice	0.00	1.04
							1/2" Ice	0.00	1.04
							1" Ice	0.00	1.04
							2" Ice	0.00	1.04
***									
DC Cable (AT&T - Proposed)	B	No	No	Inside Pole	143.00 - 6.00	8	No Ice	0.00	0.88
							1/2" Ice	0.00	0.88
							1" Ice	0.00	0.88
							2" Ice	0.00	0.88
Fiber Cable	B	No	No	Inside Pole	143.00 - 6.00	3	No Ice	0.00	1.00
							1/2" Ice	0.00	1.00
							1" Ice	0.00	1.00
							2" Ice	0.00	1.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	184.00-166.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	46.55
		C	0.000	0.000	0.000	0.000	0.00
L2	166.50-133.08	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	16.352	0.000	535.12
		C	0.000	0.000	0.000	0.000	602.11
L3	133.08-112.99	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	14.990	0.000	698.04
		C	0.000	0.000	0.000	0.000	418.27
L4	112.99-87.99	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	26.150	0.000	1026.90
		C	0.000	0.000	0.000	0.000	520.50
L5	87.99-43.91	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	46.635	0.000	1812.90
		C	0.000	0.000	0.000	0.000	917.75
L6	43.91-1.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	41.853	0.000	1566.67
		C	0.000	0.000	0.000	0.000	789.29

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	184.00-166.50	A	2.215	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	46.55

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
		C		0.000	0.000	0.000	0.000	0.00
L2	166.50-133.08	A	2.180	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	44.720	0.000	1170.08
		C		0.000	0.000	0.000	0.000	602.11
L3	133.08-112.99	A	2.138	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	40.642	0.000	1267.33
		C		0.000	0.000	0.000	0.000	418.27
L4	112.99-87.99	A	2.095	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	71.971	0.000	1993.27
		C		0.000	0.000	0.000	0.000	520.50
L5	87.99-43.91	A	2.008	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	131.235	0.000	3579.05
		C		0.000	0.000	0.000	0.000	917.75
L6	43.91-1.00	A	1.800	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	124.093	0.000	3189.30
		C		0.000	0.000	0.000	0.000	789.29

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	184.00-166.50	0.0000	0.0000	0.0000	0.0000
L2	166.50-133.08	2.9495	-1.7029	2.9602	-1.7091
L3	133.08-112.99	3.9664	-2.2900	3.8662	-2.2322
L4	112.99-87.99	5.1632	-2.9810	4.9265	-2.8443
L5	87.99-43.91	5.4741	-3.1605	5.6171	-3.2431
L6	43.91-1.00	5.3244	-3.0740	6.1990	-3.5790

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L2	6	1/2	133.08 - 155.00	1.0000	1.0000
L2	7	2-1/2" Innerduct	133.08 - 155.00	1.0000	1.0000
L3	6	1/2	112.99 - 133.08	1.0000	1.0000
L3	7	2-1/2" Innerduct	112.99 - 133.08	1.0000	1.0000
L3	18	Hybrid Cable (1-1/2")	112.99 - 113.00	1.0000	1.0000
L4	6	1/2	87.99 - 112.99	1.0000	1.0000
L4	7	2-1/2" Innerduct	87.99 - 112.99	1.0000	1.0000
L4	18	Hybrid Cable (1-1/2")	87.99 - 112.99	1.0000	1.0000
L5	1	1/2	43.91 - 53.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L5	6	1/2	43.91 - 87.99	1.0000	1.0000
L5	7	2-1/2" Innerduct	43.91 - 87.99	1.0000	1.0000
L5	18	Hybrid Cable (1-1/2")	43.91 - 87.99	1.0000	1.0000
L6	1	1/2	6.00 - 43.91	1.0000	1.0000
L6	6	1/2	6.00 - 43.91	1.0000	1.0000
L6	7	2-1/2" Innerduct	6.00 - 43.91	1.0000	1.0000
L6	18	Hybrid Cable (1-1/2")	6.00 - 43.91	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Lightning Rod w/ Pipe Extension	C	From Face	0.00 0.00 0.00	0.0000	191.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.00 6.03 8.07 12.20	4.00 6.03 8.07 12.20	80.00 110.77 154.12 279.14
SODU 48VDC XALT	A	From Face	2.00 0.00 0.00	0.0000	188.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.50 1.65 1.81 2.10	1.13 1.26 1.41 1.65	15.00 29.91 47.34 74.64
SODU 48VDC XALT	A	From Face	2.00 0.00 0.00	0.0000	188.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.50 1.65 1.81 2.10	1.13 1.26 1.41 1.65	15.00 29.91 47.34 74.64
PiROD 13' Low Profile Platform Top (Monopole)	C	None		0.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice	15.70 20.10 24.50 33.30	15.70 20.10 24.50 33.30	1300.00 1765.00 2230.00 3160.00
20' 4-Bay Dipole	C	From Face	0.00 0.00 0.00	0.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.84 6.04 7.21 8.68	3.84 6.04 7.21 8.68	50.00 83.62 125.14 232.45
20' 4-Bay Dipole	C	From Face	0.00 0.00 0.00	0.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.84 6.04 7.21 8.68	3.84 6.04 7.21 8.68	50.00 83.62 125.14 232.45
**									
PiROD 13' Low Profile Platform	C	None		0.0000	123.00	No Ice 1/2" Ice 1" Ice 2" Ice	15.70 20.10 24.50 33.30	15.70 20.10 24.50 33.30	1300.00 1765.00 2230.00 3160.00
Panel Antenna (CT5448)	C	From Face	3.00 0.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.13 8.59 9.05 10.00	4.70 5.15 5.60 6.53	50.00 97.28 150.59 276.07
20' 4-Bay Dipole	C	From Face	0.00 0.00 0.00	0.0000	128.50	No Ice 1/2" Ice 1" Ice 2" Ice	4.04 6.04 7.21 8.68	4.04 6.04 7.21 8.68	50.00 83.62 125.14 232.45
Omni 2"X6'	C	From Face	0.00	0.0000	135.00	No Ice	1.20	1.20	35.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			1/2" Ice	1.80	1.80	44.39
			0.00			1" Ice	2.17	2.17	57.81
						2" Ice	2.93	2.93	97.31
Omni 2"X6'	C	From Face	0.00	0.0000	129.50	No Ice	1.20	1.20	35.00
			0.00			1/2" Ice	1.80	1.80	44.39
			0.00			1" Ice	2.17	2.17	57.81
						2" Ice	2.93	2.93	97.31
24" Yagi Antena	C	From Face	0.00	0.0000	128.50	No Ice	1.50	1.50	10.00
			0.00			1/2" Ice	2.25	2.25	20.00
			0.00			1" Ice	3.00	3.00	30.00
						2" Ice	4.50	4.50	50.00
15" Yagi Antena	C	From Face	0.00	0.0000	125.50	No Ice	0.75	0.75	5.00
			0.00			1/2" Ice	1.25	1.25	8.00
			0.00			1" Ice	1.75	1.75	11.00
						2" Ice	2.75	2.75	17.00
2'-6" Yagi Antena	C	From Face	0.00	0.0000	121.50	No Ice	1.50	1.50	12.00
			0.00			1/2" Ice	2.25	2.25	22.00
			0.00			1" Ice	3.00	3.00	32.00
						2" Ice	4.50	4.50	52.00
**									
3' Side Mount Standoff	C	From Face	0.00	0.0000	53.00	No Ice	1.50	1.50	45.00
			0.00			1/2" Ice	2.20	2.20	70.00
			0.00			1" Ice	2.90	2.90	95.00
						2" Ice	4.30	4.30	145.00
GPS	C	From Face	0.00	0.0000	54.50	No Ice	0.21	0.21	5.00
			0.00			1/2" Ice	0.32	0.32	7.52
			0.00			1" Ice	0.44	0.44	11.31
						2" Ice	0.65	0.65	15.08
**									
12'-6" Platform w/ Handrail + Lift Kit	C	None		0.0000	163.00	No Ice	24.00	22.00	1950.00
						1/2" Ice	29.00	27.00	2340.00
						1" Ice	34.00	32.00	2845.00
						2" Ice	44.00	42.00	3510.00
APXVAARR24_43-U-NA20 Antenna w/ Mounting Pipe	A	From Face	3.00	0.0000	163.00	No Ice	20.24	10.79	157.20
			1.00			1/2" Ice	20.89	12.21	290.89
			0.00			1" Ice	21.55	13.49	435.20
						2" Ice	22.88	15.72	759.63
APXVAARR24_43-U-NA20 Antenna w/ Mounting Pipe	B	From Face	3.00	0.0000	163.00	No Ice	20.24	10.79	157.20
			1.00			1/2" Ice	20.89	12.21	290.89
			0.00			1" Ice	21.55	13.49	435.20
						2" Ice	22.88	15.72	759.63
APXVAARR24_43-U-NA20 Antenna w/ Mounting Pipe	C	From Face	3.00	0.0000	163.00	No Ice	20.24	10.79	157.20
			1.00			1/2" Ice	20.89	12.21	290.89
			0.00			1" Ice	21.55	13.49	435.20
						2" Ice	22.88	15.72	759.63
AIR 32 B66A B2A Antenna w/ Mounting Pipe	A	From Face	3.00	0.0000	163.00	No Ice	6.81	6.14	154.90
			-5.00			1/2" Ice	7.30	6.99	216.61
			0.00			1" Ice	7.76	7.73	285.26
						2" Ice	8.71	9.24	446.66
AIR 32 B66A B2A Antenna w/ Mounting Pipe	B	From Face	3.00	0.0000	163.00	No Ice	6.81	6.14	154.90
			-5.00			1/2" Ice	7.30	6.99	216.61
			0.00			1" Ice	7.76	7.73	285.26
						2" Ice	8.71	9.24	446.66
AIR 32 B66A B2A Antenna w/ Mounting Pipe	C	From Face	3.00	0.0000	163.00	No Ice	6.81	6.14	154.90
			-5.00			1/2" Ice	7.30	6.99	216.61
			0.00			1" Ice	7.76	7.73	285.26
						2" Ice	8.71	9.24	446.66

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
AIR 3246 B66 Antenna w/ Mounting Pipe	A	From Face	3.00 5.00 0.00	0.0000	163.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.26 8.75 9.23 10.22	6.60 7.46 8.21 9.74	200.90 271.78 349.93 531.32
AIR 3246 B66 Antenna w/ Mounting Pipe	B	From Face	3.00 5.00 0.00	0.0000	163.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.26 8.75 9.23 10.22	6.60 7.46 8.21 9.74	200.90 271.78 349.93 531.32
AIR 3246 B66 Antenna w/ Mounting Pipe	C	From Face	3.00 5.00 0.00	0.0000	163.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.26 8.75 9.23 10.22	6.60 7.46 8.21 9.74	200.90 271.78 349.93 531.32
AIR6449 B41 Antenna w/ Mounting Pipe	A	From Face	3.00 -1.00 0.00	0.0000	163.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.42 7.00 7.50 8.56	3.89 4.62 5.22 6.47	124.90 179.59 240.17 382.30
AIR6449 B41 Antenna w/ Mounting Pipe	B	From Face	3.00 -1.00 0.00	0.0000	163.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.42 7.00 7.50 8.56	3.89 4.62 5.22 6.47	124.90 179.59 240.17 382.30
AIR6449 B41 Antenna w/ Mounting Pipe	C	From Face	3.00 -1.00 0.00	0.0000	163.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.42 7.00 7.50 8.56	3.89 4.62 5.22 6.47	124.90 179.59 240.17 382.30
4449 B71+B85 RRH	A	From Face	2.00 1.00 1.00	0.0000	163.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.15 2.33 2.72	1.40 1.56 1.72 2.07	74.00 92.48 113.77 165.60
4449 B71+B85 RRH	B	From Face	2.00 1.00 1.00	0.0000	163.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.15 2.33 2.72	1.40 1.56 1.72 2.07	74.00 92.48 113.77 165.60
4449 B71+B85 RRH	C	From Face	2.00 1.00 1.00	0.0000	163.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.15 2.33 2.72	1.40 1.56 1.72 2.07	74.00 92.48 113.77 165.60
4415 B25 RRH	A	From Face	2.00 1.00 -1.00	0.0000	163.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.84 2.01 2.19 2.57	0.82 0.94 1.07 1.37	46.00 60.07 76.66 118.17
4415 B25 RRH	B	From Face	2.00 1.00 -1.00	0.0000	163.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.84 2.01 2.19 2.57	0.82 0.94 1.07 1.37	46.00 60.07 76.66 118.17
4415 B25 RRH	C	From Face	2.00 1.00 -1.00	0.0000	163.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.84 2.01 2.19 2.57	0.82 0.94 1.07 1.37	46.00 60.07 76.66 118.17
**									
PiROD 13' Low Profile Platform	C	None		0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	15.70 20.10 24.50 33.30	15.70 20.10 24.50 33.30	1300.00 1765.00 2230.00 3160.00
APXVSPP18-C Antenna w/ Mounting Pipe	C	From Face	3.00 -4.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.02 8.48 8.94 9.89	7.23 8.19 9.02 10.74	83.90 151.78 227.47 405.58

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight lb
APXVSPP18-C Antenna w/ Mounting Pipe	C	From Face	3.00 -4.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.02 8.48 8.94 9.89	7.23 8.19 9.02 10.74	83.90 151.78 227.47 405.58
APXVSPP18-C Antenna w/ Mounting Pipe	C	From Face	3.00 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.02 8.48 8.94 9.89	7.23 8.19 9.02 10.74	83.90 151.78 227.47 405.58
APXVTM14-C Antenna w/ Mounting Pipe	C	From Face	3.00 4.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.65 7.14 7.60 8.55	5.03 5.89 6.63 8.13	52.90 108.31 170.47 318.30
APXVTM14-C Antenna w/ Mounting Pipe	C	From Face	3.00 4.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.65 7.14 7.60 8.55	5.03 5.89 6.63 8.13	52.90 108.31 170.47 318.30
APXVTM14-C Antenna w/ Mounting Pipe	C	From Face	3.00 4.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.65 7.14 7.60 8.55	5.03 5.89 6.63 8.13	52.90 108.31 170.47 318.30
Junction Box	C	From Face	0.00 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.78 4.03 4.29 4.83	2.51 2.72 2.94 3.41	32.00 63.40 98.56 180.91
Ring Mount	C	From Face	0.00 0.00 2.50	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.40 2.40 3.40 5.40	1.40 2.40 3.40 5.40	90.00 130.00 170.00 250.00
1900 4x45 RRH	C	From Face	0.00 0.00 2.50	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.31 2.52 2.73 3.17	2.38 2.58 2.79 3.24	60.00 83.90 111.08 176.02
1900 4x45 RRH	C	From Face	0.00 0.00 2.50	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.31 2.52 2.73 3.17	2.38 2.58 2.79 3.24	60.00 83.90 111.08 176.02
1900 4x45 RRH	C	From Face	0.00 0.00 2.50	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.31 2.52 2.73 3.17	2.38 2.58 2.79 3.24	60.00 83.90 111.08 176.02
1900 4x45 RRH	C	From Face	0.00 0.00 2.50	0.0000	157.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.31 2.52 2.73 3.17	2.38 2.58 2.79 3.24	60.00 83.90 111.08 176.02
1900 4x45 RRH	C	From Face	0.00 0.00 2.50	0.0000	157.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.31 2.52 2.73 3.17	2.38 2.58 2.79 3.24	60.00 83.90 111.08 176.02
1900 4x45 RRH	C	From Face	0.00 0.00 2.50	0.0000	157.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.31 2.52 2.73 3.17	2.38 2.58 2.79 3.24	60.00 83.90 111.08 176.02
RRH 8X20-25	C	From Face	0.00 0.00 2.50	0.0000	159.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.05 4.30 4.56 5.10	1.53 1.71 1.90 2.29	70.00 97.14 127.80 200.48
RRH 8X20-25	C	From Face	0.00	0.0000	159.00	No Ice	4.05	1.53	70.00

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft ft ft*	*Azimuth Adjustment* °	*Placement* *ft*		C_AA_A *Front* *ft²*	C_AA_A *Side* *ft²*	*Weight* *lb*
			0.00			1/2" Ice	4.30	1.71	97.14
			2.50			1" Ice	4.56	1.90	127.80
						2" Ice	5.10	2.29	200.48
RRH 8X20-25	C	From Face	0.00	0.0000	159.00	No Ice	4.05	1.53	70.00
			0.00			1/2" Ice	4.30	1.71	97.14
			2.50			1" Ice	4.56	1.90	127.80
						2" Ice	5.10	2.29	200.48
RRH-2X50-800	C	From Face	0.00	0.0000	156.00	No Ice	2.13	1.79	64.00
			0.00			1/2" Ice	2.32	1.96	85.30
			2.50			1" Ice	2.51	2.14	109.61
						2" Ice	2.92	2.53	168.08
RRH-2X50-800	C	From Face	0.00	0.0000	156.00	No Ice	2.13	1.79	64.00
			0.00			1/2" Ice	2.32	1.96	85.30
			2.50			1" Ice	2.51	2.14	109.61
						2" Ice	2.92	2.53	168.08
RRH-2X50-800	C	From Face	0.00	0.0000	156.00	No Ice	2.13	1.79	64.00
			0.00			1/2" Ice	2.32	1.96	85.30
			2.50			1" Ice	2.51	2.14	109.61
						2" Ice	2.92	2.53	168.08
**									
12'-6" Platform w/ Handrail	C	None		0.0000	113.00	No Ice	21.50	20.00	1500.00
						1/2" Ice	26.00	24.50	1850.00
						1" Ice	31.00	29.00	2300.00
						2" Ice	39.50	38.00	2900.00
LNX-6514DS-VTM Antenna	A	From Face	3.00	0.0000	113.00	No Ice	8.20	6.85	52.90
w/ Mounting Pipe			6.00			1/2" Ice	8.66	7.81	119.42
			0.00			1" Ice	9.13	8.64	193.78
						2" Ice	10.09	10.36	369.24
LNX-6514DS-VTM Antenna	B	From Face	3.00	0.0000	113.00	No Ice	8.20	6.85	52.90
w/ Mounting Pipe			6.00			1/2" Ice	8.66	7.81	119.42
			0.00			1" Ice	9.13	8.64	193.78
						2" Ice	10.09	10.36	369.24
LNX-6514DS-VTM Antenna	C	From Face	3.00	0.0000	113.00	No Ice	8.20	6.85	52.90
w/ Mounting Pipe			6.00			1/2" Ice	8.66	7.81	119.42
			0.00			1" Ice	9.13	8.64	193.78
						2" Ice	10.09	10.36	369.24
LNX-6514DS-VTM Antenna	A	From Face	3.00	0.0000	113.00	No Ice	8.20	6.85	52.90
w/ Mounting Pipe			-2.00			1/2" Ice	8.66	7.81	119.42
			0.00			1" Ice	9.13	8.64	193.78
						2" Ice	10.09	10.36	369.24
LNX-6514DS-VTM Antenna	B	From Face	3.00	0.0000	113.00	No Ice	8.20	6.85	52.90
w/ Mounting Pipe			-2.00			1/2" Ice	8.66	7.81	119.42
			0.00			1" Ice	9.13	8.64	193.78
						2" Ice	10.09	10.36	369.24
LNX-6514DS-VTM Antenna	C	From Face	3.00	0.0000	113.00	No Ice	8.20	6.85	52.90
w/ Mounting Pipe			-2.00			1/2" Ice	8.66	7.81	119.42
			0.00			1" Ice	9.13	8.64	193.78
						2" Ice	10.09	10.36	369.24
NNHH-65B-R4 Antenna w/	A	From Face	3.00	0.0000	113.00	No Ice	12.27	7.17	100.90
Mounting Pipe			-6.00			1/2" Ice	12.77	8.13	188.93
			0.00			1" Ice	13.27	8.97	285.27
						2" Ice	14.29	10.68	506.17
NNHH-65B-R4 Antenna w/	B	From Face	3.00	0.0000	113.00	No Ice	12.27	7.17	100.90
Mounting Pipe			-6.00			1/2" Ice	12.77	8.13	188.93
			0.00			1" Ice	13.27	8.97	285.27
						2" Ice	14.29	10.68	506.17
NNHH-65B-R4 Antenna w/	C	From Face	3.00	0.0000	113.00	No Ice	12.27	7.17	100.90

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Mounting Pipe			-6.00			1/2" Ice	12.77	8.13	188.93
			0.00			1" Ice	13.27	8.97	285.27
						2" Ice	14.29	10.68	506.17
NNHH-65B-R4 Antenna w/ Mounting Pipe	A	From Face	3.00	0.0000	113.00	No Ice	12.27	7.17	100.90
			2.00			1/2" Ice	12.77	8.13	188.93
			0.00			1" Ice	13.27	8.97	285.27
						2" Ice	14.29	10.68	506.17
NNHH-65B-R4 Antenna w/ Mounting Pipe	B	From Face	3.00	0.0000	113.00	No Ice	12.27	7.17	100.90
			2.00			1/2" Ice	12.77	8.13	188.93
			0.00			1" Ice	13.27	8.97	285.27
						2" Ice	14.29	10.68	506.17
NNHH-65B-R4 Antenna w/ Mounting Pipe	C	From Face	3.00	0.0000	113.00	No Ice	12.27	7.17	100.90
			2.00			1/2" Ice	12.77	8.13	188.93
			0.00			1" Ice	13.27	8.97	285.27
						2" Ice	14.29	10.68	506.17
B2/B66A RRH-BR049 RRH	A	From Face	2.00	0.0000	113.00	No Ice	1.88	1.25	98.00
			-6.00			1/2" Ice	2.05	1.39	116.34
			0.00			1" Ice	2.22	1.54	137.47
						2" Ice	2.60	1.86	188.87
B2/B66A RRH-BR049 RRH	B	From Face	2.00	0.0000	113.00	No Ice	1.88	1.25	98.00
			-6.00			1/2" Ice	2.05	1.39	116.34
			0.00			1" Ice	2.22	1.54	137.47
						2" Ice	2.60	1.86	188.87
B2/B66A RRH-BR049 RRH	C	From Face	2.00	0.0000	113.00	No Ice	1.88	1.25	98.00
			-6.00			1/2" Ice	2.05	1.39	116.34
			0.00			1" Ice	2.22	1.54	137.47
						2" Ice	2.60	1.86	188.87
B5/B13 RRH-BR04C RRH	A	From Face	2.00	0.0000	113.00	No Ice	1.88	1.01	82.00
			2.00			1/2" Ice	2.05	1.14	98.43
			0.00			1" Ice	2.22	1.28	117.53
						2" Ice	2.60	1.59	164.50
B5/B13 RRH-BR04C RRH	B	From Face	2.00	0.0000	113.00	No Ice	1.88	1.01	82.00
			2.00			1/2" Ice	2.05	1.14	98.43
			0.00			1" Ice	2.22	1.28	117.53
						2" Ice	2.60	1.59	164.50
B5/B13 RRH-BR04C RRH	C	From Face	2.00	0.0000	113.00	No Ice	1.88	1.01	82.00
			2.00			1/2" Ice	2.05	1.14	98.43
			0.00			1" Ice	2.22	1.28	117.53
						2" Ice	2.60	1.59	164.50
OVP	A	From Face	0.00	0.0000	113.00	No Ice	3.78	2.51	32.00
			0.00			1/2" Ice	4.03	2.72	63.40
			0.00			1" Ice	4.29	2.94	98.56
						2" Ice	4.83	3.41	180.91
OVP	C	From Face	0.00	0.0000	113.00	No Ice	3.78	2.51	32.00
			0.00			1/2" Ice	4.03	2.72	63.40
			0.00			1" Ice	4.29	2.94	98.56
						2" Ice	4.83	3.41	180.91
**									
12'-6" Platform w/ Handrail + Lift Kit	C	None		0.0000	143.00	No Ice	24.00	22.00	1950.00
						1/2" Ice	29.00	27.00	2340.00
						1" Ice	34.00	32.00	2845.00
						2" Ice	44.00	42.00	3510.00
RRUS 32 B30 RRH	A	From Face	2.00	0.0000	143.00	No Ice	2.74	1.67	60.00
			-6.00			1/2" Ice	2.96	1.86	81.11
			0.00			1" Ice	3.19	2.05	105.42
						2" Ice	3.68	2.46	164.41
RRUS 32 B30 RRH	B	From Face	2.00	0.0000	143.00	No Ice	2.74	1.67	60.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			-6.00			1/2" Ice	2.96	1.86	81.11
			0.00			1" Ice	3.19	2.05	105.42
						2" Ice	3.68	2.46	164.41
RRUS 32 B30 RRH	C	From Face	2.00	0.0000	143.00	No Ice	2.74	1.67	60.00
			-6.00			1/2" Ice	2.96	1.86	81.11
			0.00			1" Ice	3.19	2.05	105.42
						2" Ice	3.68	2.46	164.41
RRUS 32 B66A RRH	A	From Face	2.00	0.0000	143.00	No Ice	2.74	1.67	60.00
			1.00			1/2" Ice	2.96	1.86	81.11
			0.00			1" Ice	3.19	2.05	105.42
						2" Ice	3.68	2.46	164.41
RRUS 32 B66A RRH	B	From Face	2.00	0.0000	143.00	No Ice	2.74	1.67	60.00
			1.00			1/2" Ice	2.96	1.86	81.11
			0.00			1" Ice	3.19	2.05	105.42
						2" Ice	3.68	2.46	164.41
RRUS 32 B66A RRH	C	From Face	2.00	0.0000	143.00	No Ice	2.74	1.67	60.00
			1.00			1/2" Ice	2.96	1.86	81.11
			0.00			1" Ice	3.19	2.05	105.42
						2" Ice	3.68	2.46	164.41
RRUS-E2 B29 RRH	A	From Face	2.00	0.0000	143.00	No Ice	3.15	1.29	53.00
			-6.00			1/2" Ice	3.36	1.44	76.22
			0.00			1" Ice	3.59	1.60	102.64
						2" Ice	4.07	1.95	165.88
RRUS-E2 B29 RRH	B	From Face	2.00	0.0000	143.00	No Ice	3.15	1.29	53.00
			-6.00			1/2" Ice	3.36	1.44	76.22
			0.00			1" Ice	3.59	1.60	102.64
						2" Ice	4.07	1.95	165.88
RRUS-E2 B29 RRH	C	From Face	2.00	0.0000	143.00	No Ice	3.15	1.29	53.00
			-6.00			1/2" Ice	3.36	1.44	76.22
			0.00			1" Ice	3.59	1.60	102.64
						2" Ice	4.07	1.95	165.88
B14 4478 RRH	A	From Face	2.00	0.0000	143.00	No Ice	2.02	1.25	60.00
			1.00			1/2" Ice	2.20	1.40	77.66
			0.00			1" Ice	2.39	1.56	98.08
						2" Ice	2.78	1.90	148.04
B14 4478 RRH	B	From Face	2.00	0.0000	143.00	No Ice	2.02	1.25	60.00
			1.00			1/2" Ice	2.20	1.40	77.66
			0.00			1" Ice	2.39	1.56	98.08
						2" Ice	2.78	1.90	148.04
B14 4478 RRH	C	From Face	2.00	0.0000	143.00	No Ice	2.02	1.25	60.00
			1.00			1/2" Ice	2.20	1.40	77.66
			0.00			1" Ice	2.39	1.56	98.08
						2" Ice	2.78	1.90	148.04
Squid Surge Arrestor	A	From Leg	0.00	0.0000	143.00	No Ice	0.81	0.81	33.00
			0.00			1/2" Ice	1.30	1.30	48.38
			0.00			1" Ice	1.48	1.48	66.11
						2" Ice	1.86	1.86	109.29
**									
DMP65R-BU8DA Antenna w/ Mounting Pipe	A	From Face	3.00	0.0000	143.00	No Ice	17.87	10.02	125.20
			6.00			1/2" Ice	18.50	11.44	243.88
			0.00			1" Ice	19.14	12.72	372.91
						2" Ice	20.44	14.94	665.96
DMP65R-BU8DA Antenna w/ Mounting Pipe	B	From Face	3.00	0.0000	143.00	No Ice	17.87	10.02	125.20
			6.00			1/2" Ice	18.50	11.44	243.88
			0.00			1" Ice	19.14	12.72	372.91
						2" Ice	20.44	14.94	665.96
DMP65R-BU6DA Antenna	C	From Face	3.00	0.0000	143.00	No Ice	12.73	7.04	101.90

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
w/ Mounting Pipe			6.00			1/2" Ice	13.23	7.99	191.74
			0.00			1" Ice	13.73	8.82	289.91
						2" Ice	14.77	10.53	514.51
QD8616-7 Antenna w/ Mounting Pipe	A	From Face	3.00	0.0000	143.00	No Ice	18.81	11.50	179.20
			-6.00			1/2" Ice	19.45	12.93	309.62
			0.00			1" Ice	20.10	14.22	450.59
						2" Ice	21.41	16.46	768.16
QD8616-7 Antenna w/ Mounting Pipe	B	From Face	3.00	0.0000	143.00	No Ice	18.81	11.50	179.20
			-6.00			1/2" Ice	19.45	12.93	309.62
			0.00			1" Ice	20.10	14.22	450.59
						2" Ice	21.41	16.46	768.16
QD6616-7 Antenna w/ Mounting Pipe	C	From Face	3.00	0.0000	143.00	No Ice	13.58	8.22	151.90
			-6.00			1/2" Ice	14.08	9.19	251.75
			0.00			1" Ice	14.60	10.02	360.20
						2" Ice	15.65	11.71	606.11
AIR 6419 Antenna w/ Mounting Pipe (AT&T)	A	From Face	3.00	0.0000	143.00	No Ice	4.97	3.43	87.90
			1.00			1/2" Ice	5.52	4.14	132.90
			1.50			1" Ice	6.00	4.73	183.30
						2" Ice	7.01	5.95	303.56
AIR 6419 Antenna w/ Mounting Pipe (AT&T)	B	From Face	3.00	0.0000	143.00	No Ice	4.97	3.43	87.90
			1.00			1/2" Ice	5.52	4.14	132.90
			1.50			1" Ice	6.00	4.73	183.30
						2" Ice	7.01	5.95	303.56
AIR 6419 Antenna w/ Mounting Pipe (AT&T)	C	From Face	3.00	0.0000	143.00	No Ice	4.97	3.43	87.90
			1.00			1/2" Ice	5.52	4.14	132.90
			1.50			1" Ice	6.00	4.73	183.30
						2" Ice	7.01	5.95	303.56
AIR 6449 Antenna (AT&T)	A	From Face	3.00	0.0000	143.00	No Ice	4.05	2.74	82.00
			1.00			1/2" Ice	4.32	2.97	115.62
			-1.50			1" Ice	4.59	3.20	153.14
						2" Ice	5.15	3.68	240.65
AIR 6449 Antenna (AT&T)	B	From Face	3.00	0.0000	143.00	No Ice	4.05	2.74	82.00
			1.00			1/2" Ice	4.32	2.97	115.62
			-1.50			1" Ice	4.59	3.20	153.14
						2" Ice	5.15	3.68	240.65
AIR 6449 Antenna (AT&T)	C	From Face	3.00	0.0000	143.00	No Ice	4.05	2.74	82.00
			1.00			1/2" Ice	4.32	2.97	115.62
			-1.50			1" Ice	4.59	3.20	153.14
						2" Ice	5.15	3.68	240.65
4415 B25 RRH	A	From Leg	1.00	0.0000	143.00	No Ice	1.84	0.82	46.00
			0.00			1/2" Ice	2.01	0.94	60.07
			0.00			1" Ice	2.19	1.07	76.66
						2" Ice	2.57	1.37	118.17
4415 B25 RRH	B	From Leg	1.00	0.0000	143.00	No Ice	1.84	0.82	46.00
			0.00			1/2" Ice	2.01	0.94	60.07
			0.00			1" Ice	2.19	1.07	76.66
						2" Ice	2.57	1.37	118.17
4415 B25 RRH	C	From Leg	1.00	0.0000	143.00	No Ice	1.84	0.82	46.00
			0.00			1/2" Ice	2.01	0.94	60.07
			0.00			1" Ice	2.19	1.07	76.66
						2" Ice	2.57	1.37	118.17
4449 B5/B12 RRH	A	From Leg	1.00	0.0000	143.00	No Ice	1.97	1.40	7.20
			0.00			1/2" Ice	2.15	1.56	25.68
			0.00			1" Ice	2.33	1.72	46.97
						2" Ice	2.72	2.07	98.80
4449 B5/B12 RRH	B	From Leg	1.00	0.0000	143.00	No Ice	1.97	1.40	7.20
			0.00			1/2" Ice	2.15	1.56	25.68

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			1" Ice	2.33	1.72	46.97
						2" Ice	2.72	2.07	98.80
4449 B5/B12 RRH	C	From Leg	1.00	0.0000	143.00	No Ice	1.97	1.40	7.20
			0.00			1/2" Ice	2.15	1.56	25.68
			0.00			1" Ice	2.33	1.72	46.97
						2" Ice	2.72	2.07	98.80
Squid Surge Arrestor	A	From Leg	1.00	0.0000	143.00	No Ice	0.81	0.81	33.00
			0.00			1/2" Ice	1.30	1.30	48.38
			0.00			1" Ice	1.48	1.48	66.11
						2" Ice	1.86	1.86	109.29
Squid Surge Arrestor	B	From Leg	1.00	0.0000	143.00	No Ice	0.81	0.81	33.00
			0.00			1/2" Ice	1.30	1.30	48.38
			0.00			1" Ice	1.48	1.48	66.11
						2" Ice	1.86	1.86	109.29
Squid Surge Arrestor	C	From Leg	1.00	0.0000	143.00	No Ice	0.81	0.81	33.00
			0.00			1/2" Ice	1.30	1.30	48.38
			0.00			1" Ice	1.48	1.48	66.11
						2" Ice	1.86	1.86	109.29

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
2' Dish Antenna w/ Shroud	A	Paraboloid w/Shroud (HP)	From Leg	3.00 0.00 0.00	70.0000		190.00	2.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.14 3.41 3.68 4.21	25.00 42.50 60.01 95.02
2' Dish Antenna w/ Shroud **	A	Paraboloid w/Shroud (HP)	From Leg	3.00 0.00 0.00	-60.0000		190.00	2.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.14 3.41 3.68 4.21	25.00 42.50 60.01 95.02
3' Dish Antenna w/ Radome	B	Paraboloid w/Radome	From Leg	3.50 0.00 0.00	-10.0000		151.00	3.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.07 7.47 7.86 8.66	50.00 88.35 126.69 203.38
2' Dish Antenna w/ Radome	C	Paraboloid w/Radome	From Leg	3.50 0.00 0.00	10.0000		152.00	2.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.14 3.41 3.68 4.21	40.00 57.50 75.01 110.02
2' Dish Antenna w/ Radome	A	Paraboloid w/Radome	From Leg	3.50 0.00 0.00	40.0000		152.00	2.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.14 3.41 3.68 4.21	40.00 57.50 75.01 110.02

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L1	184 - 166.5	Pole	Max Tension	45	0.05	-0.15	0.04
			Max. Compression	26	-6308.33	377.55	133.85
			Max. Mx	20	-1909.17	48314.01	443.95
			Max. My	2	-1933.53	670.14	45300.82
			Max. Vy	20	-3411.32	48314.01	443.95
			Max. Vx	14	3272.68	-930.54	-45251.30
			Max. Torque	18			-1417.20
L2	166.5 - 133.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-49113.76	-15.10	-13428.05
			Max. Mx	20	-15725.06	538238.63	-417.47
			Max. My	14	-15615.17	-2800.52	-548366.08
			Max. Vy	20	-26598.34	538238.63	-417.47
			Max. Vx	2	-26983.71	2262.86	543094.87
			Max. Torque	9			-7463.77
L3	133.08 - 112.99	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-71813.60	-884.73	-14999.58
			Max. Mx	20	-25663.05	1219544.51	732.38
			Max. My	14	-25558.77	-4628.74	-1238583.53
			Max. Vy	20	-36558.98	1219544.51	732.38
			Max. Vx	2	-36981.09	4599.24	1233660.92
			Max. Torque	9			-5780.01
L4	112.99 - 87.99	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-79346.42	-2387.57	-15088.98
			Max. Mx	20	-31419.87	1966696.07	2404.88
			Max. My	14	-31339.06	-6789.02	-1993706.38
			Max. Vy	20	-38223.42	1966696.07	2404.88
			Max. Vx	2	-38645.16	6832.96	1989644.10
			Max. Torque	9			-5778.49
L5	87.99 - 43.91	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-100593.05	-6071.04	-14520.64
			Max. Mx	20	-47599.68	3686268.97	6087.51
			Max. My	14	-47560.01	-11457.03	-3730324.17
			Max. Vy	20	-41793.90	3686268.97	6087.51
			Max. Vx	2	-42206.09	11426.62	3728090.70
			Max. Torque	9			-5835.78
L6	43.91 - 1	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-129906.15	-10334.08	-12333.67
			Max. Mx	20	-70785.26	5813040.42	10476.66
			Max. My	2	-70784.37	16353.60	5875894.04
			Max. Vy	20	-44683.92	5813040.42	10476.66
			Max. Vx	2	-45071.90	16353.60	5875894.04
			Max. Torque	9			-5831.04

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
L1	184 - 166.5	Pole	TP19.399x15.5x0.1875	1	-1909.17	645575.00	16.0	Pass
L2	166.5 - 133.08	Pole	TP26.401x18.3556x0.25	2	-15597.20	1174650.00	73.9	Pass
L3	133.08 - 112.99	Pole	TP30.285x25.0549x0.375	3	-25515.40	2082620.00	78.2	Pass
L4	112.99 - 87.99	Pole	TP35.892x30.285x0.415	4	-31271.20	2647330.00	86.0	Pass
L5	87.99 - 43.91	Pole	TP44.903x33.9406x0.485	5	-47502.90	3875930.00	88.0	Pass
L6	43.91 - 1	Pole	TP53.5x42.5549x0.54	6	-56501.80	4603150.00	83.6	Pass
							Summary	
							Pole (L5) 88.0	Pass
							Base Plate 84.7	Pass
							RATING = **88.0**	**Pass**

tnxFoundation	Job:	CT5448	Date:
	Client:	AT&T;	11/17/2021 1:06:35 PM

Foundation

Foundation name: Tower Foundation

Foundation type: Caisson

Geometry and Materials

Caisson:

Diameter	D	7.00 ft
Caisson length	L	32.00 ft
Base area		38.48 ft2

Levels:

Pier above ground	h	1.00 ft
Foundation level	hf	31.00 ft
Frost depth	fd	3.50 ft
Ground water level	hw	5.00 ft

Concrete:

Strength	f'c	4.0 ksi
Unit weight		0.15 kcf

Parameters:

Caisson unit skin friction and unit end bearing stress are defined	No
End bearing capacity factors Nc and Nq are defined	No

Soils:

#	Name	Φ	Cu	Kp	γ.dry	γ.sat	fs	qb	Top level
1	Clay Custom 1	0.00	1.00 ksf	1	110.0 pcf	130.0 pcf	0.0 ksf	0.0 ksf	0.00 ft
2	Sand Custom 1	38.00	0.00 ksf	3	110.0 pcf	130.0 pcf	0.0 ksf	0.0 ksf	3.50 ft
3	Sand Custom 2	38.00	0.00 ksf	3	110.0 pcf	130.0 pcf	0.0 ksf	0.0 ksf	5.00 ft
4	Sand Custom 3	38.00	0.00 ksf	3	110.0 pcf	130.0 pcf	0.0 ksf	0.0 ksf	15.00 ft

Φ - internal friction angle

Cu - soil cohesion

Kp - coefficient of passive pressure

γ.dry - dry soil density

γ.sat - saturated soil density

fs - external skin friction (unit value)

qb - end bearing stress (unit value)

Soils:

#	Name	∈	Kt	Ξ	Nc	Nq
1	Clay Custom 1	0.00	1.00	0.50	9.00	1.00

2	Sand Custom 1	30.00	0.50	0.50	9.00	1.00
3	Sand Custom 2	30.00	0.50	0.50	9.00	1.00
4	Sand Custom 3	30.00	0.50	0.50	9.00	1.00

δ - friction angle between soil and the pile

Kt - coefficient for lateral earth pressure

α - adhesion factor

Nc - pile Bearing capacity factor Nc

Nq - pile Bearing capacity factor Nq

Loads:

#	Name	Description	P	Vx	Vz	Mz	Mx
1	Dead Only	TIA-222-H load combination	59.0 kip	0.0 kip	0.0 kip	1.7 kip-ft	-1.7 kip-ft
2	1.2 Dead+1.0 Wind 0 deg - No Ice	TIA-222-H load combination	70.8 kip	0.1 kip	45.0 kip	-16.4 kip-ft	5875.9 kip-ft
3	0.9 Dead+1.0 Wind 0 deg - No Ice	TIA-222-H load combination	53.1 kip	0.1 kip	45.0 kip	-16.5 kip-ft	5764.4 kip-ft
4	1.2 Dead+1.0 Wind 30 deg - No Ice	TIA-222-H load combination	70.8 kip	-22.1 kip	38.9 kip	2878.1 kip-ft	5084.0 kip-ft
5	0.9 Dead+1.0 Wind 30 deg - No Ice	TIA-222-H load combination	53.1 kip	-22.1 kip	38.9 kip	2822.8 kip-ft	4987.6 kip-ft
6	1.2 Dead+1.0 Wind 60 deg - No Ice	TIA-222-H load combination	70.8 kip	-38.5 kip	22.4 kip	5013.7 kip-ft	2912.7 kip-ft
7	0.9 Dead+1.0 Wind 60 deg - No Ice	TIA-222-H load combination	53.1 kip	-38.5 kip	22.4 kip	4917.6 kip-ft	2857.8 kip-ft
8	1.2 Dead+1.0 Wind 90 deg - No Ice	TIA-222-H load combination	70.8 kip	-44.5 kip	-0.1 kip	5799.7 kip-ft	-20.8 kip-ft
9	0.9 Dead+1.0 Wind 90 deg - No Ice	TIA-222-H load combination	53.1 kip	-44.5 kip	-0.1 kip	5688.6 kip-ft	-19.8 kip-ft
10	1.2 Dead+1.0 Wind 120 deg - No Ice	TIA-222-H load combination	70.8 kip	-38.6 kip	-22.6 kip	5031.0 kip-ft	-2956.2 kip-ft
11	0.9 Dead+1.0 Wind 120 deg - No Ice	TIA-222-H load combination	53.1 kip	-38.6 kip	-22.6 kip	4934.6 kip-ft	-2899.3 kip-ft
12	1.2 Dead+1.0 Wind 150 deg - No Ice	TIA-222-H load combination	70.8 kip	-22.8 kip	-39.7 kip	2956.2 kip-ft	-5159.7 kip-ft
13	0.9 Dead+1.0 Wind 150 deg - No Ice	TIA-222-H load combination	53.1 kip	-22.8 kip	-39.7 kip	2899.5 kip-ft	-5061.1 kip-ft
14	1.2 Dead+1.0 Wind 180 deg - No Ice	TIA-222-H load combination	70.8 kip	-0.1 kip	-45.0 kip	16.6 kip-ft	-5875.6 kip-ft
15	0.9 Dead+1.0 Wind 180 deg - No Ice	TIA-222-H load combination	53.1 kip	-0.1 kip	-45.0 kip	15.8 kip-ft	-5763.0 kip-ft
16	1.2 Dead+1.0 Wind 210 deg - No Ice	TIA-222-H load combination	70.8 kip	22.3 kip	-38.9 kip	-2903.1 kip-ft	-5083.1 kip-ft
17	0.9 Dead+1.0 Wind 210 deg - No Ice	TIA-222-H load combination	53.1 kip	22.3 kip	-38.9 kip	-2848.2 kip-ft	-4985.5 kip-ft
18	1.2 Dead+1.0 Wind 240 deg - No Ice	TIA-222-H load combination	70.8 kip	38.6 kip	-22.5 kip	-5031.9 kip-ft	-2935.2 kip-ft
19	0.9 Dead+1.0 Wind 240 deg - No Ice	TIA-222-H load combination	53.1 kip	38.6 kip	-22.5 kip	-4936.4 kip-ft	-2878.7 kip-ft
20	1.2 Dead+1.0 Wind 270 deg - No Ice	TIA-222-H load combination	70.8 kip	44.6 kip	0.1 kip	-5813.0 kip-ft	10.5 kip-ft
21	0.9 Dead+1.0 Wind 270 deg - No Ice	TIA-222-H load combination	53.1 kip	44.6 kip	0.1 kip	-5702.7 kip-ft	10.8 kip-ft
22	1.2 Dead+1.0 Wind 300 deg - No Ice	TIA-222-H load combination	70.8 kip	38.6 kip	22.5 kip	-5035.4 kip-ft	2940.9 kip-ft
23	0.9 Dead+1.0 Wind 300 deg - No Ice	TIA-222-H load combination	53.1 kip	38.6 kip	22.5 kip	-4939.9 kip-ft	2885.4 kip-ft
24	1.2 Dead+1.0 Wind 330 deg - No Ice	TIA-222-H load combination	70.8 kip	22.7 kip	39.7 kip	-2948.2 kip-ft	5159.5 kip-ft

25	0.9 Dead+1.0 Wind 330 deg - No Ice	TIA-222-H load combination	53.1 kip	22.7 kip	39.7 kip	-2892.7 kip-ft	5062.0 kip-ft
26	1.2 Dead+1.0 Ice+1.0 Temp	TIA-222-H load combination	129.9 kip	0.0 kip	0.0 kip	10.3 kip-ft	-12.3 kip-ft
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	TIA-222-H load combination	129.9 kip	0.0 kip	10.5 kip	7.5 kip-ft	1525.2 kip-ft
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	TIA-222-H load combination	129.9 kip	-5.2 kip	9.1 kip	771.5 kip-ft	1318.7 kip-ft
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	TIA-222-H load combination	129.9 kip	-9.1 kip	5.2 kip	1333.8 kip-ft	751.9 kip-ft
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	TIA-222-H load combination	129.9 kip	-10.5 kip	0.0 kip	1540.1 kip-ft	-15.6 kip-ft
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	TIA-222-H load combination	129.9 kip	-9.1 kip	-5.3 kip	1336.6 kip-ft	-783.6 kip-ft
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	TIA-222-H load combination	129.9 kip	-5.3 kip	-9.1 kip	778.7 kip-ft	-1344.5 kip-ft
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	TIA-222-H load combination	129.9 kip	0.0 kip	-10.5 kip	12.8 kip-ft	-1549.4 kip-ft
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	TIA-222-H load combination	129.9 kip	5.2 kip	-9.1 kip	-756.3 kip-ft	-1342.5 kip-ft
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	TIA-222-H load combination	129.9 kip	9.1 kip	-5.3 kip	-1317.2 kip-ft	-780.5 kip-ft
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	TIA-222-H load combination	129.9 kip	10.5 kip	0.0 kip	-1522.6 kip-ft	-10.5 kip-ft
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	TIA-222-H load combination	129.9 kip	9.1 kip	5.3 kip	-1317.3 kip-ft	756.4 kip-ft
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	TIA-222-H load combination	129.9 kip	5.3 kip	9.1 kip	-756.8 kip-ft	1320.2 kip-ft
39	Dead+Wind 0 deg - Service	TIA-222-H load combination	59.0 kip	0.0 kip	8.0 kip	-1.5 kip-ft	1034.1 kip-ft
40	Dead+Wind 30 deg - Service	TIA-222-H load combination	59.0 kip	-3.9 kip	6.9 kip	508.6 kip-ft	894.5 kip-ft
41	Dead+Wind 60 deg - Service	TIA-222-H load combination	59.0 kip	-6.8 kip	4.0 kip	884.9 kip-ft	511.8 kip-ft
42	Dead+Wind 90 deg - Service	TIA-222-H load combination	59.0 kip	-7.9 kip	0.0 kip	1023.4 kip-ft	-5.1 kip-ft
43	Dead+Wind 120 deg - Service	TIA-222-H load combination	59.0 kip	-6.8 kip	-4.0 kip	888.0 kip-ft	-522.4 kip-ft
44	Dead+Wind 150 deg - Service	TIA-222-H load combination	59.0 kip	-4.0 kip	-7.0 kip	522.4 kip-ft	-910.8 kip-ft
45	Dead+Wind 180 deg - Service	TIA-222-H load combination	59.0 kip	0.0 kip	-8.0 kip	4.3 kip-ft	-1037.0 kip-ft
46	Dead+Wind 210 deg - Service	TIA-222-H load combination	59.0 kip	4.0 kip	-6.9 kip	-510.3 kip-ft	-897.3 kip-ft
47	Dead+Wind 240 deg - Service	TIA-222-H load combination	59.0 kip	6.9 kip	-4.0 kip	-885.4 kip-ft	-518.7 kip-ft
48	Dead+Wind 270 deg - Service	TIA-222-H load combination	59.0 kip	7.9 kip	0.0 kip	-1023.1 kip-ft	0.4 kip-ft
49	Dead+Wind 300 deg - Service	TIA-222-H load combination	59.0 kip	6.9 kip	4.0 kip	-886.1 kip-ft	516.8 kip-ft
50	Dead+Wind 330 deg - Service	TIA-222-H load combination	59.0 kip	4.0 kip	7.0 kip	-518.3 kip-ft	907.8 kip-ft

Uplift capacity

Resistance factors

Resistance factor for shaft resistance of caisson - Uplift	0.35
Load factor for foundation weight	0.750
Load factor for soil weigth	0.750

Details for maximum uplift force:

Number of critical combination	1
Maximum uplift force from critical combination	0.00 kip
Shaft resistance of caisson due to skin friction	240.22 kip
Weight of caisson	185.36 kip
Weight of soil (for belled caissons)	0.00 kip
Allowable uplift resistance	223.10 kip
Ratio = Maximum uplift force / Uplift resistance	0

Bearing capacity

Resistance factors

Resistance factor for shaft resistance of caisson - Bearing	0.45
Resistance factor for base resistance of caisson - Bearing	0.4

Details for maximum compression force:

Number of critical combination	26
Maximum compression force from critical combination	129.91 kip
Shaft resistance of caisson due to skin friction	240.22 kip
Base resistance	4344.14 kip
Allowable bearing resistance	1845.75 kip
Ratio = Maximum compression / Compression resistance	0.07

Maximum moment along Caisson (P-Y)

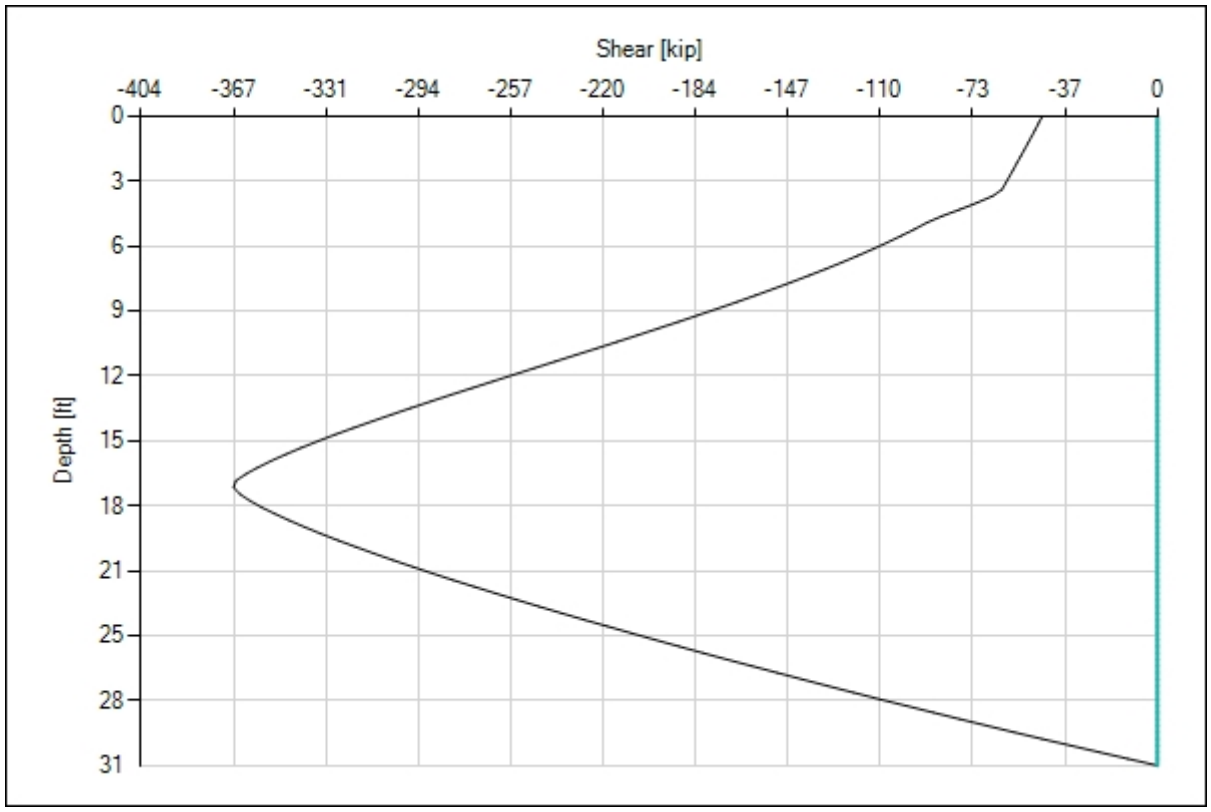
Results for the critical load:

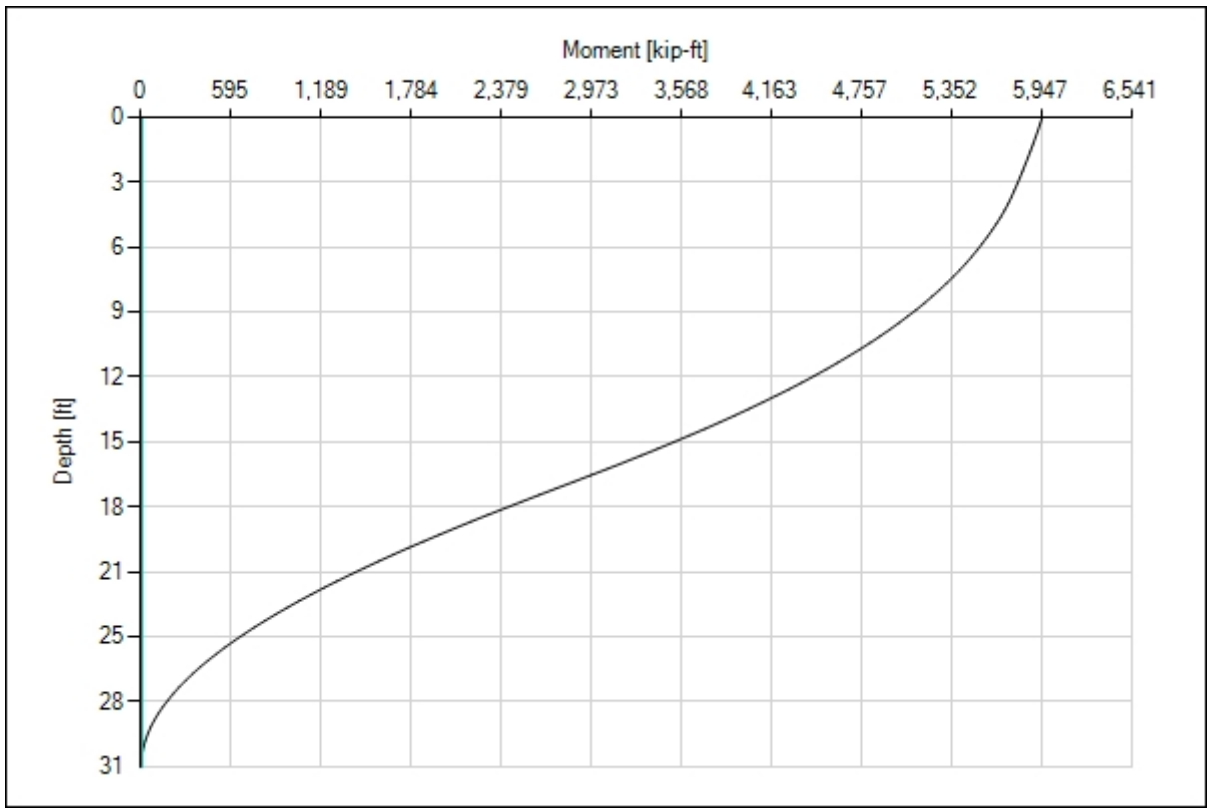
Number of critical combination		12
Max moment in caisson	Mmax	5946.51 kip-ft

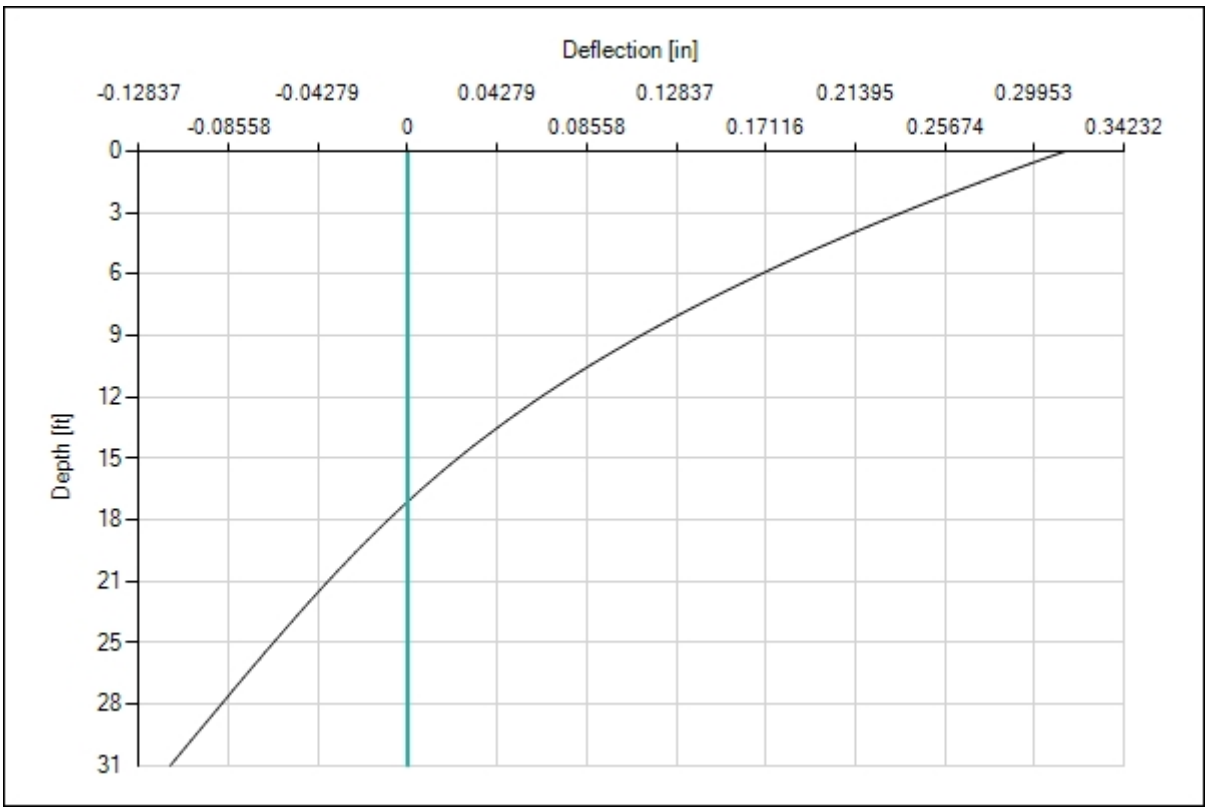
Shear and Moments along Caisson:

Level	Shear	Moment	Deflection
0.0 ft	-45.91 kip	5946.51 kip-ft	0.314 in
3.4 ft	-61.84 kip	5762.36 kip-ft	0.227 in
6.9 ft	-125.44 kip	5442.65 kip-ft	0.154 in
10.3 ft	-206.66 kip	4877.06 kip-ft	0.093 in
13.8 ft	-296.80 kip	4009.81 kip-ft	0.043 in
17.2 ft	-366.44 kip	2854.89 kip-ft	0.003 in

20.7 ft	-311.41 kip	1664.43 kip-ft	-0.031 in
24.1 ft	-218.68 kip	746.14 kip-ft	-0.061 in
27.6 ft	-110.37 kip	175.98 kip-ft	-0.089 in
30.7 ft	-0.05 kip	0.00 kip-ft	-0.114 in







Caisson Flexure

Data:

Resistance factor for tension		0.9
Concrete cover		3.63 in
Steel strength of vertical bars	fy	60.00 ksi
Number of vertical bars		27
Diameter of vertical bars		1.41 in
Area of one bar		1.56 in2

Reinforcement ratio:

Reinforcement area		42.16 in2
Reinforcement ratio		0.008
Min reinforcement ratio		0.002
Verification: Reinforcement ratio > Min reinforcement ratio		OK

Results for the critical load:

Max moment in caisson	Mu	5946.51 kip-ft
Vertical load	Pu	70.83 kip
Caisson moment capacity	Mn	6880.99 kip-ft
Ratio = Mu / Mn		0.864

EXHIBIT 4

October 22, 2021
January 11, 2022 (Rev.1)

Centerline Communications
750 West Center Street, Suite #301
West Bridgewater, MA 02379

RE:

Site Number:	CT5448
FA Number:	10071105
PACE Number:	MRCTB052248
PT Number:	2051A101XN
Site Name:	MANCHESTER CENTRAL
Site Address:	239 Middle Turnpike East Manchester, CT 06040

To Whom It May Concern:

Hudson Design Group LLC (HDG) has been authorized by Centerline Communications to perform a mount analysis on the proposed AT&T antenna/RRH mount to determine their capability of supporting the following additional loading:

- (3) RRUS-32 B30 RRH's (27.2"x12.1"x7.0" – Wt. = 60 lbs. /each)
- (3) RRUS-32 B66A RRH's (27.2"x12.1"x7.0" – Wt. = 60 lbs. /each)
- (3) RRUS-E2 B29 RRH's (20.4"x18.5"x7.5"– Wt. = 53 lbs. /each)
- (3) B14 4478 RRH's (18.1"x13.4"x8.3" – Wt. = 60 lbs. /each)
- (1) Squid Surge Arrestors (24.0"x9.7" Φ – Wt. = 33 lbs. /each)
- **(2) DMP65R-BU8DA Antennas (96.0"x20.7"x7.7" – Wt. = 96 lbs. /each)**
- **(1) DMP65R-BU6DA Antennas (71.2"x20.7"x7.7" – Wt. = 80 lbs. /each)**
- **(2) QD8616-7 Antennas (96.0"x22.0"x9.6" – Wt. = 150 lbs. /each)**
- **(1) QD6616-7 Antennas (72.0"x22.0"x9.6" – Wt. = 130 lbs. /each)**
- **(3) AIR 6419 Antennas (31.0"x16.1"x7.3" – Wt. = 66 lbs. /each)**
- **(3) AIR 6449 Antennas (30.6"x15.9"x10.6" – Wt. = 82 lbs. /each)**
- **(3) 4415 B25 RRH's (16.5"x13.4"x5.9" – Wt. = 46 lbs. /each)**
- **(3) B5/B12 4449 RRH's (17.9"x13.2"x9.4" – Wt. = 73 lbs. /each)**
- **(3) Squid Surge Arrestors (24.0"x9.7" Φ – Wt. = 33 lbs. /each)**

**Proposed equipment shown in bold.*

Mount fabrication drawings prepared by SitePro1 P/N RMQLP-4120-H10, dated October 18, 2019 were used to perform this analysis.

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Mount Analysis Methods:

- This analysis was conducted in accordance with EIA/TIA-222-H, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, the International Building Code 2015 with 2018 Connecticut State Building Code, and AT&T Mount Technical Directive – R16.
- HDG considers this mount to be asymmetrical and has applied wind loads in 30-degree increments all around the mount. Per TIA-222-H and Appendix N of the Connecticut State Building Code, the max basic wind speed for this site is equal to 135 mph with a max basic wind speed with ice of 50 mph and a max ice thickness of 1.5 in. An escalated ice thickness of 2.17 in was used for this analysis.
- HDG considers this site to be exposure category B; tower is located in an urban/suburban or wooded area with numerous closely spaced obstructions.
- HDG considers this site to be topographic category 1; tower is located on flat terrain or the bottom of a hill or ridge.
- HDG considers this site to have a spectral response acceleration parameter at short periods, S_S, of 0.178 and a spectral response acceleration parameter at a period of 1 second, S_1, of 0.064.
- The mount has been analyzed with load combinations consisting of 500 lbs live load using a service wind speed of 30 mph wind on the worst case antenna. Analysis performed on each antenna pipe to determine worst case location; worst case location was antenna position 2.
- The mount has been analyzed with load combinations consisting of a 250 lbs live load in a worst case location on the mount.
- The proposed mounts are to be secured to the existing monopole with HSS members and angles secured to ring mounts. The ring mounts are secured around the monopole using threaded rods. HDG considers the threaded rods to be the governing connection member.

Based on our evaluation, we have determined that the Proposed SitePro1 P/N RMQLP-4120-H10 mount **IS CAPABLE** of supporting the proposed installation.

	Component	Controlling Load Case	Stress Ratio	Pass/Fail
Proposed Mount Rating	43	LC3	83%	**PASS**

Reference Documents:

- Fabrication drawings prepared by SitePro1 P/N RMQLP-4120-H10, dated October 29, 2019.

This determination was based on the following limitations and assumptions:

1. HDG is not responsible for any modifications completed prior to and hereafter which HDG was not directly involved.
2. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.
3. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer's requirements.
4. The existing mount has been adequately secured to the tower structure per the mount manufacturer's specifications.
5. All components pertaining to AT&T's mounts must be tightened and re-plumbed prior to the installation of new appurtenances.
6. HDG performed a localized analysis on the mount itself and not on the supporting tower structure.

Please feel free to contact our office should you have any questions.

Respectfully Submitted,
Hudson Design Group LLC

Michael Cabral
Vice President

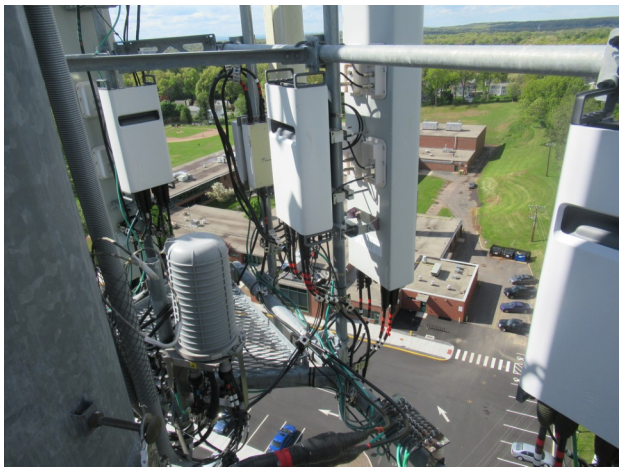
STATE OF CONNECTICUT
DANIEL HAMM
24178
LICENSED
PROFESSIONAL ENGINEER

Daniel P. Hamm, PE
Principal

FIELD PHOTOS:
*Note: Existing mount to be removed.

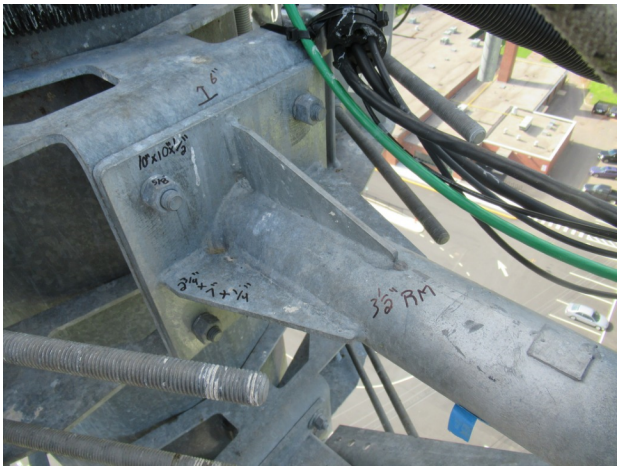








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Wind & Ice
Calculations

Date: 1/11/2022
Project Name: MANCHESTER CENTRAL
Project No.: CT5448
Designed By: ID **Checked By:** MSC

HUDSON Design Group LLC

2.6.5.2 Velocity Pressure Coeff:

$K_z = 2.01\ (z/z_g)^{2/\alpha}$

z=	143	(ft)
z_g=	1200	(ft)
α=	7.0	

K_z= 1.095

Kzmin ≤ Kz ≤ 2.01

Table 2-4

Exposure	Z_g	α	K_{zmin}	K_c
B	1200 ft	7.0	0.70	0.9
C	900 ft	9.5	0.85	1.0
D	700 ft	11.5	1.03	1.1

2.6.6.2 Topographic Factor:

Table 2-5

Topo. Category	K_t	f
2	0.43	1.25
3	0.53	2.0
4	0.72	1.5

$K_{zt} = [1+(K_c\ K_t/K_h)]^2$

$K_h = e^{(f*z/H)}$

K_{zt}= 1

K_h=	1	
K_c=	0.9	(from Table 2-4)
K_t=	0	(from Table 2-5)
f=	0	(from Table 2-5)
z=	143	
z_s=	283	(Mean elevation of base of structure above sea level)
H=	0	(Ht. of the crest above surrounding terrain)
K_{zt}=	1.00	(from 2.6.6.2.1)
K_e=	0.99	(from 2.6.8)

(If Category 1 then K_{zt} =1.0)

Category= **1**

2.6.10 Design Ice Thickness

Max Ice Thickness = t_i =	1.50	in
Importance Factor = I=	1.25	(from Table 2-3)
K_{iz} =	1.16	(from Sec. 2.6.10)

$t_{iz} = t_i * I * K_{iz} * (K_{zt})^{0.35}$

t_{iz} = 2.17 in

Date: 1/11/2022
Project Name: MANCHESTER CENTRAL
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2.6.9 Gust Effect Factor

2.6.9.1 Self Supporting Lattice Structures

G_h = 1.0 Latticed Structures > 600 ft

G_h = 0.85 Latticed Structures 450 ft or less

G_h = 0.85 + 0.15 [h/150 - 3.0] h= ht. of structure

h=	184	G_h=	0.85

2.6.9.2 Guyed Masts G_h= 0.85

2.6.9.3 Pole Structures G_h= 1.1

2.6.9 Appurtenances G_h= 1.0

2.6.9.4 Structures Supported on Other Structures

(Cantilivered tubular or latticed spines, pole, structures on buildings (ht. : width ratio > 5)

G_h=	1.35	**Gh=**	**1.00**

2.6.11.2 Design Wind Force on Appurtenances

$F = q_z * G_h * (EPA)_A$

$q_z = 0.00256 * K_z * K_{zt} * K_s * K_e * K_d * V_{max}^2$

		K_z=	1.095	(from 2.6.5.2)
		K_{zt}=	1.0	(from 2.6.6.2.1)
		K_s=	1.0	(from 2.6.7)
q_z=	**48.02**	K_e=	0.99	(from 2.6.8)
$q_{z\,(ice)}$=	**6.59**	K_d=	0.95	(from Table 2-2)
$q_{z\,(30)}$=	**2.37**	V_{max}=	135	mph (Ultimate Wind Speed)
		$V_{max\,(ice)}$=	50	mph
		V_{30}=	30	mph

Table 2-2

Structure Type	Wind Direction Probability Factor, Kd
Latticed structures with triangular, square or rectangular cross sections	0.85
Tubular pole structures, latticed structures with other cross sections, appurtenances	0.95
Tubular pole structures supporting antennas enclosed within a cylindrical shroud	1.00

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Determine Ca:

Table 2-9

Force Coefficients (Ca) for Appurtenances				
Member Type		Aspect Ratio ≤ 2.5	Aspect Ratio = 7	Aspect Ratio ≥ 25
		Ca	Ca	Ca
Flat		1.2	1.4	2.0
Square/Rectangular HSS		1.2 - 2.8(r_s) ≥ 0.85	1.4 - 4.0(r_s) ≥ 0.90	2.0 - 6.0(r_s) ≥ 1.25
Round	**C < 39** (Subcritical)	0.7	0.8	1.2
	39 ≤ C ≤ 78 (Transitional)	$4.14/(C^{0.485})$	$3.66/(C^{0.415})$	$46.8/(C^{1.0})$
	C > 78 (Supercritical)	0.5	0.6	0.6

Aspect Ratio is the overall length/width ratio in the plane normal to the wind direction.
(Aspect ratio is independent of the spacing between support points of a linear appurtenance,

Note: Linear interpolation may be used for aspect ratios other than those shown.

Ice Thickness = **2.17** **in** | **Angle =** **0 (deg)** | **Equivalent Angle =** **180 (deg)**

Appurtenances	Height	Width	Depth	Flat Area	Aspect Ratio	Ca	Force (lbs)	Force (lbs) (w/ Ice)	Force (lbs) (30 mph)
DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	4.64	1.30	**858**	**149**	**42**
DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.44	1.24	**610**	**107**	**30**
QD6616-7 Antenna	72.0	22.0	9.6	11.00	3.27	1.23	**652**	**114**	**32**
AIR 6419 N77G Antenna	31.0	16.1	7.3	3.47	1.93	1.20	**200**	**40**	**10**
AIR 6449 N77D Antenna	30.6	15.9	10.6	3.38	1.92	1.20	**195**	**39**	**10**
4478 B14 RRH	18.1	13.4	8.3	1.68	1.35	1.20	**97**	**22**	**5**
4478 B14 RRH (Shielded)	18.1	6.7	8.3	0.84	2.70	1.21	**49**	**14**	**2**
RRUS-32 B66A RRH	27.2	12.1	7.0	2.29	2.25	1.20	**132**	**28**	**7**
RRUS-32 B66A RRH (Shielded)	27.2	6.1	7.0	1.14	4.50	1.29	**71**	**19**	**3**
RRUS-32 B30 RRH	27.2	7.0	12.1	1.32	3.89	1.26	**80**	**21**	**4**
RRUS-32 B30 RRH (Shielded)	27.2	3.5	12.1	0.66	7.77	1.43	**45**	**16**	**2**
RRUS-E2 B29 RRH	20.4	7.5	17.0	1.06	2.72	1.21	**62**	**16**	**3**
RRUS-E2 B29 RRH (Shielded)	20.4	3.8	17.0	0.53	5.44	1.33	**34**	**12**	**2**
4415 B25 RRH	16.5	5.9	13.4	0.68	2.80	1.21	**39**	**12**	**2**
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.90	1.20	**67**	**17**	**3**
Surge Arrestor	24.0	9.7	9.7	1.62	2.47	0.70	**54**	**13**	**3**

Date: 4/14/2021
Project Name: MANCHESTER CENTRAL
Project No.: CT5448
Designed By: ID Checked By: MSC

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Appurtenances	Height	Width	Depth	Flat Area	Aspect Ratio	Ca	Force (lbs)	Force (lbs) (w/ Ice)	Force (lbs) (30 mph)
PL 6x3/8	6.0	12.0	-	0.50	0.50	1.20	**29**		
HSS 4x4	4.0	12.0	-	0.33	0.33	1.25	**20**		
L 2-1/2x2-1/2 Angles	2.5	12.0	-	0.21	0.21	2.00	**20**		
L 2x2 Angles	2.0	12.0	-	0.17	0.17	2.00	**16**		
3" Pipe	3.5	12.0	-	0.29	0.29	1.20	**17**		
2-1/2" Pipe	2.9	12.0	-	0.24	0.24	1.20	**14**		
2" Pipe	2.4	12.0	-	0.20	0.20	1.20	**11**		

Date: 1/11/2022
Project Name: MANCHESTER CENTRAL
Project No.: CT5448
Designed By: ID Checked By: MSC

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WIND LOADS

Angle = 30 (deg) | Ice Thickness = 2.17 in. | Equivalent Angle = 210 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Aspect Ratio	Aspect Ratio	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	5.13	4.64	12.47	1.30	1.58	858	390	741
DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	610	270	525
QD6616-7 Antenna	72.0	22.0	9.6	11.00	4.80	3.27	7.50	1.23	1.42	652	327	571
AIR 6419 N77G Antenna	31.0	16.1	7.3	3.47	1.57	1.93	4.25	1.20	1.28	200	96	174
AIR 6449 N77D Antenna	30.6	15.9	10.6	3.38	2.25	1.92	2.89	1.20	1.22	195	132	179
4478 B14 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	97	60	88
4478 B14 RRH (Shielded)	18.1	6.7	8.3	0.84	1.04	2.70	2.18	1.21	1.20	49	60	52
RRUS-32 B66A RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	132	80	119
RRUS-32 B66A RRH (Shielded)	27.2	6.1	7.0	1.14	1.32	4.50	3.89	1.29	1.26	71	80	73
RRUS-32 B30 RRH	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	80	132	93
RRUS-32 B30 RRH (Shielded)	27.2	3.5	12.1	0.66	2.29	7.77	2.25	1.43	1.20	45	132	67
RRUS-E2 B29 RRH	20.4	7.5	17.0	1.06	2.41	2.72	1.20	1.21	1.20	62	139	81
RRUS-E2 B29 RRH (Shielded)	20.4	3.8	17.0	0.53	2.41	5.44	1.20	1.33	1.20	34	139	60
4415 B25 RRH	16.5	5.9	13.4	0.68	1.54	2.80	1.23	1.21	1.20	39	88	52
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	67	95	74

WIND LOADS WITH ICE:

DMP65R-BU8DA Antenna	100.3	25.0	12.0	17.45	8.39	4.01	8.33	1.27	1.44	146	80	129
DMP65R-BU6DA Antenna	75.5	25.0	12.0	13.14	6.32	3.02	6.27	1.22	1.37	106	57	94
QD6616-7 Antenna	76.3	26.3	13.9	13.97	7.39	2.90	5.48	1.22	1.33	112	65	100
AIR 6419 N77G Antenna	35.3	20.4	11.6	5.02	2.86	1.73	3.04	1.20	1.22	40	23	36
AIR 6449 N77D Antenna	34.9	20.2	14.9	4.91	3.63	1.73	2.34	1.20	1.20	39	29	36
4478 B14 RRH	22.4	17.7	12.6	2.77	1.97	1.26	1.78	1.20	1.20	22	16	20
4478 B14 RRH (Shielded)	22.4	8.9	12.6	1.38	1.97	2.53	1.78	1.20	1.20	11	16	12
RRUS-32 B66A RRH	31.5	16.4	11.3	3.60	2.48	1.92	2.78	1.20	1.21	28	20	26
RRUS-32 B66A RRH (Shielded)	31.5	8.2	11.3	1.80	2.48	3.84	2.78	1.26	1.21	15	20	16
RRUS-32 B30 RRH	31.5	11.3	16.4	2.48	3.60	2.78	1.92	1.21	1.20	20	28	22
RRUS-32 B30 RRH (Shielded)	31.5	5.7	16.4	1.24	3.60	5.56	1.92	1.34	1.20	11	28	15
RRUS-E2 B29 RRH	24.7	11.8	21.3	2.03	3.67	2.09	1.16	1.20	1.20	16	29	19
RRUS-E2 B29 RRH (Shielded)	24.7	5.9	21.3	1.02	3.67	4.18	1.16	1.27	1.20	9	29	14
4415 B25 RRH	20.8	10.2	17.7	1.48	2.57	2.03	1.17	1.20	1.20	12	20	14
B5/B12 4449 RRH	22.2	13.7	17.5	2.12	2.71	1.62	1.27	1.20	1.20	17	21	18

WIND LOADS AT 30 MPH:

DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	5.13	4.64	12.47	1.30	1.58	42	19	37
DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	30	13	26
QD6616-7 Antenna	72.0	22.0	9.6	11.00	4.80	3.27	7.50	1.23	1.42	32	16	28
AIR 6419 N77G Antenna	31.0	16.1	7.3	3.47	1.57	1.93	4.25	1.20	1.28	10	5	9
AIR 6449 N77D Antenna	30.6	15.9	10.6	3.38	2.25	1.92	2.89	1.20	1.22	10	7	9
4478 B14 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	5	3	4
4478 B14 RRH (Shielded)	18.1	6.7	8.3	0.84	1.04	2.70	2.18	1.21	1.20	2	3	3
RRUS-32 B66A RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	6
RRUS-32 B66A RRH (Shielded)	27.2	6.1	7.0	1.14	1.32	4.50	3.89	1.29	1.26	3	4	4
RRUS-32 B30 RRH	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	4	7	5
RRUS-32 B30 RRH (Shielded)	27.2	3.5	12.1	0.66	2.29	7.77	2.25	1.43	1.20	2	7	3
RRUS-E2 B29 RRH	20.4	7.5	17.0	1.06	2.41	2.72	1.20	1.21	1.20	3	7	4
RRUS-E2 B29 RRH (Shielded)	20.4	3.8	17.0	0.53	2.41	5.44	1.20	1.33	1.20	2	7	3
4415 B25 RRH	16.5	5.9	13.4	0.68	1.54	2.80	1.23	1.21	1.20	2	4	3
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	3	5	4

Date: 1/11/2022
Project Name: MANCHESTER CENTRAL
Project No.: CT5448
Designed By: ID Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle =	60	(deg)	Ice Thickness =	2.17	in.	Equivalent Angle =	240	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	5.13	4.64	12.47	1.30	1.58	858	390	507
DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	610	270	355
QD6616-7 Antenna	72.0	22.0	9.6	11.00	4.80	3.27	7.50	1.23	1.42	652	327	408
AIR 6419 N77G Antenna	31.0	16.1	7.3	3.47	1.57	1.93	4.25	1.20	1.28	200	96	122
AIR 6449 N77D Antenna	30.6	15.9	10.6	3.38	2.25	1.92	2.89	1.20	1.22	195	132	147
4478 B14 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	97	60	69
4478 B14 RRH (Shielded)	18.1	10.1	8.3	1.26	1.04	1.80	2.18	1.20	1.20	73	60	63
RRUS-32 B66A RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	132	80	93
RRUS-32 B66A RRH (Shielded)	27.2	9.1	7.0	1.71	1.32	3.00	3.89	1.22	1.26	101	80	85
RRUS-32 B30 RRH	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	80	132	119
RRUS-32 B30 RRH (Shielded)	27.2	5.3	12.1	0.99	2.29	5.18	2.25	1.32	1.20	63	132	114
RRUS-E2 B29 RRH	20.4	7.5	17.0	1.06	2.41	2.72	1.20	1.21	1.20	62	139	120
RRUS-E2 B29 RRH (Shielded)	20.4	5.6	17.0	0.80	2.41	3.63	1.20	1.25	1.20	48	139	116
4415 B25 RRH	16.5	5.9	13.4	0.68	1.54	2.80	1.23	1.21	1.20	39	88	76
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	67	95	88

WIND LOADS WITH ICE:

DMP65R-BU8DA Antenna	100.3	25.0	12.0	17.45	8.39	4.01	8.33	1.27	1.44	146	80	96
DMP65R-BU6DA Antenna	75.5	25.0	12.0	13.14	6.32	3.02	6.27	1.22	1.37	106	57	69
QD6616-7 Antenna	76.3	26.3	13.9	13.97	7.39	2.90	5.48	1.22	1.33	112	65	77
AIR 6419 N77G Antenna	35.3	20.4	11.6	5.02	2.86	1.73	3.04	1.20	1.22	40	23	27
AIR 6449 N77D Antenna	34.9	20.2	14.9	4.91	3.63	1.73	2.34	1.20	1.20	39	29	31
4478 B14 RRH	22.4	17.7	12.6	2.77	1.97	1.26	1.78	1.20	1.20	22	16	17
4478 B14 RRH (Shielded)	22.4	13.3	12.6	2.07	1.97	1.69	1.78	1.20	1.20	16	16	16
RRUS-32 B66A RRH	31.5	16.4	11.3	3.60	2.48	1.92	2.78	1.20	1.21	28	20	22
RRUS-32 B66A RRH (Shielded)	31.5	12.3	11.3	2.70	2.48	2.56	2.78	1.20	1.21	21	20	20
RRUS-32 B30 RRH	31.5	11.3	16.4	2.48	3.60	2.78	1.92	1.21	1.20	20	28	26
RRUS-32 B30 RRH (Shielded)	31.5	8.5	16.4	1.86	3.60	3.71	1.92	1.25	1.20	15	28	25
RRUS-E2 B29 RRH	24.7	11.8	21.3	2.03	3.67	2.09	1.16	1.20	1.20	16	29	26
RRUS-E2 B29 RRH (Shielded)	24.7	8.9	21.3	1.53	3.67	2.79	1.16	1.21	1.20	12	29	25
4415 B25 RRH	20.8	10.2	17.7	1.48	2.57	2.03	1.17	1.20	1.20	12	20	18
B5/B12 4449 RRH	22.2	13.7	17.5	2.12	2.71	1.62	1.27	1.20	1.20	17	21	20

WIND LOADS AT 30 MPH:

DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	5.13	4.64	12.47	1.30	1.58	42	19	25
DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	30	13	18
QD6616-7 Antenna	72.0	22.0	9.6	11.00	4.80	3.27	7.50	1.23	1.42	32	16	20
AIR 6419 N77G Antenna	31.0	16.1	7.3	3.47	1.57	1.93	4.25	1.20	1.28	10	5	6
AIR 6449 N77D Antenna	30.6	15.9	10.6	3.38	2.25	1.92	2.89	1.20	1.22	10	7	7
4478 B14 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	5	3	3
4478 B14 RRH (Shielded)	18.1	10.1	8.3	1.26	1.04	1.80	2.18	1.20	1.20	4	3	3
RRUS-32 B66A RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	5
RRUS-32 B66A RRH (Shielded)	27.2	9.1	7.0	1.71	1.32	3.00	3.89	1.22	1.26	5	4	4
RRUS-32 B30 RRH	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	4	7	6
RRUS-32 B30 RRH (Shielded)	27.2	5.3	12.1	0.99	2.29	5.18	2.25	1.32	1.20	3	7	6
RRUS-E2 B29 RRH	20.4	7.5	17.0	1.06	2.41	2.72	1.20	1.21	1.20	3	7	6
RRUS-E2 B29 RRH (Shielded)	20.4	5.6	17.0	0.80	2.41	3.63	1.20	1.25	1.20	2	7	6
4415 B25 RRH	16.5	5.9	13.4	0.68	1.54	2.80	1.23	1.21	1.20	2	4	4
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	3	5	4

Date: 1/11/2022
Project Name: MANCHESTER CENTRAL
Project No.: CT5448
Designed By: ID Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle =	90	(deg)	Ice Thickness =	2.17	in.	Equivalent Angle =	270	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	5.13	4.64	12.47	1.30	1.58	858	390	390
DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	610	270	270
QD6616-7 Antenna	72.0	22.0	9.6	11.00	4.80	3.27	7.50	1.23	1.42	652	327	327
AIR 6419 N77G Antenna	31.0	16.1	7.3	3.47	1.57	1.93	4.25	1.20	1.28	200	96	96
AIR 6449 N77D Antenna	30.6	15.9	10.6	3.38	2.25	1.92	2.89	1.20	1.22	195	132	132
4478 B14 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	97	60	60
4478 B14 RRH (Shielded)	18.1	6.7	8.3	0.84	1.04	2.70	2.18	1.21	1.20	49	60	60
RRUS-32 B66A RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	132	80	80
RRUS-32 B66A RRH (Shielded)	27.2	6.1	7.0	1.14	1.32	0.00	3.89	1.20	1.26	66	80	80
RRUS-32 B30 RRH	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	80	132	132
RRUS-32 B30 RRH (Shielded)	27.2	3.5	12.1	0.66	2.29	7.77	2.25	1.43	1.20	45	132	132
RRUS-E2 B29 RRH	20.4	7.5	17.0	1.06	2.41	2.72	1.20	1.21	1.20	62	139	139
RRUS-E2 B29 RRH (Shielded)	20.4	3.8	17.0	0.53	2.41	5.44	1.20	1.33	1.20	34	139	139
4415 B25 RRH	16.5	5.9	13.4	0.68	1.54	2.80	1.23	1.21	1.20	39	88	88
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	67	95	95

WIND LOADS WITH ICE:

DMP65R-BU8DA Antenna	100.3	25.0	12.0	17.45	8.39	4.01	8.33	1.27	1.44	146	80	80
DMP65R-BU6DA Antenna	75.5	25.0	12.0	13.14	6.32	3.02	6.27	1.22	1.37	106	57	57
QD6616-7 Antenna	76.3	26.3	13.9	13.97	7.39	2.90	5.48	1.22	1.33	112	65	65
AIR 6419 N77G Antenna	35.3	20.4	11.6	5.02	2.86	1.73	3.04	1.20	1.22	40	23	23
AIR 6449 N77D Antenna	34.9	20.2	14.9	4.91	3.63	1.73	2.34	1.20	1.20	39	29	29
4478 B14 RRH	22.4	17.7	12.6	2.77	1.97	1.26	1.78	1.20	1.20	22	16	16
4478 B14 RRH (Shielded)	22.4	11.0	12.6	1.72	1.97	2.03	1.78	1.20	1.20	14	16	16
RRUS-32 B66A RRH	31.5	16.4	11.3	3.60	2.48	1.92	2.78	1.20	1.21	28	20	20
RRUS-32 B66A RRH (Shielded)	31.5	10.4	11.3	2.28	2.48	3.04	2.78	1.22	1.21	18	20	20
RRUS-32 B30 RRH	31.5	11.3	16.4	2.48	3.60	2.78	1.92	1.21	1.20	20	28	28
RRUS-32 B30 RRH (Shielded)	31.5	7.8	16.4	1.72	3.60	4.02	1.92	1.27	1.20	14	28	28
RRUS-E2 B29 RRH	24.7	11.8	21.3	2.03	3.67	2.09	1.16	1.20	1.20	16	29	29
RRUS-E2 B29 RRH (Shielded)	24.7	8.1	21.3	1.39	3.67	3.06	1.16	1.22	1.20	11	29	29
4415 B25 RRH	20.8	10.2	17.7	1.48	2.57	2.03	1.17	1.20	1.20	12	20	20
B5/B12 4449 RRH	22.2	13.7	17.5	2.12	2.71	1.62	1.27	1.20	1.20	17	21	21

WIND LOADS AT 30 MPH:

DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	5.13	4.64	12.47	1.30	1.58	42	19	19
DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	30	13	13
QD6616-7 Antenna	72.0	22.0	9.6	11.00	4.80	3.27	7.50	1.23	1.42	32	16	16
AIR 6419 N77G Antenna	31.0	16.1	7.3	3.47	1.57	1.93	4.25	1.20	1.28	10	5	5
AIR 6449 N77D Antenna	30.6	15.9	10.6	3.38	2.25	1.92	2.89	1.20	1.22	10	7	7
4478 B14 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	5	3	3
4478 B14 RRH (Shielded)	18.1	6.7	8.3	0.84	1.04	0.00	2.18	1.20	1.20	2	3	3
RRUS-32 B66A RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	4
RRUS-32 B66A RRH (Shielded)	27.2	6.1	7.0	1.14	1.32	0.00	3.89	1.20	1.26	3	4	4
RRUS-32 B30 RRH	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	4	7	7
RRUS-32 B30 RRH (Shielded)	27.2	3.5	12.1	0.66	2.29	0.00	2.25	1.20	1.20	2	7	7
RRUS-E2 B29 RRH	20.4	7.5	17.0	1.06	2.41	2.72	1.20	1.21	1.20	3	7	7
RRUS-E2 B29 RRH (Shielded)	20.4	3.8	17.0	0.53	2.41	0.00	1.20	1.20	1.20	2	7	7
4415 B25 RRH	16.5	5.9	13.4	0.68	1.54	2.80	1.23	1.21	1.20	2	4	4
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	3	5	5

Date: 1/11/2022
Project Name: MANCHESTER CENTRAL
Project No.: CT5448
Designed By: ID Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle =	120	(deg)	Ice Thickness =	2.17	in.	Equivalent Angle =	300	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	5.13	4.64	12.47	1.30	1.58	858	390	507
DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	610	270	355
QD6616-7 Antenna	72.0	22.0	9.6	11.00	4.80	3.27	7.50	1.23	1.42	652	327	408
AIR 6419 N77G Antenna	31.0	16.1	7.3	3.47	1.57	1.93	4.25	1.20	1.28	200	96	122
AIR 6449 N77D Antenna	30.6	15.9	10.6	3.38	2.25	1.92	2.89	1.20	1.22	195	132	147
4478 B14 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	97	60	69
4478 B14 RRH (Shielded)	18.1	10.1	8.3	1.26	1.04	1.80	2.18	1.20	1.20	73	60	63
RRUS-32 B66A RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	132	80	93
RRUS-32 B66A RRH (Shielded)	27.2	9.1	7.0	1.71	1.32	3.00	3.89	1.22	1.26	101	80	85
RRUS-32 B30 RRH	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	80	132	119
RRUS-32 B30 RRH (Shielded)	27.2	5.3	12.1	0.99	2.29	5.18	2.25	1.32	1.20	63	132	114
RRUS-E2 B29 RRH	20.4	7.5	17.0	1.06	2.41	2.72	1.20	1.21	1.20	62	139	120
RRUS-E2 B29 RRH (Shielded)	20.4	5.6	17.0	0.80	2.41	3.63	1.20	1.25	1.20	48	139	116
4415 B25 RRH	16.5	5.9	13.4	0.68	1.54	2.80	1.23	1.21	1.20	39	88	76
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	67	95	88

WIND LOADS WITH ICE:

DMP65R-BU8DA Antenna	100.3	25.0	12.0	17.45	8.39	4.01	8.33	1.27	1.44	146	80	96
DMP65R-BU6DA Antenna	75.5	25.0	12.0	13.14	6.32	3.02	6.27	1.22	1.37	106	57	69
QD6616-7 Antenna	76.3	26.3	13.9	13.97	7.39	2.90	5.48	1.22	1.33	112	65	77
AIR 6419 N77G Antenna	35.3	20.4	11.6	5.02	2.86	1.73	3.04	1.20	1.22	40	23	27
AIR 6449 N77D Antenna	34.9	20.2	14.9	4.91	3.63	1.73	2.34	1.20	1.20	39	29	31
4478 B14 RRH	22.4	17.7	12.6	2.77	1.97	1.26	1.78	1.20	1.20	22	16	17
4478 B14 RRH (Shielded)	22.4	13.3	12.6	2.07	1.97	1.69	1.78	1.20	1.20	16	16	16
RRUS-32 B66A RRH	31.5	16.4	11.3	3.60	2.48	1.92	2.78	1.20	1.21	28	20	22
RRUS-32 B66A RRH (Shielded)	31.5	12.3	11.3	2.70	2.48	2.56	2.78	1.20	1.21	21	20	20
RRUS-32 B30 RRH	31.5	11.3	16.4	2.48	3.60	2.78	1.92	1.21	1.20	20	28	26
RRUS-32 B30 RRH (Shielded)	31.5	8.5	16.4	1.86	3.60	3.71	1.92	1.25	1.20	15	28	25
RRUS-E2 B29 RRH	24.7	11.8	21.3	2.03	3.67	2.09	1.16	1.20	1.20	16	29	26
RRUS-E2 B29 RRH (Shielded)	24.7	8.9	21.3	1.53	3.67	2.79	1.16	1.21	1.20	12	29	25
4415 B25 RRH	20.8	10.2	17.7	1.48	2.57	2.03	1.17	1.20	1.20	12	20	18
B5/B12 4449 RRH	22.2	13.7	17.5	2.12	2.71	1.62	1.27	1.20	1.20	17	21	20

WIND LOADS AT 30 MPH:

DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	5.13	4.64	12.47	1.30	1.58	42	19	25
DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	30	13	18
QD6616-7 Antenna	72.0	22.0	9.6	11.00	4.80	3.27	7.50	1.23	1.42	32	16	20
AIR 6419 N77G Antenna	31.0	16.1	7.3	3.47	1.57	1.93	4.25	1.20	1.28	10	5	6
AIR 6449 N77D Antenna	30.6	15.9	10.6	3.38	2.25	1.92	2.89	1.20	1.22	10	7	7
4478 B14 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	5	3	3
4478 B14 RRH (Shielded)	18.1	10.1	8.3	1.26	1.04	1.80	2.18	1.20	1.20	4	3	3
RRUS-32 B66A RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	5
RRUS-32 B66A RRH (Shielded)	27.2	9.1	7.0	1.71	1.32	3.00	3.89	1.22	1.26	5	4	4
RRUS-32 B30 RRH	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	4	7	6
RRUS-32 B30 RRH (Shielded)	27.2	5.3	12.1	0.99	2.29	5.18	2.25	1.32	1.20	3	7	6
RRUS-E2 B29 RRH	20.4	7.5	17.0	1.06	2.41	2.72	1.20	1.21	1.20	3	7	6
RRUS-E2 B29 RRH (Shielded)	20.4	5.6	17.0	0.80	2.41	3.63	1.20	1.25	1.20	2	7	6
4415 B25 RRH	16.5	5.9	13.4	0.68	1.54	2.80	1.23	1.21	1.20	2	4	4
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	3	5	4

Date: 1/11/2022
Project Name: MANCHESTER CENTRAL
Project No.: CT5448
Designed By: ID Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle = 150 (deg)

Ice Thickness = 2.17 in.

Equivalent Angle = 330 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	5.13	4.64	12.47	1.30	1.58	858	390	741
DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	610	270	525
QD6616-7 Antenna	72.0	22.0	9.6	11.00	4.80	3.27	7.50	1.23	1.42	652	327	571
AIR 6419 N77G Antenna	31.0	16.1	7.3	3.47	1.57	1.93	4.25	1.20	1.28	200	96	174
AIR 6449 N77D Antenna	30.6	15.9	10.6	3.38	2.25	1.92	2.89	1.20	1.22	195	132	179
4478 B14 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	97	60	88
4478 B14 RRH (Shielded)	18.1	6.7	8.3	0.84	1.04	2.70	2.18	1.21	1.20	49	60	52
RRUS-32 B66A RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	132	80	119
RRUS-32 B66A RRH (Shielded)	27.2	6.1	7.0	1.14	1.32	4.50	3.89	1.29	1.26	71	80	73
RRUS-32 B30 RRH	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	80	132	93
RRUS-32 B30 RRH (Shielded)	27.2	3.5	12.1	0.66	2.29	7.77	2.25	1.43	1.20	45	132	67
RRUS-E2 B29 RRH	20.4	7.5	17.0	1.06	2.41	2.72	1.20	1.21	1.20	62	139	81
RRUS-E2 B29 RRH (Shielded)	20.4	3.8	17.0	0.53	2.41	5.44	1.20	1.33	1.20	34	139	60
4415 B25 RRH	16.5	5.9	13.4	0.68	1.54	2.80	1.23	1.21	1.20	39	88	52
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	67	95	74

WIND LOADS WITH ICE:

DMP65R-BU8DA Antenna	100.3	25.0	12.0	17.45	8.39	4.01	8.33	1.27	1.44	146	80	129
DMP65R-BU6DA Antenna	75.5	25.0	12.0	13.14	6.32	3.02	6.27	1.22	1.37	106	57	94
QD6616-7 Antenna	76.3	26.3	13.9	13.97	7.39	2.90	5.48	1.22	1.33	112	65	100
AIR 6419 N77G Antenna	35.3	20.4	11.6	5.02	2.86	1.73	3.04	1.20	1.22	40	23	36
AIR 6449 N77D Antenna	34.9	20.2	14.9	4.91	3.63	1.73	2.34	1.20	1.20	39	29	36
4478 B14 RRH	22.4	17.7	12.6	2.77	1.97	1.26	1.78	1.20	1.20	22	16	20
4478 B14 RRH (Shielded)	22.4	8.9	12.6	1.38	1.97	2.53	1.78	1.20	1.20	11	16	12
RRUS-32 B66A RRH	31.5	16.4	11.3	3.60	2.48	1.92	2.78	1.20	1.21	28	20	26
RRUS-32 B66A RRH (Shielded)	31.5	8.2	11.3	1.80	2.48	3.84	2.78	1.26	1.21	15	20	16
RRUS-32 B30 RRH	31.5	11.3	16.4	2.48	3.60	2.78	1.92	1.21	1.20	20	28	22
RRUS-32 B30 RRH (Shielded)	31.5	5.7	16.4	1.24	3.60	5.56	1.92	1.34	1.20	11	28	15
RRUS-E2 B29 RRH	24.7	11.8	21.3	2.03	3.67	2.09	1.16	1.20	1.20	16	29	19
RRUS-E2 B29 RRH (Shielded)	24.7	5.9	21.3	1.02	3.67	4.18	1.16	1.27	1.20	9	29	14
4415 B25 RRH	20.8	10.2	17.7	1.48	2.57	2.03	1.17	1.20	1.20	12	20	14
B5/B12 4449 RRH	22.2	13.7	17.5	2.12	2.71	1.62	1.27	1.20	1.20	17	21	18

WIND LOADS AT 30 MPH:

DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	5.13	4.64	12.47	1.30	1.58	42	19	37
DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	30	13	26
QD6616-7 Antenna	72.0	22.0	9.6	11.00	4.80	3.27	7.50	1.23	1.42	32	16	28
AIR 6419 N77G Antenna	31.0	16.1	7.3	3.47	1.57	1.93	4.25	1.20	1.28	10	5	9
AIR 6449 N77D Antenna	30.6	15.9	10.6	3.38	2.25	1.92	2.89	1.20	1.22	10	7	9
4478 B14 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	5	3	4
4478 B14 RRH (Shielded)	18.1	6.7	8.3	0.84	1.04	2.70	2.18	1.21	1.20	2	3	3
RRUS-32 B66A RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	6
RRUS-32 B66A RRH (Shielded)	27.2	6.1	7.0	1.14	1.32	4.50	3.89	1.29	1.26	3	4	4
RRUS-32 B30 RRH	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	4	7	5
RRUS-32 B30 RRH (Shielded)	27.2	3.5	12.1	0.66	2.29	7.77	2.25	1.43	1.20	2	7	3
RRUS-E2 B29 RRH	20.4	7.5	17.0	1.06	2.41	2.72	1.20	1.21	1.20	3	7	4
RRUS-E2 B29 RRH (Shielded)	20.4	3.8	17.0	0.53	2.41	5.44	1.20	1.33	1.20	2	7	3
4415 B25 RRH	16.5	5.9	13.4	0.68	1.54	2.80	1.23	1.21	1.20	2	4	3
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	3	5	4

Date: 4/14/2021
Project Name: MANCHESTER CENTRAL
Project No.: CT5448
Designed By: ID **Checked By:** MSC

HUDSON Design Group LLC

ICE WEIGHT CALCULATIONS

Thickness of ice: 2.17 in.
Density of ice: 56 pcf

DMP65R-BU8DA Antenna

Weight of ice based on total radial SF area:

Height (in):	96.0	
Width (in):	20.7	
Depth (in):	7.7	
Total weight of ice on object:		514 lbs
Weight of object:	96.0 lbs	
Combined weight of ice and object:		610 lbs

DMP65R-BU6DA Antenna

Weight of ice based on total radial SF area:

Height (in):	71.2	
Width (in):	20.7	
Depth (in):	7.7	
Total weight of ice on object:		382 lbs
Weight of object:	80.0 lbs	
Combined weight of ice and object:		462 lbs

QD8616-7 Antenna

Weight of ice based on total radial SF area:

Height (in):	96.0	
Width (in):	22.0	
Depth (in):	9.6	
Total weight of ice on object:		555 lbs
Weight of object:	150.0 lbs	
Combined weight of ice and object:		705 lbs

QD6616-7 Antenna

Weight of ice based on total radial SF area:

Height (in):	72.0	
Width (in):	22.0	
Depth (in):	9.6	
Total weight of ice on object:		416 lbs
Weight of object:	130.0 lbs	
Combined weight of ice and object:		546 lbs

AIR 6419 N77G Antenna

Weight of ice based on total radial SF area:

Height (in):	31.0	
Width (in):	16.1	
Depth (in):	7.3	
Total weight of ice on object:		136 lbs
Weight of object:	66.0 lbs	
Combined weight of ice and object:		202 lbs

AIR 6449 N77D Antenna

Weight of ice based on total radial SF area:

Height (in):	30.6	
Width (in):	15.9	
Depth (in):	10.6	
Total weight of ice on object:		144 lbs
Weight of object:	82.0 lbs	
Combined weight of ice and object:		226 lbs

4478 B14 RRH

Weight of ice based on total radial SF area:

Height (in):	18.1	
Width (in):	13.4	
Depth (in):	8.3	
Total weight of ice on object:		72 lbs
Weight of object:	60.0 lbs	
Combined weight of ice and object:		132 lbs

RRUS-32 B66A RRH

Weight of ice based on total radial SF area:

Height (in):	27.2	
Width (in):	12.1	
Depth (in):	7.0	
Total weight of ice on object:		97 lbs
Weight of object:	60.0 lbs	
Combined weight of ice and object:		157 lbs

RRUS-32 B30 RRH

Weight of ice based on total radial SF area:

Height (in):	27.2	
Width (in):	12.1	
Depth (in):	7.0	
Total weight of ice on object:		97 lbs
Weight of object:	60.0 lbs	
Combined weight of ice and object:		157 lbs

RRUS-E2 B29 RRH

Weight of ice based on total radial SF area:

Height (in):	20.4	
Width (in):	18.5	
Depth (in):	7.5	
Total weight of ice on object:		100 lbs
Weight of object:	53.0 lbs	
Combined weight of ice and object:		153 lbs

4415 B25 RRH

Weight of ice based on total radial SF area:

Height (in):	16.5	
Width (in):	13.4	
Depth (in):	5.9	
Total weight of ice on object:		61 lbs
Weight of object:	46.0 lbs	
Combined weight of ice and object:		107 lbs

B5/B12 4449 RRH

Weight of ice based on total radial SF area:

Height (in):	17.9	
Width (in):	13.2	
Depth (in):	9.4	
Total weight of ice on object:		73 lbs
Weight of object:	73.0 lbs	
Combined weight of ice and object:		146 lbs

Date: 1/11/2022
Project Name: MANCHESTER CENTRAL
Project No.: CT5448
Designed By: ID **Checked By:** MSC

HUDSON Design Group LLC

Squid Surge Arrestor

Weight of ice based on total radial SF area:

Depth (in):	24.0	
Diameter(in):	9.7	
Total weight of ice on object:		63 lbs
Weight of object:	33 lbs	
Combined weight of ice and object:		96 lbs

L 2x2 Angles

Weight of ice based on total radial SF area:

Height (in):	2	
Width (in):	2	
Per foot weight of ice on object:		13 plf

HSS 4x4

Weight of ice based on total radial SF area:

Height (in):	3.375	
Width (in):	0.1875	
Per foot weight of ice on object:		15 plf

2-1/2" Pipe

Per foot weight of ice:

diameter (in):	2.88	
Per foot weight of ice on object:		13 plf

PL 6x3/8

Weight of ice based on total radial SF area:

Height (in):	6	
Width (in):	0.375	
Per foot weight of ice on object:		22 plf

L 2-1/2x2-1/2 Angles

Weight of ice based on total radial SF area:

Height (in):	2.5	
Width (in):	2.5	
Per foot weight of ice on object:		15 plf

3" Pipe

Per foot weight of ice:

diameter (in):	3.5	
Per foot weight of ice on object:		15 plf

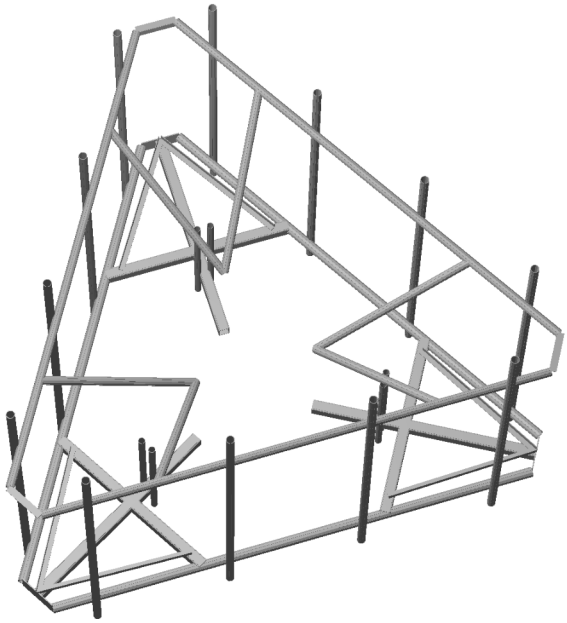
2" Pipe

Per foot weight of ice:

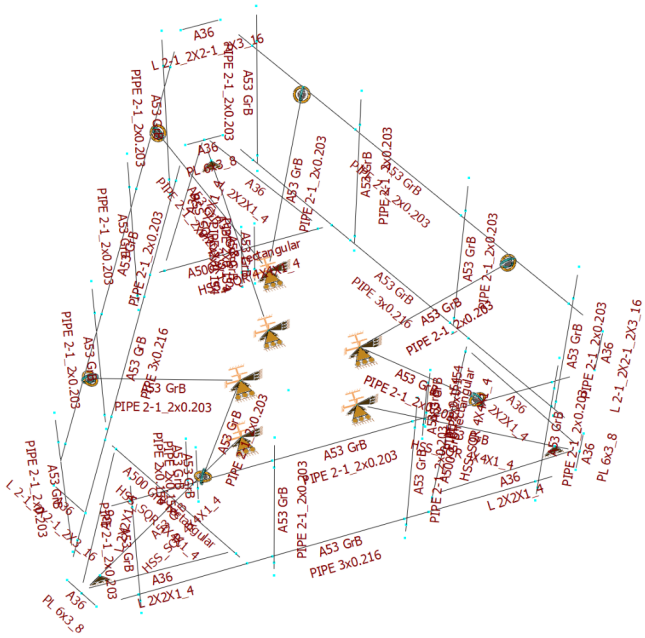
diameter (in):	2.38	
Per foot weight of ice on object:		12 plf

HUDSON
Design Group LLC

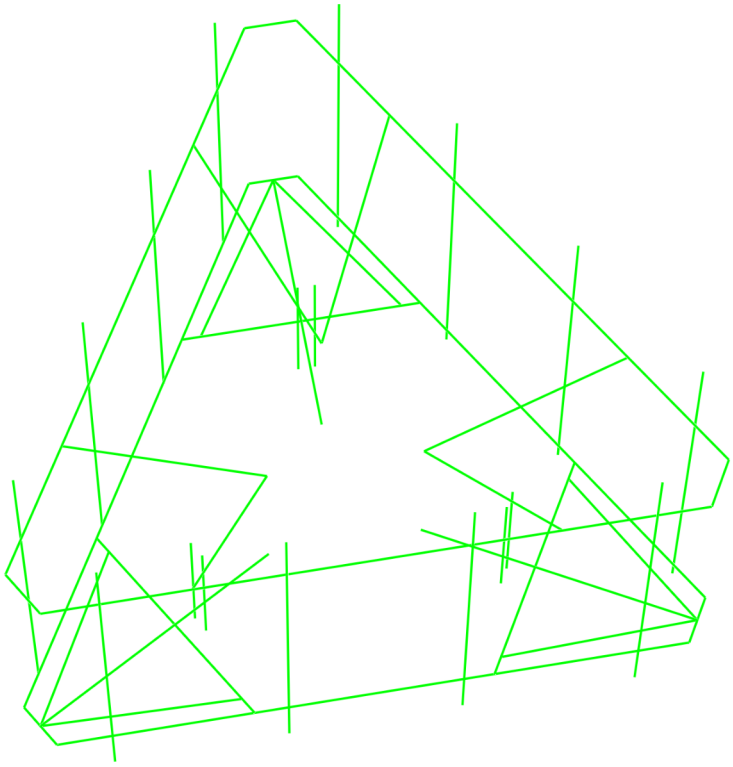
Mount Calculations
(Proposed Conditions)

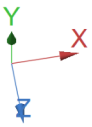

Y
X
Z

Current Date: 1/12/2022 8:54 AM
Units system: English



Design status
- Not designed
- Error on design
- Design O.K.
- With warnings





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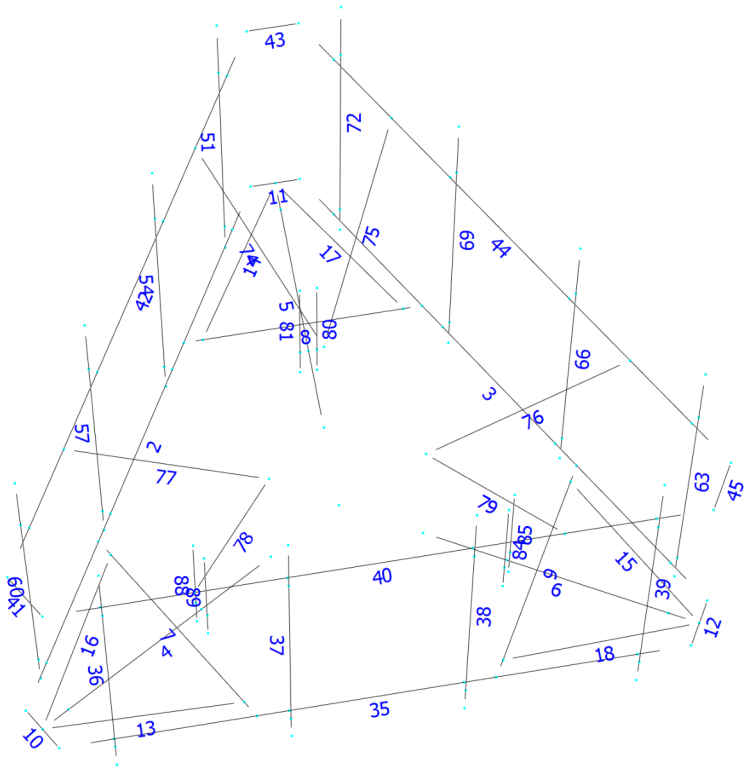

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Units system: English

Load data

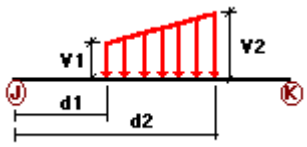
GLOSSARY

Comb : Indicates if load condition is a load combination

Load Conditions

Condition	Description	Comb.	Category
DL	Dead Load	No	DL
W0	Wind Load 0/60/120 deg	No	WIND
W30	Wind Load 30/90/150 deg	No	WIND
Di	Ice Load	No	LL
Wi0	Ice Wind Load 0/60/120 deg	No	WIND
Wi30	Ice Wind Load 30/90/150 deg	No	WIND
WL0	WL 30 mph 0/60/120 deg	No	WIND
WL30	WL 30 mph 30/90/150 deg	No	WIND
LL1	250 lb Live Load Center of Mount	No	LL
LL2	250 lb Live Load End of Mount	No	LL
LLa1	500 lb Live Load Antenna 1	No	LL
LLa2	500 lb Live Load Antenna 2	No	LL
LLa3	500 lb Live Load Antenna 3	No	LL
LLa4	500 lb Live Load Antenna 4	No	LL

Distributed force on members



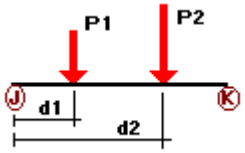
Condition	Member	Dir1	Val1 [Kip/ft]	Val2 [Kip/ft]	Dist1 [ft]	%	Dist2 [ft]	%
DL	4	y	-0.01	-0.01	0.00	No	3.90	No
	5	y	-0.01	-0.01	0.00	No	3.90	No
	6	y	-0.01	-0.01	0.00	No	3.90	No
	7	y	-0.01	0.00	0.00	No	0.00	No
	8	y	-0.01	0.00	0.00	No	0.00	No
	9	y	-0.01	0.00	0.00	No	0.00	No
	13	y	-0.01	0.00	0.00	No	0.00	No
	14	y	-0.01	0.00	0.00	No	0.00	No
	15	y	-0.01	0.00	0.00	No	0.00	No
	16	y	-0.01	0.00	0.00	No	0.00	No
	17	y	-0.01	0.00	0.00	No	0.00	No
	18	y	-0.01	0.00	0.00	No	0.00	No
W0	2	z	-0.017	0.00	0.00	No	0.00	No
	3	z	-0.017	0.00	0.00	No	0.00	No
	4	z	-0.02	0.00	0.00	No	0.00	No
	5	z	-0.02	0.00	0.00	No	0.00	No

	6	z	-0.02	0.00	0.00	No	0.00	No
	7	z	-0.02	0.00	0.00	No	0.00	No
	8	z	-0.02	0.00	0.00	No	0.00	No
	9	z	-0.02	0.00	0.00	No	0.00	No
	10	z	-0.029	0.00	0.00	No	0.00	No
	11	z	-0.029	0.00	0.00	No	0.00	No
	12	z	-0.029	0.00	0.00	No	0.00	No
	13	z	-0.016	0.00	0.00	No	0.00	No
	14	z	-0.016	0.00	0.00	No	0.00	No
	15	z	-0.016	0.00	0.00	No	0.00	No
	16	z	-0.016	0.00	0.00	No	0.00	No
	17	z	-0.016	0.00	0.00	No	0.00	No
	18	z	-0.016	0.00	0.00	No	0.00	No
	35	z	-0.017	0.00	0.00	No	0.00	No
	39	z	-0.014	0.00	0.00	No	0.00	No
	40	z	-0.014	0.00	0.00	No	0.00	No
	41	z	-0.02	0.00	0.00	No	0.00	No
	42	z	-0.014	0.00	0.00	No	0.00	No
	43	z	-0.02	0.00	0.00	No	0.00	No
	44	z	-0.014	0.00	0.00	No	0.00	No
	45	z	-0.02	0.00	0.00	No	0.00	No
	51	z	-0.014	0.00	0.00	No	0.00	No
	54	z	-0.014	0.00	0.00	No	0.00	No
	57	z	-0.014	0.00	0.00	No	0.00	No
	60	z	-0.014	0.00	0.00	No	0.00	No
	63	z	-0.014	0.00	0.00	No	0.00	No
	66	z	-0.014	0.00	0.00	No	0.00	No
	69	z	-0.014	0.00	0.00	No	0.00	No
	72	z	-0.014	0.00	0.00	No	0.00	No
	74	z	-0.014	0.00	0.00	No	0.00	No
	75	z	-0.014	0.00	0.00	No	0.00	No
	76	z	-0.014	0.00	0.00	No	0.00	No
	77	z	-0.014	0.00	0.00	No	0.00	No
	78	z	-0.014	0.00	0.00	No	0.00	No
	79	z	-0.014	0.00	0.00	No	0.00	No
	80	z	-0.011	0.00	0.00	No	0.00	No
	81	z	-0.011	0.00	0.00	No	0.00	No
	84	z	-0.011	0.00	0.00	No	0.00	No
	85	z	-0.011	0.00	0.00	No	0.00	No
	88	z	-0.011	0.00	0.00	No	0.00	No
	89	z	-0.011	0.00	0.00	No	0.00	No
W30	2	x	-0.017	0.00	0.00	No	0.00	No
	3	x	-0.017	0.00	0.00	No	0.00	No
	4	x	-0.02	0.00	0.00	No	0.00	No
	5	x	-0.02	0.00	0.00	No	0.00	No
	6	x	-0.02	0.00	0.00	No	0.00	No
	7	x	-0.02	0.00	0.00	No	0.00	No
	8	x	-0.02	0.00	0.00	No	0.00	No
	9	x	-0.02	0.00	0.00	No	0.00	No
	10	x	-0.029	0.00	0.00	No	0.00	No
	12	x	-0.029	0.00	0.00	No	0.00	No
	13	x	-0.016	0.00	0.00	No	0.00	No
	14	x	-0.016	0.00	0.00	No	0.00	No
	15	x	-0.016	0.00	0.00	No	0.00	No
	16	x	-0.016	0.00	0.00	No	0.00	No
	17	x	-0.016	0.00	0.00	No	0.00	No
	18	x	-0.016	0.00	0.00	No	0.00	No
	36	x	-0.014	0.00	0.00	No	0.00	No
	37	x	-0.014	0.00	0.00	No	0.00	No
	38	x	-0.014	0.00	0.00	No	0.00	No

	39	x	-0.014	0.00	0.00	No	0.00	No
	41	x	-0.02	0.00	0.00	No	0.00	No
	42	x	-0.014	0.00	0.00	No	0.00	No
	43	x	-0.02	0.00	0.00	No	0.00	No
	44	x	-0.014	0.00	0.00	No	0.00	No
	45	x	-0.02	0.00	0.00	No	0.00	No
	51	x	-0.014	0.00	0.00	No	0.00	No
	54	x	-0.014	0.00	0.00	No	0.00	No
	57	x	-0.014	0.00	0.00	No	0.00	No
	60	x	-0.014	0.00	0.00	No	0.00	No
	63	x	-0.014	0.00	0.00	No	0.00	No
	66	x	-0.014	0.00	0.00	No	0.00	No
	69	x	-0.014	0.00	0.00	No	0.00	No
	72	x	-0.014	0.00	0.00	No	0.00	No
	74	x	-0.014	0.00	0.00	No	0.00	No
	75	x	-0.014	0.00	0.00	No	0.00	No
	76	x	-0.014	0.00	0.00	No	0.00	No
	77	x	-0.014	0.00	0.00	No	0.00	No
	78	x	-0.014	0.00	0.00	No	0.00	No
	79	x	-0.014	0.00	0.00	No	0.00	No
	80	x	-0.011	0.00	0.00	No	0.00	No
	81	x	-0.011	0.00	0.00	No	0.00	No
	84	x	-0.011	0.00	0.00	No	0.00	No
	85	x	-0.011	0.00	0.00	No	0.00	No
	88	x	-0.011	0.00	0.00	No	0.00	No
	89	x	-0.011	0.00	0.00	No	0.00	No
Di	2	y	-0.015	0.00	0.00	No	0.00	No
	3	y	-0.015	0.00	0.00	No	0.00	No
	4	y	-0.015	0.00	0.00	No	0.00	No
	5	y	-0.015	0.00	0.00	No	0.00	No
	6	y	-0.015	0.00	0.00	No	0.00	No
	7	y	-0.015	0.00	0.00	No	0.00	No
	8	y	-0.015	0.00	0.00	No	0.00	No
	9	y	-0.015	0.00	0.00	No	0.00	No
	10	y	-0.022	0.00	0.00	No	0.00	No
	11	y	-0.022	0.00	0.00	No	0.00	No
	12	y	-0.022	0.00	0.00	No	0.00	No
	13	y	-0.013	0.00	0.00	No	0.00	No
	14	y	-0.013	0.00	0.00	No	0.00	No
	15	y	-0.013	0.00	0.00	No	0.00	No
	16	y	-0.013	0.00	0.00	No	0.00	No
	17	y	-0.013	0.00	0.00	No	0.00	No
	18	y	-0.013	0.00	0.00	No	0.00	No
	35	y	-0.015	0.00	0.00	No	0.00	No
	36	y	-0.013	0.00	0.00	No	0.00	No
	37	y	-0.013	0.00	0.00	No	0.00	No
	38	y	-0.013	0.00	0.00	No	0.00	No
	39	y	-0.013	0.00	0.00	No	0.00	No
	40	y	-0.013	0.00	0.00	No	0.00	No
	41	y	-0.015	0.00	0.00	No	0.00	No
	42	y	-0.013	0.00	0.00	No	0.00	No
	43	y	-0.015	0.00	0.00	No	0.00	No
	44	y	-0.013	0.00	0.00	No	0.00	No
	45	y	-0.015	0.00	0.00	No	0.00	No
	51	y	-0.013	0.00	0.00	No	0.00	No
	54	y	-0.013	0.00	0.00	No	0.00	No
	57	y	-0.013	0.00	0.00	No	0.00	No
	60	y	-0.013	0.00	0.00	No	0.00	No
	63	y	-0.013	0.00	0.00	No	0.00	No
	66	y	-0.013	0.00	0.00	No	0.00	No

69	y	-0.013	0.00	0.00	No	0.00	No
72	y	-0.013	0.00	0.00	No	0.00	No
74	y	-0.013	0.00	0.00	No	0.00	No
75	y	-0.013	0.00	0.00	No	0.00	No
76	y	-0.013	0.00	0.00	No	0.00	No
77	y	-0.013	0.00	0.00	No	0.00	No
78	y	-0.013	0.00	0.00	No	0.00	No
79	y	-0.013	0.00	0.00	No	0.00	No
80	y	-0.012	0.00	0.00	No	0.00	No
81	y	-0.012	0.00	0.00	No	0.00	No
84	y	-0.012	0.00	0.00	No	0.00	No
85	y	-0.012	0.00	0.00	No	0.00	No
88	y	-0.012	0.00	0.00	No	0.00	No
89	y	-0.012	0.00	0.00	No	0.00	No

Concentrated forces on members



Condition	Member	Dir1	Value1 [Kip]	Dist1 [ft]	%
DL	36	y	-0.075	1.50	No
		y	-0.075	8.50	No
		y	-0.06	50.00	Yes
		y	-0.053	50.00	Yes
	37	y	-0.033	2.00	No
		y	-0.033	4.00	No
		y	-0.041	5.00	No
		y	-0.041	7.00	No
		y	-0.06	50.00	Yes
	38	y	-0.048	1.50	No
		y	-0.048	8.50	No
		y	-0.06	50.00	Yes
	51	y	-0.065	1.50	No
		y	-0.065	8.50	No
		y	-0.06	50.00	Yes
		y	-0.053	50.00	Yes
	54	y	-0.033	2.00	No
		y	-0.033	4.00	No
		y	-0.041	5.00	No
		y	-0.041	7.00	No
		y	-0.06	50.00	Yes
	57	y	-0.04	1.50	No
		y	-0.04	8.50	No
		y	-0.06	50.00	Yes
	63	y	-0.075	1.50	No
		y	-0.075	8.50	No
		y	-0.06	50.00	Yes
		y	-0.053	50.00	Yes
	66	y	-0.033	2.00	No
		y	-0.033	4.00	No
		y	-0.041	5.00	No

		y	-0.041	7.00	No
		y	-0.06	50.00	Yes
	69	y	-0.048	1.50	No
		y	-0.048	8.50	No
		y	-0.06	50.00	Yes
	80	y	-0.033	50.00	Yes
	81	y	-0.046	50.00	Yes
		y	-0.073	50.00	Yes
	84	y	-0.033	50.00	Yes
	85	y	-0.046	50.00	Yes
		y	-0.073	50.00	Yes
	88	y	-0.033	50.00	Yes
	89	y	-0.046	50.00	Yes
		y	-0.073	50.00	Yes
W0	36	z	-0.452	1.50	No
		z	-0.452	8.50	No
		z	-0.045	50.00	Yes
		z	-0.034	50.00	Yes
	37	z	-0.10	2.00	No
		z	-0.10	4.00	No
		z	-0.098	5.00	No
		z	-0.098	7.00	No
		z	-0.071	50.00	Yes
	38	z	-0.43	1.50	No
		z	-0.43	8.50	No
		z	-0.049	50.00	Yes
	51	z	-0.204	2.50	No
		z	-0.204	7.50	No
		z	-0.116	50.00	Yes
	54	z	-0.062	2.00	No
		z	-0.062	4.00	No
		z	-0.074	5.00	No
		z	-0.074	7.00	No
		z	-0.085	50.00	Yes
	57	z	-0.178	2.50	No
		z	-0.178	7.50	No
		z	-0.063	50.00	Yes
	63	z	-0.286	1.50	No
		z	-0.286	8.50	No
		z	-0.116	50.00	Yes
	66	z	-0.062	2.00	No
		z	-0.062	4.00	No
		z	-0.074	5.00	No
		z	-0.074	7.00	No
		z	-0.085	50.00	Yes
	69	z	-0.254	1.50	No
		z	-0.254	8.50	No
		z	-0.063	50.00	Yes
	80	z	-0.054	50.00	Yes
	81	z	-0.095	50.00	Yes
	84	z	-0.054	50.00	Yes
	85	z	-0.039	50.00	Yes
		z	-0.067	50.00	Yes
	88	z	-0.054	50.00	Yes
	89	z	-0.039	50.00	Yes
		z	-0.067	50.00	Yes
W30	36	x	-0.231	1.50	No
		x	-0.231	8.50	No
		x	-0.139	50.00	Yes
	37	x	-0.049	2.00	No

		x	-0.049	4.00	No
		x	-0.066	5.00	No
		x	-0.066	7.00	No
		x	-0.132	50.00	Yes
	38	x	-0.196	1.50	No
		x	-0.196	8.50	No
		x	-0.06	50.00	Yes
	51	x	-0.286	2.50	No
		x	-0.286	7.50	No
		x	-0.067	50.00	Yes
	54	x	-0.087	2.00	No
		x	-0.087	4.00	No
		x	-0.09	5.00	No
		x	-0.09	7.00	No
		x	-0.073	50.00	Yes
	57	x	-0.263	2.50	No
		x	-0.263	7.50	No
		x	-0.052	50.00	Yes
	63	x	-0.397	1.50	No
		x	-0.397	8.50	No
		x	-0.067	50.00	Yes
	66	x	-0.087	2.00	No
		x	-0.087	4.00	No
		x	-0.09	5.00	No
		x	-0.09	7.00	No
		x	-0.073	50.00	Yes
	69	x	-0.371	1.50	No
		x	-0.371	8.50	No
		x	-0.052	50.00	Yes
	80	x	-0.054	50.00	Yes
	81	x	-0.039	50.00	Yes
		x	-0.067	50.00	Yes
	84	x	-0.054	50.00	Yes
	85	x	-0.095	50.00	Yes
	88	x	-0.054	50.00	Yes
	89	x	-0.095	50.00	Yes
Di	36	y	-0.278	1.50	No
		y	-0.278	8.50	No
		y	-0.097	50.00	Yes
		y	-0.10	50.00	Yes
	37	y	-0.068	2.00	No
		y	-0.033	4.00	No
		y	-0.072	5.00	No
		y	-0.072	7.00	No
		y	-0.097	50.00	Yes
	38	y	-0.257	1.50	No
		y	-0.257	8.50	No
		y	-0.072	50.00	Yes
	51	y	-0.208	1.50	No
		y	-0.208	8.50	No
		y	-0.097	50.00	Yes
		y	-0.10	50.00	Yes
	54	y	-0.068	2.00	No
		y	-0.033	4.00	No
		y	-0.072	5.00	No
		y	-0.072	7.00	No
		y	-0.097	50.00	Yes
	57	y	-0.191	1.50	No
		y	-0.191	8.50	No
		y	-0.072	50.00	Yes

	63	y	-0.278	1.50	No
		y	-0.278	8.50	No
		y	-0.097	50.00	Yes
		y	-0.10	50.00	Yes
	66	y	-0.068	2.00	No
		y	-0.033	4.00	No
		y	-0.072	5.00	No
		y	-0.072	7.00	No
		y	-0.097	50.00	Yes
	69	y	-0.257	1.50	No
		y	-0.257	8.50	No
		y	-0.072	50.00	Yes
	80	y	-0.063	50.00	Yes
	81	y	-0.061	50.00	Yes
		y	-0.073	50.00	Yes
	84	y	-0.063	50.00	Yes
	85	y	-0.061	50.00	Yes
		y	-0.073	50.00	Yes
	88	y	-0.063	50.00	Yes
	89	y	-0.061	50.00	Yes
		y	-0.073	50.00	Yes
Wi0	36	z	-0.078	1.50	No
		z	-0.078	8.50	No
		z	-0.016	50.00	Yes
		z	-0.012	50.00	Yes
	37	z	-0.02	2.00	No
		z	-0.02	4.00	No
		z	-0.02	5.00	No
		z	-0.02	7.00	No
		z	-0.019	50.00	Yes
	38	z	-0.075	1.50	No
		z	-0.075	8.50	No
		z	-0.014	50.00	Yes
	51	z	-0.039	2.50	No
		z	-0.039	7.50	No
		z	-0.025	50.00	Yes
	54	z	-0.014	2.00	No
		z	-0.014	4.00	No
		z	-0.016	5.00	No
		z	-0.016	7.00	No
		z	-0.02	50.00	Yes
	57	z	-0.035	2.50	No
		z	-0.035	7.50	No
		z	-0.016	50.00	Yes
	63	z	-0.053	1.50	No
		z	-0.053	8.50	No
		z	-0.025	50.00	Yes
	66	z	-0.014	2.00	No
		z	-0.014	4.00	No
		z	-0.016	5.00	No
		z	-0.016	7.00	No
		z	-0.02	50.00	Yes
	69	z	-0.049	1.50	No
		z	-0.049	8.50	No
		z	-0.016	50.00	Yes
	80	z	-0.013	50.00	Yes
	81	z	-0.021	50.00	Yes
	84	z	-0.013	50.00	Yes
	85	z	-0.017	50.00	Yes
		z	-0.013	50.00	Yes

	88	z	-0.013	50.00	Yes
	89	z	-0.017	50.00	Yes
		z	-0.013	50.00	Yes
Wi30	36	x	-0.046	1.50	No
		x	-0.046	8.50	No
		x	-0.029	50.00	Yes
	37	x	-0.012	2.00	No
		x	-0.012	4.00	No
		x	-0.015	5.00	No
		x	-0.015	7.00	No
		x	-0.02	50.00	Yes
	38	x	-0.04	1.50	No
		x	-0.04	8.50	No
		x	-0.016	50.00	Yes
	51	x	-0.051	2.50	No
		x	-0.051	7.50	No
		x	-0.015	50.00	Yes
	54	x	-0.018	2.00	No
		x	-0.018	4.00	No
		x	-0.019	5.00	No
		x	-0.019	7.00	No
		x	-0.016	50.00	Yes
	57	x	-0.047	2.50	No
		x	-0.047	7.50	No
		x	-0.012	50.00	Yes
	63	x	-0.069	1.50	No
		x	-0.069	8.50	No
		x	-0.015	50.00	Yes
	66	x	-0.018	2.00	No
		x	-0.018	4.00	No
		x	-0.019	5.00	No
		x	-0.019	7.00	No
		x	-0.016	50.00	Yes
	69	x	-0.065	1.50	No
		x	-0.065	8.50	No
		x	-0.012	50.00	Yes
	80	x	-0.013	50.00	Yes
	81	x	-0.017	50.00	Yes
		x	-0.013	50.00	Yes
	84	x	-0.013	50.00	Yes
	85	x	-0.021	50.00	Yes
	88	x	-0.013	50.00	Yes
	89	x	-0.021	50.00	Yes
WL0	36	z	-0.023	1.50	No
		z	-0.023	8.50	No
		z	-0.002	50.00	Yes
		z	-0.002	50.00	Yes
	37	z	-0.005	2.00	No
		z	-0.005	4.00	No
		z	-0.005	5.00	No
		z	-0.005	7.00	No
		z	-0.003	50.00	Yes
	38	z	-0.022	1.50	No
		z	-0.022	8.50	No
		z	-0.002	50.00	Yes
	51	z	-0.011	1.50	No
		z	-0.011	8.50	No
		z	-0.006	50.00	Yes
	54	z	-0.004	2.00	No
		z	-0.004	4.00	No

		z	-0.004	5.00	No
		z	-0.004	7.00	No
		z	-0.004	50.00	Yes
	57	z	-0.009	1.50	No
		z	-0.009	8.50	No
		z	-0.003	50.00	Yes
	63	z	-0.015	1.50	No
		z	-0.015	8.50	No
		z	-0.006	50.00	Yes
	66	z	-0.004	2.00	No
		z	-0.004	4.00	No
		z	-0.004	5.00	No
		z	-0.004	7.00	No
		z	-0.004	50.00	Yes
	69	z	-0.013	1.50	No
		z	-0.013	8.50	No
		z	-0.003	50.00	Yes
	80	z	-0.003	50.00	Yes
	81	z	-0.005	50.00	Yes
	84	z	-0.003	50.00	Yes
	85	z	-0.003	50.00	Yes
		z	-0.003	50.00	Yes
	88	z	-0.003	50.00	Yes
	89	z	-0.003	50.00	Yes
		z	-0.003	50.00	Yes
WL30	36	x	-0.012	1.50	No
		x	-0.012	8.50	No
		x	-0.007	50.00	Yes
	37	x	-0.003	2.00	No
		x	-0.003	4.00	No
		x	-0.004	5.00	No
		x	-0.004	7.00	No
		x	-0.004	50.00	Yes
	38	x	-0.01	1.50	No
		x	-0.01	8.50	No
		x	-0.003	50.00	Yes
	51	x	-0.015	2.50	No
		x	-0.015	7.50	No
		x	-0.006	50.00	Yes
	54	x	-0.005	2.00	No
		x	-0.005	4.00	No
		x	-0.005	5.00	No
		x	-0.005	7.00	No
		x	-0.004	50.00	Yes
	57	x	-0.013	2.50	No
		x	-0.013	7.50	No
		x	-0.003	50.00	Yes
	63	x	-0.02	1.50	No
		x	-0.02	8.50	No
		x	-0.003	50.00	Yes
	66	x	-0.005	2.00	No
		x	-0.005	4.00	No
		x	-0.005	5.00	No
		x	-0.005	7.00	No
		x	-0.004	50.00	Yes
	69	x	-0.019	1.50	No
		x	-0.019	8.50	No
		x	-0.003	50.00	Yes
	80	x	-0.003	50.00	Yes
	81	x	-0.003	50.00	Yes

		x	-0.003	50.00	Yes
	84	x	-0.003	50.00	Yes
	85	x	-0.005	50.00	Yes
	88	x	-0.003	50.00	Yes
	89	x	-0.005	50.00	Yes
LL1	35	y	-0.25	50.00	Yes
LL2	35	y	-0.25	100.00	Yes
LLa1	39	y	-0.50	50.00	Yes
LLa2	38	y	-0.50	50.00	Yes
LLa3	37	y	-0.50	50.00	Yes
LLa4	36	y	-0.50	50.00	Yes

Self weight multipliers for load conditions

Condition	Description	Self weight multiplier			
		Comb.	MultX	MultY	MultZ
DL	Dead Load	No	0.00	-1.00	0.00
W0	Wind Load 0/60/120 deg	No	0.00	0.00	0.00
W30	Wind Load 30/90/150 deg	No	0.00	0.00	0.00
Di	Ice Load	No	0.00	0.00	0.00
Wi0	Ice Wind Load 0/60/120 deg	No	0.00	0.00	0.00
Wi30	Ice Wind Load 30/90/150 deg	No	0.00	0.00	0.00
WL0	WL 30 mph 0/60/120 deg	No	0.00	0.00	0.00
WL30	WL 30 mph 30/90/150 deg	No	0.00	0.00	0.00
LL1	250 lb Live Load Center of Mount	No	0.00	0.00	0.00
LL2	250 lb Live Load End of Mount	No	0.00	0.00	0.00
LLa1	500 lb Live Load Antenna 1	No	0.00	0.00	0.00
LLa2	500 lb Live Load Antenna 2	No	0.00	0.00	0.00
LLa3	500 lb Live Load Antenna 3	No	0.00	0.00	0.00
LLa4	500 lb Live Load Antenna 4	No	0.00	0.00	0.00

Earthquake (Dynamic analysis only)

Condition	a/g	Ang. [Deg]	Damp. [%]
DL	0.00	0.00	0.00
W0	0.00	0.00	0.00
W30	0.00	0.00	0.00
Di	0.00	0.00	0.00
Wi0	0.00	0.00	0.00
Wi30	0.00	0.00	0.00
WL0	0.00	0.00	0.00
WL30	0.00	0.00	0.00
LL1	0.00	0.00	0.00
LL2	0.00	0.00	0.00
LLa1	0.00	0.00	0.00
LLa2	0.00	0.00	0.00
LLa3	0.00	0.00	0.00
LLa4	0.00	0.00	0.00

Current Date: 1/12/2022 8:55 AM
Units system: English

Steel Code Check

Report: Summary - Group by member

Load conditions to be included in design :

LC1=1.2DL+W0
LC2=1.2DL+W30
LC3=1.2DL-W0
LC4=1.2DL-W30
LC5=0.9DL+W0
LC6=0.9DL+W30
LC7=0.9DL-W0
LC8=0.9DL-W30
LC9=1.2DL+Di+Wi0
LC10=1.2DL+Di+Wi30
LC11=1.2DL+Di-Wi0
LC12=1.2DL+Di-Wi30
LC13=1.4DL
LC14=1.2DL+1.6LL1
LC15=1.2DL+1.6LL2
LC16=1.2DL+WL0+1.6LLa1
LC17=1.2DL+WL30+1.6LLa1
LC18=1.2DL-WL0+1.6LLa1
LC19=1.2DL-WL30+1.6LLa1
LC20=1.2DL+WL0+1.6LLa2
LC21=1.2DL+WL30+1.6LLa2
LC22=1.2DL-WL0+1.6LLa2
LC23=1.2DL-WL30+1.6LLa2
LC24=1.2DL+WL0+1.6LLa3
LC25=1.2DL+WL30+1.6LLa3
LC26=1.2DL-WL0+1.6LLa3
LC27=1.2DL-WL30+1.6LLa3
LC28=1.2DL+WL0+1.6LLa4
LC29=1.2DL+WL30+1.6LLa4
LC30=1.2DL-WL0+1.6LLa4
LC31=1.2DL-WL30+1.6LLa4

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	HSS_SQR 4X4X1_4	**4**	LC3 at 100.00%	0.36	OK	Eq. H1-1b
		5	LC4 at 100.00%	**0.42**	**OK**	Eq. H1-1b
		6	LC3 at 100.00%	0.39	OK	Eq. H1-1b
		7	LC2 at 50.00%	0.28	OK	Eq. H1-1b
		8	LC9 at 50.00%	0.28	OK	Eq. H1-1b
		9	LC11 at 50.00%	0.29	OK	Eq. H1-1b
	L 2-1_2X2-1_2X3_16	**41**	LC4 at 100.00%	0.75	OK	Sec. F1
		43	LC3 at 0.00%	**0.83**	**OK**	Sec. F1
		45	LC2 at 100.00%	0.83	OK	Sec. F1
	L 2X2X1_4	**13**	LC3 at 100.00%	0.24	OK	Eq. H2-1
		14	LC1 at 100.00%	0.26	OK	Eq. H2-1
		15	LC4 at 100.00%	**0.29**	**OK**	Eq. H2-1
		16	LC2 at 0.00%	0.27	OK	Eq. H2-1
		17	LC1 at 0.00%	0.25	OK	Eq. H2-1
		18	LC12 at 0.00%	0.25	OK	Eq. H2-1
	PIPE 2-1_2x0.203	**36**	LC2 at 89.58%	0.21	OK	Eq. H1-1b

	37	LC2 at 89.58%	0.25	OK	Eq. H1-1b
	38	LC4 at 89.58%	0.20	OK	Eq. H1-1b
	39	LC3 at 20.83%	0.18	OK	Eq. H1-1b
	40	LC1 at 77.68%	0.55	OK	Eq. H1-1b
	42	LC4 at 22.32%	0.57	OK	Eq. H1-1b
	44	LC2 at 77.68%	**0.68**	**OK**	Eq. H1-1b
	51	LC1 at 89.58%	0.31	OK	Eq. H1-1b
	54	LC1 at 89.58%	0.27	OK	Eq. H1-1b
	57	LC2 at 89.58%	0.25	OK	Eq. H1-1b
	60	LC2 at 20.83%	0.23	OK	Eq. H1-1b
	63	LC4 at 89.58%	0.30	OK	Eq. H1-1b
	66	LC4 at 50.00%	0.24	OK	Eq. H1-1b
	69	LC1 at 89.58%	0.26	OK	Eq. H1-1b
	72	LC1 at 89.58%	0.21	OK	Eq. H1-1b
	74	LC2 at 0.00%	0.41	OK	Eq. H1-1b
	75	LC4 at 0.00%	0.39	OK	Eq. H1-1b
	76	LC1 at 0.00%	0.38	OK	Eq. H1-1b
	77	LC1 at 0.00%	0.33	OK	Eq. H1-1b
	78	LC3 at 0.00%	0.29	OK	Eq. H1-1b
	79	LC3 at 0.00%	0.25	OK	Eq. H1-1b
PIPE 2x0.154	**80**	LC2 at 71.88%	0.08	OK	Eq. H1-1b
	81	LC2 at 71.88%	**0.12**	**OK**	Eq. H1-1b
	84	LC1 at 71.88%	0.08	OK	Eq. H1-1b
	85	LC1 at 71.88%	0.12	OK	Eq. H1-1b
	88	LC3 at 71.88%	0.08	OK	Eq. H1-1b
	89	LC3 at 71.88%	0.12	OK	Eq. H1-1b
PIPE 3x0.216	**2**	LC12 at 91.96%	0.21	OK	Eq. H1-1b
	3	LC4 at 91.96%	**0.25**	**OK**	Eq. H1-1b
	35	LC11 at 91.96%	0.24	OK	Eq. H1-1b
PL 6x3_8	**10**	LC2 at 50.00%	0.29	OK	Eq. H1-1b
	11	LC1 at 50.00%	**0.31**	**OK**	Eq. H1-1b
	12	LC4 at 50.00%	0.27	OK	Eq. H1-1b

Current Date: 1/11/2022 2:14 PM
Units system: English

Geometry data

GLOSSARY

Cb22, Cb33	: Moment gradient coefficients
Cm22, Cm33	: Coefficients applied to bending term in interaction formula
d0	: Tapered member section depth at J end of member
DJX	: Rigid end offset distance measured from J node in axis X
DJY	: Rigid end offset distance measured from J node in axis Y
DJZ	: Rigid end offset distance measured from J node in axis Z
DKX	: Rigid end offset distance measured from K node in axis X
DKY	: Rigid end offset distance measured from K node in axis Y
DKZ	: Rigid end offset distance measured from K node in axis Z
dL	: Tapered member section depth at K end of member
Ig factor	: Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members
K22	: Effective length factor about axis 2
K33	: Effective length factor about axis 3
L22	: Member length for calculation of axial capacity
L33	: Member length for calculation of axial capacity
LB pos	: Lateral unbraced length of the compression flange in the positive side of local axis 2
LB neg	: Lateral unbraced length of the compression flange in the negative side of local axis 2
RX	: Rotation about X
RY	: Rotation about Y
RZ	: Rotation about Z
TO	: 1 = Tension only member 0 = Normal member
TX	: Translation in X
TY	: Translation in Y
TZ	: Translation in Z

Nodes

Node	X [ft]	Y [ft]	Z [ft]	Rigid Floor
1	0.00	-4.00	0.00	0
3	0.596	-4.00	-8.7157	0
4	7.846	-4.00	3.8417	0
9	-7.846	-4.00	3.8417	0
10	-0.596	-4.00	-8.7157	0
12	7.25	-4.00	4.874	0
13	-7.25	-4.00	4.874	0
14	7.548	-4.00	4.3578	0
15	1.7716	-4.00	1.0228	0
18	-7.548	-4.00	4.3578	0
19	-1.7716	-4.00	1.0228	0
20	0.00	-4.00	-8.7157	0
21	0.00	-4.00	-2.0457	0
22	2.846	-4.00	-4.8186	0
23	5.596	-4.00	-0.0554	0
26	-2.846	-4.00	-4.8186	0
27	-5.596	-4.00	-0.0554	0
28	-2.75	-4.00	4.874	0
29	2.75	-4.00	4.874	0
30	5.3725	-4.00	0.3317	0
31	2.9735	-4.00	4.4869	0
34	-2.9735	-4.00	4.4869	0
35	-5.3725	-4.00	0.3317	0

36	-2.399	-4.00	-4.8186	0
37	2.399	-4.00	-4.8186	0
86	6.00	-4.00	4.874	0
87	6.00	-4.00	5.074	0
90	2.00	-4.00	4.874	0
91	2.00	-4.00	5.074	0
94	-2.00	-4.00	4.874	0
95	-2.00	-4.00	5.074	0
98	-6.00	-4.00	4.874	0
99	-6.00	-4.00	5.074	0
100	6.00	5.00	5.074	0
101	2.00	5.00	5.074	0
102	-2.00	5.00	5.074	0
103	-6.00	5.00	5.074	0
104	6.00	-5.00	5.074	0
105	2.00	-5.00	5.074	0
106	-2.00	-5.00	5.074	0
107	-6.00	-5.00	5.074	0
108	-7.25	3.00	4.874	0
109	-7.846	3.00	3.8417	0
110	-0.596	3.00	-8.7157	0
111	0.596	3.00	-8.7157	0
112	7.25	3.00	4.874	0
113	7.846	3.00	3.8417	0
114	-1.7716	0.00	1.0228	0
115	0.00	0.00	-2.0457	0
116	1.7716	0.00	1.0228	0
117	-6.00	3.00	4.874	0
118	-6.00	3.00	5.074	0
119	-2.00	3.00	4.874	0
120	-2.00	3.00	5.074	0
121	2.00	3.00	4.874	0
122	2.00	3.00	5.074	0
123	6.00	3.00	4.874	0
124	6.00	3.00	5.074	0
125	-1.221	-4.00	-7.6332	0
126	-1.3942	-4.00	-7.7332	0
127	-1.3942	5.00	-7.7332	0
128	-1.3942	-5.00	-7.7332	0
129	-1.221	3.00	-7.6332	0
130	-1.3942	3.00	-7.7332	0
131	-3.221	-4.00	-4.1691	0
132	-3.3942	-4.00	-4.2691	0
133	-3.3942	5.00	-4.2691	0
134	-3.3942	-5.00	-4.2691	0
135	-3.221	3.00	-4.1691	0
136	-3.3942	3.00	-4.2691	0
137	-5.221	-4.00	-0.7049	0
138	-5.3942	-4.00	-0.8049	0
139	-5.3942	5.00	-0.8049	0
140	-5.3942	-5.00	-0.8049	0
141	-5.221	3.00	-0.7049	0
142	-5.3942	3.00	-0.8049	0
143	-7.221	-4.00	2.7592	0
144	-7.3942	-4.00	2.6592	0
145	-7.3942	5.00	2.6592	0
146	-7.3942	-5.00	2.6592	0
147	-7.221	3.00	2.7592	0
148	-7.3942	3.00	2.6592	0
149	7.221	-4.00	2.7592	0

150	7.3942	-4.00	2.6592	0
151	7.3942	5.00	2.6592	0
152	7.3942	-5.00	2.6592	0
153	7.221	3.00	2.7592	0
154	7.3942	3.00	2.6592	0
155	5.221	-4.00	-0.7049	0
156	5.3942	-4.00	-0.8049	0
157	5.3942	5.00	-0.8049	0
158	5.3942	-5.00	-0.8049	0
159	5.221	3.00	-0.7049	0
160	5.3942	3.00	-0.8049	0
161	3.221	-4.00	-4.1691	0
162	3.3942	-4.00	-4.2691	0
163	3.3942	5.00	-4.2691	0
164	3.3942	-5.00	-4.2691	0
165	3.221	3.00	-4.1691	0
166	3.3942	3.00	-4.2691	0
167	1.221	-4.00	-7.6332	0
168	1.3942	-4.00	-7.7332	0
169	1.3942	5.00	-7.7332	0
170	1.3942	-5.00	-7.7332	0
171	1.221	3.00	-7.6332	0
172	1.3942	3.00	-7.7332	0
173	6.221	3.00	1.0271	0
174	-4.00	3.00	4.874	0
175	-2.221	3.00	-5.9011	0
176	4.00	3.00	4.874	0
177	-6.221	3.00	1.0271	0
178	2.221	3.00	-5.9011	0
179	0.00	-4.00	-7.9746	0
180	6.9062	-4.00	3.9873	0
181	-6.9062	-4.00	3.9873	0
182	0.00	-4.00	-4.0944	0
183	0.20	-4.00	-4.0944	0
184	0.20	-5.00	-4.0944	0
185	0.20	-1.00	-4.0944	0
186	-0.20	-4.00	-4.0944	0
187	-0.20	-5.00	-4.0944	0
188	-0.20	-1.00	-4.0944	0
189	3.5459	-4.00	2.0472	0
190	-3.5459	-4.00	2.0472	0
191	3.4459	-4.00	2.2204	0
192	-3.6459	-4.00	1.874	0
193	3.4459	-5.00	2.2204	0
194	-3.6459	-5.00	1.874	0
195	3.4459	-1.00	2.2204	0
196	-3.6459	-1.00	1.874	0
197	3.6459	-4.00	1.874	0
198	-3.4459	-4.00	2.2204	0
199	3.6459	-5.00	1.874	0
200	-3.4459	-5.00	2.2204	0
201	3.6459	-1.00	1.874	0
202	-3.4459	-1.00	2.2204	0

Restraints

Node	TX	TY	TZ	RX	RY	RZ
15	1	1	1	1	1	1
19	1	1	1	1	1	1
21	1	1	1	1	1	1
114	1	1	1	1	1	1
115	1	1	1	1	1	1
116	1	1	1	1	1	1
179	0	1	0	0	0	0
180	0	1	0	0	0	0
181	0	1	0	0	0	0

Members

Member	NJ	NK	Description	Section	Material	d0 [in]	dL [in]	lg factor
2	9	10		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
3	3	4		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
4	18	19		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
5	20	21		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
6	14	15		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
7	28	27		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
8	26	22		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
9	23	29		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
10	13	9		PL 6x3_8	A36	0.00	0.00	0.00
11	10	3		PL 6x3_8	A36	0.00	0.00	0.00
12	12	4		PL 6x3_8	A36	0.00	0.00	0.00
13	34	18		L 2X2X1_4	A36	0.00	0.00	0.00
14	36	20		L 2X2X1_4	A36	0.00	0.00	0.00
15	30	14		L 2X2X1_4	A36	0.00	0.00	0.00
16	18	35		L 2X2X1_4	A36	0.00	0.00	0.00
17	20	37		L 2X2X1_4	A36	0.00	0.00	0.00
18	14	31		L 2X2X1_4	A36	0.00	0.00	0.00
35	12	13		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
36	103	107		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
37	102	106		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
38	101	105		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
39	100	104		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
40	112	108		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
41	108	109		L 2-1_2X2-1_2X3_16	A36	0.00	0.00	0.00
42	109	110		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
43	110	111		L 2-1_2X2-1_2X3_16	A36	0.00	0.00	0.00
44	111	113		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
45	112	113		L 2-1_2X2-1_2X3_16	A36	0.00	0.00	0.00
51	127	128		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
54	133	134		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
57	139	140		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
60	145	146		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
63	151	152		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
66	157	158		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
69	163	164		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
72	169	170		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
74	115	175		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
75	115	178		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
76	116	173		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
77	114	177		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
78	114	174		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
79	116	176		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00

80	185	184	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
81	188	187	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
84	195	193	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
85	201	199	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
88	196	194	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
89	202	200	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00

Orientation of local axes

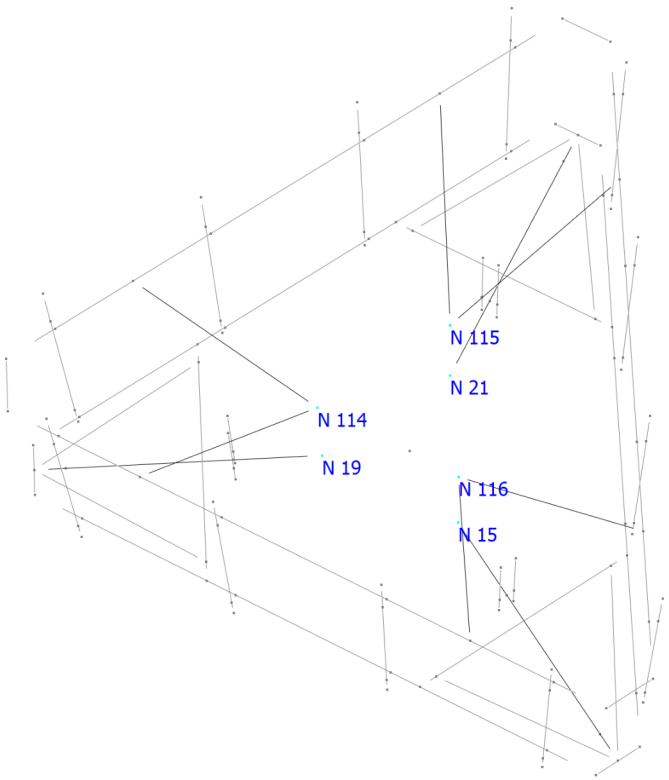
Member	Rotation [Deg]	Axes23	NX	NY	NZ
41	180.00	0	0.00	0.00	0.00
43	180.00	0	0.00	0.00	0.00
45	90.00	0	0.00	0.00	0.00

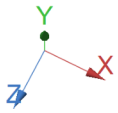
Rigid end offsets

Member	DJX [in]	DJY [in]	DJZ [in]	DKX [in]	DKY [in]	DKZ [in]
13	0.00	3.00	0.00	0.00	3.00	0.00
14	0.00	3.00	0.00	0.00	3.00	0.00
15	0.00	3.00	0.00	0.00	3.00	0.00
16	0.00	3.00	0.00	0.00	3.00	0.00
17	0.00	3.00	0.00	0.00	3.00	0.00
18	0.00	3.00	0.00	0.00	3.00	0.00

Hinges

	Node-J				Node-K						
Member	M33	M22	V3	V2	M33	M22	V3	V2	TOR	AXL	Axial rigidity
74	0	0	0	0	1	1	0	0	0	0	Full
75	0	0	0	0	1	1	0	0	0	0	Full
76	0	0	0	0	1	1	0	0	0	0	Full
77	0	0	0	0	1	1	0	0	0	0	Full
78	0	0	0	0	1	1	0	0	0	0	Full
79	0	0	0	0	1	1	0	0	0	0	Full


N 115
N 21
N 114
N 19
N 116
N 15

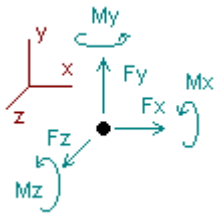

Y
X
Z

Current Date: 1/12/2022 8:55 AM
Units system: English

Analysis result

Envelope for nodal reactions

Note.- **Ic** is the controlling load condition



Direction of positive forces and moments

Envelope of nodal reactions for :

LC1=1.2DL+W0
LC2=1.2DL+W30
LC3=1.2DL-W0
LC4=1.2DL-W30
LC5=0.9DL+W0
LC6=0.9DL+W30
LC7=0.9DL-W0
LC8=0.9DL-W30
LC9=1.2DL+Di+Wi0
LC10=1.2DL+Di+Wi30
LC11=1.2DL+Di-Wi0
LC12=1.2DL+Di-Wi30
LC13=1.4DL
LC14=1.2DL+1.6LL1
LC15=1.2DL+1.6LL2
LC16=1.2DL+WL0+1.6LLa1
LC17=1.2DL+WL30+1.6LLa1
LC18=1.2DL-WL0+1.6LLa1
LC19=1.2DL-WL30+1.6LLa1
LC20=1.2DL+WL0+1.6LLa2
LC21=1.2DL+WL30+1.6LLa2
LC22=1.2DL-WL0+1.6LLa2
LC23=1.2DL-WL30+1.6LLa2
LC24=1.2DL+WL0+1.6LLa3
LC25=1.2DL+WL30+1.6LLa3
LC26=1.2DL-WL0+1.6LLa3
LC27=1.2DL-WL30+1.6LLa3
LC28=1.2DL+WL0+1.6LLa4
LC29=1.2DL+WL30+1.6LLa4
LC30=1.2DL-WL0+1.6LLa4
LC31=1.2DL-WL30+1.6LLa4

		Forces						Moments					
Node		**Fx** [Kip]	**Ic**	**Fy** [Kip]	**Ic**	**Fz** [Kip]	**Ic**	**Mx** [Kip*ft]	**Ic**	**My** [Kip*ft]	**Ic**	**Mz** [Kip*ft]	**Ic**
15	Max	2.112	LC2	1.950	LC12	1.583	LC1	0.46252	LC5	1.55812	LC3	2.52274	LC12
	Min	-1.934	LC8	0.207	LC6	-1.497	LC7	-1.36295	LC3	-1.53405	LC5	-0.00216	LC6
19	Max	1.862	LC6	1.837	LC10	1.504	LC1	0.37082	LC5	1.39515	LC1	-0.00084	LC8
	Min	-2.023	LC4	0.206	LC8	-1.395	LC7	-1.61670	LC11	-1.36514	LC7	-2.17155	LC10

21	Max	1.390	LC6	1.875	LC9	2.246	LC5	2.67872	LC9	2.22390	LC4	0.87129	LC8
	Min	-1.402	LC4	0.184	LC7	-2.440	LC3	0.22938	LC7	-2.20075	LC6	-0.97729	LC2
114	Max	1.491	LC6	1.235	LC4	1.182	LC1	0.58919	LC5	0.51034	LC5	0.48007	LC8
	Min	-1.595	LC4	-1.001	LC6	-1.121	LC7	-0.77643	LC3	-0.57289	LC3	-0.64276	LC2
115	Max	0.821	LC6	1.388	LC3	1.800	LC5	0.71927	LC1	0.82111	LC8	0.79286	LC8
	Min	-0.824	LC4	-1.153	LC5	-1.919	LC3	-0.48379	LC7	-0.87848	LC2	-0.85315	LC2
116	Max	1.867	LC2	1.393	LC2	1.124	LC1	0.65549	LC5	0.53894	LC7	0.73820	LC4
	Min	-1.764	LC8	-1.157	LC8	-1.067	LC7	-0.71438	LC3	-0.59584	LC1	-0.49510	LC6

Date: 1/11/2022
Project Name: MANCHESTER CENTRAL
Project No.: CT5448
Designed By: ID **Checked By:** MSC

HUDSON Design Group LLC

CHECK CONNECTION CAPACITY (Worst Case)

Reference: AISC Steel Construction Manual 14th Edition (ASD)

Bolt Type = A36 5/8" (Threaded Rod)

Allowable Tensile Load =

F_{Tall} = 6673 lbs.

Allowable Shear Load =

F_{Vall} = 4004 lbs.

TENSILE FORCES

Reaction **F =** 2440 lbs. (See Bentley Output)

SHEAR FORCES

Reactions in X direction: 1402 lbs. (See Bentley Output)
Reactions in Y direction: 1875 lbs. (See Bentley Output)

Resultant: 2341 lbs.

No. of Supports = 1
No. of Bolts / Support = 3

Tension Design Load /Bolts =

f_t = 813.33 lbs. < 6673 lbs. **Therefore, OK !**

Shear Design Load / Bolts=

f_v = 780.40 lbs. < 4004 lbs. **Therefore, OK !**

CHECK COMBINED TENSION AND SHEAR

f_t / F_T	+	f_v / F_V	≤	1.0			
0.122	+	0.195	=	0.317	<	1.0	**Therefore, OK !**

EXHIBIT 5

Radio Frequency Exposure Analysis Report

April 1, 2022

Centerline on behalf of AT&T
Centerline Communications Project Number: 566483

AT&T Site Name: MANCHESTER CENTRAL
Site Number: CT5448
FA#: 10071105
USID: 26172

Site Address: 239 MIDDLE TURNPIKE EAST, MANCHESTER, CT 06040

Site Compliance Summary

AT&T Compliance Status:	Compliant
Cumulative Calculated Power Density (Ground Level):	22.35802 µW/cm^2
Cumulative General Population % MPE (Ground Level):	2.23585%

April 1, 2022

Centerline
Attn: Jennifer Iliades, Project Manager
750 W Center St, Suite 301
West Bridgewater, MA 02379

RF Exposure Analysis for Site: **MANCHESTER CENTRAL**

Centerline Communications, LLC ("Centerline") was contracted to analyze the proposed AT&T facility at **239 MIDDLE TURNPIKE EAST, MANCHESTER, CT 06040** for the purpose of determining whether the predictive exposure from the proposed facility is within specified federal limits.

All information used in this report was analyzed as a percentage of the Maximum Permissible Exposure (% MPE) limits as detailed in 47 CFR § 1.1310 as well as Federal Communications Commission (FCC) OET Bulletin 65 Edition 97-01. The FCC MPE limits are typically expressed in units of milliwatts per square centimeter (mW/cm^2) or microwatts per square centimeter ($\mu W/cm^2$). The exposure limits vary depending upon the frequencies being utilized. The General Population/Uncontrolled MPE limit (in mW/cm^2) for frequencies between 300 and 1500 is defined as frequency (in MHz) divided by 1500 ($f_{MHz}/1500$). Frequencies between 1500 and 100,000 MHz have a General Population/Uncontrolled MPE limit of 1 mW/cm^2 (1000 $\mu W/cm^2$). The calculated power density at each sample point divided by the limit at each calculated frequency provides a result in % MPE. Summing the calculated % MPE from all contributors provides a cumulative % MPE at a particular sample point. Wireless carriers use different frequency bands with varying MPE limits; therefore, it is useful to report results in terms of % MPE as opposed to power density.

All results were compared to the FCC radio frequency exposure rules as detailed in 47 CFR § 1.1307(b) to determine compliance with the 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.

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, 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.

Calculation Methodology

Centerline Communications, LLC has performed theoretical modeling of the site using a software tool, RoofMaster®, which incorporates calculation methodologies detailed in FCC OET 65. RoofMaster® uses a cylindrical model for conservative power density predictions within the near field of the antenna where the antenna pattern has not truly formed yet. Within this area power density values tend to decrease based upon an inverse distance function. At the point where it is appropriate for modeling to change from near-field calculations to far-field calculations, the power decreases inversely with the square of the distance. The modeling is based on worst-case assumptions in terms of transmitter power and duty cycle. No losses were included in the power calculations unless they were specifically provided for the project.

In OET 65, a far field model is presented to calculate the spatial peak power density. The RoofMaster® implementation of this model incorporates antenna manufacturer's horizontal and vertical pattern data to determine the power density in all directions. This model yields the power density at a single point in space. In order to determine the spatial power density for comparison to the FCC limits, the average of several points calculated within the human profile (0-6') must be conducted. RoofMaster® calculates seven power density values between 0-6' above the specified study plane and performs a linear spatial average.

Data & Results

The following table details the antennas and operating parameters for the AT&T antenna system as well as any other antenna systems at the site. This is based on antenna information provided by the client and data compiled from other sources where necessary. The data below was input into Roofmaster® to perform the theoretical exposure calculations at the ground level.

The theoretical calculations performed in Roofmaster® determine the cumulative exposure at all sample points at ground level (0-6' spatial average). The results from highest cumulative sample point at ground level surrounding the site are displayed in the table below. The contribution from directional antennas to the maximum cumulative totals varies greatly depending on location; therefore, the contribution from one antenna sector at the highest calculated exposure point may be greater or less than other sectors since sectorized directional antennas are pointed in different directions and there is not much overlapping exposure.

The contribution to the cumulative power density and % MPE for each antenna/frequency band is listed in the table. The cumulative power density and cumulative % MPE are displayed at the bottom of the table.

Maximum Calculated Cumulative Power Density (Location: approximately 55' southeast of site)

Antenna ID	Make / Model	Frequency Band (MHz)	Antenna Gain (dBd)	Antenna Centerline (ft)	Channel Count	TX Power/ Channel (watts)	ERP (watts)	Calculated Power Density ($\mu W/cm^2$)	General Population MPE Limit ($\mu W/cm^2$)	General Population % MPE
AT&T A 1	QUINTEL QD6616-7 V1	700	11.97	143.00	4.00	40.00	2519.01	0.00000	466.67	0.00000
AT&T A 1	QUINTEL QD6616-7 V1	1900	15.11	143.00	4.00	40.00	5184.30	0.00000	1000.00	0.00000
AT&T A 1	QUINTEL QD6616-7 V1	2100	15.33	143.00	4.00	40.00	5457.70	0.00000	1000.00	0.00000
AT&T A 1	QUINTEL QD6616-7 V1	700	11.97	143.00	2.00	40.00	1259.51	0.00000	466.67	0.00000
AT&T A 2	ERICSSON SON_AIR6449	3700	23.55	141.00	1.00	108.40	24548.74	0.00000	1000.00	0.00000
AT&T A 3	ERICSSON SON_AIR6419	3400	22.85	145.00	1.00	54.20	10447.19	0.00665	1000.00	0.00067
AT&T A 3	ERICSSON SON_AIR6419	3400	22.85	145.00	1.00	54.00	10408.63	0.00665	1000.00	0.00067
AT&T A 4	CCI DMP65R-BU6D	700	11.75	143.00	4.00	40.00	2393.98	0.00000	466.67	0.00000
AT&T A 4	CCI DMP65R-BU6D	850	11.45	143.00	4.00	40.00	2234.19	0.00000	566.67	0.00000
AT&T A 4	CCI DMP65R-BU6D	2300	15.45	143.00	4.00	25.00	3507.52	0.00000	1000.00	0.00000
AT&T B 5	QUINTEL QD8616-7 V1	700	13.08	143.00	4.00	40.00	3252.74	0.00006	466.67	0.00001
AT&T B 5	QUINTEL QD8616-7 V1	1900	15.15	143.00	4.00	40.00	5234.68	0.00003	1000.00	0.00000
AT&T B 5	QUINTEL QD8616-7 V1	2100	15.83	143.00	4.00	40.00	6120.83	0.00002	1000.00	0.00000
AT&T B 5	QUINTEL QD8616-7 V1	700	13.08	143.00	2.00	40.00	1627.50	0.00002	466.67	0.00000
AT&T B 6	ERICSSON SON_AIR6449	3700	23.55	141.00	1.00	108.40	24548.74	0.00026	1000.00	0.00003
AT&T B 7	ERICSSON SON_AIR6419	3400	22.85	145.00	1.00	54.20	10447.19	5.68235	1000.00	0.56824
AT&T B 7	ERICSSON SON_AIR6419	3400	22.85	145.00	1.00	54.00	10408.63	5.68235	1000.00	0.56824
AT&T B 8	CCI DMP65R-BU8D	700	12.25	143.00	4.00	40.00	2686.09	0.00003	466.67	0.00001
AT&T B 8	CCI DMP65R-BU8D	850	12.75	143.00	4.00	40.00	3013.84	0.00003	566.67	0.00001
AT&T B 8	CCI DMP65R-BU8D	2300	15.15	143.00	4.00	25.00	3273.41	0.00002	1000.00	0.00000
AT&T C 9	QUINTEL QD8616-7 V1	700	12.99	143.00	4.00	40.00	3185.44	0.00004	466.67	0.00001
AT&T C 9	QUINTEL QD8616-7 V1	1900	15.27	143.00	4.00	40.00	5389.64	0.00002	1000.00	0.00000
AT&T C 9	QUINTEL QD8616-7 V1	2100	15.56	143.00	4.00	40.00	5762.22	0.00002	1000.00	0.00000
AT&T C 9	QUINTEL QD8616-7 V1	700	12.99	143.00	2.00	40.00	1592.72	0.00002	466.67	0.00000
AT&T C 10	ERICSSON SON_AIR6449	3700	23.55	141.00	1.00	108.40	24548.74	0.00024	1000.00	0.00002
AT&T C 11	ERICSSON SON_AIR6419	3400	22.85	145.00	1.00	54.20	10447.19	5.48944	1000.00	0.54894
AT&T C 11	ERICSSON SON_AIR6419	3400	22.85	145.00	1.00	54.00	10408.63	5.48944	1000.00	0.54894
AT&T C 12	CCI DMP65R-BU8D	700	12.15	143.00	4.00	40.00	2624.94	0.00007	466.67	0.00002
AT&T C 12	CCI DMP65R-BU8D	850	12.65	143.00	4.00	40.00	2945.24	0.00002	566.67	0.00000
AT&T C 12	CCI DMP65R-BU8D	2300	15.25	143.00	4.00	25.00	3349.65	0.00001	1000.00	0.00000
Unknown A 13	GENERIC OMNI 6FT	850	5.96	187.30	1.00	25.00	98.61	0.00000	566.67	0.00000
Unknown A 14	GENERIC OMNI 6FT	850	5.96	187.30	1.00	25.00	98.61	0.00000	566.67	0.00000
Unknown A 15	GENERIC OMNI 6FT	850	5.96	187.30	1.00	25.00	98.61	0.00000	566.67	0.00000
Unknown B 16	GENERIC PANEL 6FT	850	12.62	170.20	1.00	100.00	1828.10	0.00000	566.67	0.00000

Antenna ID	Make / Model	Frequency Band (MHz)	Antenna Gain (dBd)	Antenna Centerline (ft)	Channel Count	TX Power/ Channel (watts)	ERP (watts)	Calculated Power Density (μW/cm²)	General Population MPE Limit (μW/cm²)	General Population % MPE
Unknown C 17	GENERIC PANEL 6FT	850	12.62	170.20	1.00	100.00	1828.10	0.00001	566.67	0.00000
Unknown D 18	GENERIC PANEL 6FT	850	12.62	170.20	1.00	100.00	1828.10	0.00000	566.67	0.00000
T-Mobile A 19	GENERIC PANEL 6FT	1900	15.84	161.10	2.00	60.00	4604.49	0.00000	1000.00	0.00000
T-Mobile A 20	GENERIC PANEL 6FT	600	12.33	161.10	2.00	60.00	2052.02	0.00000	400.00	0.00000
T-Mobile A 20	GENERIC PANEL 6FT	700	12.33	161.10	2.00	60.00	2052.02	0.00000	466.67	0.00000
T-Mobile A 21	GENERIC PANEL 6FT	2100	16.39	161.10	2.00	60.00	5226.14	0.00000	1000.00	0.00000
T-Mobile B 22	GENERIC PANEL 6FT	1900	15.84	161.10	2.00	60.00	4604.49	0.00001	1000.00	0.00000
T-Mobile B 23	GENERIC PANEL 6FT	600	12.33	161.10	2.00	60.00	2052.02	0.00001	400.00	0.00000
T-Mobile B 23	GENERIC PANEL 6FT	700	12.33	161.10	2.00	60.00	2052.02	0.00001	466.67	0.00000
T-Mobile B 24	GENERIC PANEL 6FT	2100	16.39	161.10	2.00	60.00	5226.14	0.00001	1000.00	0.00000
T-Mobile C 25	GENERIC PANEL 6FT	1900	15.84	161.10	2.00	60.00	4604.49	0.00001	1000.00	0.00000
T-Mobile C 26	GENERIC PANEL 6FT	600	12.33	161.10	2.00	60.00	2052.02	0.00001	400.00	0.00000
T-Mobile C 26	GENERIC PANEL 6FT	700	12.33	161.10	2.00	60.00	2052.02	0.00001	466.67	0.00000
T-Mobile C 27	GENERIC PANEL 6FT	2100	16.39	161.10	2.00	60.00	5226.14	0.00000	1000.00	0.00000
Sprint A 28	GENERIC PANEL 6FT	862	12.62	154.10	2.00	40.00	1462.48	0.00000	574.67	0.00000
Sprint A 28	GENERIC PANEL 6FT	1900	15.84	154.10	2.00	60.00	4604.49	0.00000	1000.00	0.00000
Sprint A 29	GENERIC PANEL 6FT	2500	14.49	154.10	1.00	34.70	975.73	0.00000	1000.00	0.00000
Sprint B 30	GENERIC PANEL 6FT	862	12.62	154.10	2.00	40.00	1462.48	0.00000	574.67	0.00000
Sprint B 30	GENERIC PANEL 6FT	1900	15.84	154.10	2.00	60.00	4604.49	0.00000	1000.00	0.00000
Sprint B 31	GENERIC PANEL 6FT	2500	14.49	154.10	1.00	34.70	975.73	0.00000	1000.00	0.00000
Sprint C 32	GENERIC PANEL 6FT	862	12.62	154.10	2.00	40.00	1462.48	0.00001	574.67	0.00000
Sprint C 32	GENERIC PANEL 6FT	1900	15.84	154.10	2.00	60.00	4604.49	0.00002	1000.00	0.00000
Sprint C 33	GENERIC PANEL 6FT	2500	14.49	154.10	1.00	34.70	975.73	0.00000	1000.00	0.00000
Unknown A 34	GENERIC YAGI 2FT	700	11.10	127.90	1.00	6.46	83.18	0.00000	466.67	0.00000
Verizon A 35	GENERIC PANEL 6FT	850	12.62	112.80	4.00	40.00	2924.96	0.00000	566.67	0.00000
Verizon A 36	GENERIC PANEL 6FT	1900	15.84	112.80	4.00	40.00	6139.32	0.00000	1000.00	0.00000
Verizon A 37	GENERIC PANEL 6FT	2100	16.39	112.80	4.00	40.00	6968.19	0.00000	1000.00	0.00000
Verizon A 38	GENERIC PANEL 6FT	700	12.33	112.80	4.00	40.00	2736.02	0.00000	466.67	0.00000
Verizon B 39	GENERIC PANEL 6FT	850	12.62	112.80	4.00	40.00	2924.96	0.00002	566.67	0.00000
Verizon B 40	GENERIC PANEL 6FT	1900	15.84	112.80	4.00	40.00	6139.32	0.00001	1000.00	0.00000
Verizon B 41	GENERIC PANEL 6FT	2100	16.39	112.80	4.00	40.00	6968.19	0.00001	1000.00	0.00000

Antenna ID	Make / Model	Frequency Band (MHz)	Antenna Gain (dBd)	Antenna Centerline (ft)	Channel Count	TX Power/ Channel (watts)	ERP (watts)	Calculated Power Density ($\mu W/cm^2$)	General Population MPE Limit ($\mu W/cm^2$)	General Population % MPE
Verizon B 42	GENERIC PANEL 6FT	700	12.33	112.80	4.00	40.00	2736.02	0.00003	466.67	0.00001
Verizon C 43	GENERIC PANEL 6FT	850	12.62	112.80	4.00	40.00	2924.96	0.00002	566.67	0.00000
Verizon C 44	GENERIC PANEL 6FT	1900	15.84	112.80	4.00	40.00	6139.32	0.00001	1000.00	0.00000
Verizon C 45	GENERIC PANEL 6FT	2100	16.39	112.80	4.00	40.00	6968.19	0.00001	1000.00	0.00000
Verizon C 46	GENERIC PANEL 6FT	700	12.33	112.80	4.00	40.00	2736.02	0.00002	466.67	0.00001
							Cumulative Power Density:	**22.35802 $\mu W/cm^2$**	**Cumulative % MPE:**	**2.23585%**

Summary

The theoretical calculations performed for this analysis yielded cumulative power density totals in all areas at ground level that are within the allowable federal limits for public exposure to RF energy. Therefore, the site is **Compliant** FCC rules and regulations.

Katrina Styx
RF EME Technical Writer
Centerline Communications, LLC

EXHIBIT 6

VIII. ZONING PLAN EXAMINERS NOTES

DISTRICT RA

USE - communications or municipal towers

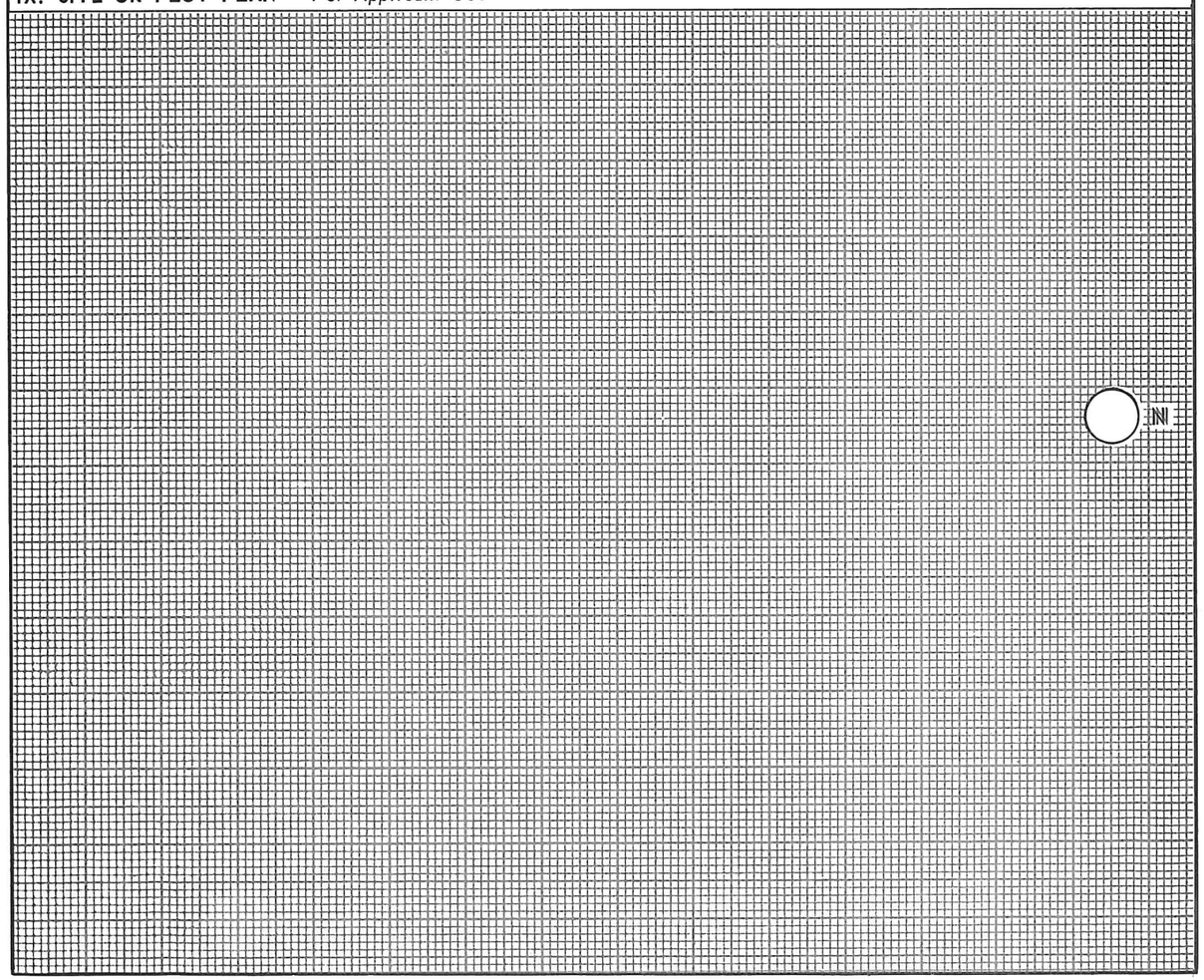
FRONT YARD

SIDE YARD SIDE YARD

REAR YARD

NOTES

IX. SITE OR PLOT PLAN – *For Applicant Use*



Revised Plans

03-674

APPLICATION FOR PLAN EXAMINATION AND BUILDING PERMIT

NO. _____ STREET _____

IMPORTANT – Applicant to complete all items in sections: I, II, III, IV, and IX.

I. LOCATION OF BUILDING

AT (LOCATION) 239 (NO.) Middle turnpike East (STREET) ZONING DISTRICT RA

BETWEEN Princeton Street (CROSS STREET) AND Middle turnpike East (CROSS STREET)

SUBDIVISION _____ LOT _____ BLOCK _____ LOT SIZE _____

II. TYPE AND COST OF BUILDING – *All applicants complete Parts A – D*

A. TYPE OF IMPROVEMENT

1 ☐ New building
2 ☐ Addition (*If residential, enter number of new housing units added, if any, in Part D, 13*)
3 ☐ Alteration (*See 2 above*)
4 ☐ Repair, replacement
5 ☐ Wrecking (*If multifamily residential, enter number of units in building in Part D, 13*)
6 ☐ Moving (relocation)
7 ☐ Foundation only

B. OWNERSHIP

8 ☐ Private (individual, corporation, nonprofit institution, etc.)
9 ☑ Public (Federal, State, or local government)

D. PROPOSED USE – *For "Wrecking" most recent use*

Residential

12 ☐ One family
13 ☐ Two or more family – *Enter number of units* ----→ _____
14 ☐ Transient hotel, motel, or dormitory – *Enter number of units* ----→ _____
15 ☐ Garage
16 ☐ Carport
17 ☐ Other – *Specify* _____

Nonresidential

18 ☐ Amusement, recreational
19 ☐ Church, other religious
20 ☐ Industrial
21 ☐ Parking garage
22 ☐ Service station, repair garage
23 ☐ Hospital, institutional
24 ☐ Office, bank, professional
25 ☐ Public utility
26 ☐ School, library, other educational
27 ☐ Stores, mercantile
28 ☐ Tanks, towers ~~Municipal~~ Wireless
29 ☐ Other – *Specify* ~~Wireless~~ Communication facility

RECEIVED
SEP 30 2002
TOWN OF MANCHESTER
BUILDING INSPECTION DIVISION

C. COST

	(Omit cents)
10. Cost of improvement	$ ~~25,000~~ 40,000
To be installed but not included in the above cost	
a. Electrical	~~15,000~~
b. Plumbing	
c. Heating, air conditioning	
d. Other (elevator, etc.)	
11. TOTAL COST OF IMPROVEMENT	$ ~~40,000~~

Nonresidential – Describe in detail proposed use of buildings, e.g., food processing plant, machine shop, laundry building at hospital, elementary school, secondary school, college, parochial school, parking garage for department store, rental office building, office building at industrial plant. If use of existing building is being changed, enter proposed use.

~~Municipal~~ Scope of work is to construct a wireless communication facility consisting of a 10'x 20' concrete pad for equipment and six platform mounted antennas

III. SELECTED CHARACTERISTICS OF BUILDING – *For new buildings and additions, complete Parts E – L; for wrecking, complete only Part J, for all others skip to IV.*

E. PRINCIPAL TYPE OF FRAME

30 ☐ Masonry (wall bearing)
31 ☐ Wood frame
32 ☐ Structural steel
33 ☐ Reinforced concrete
34 ☐ Other – *Specify* _____

F. PRINCIPAL TYPE OF HEATING FUEL

35 ☐ Gas
36 ☐ Oil
37 ☐ Electricity
38 ☐ Coal
39 ☐ Other – *Specify* _____

G. TYPE OF SEWAGE DISPOSAL

40 ☐ Public or private company
41 ☐ Private (septic tank, etc.)

H. TYPE OF WATER SUPPLY

42 ☐ Public or private company
43 ☐ Private (well, cistern)

I. TYPE OF MECHANICAL

Will there be central air conditioning?
44 ☐ Yes 45 ☐ No

Will there be an elevator?
46 ☐ Yes 47 ☐ No

J. DIMENSIONS

48. Number of stories _____
49. Total square feet of floor area, all floors, based on exterior dimensions _____
50. Total land area, sq. ft. _____

K. NUMBER OF OFF-STREET PARKING SPACES

51. Enclosed _____
52. Outdoors _____

L. RESIDENTIAL BUILDINGS ONLY

53. Number of bedrooms _____
54. Number of bathrooms: Full _____ Partial _____

NOTES and Data – *(For department use)*

IV. IDENTIFICATION – *To be completed by all applicants*

	Name	Mailing address – *Number, street, city, and State*	ZIP code	Tel. No.
1. Owner or Lessee	Town of Manchester	41 Center Street, Manchester, CT	06 045	
2. Contractor	Construction Services of Branford, LLC	63-3 North Branford Rd, Branford, CT	Builder's License No. ↓	(203) 488-071[illegible]
3. Architect or Engineer	Natzomm	63-2 North Branford Rd, Branford, CT	MCO.900576	(203) 488-0560

I hereby certify that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and we agree to conform to all applicable laws of this jurisdiction.

Signature of applicant	Address	Application date

DO NOT WRITE BELOW THIS LINE

V. PLAN REVIEW RECORD – *For office use*

Plans Review Required	Check	Plan Review Fee	Date Plans Started	By	Date Plans Approved	By	Notes
BUILDING		$			10-25-02	HD	
PLUMBING		$					
MECHANICAL		$					
ELECTRICAL		$					
OTHER 2		$			10/25/02	[illegible]	

VI. ADDITIONAL PERMITS REQUIRED OR OTHER JURISDICTION APPROVALS

Permit or Approval	Check	Date Obtained	Number	By	Permit or Approval	Check	Date Obtained	Number	By
BOILER					PLUMBING				
CURB OR SIDEWALK CUT					ROOFING				
ELEVATOR					SEWER				
ELECTRICAL					SIGN OR BILLBOARD				
FURNACE					STREET GRADES				
GRADING					USE OF PUBLIC AREAS				
OIL BURNER					WRECKING				
OTHER					OTHER				

VII. VALIDATION

Building Permit number ______

Building Permit issued ______

Building Permit Fee $ ______

$565 waived

$6.40 008531 R#4761 & 4757 pm

Certificate of Occupancy $ ______

Drain Tile $ ______

Plan Review Fee $ ______

FOR DEPARTMENT USE ONLY

Use Group ______

Fire Grading ______

Live Loading ______

Occupancy Load ______

Approved by: [signature] 10-25-02

IACBO

TITLE

EXHIBIT 7

Proof of Delivery

Dear Customer,

This notice serves as proof of delivery for the shipment listed below.

Tracking Number

1Z9Y45030307470850

Weight

1.00 LBS

Service

UPS Ground

Shipped / Billed On

04/18/2022

Delivered On

05/10/2022 10:09 A.M.

Delivered To

41 CENTER ST
MANCHESTER, CT, 06040, US

Received By

RANALDI

Left At

Front Desk

Reference Number(s)

CT5448- CSC TO MAYOR

Thank you for giving us this opportunity to serve you. Details are only available for shipments delivered within the last 120 days. Please print for your records if you require this information after 120 days.

Sincerely,

UPS

Tracking results provided by UPS: 05/16/2022 1:30 P.M. EST

Proof of Delivery

Dear Customer,

This notice serves as proof of delivery for the shipment listed below.

Tracking Number
1Z9Y45030310418875

Weight
1.00 LBS

Service

UPS Ground

Shipped / Billed On
04/18/2022

Delivered On

05/10/2022 2:23 P.M.

Delivered To
494 MAIN ST
204
MANCHESTER, CT, 06040, US

Received By

WILAFORD

Left At
Office

Reference Number(s)
CT5448-CSC TO ZEO

Thank you for giving us this opportunity to serve you. Details are only available for shipments delivered within the last 120 days. Please print for your records if you require this information after 120 days.

Sincerely,

UPS

Tracking results provided by UPS: 05/16/2022 1:32 P.M. EST

Proof of Delivery

Dear Customer,

This notice serves as proof of delivery for the shipment listed below.

Tracking Number
1Z9Y45030314195886

Weight
1.00 LBS

Service

UPS Ground

Shipped / Billed On
04/18/2022

Delivered On

05/10/2022 2:23 P.M.

Delivered To
494 MAIN ST
204
MANCHESTER, CT, 06040, US

Received By

WILAFORD

Left At
Office

Reference Number(s)
CT5448-CSC TO DIRECTOR OF PLANNING

Thank you for giving us this opportunity to serve you. Details are only available for shipments delivered within the last 120 days. Please print for your records if you require this information after 120 days.

Sincerely,

UPS

Tracking results provided by UPS: 05/16/2022 1:27 P.M. EST