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Also admitted in Massachusetts
and New York

July 1, 2021

Via Electronic Mail

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

Re: **Notice of Exempt Modification – Facility Modification
134R Creamery Road, Durham, Connecticut**

Dear Attorney Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains an existing wireless telecommunications facility at the above-referenced property address (the “Property”). The facility consists of antennas and remote radio heads attached to the existing tower and related equipment at the base of the tower. The tower was approved by the Council in December 2003 in Docket No. 254. Cellco’s use of the tower was approved by the Council in Petition No. 1092 in March 2014. A copy of the Council’s Docket No. 254 Decision and Order and Petition No. 1092 Staff Report are included in [Attachment 1](#).

Cellco now intends to modify its facility by removing its nine (9) existing antennas and installing six (6) JAHH-65B-R3B antennas and three (3) Samsung MT6407-77A antennas on T-Arms in the same flush-mounted configuration. Cellco also intends to replace six (6) remote radio heads (“RRHs”) with six (6) new RRHs behind its antennas. A set of project plans showing Cellco’s proposed facility modifications and new antenna and RRH specifications are included in [Attachment 2](#).

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 Durham’s Chief Elected Official and Land Use Officer.

Melanie A. Bachman, Esq.
July 1, 2021
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The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing building. Cellco's new antennas and RRHs will be installed on the existing antenna mount.
2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The installation of Cellco's new antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A Cumulative General Power Density table for the modified facility is included in Attachment 3. The modified facility will be capable of providing Cellco's 5G wireless service.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. According to the attached Structural Analysis ("SA") and Mount Analysis ("MA"), the existing tower, tower foundation and antenna mounts can support Cellco's proposed modifications. Copies of the SA and MA are included in Attachment 4. Also included in Attachment 4 is a separate letter prepared by the consulting engineer responsible for the preparation of the SA verifying that the antenna model described in the SA, as a VZS01 Antenna, is the Samsung 64T64R model antenna.

A copy of the parcel map and Property owner information is included in Attachment 5. A Certificate of Mailing verifying that this filing was sent to municipal officials and the property owner is included in Attachment 6.

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

Melanie A. Bachman, Esq.
July 1, 2021
Page 3

Sincerely,

A handwritten signature in black ink, appearing to read "Kenneth C. Baldwin". The signature is fluid and cursive, with a long horizontal stroke at the end.

Kenneth C. Baldwin

Enclosures

Copy to:

Laura Francis, Durham First Selectman
Robin Newton, Town Planner
ADCT LLC, Property Owner
Aleksey Tyurin

ATTACHMENT 1

DOCKET NO. 254 - Sprint Spectrum, L.P. d/b/a Sprint PCS application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a wireless telecommunications facility at 134R Creamery Road, Durham, Connecticut. } Connecticut
} Siting
} Council

December 9, 2003

Decision and Order

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a telecommunications facility including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate either alone or cumulatively with other effects when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the proposed site, located at 134R Creamery Road, Durham, Connecticut.

The facility shall be constructed, operated, and maintained substantially as specified in the Council's record in this matter, and subject to the following conditions:

1. The tower shall be constructed as a flush-mounted tower, no taller than necessary to provide the proposed telecommunications services, sufficient to accommodate the antennas of Sprint and other entities, both public and private, but such tower shall not exceed a height of 100 feet above ground level, capable of being increased in height by means of a petition to the Council.
2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be submitted to and approved by the Council prior to the commencement of facility construction and shall include:
 - a) a final site plan(s) of site development to include specifications for the tower, tower foundation, antennas, equipment building, access road, utility line, and landscaping; and
 - b) construction plans for site clearing, water drainage, and erosion and sedimentation control consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.
3. The Certificate Holder shall, prior to the commencement of operation, provide the Council worst-case

modeling of electromagnetic radio frequency power density of all proposed entities' antennas at the closest point of uncontrolled access to the tower base, consistent with

Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall ensure a recalculated report of electromagnetic radio frequency power density is submitted to the Council if and when circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order.

4. Upon the establishment of any new State or federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.

5. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing. The Certificate Holder shall provide reasonable space on the tower for no compensation for any municipal antennas, provided such antennas are compatible with the structural integrity of the tower.

6. If the facility does not initially provide wireless services within one year of completion of construction or ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made.

7. Any antenna that becomes obsolete and ceases to function shall be removed within 60 days after such antennas become obsolete and cease to function.

8. Unless otherwise approved by the Council, this Decision and Order shall be void if the facility authorized herein is not operational within one year of the effective date of this Decision and Order or within one year after all appeals to this Decision and Order have been resolved.

Pursuant to General Statutes § 16-50p, we hereby direct that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below, and notice of issuance shall be published in The Hartford Courant, The Town Times and The Middletown Press.

By this Decision and Order, the Council disposes of the legal rights, duties, and privileges of each party named or admitted to the proceeding in accordance with Section 16-50j-17 of the Regulations of Connecticut State Agencies.

The parties and intervenors to this proceeding are:

Applicant

Sprint Spectrum, L..P.

d/b/a Sprint PCS

Its Representative

Thomas J. Regan, Esq.

Intervenor

Tower Ventures II, LLC

Brown Rudnick Berlack Israels LLP

CityPlace I, 38th Floor

185 Asylum Street

Hartford, CT 06103-3402

Its Representative

Scott T. Penner, Esq.

Hurwitz & Sagarin, LLC

147 N. Broad St.

P.O. Box 112

Milford, CT 06460

Petition No. 1092
Verizon
Durham, Connecticut
Staff Report
March 6, 2014

On January 16, 2014, the Connecticut Siting Council (Council) received a petition from Cellco Partnership d/b/a Verizon Wireless (Verizon) for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the extension of an existing telecommunications facility at 134R Creamery Road in Durham, Connecticut. Council member Dr. Barbara Bell and Siting Analyst David Martin visited the site on February 21, 2014 to review the proposal. Attorney Kenneth Baldwin represented Verizon at the field review. Durham's First Selectman Laura Francis and two members of the Durham South End Cellular Action Group, Charles Stengel and Carleton Stoup, were also present at the field review. The Town of Durham's Communications Officer, Scott Wright, participated in the field review via cellphone.

The existing telecommunications tower is currently owned by SBA and was approved by the Council under Docket 254 on December 9, 2003 at a height of 100 feet and capable of being increased in height by means of a petition to the Council. The Decision and Order also specified that all antennas on the tower would have to be flush mounted. According to engineering drawings submitted with the Development and Management Plan, the tower was designed to be extendable to a maximum height of 130 feet, which is the height the docket applicant, Sprint, originally proposed. Currently, Sprint has three flush mounted antennas at a centerline height of 96.5 feet and the Town of Durham has a whip antenna at a mounting height of 78.5 feet and a dipole antenna at a mounting height of 71.7 feet.

Verizon now proposes to extend the tower by 10 feet to a height of 110 feet in order to install nine cluster mounted antennas at a centerline height of 107 feet. Verizon would also install a 12-foot by 30-foot shelter, within the existing 50-foot by 50-foot compound, for its ground equipment and a diesel generator for backup power.

In addition to notifying the Town, Verizon provided notice to abutting property owners. No opposing comments have been received.

This petition is somewhat unusual in that a local citizens' group, the Durham South End Cellular Action Group, is asking the Council to consider approving a higher extension of the tower than the petitioner is proposing. This group is concerned about the lack of wireless coverage in the southern part of Durham and has been working with town officials to find a solution for this problem. The group has submitted a letter to the Council stating its concerns and suggesting that the tower be extended to 140 feet and that platforms be allowed instead of restricting antennas to flush-mounts. During the field review, the First Selectman made it clear that she supported this group's efforts to improve coverage in this part of the town. The town's Communications Officer also stated that Verizon's proposed tower extension would be welcomed because it would enable the town to improve the coverage of its emergency services wireless network. Durham's State Senator, Ed Meyer, submitted a letter requesting an extension of the tower to 140 feet, and State Representative Vincent Candelora wrote to support the proposed height extension. This municipal and legislative support for the petition is especially noteworthy given the considerable opposition voiced by neighbors and town officials during the original docket proceeding.

For this petition, Council staff sent a memo to telecom carriers asking if any of them had an interest in co-locating on this tower. To date, only T-Mobile has responded, stating that it does have an interest in this site "in the immediate future."

The maps of Verizon's existing and proposed coverage submitted in support of this petition indicate that extending the tower to 110 feet will meet Verizon's coverage objectives and that going to a height of 140 feet would not significantly improve the coverage possible from this tower. At the request of the Cellular Action Group and the Council for evidence of this position, Verizon supplied supplemental maps showing the predicted coverage from 140 feet. These maps corroborate Verizon's stance that locating its antennas at the 140-foot height would not result in any significant improvement in coverage.

A Visibility Analysis was submitted as part of the petition materials. The low height of the existing tower makes it scarcely visible in the surrounding area. This condition was confirmed by the two members of the Durham South End Cellular Action Group, who took their own, informal visual survey from vantage points in the neighborhood. It was also confirmed by the Council's representatives who, while standing in the driveway of the property owner's house, could not see the tower. A 10-foot extension of the tower should hardly make a discernible difference in its visibility.

The proposed tower extension is not expected to have any substantial adverse environmental effects. Staff recommends approval.

ATTACHMENT 2

verizon

WIRELESS COMMUNICATIONS FACILITY

DURHAM SOUTH CT 134 R CREAMERY ROAD DURHAM, CT 06422

DRAWING INDEX

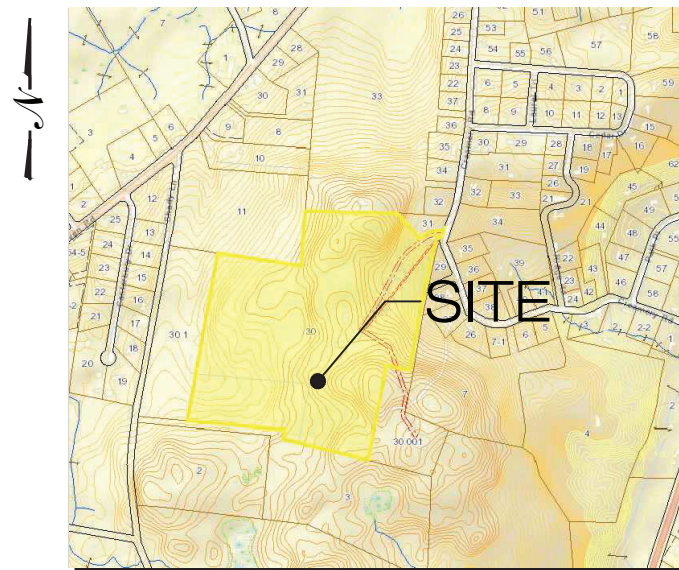
- T-1 TITLE SHEET
- C-1 COMPOUND PLAN, TOWER ELEVATION, EQUIPMENT CONFIGURATION PLANS & ELEVATIONS.
- B-1 RF BILL OF MATERIALS, MECHANICAL SPECIFICATIONS & EQUIPMENT DETAILS.
- N-1 NOTES & SPECIFICATIONS

SITE DIRECTIONS

**START: 20 ALEXANDER DRIVE
WALLINGFORD, CONNECTICUT 06492**

**END: 134 R CREAMERY ROAD
DURHAM, CT 06422**

- | | |
|--|--------|
| 1. HEAD SOUTH TOWARDS ALEXANDER DRIVE | 279 FT |
| 2. SLIGHT RIGHT TOWARDS ALEXANDER DRIVE | 289 FT |
| 3. TURN RIGHT TOWARDS ALEXANDER DRIVE | 167 FT |
| 4. TURN RIGHT ONTO ALEXANDER DRIVE | 0.3 MI |
| 5. TURN RIGHT ONTO BARNES INDUSTRIAL RD S. | 0.1 MI |
| 6. TURN RIGHT ONTO CT-68 E | 0.4 MI |
| 7. CONTINUE STRAIGHT TO STAY ON CT-68W | 3.6 MI |
| 8. TURN RIGHT ONTO PENT ROAD | 0.9 MI |
| 9. TURN LEFT ONTO PARMELEE HILL ROAD | 0.7 MI |
| 10. TURN RIGHT ONTO INDIAN LANE | 0.5 MI |
| 11. SLIGHT RIGHT ONTO NEW HAVEN ROAD | 105 FT |
| 12. TURN LEFT ONTO MEETING HOUSE ROAD | 0.2 MI |
| 13. TURN RIGHT ONTO CREAMERY ROAD | 0.2 MI |
| 14. (DESTINATION WILL BE ON LEFT) | 0.3 MI |



LOCATION MAP
SCALE: 1" = 500'-0"

SITE INFORMATION

VZ SITE NAME: DURHAM SOUTH CT
VZ PROJ FUZE I.D.: 16272119
VZ LOCATION CODE: 437330
VZ PROJECT CODE: 20212234091
LOCATION: 134 R CREAMERY ROAD
DURHAM, CT 06422

PROJECT SCOPE: REFER TO NOTES ON DRAWING C-1 FOR SCOPE OF WORK.

PARCEL ID: 100-30

ZONING DISTRICT: FR (FARM RESIDENTIAL)

LATITUDE: 41° 26' 28.8708" N (41.4413530° N)

LONGITUDE: 72° 41' 46.1292" W (72.6961470° W)

SITE COORDINATES AND GROUND ELEVATION OBTAINED FROM GOOGLE EARTH.

GROUND ELEVATION: 476± AMSL

PROPERTY OWNER: ADCT LLC
34R GOLDFINCH RD
DURHAM, CT 06422

APPLICANT: CELCO PARTNERSHIP
d/b/a VERIZON WIRELESS
20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

LEGAL/REGULATORY COUNSEL: ROBINSON & COLE, LLP
KENNETH C. BALDWIN, ESQ.
280 TRUMBULL STREET
HARTFORD, CT 06103

ENGINEER CONTACT: ALL-POINTS TECHNOLOGY CORP., P.C.
567 VAUXHALL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385
(860) 663-1697

VERIZON SMART TOOL PROJECT #: 10046597

Cellco Partnership d/b/a



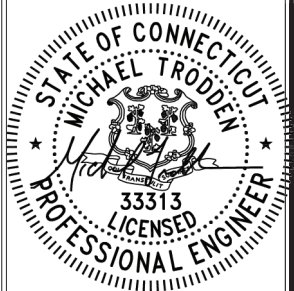
20 ALEXANDER DRIVE
WALLINGFORD, CT 06492



567 VAUXHALL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PHONE: (860)-663-1697
WWW.ALLPOINTS TECH.COM FAX: (860)-663-0935

CONSTRUCTION DOCUMENTS

NO	DATE	REVISION
0	04/16/21	FOR REVIEW: JRM
1	06/10/21	FOR CONSTRUCTION: JRM
2		
3		
4		
5		
6		



DESIGN PROFESSIONALS OF RECORD

PROF: MICHAEL S. TRODDEN P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 567 VAUXHALL STREET EXT. SUITE 311
WATERFORD, CT 06385

OWNER: ADCT LLC
ADDRESS: 34R GOLDFINCH RD
DURHAM, CT 06422

DURHAM SOUTH CT

SITE 134 R CREAMERY ROAD
ADDRESS: DURHAM, CT 06422

APT FILING NUMBER: CT141_12330

DRAWN BY: DRA

DATE: 04/16/21 CHECKED BY: JRM

VZ PROJECT CODE: 20212234091

VZ LOCATION CODE: 437330

VZ FUZE ID: 16272119

SHEET TITLE:

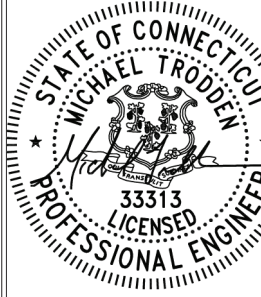
TITLE SHEET

SHEET NUMBER:

T-1

CONSTRUCTION DOCUMENTS

NO	DATE	REVISION
0	04/16/21	FOR REVIEW: JRM
1	06/10/21	FOR CONSTRUCTION: JRM
2		
3		
4		
5		
6		



DESIGN PROFESSIONALS OF RECORD

PROF: MICHAEL S. TRODDEN P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 567 VAUXHALL STREET EXT. SUITE 311
WATERFORD, CT 06385

OWNER: ADCT LLC
ADDRESS: 34R GOLDFINCH RD
DURHAM, CT 06422

DURHAM SOUTH CT

SITE 134 R CREAMERY ROAD
ADDRESS: DURHAM, CT 06422

APT FILING NUMBER: CT141_12330

DRAWN BY: DRA

DATE: 04/16/21 CHECKED BY: JRM

VZ PROJECT CODE: 2021234091

VZ LOCATION CODE: 437330

VZ FUZE ID: 16272119

SHEET TITLE:

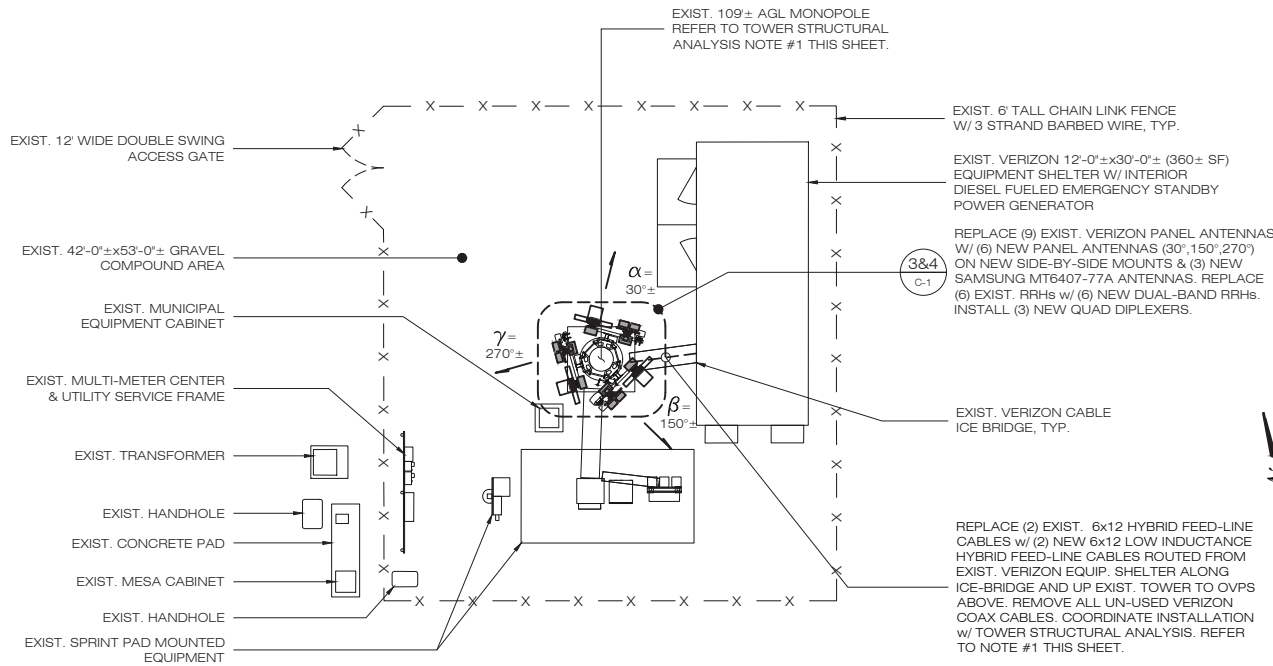
COMPOUND PLAN,
TOWER ELEVATION,
EQUIP. CONFIGURATION
PLANS & ELEVATIONS

SHEET NUMBER:

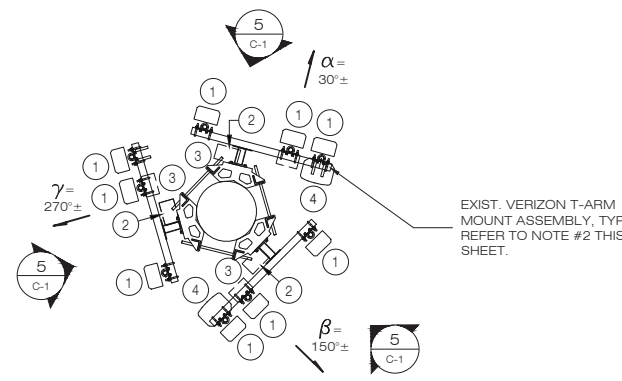
C-1

NOTES:

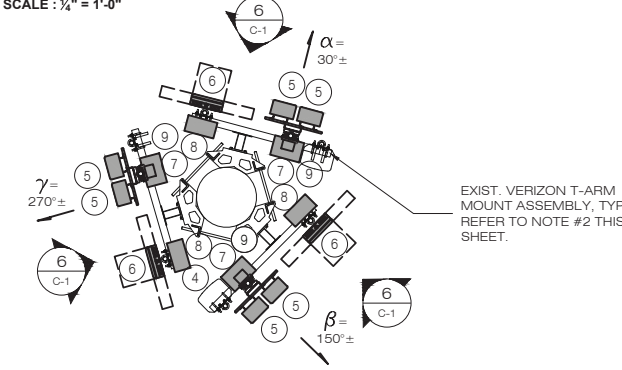
- REFER TO MONOPOLE TOWER STRUCTURAL ANALYSIS REPORT PREPARED BY TOWER ENGINEERING SOLUTIONS DATED 5/17/21 AVAILABLE UNDER SEPARATE COVER.
- REFER TO TOWER ANALYSIS REPORT PREPARED BY MASER CONSULTING, P.A., PROJECT #2177321A MARKED REV0, DATED 05/03/21 AVAILABLE UNDER SEPARATE COVER.
- BASE MAPPING FROM FIELD MEASUREMENTS TAKEN BY ALL-POINTS TECH. CORP., P.C. ON 03/23/21.
- PROJECT SCOPE INCLUDES THE FOLLOWING:
 - REPLACEMENT OF (9) EXIST. PANEL ANTENNAS w/ (6) NEW PANEL ANTENNAS ON NEW SIDE-BY-SIDE MOUNTS (COMMSCOPE BSAMNT-SBS-2-2) & (3) NEW SAMSUNG MT6407-77A ANTENNAS
 - REPLACEMENT OF (6) EXIST. RRHs w/ (6) NEW DUAL-BAND RRHs
 - REPLACEMENT OF (2) 6x12 HYBRID FEED-LINE CABLES w/ (2) NEW 6x12 LOW INDUCTANCE HYBRID FEED-LINE CABLES.
 - REPLACEMENT OF (6) EXIST. RRHs w/ (6) NEW DUAL BAND RRHs.
 - INSTALL (3) NEW QUAD DIPLEXERS
- ALL EXPOSED STEEL AND HARDWARE TO BE HOT DIP GALV. (HDG). PAINT TO MATCH EXIST. (WHERE APPLICABLE)
- CAP & WEATHERPROOF ALL UN-USED CABLE ENTRY PORTS (WHERE APPLICABLE).
- MOUNT & GROUND ALL NEW EQUIPMENT IN ACCORDANCE WITH NEC (NFPA-70), NESC AND MANUFACTURERS SPECIFICATION.
- SECURE ALL NEW ANTENNA CABLES PER MANUFACTURER RECOMMENDATIONS.
- BOND NEW ANTENNA MOUNTING PIPES TO ANTENNA SECTOR GROUND BAR w/ # 2 AWG. BCW, (WHERE APPLICABLE).
- CONTRACTOR SHALL INSTALL NEW SIDE-BY-SIDE & DUAL-MOUNT BRACKETS PER ANTENNA MOUNT MANUFACTURER RECOMMENDATIONS, INCLUDING VERIFICATION OF MINIMUM PIPE MAST DIAMETER REQUIRED TO INSTALL NEW MOUNT BRACKETS. CONTRACTOR SHALL NOTIFY ENGINEER OF RECORD SHOULD EXIST. PIPE MASTS REQUIRE REPLACEMENT TO SUPPORT THE NEW MOUNT BRACKETS.
- ANTENNA CONFIGURATIONS SHOWN HEREIN ARE FRONT ELEVATIONS.
- ANTENNA SPACING DIMENSIONS ARE TO THE CENTER OF THE EXIST. ANTENNA AND PROP. ANTENNA FACE.
- REFER TO THE FINAL RFDS PROVIDED BY VERIZON FOR THE LATEST INFORMATION REGARDING EQUIPMENT MODELS, REQUIRED CABLING & DOWN-TILT INFORMATION.
- APPLY 3M FILM OVER ALL EXPOSED MMWAVE ANTENNAS COLOR TO MATCH EXIST. STRUCTURE (WHERE APPLICABLE) COORDINATE WITH VERIZON CONSTRUCTION MANAGER AND LL.
- PAINT ALL NEW NON SAMSUNG MT6407-77A ANTENNAS & APPURTENANCES TO MATCH EXIST. STRUCTURE (WHERE APPLICABLE) COORDINATE W/ VERIZON CONSTRUCTION MANAGER & BUILDING OWNER.



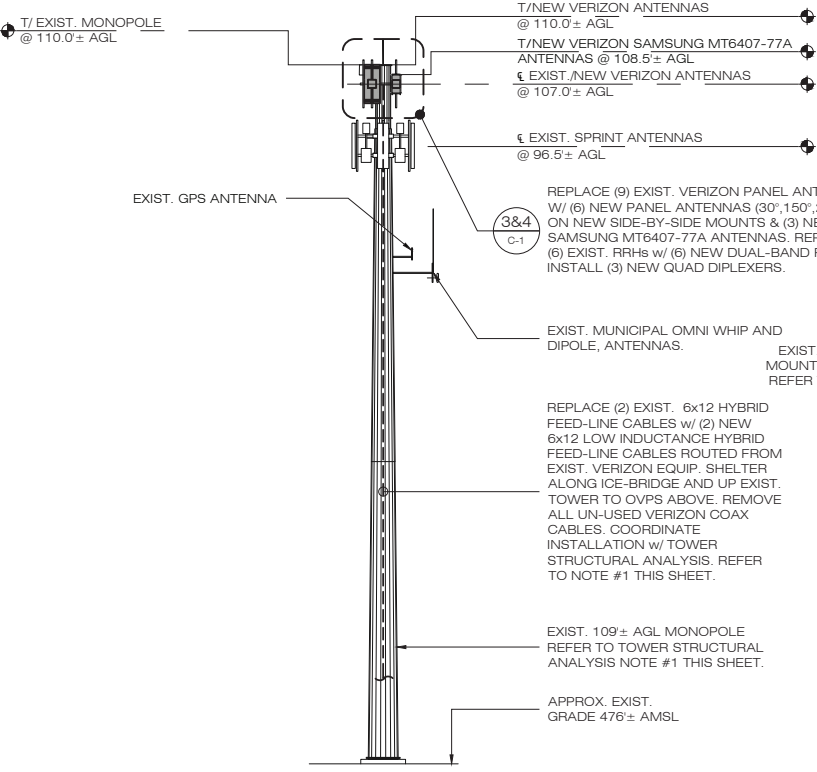
1 COMPOUND PLAN
SCALE: 1" = 10'-0"



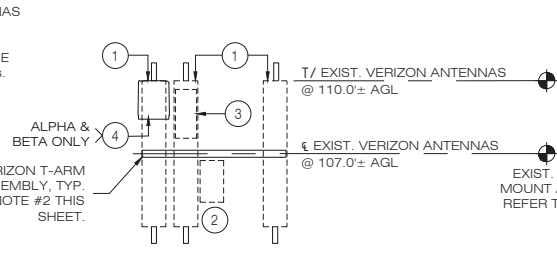
3 EQUIP. CONFIGURATION PLAN (EXIST.)
SCALE: 1/4" = 1'-0"



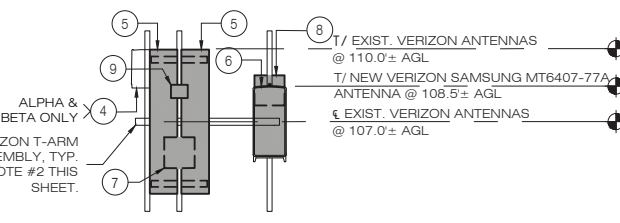
4 EQUIP. CONFIGURATION PLAN (NEW)
SCALE: 1/4" = 1'-0"



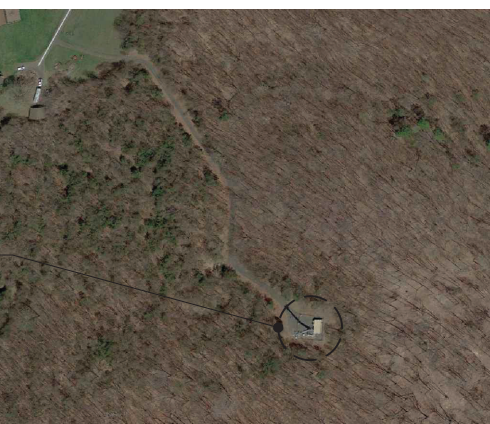
2 TOWER ELEVATION
SCALE: 1" = 10'-0"



5 EQUIP. MOUNTING CONFIG. (EXIST.)
SCALE: 1/4" = 1'-0"



6 EQUIP. MOUNTING CONFIG. (NEW)
SCALE: 1/4" = 1'-0"



LOCATION PLAN
SCALE: 1" = 200'

GENERAL ABBREVIATION LIST:

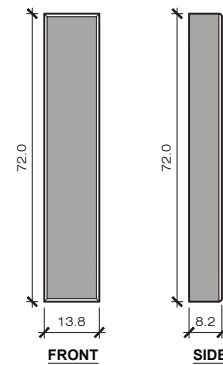
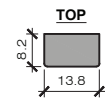
• ABP	ABOVE BASE PLATE
• AGL	ABOVE GROUND LEVEL
• AMSL	ABOVE MEAN SEA LEVEL
• AWS	ADVANCED WIRELESS SERVICE
• HDG	HOT DIP GALVANIZED
• OVP	OVER VOLTAGE PROTECTION
• RRH	REMOTE RADIO HEAD
• V.I.F.	VERIFY IN FIELD
• W.P.	WORK POINT
• A.F.R.	ABOVE FINISH ROOF

SCOPE OF WORK (ALL) SECTORS

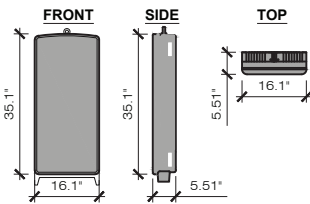
1 EXIST. ANTENNA (TO BE REPLACED) MODEL: ANDREW SBNHH-1D65B	4 EXIST. 6 OVP (TO REMAIN) (ALPHA & BETA) MODEL: RAYCAP RRFDC-3315-PF-48 (V.I.F.)	7 NEW DUAL BAND RRH MODEL: SAMSUNG B13/B5 RRH-BR04C (RFV01U-D2A)
2 EXIST. RRH (TO BE REPLACED) MODEL: NOKIA B13 RRH 4x30 700	5 NEW ANTENNA MODEL: COMMSCOPE JAHH-65B-R3B	8 NEW DUAL BAND RRH MODEL: SAMSUNG B66/B2A RRH-BR049 (RFV01U-D1A)
3 EXIST. RRH (TO BE REPLACED) MODEL: NOKIA B66A RRH 4x45 AWS	6 NEW ANTENNA MODEL: SAMSUNG MT6407-77A	9 NEW QUAD DIPLEXER MODEL: COMMSCOPE CBC78T-43-2X

EQUIPMENT DATA								
EQUIPMENT SPECIFICATIONS								
SECTOR	ANTENNA MAKE/MODEL	QTY	AZIMUTH	EQUIPMENT STATUS	HEIGHT (IN)	WIDTH (IN)	DEPTH (IN)	WEIGHT (LBS)
ALPHA	SAMSUNG MT6407-77A	1	30°	NEW	35.1 ⁽⁵⁾	16.1 ⁽⁵⁾	5.51 ⁽⁵⁾	87.1 ⁽²⁾⁽³⁾
	700/850/1900/2100: COMMSCOPE JAHH-65B-R3B	1	30°	NEW	72.0	13.8	8.2	68.6 ⁽²⁾
	700/850/1900/2100: COMMSCOPE JAHH-65B-R3B	1	30°	NEW	72.0	13.8	8.2	68.6 ⁽²⁾
BETA	SAMSUNG MT6407-77A	1	150°	NEW	35.1 ⁽⁵⁾	16.1 ⁽⁵⁾	5.51 ⁽⁵⁾	87.1 ⁽²⁾⁽³⁾
	700/850/1900/2100: COMMSCOPE JAHH-65B-R3B	1	150°	NEW	72.0	13.8	8.2	68.6 ⁽²⁾
	700/850/1900/2100: COMMSCOPE JAHH-65B-R3B	1	150°	NEW	72.0	13.8	8.2	68.6 ⁽²⁾
GAMMA	SAMSUNG MT6407-77A	1	270°	NEW	35.1 ⁽⁵⁾	16.1 ⁽⁵⁾	5.51 ⁽⁵⁾	87.1 ⁽²⁾⁽³⁾
	700/850/1900/2100: COMMSCOPE JAHH-65B-R3B	1	270°	NEW	72.0	13.8	8.2	68.6 ⁽²⁾
	700/850/1900/2100: COMMSCOPE JAHH-65B-R3B	1	270°	NEW	72.0	13.8	8.2	68.6 ⁽²⁾
APPURTENANCE MAKE/MODEL								
	SAMSUNG B2/B66A RRH-BR049 (RFV01U-D1A)	3	-	NEW	14.9	14.9	10.04	97.5
	SAMSUNG B5/B13 RRH-BR04C (RFV01U-D2A)	3	-	NEW	14.9	14.9	8.14	82.0
	COMMSCOPE CB78T-43-2X QUAD DIPLEXERS	3	-	NEW	6.4	6.9	9.6	20.7
	RAYCAP RRFDC-3315-PF-48	2	-	ETR	19.8	15.73	10.25	32

- (1) ETR DENOTES EXIST. TO REMAIN
- (2) WEIGHT WITHOUT MOUNTING BRACKET
- (3) ANTENNA DATA BASED ON RFDS REV1 DATED 02/26/21
- (4) EQUIPMENT CONFIGURATION AS VIEWED FROM BEHIND.
- (5) NOT TO EXCEED



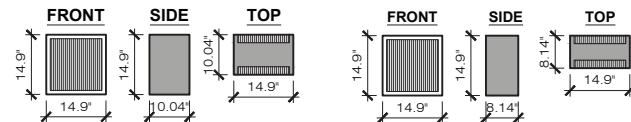
COMMSCOPE JAHH-65B-R3B
HxWxD=72.0"x13.8"x8.2" (68.6 Lbs)



SAMSUNG MT6407-77A ANTENNA
HxWxD=35.1"x16.1"x5.51"
WT=87.1 Lbs
(NOT TO EXCEED)

2 NEW ANTENNA DETAIL

B-1 SCALE: 1/2" = 1'-0"



SAMSUNG DUAL HIGH BAND B2/B66A
RRH-BR049 (RFV01U-D1A)
RRH PCS/AWS
REMOTE RADIO HEAD (RRH)
WxDxH=14.9"x14.9"x10.04" (97.5 Lbs)

SAMSUNG DUAL HIGH BAND B5/B13
RRH-BR04C (RFV01U-D2A)
RRH 850/700
REMOTE RADIO HEAD (RRH)
WxDxH=14.9"x14.9"x8.14" (82.0 Lbs)

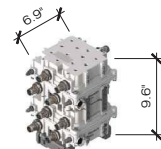
NOTE: WEIGHTS INCLUDE SOLAR SHIELD & MOUNTING BRACKET

4 RRH EQUIPMENT DETAILS

B-1 SCALE: 1/2" = 1'-0"

3 NEW ANTENNA DETAIL

B-1 SCALE: 1/2" = 1'-0"



COMMSCOPE CBC78T-DS-43-2X
QUAD DIPLEXER
HxWxD=6.4"x6.9"x9.6" (20.7 Lbs)

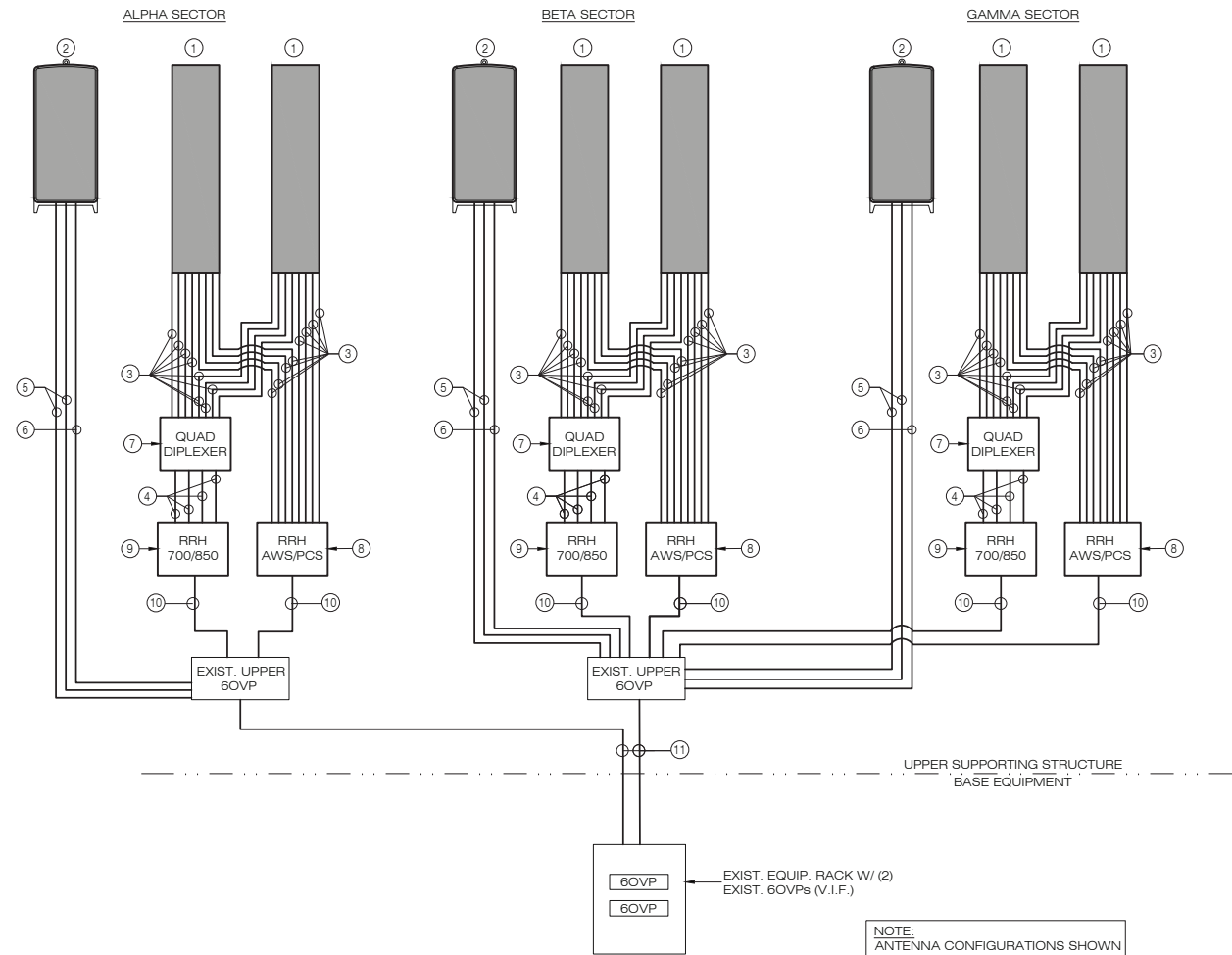
5 QUAD DIPLEXER

B-1 SCALE: 1" = 1'-0"

BILL OF MATERIALS				
	QUANTITY	LENGTH	COMMENTS	
①	700/850/1900/2100	6		(COMMSCOPE JAHH-65B-R3B) MOUNTED TO EXIST. PIPE MAST VIA NEW SBS MOUNT (COMMSCOPE BSAMNT-SBS-2-2)
②	SAMSUNG MT6407-77A	3		MOUNTED TO EXIST. PIPE MAST
③	1/2" JUMPER CABLE	48	15 FT	ROUTE FROM RRH TO ANTENNAS & FROM DIPLEXERS
④	1/2" JUMPER CABLE	12	6 FT	ROUTE FROM RRH TO DIPLEXERS
⑤	ANTENNA LINK CABLES	6	15 M	ROUTE FROM UPPER OVP TO ANTENNAS
⑥	ANTENNA POWER CABLES	3	15 M	PROPRIETARY POWER CABLE FROM UPPER OVP TO ANTENNAS
⑦	QUAD DIPLEXER	3		COMMSCOPE CSC78T-DS-43-2X
⑧	AWS/PCS RRH	3		SAMSUNG B2/B66 RRH-BR049 (RFV01U-D1A) MOUNTED TO EXIST. PIPE MAST
⑨	700/850 RRH	3		SAMSUNG B5/B13 RRH-BR04C (RFV01U-D2A) MOUNTED TO EXIST. PIPE MAST
⑩	RRH CABLES	6	15M	PROPRIETARY POWER & FIBER CABLES
⑪	HYBRID CABLE	2	170± FT	6x12 LOW INDUCTANCE HYBRID CABLE

NOTES:

1. INFORMATION SHOWN HEREON IS FOR USE BY VERIZON EQUIPMENT OPERATIONS.
2. INFORMATION IS BASED ON RFDS REV1 DATED 02/26/21.
3. * DENOTES EQUIPMENT DESIGNATED "FOR LEASING ONLY" (WHERE APPLICABLE)
4. INSTALL ALARM BOARDS AT ALL OVPs WHERE REQUIRED. COORDINATE w/ VERIZON EQUIPMENT ENGINEERING.
5. INSTALL UP-CONVERTER(S) LOCATED AT BASE OVPs WHERE REQUIRED. COORDINATE w/ VERIZON EQUIPMENT ENGINEERING AS NECESSARY.
6. COORDINATE ANTENNA CABLING REQUIREMENTS WITH VERIZON ENGINEERING.
7. CONTRACTOR SHALL INSTALL NEW SIDE-BY-SIDE & DUAL-MOUNT BRACKETS PER ANTENNA MOUNT MANUFACTURER RECOMMENDATIONS, INCLUDING VERIFICATION OF MINIMUM PIPE MAST DIAMETER REQUIRED TO INSTALL NEW MOUNT BRACKETS. CONTRACTOR SHALL NOTIFY ENGINEER OF RECORD SHOULD EXIST. PIPE MAST REQUIRE REPLACEMENT TO SUPPORT THE NEW MOUNT BRACKETS.



1 PLUMBING DIAGRAM

B-1 SCALE: 1/2" = 1'-0"

NOTE:
ANTENNA CONFIGURATIONS SHOWN
WITHIN PLUMBING DIAGRAM ARE
VIEWED FROM BEHIND.

Cellco Partnership d/b/a

verizon

20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

ALL-POINTS
TECHNOLOGY CORPORATION

567 VAUXHALL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PHONE: (860)-963-1697
WWW.ALLPOINTSTECH.COM FAX: (860)-963-0935

CONSTRUCTION DOCUMENTS

NO	DATE	REVISION
0	04/16/21	FOR REVIEW: JRM
1	06/10/21	FOR CONSTRUCTION: JRM
2		
3		
4		
5		
6		



DESIGN PROFESSIONALS OF RECORD

PROF: MICHAEL S. TRODDEN P.E.
COMP: ALL-POINTS TECHNOLOGY
CORPORATION, P.C.
ADD: 567 VAUXHALL STREET EXT.
SUITE 311
WATERFORD, CT 06385

OWNER: ADCT LLC
ADDRESS: 34R GOLDFINCH RD
DURHAM, CT 06422

DURHAM SOUTH CT

SITE 134 R CREAMERY ROAD
ADDRESS: DURHAM, CT 06422

APT FILING NUMBER: CT141_12330

DRAWN BY: DRA

DATE: 04/16/21 CHECKED BY: JRM

VZ PROJECT CODE: 20212234091

VZ LOCATION CODE: 437330

VZ FUZE ID: 16272119

SHEET TITLE:
**RF BILL OF MATERIALS,
MECHANICAL
SPECIFICATIONS &
EQUIPMENT DETAILS**

SHEET NUMBER:

B-1

DESIGN BASIS:

GOVERNING CODES/DESIGN STANDARDS:

2015 INTERNATIONAL BUILDING CODE (IBC) AS AMENDED BY THE 2018 CONNECTICUT STATE BUILDING CODE
ASCE 7-10
TIA-222-G (TOWER)

01 GENERAL:

ABBREVIATIONS USED IN THESE SPECIFICATIONS INCLUDE THE FOLLOWING:

- ACI AMERICAN CONCRETE INSTITUTE
- ANSI AMERICAN NATIONAL STANDARDS INSTITUTE
- AWIS AMERICAN WELDING SOCIETY
- ASIS AMERICAN INSTITUTE OF STEEL CONSTRUCTION
- ASSE AMERICAN SOCIETY OF CIVIL ENGINEERS
- ASTM AMERICAN STANDARDS AND TESTING METHODS
- CRSI CONCRETE REINFORCING STEEL INSTITUTE
- ICC-ES INTERNATIONAL CODE COUNCIL, EVALUATION SERVICE
- TL TELECOMMUNICATIONS INDUSTRY ASSOCIATION
- UL UNDERWRITERS LABORATORIES
- NEC NATIONAL ELECTRICAL CODE
- NFPA NATIONAL FIRE PROTECTION ASSOCIATION
- OSHA OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

EVERY INDIVIDUAL TRADE, DISCIPLINE, AND CONTRACTOR SHALL INCLUDE THESE GENERAL SPECIFICATIONS.
THE ENGINEER IS NOT RESPONSIBLE FOR NOR A GUARANTOR OF THE INSTALLING CONTRACTORS WORK ADEQUACY OF ANY SITE COMPONENT, SUPERVISION OF ANY WORK, AND SAFETY IN, ON, OR ABOUT THE WORK SITE.
ANY REFERENCE HEREIN TO AN ORIGINAL ITEM, THAT EQUAL ITEM SHALL BE PRE-APPROVED BY THE CONSTRUCTION MANAGER BEFORE INSTALLATION.

ALL TRADES SHALL COORDINATE THEIR WORK WITH ALL OTHER TRADES AND OTHER WORK AND CONDITIONS AS APPROPRIATE OR REQUIRED TO AVOID CONFLICTS. RESOLVE AND COORDINATE ALL CONFLICTS WITH ALL AFFECTED WORK AND SITE OPERATIONS. COORDINATION WITH THE SITE SHALL BE WITH THE OWNER, OR OWNERS SPECIFIED REPRESENTATIVE, FOR EVERYTHING RELATED TO THE INSTALLATION OF THIS PROJECT.

ALL WORK SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE EDITIONS OF ALL APPLICABLE CODES AND SHALL BE ACCEPTABLE TO ALL AUTHORITIES HAVING JURISDICTION (A/H). WHERE A CONFLICT EXISTS BETWEEN CODES, PLANS, SPECIFICATIONS, AND/OR SHALL THE MORE STRINGENT AUTHORITY SHALL APPLY. WHERE CONFLICT EXISTS BETWEEN PLANS AND SPECIFICATIONS, PLANS SHALL APPLY. WHERE CONFLICT EXISTS BETWEEN PLAN SHEETS, CONSTRUCTION MANAGER SHALL BE CONSULTED PRIOR TO COMMENCING ANY WORK.

CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT, INSTALLATION, CONSTRUCTION TOOLS, TRANSPORTATION, ETC. FOR A COMPLETE AND NEWELY OPERATIVE AND USABLE SYSTEM THROUGHOUT AND AS INDICATED ON THE DRAWINGS AND AS SPECIFIED HEREIN AND/OR OTHERWISE REQUIRED.
CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS, INSTALLATIONS, AND EQUIPMENT IN THE FIELD PRIOR TO BID, FABRICATION, AND INSTALLATION OF ANY WORK.
CONTRACTORS SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. THE ENGINEER SHALL BE NOTIFIED FOR INSPECTIONS PRIOR TO CLOSING PENETRATIONS AND OF ANY CONDITIONS WHICH PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

CONTRACTOR SHALL VISIT THE SITE TO MANAGE AND GAIN APPROVAL FOR ALL TENANT DISTRIBUTIONS, POWER OUTLAYS, WORK SCHEDULES, DEFINITION OF WORK AREA AND WORK STORAGE, NEWER BUILDING/SITE ACCESS, NOISE AND CLEANLINESS REQUIREMENTS WITH THE BUILDING/SITE MANAGEMENT PRIOR TO ALL WORK. ANY DISTURBANCES SHALL BE KEPT TO A MINIMUM AND SHALL BE IMPLEMENTED ONLY UPON WRITTEN APPROVAL OF THE OWNER.
THE CONTRACTOR SHALL SAFEGUARD AGAINST CREATING ANY HAZARD AFFECTING TENANT EGRESS OR COMPROMISING SITE SECURITY MEASURES.

PRIOR TO ALL BELOW-GRADE WORK AND ANY SURFACE WORK IN A NEW AREA FOR STRUCTURES OR VEHICLES, CONTRACTOR SHALL ENGAGE A MARKOUT SERVICE TO IDENTIFY ANY UNDERGROUND STRUCTURES, CONDUITS, AND PRELINES IN THE AREA. ALL EXISTING SEWER, WATER, GAS, ELECTRIC, FIBER OPTIC, AND OTHER UNDERGROUND UTILITIES IDENTIFIED OR ENCOUNTERED, SHALL BE PROTECTED AT ALL TIMES. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN DIGGING OR EXCAVATING IN ANY MANNER GROUND OR NEAR SUCH UTILITIES. CONTRACTOR IS RESPONSIBLE FOR REPAIRS, REPLACEMENT, AND ALL DAMAGES DUE TO DAMAGE OF UTILITIES BY HIS OPERATIONS.
ALL EXISTING AND NEW EQUIPMENT AND MATERIAL LOCATIONS, ROUTING, ORIENTATION, MOUNTING, SPECIFICATIONS AND GENERAL INSTALLED CHARACTERISTICS SHALL BE CONSIDERED DIAGRAMMATIC ON THE PLANS. EXACT CONDITIONS SHALL BE DETERMINED IN THE FIELD PRIOR TO ANY INSTALLATION. ANY DIFFERENCES THAT MAY CAUSE SCHEDULE, COST OR QUALITY SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER OR ENGINEER PRIOR TO ANY WORK.
ALL REFERENCES HEREIN TO VERIFICATION OF ANY CONDITION OF SITE, FIELD PLANS, OR SPECIFICATIONS PRIOR TO ANY WORK SHALL BE THE FULL RESPONSIBILITY OF THE CONTRACTOR. ANY AND ALL ADDITIONS, MODIFICATIONS, CHANGES, REPAIR, OR DEMOLITION AS A RESULT OF FAILURE TO BRING ANY EXISTING CONDITION NEWELRY TO THE ATTENTION OF THE OWNER OR ENGINEER SHALL BE THE FULL RESPONSIBILITY OF THE CONTRACTOR WITHOUT DELAY, COST, OR CHANGES IN QUALITY.

ALL NOTES THIS SHEET SHALL APPLY UNLESS SPECIFICALLY NOTED OTHERWISE ON THE INCLUDED DRAWINGS OR IN SEPARATE PLOTTED SPECIFICATIONS AS APPLICABLE. ALL SPECIFICATIONS SHALL BE CONSIDERED REQUIRED UNLESS APPROVED EQUAL BY THE OWNER, CONSTRUCTION MANAGER, OR ENGINEER AS APPLICABLE.
THE WORDS "PROVIDE" OR "INSTALL" SHALL MEAN FURNISH AND INSTALL.

CONTRACTOR SHALL PROVIDE ALL CUTTING AND PATCHING AS REQUIRED FOR THE INSTALLATION OF HIS WORK. ANY PATCHING SHALL MATCH EXISTING SURROUNDING AREA IN ALL RESPECTS. ALL REMOVED MATERIAL SHALL BE REMOVED FROM THE PREMISES DAILY IN AN APPROVED SAFE MANNER.
ALL SURPLUS MATERIAL SHALL BE REMOVED FROM THE SITE PROMPTLY WHEN DEEMED TO BE SURPLUS.

EVERY CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF HIS WORK AND NEWLY INSTALLED OR EXISTING WORK, INCLUDING PROTECTION OF THE SITE, ALL STRUCTURES, AND ALL OCCUPANTS. FURNISH, INSTALL, MAINTAIN, AND REMOVE AS APPROPRIATE, ALL APPROPRIATE BARRIERS, SAFETY GUARDS, SIGNAGE, AND SECURITY AS REQUIRED.

EVERY CONTRACTOR SHALL BE RESPONSIBLE FOR THEIR RESPECTIVE FEES, PERMITS, INSPECTIONS, TESTING, CERTIFICATES, AND ALL MANAGEMENT OF SAME REQUIRED FOR COMPLETION OF AND LEGAL OCCUPANCY OF THE FINISHED PROJECT.
ALL CONTRACTORS SHALL PROVIDE ALL NECESSARY TOOLS, FIXTURES, SERVICES, MATERIALS, JOB AIDS, AND PERSONNEL REQUIRED FOR THE EXECUTION OF THEIR WORK.
EACH CONTRACTOR SHALL GUARANTEE ALL MATERIALS AND WORKMANSHIP BY THEM TO BE FREE OF DEFECTS AND MAINTAINED FOR A PERIOD OF ONE YEAR AFTER ACCEPTANCE OF THE INSTALLATION BY THE OWNER AND ENGINEER.

ALL WORK SHALL BE PERFORMED BY LICENSED CONTRACTORS IN THE TRADE HAVING JURISDICTION.
ANY DEVIATION, MODIFICATION, ADDITION, OR CHANGE IN DESIGN SHALL NOT BE MADE WITHOUT WRITTEN APPROVAL OF THE OWNER OR ENGINEER.
ALL CONTRACTORS SHALL SUBMIT SHOP DRAWINGS OF ALL EQUIPMENT AND MATERIALS TO THE ENGINEER FOR APPROVAL PRIOR TO FABRICATION AND INSTALLATION, AND SHALL NOT PROCEED UNTIL ENGINEER APPROVAL IN WRITING IS RETURNED. EACH CONTRACTOR SHALL MAINTAIN ON JOB SITE A COMPLETE SET OF SHOP DRAWINGS WITH ANY DEVIATIONS FROM THE ORIGINAL DESIGN SHALL BE NOTED.
ALL MATERIALS AND EQUIPMENT SHALL BE NEW, WITHOUT BLEMISH OR DEFECT, AND SUITABLE AND LISTED FOR THE INSTALLATION AND SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS OR SPECIFICATIONS. ALL ITEMS OF EQUIPMENT OR MATERIAL THAT ARE OF ONE GENERIC TYPE SHALL BE ONE MANUFACTURER THROUGHOUT.

ALL MATERIALS, EQUIPMENT, TOOLS, AND ITEMS UNDER THE CONTRACTORS RESPONSIBILITY ON THE JOBSITE SHALL BE ADEQUATELY SECURED, MAINTAINED, AND PROTECTED, SO AS NOT TO BECOME DAMAGED OR CREATE ANY HAZARD TO PERSONNEL OR NEWERTY.
THE CONTRACTORS HOURS OF WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES AND ORDINANCES AND BE APPROVED BY THE OWNER.
CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR ALL OF HIS CREW AND INSURE THAT EVERY CREW MEMBER FOLLOWS SAFE WORK PRACTICES. SAFETY TRAINING SHALL INCLUDE, BUT NOT BE LIMITED TO, FALL PROTECTION, CONFINED SPACE ENTRY, ELECTRICAL SAFETY, AND TRENCH/EXCAVATION SAFETY WHERE SUCH WORK IS EXECUTED OR ENCOUNTERED.
ALL TEMPORARY WORK REQUIRED OR SPECIFIED AS A PART OF THIS WORK, SHALL MEET ALL OF THE SAME REQUIREMENTS AS PERMANENT INSTALLATIONS. SHALL MEET ALL APPLICABLE CODE REQUIREMENTS, AND SHALL BE COMPLETELY REMOVED AFTER ITS PURPOSES HAVE BEEN SERVED.

ANY EXISTING UTILITY, SERVICE, STRUCTURE, EQUIPMENT, OR FUTURE OBSTRUCTING THE WORK SHALL BE REMOVED AND/OR RELOCATED AS DIRECTED BY THE CONSTRUCTION MANAGER.

IF ASBESTOS IS ENCOUNTERED DURING WORK EXECUTION, CONTRACTOR SHALL IMMEDIATELY NOTIFY THE CONSTRUCTION

MANAGER AND CEASE ALL ACTIVITIES IN AFFECTED AREAS UNTIL NOTIFIED BY THE CONSTRUCTION TO RESUME OPERATIONS.

EXIST. ELECTRICAL AND MECHANICAL FIXTURES, PIPING, WIRING AND EQUIPMENT OBSTRUCTING THE WORK SHALL BE REMOVED AND/OR RELOCATED AS DIRECTED BY THE CONSTRUCTION MANAGER. TEMPORARY SERVICE INTERRUPTIONS MUST BE COORDINATED WITH OWNER.

05 STEEL:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN.

- MATERIALS:**
- WIDE FLANGE ASTM A992, GR 50
 - TUBING ASTM A500, GR B
 - PIPE ASTM A53, GR B
 - BOLTS ASTM A325
 - GRATING TYPE GR-1 1-1/4X1/4" (BARS)
 - EXISTING METALS ASTM A36

PROVIDE CERTIFICATION THAT WELDERS TO BE USED IN WORK ARE LICENSED AND HAVE SATISFACTORILY PASSED AWS QUALIFICATION TEST UNDER THE PROVISIONS OF APPENDIX D, PARTS II AND III OF THE AWS CODE FOR WELDING IN BUILDING CONSTRUCTION.

ALL BUILDING CONNECTION POINTS TO BE CENTERED ON EXISTING STRUCTURAL BEARING POINTS AND THE LOCATIONS ARE TO BE VERIFIED IN FIELD PRIOR TO THE FABRICATION OF STEEL.

DESIGN AND CONSTRUCTION OF STRUCTURAL STEEL SHALL CONFORM TO THE LATEST EDITION OF AISC SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS. NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8" DIAMETER GALVANNEED ASTA 307 BOLTS UNLESS OTHERWISE NOTED. ALL STEEL MATERIAL SHALL BE GALVANNEED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 ZINC HOT-DIPPED GALVANNEED COATING ON IRON AND STEEL PRODUCTS WITH A COATING WEIGHT OF 2 OZ/SF.

ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE EXPOSED TO WEATHER SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE.

DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY TOUCHING UP ALL DAMAGED GALVANIZED STEEL WITH COLD ZINC GALVANIC DRY GALV, OR ZINC IT. IN ACCORDANCE WITH MANUFACTURERS GUIDELINES. TOUCH UP DAMAGED NON-GALVANIZED STEEL WITH SAME PAINT APPLIED IN SHOP OR FIELD.

THE ENGINEER SHALL BE NOTIFIED OF ANY INDORECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS OR CONDITIONS TO REMOVAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW. FIELD CUTTING OF STRUCTURAL STEEL IS NOT PERMITTED EXCEPT WITH THE PRIOR APPROVAL OF THE ENGINEER.

CONTRACTOR TO REMOVE AND RE-INSTALL ALL FIRE PROOFING AS REQUIRED DURING CONSTRUCTION.
THE STEEL STRUCTURE SHALL BE DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER COMPLETION. IT IS THE CONTRACTORS SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO INSURE THE SAFETY OF THE BUILDING AND ITS COMPONENT PARTS DURING ERECTION.

ALL STEEL ELEMENTS SHALL BE INSTALLED PLUMB AND LEVEL. TOWER MANUFACTURERS DESIGNS SHALL PREVAIL FOR TOWER CONNECTIONS. CONNECTIONS SHALL BE DESIGNED BY THE FABRICATOR AND CONSTRUCTED IN ACCORDANCE WITH THE LATEST EDITION OF THE AISC MANUAL OF STEEL CONSTRUCTION. CONNECTIONS SHALL BE PROVIDED TO CONFORM TO THE REQUIREMENTS OF TYPE 2 CONSTRUCTION.

STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE MINIMUM 3/8" DIAMETER AND EACH CONNECTION SHALL HAVE MINIMUM TWO BOLTS. LOCK WASHERS ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES. IF TENSION CONTROL BOLTS ARE USED, CONNECTIONS SHALL BE DESIGNED FOR SLIP CRITICAL BOLT ALLOWABLE LOAD VALUES.

DESIGN CONNECTIONS AT 85MM ENDS FOR 10 KPS (KSI);
ALL U-BOLTED CONNECTIONS SHALL BE COMPLETED WITH DOUBLE NUTS OR A LOCK WASHER.

CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES, APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS STANDARD QUALIFICATION PROCEDURES. ALL WELDING SHALL BE PERFORMED USING E70XX ELECTRODES AND SHALL CONFORM TO AWS D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE LARGER OF 1/4" FILLET OR MINIMUM SIZE PER TABLE J2 IN THE AISC MANUAL OF STEEL CONSTRUCTION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED. SEE NOTE REGARDING DAMAGED GALVANIZED SURFACES.
ALL ARC AND GAS WELDING SHALL BE DONE BY A LICENSED AND CERTIFIED WELDER IN ACCORDANCE WITH AWS.

SEAL ALL PENETRATIONS AND SEAMS BETWEEN MASONRY AND STEEL WITH DOWN CORNING 790 SILICONE BUILDING SEALANT OR EQUAL.

26 ELECTRICAL:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN.

- ALL ELECTRICAL CONDUCTORS:**
- INSULATION SHALL BE MINIMUM 600V TYPE THHN, THWN-2, OR XHHW.
 - BRANCH CIRCUIT CONDUCTORS SHALL BE SOFT DRAWN 96% MINIMUM CONDUCTIVITY NEWLY REFINED COPPER.
 - FEEDER CIRCUIT CONDUCTORS SHALL BE EITHER COPPER OR ALUMINUM OF THE APPROPRIATE SIZE FOR THE APPLICATION, OR AS SPECIFICALLY NOTED.
 - PERMANENTLY LABEL OR TAG ALL CONDUCTORS WITH THEIR CIRCUIT DESIGNATION AT ALL TERMINATION ENDS, SPLICES, AND VISIBLE PASS-THROUGH IN ALL ENCLOSURES.

ALL CONDUIT, RACEWAY, WIREWAYS, DUCTS, ETC. SHALL BE LISTED AND SUITABLE FOR THE APPLICATION. ONLY THE FOLLOWING CONDUITS AS APPROVED AND LISTED FOR THE APPLICATION SHALL BE ACCEPTABLE:

- ELECTRICAL METALLIC TUBING (EMT).
- COMPRESSION COUPLINGS AND CONNECTORS ONLY MADE UP WRENCH TIGHT.
- FLEXIBLE METAL CONDUIT (FMC) AND LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC).
- FINAL CONNECTIONS TO VIBRATING OR ADJUSTABLE EQUIPMENT INCLUDING, BUT NOT LIMITED TO, LIGHT FIXTURES, HVAC UNITS, TRANSFORMERS, MOTORS, ETC. OR WHERE EQUIPMENT IS PLACED UPON SLAB ON-GRADE.
- RIGID GALVANIZED STEEL (RGS).
- ALL FITTINGS, CONNECTORS, AND COUPLINGS SHALL BE THREADED MADE UP WRENCH TIGHT.
- RIGID POLYVINYL CHLORIDE (PVC) SCHEDULE 40 OR SCHEDULE 80.
- MAY BE USED FOR SERVICES, EXTERIOR, BELOW GRADE, AND WET LOCATIONS.
- SHALL NOT BE USED IN CONCRETE SLABS NOR EXPOSED WITHIN A BUILDING OR STRUCTURE.
- METAL-CLAD CABLE (MC).

CONCEALED INSTALLATIONS ONLY
WITHIN A DUCT WITH SMOOTH OR CORRUATED METAL JACKET AND NO OUTER COVERING OVER THE METAL JACKET.

IN FINISHED SPACES, ALL CONDUITS SHALL BE CONCEALED EXCEPT TO MAKE A FINAL CONNECTION TO EQUIPMENT NOT MOUNTED IN OR AGAINST FINISH MATERIAL.

ALL FEEDER AND BRANCH CIRCUITS SHALL HAVE A SEPARATE NEWELY SIZED AND MARKED GROUNDING CONDUCTOR, PER APPLICABLE CODES, THAT BONDS ALL ENCLOSURES, BOXES, ETC. CONDUIT SHALL NOT BE USED AS A GROUNDING OR BONDING CONDUCTOR.
IF EXISTING ELECTRIC SERVICE IS TO REMAIN, CONTRACTOR SHALL VERIFY THAT IT MEETS PROJECT REQUIREMENTS WITHOUT MODIFICATION. IF IT IS TO BE ADDED OR REPLACED AS A PART OF THIS WORK, CONTRACTOR SHALL OBTAIN PERMIT, COORDINATE WITH AID AND GAIN APPROVAL FROM THE ELECTRICAL UTILITY. ALL ELECTRICAL EQUIPMENT SHALL BE AS SPECIFIED AND AS APPROVED BY THE LOCAL UTILITY WHERE APPLICABLE.

ALL EQUIPMENT, ENCLOSURES, ETC. SHALL BE SUITABLE FOR THE INSTALLED ENVIRONMENT, MINIMUM NEMA 3R FOR ALL EXTERIOR INSTALLATIONS.

WRING DEVICES SHALL BE SPECIFICATION GRADE AND WRING DEVICE COVER PLATES SHALL BE PLASTIC WITH ENGRAVING AS SPECIFIED. COLOR SHALL BE IVORY. ALL DEVICES AND COVER PLATES SHALL BE OF THE SAME MANUFACTURER.

ALL FIRE-RATED PENETRATIONS SHALL BE SEALED USING A SUITABLE AND LISTED FIRE SEALING DEVICE OR GROUUT THAT WILL MAINTAIN THE FIRE RATING OF THE STRUCTURE PENETRATED.
PROVIDE PERMANENTLY AFFIXED ENGRAVED NAMEPLATES FOR ALL CODE REQUIRED LABELING AND ON ALL PANELS, METERS, DISCONNECTS, AND ELECTRICAL EQUIPMENT THAT IDENTIFIES EQUIPMENT SERVED, ELECTRICAL SOURCE WITH CIRCUIT IDENTIFICATION, AND VOLTAGES WITH ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR ALL FINAL TERMINATIONS TO ALL EQUIPMENT.

ALL ELECTRICAL APPURTENANCES THAT ARE DISCONNECTED SHALL BE COMPLETELY FINISHED, FILLED, PAINTED, ETC. ALL PANEL SCHEDULES, EQUIPMENT LABELING, AND CODE-REQUIRED LABELING SHALL BE VERIFIED AND NEWELY COMPLETED TO MATCH THE INSTALLATION.

26 GROUNDING:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN.

GROUND ALL SYSTEMS AND EQUIPMENT IN ACCORDANCE WITH BEST INDUSTRY PRACTICE, THE REQUIREMENTS OF THE NFPA 70 NATIONAL ELECTRICAL CODE (NEC), AND ALL OTHER APPLICABLE CODES AND

REGULATIONS:

ALL GROUNDING ELECTRODES PRESENT AT EACH SERVICE LOCATION SHALL BE BONDED TOGETHER TO FORM THE GROUNDING ELECTRODE SYSTEM.

ALL EQUIPMENT ENCLOSURES, DEVICES, AND CONDUITS SHALL BE EQUIPPED BY THE INSTALLATION OF A SEPARATE GROUNDING CONDUCTOR FOR ALL FEEDER AND BRANCH CIRCUITS THAT IS SIZED PER CODE OR IS THE SIZE INDICATED ON THE DRAWINGS. SHALL BE CONTINUOUS IN LENGTH, AND SHALL BE BONDED TO EACH ENCLOSURE PASSED THROUGH. CONDUIT SHALL NOT BE USED AS A GROUNDING OR BONDING WIRE OR CIRCUIT.
BOND ALL METALLIC CONDUITS TOGETHER THAT ARE CONNECTED TO NON-METALLIC ENCLOSURES, IN-GROUND BOXES, AND TO AN ENCLOSURE WHERE A GROUND BUS IS SPECIFICALLY SUPPLIED. ACCOMPLISH THIS BOND WITH GROUNDING CONDUCTORS MINIMUM SIZED TO THE LARGEST GROUNDING CONDUCTOR PRESENT IN THE ENCLOSURE CONNECTED TO A GROUNDING TYPE BUSHING EQUALLY SIZED OR MAXIMUM GROUND WIRE ACCOMMODATION AVAILABLE IN STANDARD MANUFACTURE FOR THE RESULT AS NOTED IN LESSER EQUIPMENT GROUNDING AND LOAD SIDE BONDING CONDUCTORS SHALL BE SIZED PER THE CIRCUITS OVER-CURRENT PROTECTIVE DEVICE (OCPD) SIZE. WHERE THE UNGROUNDED CONDUCTORS ARE INCREASED IN SIZE ABOVE THE STANDARD FOR THE CIRCUITS OCPD, INCREASE THE GROUNDING CONDUCTOR NEWORKITENATELY TO THE CROSS-SECTIONAL AREA OF THE UNGROUNDED CONDUCTORS.

SERVICE MAIN BONDING JUMPERS AND GROUNDING ELECTRODE CONDUCTORS SHALL BE SIZED AND INSTALLED PER THE MINIMUM OF ALL APPLICABLE CODES AND REGULATIONS.

26 LIGHTNING PROTECTION:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS AND THE GROUNDING SPECIFICATIONS HEREIN.
THE LIGHTNING PROTECTION GROUNDING SYSTEM (LPGS) SHALL CONSIST OF BONDING ALL EQUIPMENT AND CONDUCTIVE STRUCTURES TO LOCALIZED SINGLE-POINT GROUNDING CONNECTIONS (TYPICALLY GROUND BARS) WHICH ARE BONDED TOGETHER AND TO AN IN-GROUND SYSTEM. IF THE LPGS IS ON A BUILDING, IT SHALL BE EFFECTIVELY BONDED TO THE ELECTRICAL SERVICE AND TO AN IN-GROUND AND TO ADDITIONAL IN-GROUND ELECTRODES AS MAY BE REQUIRED OR INDICATED. IF THE LPGS IS ON A DEDICATED COMMUNICATION SITE, ALL EQUIPMENT AREAS AND TOWERS SHALL EACH HAVE THEIR OWN IN-GROUND RING WITH EVERY RING BONDED TOGETHER, AND ALL CONDUCTIVE STRUCTURES IN CLOSE PROXIMITY (FENCES, ICE BRIDGES, RELATED EQUIPMENT, ETC.) ALSO BONDED TO PROVIDE A COMMON ELECTRICAL EQUIPMENT/UTL SYSTEM FOR ALL CONDUCTIVE ELEMENTS AND STRUCTURES.

- CONDUCTORS:**
- MIN #2 AWG SOLID BARE TINNED COPPER (SBTC) FOR ALL IN-GROUND CONDUCTORS.
 - MIN #2 AWG COPPER GREEN STRANDED FOR BONDING STRUCTURES, AND FOR INTER-SYSTEM BONDING OF INDIVIDUAL ELEMENTS SUCH AS GROUNDING BONDING JUMPERS.
 - MIN #8 AWG COPPER GREEN STRANDED OR ALL EQUIPMENT BONDING.

- INSTALL ALL IN-GROUND CONDUCTORS IN THE SAME HORIZONTAL PLANE OR IN A DOWNWARD DIRECTION AWAY FROM THE TOWER AND EQUIPMENT AREAS.
- AVOID LONG RUNS. MAKE DIRECT RUNS AS MUCH AS POSSIBLE.
- PLACE THROUGH NON-METALLIC SLEEVES WHEN PASSING THROUGH FLOORS, WALLS, CEILING, AND SIMILAR STRUCTURES.
- MAKE ALL CONNECTIONS IN CONTACT WITH EXISTING OR EXOTHERMIC WELDING. MAKE ALL OTHER CONNECTIONS WITH EXOTHERMIC WELDING, IRREVERSIBLE COMPRESSION CONNECTORS, OR LISTED COMPRESSION TWO-HOLE SLEEVES.
- INSTALL ALL CONDUCTORS WITH A MINIMUM 18 INCH BEND RADIUS AND NO BEND LONGER THAN A 90 DEGREE ARC. ALL BENDS SHALL BE HORIZONTAL, OR DOWNWARD TOWARDS EARTH.
- ALL CONDUCTORS PASSING FROM ABOVE-GROUND TO IN-GROUND CONNECTIONS, WHEN EXPOSED, SHALL BE COVERED AND PROTECTED WITH A NON-METALLIC CONDUIT SEALED AT BOTH ENDS.
- IF 2 OR MORE IN-GROUND CONDUCTOS ARE IN THE SAME PATH, 2 RINGS OVERLAPPING, BONDING FOLLOWING ANOTHER RING OR RADIAL, OR SIMILAR, COMBINE WITH A SHARED SINGLE EQUIPMENT AND TOWER GROUND RINGS SHALL BE:

- BONDED TO ANY CONDUCTIVE OBJECT OR STRUCTURE WITHIN 5 FEET OF GROUND RINGS AND WITHIN 20 FEET OF TOWER GROUND RINGS.
- INSTALLED MINIMUM 18 INCHES FROM FOUNDATIONS, FOOTINGS, AND SIMILAR.

INSTALL ALL IN-GROUND RINGS, RADIALS, BONDS CONNECTING THEM, AND ALL SIMILAR GROUNDING.

- MIN 30 INCHES BELOW GRADE, OR 6 INCHES BELOW THE FRONT LINE, WHICHEVER IS GREATER DEPTH.
- MIN 2 FEET FROM FOUNDATIONS, FOOTINGS, OTHER GROUNDING SYSTEMS, AND SIMILAR STRUCTURES, EXCEPT WHEN MAKING A BOND TO ANY OF THESE STRUCTURES. DO NOT BOND TO FOUNDATION INTERNAL REINFORCEMENT.

ALL EQUIPMENT GROUNDED IN A COMMON AREA, COMPOUND, STRUCTURE, OR SIMILAR SHALL BE BONDED TO A SINGLE-POINT GROUND, PREFERABLY AN ISOLATED GROUND BAR. BOND THE GROUNDING BAR TO THE SYSTEM WITH MINIMUM 2 CONDUCTORS DIRECTLY BONDING TO AN IN-GROUND RING. INSTALL 2 BONDING CONDUCTORS MINIMUM WITH EACH CONDUCTOR INSTALLED DIRECTIONALLY AWAY FROM EACH OTHER AND PARALLEL TO THE IN-GROUND RING, WITH NO TEE CONNECTIONS.

TOWER GROUNDING:

- EACH TOWER LEG SHALL BE BONDED TO ITS RING. SINGLE-LEGGED TOWERS, OR MONOPOLES, SHALL HAVE 2 BONDS ON OPPOSITE SIDES.
- BOND TO TOWER BASE, NOT TO VERTICAL TOWER STRUCTURE, AWAY FROM TOWER MOUNTING HARDWARE.
- EACH BOND SHALL HAVE A CORRESPONDING GROUND ROD ON THE RING.
- EACH BOND SHALL CONSIST OF 2 CONDUCTORS FROM THE TOWER TO ITS RING WITH EACH CONDUCTOR DIRECTED IN OPPOSITE DIRECTIONS WITH A PARALLEL CONNECTION ON THE RING ON OPPOSITE SIDES OF THE GROUND ROD.

EQUIPMENT AREA GROUNDING:

- COMMUNICATION AREAS ON EARTH SHALL HAVE A GROUND RING.
- BOND ALL EQUIPMENT TO A SINGLE-POINT GROUND (GROUND BAR).
- BOND THE EQUIPMENT SINGLE-POINT GROUND TO THE EQUIPMENT GROUND RING WITH MINIMUM 2 CONDUCTORS DIRECTED IN OPPOSITE DIRECTIONS WITH PARALLEL CONNECTIONS ON THE RING.
- IF EQUIPMENT IS ENCLOSED IN A SHELTER:
 - IF THE SHELTER IS CONSIDERED TO BE EXPOSED TO A DIRECT LIGHTNING STRIKE, INSTALL A BUILDING LIGHTNING PROTECTION SYSTEM PER APPLICABLE VERSION OF NFPA 780.
 - BOND ALL FIXED CONDUCTIVE BUILDING COMPONENTS TOGETHER AND TO THE BUILDING RING GROUND AT THE CORNERS. THIS IS TYPICALLY CALLED THE HALO GROUND. DO NOT BOND EQUIPMENT TO THE HALO GROUND.
- BOND ALL EQUIPMENT TOGETHER TO A SINGLE-POINT OR INTERIOR EQUIPMENT RING GROUND (EGR). BOND THE SINGLE-POINT OR IEGR TO THE EXTERNAL EQUIPMENT RING GROUND.
- PLACE GROUND RODS AT THE EQUIPMENT GROUND RING CORNERS GROUND RODS.

- SEPARATION SPACE BETWEEN ANY 2 GROUND RODS SHALL BE NO CLOSER THAN THEIR DEPTH. THIS APPLIES TO ALL RODS IN THE COMPLETE SYSTEM.
- DIRE VERTICALLY IN UNDISTURBED SOIL WITH THE TOP AT SAME DEPTH AS THE IN-GROUND CONDUCTOR. IF NOT POSSIBLE TO INSTALL VERTICALLY, PLACE AS CLOSE TO VERTICAL AS POSSIBLE AND IN A DIRECTION AWAY FROM THE NEAREST ABOVE-GROUND CONDUCTIVE ELEMENT (TOWER, EQUIPMENT, ETC.).

- RADIALS (TYP. NEW DEDICATED COMMUNICATION STRIPS):
 - WHERE FEASIBLE WITH ENOUGH SPACE AVAILABLE, INSTALL A MINIMUM OF A MAXIMUM 10 RING RADIALS.
 - EACH RADIALS LENGTH SHALL BE MAX 20 FT. MAX 80 FT. MODIFICATION. IF IT IS TO BE ADDED OR REPLACED AS A PART OF THIS WORK, CONTRACTOR SHALL OBTAIN PERMIT, COORDINATE WITH AID AND GAIN APPROVAL FROM THE ELECTRICAL UTILITY.
 - EXTEND RADIALS PERPENDICULAR FROM RINGS IN AS STRAIGHT LINE AS POSSIBLE, AWAY FROM OTHER RING GROUNDS, RADIALS, BONDS, AND SIMILAR.
 - A COMMON PRACTICE IS TO PLACE 4 RADIALS FROM THE TOWER RING TO THE 4 CORNERS OF THE AVAILABLE AREA.
- AT A MINIMUM, BOND ALL COMPOUND CONDUCTIVE FENCE CORNER POSTS AND GATE POSTS TO THE LPGS. PREFERABLY, INSTALL A GROUND RING THAT FOLLOWS THE FENCE LINE, BONDING ALL POSTS TO THE RING.

27 ANTENNAS & CABLES:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN.

THE CONTRACTOR SHALL FURNISH AND INSTALL ALL TRANSMISSION CABLES, JUMPERS, CONNECTORS, GROUNDING STRAPS, ANTENNAS, MOUNT AND HARDWARE. ALL MATERIALS SHALL BE INSPECTED BY THE CONTRACTOR FOR DAMAGE PRIOR TO INSTALLATION. JUMPERS SHALL BE SUPPLIED AT ANTENNAS AND EQUIPMENT INSIDE SHELTER. COORDINATE LENGTH OF JUMPER CABLES WITH THE OWNER. COORDINATE AND VERIFY ALL OF THE MATERIALS TO BE PROVIDED WITH OWNER PRIOR TO SUBMITTING BID AND ORDERING MATERIALS.

AFTER INSTALLATION, THE TRANSMISSION LINE SYSTEM SHALL BE IRM / SWEEP TESTED FOR NEVER INSTALLATION AND DAMAGE WITH ANTENNAS CONNECTED. CONTRACTOR SHALL OBTAIN AND USE LATEST TESTING PROCEDURES FROM OWNER OR MANUFACTURER PRIOR TO BIDDING.

ANTENNA CABLES SHALL BE UNIQUELY COLOR-CODED AT THE ANTENNAS. BOTH SIDES OF EQUIPMENT SHELTER WALL, AND JUMPER CABLES AT THE EQUIPMENT.

THE CONTRACTOR SHALL FURNISH AND INSTALL ALL CONNECTORS, ASSOCIATED CABLE MOUNTING AND GROUNDING HARDWARE, WALL MOUNTS, STANDOFFS, AND ALL ASSOCIATED HARDWARE TO INSTALL

ALL CABLES AND ANTENNAS TO THE MANUFACTURERS AND OWNERS SPECIFICATIONS.

ANTENNA CABLES SHALL BE FOAM DIELECTRIC COAXIAL CABLES AS FOLLOWS:

- BASE STATION ANTENNAS:
- 7/8" DIAMETER FOR CABLE LENGTHS UP TO 100 FT.
- 1-5/8" DIAMETER FOR CABLE LENGTHS GREATER THAN 100 FT.
- GPS ANTENNAS
- 7/8" DIAMETER FOR CABLE LENGTHS UP TO 200 FT.
- 1-5/8" DIAMETER FOR CABLE LENGTHS GREATER THAN 200 FT.

MINIMUM BENDING RADIUS FOR COAXIAL CABLES SHALL BE:
• 15 FT FOR 7/8" COAXIAL CABLES
• 25 FT FOR 1-5/8" COAXIAL CABLES.

CABLE SHALL BE INSTALLED WITH A MINIMUM NUMBER OF BENDS WHERE POSSIBLE. CABLE SHALL NOT BE LEFT UNTERMINATED AND SHALL BE SEALED IMMEDIATELY AFTER BEING INSTALLED.
ALL EXTERIOR CABLE CONNECTIONS SHALL BE COVERED WITH A WATERPROOF SPLICING KIT.

CONTRACTOR SHALL VERIFY EXACT LENGTH AND DIRECTION OF TRAVEL IN FIELD PRIOR TO CONSTRUCTION.
CABLE SHALL BE FURNISHED AND INSTALLED WITHOUT SPLICES AND WITH CONNECTORS AT EACH END.

27 CABLE TRAY:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN.

CABLE TRAY SHALL BE MADE OF EITHER CORROSION RESISTANT METAL OR WITH A CORROSION RESISTANT FINISH.
CABLE TRAY SHALL BE OF LADDER TRAY TYPE WITH FLAT COVER CLAMPED TO SIDE RAILS.

CABLE LADDER SHALL BE SIZED TO FIT ALL CABLES IN ACCORDANCE WITH NEC AND NEMA 11-15-84.
CABLE LADDER TRAYS SHALL BE NEMA CLASS 12A BY PV INDUSTRIES, INC. OR EQUAL.

CABLE LADDER TRAY SHALL BE SUPPORTED IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS.
ALL WORKMANSHIP SHALL CONFORM TO THESE REQUIREMENTS AND ALL LOCAL CODES AND STANDARDS TO ENSURE SAFE AND ADEQUATE GROUNDING SYSTEM.

Cellco Partnership db/a



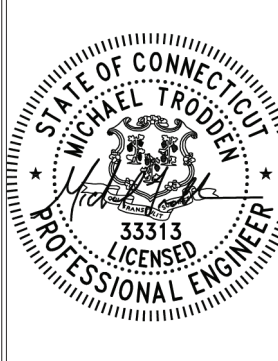
20 ALEXANDER DRIVE
WALLINGFORD, CT 06492



567 VAUXHALL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PHONE: (860)-963-1697
WWW.ALLPOINTSCTECH.COM FAX: (860)-963-9335

CONSTRUCTION DOCUMENTS

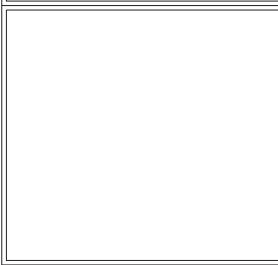
NO	DATE	REVISION
0	04/16/21	FOR REVIEW: JRM
1	06/10/21	FOR CONSTRUCTION: JRM
2		
3		
4		
5		
6		



DESIGN PROFESSIONALS OF RECORD

PROF. MICHAEL S. TRODDEN P.E.
COMP. ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 567 VAUXHALL STREET EXT. SUITE 311 WATERFORD, CT 06385

OWNER: ADCT LLC
ADDRESS: 34F GOLDFINCH RD DURHAM, CT 06422



DURHAM SOUTH CT

SITE ADDRESS: 134 R CREAMERY ROAD DURHAM, CT 06422

APT FILING NUMBER: CT141_12330

DRAWN BY: DRA
CHECKED BY: JRM

DATE: 04/16/21

VZ PROJECT CODE: 20212234091

VZ LOCATION CODE: 437330

VZ FUZE ID: 16272119

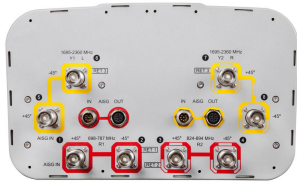
SHEET TITLE:

NOTES & SPECIFICATIONS

SHEET NUMBER:

N-1

JAHH-65B-R3B



8-port sector antenna, 2x 698–787, 2x 824–894 and 4x 1695–2360 MHz, 65° HPBW, 3x RET and low bands have diplexers. Internal SBT's on first LB(Port 1) and first HB(Port 5).

- Internal SBT on low and high band allow remote RET control from the radio over the RF jumper cable
- One RET for 700MHz, one RET for 850MHz, and one RET for both high bands to ensure same tilt level for 4x Rx or 4x MIMO
- Internal filter on low band and interleaved dipole technology providing for attractive, low wind load mechanical package
- Separate RS-485 RET input/output for low and high band

General Specifications

Antenna Type	Sector
Band	Multiband
Color	Light gray
Effective Projective Area (EPA), frontal	0.28 m ² 3.014 ft ²
Effective Projective Area (EPA), lateral	0.24 m ² 2.583 ft ²
Grounding Type	RF connector body grounded to reflector and mounting bracket
Performance Note	Outdoor usage Wind loading figures are validated by wind tunnel measurements described in white paper WP-112534-EN
Radome Material	Fiberglass, UV resistant
Radiator Material	Aluminum Low loss circuit board
Reflector Material	Aluminum
RF Connector Interface	4.3-10 Female
RF Connector Location	Bottom
RF Connector Quantity, high band	4
RF Connector Quantity, low band	4
RF Connector Quantity, total	8

Remote Electrical Tilt (RET) Information, General

RET Interface	8-pin DIN Female 8-pin DIN Male
RET Interface, quantity	2 female 2 male

Dimensions

Width	350 mm 13.78 in
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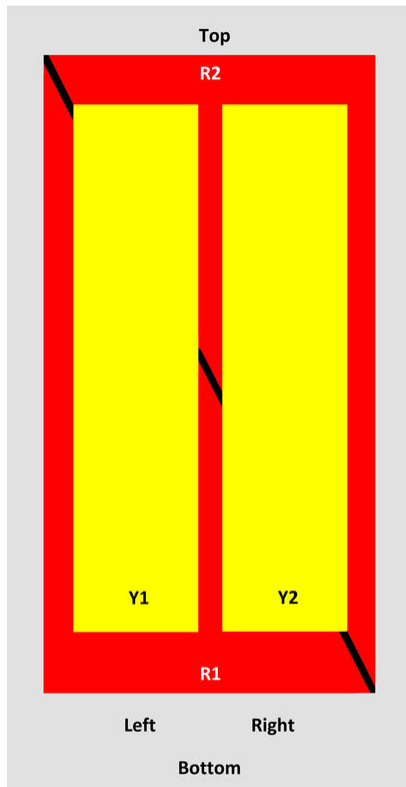
JAHH-65B-R3B

Length 1828 mm | 71.969 in

Depth 208 mm | 8.189 in

Array Layout

JAHH-65A-R3B JAHH-65B-R3B JAHH-65C-R3B



Array	Freq (MHz)	Conns	RET (SRET)	AISG RET UID
R1	698-798	1-2	1	ANXXXXXXXXXXXXXXXXX1
R2	824-894	3-4	2	ANXXXXXXXXXXXXXXXXX2
Y1	1695-2360	5-6	3	ANXXXXXXXXXXXXXXXXX3
Y2	1695-2360	7-8		

View from the front of the antenna

(Sizes of colored boxes are not true depictions of array sizes)

Electrical Specifications

Impedance 50 ohm

Operating Frequency Band 1695 – 2360 MHz | 698 – 787 MHz | 824 – 894 MHz

Polarization ±45°

Remote Electrical Tilt (RET) Information, Electrical

Protocol 3GPP/AISG 2.0 (Single RET)

Power Consumption, idle state, maximum 2 W

JAHH-65B-R3B

Power Consumption, normal conditions, maximum	13 W
Input Voltage	10–30 Vdc
Internal Bias Tee	Port 1 Port 5
Internal RET	High band (1) Low band (2)

Electrical Specifications

Frequency Band, MHz	698–787	824–894	1695–1880	1850–1990	1920–2200	2300–2360
Gain, dBi	14.5	15.8	18	18.4	18.5	18.8
Beamwidth, Horizontal, degrees	67	65	63	63	65	68
Beamwidth, Vertical, degrees	12.4	10.5	5.7	5.2	4.9	4.4
Beam Tilt, degrees	2–14	2–14	0–10	0–10	0–10	0–10
USLS (First Lobe), dB	18	18	20	20	21	23
Front-to-Back Ratio at 180°, dB	32	34	31	35	36	38
Isolation, Cross Polarization, dB	25	25	25	25	25	25
Isolation, Inter-band, dB	30	30	30	30	30	30
VSWR Return loss, dB	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port at 50° C, maximum, watts	200	200	300	300	300	250

Electrical Specifications, BASTA

Frequency Band, MHz	698–787	824–894	1695–1880	1850–1990	1920–2200	2300–2360
Gain by all Beam Tilts, average, dBi	14.3	14.9	17.6	18.1	18.2	18.5
Gain by all Beam Tilts Tolerance, dB	±0.3	±0.5	±0.6	±0.4	±0.5	±0.6
Gain by Beam Tilt, average, dBi	2° 14.3 8° 14.3 14° 14.3	2° 15.0 8° 14.9 14° 15.4	0° 17.2 5° 17.6 10° 17.6	0° 17.6 5° 18.2 10° 18.2	0° 17.7 5° 18.3 10° 18.3	0° 17.9 5° 18.7 10° 18.7
Beamwidth, Horizontal Tolerance, degrees	±1.2	±1.4	±4	±2.4	±2.9	±2.7
Beamwidth, Vertical Tolerance, degrees	±0.9	±0.5	±0.3	±0.2	±0.3	±0.1
USLS, beampeak to 20° above beampeak, dB	18	17	17	18	19	18
Front-to-Back Total Power at 180° ± 30°, dB	25	24	26	29	27	29
CPR at Boresight, dB	22	23	20	21	21	24

JAHH-65B-R3B

CPR at Sector, dB	11	12	11	11	11	8
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Mechanical Specifications

Wind Loading at Velocity, frontal	301.0 N @ 150 km/h 67.7 lbf @ 150 km/h
Wind Loading at Velocity, lateral	254.0 N @ 150 km/h 57.1 lbf @ 150 km/h
Wind Loading at Velocity, maximum	143.4 lbf @ 150 km/h 638.0 N @ 150 km/h
Wind Speed, maximum	241 km/h 149.75 mph

Packaging and Weights

Width, packed	456 mm 17.953 in
Depth, packed	357 mm 14.055 in
Length, packed	1975 mm 77.756 in
Net Weight, without mounting kit	29.2 kg 64.375 lb
Weight, gross	42.5 kg 93.696 lb

Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Above maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
ROHS	Compliant/Exempted



Included Products

BSAMNT-3 — Wide Profile Antenna Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

* Footnotes

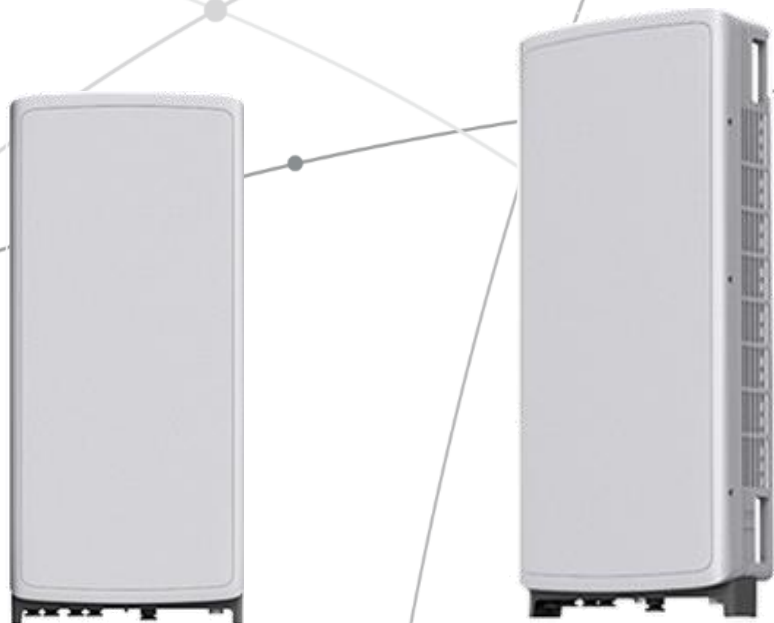
Performance Note Severe environmental conditions may degrade optimum performance

SAMSUNG C-Band 64T64R Massive MIMO Radio

for High Capacity and Wide Coverage

Samsung C-Band 64T64R Massive MIMO Radio enables mobile operators to increase coverage range, boost data speeds and ultimately offer enriched 5G experiences to users in the U.S..

Model Code : MT6407-77A



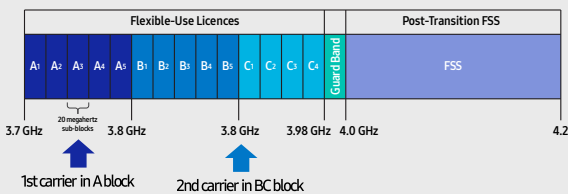
Points of Differentiation

Wide Bandwidth

With capability to support up to 2 CC carrier configuration, Samsung C-Band massive MIMO Radio supports 200 MHz bandwidth in the C-Band spectrum.

Samsung C-Band massive MIMO Radio covers the entire C-Band 280 MHz spectrum, so it can meet the operator's needs in current A block and future B/C blocks

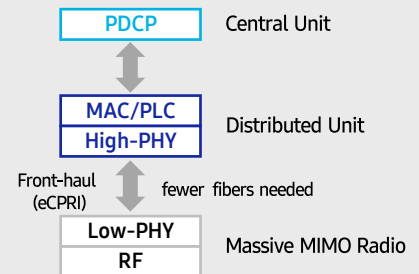
C-Band spectrum supported by Massive MIMO Radio



Future Proof Product

Samsung C-Band 64T64R Massive MIMO radio supports not only CPRI but also eCPRI as front-haul interface.

It enables operators can cut down on OPEX/CAPEX by reducing front-haul bandwidth through low layer split and using ethernet based higher efficient line.

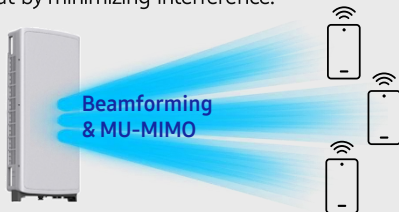


Enhanced Performance

C-Band massive MIMO Radio creates sharp beams and extends networks' coverage on the critical mid-band spectrum using a large number of antenna elements and high output power to boost data speeds.

This helps operators reduce their CAPEX as they now need less products to cover the same area than before.

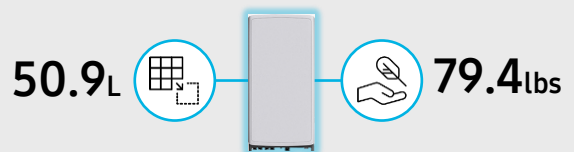
Furthermore, as C-Band massive MIMO Radio supports MU-MIMO (Multi-user MIMO), it enables to increase user throughput by minimizing interference.



Well Matched Design

Samsung C-Band Massive MIMO radio utilizes 64 antennas, supports up to 280MHz bandwidth, and delivers a 200W output power. despite the above advanced performance, the Radio has a compact size of 50.9L and 79.4lbs. This makes it easy to install the Radio.

It is designed to look solid and compact, with a low profile appearance so that, when installed, harmonizes well with the surrounding environment.



Technical Specifications

Item	Specification
Tech	NR
Band	n77
Frequency Band	3700 - 3980 MHz
EIRP	78.5dBm (53.0 dBm+25.5 dBi)
IBW/OBW	280 MHz / 200 MHz
Installation	Pole/Wall
Size/Weight	16.06 x 35.06 x 5.51 inch (50.86L) / 79.4 lbs



SAMSUNG



About Samsung Electronics Co., Ltd.

Samsung inspires the world and shapes the future with transformative ideas and technologies. The company is redefining the worlds of TVs, smartphones, wearable devices, tablets, digital appliances, network systems, and memory, system LSI, foundry and LED solutions.

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SAMSUNG

Dual-Band Radio Unit AWS/PCS (B66/B2)

RFV01U-D1A

Samsung's RFV01U-D1A is a compact remote Radio Unit (RU) designed for deployments that require flexibility in installation and rapid onlining, without compromising on coverage, capacity or operational expenses.



The RFV01U-D1A RU targets dual-band support across Band 66 (AWS) and Band 2 (PCS), making it an ideal product for broad coverage footprints across multiple common mid-range frequencies.

The RU handles all Radio Frequency (RF) processing in a single, compact unit, and is designed to interface via CPRI with Samsung's CDU baseband offerings, in both distributed- and central-RAN configurations.

In addition to its minimal footprint and ease of installation, the RU is also designed to reduce cost of ownership through its integrated spectrum analyzer, which allows for remote RF monitoring, greatly reducing the need for on-site maintenance visits.

Features and Benefits

- Dual-band support for broad frequency coverage
- Minimal footprint reduces site costs
- Rapid, easy installation
- Flexibly deployable in any location
- Remote RF monitoring capability
- Convection cooled, silent operation
- Built-in Broadcast Auxiliary Services (BAS) filter ensures compliant AWS operation without impacting footprint

Key Technical Specifications

Duplex Type: FDD

Operating Frequencies:

B66: DL(2,110-2,180MHz)/UL(1,710-1,780MHz)

B2: DL(1,930-1,990MHz)/UL(1,850-1,910MHz)

Instantaneous Bandwidth:

70MHz(B66) + 60MHz(B2)

RF Chain: 4T4R/2T4R/2T2R

Output Power: Total 320W

DU-RU Interface: CPRI (10Gbps)

Dimensions: 380 x 380 x 255mm (36.8L)

Weight: 38.3kg

Input Power: -48V DC

Operating Temp.: -40 - 55°(w/o solar load)

Cooling: Natural convection

SAMSUNG

Dual-Band Radio Unit 700/850MHz (B13/B5) RFV01U-D2A

Samsung's RFV01U-D2A is a compact remote Radio Unit (RU) designed for deployments that require flexibility in installation and rapid onlining, without compromising on coverage, capacity or operational expenses.



The RFV01U-D2A RU targets dual-band support across Band 13 (700MHz) and Band 5 (850MHz), making it an ideal product for broad coverage footprints across multiple common low-end, long-range frequencies.

The RU handles all Radio Frequency (RF) processing in a single, compact unit, and is designed to interface via CPRI with Samsung's CDU baseband offerings, in both distributed- and central-RAN configurations.

In addition to its minimal footprint and ease of installation, the RU is also designed to reduce cost of ownership through its integrated spectrum analyzer, which allows for remote RF monitoring, greatly reducing the need for on-site maintenance visits.

Features and Benefits

- Dual-band support for broad frequency coverage
- Minimal footprint reduces site costs
- Rapid, easy installation
- Flexibly deployable in any location
- Remote RF monitoring capability
- Convection cooled, silent operation

Key Technical Specifications

Duplex Type: FDD
Operating Frequencies:
B13: DL(746-756MHz)/UL(777-787MHz)
B5: DL(869-894MHz)/UL(824-849MHz)
Instantaneous Bandwidth: 10MHz(B13) + 25MHz(B5)
RF Chain: 4T4R/2T4R/2T2R
Output Power: Total 320W
DU-RU Interface: CPRI (10Gbps)
Dimensions: 380 x 380 x 207mm (29.9L)
Weight: 31.9kg
Input Power: -48V DC
Operating Temp.: -40 - 55°(w/o solar load)
Cooling: Natural convection

ATTACHMENT 3

ATTACHMENT 4



Tower Engineering Solutions

Phone (972) 483-0607, Fax (972) 975-9615
1320 Greenway Drive, Suite 600, Irving, Texas 75038

Structural Analysis Report

Existing 109 ft EEI Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT46140-A

Customer Site Name: S. Durham-rt 17/ Lawson

Carrier Name: Verizon (App#: 150986, V1)

Carrier Site ID / Name: 467330 / DURHAM_SOUTH_CT

Site Location: 134 R Creamery Road

Durham, Connecticut

MIDDLESEX County

Latitude: 41.441352

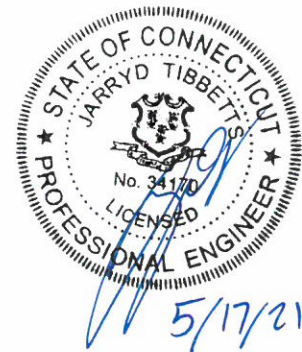
Longitude: -72.696147

Analysis Result:

Max Structural Usage: 54.9% [Pass]

Max Foundation Usage: 34.0% [Pass]

Additional Usage Caused by New Mount/Mount Modification: N/A



Report Prepared By : Delu Zhou



Tower Engineering Solutions

Phone (972) 483-0607, Fax (972) 975-9615
1320 Greenway Drive, Suite 600, Irving, Texas 75038

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Analysis Result:

Max Structural Usage: 54.9% [Pass]

Max Foundation Usage: 34.0% [Pass]

Additional Usage Caused by New Mount/Mount Modification: N/A

Report Prepared By : Delu Zhou

Introduction

The purpose of this report is to summarize the analysis results on the 109 ft EEI Monopole to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

Sources of Information

Tower Drawings	Engineered Endeavors, Inc. (Job No. 12807-E01 Rev. 1) Structure Design Calculations dated August 4, 2004
Foundation Drawing	Engineered Endeavors, Inc. (Project No. 12807) Foundation Design Calculations dated July 28, 2004
Geotechnical Report	Clarence Welti Assoc., Inc. (Project Name Sprint Site-CT33XC526) Geotechnical Study dated October 25, 2000
Modification Drawings	FDH, Project # 13TFSP1400, Dated 12/27/2013
Mount Analysis	N/A

Analysis Criteria

The rigorous analysis was performed in accordance with the requirements and stipulations of the TIA-222-G-2. In accordance with this standard, the structure was analyzed using **TESPoles**, a proprietary analysis software. The program considers the structure as an elastic 3-D model with second-order effects and temperature effects incorporated in the analysis. The analysis was performed using multiple wind directions.

Wind Speed Used in the Analysis:	Ultimate Design Wind Speed $V_{ult} = 126.0$ mph (3-Sec. Gust)/ Nominal Design Wind Speed $V_{asd} = 98.0$ mph (3-Sec. Gust)
Wind Speed with Ice:	50 mph (3-Sec. Gust) with 3/4" radial ice concurrent
Operational Wind Speed:	60 mph + 0" Radial ice
Standard/Codes:	TIA-222-G-2 / 2015 IBC / 2018 Connecticut State Building Code
Exposure Category:	C
Structure Class:	II
Topographic Category:	1
Crest Height:	0 ft
Seismic Parameters:	$S_5 = 0.179$, $S_1 = 0.062$

This structural analysis is based upon the tower being classified as a Structure Class II; however, if a different classification is required subsequent to the date hereof, the tower classification will be changed to meet such requirement and a new structural analysis will be run.

Existing Antennas, Mounts and Transmission Lines

The table below summarizes the antennas, mounts and transmission lines that were considered in the analysis as existing on the tower.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
-	108.0	9	Andrew SBNHH-1D65B - Panel	Flush Mount	(2) 1 5/8" Fiber	Verizon
-		3	Alcatel Lucent RRH 4x45-AWS			
-		3	Alcatel Lucent RRH2x60-700			
-		3	Alcatel Lucent RRH2X60-PCS			
-		2	Rfs Celwave DB-T1-6Z-8AB-OZ			
6	96.0	3	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo) - Panel	SitePro ULPD12-472	(3) 2" Hybrid	T-Mobile Sprint
7		3	RFS - APXVAALL24-43-U-NA20 - Panel			
8		3	Ericsson - AIR6449 B41 - Panel			
9		3	Ericsson 4415 B25 RRU			
10		3	Ericsson 4449 B71 + B85 RRUs			
11		6	ALU 800 MHz RRH RRU			
12	86.0	3	JMA Wireless MX08FRO665-21 Panel	Sitepro1 SNP8HR-3XX Platform w/HRK	(1) 1.4" Hybrid	Dish Wireless
13		3	Fujitsu TA08025-B605 RRU			
14		3	Fujitsu TA08025-B604 RRU			
15		1	Raycap RDIDC-9181-PF-48 OVP			
16	78.5	1	10'x1" Omni	(1) Side Mount	(2) 1/2"	Town of Durham
17	71.7	1	3'6" x 2'6" Dipole			

Proposed Carrier's Final Configuration of Antennas, Mounts and Transmission Lines

Information pertaining to the proposed carrier's final configuration of antennas and transmission lines was provided by SBA Communications Corp. The proposed antennas and lines are listed below.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	108.0	6	Andrew JAHH-65B-R3B Panel	Flush Mount	(2) 1 5/8" Hybrid	Verizon
2		3	Samsung VZS01 Panel			
3		3	Samsung B2/B66A RRH-BR049			
4		3	Samsung B5/B13 RRH-BR04C			
5		2	RFS DB-T1-6Z-8AB-OZ OVP			

See the attached coax layout for the line placement considered in the analysis.

Analysis Results

The results of the structural analysis, performed for the wind and ice loading and antenna equipment as defined above, are summarized as the following:

	Pole shafts	Anchor Bolts	Base Plate
Max. Usage:	51.0%	47.7%	54.9%
Pass/Fail	Pass	Pass	Pass

Foundations

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Analysis Reactions	1884.6	24.1	47.0

The foundation has been investigated using the supplied documents and soils report and was found adequate. Therefore, no modification to the foundation will be required.

Operational Condition (Rigidity):

Operational characteristics of the tower are found to be within the limits prescribed by TIA-222 for the installed antennas. The maximum twist/sway at the elevation of the proposed equipment is 0.4712 degrees under the operational wind speed as specified in the Analysis Criteria.

Conclusions

Based on the analysis results, the existing structure and its foundation were found to be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the TIA-222 Standard under the design basic wind speed as specified in the Analysis Criteria.

Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC**. Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.
2. The structural analysis was performance based upon the evidence available at the time of this report. All information provided by the client is considered to be accurate.
3. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed and/or ice loads are different from the minimum values recommended by the ANSI/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.
4. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.
5. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.
6. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

Usage Diagram - Max Ratio 50.99% at 0.0ft

Structure: CT46140-A-SBA
Site Name: S. Durham-rt 17/ Lawson
Height: 108.50 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-G
Exposure: C
Gh: 1.1

5/17/2021

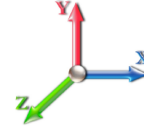


Page: 1

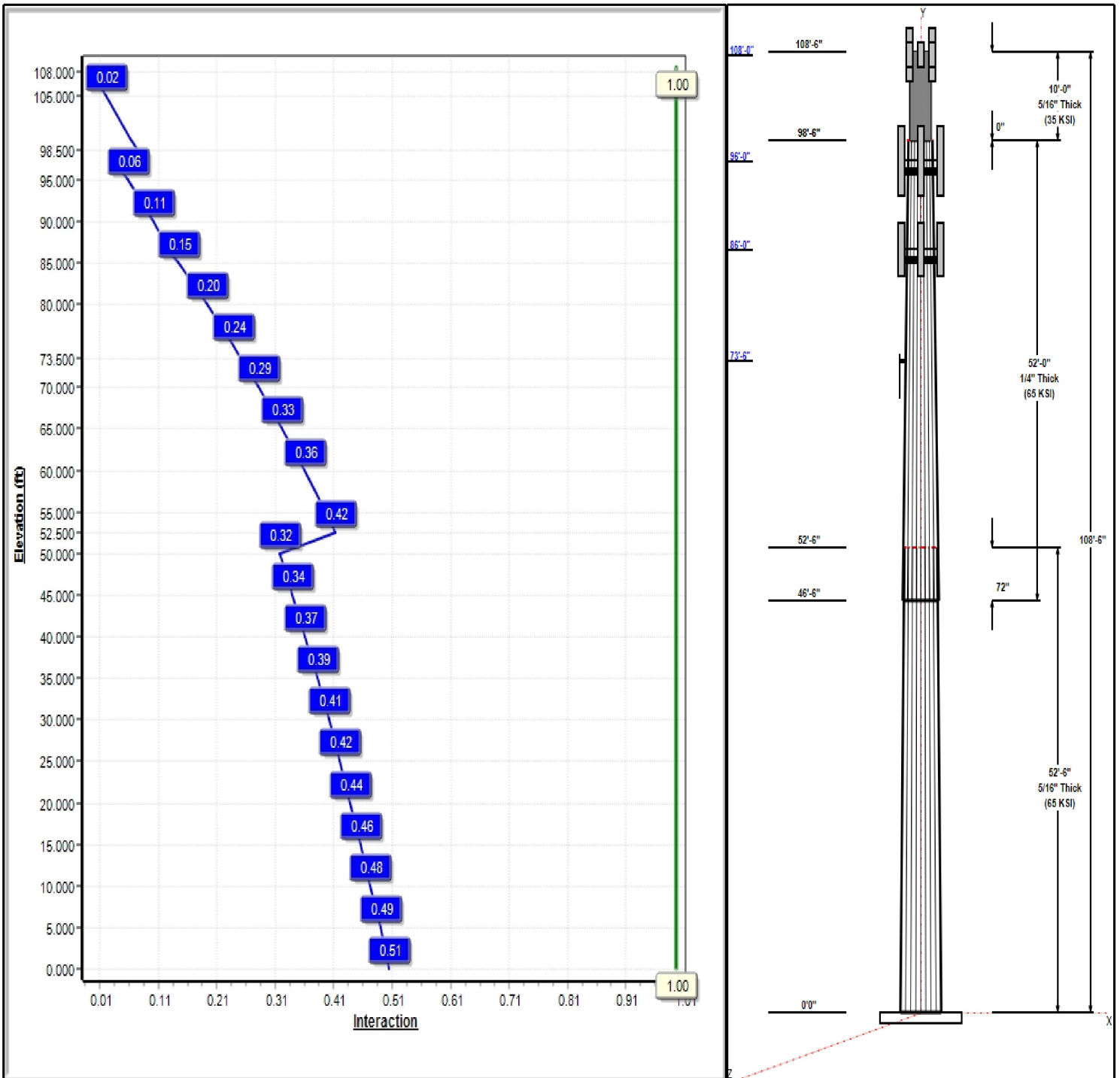
Dead Load Factor: 1.20
Wind Load Factor: 1.60

Iterations: 19

Load Case : 1.2D + 1.6W 98 mph Wind



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Structure: CT46140-A-SBA

Type: Custom
Site Name: S. Durham-rt 17/ Lawson
Height: 108.50 (ft)
Base Elev: 0.00 (ft)

Base Shape: 18 Sided
Taper: 0.25659

5/17/2021

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Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	52.50	42.53	56.00	0.313		0.25659	65
2	52.00	31.23	44.57	0.250	Slip	0.25659	65
3	10.00	28.00	28.00	0.312	Butt	0.00000	35

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
108.50	108.50	1	Lightning Rod	
108.00	108.00	1	Flush Mount	Verizon
108.00	108.00	6	JAHH-65B-R3B	Verizon
108.00	108.00	3	VZS01	Verizon
108.00	108.00	3	B2/B66A RRH-BR049	Verizon
108.00	108.00	3	B5/B13 RRH-BR04C	Verizon
108.00	108.00	2	DB-T1-6Z-8AB-OZ	Verizon
96.00	96.00	3	AIR32	T-Mobile Sprint
96.00	96.00	3	APXVAALL24-43-U-NA20	T-Mobile Sprint
96.00	96.00	3	AIR6449 B41	T-Mobile Sprint
96.00	96.00	3	Ericsson 4415 B25 RRU	T-Mobile Sprint
96.00	96.00	3	Ericsson 4449 B71 + B85	T-Mobile Sprint
96.00	96.00	6	ALU 800 MHz RRH RRU	T-Mobile Sprint
96.00	96.00	1	ULPD12-472	T-Mobile Sprint
86.00	86.00	3	MX08FRO665-21	Dish Wireless
86.00	86.00	1	SNP8HR-3XX	Dish Wireless
86.00	86.00	3	TA08025-B605	Dish Wireless
86.00	86.00	3	TA08025-B604	Dish Wireless
86.00	86.00	1	RDIDC-9181-PF-48	Dish Wireless
73.50	78.50	1	10' x1" Omni	Town of Durham
73.50	71.70	1	3'6" x 2'6" Dipole	Town of Durham
73.50	73.50	1	Sidearm	Town of Durham

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	108.00	Inside	1 5/8" Hybrid	Verizon
0.00	96.60	Inside	2" Hybrid	T-Mobile Sprint
0.00	86.00	Inside	1.4" Hybrid	Dish Wireless
0.00	73.50	Inside	1/2" Coax	Town of Durham

Anchor Bolts

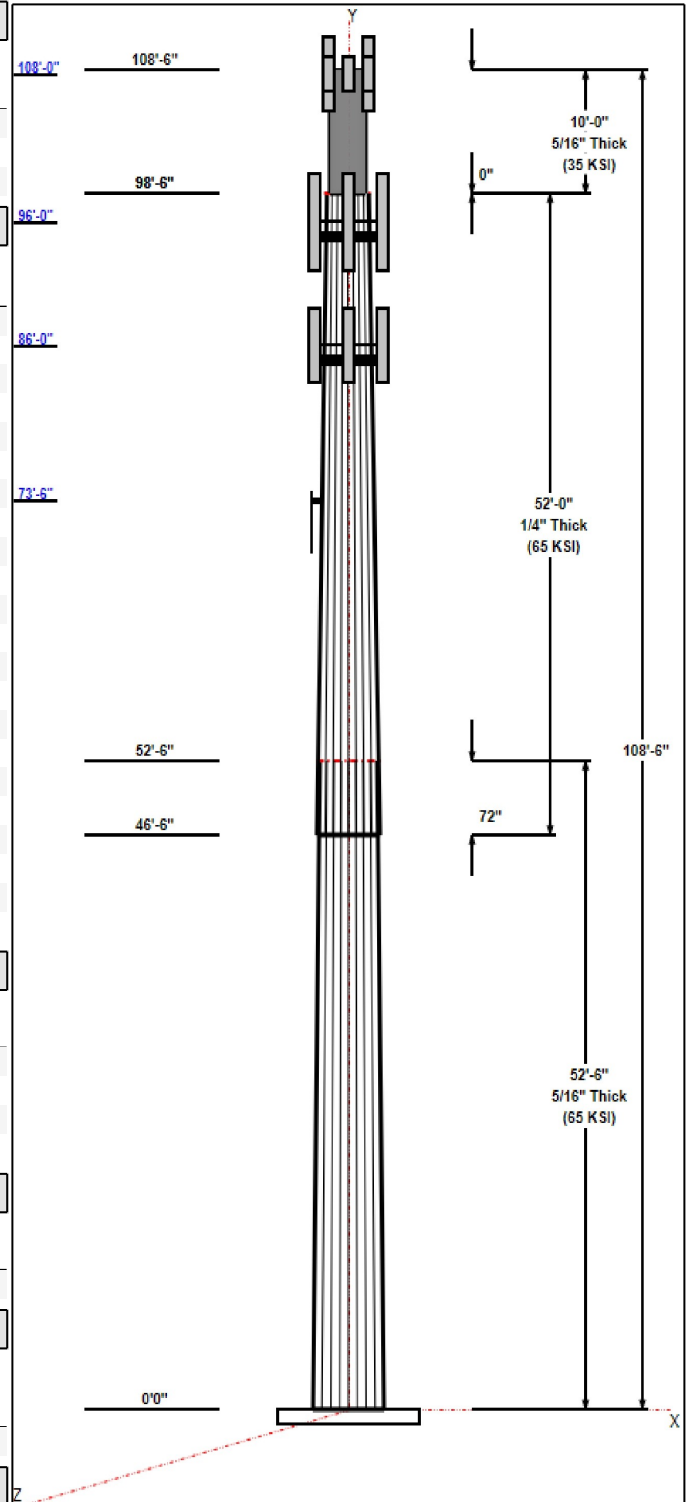
Qty	Specifications	Grade (ksi)	Arrangement
12	2.25" 18J	75.0	Radial

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
1.5000	71.0	60.0	Round

Reactions

Load Case	Moment (FT-Kips)	Shear (Kips)	Axial (Kips)
1.2D + 1.6W 98 mph Wind	1884.6	24.1	28.3
0.9D + 1.6W 98 mph Wind	1877.0	24.1	21.2
1.2D + 1.0Di + 1.0Wi 50 mph Wind	510.4	6.7	47.0



Structure: CT46140-A-SBA

Type: Custom **Base Shape:** 18 Sided 5/17/2021
Site Name: S. Durham-rt 17/ Lawson **Taper:** 0.00000
Height: 108.50 (ft)
Base Elev: 0.00 (ft)



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1.2D + 1.0E	69.9	0.8	28.3
0.9D + 1.0E	69.6	0.8	21.2
1.0D + 1.0W 60 mph Wind	440.4	5.6	23.6

Structure: CT46140-A-SBA - Coax Line Placement

Type: Monopole
Site Name: S. Durham-rt 17/ Lawson
Height: 108.50 (ft)

5/17/2021



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Shaft Properties

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	18	52.500	0.3125	65		0.00	8,674
2	18	52.000	0.2500	65	Slip	72.00	5,286
3	R	10.000	0.3120	35	Flange	0.00	923
Total Shaft Weight:							14,883

Bottom

Top

Sec. No.	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Taper
1	56.00	0.00	55.23	21640.51	30.19	179.20	42.53	52.50	41.87	9428.49	22.59	136.0	0.256590
2	44.57	46.50	35.17	8726.53	30.02	178.27	31.23	98.50	24.58	2979.59	20.61	124.9	0.256590
3	28.00	98.50	27.14	2602.69	0.00	89.74	28.00	108.50	27.14	2602.69	0.00	89.74	0.000000

Load Summary

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Discrete Appurtenances

No.	Elev (ft)	Description	Qty	No Ice			Ice			Hor. Ecc. (ft)	Vert Ecc (ft)
				Weight (lb)	CaAa (sf)	CaAa Factor	Weight (lb)	CaAa (sf)	CaAa Factor		
1	108.50	Lightning Rod	1	5.00	0.50	1.00	25.28	2.190	1.00	0.00	0.00
2	108.00	Flush Mount	1	350.00	5.00	1.00	633.72	8.378	1.00	0.00	0.00
3	108.00	JAHH-65B-R3B	6	63.30	9.11	0.83	285.07	10.411	0.83	0.00	0.00
4	108.00	VZS01	3	87.10	4.30	0.76	193.79	5.154	0.76	0.00	0.00
5	108.00	B2/B66A RRH-BR049	3	84.40	1.87	0.67	157.90	2.423	0.67	0.00	0.00
6	108.00	B5/B13 RRH-BR04C	3	70.30	1.87	0.67	136.86	2.423	0.67	0.00	0.00
7	108.00	DB-T1-6Z-8AB-0Z	2	18.90	4.80	0.75	136.07	5.773	0.75	0.00	0.00
8	96.00	AIR32 KRD901146-1_B66A_B2A	3	132.20	6.51	0.87	307.12	7.638	0.87	0.00	0.00
9	96.00	APXVAALL24-43-U-NA20	3	122.80	20.24	0.73	529.61	22.054	0.73	0.00	0.00
10	96.00	AIR6449 B41	3	103.00	5.65	0.71	234.13	6.559	0.71	0.00	0.00
11	96.00	Ericsson 4415 B25 RRU	3	46.30	1.86	0.67	103.71	2.397	0.67	0.00	0.00
12	96.00	Ericsson 4449 B71 + B85 RRUs	3	73.20	1.97	0.67	128.42	2.514	0.67	0.00	0.00
13	96.00	ALU 800 MHz RRH RRU	6	53.00	2.49	0.67	123.73	3.584	0.67	0.00	0.00
14	96.00	ULPD12-472	1	2331.00	40.30	1.00	5443.43	80.657	1.00	0.00	0.00
15	86.00	MX08FRO665-21	3	64.50	12.49	0.74	339.63	13.876	0.74	0.00	0.00
16	86.00	SNP8HR-3XX	1	1876.00	39.73	1.00	3734.12	86.941	1.00	0.00	0.00
17	86.00	TA08025-B605	3	75.00	1.96	0.67	124.47	2.491	0.67	0.00	0.00
18	86.00	TA08025-B604	3	63.90	1.96	0.67	111.79	2.491	0.67	0.00	0.00
19	86.00	RDIDC-9181-PF-48	1	21.85	2.01	1.00	72.10	2.547	1.00	0.00	0.00
20	73.50	10' x1" Omni	1	12.00	1.25	1.00	35.40	5.313	1.00	0.00	5.00
21	73.50	3'6" x 2'6" Dipole	1	15.00	1.74	1.00	67.61	3.844	1.00	0.00	-1.80
22	73.50	Sidearm	1	53.32	3.50	1.00	153.03	10.943	1.00	0.00	0.00
Totals:			55	8,167.87			19,992.01				

Linear Appurtenances

Bottom Elev. (ft)	Top Elev. (ft)	Description	Exposed Width	Exposed
0.00	108.00	(2) 1 5/8" Hybrid	0.00	Inside
0.00	96.60	(3) 2" Hybrid	0.00	Inside
0.00	86.00	(1) 1.4" Hybrid	0.00	Inside
0.00	73.50	(2) 1/2" Coax	0.00	Inside

Shaft Section Properties

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Increment Length: 5 (ft)

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in ²)	Ix (in ⁴)	W/t Ratio	D/t Ratio	Fpy (ksi)	S (in ³)	Weight (lb)
0.00		0.3125	56.000	55.233	21640.5	30.19	179.20	65.9	761.1	0.0
5.00		0.3125	54.717	53.961	20179.0	29.46	175.09	66.7	726.4	928.9
10.00		0.3125	53.434	52.688	18784.9	28.74	170.99	67.6	692.4	907.3
15.00		0.3125	52.151	51.416	17456.4	28.02	166.88	68.4	659.3	885.6
20.00		0.3125	50.868	50.143	16192.2	27.29	162.78	69.3	627.0	864.0
25.00		0.3125	49.585	48.871	14990.5	26.57	158.67	70.2	595.4	842.3
30.00		0.3125	48.302	47.598	13849.7	25.84	154.57	71.0	564.7	820.7
35.00		0.3125	47.019	46.326	12768.4	25.12	150.46	71.9	534.9	799.0
40.00		0.3125	45.736	45.053	11744.9	24.40	146.36	72.7	505.8	777.4
45.00		0.3125	44.453	43.781	10777.5	23.67	142.25	73.6	477.5	755.7
46.50	Bot - Section 2	0.3125	44.069	43.399	10498.1	23.45	141.02	73.8	469.2	222.5
50.00		0.3125	43.171	42.508	9864.8	22.95	138.15	74.4	450.1	926.1
52.50	Top - Section 1	0.2500	43.029	33.944	7848.3	28.94	172.12	0.0	0.0	649.8
55.00		0.2500	42.388	33.435	7500.5	28.49	169.55	67.9	348.5	286.6
60.00		0.2500	41.105	32.417	6836.1	27.58	164.42	69.0	327.6	560.2
65.00		0.2500	39.822	31.399	6212.1	26.68	159.29	70.0	307.3	542.9
70.00		0.2500	38.539	30.381	5627.3	25.77	154.15	71.1	287.6	525.6
73.50		0.2500	37.641	29.668	5240.5	25.14	150.56	71.8	274.2	357.6
75.00		0.2500	37.256	29.363	5080.3	24.87	149.02	72.2	268.6	150.7
80.00		0.2500	35.973	28.345	4570.1	23.96	143.89	73.2	250.2	490.9
85.00		0.2500	34.690	27.327	4095.1	23.06	138.76	74.3	232.5	473.6
86.00		0.2500	34.433	27.123	4004.3	22.88	137.73	74.5	229.0	92.6
90.00		0.2500	33.407	26.309	3654.3	22.15	133.63	75.3	215.5	363.6
95.00		0.2500	32.124	25.291	3246.3	21.25	128.50	76.4	199.0	439.0
96.00		0.2500	31.867	25.087	3168.6	21.07	127.47	76.6	195.8	85.7
98.50	Top - Section 2	0.2500	31.226	24.578	2979.6	20.61	124.90	77.2	187.9	211.3
98.50	Bot - Section 3	0.3120	28.000	27.139	2602.7	16.52	100.08	35.0	185.9	
100.00		0.3120	28.000	27.139	2602.7	0.00	89.74	35.0	185.9	138.5
105.00		0.3120	28.000	27.139	2602.7	0.00	89.74	35.0	185.9	461.7
108.00		0.3120	28.000	27.139	2602.7	0.00	89.74	35.0	185.9	277.0
108.50		0.3120	28.000	27.139	2602.7	0.00	89.74	35.0	185.9	46.2

14882.9

Wind Loading - Shaft

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



Load Case: 1.2D + 1.6W 98 mph Wind	Iterations 19
Dead Load Factor 1.20	
Wind Load Factor 1.60	

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	19.853	21.84	428.14	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	19.853	21.84	418.34	0.650	0.000	5.00	23.422	15.22	532.0	0.0	1114.7
10.00		1.00	0.85	19.853	21.84	408.53	0.650	0.000	5.00	22.879	14.87	519.6	0.0	1088.7
15.00		1.00	0.85	19.853	21.84	398.72	0.650	0.000	5.00	22.336	14.52	507.3	0.0	1062.7
20.00		1.00	0.90	21.065	23.17	400.60	0.650	0.000	5.00	21.793	14.17	525.2	0.0	1036.7
25.00		1.00	0.95	22.078	24.29	399.78	0.650	0.000	5.00	21.251	13.81	536.7	0.0	1010.8
30.00		1.00	0.98	22.942	25.24	396.98	0.650	0.000	5.00	20.708	13.46	543.5	0.0	984.8
35.00		1.00	1.01	23.699	26.07	392.76	0.650	0.000	5.00	20.165	13.11	546.7	0.0	958.8
40.00		1.00	1.04	24.375	26.81	387.45	0.650	0.000	5.00	19.622	12.75	547.2	0.0	932.8
45.00		1.00	1.07	24.987	27.49	381.28	0.650	0.000	5.00	19.079	12.40	545.4	0.0	906.8
46.50	Bot - Section 2	1.00	1.08	25.160	27.68	379.29	0.650	0.000	1.50	5.618	3.65	161.7	0.0	267.0
50.00		1.00	1.09	25.547	28.10	374.41	0.650	0.000	3.50	13.067	8.49	381.9	0.0	1111.4
52.50	Top - Section 1	1.00	1.11	25.811	28.39	370.74	0.650	0.000	2.50	9.171	5.96	270.8	0.0	779.8
55.00		1.00	1.12	26.065	28.67	371.32	0.650	0.000	2.50	9.035	5.87	269.4	0.0	343.9
60.00		1.00	1.14	26.547	29.20	363.40	0.650	0.000	5.00	17.663	11.48	536.4	0.0	672.2
65.00		1.00	1.16	26.998	29.70	355.03	0.650	0.000	5.00	17.120	11.13	528.8	0.0	651.5
70.00		1.00	1.17	27.423	30.16	346.29	0.650	0.000	5.00	16.577	10.77	520.0	0.0	630.7
73.50	Appurtenance(s)	1.00	1.19	27.706	30.48	339.96	0.650	0.000	3.50	11.281	7.33	357.6	0.0	429.1
75.00		1.00	1.19	27.824	30.61	337.20	0.650	0.000	1.50	4.753	3.09	151.3	0.0	180.8
80.00		1.00	1.21	28.204	31.02	327.81	0.650	0.000	5.00	15.491	10.07	499.8	0.0	589.1
85.00		1.00	1.22	28.567	31.42	318.14	0.650	0.000	5.00	14.948	9.72	488.5	0.0	568.3
86.00	Appurtenance(s)	1.00	1.23	28.637	31.50	316.18	0.650	0.000	1.00	2.925	1.90	95.8	0.0	111.2
90.00		1.00	1.24	28.912	31.80	308.22	0.650	0.000	4.00	11.481	7.46	379.7	0.0	436.4
95.00		1.00	1.25	29.243	32.17	298.08	0.650	0.000	5.00	13.863	9.01	463.8	0.0	526.8
96.00	Appurtenance(s)	1.00	1.25	29.308	32.24	296.02	0.650	0.000	1.00	2.707	1.76	90.8	0.0	102.9
98.50	Top - Section 2	1.00	1.26	29.467	32.41	290.85	0.650	0.000	2.50	6.674	4.34	225.0	0.0	253.5
100.00		1.00	1.27	29.561	32.52	257.25	0.600	0.000	1.50	3.500	2.10	109.3	0.0	166.2
105.00		1.00	1.28	29.866	32.85	258.57	0.600	0.000	5.00	11.667	7.00	368.0	0.0	554.1
108.00	Appurtenance(s)	1.00	1.29	30.044	33.05	259.34	0.600	0.000	3.00	7.000	4.20	222.1	0.0	332.5
108.50	Appurtenance(s)	1.00	1.29	30.073	33.08	259.47	0.600	0.000	0.50	1.167	0.70	37.1	0.0	55.4
Totals:									108.50			10,961.2		17,859.5

Discrete Appurtenance Forces

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



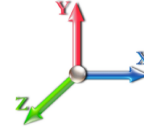
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Load Case: 1.2D + 1.6W 98 mph Wind

Iterations 19

Dead Load Factor 1.20

Wind Load Factor 1.60



No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	108.50	Lightning Rod	1	30.073	33.080	1.00	1.00	0.50	6.00	0.000	0.000	26.46	0.00	0.00
2	108.00	VZS01	3	30.044	33.048	0.76	1.00	9.80	313.56	0.000	0.000	518.41	0.00	0.00
3	108.00	Flush Mount	1	30.044	33.048	1.00	1.00	5.00	420.00	0.000	0.000	264.39	0.00	0.00
4	108.00	JAHH-65B-R3B	6	30.044	33.048	0.83	1.00	45.37	455.76	0.000	0.000	2398.92	0.00	0.00
5	108.00	B2/B66A RRH-BR049	3	30.044	33.048	0.67	1.00	3.76	303.84	0.000	0.000	198.75	0.00	0.00
6	108.00	B5/B13 RRH-BR04C	3	30.044	33.048	0.67	1.00	3.76	253.08	0.000	0.000	198.75	0.00	0.00
7	108.00	DB-T1-6Z-8AB-0Z	2	30.044	33.048	0.75	1.00	7.20	45.36	0.000	0.000	380.72	0.00	0.00
8	96.00	ULPD12-472	1	29.308	32.239	0.75	0.75	30.22	2797.20	0.000	0.000	1559.07	0.00	0.00
9	96.00	ALU 800 MHz RRH RRU	6	29.308	32.239	0.54	0.80	8.01	381.60	0.000	0.000	413.06	0.00	0.00
10	96.00	Ericsson 4449 B71 + B85	3	29.308	32.239	0.54	0.80	3.17	263.52	0.000	0.000	163.40	0.00	0.00
11	96.00	Ericsson 4415 B25 RRU	3	29.308	32.239	0.54	0.80	2.99	166.68	0.000	0.000	154.28	0.00	0.00
12	96.00	AIR6449 B41	3	29.308	32.239	0.57	0.80	9.63	370.80	0.000	0.000	496.61	0.00	0.00
13	96.00	APXVAALL24-43-U-NA20	3	29.308	32.239	0.58	0.80	35.46	442.08	0.000	0.000	1829.13	0.00	0.00
14	96.00	AIR32	3	29.308	32.239	0.70	0.80	13.59	475.92	0.000	0.000	701.15	0.00	0.00
15	86.00	RDIDC-9181-PF-48	1	28.637	31.501	1.00	1.00	2.01	26.22	0.000	0.000	101.31	0.00	0.00
16	86.00	TA08025-B604	3	28.637	31.501	0.50	0.75	2.95	230.04	0.000	0.000	148.92	0.00	0.00
17	86.00	TA08025-B605	3	28.637	31.501	0.50	0.75	2.95	270.00	0.000	0.000	148.92	0.00	0.00
18	86.00	SNP8HR-3XX	1	28.637	31.501	1.00	1.00	39.73	2251.20	0.000	0.000	2002.19	0.00	0.00
19	86.00	MX08FRO665-21	3	28.637	31.501	0.55	0.75	20.80	232.20	0.000	0.000	1048.14	0.00	0.00
20	73.50	Sidearm	1	27.706	30.476	1.00	1.00	3.50	63.98	0.000	0.000	170.67	0.00	0.00
21	73.50	3'6" x 2'6" Dipole	1	27.561	30.318	1.00	1.00	1.74	18.00	0.000	-1.800	84.40	0.00	-151.93
22	73.50	10' x 1" Omni	1	28.092	30.901	1.00	1.00	1.25	14.40	0.000	5.000	61.80	0.00	309.01
Totals:									9,801.44			13,069.43		

Total Applied Force Summary

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 1.2D + 1.6W 98 mph Wind

Dead Load Factor 1.20
Wind Load Factor 1.60



Iterations 19

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		531.96	1148.52	0.00	0.00
10.00		519.64	1122.55	0.00	0.00
15.00		507.31	1096.57	0.00	0.00
20.00		525.19	1070.59	0.00	0.00
25.00		536.74	1044.61	0.00	0.00
30.00		543.50	1018.63	0.00	0.00
35.00		546.71	992.65	0.00	0.00
40.00		547.16	966.67	0.00	0.00
45.00		545.38	940.69	0.00	0.00
46.50		161.70	277.14	0.00	0.00
50.00		381.89	1135.05	0.00	0.00
52.50		270.79	796.72	0.00	0.00
55.00		269.40	360.83	0.00	0.00
60.00		536.40	706.08	0.00	0.00
65.00		528.76	685.29	0.00	0.00
70.00		520.04	664.51	0.00	0.00
73.50	(3) attachments	674.42	549.18	0.00	157.09
75.00		151.30	190.36	0.00	0.00
80.00		499.84	621.02	0.00	0.00
85.00		488.52	600.24	0.00	0.00
86.00	(11) attachments	3545.29	3127.21	0.00	0.00
90.00		379.75	456.43	0.00	0.00
95.00		463.78	551.83	0.00	0.00
96.00	(22) attachments	5407.47	5005.67	0.00	0.00
98.50		224.97	261.53	0.00	0.00
100.00		109.26	170.19	0.00	0.00
105.00		367.95	567.29	0.00	0.00
108.00	(18) attachments	4182.01	2131.97	0.00	0.00
108.50	(1) attachments	63.51	61.41	0.00	0.00
	Totals:	24,030.64	28,321.41	0.00	157.09

Calculated Forces

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Page: 11
	Struct Class: II	



Load Case: 1.2D + 1.6W 98 mph Wind

Iterations 19

Dead Load Factor 1.20
Wind Load Factor 1.60



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-28.30	-24.06	0.00	-1884.5	0.00	1884.59	3275.65	1637.82	7512.12	3761.64	0.00	0.000	0.000	0.510
5.00	-27.10	-23.58	0.00	-1764.2	0.00	1764.29	3241.53	1620.76	7261.66	3636.23	0.07	-0.120	0.000	0.494
10.00	-25.93	-23.12	0.00	-1646.3	0.00	1646.36	3205.46	1602.73	7010.56	3510.49	0.26	-0.240	0.000	0.477
15.00	-24.79	-22.66	0.00	-1530.7	0.00	1530.79	3167.44	1583.72	6759.13	3384.59	0.57	-0.360	0.000	0.460
20.00	-23.67	-22.17	0.00	-1417.5	0.00	1417.51	3127.48	1563.74	6507.68	3258.68	1.02	-0.481	0.000	0.443
25.00	-22.59	-21.67	0.00	-1306.6	0.00	1306.66	3085.56	1542.78	6256.52	3132.91	1.58	-0.600	0.000	0.425
30.00	-21.53	-21.16	0.00	-1198.3	0.00	1198.30	3041.69	1520.85	6005.97	3007.45	2.28	-0.719	0.000	0.406
35.00	-20.51	-20.64	0.00	-1092.4	0.00	1092.49	2995.87	1497.94	5756.34	2882.45	3.10	-0.837	0.000	0.386
40.00	-19.51	-20.12	0.00	-989.28	0.00	989.28	2948.10	1474.05	5507.93	2758.06	4.04	-0.953	0.000	0.365
45.00	-18.55	-19.58	0.00	-888.68	0.00	888.68	2898.39	1449.19	5261.05	2634.44	5.10	-1.066	0.000	0.344
46.50	-18.26	-19.43	0.00	-859.31	0.00	859.31	2883.09	1441.55	5187.33	2597.52	5.44	-1.101	0.000	0.337
50.00	-17.11	-19.05	0.00	-791.29	0.00	791.29	2846.72	1423.36	5016.02	2511.74	6.27	-1.179	0.000	0.321
52.50	-16.30	-18.78	0.00	-743.67	0.00	743.67	2057.96	1028.98	3624.72	1815.05	6.91	-1.235	0.000	0.418
55.00	-15.92	-18.52	0.00	-696.73	0.00	696.73	2043.11	1021.55	3544.30	1774.78	7.57	-1.289	0.000	0.401
60.00	-15.19	-18.00	0.00	-604.11	0.00	604.11	2011.95	1005.98	3383.36	1694.19	8.99	-1.412	0.000	0.364
65.00	-14.48	-17.49	0.00	-514.10	0.00	514.10	1978.85	989.42	3222.55	1613.67	10.53	-1.529	0.000	0.326
70.00	-13.80	-16.97	0.00	-426.67	0.00	426.67	1943.79	971.90	3062.19	1533.37	12.19	-1.636	0.000	0.286
73.50	-13.26	-16.29	0.00	-367.13	0.00	367.13	1918.09	959.05	2950.37	1477.38	13.42	-1.707	0.000	0.256
75.00	-13.06	-16.15	0.00	-342.69	0.00	342.69	1906.79	953.39	2902.59	1453.45	13.96	-1.736	0.000	0.243
80.00	-12.43	-15.64	0.00	-261.96	0.00	261.96	1867.83	933.91	2744.05	1374.07	15.83	-1.820	0.000	0.198
85.00	-11.84	-15.14	0.00	-183.75	0.00	183.75	1826.92	913.46	2586.89	1295.37	17.77	-1.890	0.000	0.149
86.00	-8.82	-11.50	0.00	-168.60	0.00	168.60	1818.51	909.25	2555.66	1279.73	18.17	-1.902	0.000	0.137
90.00	-8.37	-11.11	0.00	-122.60	0.00	122.60	1784.07	892.03	2431.43	1217.52	19.78	-1.943	0.000	0.106
95.00	-7.83	-10.63	0.00	-67.03	0.00	67.03	1739.26	869.63	2277.96	1140.67	21.84	-1.980	0.000	0.063
96.00	-3.02	-5.06	0.00	-56.40	0.00	56.40	1730.06	865.03	2247.53	1125.44	22.26	-1.985	0.000	0.052
98.50	-2.76	-4.82	0.00	-43.76	0.00	43.76	1706.74	853.37	2171.89	1087.56	23.30	-1.997	0.000	0.042
98.50	-2.76	-4.82	0.00	-43.76	0.00	43.76	854.88	427.44	974.68	581.27	23.30	-1.997	0.000	0.079
100.00	-2.60	-4.71	0.00	-36.53	0.00	36.53	854.88	427.44	974.68	581.27	23.93	-2.002	0.000	0.066
105.00	-2.04	-4.32	0.00	-12.99	0.00	12.99	854.88	427.44	974.68	581.27	26.03	-2.016	0.000	0.025
108.00	-0.06	-0.07	0.00	-0.03	0.00	0.03	854.88	427.44	974.68	581.27	27.30	-2.018	0.000	0.000
108.50	0.00	-0.06	0.00	0.00	0.00	0.00	854.88	427.44	974.68	581.27	27.51	-2.018	0.000	0.000

Wind Loading - Shaft

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II

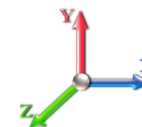


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Load Case: 0.9D + 1.6W 98 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 19

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	19.853	21.84	428.14	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	19.853	21.84	418.34	0.650	0.000	5.00	23.422	15.22	532.0	0.0	836.0
10.00		1.00	0.85	19.853	21.84	408.53	0.650	0.000	5.00	22.879	14.87	519.6	0.0	816.5
15.00		1.00	0.85	19.853	21.84	398.72	0.650	0.000	5.00	22.336	14.52	507.3	0.0	797.0
20.00		1.00	0.90	21.065	23.17	400.60	0.650	0.000	5.00	21.793	14.17	525.2	0.0	777.6
25.00		1.00	0.95	22.078	24.29	399.78	0.650	0.000	5.00	21.251	13.81	536.7	0.0	758.1
30.00		1.00	0.98	22.942	25.24	396.98	0.650	0.000	5.00	20.708	13.46	543.5	0.0	738.6
35.00		1.00	1.01	23.699	26.07	392.76	0.650	0.000	5.00	20.165	13.11	546.7	0.0	719.1
40.00		1.00	1.04	24.375	26.81	387.45	0.650	0.000	5.00	19.622	12.75	547.2	0.0	699.6
45.00		1.00	1.07	24.987	27.49	381.28	0.650	0.000	5.00	19.079	12.40	545.4	0.0	680.1
46.50	Bot - Section 2	1.00	1.08	25.160	27.68	379.29	0.650	0.000	1.50	5.618	3.65	161.7	0.0	200.2
50.00		1.00	1.09	25.547	28.10	374.41	0.650	0.000	3.50	13.067	8.49	381.9	0.0	833.5
52.50	Top - Section 1	1.00	1.11	25.811	28.39	370.74	0.650	0.000	2.50	9.171	5.96	270.8	0.0	584.8
55.00		1.00	1.12	26.065	28.67	371.32	0.650	0.000	2.50	9.035	5.87	269.4	0.0	257.9
60.00		1.00	1.14	26.547	29.20	363.40	0.650	0.000	5.00	17.663	11.48	536.4	0.0	504.2
65.00		1.00	1.16	26.998	29.70	355.03	0.650	0.000	5.00	17.120	11.13	528.8	0.0	488.6
70.00		1.00	1.17	27.423	30.16	346.29	0.650	0.000	5.00	16.577	10.77	520.0	0.0	473.0
73.50	Appurtenance(s)	1.00	1.19	27.706	30.48	339.96	0.650	0.000	3.50	11.281	7.33	357.6	0.0	321.8
75.00		1.00	1.19	27.824	30.61	337.20	0.650	0.000	1.50	4.753	3.09	151.3	0.0	135.6
80.00		1.00	1.21	28.204	31.02	327.81	0.650	0.000	5.00	15.491	10.07	499.8	0.0	441.8
85.00		1.00	1.22	28.567	31.42	318.14	0.650	0.000	5.00	14.948	9.72	488.5	0.0	426.2
86.00	Appurtenance(s)	1.00	1.23	28.637	31.50	316.18	0.650	0.000	1.00	2.925	1.90	95.8	0.0	83.4
90.00		1.00	1.24	28.912	31.80	308.22	0.650	0.000	4.00	11.481	7.46	379.7	0.0	327.3
95.00		1.00	1.25	29.243	32.17	298.08	0.650	0.000	5.00	13.863	9.01	463.8	0.0	395.1
96.00	Appurtenance(s)	1.00	1.25	29.308	32.24	296.02	0.650	0.000	1.00	2.707	1.76	90.8	0.0	77.1
98.50	Top - Section 2	1.00	1.26	29.467	32.41	290.85	0.650	0.000	2.50	6.674	4.34	225.0	0.0	190.1
100.00		1.00	1.27	29.561	32.52	257.25	0.600	0.000	1.50	3.500	2.10	109.3	0.0	124.7
105.00		1.00	1.28	29.866	32.85	258.57	0.600	0.000	5.00	11.667	7.00	368.0	0.0	415.6
108.00	Appurtenance(s)	1.00	1.29	30.044	33.05	259.34	0.600	0.000	3.00	7.000	4.20	222.1	0.0	249.3
108.50	Appurtenance(s)	1.00	1.29	30.073	33.08	259.47	0.600	0.000	0.50	1.167	0.70	37.1	0.0	41.6
Totals:									108.50			10,961.2		13,394.6

Discrete Appurtenance Forces

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 0.9D + 1.6W 98 mph Wind

Dead Load Factor 0.90
Wind Load Factor 1.60



Iterations 19

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	108.50	Lightning Rod	1	30.073	33.080	1.00	1.00	0.50	4.50	0.000	0.000	26.46	0.00	0.00
2	108.00	VZS01	3	30.044	33.048	0.76	1.00	9.80	235.17	0.000	0.000	518.41	0.00	0.00
3	108.00	Flush Mount	1	30.044	33.048	1.00	1.00	5.00	315.00	0.000	0.000	264.39	0.00	0.00
4	108.00	JAHH-65B-R3B	6	30.044	33.048	0.83	1.00	45.37	341.82	0.000	0.000	2398.92	0.00	0.00
5	108.00	B2/B66A RRH-BR049	3	30.044	33.048	0.67	1.00	3.76	227.88	0.000	0.000	198.75	0.00	0.00
6	108.00	B5/B13 RRH-BR04C	3	30.044	33.048	0.67	1.00	3.76	189.81	0.000	0.000	198.75	0.00	0.00
7	108.00	DB-T1-6Z-8AB-0Z	2	30.044	33.048	0.75	1.00	7.20	34.02	0.000	0.000	380.72	0.00	0.00
8	96.00	ULPD12-472	1	29.308	32.239	0.75	0.75	30.22	2097.90	0.000	0.000	1559.07	0.00	0.00
9	96.00	ALU 800 MHz RRH RRU	6	29.308	32.239	0.54	0.80	8.01	286.20	0.000	0.000	413.06	0.00	0.00
10	96.00	Ericsson 4449 B71 + B85	3	29.308	32.239	0.54	0.80	3.17	197.64	0.000	0.000	163.40	0.00	0.00
11	96.00	Ericsson 4415 B25 RRU	3	29.308	32.239	0.54	0.80	2.99	125.01	0.000	0.000	154.28	0.00	0.00
12	96.00	AIR6449 B41	3	29.308	32.239	0.57	0.80	9.63	278.10	0.000	0.000	496.61	0.00	0.00
13	96.00	APXVAALL24-43-U-NA20	3	29.308	32.239	0.58	0.80	35.46	331.56	0.000	0.000	1829.13	0.00	0.00
14	96.00	AIR32	3	29.308	32.239	0.70	0.80	13.59	356.94	0.000	0.000	701.15	0.00	0.00
15	86.00	RDIDC-9181-PF-48	1	28.637	31.501	1.00	1.00	2.01	19.67	0.000	0.000	101.31	0.00	0.00
16	86.00	TA08025-B604	3	28.637	31.501	0.50	0.75	2.95	172.53	0.000	0.000	148.92	0.00	0.00
17	86.00	TA08025-B605	3	28.637	31.501	0.50	0.75	2.95	202.50	0.000	0.000	148.92	0.00	0.00
18	86.00	SNP8HR-3XX	1	28.637	31.501	1.00	1.00	39.73	1688.40	0.000	0.000	2002.19	0.00	0.00
19	86.00	MX08FRO665-21	3	28.637	31.501	0.55	0.75	20.80	174.15	0.000	0.000	1048.14	0.00	0.00
20	73.50	Sidearm	1	27.706	30.476	1.00	1.00	3.50	47.99	0.000	0.000	170.67	0.00	0.00
21	73.50	3'6" x 2'6" Dipole	1	27.561	30.318	1.00	1.00	1.74	13.50	0.000	-1.800	84.40	0.00	-151.93
22	73.50	10' x 1" Omni	1	28.092	30.901	1.00	1.00	1.25	10.80	0.000	5.000	61.80	0.00	309.01
Totals:									7,351.08			13,069.43		

Total Applied Force Summary

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 0.9D + 1.6W 98 mph Wind

Dead Load Factor 0.90
Wind Load Factor 1.60



Iterations 19

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		531.96	861.39	0.00	0.00
10.00		519.64	841.91	0.00	0.00
15.00		507.31	822.42	0.00	0.00
20.00		525.19	802.94	0.00	0.00
25.00		536.74	783.45	0.00	0.00
30.00		543.50	763.97	0.00	0.00
35.00		546.71	744.48	0.00	0.00
40.00		547.16	725.00	0.00	0.00
45.00		545.38	705.51	0.00	0.00
46.50		161.70	207.85	0.00	0.00
50.00		381.89	851.29	0.00	0.00
52.50		270.79	597.54	0.00	0.00
55.00		269.40	270.62	0.00	0.00
60.00		536.40	529.56	0.00	0.00
65.00		528.76	513.97	0.00	0.00
70.00		520.04	498.38	0.00	0.00
73.50	(3) attachments	674.42	411.88	0.00	157.09
75.00		151.30	142.77	0.00	0.00
80.00		499.84	465.77	0.00	0.00
85.00		488.52	450.18	0.00	0.00
86.00	(11) attachments	3545.29	2345.41	0.00	0.00
90.00		379.75	342.32	0.00	0.00
95.00		463.78	413.87	0.00	0.00
96.00	(22) attachments	5407.47	3754.25	0.00	0.00
98.50		224.97	196.15	0.00	0.00
100.00		109.26	127.64	0.00	0.00
105.00		367.95	425.47	0.00	0.00
108.00	(18) attachments	4182.01	1598.98	0.00	0.00
108.50	(1) attachments	63.51	46.06	0.00	0.00
	Totals:	24,030.64	21,241.06	0.00	157.09

Calculated Forces

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II

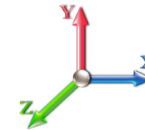


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Load Case: 0.9D + 1.6W 98 mph Wind

Iterations 19

Dead Load Factor 0.90
Wind Load Factor 1.60



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-21.21	-24.05	0.00	-1876.9	0.00	1876.96	3275.65	1637.82	7512.12	3761.64	0.00	0.000	0.000	0.506
5.00	-20.31	-23.56	0.00	-1756.7	0.00	1756.70	3241.53	1620.76	7261.66	3636.23	0.07	-0.119	0.000	0.490
10.00	-19.42	-23.08	0.00	-1638.8	0.00	1638.89	3205.46	1602.73	7010.56	3510.49	0.26	-0.239	0.000	0.473
15.00	-18.55	-22.61	0.00	-1523.4	0.00	1523.48	3167.44	1583.72	6759.13	3384.59	0.57	-0.359	0.000	0.456
20.00	-17.70	-22.11	0.00	-1410.4	0.00	1410.44	3127.48	1563.74	6507.68	3258.68	1.01	-0.478	0.000	0.439
25.00	-16.88	-21.61	0.00	-1299.8	0.00	1299.87	3085.56	1542.78	6256.52	3132.91	1.58	-0.597	0.000	0.421
30.00	-16.08	-21.09	0.00	-1191.8	0.00	1191.85	3041.69	1520.85	6005.97	3007.45	2.27	-0.716	0.000	0.402
35.00	-15.30	-20.56	0.00	-1086.4	0.00	1086.42	2995.87	1497.94	5756.34	2882.45	3.08	-0.833	0.000	0.382
40.00	-14.55	-20.03	0.00	-983.62	0.00	983.62	2948.10	1474.05	5507.93	2758.06	4.02	-0.948	0.000	0.362
45.00	-13.83	-19.49	0.00	-883.46	0.00	883.46	2898.39	1449.19	5261.05	2634.44	5.07	-1.061	0.000	0.340
46.50	-13.60	-19.34	0.00	-854.23	0.00	854.23	2883.09	1441.55	5187.33	2597.52	5.41	-1.095	0.000	0.334
50.00	-12.74	-18.95	0.00	-786.54	0.00	786.54	2846.72	1423.36	5016.02	2511.74	6.24	-1.173	0.000	0.318
52.50	-12.13	-18.68	0.00	-739.16	0.00	739.16	2057.96	1028.98	3624.72	1815.05	6.87	-1.228	0.000	0.413
55.00	-11.83	-18.43	0.00	-692.45	0.00	692.45	2043.11	1021.55	3544.30	1774.78	7.53	-1.282	0.000	0.396
60.00	-11.28	-17.90	0.00	-600.32	0.00	600.32	2011.95	1005.98	3383.36	1694.19	8.94	-1.405	0.000	0.360
65.00	-10.74	-17.38	0.00	-510.82	0.00	510.82	1978.85	989.42	3222.55	1613.67	10.48	-1.520	0.000	0.322
70.00	-10.24	-16.86	0.00	-423.92	0.00	423.92	1943.79	971.90	3062.19	1533.37	12.13	-1.627	0.000	0.282
73.50	-9.83	-16.18	0.00	-364.74	0.00	364.74	1918.09	959.05	2950.37	1477.38	13.35	-1.697	0.000	0.252
75.00	-9.67	-16.04	0.00	-340.46	0.00	340.46	1906.79	953.39	2902.59	1453.45	13.89	-1.726	0.000	0.240
80.00	-9.20	-15.54	0.00	-260.27	0.00	260.27	1867.83	933.91	2744.05	1374.07	15.74	-1.810	0.000	0.195
85.00	-8.76	-15.04	0.00	-182.58	0.00	182.58	1826.92	913.46	2586.89	1295.37	17.68	-1.879	0.000	0.146
86.00	-6.53	-11.42	0.00	-167.54	0.00	167.54	1818.51	909.25	2555.66	1279.73	18.08	-1.891	0.000	0.135
90.00	-6.19	-11.04	0.00	-121.85	0.00	121.85	1784.07	892.03	2431.43	1217.52	19.68	-1.932	0.000	0.104
95.00	-5.79	-10.56	0.00	-66.67	0.00	66.67	1739.26	869.63	2277.96	1140.67	21.72	-1.969	0.000	0.062
96.00	-2.22	-5.03	0.00	-56.11	0.00	56.11	1730.06	865.03	2247.53	1125.44	22.14	-1.974	0.000	0.051
98.50	-2.03	-4.80	0.00	-43.54	0.00	43.54	1706.74	853.37	2171.89	1087.56	23.18	-1.986	0.000	0.041
98.50	-2.03	-4.80	0.00	-43.54	0.00	43.54	854.88	427.44	974.68	581.27	23.18	-1.986	0.000	0.077
100.00	-1.91	-4.68	0.00	-36.35	0.00	36.35	854.88	427.44	974.68	581.27	23.80	-1.991	0.000	0.065
105.00	-1.50	-4.30	0.00	-12.93	0.00	12.93	854.88	427.44	974.68	581.27	25.89	-2.005	0.000	0.024
108.00	-0.04	-0.07	0.00	-0.03	0.00	0.03	854.88	427.44	974.68	581.27	27.15	-2.007	0.000	0.000
108.50	0.00	-0.06	0.00	0.00	0.00	0.00	854.88	427.44	974.68	581.27	27.36	-2.007	0.000	0.000

Wind Loading - Shaft

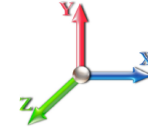
Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20
Wind Load Factor 1.00



Iterations 18

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	5.168	5.68	0.00	1.200	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	5.168	5.68	0.00	1.200	1.242	5.00	24.457	29.35	166.8	431.0	1545.7
10.00		1.00	0.85	5.168	5.68	0.00	1.200	1.331	5.00	23.988	28.79	163.6	452.0	1540.7
15.00		1.00	0.85	5.168	5.68	0.00	1.200	1.386	5.00	23.491	28.19	160.3	460.2	1522.9
20.00		1.00	0.90	5.483	6.03	0.00	1.200	1.427	5.00	22.982	27.58	166.4	462.6	1499.4
25.00		1.00	0.95	5.747	6.32	0.00	1.200	1.459	5.00	22.466	26.96	170.4	461.7	1472.5
30.00		1.00	0.98	5.972	6.57	0.00	1.200	1.486	5.00	21.946	26.34	173.0	458.6	1443.4
35.00		1.00	1.01	6.169	6.79	0.00	1.200	1.509	5.00	21.422	25.71	174.4	454.0	1412.8
40.00		1.00	1.04	6.345	6.98	0.00	1.200	1.529	5.00	20.897	25.08	175.0	448.1	1380.9
45.00		1.00	1.07	6.504	7.15	0.00	1.200	1.547	5.00	20.369	24.44	174.9	441.3	1348.1
46.50	Bot - Section 2	1.00	1.08	6.549	7.20	0.00	1.200	1.552	1.50	6.006	7.21	51.9	131.7	398.7
50.00		1.00	1.09	6.650	7.32	0.00	1.200	1.564	3.50	13.979	16.77	122.7	306.9	1418.3
52.50	Top - Section 1	1.00	1.11	6.719	7.39	0.00	1.200	1.571	2.50	9.825	11.79	87.1	217.2	997.0
55.00		1.00	1.12	6.785	7.46	0.00	1.200	1.579	2.50	9.693	11.63	86.8	215.1	559.1
60.00		1.00	1.14	6.910	7.60	0.00	1.200	1.592	5.00	18.990	22.79	173.2	421.5	1093.7
65.00		1.00	1.16	7.028	7.73	0.00	1.200	1.605	5.00	18.457	22.15	171.2	412.2	1063.7
70.00		1.00	1.17	7.138	7.85	0.00	1.200	1.617	5.00	17.925	21.51	168.9	402.6	1033.2
73.50	Appurtenance(s)	1.00	1.19	7.212	7.93	0.00	1.200	1.625	3.50	12.229	14.67	116.4	276.9	706.0
75.00		1.00	1.19	7.243	7.97	0.00	1.200	1.628	1.50	5.160	6.19	49.3	117.7	298.5
80.00		1.00	1.21	7.342	8.08	0.00	1.200	1.639	5.00	16.857	20.23	163.4	382.1	971.2
85.00		1.00	1.22	7.436	8.18	0.00	1.200	1.649	5.00	16.323	19.59	160.2	371.4	939.7
86.00	Appurtenance(s)	1.00	1.23	7.454	8.20	0.00	1.200	1.651	1.00	3.200	3.84	31.5	73.8	185.0
90.00		1.00	1.24	7.526	8.28	0.00	1.200	1.658	4.00	12.587	15.10	125.0	288.3	724.7
95.00		1.00	1.25	7.612	8.37	0.00	1.200	1.667	5.00	15.252	18.30	153.3	349.2	876.0
96.00	Appurtenance(s)	1.00	1.25	7.629	8.39	0.00	1.200	1.669	1.00	2.986	3.58	30.1	69.4	172.2
98.50	Top - Section 2	1.00	1.26	7.671	8.44	0.00	1.200	1.673	2.50	7.371	8.84	74.6	170.6	424.1
100.00		1.00	1.27	7.695	8.46	0.00	1.200	1.676	1.50	3.919	4.70	39.8	91.1	257.4
105.00		1.00	1.28	7.774	8.55	0.00	1.200	1.684	5.00	13.070	15.68	134.1	305.4	859.5
108.00	Appurtenance(s)	1.00	1.29	7.821	8.60	0.00	1.200	1.689	3.00	7.844	9.41	81.0	183.8	516.2
108.50	Appurtenance(s)	1.00	1.29	7.828	8.61	0.00	1.200	1.690	0.50	1.307	1.57	13.5	30.6	86.1
Totals:								108.50			3,559.0	26,746.8		

Discrete Appurtenance Forces

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20
Wind Load Factor 1.00



Iterations 18

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	108.50	Lightning Rod	1	7.828	8.611	1.00	1.00	2.19	20.28	0.000	0.000	18.85	0.00	0.00
2	108.00	VZS01	3	7.821	8.603	0.76	1.00	11.75	633.63	0.000	0.000	101.08	0.00	0.00
3	108.00	Flush Mount	1	7.821	8.603	1.00	1.00	8.38	603.72	0.000	0.000	72.07	0.00	0.00
4	108.00	JAHH-65B-R3B	6	7.821	8.603	0.83	1.00	51.85	1786.40	0.000	0.000	446.02	0.00	0.00
5	108.00	B2/B66A RRH-BR049	3	7.821	8.603	0.67	1.00	4.87	524.35	0.000	0.000	41.90	0.00	0.00
6	108.00	B5/B13 RRH-BR04C	3	7.821	8.603	0.67	1.00	4.87	452.77	0.000	0.000	41.90	0.00	0.00
7	108.00	DB-T1-6Z-8AB-0Z	2	7.821	8.603	0.75	1.00	8.66	225.49	0.000	0.000	74.49	0.00	0.00
8	96.00	ULPD12-472	1	7.629	8.392	0.75	0.75	60.49	4819.63	0.000	0.000	507.66	0.00	0.00
9	96.00	ALU 800 MHz RRH RRU	6	7.629	8.392	0.54	0.80	11.53	679.39	0.000	0.000	96.72	0.00	0.00
10	96.00	Ericsson 4449 B71 + B85	3	7.629	8.392	0.54	0.80	4.04	253.99	0.000	0.000	33.93	0.00	0.00
11	96.00	Ericsson 4415 B25 RRU	3	7.629	8.392	0.54	0.80	3.85	338.92	0.000	0.000	32.35	0.00	0.00
12	96.00	AIR6449 B41	3	7.629	8.392	0.57	0.80	11.18	669.10	0.000	0.000	93.79	0.00	0.00
13	96.00	APXVAALL24-43-U-NA20	3	7.629	8.392	0.58	0.80	38.64	1662.50	0.000	0.000	324.26	0.00	0.00
14	96.00	AIR32	3	7.629	8.392	0.70	0.80	15.95	1000.68	0.000	0.000	133.83	0.00	0.00
15	86.00	RDIDC-9181-PF-48	1	7.454	8.200	1.00	1.00	2.55	98.32	0.000	0.000	20.89	0.00	0.00
16	86.00	TA08025-B604	3	7.454	8.200	0.50	0.75	3.75	337.41	0.000	0.000	30.79	0.00	0.00
17	86.00	TA08025-B605	3	7.454	8.200	0.50	0.75	3.75	380.62	0.000	0.000	30.79	0.00	0.00
18	86.00	SNP8HR-3XX	1	7.454	8.200	1.00	1.00	86.94	4037.32	0.000	0.000	712.91	0.00	0.00
19	86.00	MX08FRO665-21	3	7.454	8.200	0.55	0.75	23.10	856.00	0.000	0.000	189.44	0.00	0.00
20	73.50	Sidearm	1	7.212	7.933	1.00	1.00	10.94	133.02	0.000	0.000	86.81	0.00	0.00
21	73.50	3'6" x 2'6" Dipole	1	7.174	7.892	1.00	1.00	3.84	54.41	0.000	-1.800	30.33	0.00	-54.60
22	73.50	10' x 1" Omni	1	7.313	8.044	1.00	1.00	5.31	23.80	0.000	5.000	42.73	0.00	213.67
Totals:									19,591.75			3,163.56		

Total Applied Force Summary

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20
Wind Load Factor 1.00



Iterations 18

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		166.84	1579.50	0.00	0.00
10.00		163.64	1574.59	0.00	0.00
15.00		160.25	1556.75	0.00	0.00
20.00		166.35	1533.20	0.00	0.00
25.00		170.44	1506.33	0.00	0.00
30.00		173.00	1477.27	0.00	0.00
35.00		174.45	1446.62	0.00	0.00
40.00		175.02	1414.76	0.00	0.00
45.00		174.88	1381.95	0.00	0.00
46.50		51.92	408.86	0.00	0.00
50.00		122.71	1442.00	0.00	0.00
52.50		87.14	1013.95	0.00	0.00
55.00		86.81	575.97	0.00	0.00
60.00		173.22	1127.58	0.00	0.00
65.00		171.22	1097.54	0.00	0.00
70.00		168.90	1067.07	0.00	0.00
73.50	(3) attachments	276.30	940.91	0.00	159.07
75.00		49.33	308.11	0.00	0.00
80.00		163.37	1003.12	0.00	0.00
85.00		160.22	971.64	0.00	0.00
86.00	(11) attachments	1016.30	5901.07	0.00	0.00
90.00		125.04	744.77	0.00	0.00
95.00		153.26	901.04	0.00	0.00
96.00	(22) attachments	1252.62	9601.46	0.00	0.00
98.50		74.63	432.14	0.00	0.00
100.00		39.81	261.33	0.00	0.00
105.00		134.13	872.66	0.00	0.00
108.00	(18) attachments	858.45	4750.51	0.00	0.00
108.50	(1) attachments	32.37	106.33	0.00	0.00
	Totals:	6,722.59	46,999.03	0.00	159.07

Calculated Forces

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II

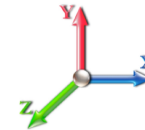


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Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Iterations 18

Dead Load Factor 1.20
Wind Load Factor 1.00



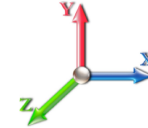
Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-47.00	-6.74	0.00	-510.38	0.00	510.38	3275.65	1637.82	7512.12	3761.64	0.00	0.000	0.000	0.150
5.00	-45.41	-6.59	0.00	-476.70	0.00	476.70	3241.53	1620.76	7261.66	3636.23	0.02	-0.032	0.000	0.145
10.00	-43.84	-6.45	0.00	-443.73	0.00	443.73	3205.46	1602.73	7010.56	3510.49	0.07	-0.065	0.000	0.140
15.00	-42.28	-6.32	0.00	-411.46	0.00	411.46	3167.44	1583.72	6759.13	3384.59	0.15	-0.097	0.000	0.135
20.00	-40.74	-6.17	0.00	-379.88	0.00	379.88	3127.48	1563.74	6507.68	3258.68	0.27	-0.130	0.000	0.130
25.00	-39.23	-6.02	0.00	-349.04	0.00	349.04	3085.56	1542.78	6256.52	3132.91	0.43	-0.162	0.000	0.124
30.00	-37.75	-5.86	0.00	-318.95	0.00	318.95	3041.69	1520.85	6005.97	3007.45	0.61	-0.193	0.000	0.118
35.00	-36.30	-5.70	0.00	-289.66	0.00	289.66	2995.87	1497.94	5756.34	2882.45	0.83	-0.224	0.000	0.113
40.00	-34.88	-5.54	0.00	-261.16	0.00	261.16	2948.10	1474.05	5507.93	2758.06	1.09	-0.255	0.000	0.107
45.00	-33.50	-5.37	0.00	-233.47	0.00	233.47	2898.39	1449.19	5261.05	2634.44	1.37	-0.285	0.000	0.100
46.50	-33.09	-5.32	0.00	-225.42	0.00	225.42	2883.09	1441.55	5187.33	2597.52	1.46	-0.294	0.000	0.098
50.00	-31.65	-5.20	0.00	-206.80	0.00	206.80	2846.72	1423.36	5016.02	2511.74	1.68	-0.315	0.000	0.093
52.50	-30.63	-5.12	0.00	-193.80	0.00	193.80	2057.96	1028.98	3624.72	1815.05	1.85	-0.329	0.000	0.122
55.00	-30.06	-5.04	0.00	-181.01	0.00	181.01	2043.11	1021.55	3544.30	1774.78	2.03	-0.343	0.000	0.117
60.00	-28.93	-4.87	0.00	-155.82	0.00	155.82	2011.95	1005.98	3383.36	1694.19	2.41	-0.375	0.000	0.106
65.00	-27.83	-4.71	0.00	-131.45	0.00	131.45	1978.85	989.42	3222.55	1613.67	2.82	-0.405	0.000	0.096
70.00	-26.76	-4.54	0.00	-107.91	0.00	107.91	1943.79	971.90	3062.19	1533.37	3.26	-0.433	0.000	0.084
73.50	-25.82	-4.26	0.00	-91.86	0.00	91.86	1918.09	959.05	2950.37	1477.38	3.58	-0.450	0.000	0.076
75.00	-25.51	-4.22	0.00	-85.46	0.00	85.46	1906.79	953.39	2902.59	1453.45	3.72	-0.457	0.000	0.072
80.00	-24.51	-4.06	0.00	-64.37	0.00	64.37	1867.83	933.91	2744.05	1374.07	4.21	-0.478	0.000	0.060
85.00	-23.54	-3.89	0.00	-44.09	0.00	44.09	1826.92	913.46	2586.89	1295.37	4.72	-0.495	0.000	0.047
86.00	-17.65	-2.83	0.00	-40.20	0.00	40.20	1818.51	909.25	2555.66	1279.73	4.83	-0.498	0.000	0.041
90.00	-16.90	-2.70	0.00	-28.90	0.00	28.90	1784.07	892.03	2431.43	1217.52	5.25	-0.508	0.000	0.033
95.00	-16.00	-2.54	0.00	-15.42	0.00	15.42	1739.26	869.63	2277.96	1140.67	5.79	-0.517	0.000	0.023
96.00	-6.41	-1.20	0.00	-12.88	0.00	12.88	1730.06	865.03	2247.53	1125.44	5.90	-0.518	0.000	0.015
98.50	-5.98	-1.12	0.00	-9.89	0.00	9.89	1706.74	853.37	2171.89	1087.56	6.17	-0.520	0.000	0.013
98.50	-5.98	-1.12	0.00	-9.89	0.00	9.89	854.88	427.44	974.68	581.27	6.17	-0.520	0.000	0.024
100.00	-5.72	-1.08	0.00	-8.21	0.00	8.21	854.88	427.44	974.68	581.27	6.33	-0.522	0.000	0.021
105.00	-4.85	-0.94	0.00	-2.82	0.00	2.82	854.88	427.44	974.68	581.27	6.88	-0.525	0.000	0.011
108.00	-0.11	-0.03	0.00	-0.02	0.00	0.02	854.88	427.44	974.68	581.27	7.21	-0.525	0.000	0.000
108.50	0.00	-0.03	0.00	0.00	0.00	0.00	854.88	427.44	974.68	581.27	7.27	-0.525	0.000	0.000

Seismic Segment Forces (Factored)

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 1.2D + 1.0E							Iterations 16
Gust Response Factor	1.10			Sds	0.12	Ss	0.18
Dead Load Factor	1.20	Seismic Load Factor	1.00	Sd1	0.04	S1	0.06
Wind Load Factor	0.00	Structure Frequency (f1)	0.63	SA	0.03	Seismic Importance Factor	1.00

Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		928.90	0.00	0.04	0.02	11.53	
10.00		907.25	0.02	0.06	0.04	15.50	
15.00		885.60	0.04	0.07	0.04	16.82	
20.00		863.95	0.06	0.07	0.04	17.23	
25.00		842.30	0.10	0.07	0.04	17.42	
30.00		820.65	0.14	0.07	0.03	17.51	
35.00		799.01	0.20	0.06	0.02	17.27	
40.00		777.36	0.26	0.05	0.02	16.20	
45.00		755.71	0.33	0.04	0.01	13.69	
46.50	Bot - Section 2	222.49	0.35	0.03	0.01	3.73	
50.00		926.13	0.40	0.02	0.01	11.65	
52.50	Top - Section 1	649.83	0.44	0.00	0.01	5.65	
55.00		286.59	0.49	-0.01	0.01	1.20	
60.00		560.20	0.58	-0.04	0.01	-3.15	
65.00		542.88	0.68	-0.08	0.03	-7.59	
70.00		525.56	0.79	-0.11	0.05	-9.59	
73.50	Appurtenance(s)	437.91	0.87	-0.12	0.08	-7.87	
75.00		150.65	0.90	-0.12	0.09	-2.55	
80.00		490.92	1.03	-0.10	0.15	-4.70	
85.00		473.60	1.16	-0.03	0.23	1.85	
86.00	Appurtenance(s)	2600.6	1.19	-0.01	0.25	19.06	
90.00		363.64	1.30	0.12	0.34	8.55	
95.00		438.96	1.45	0.38	0.48	21.65	
96.00	Appurtenance(s)	4167.2	1.48	0.45	0.52	230.23	
98.50	Top - Section 2	211.25	1.56	0.65	0.61	15.03	
100.00		138.52	1.61	0.80	0.68	11.29	
105.00		461.74	1.77	1.41	0.93	55.46	
108.00	Appurtenance(s)	1770.0	1.87	1.89	1.11	259.29	
108.50	Appurtenance(s)	51.17	1.89	1.98	1.14	7.73	
Totals:		23,050.7				760.1	Total Wind: 24,030.6

Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

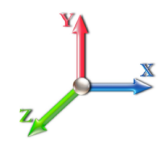
Calculated Forces

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 1.2D + 1.0E										Iterations 16
Gust Response Factor	1.10						Sds	0.12		Ss 0.18
Dead Load Factor	1.20	Seismic Load Factor	1.00	Sd1	0.04					S1 0.06
Wind Load Factor	0.00	Structure Frequency (f1)	0.63	SA	0.03	Seismic Importance Factor	1.00			



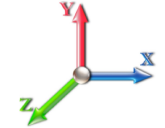
Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-28.32	-0.80	0.00	-69.86	0.00	69.86	3275.65	1637.82	7512.12	3761.64	0.00	0.00	0.00	0.027
5.00	-27.17	-0.79	0.00	-65.88	0.00	65.88	3241.53	1620.76	7261.66	3636.23	0.00	0.00	0.00	0.027
10.00	-26.05	-0.77	0.00	-61.95	0.00	61.95	3205.46	1602.73	7010.56	3510.49	0.01	-0.01	0.00	0.026
15.00	-24.95	-0.76	0.00	-58.09	0.00	58.09	3167.44	1583.72	6759.13	3384.59	0.02	-0.01	0.00	0.025
20.00	-23.88	-0.74	0.00	-54.30	0.00	54.30	3127.48	1563.74	6507.68	3258.68	0.04	-0.02	0.00	0.024
25.00	-22.84	-0.73	0.00	-50.59	0.00	50.59	3085.56	1542.78	6256.52	3132.91	0.06	-0.02	0.00	0.024
30.00	-21.82	-0.71	0.00	-46.96	0.00	46.96	3041.69	1520.85	6005.97	3007.45	0.09	-0.03	0.00	0.023
35.00	-20.83	-0.69	0.00	-43.41	0.00	43.41	2995.87	1497.94	5756.34	2882.45	0.12	-0.03	0.00	0.022
40.00	-19.86	-0.68	0.00	-39.94	0.00	39.94	2948.10	1474.05	5507.93	2758.06	0.15	-0.04	0.00	0.021
45.00	-18.92	-0.67	0.00	-36.55	0.00	36.55	2898.39	1449.19	5261.05	2634.44	0.19	-0.04	0.00	0.020
46.50	-18.64	-0.66	0.00	-35.55	0.00	35.55	2883.09	1441.55	5187.33	2597.52	0.21	-0.04	0.00	0.020
50.00	-17.51	-0.65	0.00	-33.24	0.00	33.24	2846.72	1423.36	5016.02	2511.74	0.24	-0.05	0.00	0.019
52.50	-16.71	-0.64	0.00	-31.61	0.00	31.61	2057.96	1028.98	3624.72	1815.05	0.26	-0.05	0.00	0.026
55.00	-16.35	-0.64	0.00	-30.00	0.00	30.00	2043.11	1021.55	3544.30	1774.78	0.29	-0.05	0.00	0.025
60.00	-15.64	-0.65	0.00	-26.78	0.00	26.78	2011.95	1005.98	3383.36	1694.19	0.35	-0.06	0.00	0.024
65.00	-14.96	-0.65	0.00	-23.55	0.00	23.55	1978.85	989.42	3222.55	1613.67	0.41	-0.06	0.00	0.022
70.00	-14.29	-0.65	0.00	-20.32	0.00	20.32	1943.79	971.90	3062.19	1533.37	0.47	-0.07	0.00	0.021
73.50	-13.74	-0.65	0.00	-18.06	0.00	18.06	1918.09	959.05	2950.37	1477.38	0.52	-0.07	0.00	0.019
75.00	-13.55	-0.65	0.00	-17.09	0.00	17.09	1906.79	953.39	2902.59	1453.45	0.55	-0.07	0.00	0.019
80.00	-12.93	-0.65	0.00	-13.86	0.00	13.86	1867.83	933.91	2744.05	1374.07	0.62	-0.08	0.00	0.017
85.00	-12.33	-0.64	0.00	-10.62	0.00	10.62	1826.92	913.46	2586.89	1295.37	0.70	-0.08	0.00	0.015
86.00	-9.21	-0.62	0.00	-9.98	0.00	9.98	1818.51	909.25	2555.66	1279.73	0.72	-0.08	0.00	0.013
90.00	-8.75	-0.61	0.00	-7.49	0.00	7.49	1784.07	892.03	2431.43	1217.52	0.79	-0.08	0.00	0.011
95.00	-8.20	-0.59	0.00	-4.43	0.00	4.43	1739.26	869.63	2277.96	1140.67	0.88	-0.08	0.00	0.009
96.00	-3.19	-0.35	0.00	-3.84	0.00	3.84	1730.06	865.03	2247.53	1125.44	0.89	-0.09	0.00	0.005
98.50	-2.93	-0.34	0.00	-2.95	0.00	2.95	1706.74	853.37	2171.89	1087.56	0.94	-0.09	0.00	0.004
98.50	-2.93	-0.34	0.00	-2.95	0.00	2.95	854.88	427.44	974.68	581.27	0.94	-0.09	0.00	0.009
100.00	-2.76	-0.33	0.00	-2.45	0.00	2.45	854.88	427.44	974.68	581.27	0.97	-0.09	0.00	0.007
105.00	-2.19	-0.27	0.00	-0.81	0.00	0.81	854.88	427.44	974.68	581.27	1.06	-0.09	0.00	0.004
108.00	-0.06	-0.01	0.00	0.00	0.00	0.00	854.88	427.44	974.68	581.27	1.11	-0.09	0.00	0.000
108.50	0.00	-0.01	0.00	0.00	0.00	0.00	854.88	427.44	974.68	581.27	1.12	-0.09	0.00	0.000

Seismic Segment Forces (Factored)

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 0.9D + 1.0E							Iterations 16
Gust Response Factor	1.10			Sds	0.12	Ss	0.18
Dead Load Factor	0.90	Seismic Load Factor	1.00	Sd1	0.04	S1	0.06
Wind Load Factor	0.00	Structure Frequency (f1)	0.63	SA	0.03	Seismic Importance Factor	1.00

Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		928.90	0.00	0.04	0.02	11.53	
10.00		907.25	0.02	0.06	0.04	15.50	
15.00		885.60	0.04	0.07	0.04	16.82	
20.00		863.95	0.06	0.07	0.04	17.23	
25.00		842.30	0.10	0.07	0.04	17.42	
30.00		820.65	0.14	0.07	0.03	17.51	
35.00		799.01	0.20	0.06	0.02	17.27	
40.00		777.36	0.26	0.05	0.02	16.20	
45.00		755.71	0.33	0.04	0.01	13.69	
46.50	Bot - Section 2	222.49	0.35	0.03	0.01	3.73	
50.00		926.13	0.40	0.02	0.01	11.65	
52.50	Top - Section 1	649.83	0.44	0.00	0.01	5.65	
55.00		286.59	0.49	-0.01	0.01	1.20	
60.00		560.20	0.58	-0.04	0.01	-3.15	
65.00		542.88	0.68	-0.08	0.03	-7.59	
70.00		525.56	0.79	-0.11	0.05	-9.59	
73.50	Appurtenance(s)	437.91	0.87	-0.12	0.08	-7.87	
75.00		150.65	0.90	-0.12	0.09	-2.55	
80.00		490.92	1.03	-0.10	0.15	-4.70	
85.00		473.60	1.16	-0.03	0.23	1.85	
86.00	Appurtenance(s)	2600.6	1.19	-0.01	0.25	19.06	
90.00		363.64	1.30	0.12	0.34	8.55	
95.00		438.96	1.45	0.38	0.48	21.65	
96.00	Appurtenance(s)	4167.2	1.48	0.45	0.52	230.23	
98.50	Top - Section 2	211.25	1.56	0.65	0.61	15.03	
100.00		138.52	1.61	0.80	0.68	11.29	
105.00		461.74	1.77	1.41	0.93	55.46	
108.00	Appurtenance(s)	1770.0	1.87	1.89	1.11	259.29	
108.50	Appurtenance(s)	51.17	1.89	1.98	1.14	7.73	
Totals:		23,050.7				760.1	Total Wind: 24,030.6

Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 0.9D + 1.0E							Iterations 16
Gust Response Factor	1.10			Sds	0.12		Ss 0.18
Dead Load Factor	0.90	Seismic Load Factor	1.00	Sd1	0.04		S1 0.06
Wind Load Factor	0.00	Structure Frequency (f1)	0.63	SA	0.03	Seismic Importance Factor	1.00

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-21.24	-0.80	0.00	-69.55	0.00	69.55	3275.65	1637.82	7512.12	3761.64	0.00	0.00	0.00	0.025
5.00	-20.38	-0.79	0.00	-65.58	0.00	65.58	3241.53	1620.76	7261.66	3636.23	0.00	0.00	0.00	0.024
10.00	-19.54	-0.77	0.00	-61.65	0.00	61.65	3205.46	1602.73	7010.56	3510.49	0.01	-0.01	0.00	0.024
15.00	-18.72	-0.76	0.00	-57.80	0.00	57.80	3167.44	1583.72	6759.13	3384.59	0.02	-0.01	0.00	0.023
20.00	-17.91	-0.74	0.00	-54.02	0.00	54.02	3127.48	1563.74	6507.68	3258.68	0.04	-0.02	0.00	0.022
25.00	-17.13	-0.72	0.00	-50.32	0.00	50.32	3085.56	1542.78	6256.52	3132.91	0.06	-0.02	0.00	0.022
30.00	-16.36	-0.71	0.00	-46.70	0.00	46.70	3041.69	1520.85	6005.97	3007.45	0.09	-0.03	0.00	0.021
35.00	-15.62	-0.69	0.00	-43.17	0.00	43.17	2995.87	1497.94	5756.34	2882.45	0.12	-0.03	0.00	0.020
40.00	-14.90	-0.68	0.00	-39.71	0.00	39.71	2948.10	1474.05	5507.93	2758.06	0.15	-0.04	0.00	0.019
45.00	-14.19	-0.66	0.00	-36.34	0.00	36.34	2898.39	1449.19	5261.05	2634.44	0.19	-0.04	0.00	0.019
46.50	-13.98	-0.66	0.00	-35.35	0.00	35.35	2883.09	1441.55	5187.33	2597.52	0.21	-0.04	0.00	0.018
50.00	-13.13	-0.65	0.00	-33.04	0.00	33.04	2846.72	1423.36	5016.02	2511.74	0.24	-0.05	0.00	0.018
52.50	-12.53	-0.64	0.00	-31.43	0.00	31.43	2057.96	1028.98	3624.72	1815.05	0.26	-0.05	0.00	0.023
55.00	-12.26	-0.64	0.00	-29.82	0.00	29.82	2043.11	1021.55	3544.30	1774.78	0.29	-0.05	0.00	0.023
60.00	-11.73	-0.64	0.00	-26.62	0.00	26.62	2011.95	1005.98	3383.36	1694.19	0.34	-0.06	0.00	0.022
65.00	-11.22	-0.64	0.00	-23.41	0.00	23.41	1978.85	989.42	3222.55	1613.67	0.41	-0.06	0.00	0.020
70.00	-10.72	-0.64	0.00	-20.21	0.00	20.21	1943.79	971.90	3062.19	1533.37	0.47	-0.07	0.00	0.019
73.50	-10.31	-0.64	0.00	-17.96	0.00	17.96	1918.09	959.05	2950.37	1477.38	0.52	-0.07	0.00	0.018
75.00	-10.17	-0.64	0.00	-17.00	0.00	17.00	1906.79	953.39	2902.59	1453.45	0.54	-0.07	0.00	0.017
80.00	-9.70	-0.64	0.00	-13.79	0.00	13.79	1867.83	933.91	2744.05	1374.07	0.62	-0.07	0.00	0.015
85.00	-9.25	-0.64	0.00	-10.57	0.00	10.57	1826.92	913.46	2586.89	1295.37	0.70	-0.08	0.00	0.013
86.00	-6.90	-0.62	0.00	-9.93	0.00	9.93	1818.51	909.25	2555.66	1279.73	0.72	-0.08	0.00	0.012
90.00	-6.56	-0.61	0.00	-7.46	0.00	7.46	1784.07	892.03	2431.43	1217.52	0.79	-0.08	0.00	0.010
95.00	-6.15	-0.59	0.00	-4.41	0.00	4.41	1739.26	869.63	2277.96	1140.67	0.87	-0.08	0.00	0.007
96.00	-2.39	-0.35	0.00	-3.82	0.00	3.82	1730.06	865.03	2247.53	1125.44	0.89	-0.08	0.00	0.005
98.50	-2.20	-0.34	0.00	-2.94	0.00	2.94	1706.74	853.37	2171.89	1087.56	0.93	-0.09	0.00	0.004
98.50	-2.20	-0.34	0.00	-2.94	0.00	2.94	854.88	427.44	974.68	581.27	0.93	-0.09	0.00	0.008
100.00	-2.07	-0.33	0.00	-2.44	0.00	2.44	854.88	427.44	974.68	581.27	0.96	-0.09	0.00	0.007
105.00	-1.64	-0.27	0.00	-0.81	0.00	0.81	854.88	427.44	974.68	581.27	1.05	-0.09	0.00	0.003
108.00	-0.05	-0.01	0.00	0.00	0.00	0.00	854.88	427.44	974.68	581.27	1.11	-0.09	0.00	0.000
108.50	0.00	-0.01	0.00	0.00	0.00	0.00	854.88	427.44	974.68	581.27	1.12	-0.09	0.00	0.000

Wind Loading - Shaft

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 1.0D + 1.0W 60 mph Wind	Iterations 18
Dead Load Factor 1.00	
Wind Load Factor 1.00	

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	7.442	8.19	262.13	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	7.442	8.19	256.12	0.650	0.000	5.00	23.422	15.22	124.6	0.0	928.9
10.00		1.00	0.85	7.442	8.19	250.12	0.650	0.000	5.00	22.879	14.87	121.7	0.0	907.3
15.00		1.00	0.85	7.442	8.19	244.11	0.650	0.000	5.00	22.336	14.52	118.9	0.0	885.6
20.00		1.00	0.90	7.896	8.69	245.27	0.650	0.000	5.00	21.793	14.17	123.0	0.0	864.0
25.00		1.00	0.95	8.276	9.10	244.76	0.650	0.000	5.00	21.251	13.81	125.7	0.0	842.3
30.00		1.00	0.98	8.600	9.46	243.05	0.650	0.000	5.00	20.708	13.46	127.3	0.0	820.7
35.00		1.00	1.01	8.883	9.77	240.47	0.650	0.000	5.00	20.165	13.11	128.1	0.0	799.0
40.00		1.00	1.04	9.137	10.05	237.22	0.650	0.000	5.00	19.622	12.75	128.2	0.0	777.4
45.00		1.00	1.07	9.366	10.30	233.44	0.650	0.000	5.00	19.079	12.40	127.8	0.0	755.7
46.50	Bot - Section 2	1.00	1.08	9.431	10.37	232.22	0.650	0.000	1.50	5.618	3.65	37.9	0.0	222.5
50.00		1.00	1.09	9.576	10.53	229.23	0.650	0.000	3.50	13.067	8.49	89.5	0.0	926.1
52.50	Top - Section 1	1.00	1.11	9.675	10.64	226.99	0.650	0.000	2.50	9.171	5.96	63.4	0.0	649.8
55.00		1.00	1.12	9.770	10.75	227.34	0.650	0.000	2.50	9.035	5.87	63.1	0.0	286.6
60.00		1.00	1.14	9.951	10.95	222.49	0.650	0.000	5.00	17.663	11.48	125.7	0.0	560.2
65.00		1.00	1.16	10.120	11.13	217.37	0.650	0.000	5.00	17.120	11.13	123.9	0.0	542.9
70.00		1.00	1.17	10.279	11.31	212.01	0.650	0.000	5.00	16.577	10.77	121.8	0.0	525.6
73.50	Appurtenance(s)	1.00	1.19	10.385	11.42	208.14	0.650	0.000	3.50	11.281	7.33	83.8	0.0	357.6
75.00		1.00	1.19	10.430	11.47	206.45	0.650	0.000	1.50	4.753	3.09	35.4	0.0	150.7
80.00		1.00	1.21	10.572	11.63	200.70	0.650	0.000	5.00	15.491	10.07	117.1	0.0	490.9
85.00		1.00	1.22	10.708	11.78	194.78	0.650	0.000	5.00	14.948	9.72	114.4	0.0	473.6
86.00	Appurtenance(s)	1.00	1.23	10.734	11.81	193.58	0.650	0.000	1.00	2.925	1.90	22.4	0.0	92.6
90.00		1.00	1.24	10.838	11.92	188.71	0.650	0.000	4.00	11.481	7.46	89.0	0.0	363.6
95.00		1.00	1.25	10.962	12.06	182.50	0.650	0.000	5.00	13.863	9.01	108.7	0.0	439.0
96.00	Appurtenance(s)	1.00	1.25	10.986	12.08	181.24	0.650	0.000	1.00	2.707	1.76	21.3	0.0	85.7
98.50	Top - Section 2	1.00	1.26	11.046	12.15	178.07	0.650	0.000	2.50	6.674	4.34	52.7	0.0	211.3
100.00		1.00	1.27	11.081	12.19	157.50	0.600	0.000	1.50	3.500	2.10	25.6	0.0	138.5
105.00		1.00	1.28	11.195	12.31	158.31	0.600	0.000	5.00	11.667	7.00	86.2	0.0	461.7
108.00	Appurtenance(s)	1.00	1.29	11.262	12.39	158.78	0.600	0.000	3.00	7.000	4.20	52.0	0.0	277.0
108.50	Appurtenance(s)	1.00	1.29	11.273	12.40	158.86	0.600	0.000	0.50	1.167	0.70	8.7	0.0	46.2
Totals:									108.50			2,568.0	14,882.9	

Discrete Appurtenance Forces

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations 18

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	108.50	Lightning Rod	1	11.273	12.400	1.00	1.00	0.50	5.00	0.000	0.000	6.20	0.00	0.00
2	108.00	VZS01	3	11.262	12.388	0.76	1.00	9.80	261.30	0.000	0.000	121.45	0.00	0.00
3	108.00	Flush Mount	1	11.262	12.388	1.00	1.00	5.00	350.00	0.000	0.000	61.94	0.00	0.00
4	108.00	JAHH-65B-R3B	6	11.262	12.388	0.83	1.00	45.37	379.80	0.000	0.000	562.01	0.00	0.00
5	108.00	B2/B66A RRH-BR049	3	11.262	12.388	0.67	1.00	3.76	253.20	0.000	0.000	46.56	0.00	0.00
6	108.00	B5/B13 RRH-BR04C	3	11.262	12.388	0.67	1.00	3.76	210.90	0.000	0.000	46.56	0.00	0.00
7	108.00	DB-T1-6Z-8AB-0Z	2	11.262	12.388	0.75	1.00	7.20	37.80	0.000	0.000	89.19	0.00	0.00
8	96.00	ULPD12-472	1	10.986	12.085	0.75	0.75	30.22	2331.00	0.000	0.000	365.25	0.00	0.00
9	96.00	ALU 800 MHz RRH RRU	6	10.986	12.085	0.54	0.80	8.01	318.00	0.000	0.000	96.77	0.00	0.00
10	96.00	Ericsson 4449 B71 + B85	3	10.986	12.085	0.54	0.80	3.17	219.60	0.000	0.000	38.28	0.00	0.00
11	96.00	Ericsson 4415 B25 RRU	3	10.986	12.085	0.54	0.80	2.99	138.90	0.000	0.000	36.14	0.00	0.00
12	96.00	AIR6449 B41	3	10.986	12.085	0.57	0.80	9.63	309.00	0.000	0.000	116.34	0.00	0.00
13	96.00	APXVAALL24-43-U-NA20	3	10.986	12.085	0.58	0.80	35.46	368.40	0.000	0.000	428.52	0.00	0.00
14	96.00	AIR32	3	10.986	12.085	0.70	0.80	13.59	396.60	0.000	0.000	164.26	0.00	0.00
15	86.00	RDIDC-9181-PF-48	1	10.734	11.808	1.00	1.00	2.01	21.85	0.000	0.000	23.73	0.00	0.00
16	86.00	TA08025-B604	3	10.734	11.808	0.50	0.75	2.95	191.70	0.000	0.000	34.89	0.00	0.00
17	86.00	TA08025-B605	3	10.734	11.808	0.50	0.75	2.95	225.00	0.000	0.000	34.89	0.00	0.00
18	86.00	SNP8HR-3XX	1	10.734	11.808	1.00	1.00	39.73	1876.00	0.000	0.000	469.07	0.00	0.00
19	86.00	MX08FRO665-21	3	10.734	11.808	0.55	0.75	20.80	193.50	0.000	0.000	245.55	0.00	0.00
20	73.50	Sidarm	1	10.385	11.424	1.00	1.00	3.50	53.32	0.000	0.000	39.98	0.00	0.00
21	73.50	3'6" x 2'6" Dipole	1	10.331	11.364	1.00	1.00	1.74	15.00	0.000	-1.800	19.77	0.00	-35.59
22	73.50	10' x 1" Omni	1	10.530	11.583	1.00	1.00	1.25	12.00	0.000	5.000	14.48	0.00	72.40
Totals:									8,167.87			3,061.87		

Total Applied Force Summary

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations 18

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		124.63	957.10	0.00	0.00
10.00		121.74	935.45	0.00	0.00
15.00		118.85	913.80	0.00	0.00
20.00		123.04	892.15	0.00	0.00
25.00		125.75	870.50	0.00	0.00
30.00		127.33	848.85	0.00	0.00
35.00		128.08	827.21	0.00	0.00
40.00		128.19	805.56	0.00	0.00
45.00		127.77	783.91	0.00	0.00
46.50		37.88	230.95	0.00	0.00
50.00		89.47	945.87	0.00	0.00
52.50		63.44	663.93	0.00	0.00
55.00		63.12	300.69	0.00	0.00
60.00		125.67	588.40	0.00	0.00
65.00		123.88	571.08	0.00	0.00
70.00		121.83	553.76	0.00	0.00
73.50	(3) attachments	158.00	457.65	0.00	36.80
75.00		35.45	158.63	0.00	0.00
80.00		117.10	517.52	0.00	0.00
85.00		114.45	500.20	0.00	0.00
86.00	(11) attachments	830.58	2606.01	0.00	0.00
90.00		88.97	380.36	0.00	0.00
95.00		108.65	459.86	0.00	0.00
96.00	(22) attachments	1266.85	4171.39	0.00	0.00
98.50		52.71	217.94	0.00	0.00
100.00		25.60	141.82	0.00	0.00
105.00		86.20	472.74	0.00	0.00
108.00	(18) attachments	979.75	1776.65	0.00	0.00
108.50	(1) attachments	14.88	51.17	0.00	0.00
	Totals:	5,629.84	23,601.18	0.00	36.80

Calculated Forces

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 1.0D + 1.0W 60 mph Wind	Iterations	18
Dead Load Factor 1.00		
Wind Load Factor 1.00		

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-23.60	-5.64	0.00	-440.39	0.00	440.39	3275.65	1637.82	7512.12	3761.64	0.00	0.000	0.000	0.124
5.00	-22.64	-5.52	0.00	-412.21	0.00	412.21	3241.53	1620.76	7261.66	3636.23	0.02	-0.028	0.000	0.120
10.00	-21.70	-5.41	0.00	-384.60	0.00	384.60	3205.46	1602.73	7010.56	3510.49	0.06	-0.056	0.000	0.116
15.00	-20.79	-5.30	0.00	-357.56	0.00	357.56	3167.44	1583.72	6759.13	3384.59	0.13	-0.084	0.000	0.112
20.00	-19.89	-5.19	0.00	-331.06	0.00	331.06	3127.48	1563.74	6507.68	3258.68	0.24	-0.112	0.000	0.108
25.00	-19.02	-5.07	0.00	-305.13	0.00	305.13	3085.56	1542.78	6256.52	3132.91	0.37	-0.140	0.000	0.104
30.00	-18.17	-4.95	0.00	-279.80	0.00	279.80	3041.69	1520.85	6005.97	3007.45	0.53	-0.168	0.000	0.099
35.00	-17.34	-4.82	0.00	-255.07	0.00	255.07	2995.87	1497.94	5756.34	2882.45	0.72	-0.195	0.000	0.094
40.00	-16.53	-4.70	0.00	-230.95	0.00	230.95	2948.10	1474.05	5507.93	2758.06	0.94	-0.223	0.000	0.089
45.00	-15.75	-4.57	0.00	-207.45	0.00	207.45	2898.39	1449.19	5261.05	2634.44	1.19	-0.249	0.000	0.084
46.50	-15.51	-4.54	0.00	-200.59	0.00	200.59	2883.09	1441.55	5187.33	2597.52	1.27	-0.257	0.000	0.083
50.00	-14.57	-4.45	0.00	-184.70	0.00	184.70	2846.72	1423.36	5016.02	2511.74	1.47	-0.275	0.000	0.079
52.50	-13.90	-4.39	0.00	-173.58	0.00	173.58	2057.96	1028.98	3624.72	1815.05	1.61	-0.288	0.000	0.102
55.00	-13.60	-4.33	0.00	-162.62	0.00	162.62	2043.11	1021.55	3544.30	1774.78	1.77	-0.301	0.000	0.098
60.00	-13.01	-4.20	0.00	-140.99	0.00	140.99	2011.95	1005.98	3383.36	1694.19	2.10	-0.330	0.000	0.090
65.00	-12.44	-4.08	0.00	-119.98	0.00	119.98	1978.85	989.42	3222.55	1613.67	2.46	-0.357	0.000	0.081
70.00	-11.89	-3.96	0.00	-99.57	0.00	99.57	1943.79	971.90	3062.19	1533.37	2.85	-0.382	0.000	0.071
73.50	-11.43	-3.80	0.00	-85.67	0.00	85.67	1918.09	959.05	2950.37	1477.38	3.13	-0.398	0.000	0.064
75.00	-11.27	-3.77	0.00	-79.97	0.00	79.97	1906.79	953.39	2902.59	1453.45	3.26	-0.405	0.000	0.061
80.00	-10.75	-3.65	0.00	-61.14	0.00	61.14	1867.83	933.91	2744.05	1374.07	3.70	-0.425	0.000	0.050
85.00	-10.25	-3.53	0.00	-42.89	0.00	42.89	1826.92	913.46	2586.89	1295.37	4.15	-0.441	0.000	0.039
86.00	-7.65	-2.68	0.00	-39.35	0.00	39.35	1818.51	909.25	2555.66	1279.73	4.24	-0.444	0.000	0.035
90.00	-7.27	-2.59	0.00	-28.62	0.00	28.62	1784.07	892.03	2431.43	1217.52	4.62	-0.454	0.000	0.028
95.00	-6.81	-2.48	0.00	-15.66	0.00	15.66	1739.26	869.63	2277.96	1140.67	5.10	-0.462	0.000	0.018
96.00	-2.65	-1.18	0.00	-13.17	0.00	13.17	1730.06	865.03	2247.53	1125.44	5.20	-0.464	0.000	0.013
98.50	-2.43	-1.13	0.00	-10.22	0.00	10.22	1706.74	853.37	2171.89	1087.56	5.44	-0.466	0.000	0.011
98.50	-2.43	-1.13	0.00	-10.22	0.00	10.22	854.88	427.44	974.68	581.27	5.44	-0.466	0.000	0.020
100.00	-2.29	-1.10	0.00	-8.53	0.00	8.53	854.88	427.44	974.68	581.27	5.59	-0.468	0.000	0.017
105.00	-1.82	-1.01	0.00	-3.04	0.00	3.04	854.88	427.44	974.68	581.27	6.08	-0.471	0.000	0.007
108.00	-0.05	-0.02	0.00	-0.01	0.00	0.01	854.88	427.44	974.68	581.27	6.38	-0.471	0.000	0.000
108.50	0.00	-0.01	0.00	0.00	0.00	0.00	854.88	427.44	974.68	581.27	6.42	-0.471	0.000	0.000

Final Analysis Summary

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)
1.2D + 1.6W 98 mph Wind	24.1	0.00	28.30	0.00	0.00	1884.59
0.9D + 1.6W 98 mph Wind	24.1	0.00	21.21	0.00	0.00	1876.96
1.2D + 1.0Di + 1.0Wi 50 mph Wind	6.7	0.00	47.00	0.00	0.00	510.38
1.2D + 1.0E	0.8	0.00	28.32	0.00	0.00	69.86
0.9D + 1.0E	0.8	0.00	21.24	0.00	0.00	69.55
1.0D + 1.0W 60 mph Wind	5.6	0.00	23.60	0.00	0.00	440.39

Max Stresses

Load Case	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Elev (ft)	Stress Ratio
1.2D + 1.6W 98 mph Wind	-28.30	-24.06	0.00	-1884.5	0.00	-1884.5	3275.65	1637.8	7512.12	3761.64	0.00	0.510
0.9D + 1.6W 98 mph Wind	-21.21	-24.05	0.00	-1876.9	0.00	-1876.9	3275.65	1637.8	7512.12	3761.64	0.00	0.506
1.2D + 1.0Di + 1.0Wi 50 mph Wind	-47.00	-6.74	0.00	-510.38	0.00	-510.38	3275.65	1637.8	7512.12	3761.64	0.00	0.150
1.2D + 1.0E	-28.32	-0.80	0.00	-69.86	0.00	-69.86	3275.65	1637.8	7512.12	3761.64	0.00	0.027
0.9D + 1.0E	-21.24	-0.80	0.00	-69.55	0.00	-69.55	3275.65	1637.8	7512.12	3761.64	0.00	0.025
1.0D + 1.0W 60 mph Wind	-23.60	-5.64	0.00	-440.39	0.00	-440.39	3275.65	1637.8	7512.12	3761.64	0.00	0.124

Base Plate Summary

Structure: CT46140-A-SB	Code: EIA/TIA-222-G	5/17/2021
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Reactions	Base Plate	Anchor Bolts
Original Design	Yield (ksi): 60.00	Bolt Circle: 65.00
Moment (kip-ft): 2596.40	Width (in): 71.00	Number Bolts: 12.00
Axial (kip): 24.00	Style: Round	Bolt Type: 2.25" 18J
Shear (kip): 28.50	Polygon Sides: 0.00	Bolt Diameter (in): 2.25
Analysis (1.2D + 1.6W)	Clip Length (in): 0.00	Yield (ksi): 75.00
Moment (kip-ft): 1884.59	Effective Len (in): 32.34	Ultimate (ksi): 100.00
Axial (kip): 28.30	Moment (kip-in): 539.51	Arrangement: Radial
Shear (kip): 24.06	Allow Stress (ksi): 81.00	Cluster Dist (in): 0.00
	Applied Stress (ksi): 44.55	Start Angle (deg): 0.00
	Stress Ratio: 0.55	Compression
		Force (kip): 119.89
		Allowable (kip): 260.00
		Ratio: 0.48
		Tension
		Force (kip): 112.06
		Allowable (kip): 260.00
		Ratio: 0.45



Monopole Mat Foundation Design

Date

5/17/2021

Customer Name:	Verizon	EIA/TIA Standard:	EIA-222-G
Site Name:		Structure Height (Ft.):	108.5
Site Number:	CT46140-A-SBA	Engineer Name:	D. Zhou
Engr. Number:	107755	Engineer Login ID:	

Foundation Info Obtained from:

Mapping Operation

Structure Type:

Monopole

Analysis or Design?

Analysis

Base Reactions (Factored):

Axial Load (Kips):	28.3	Shear Force (Kips):	24.1
Uplift Force (Kips):	0.0	Moment (Kips-ft):	1884.6

Allowable overstress %: 5.0%

Foundation Geometries:

Diameter of Pier (ft.):	7.0	Mods required -Yes/No ?:	No
Pier Height A. G. (ft.):	0.50	Depth of Base BG (ft.):	7.5
Length of Pad (ft.):	25	Thickness of Pad (ft.):	3.00
		Width of Pad (ft.):	25

Final Length of pad (ft)	25.0	Final width of pad (ft):	25.0
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Material Properties and Rebar Info:

Concrete Strength (psi):	3000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield (ksi):	60	
Vertical Rebar Size #:	9	Tie / Stirrup Size #:	5	
Qty. of Vertical Rebars:	37	Tie Spacing (in):	6.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	9	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf

Rebar at the bottom of the concrete pad:

Qty. of Rebar in Pad (L):	30	Qty. of Rebar in Pad (W):	30
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Rebar at the top of the concrete pad:

Qty. of Rebar in Pad (L):	30	Qty. of Rebar in Pad (W):	30
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Apply 1.35 factor for e/w Per G: 1.35

Soil Design Parameters:

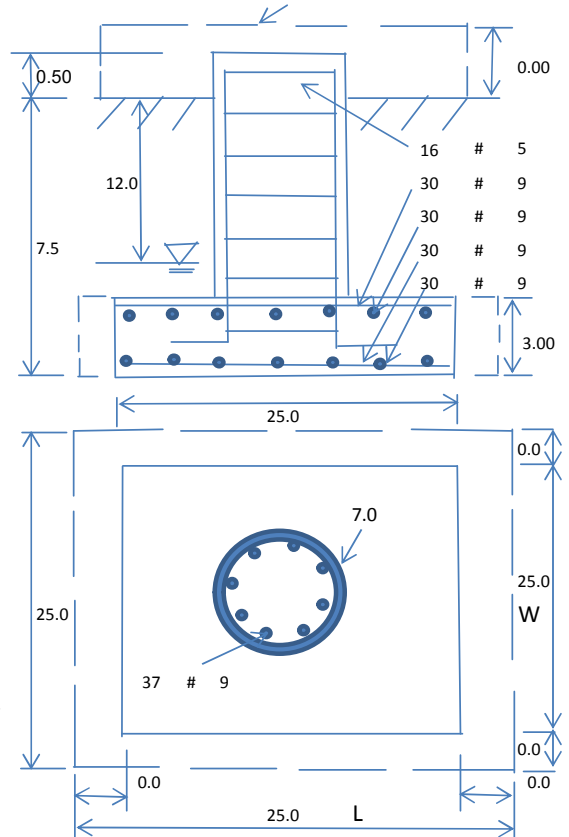
Soil Unit Weight (pcf):	110.0	Soil Buoyant Weight:	50.0	Pcf
Water Table B.G.S. (ft):	12.0	Unit Weight of Water:	62.4	pcf
Ultimate Bearing Pressure (psf):	12000	Ultimate Skin Friction:	0	Psf
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	No	
Consider soil hor. resist. for OTM.:	No	Reduction factor on the maximum soil bearing pressure:	1.00	
		Angle from Top of Pad:	30	
		Angle from Bottm of Pad:	25	
		Angle from Bottm of Pad:	25	

Foundation Analysis and Design:

Uplift Strength Reduction Factor:	0.75	Compression Strength Reduction Factor:	0.75
Total Dry Soil Volume (cu. Ft.):	2639.32	Total Dry Soil Weight (Kips):	290.33
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	290.33	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	2067.42	Total Dry Concrete Weight (Kips):	310.11
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	310.11	Total Vertical Load on Base (Kips):	628.74

Check Soil Capacities:

Calculated Maxium Net Soil Pressure under the base (psf):	1592	<	Allowable Factored Soil Bearing (psf):	9000	0.18	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	7108.7	>	Design Factored Momont (kips-ft):	2077	0.29	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	3.42					OK!



Check the capacities of Reinforcing Concrete:

Strength reduction factor (Flexure and axial tension):	0.90	Strength reduction factor (Shear):	0.75
Strength reduction factor (Axial compression):	0.65	Wind Load Factor on Concrete Design:	1.00

(1) Concrete Pier:

Vertical Steel Rebar Area (sq. in./each):	1.00	Tie / Stirrup Area (sq. in./each):	0.31			
Calculated Moment Capacity (Mn,Kips-Ft):	5899.1	>	Design Factored Moment (Mu, Kips-F	2005.1	0.34	OK!
Calculated Shear Capacity (Kips):	871.9	>	Design Factored Shear (Kips):	24.1	0.03	OK!
Calculated Tension Capacity (Tn, Kips):	1998.0	>	Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	7299.3	>	Design Factored Axial Load (Pu Kips):	28.3	0.00	OK!
Moment & Axial Strength Combination:	0.34	OK!	Check Tie Spacing (Design/Required):		0.5	OK!
Pier Reinforcement Ratio:	0.007		Reinforcement Ratio is satisfied per ACI			

(2).Concrete Pad:

One-Way Design Shear Capacity (L-Direction, Kips):	799.5	>	One-Way Factored Shear (L-D. Kips):	161.0	0.20	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	799.5	>	One-Way Factored Shear (W-D., Kips)	161.0	0.20	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	733.9	>	One-Way Factored Shear (C-C, Kips):	140.8	0.19	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0031	OK!	Lower Steel Pad Reinf. Ratio (W-Direc	0.0031		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	4220.2	>	Moment at Bottom (L-Dir. K-Ft):	911.7	0.22	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	4220.2	>	Moment at Bottom (W-Dir. K-Ft):	911.7	0.22	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	5912.9	>	Moment at Bottom (C-C Dir. K-Ft):	1289.4	0.22	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0031	OK!	Upper Steel Reinf. Ratio (W-Dir.):	0.0031		
Upper Steel Pad Moment Capacity (L-Direc. Kips-ft):	4220.2	>	Moment at the top (L-Dir K-Ft):	335.5	0.08	OK!
Upper Steel Pad Moment Capacity (W-Direc. Kips-ft):	4220.2	>	Moment at the top (W-Dir K-Ft):	335.5	0.08	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	5912.9	>	Moment at the top (C-C Dir. K-Ft):	314.8	0.05	OK!

(3).Check Punching Shear Capacity due to Moment in the Pier:

Moment transferred by punching shear:	753.8	k-ft.	Max. factored shear stress v_{u_CD} :	1.8	Psi
Max. factored shear stress v_{u_AB} :	5.5	Psi	Factored shear Strength ϕv_n :	164.3	Psi
Max. factored shear stress v_u :	5.5	Psi	Check Usage of Punching Shear Capacity:	0.03	OK!



Tower Engineering Solutions, LLC

June 14, 2021

Mr. Andrew Leone
Verizon Wireless
20 Alexander Dr.
Wallingford, CT 06492

Re: Verizon Wireless antenna Model Clarification for CT Siting Council

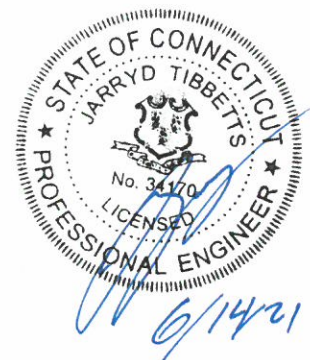
Dear Mr. Leone,

This letter is intended to clarify and confirm the antenna naming convention used by Verizon Wireless as a part of an antenna upgrade project on numerous wireless facilities.

The antenna naming convention "Licensed Sub-6, L-Sub6, nL-Sub6, VZS01" and any other slight variants refer to the 64T64RMMU, Model Code: MT6407-77A manufactured by Samsung Electronics. These names are interchangeable and are used in various documents, including but not limited to the "Structural Analysis".

If you have any questions or comments, or require additional information, please do not hesitate to contact me.

Sincerely,
Tower Engineering Solutions, LLC





Maser Consulting Connecticut
2000 Midlantic Drive, Suite 100
Mt. Laurel, NJ 08054
(856) 797-0412
peter.albano@colliersengineering.com

Antenna Mount Analysis Report and PMI Requirements

Mount Analysis

SMART Tool Project #: 10046597
Maser Consulting Connecticut Project #: 21777321A

May 3, 2021

Site Information

Site ID: 467330-VZW / DURHAM SOUTH CT
Site Name: DURHAM SOUTH CT
Carrier Name: Verizon Wireless
Address: 134 R Creamy Rd
Durham, Connecticut 06422
Middlesex County
Latitude: 41.441353°
Longitude: -72.696147°

Structure Information

Tower Type: 110-Ft Self Support
Mount Type: 4.00-Ft T-Arm

FUZE ID # 16272119

Analysis Results

T-Arm: 41.6% Pass

*****Contractor PMI Requirements:**

Included at the end of this MA report

Available & Submitted via portal at <https://pmi.vzwsmart.com>

Contractor - Please Review Specific Site PMI Requirements Upon Award

Requirements also Noted on Mount Modification Drawings

Requirements may also be Noted on A & E drawings

Report Prepared By: Ella Khosravi



Digitally signed by Justin Linette
Date: 2021.05.21 07:12:57-04'00

Executive Summary:

The objective of this report is to determine the capacity of the antenna support mount at the subject facility for the final wireless telecommunications configuration, per the applicable codes and standards. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

This analysis is inclusive of the mount structure only and does not address the structural capacity of the supporting structure. This mounting frame was not analyzed as an anchor attachment point for fall protection. All climbing activities are required to have a fall protection plan completed by a competent person.

Sources of Information:

Document Type	Remarks
<i>Radio Frequency Data Sheet (RFDS)</i>	<i>Verizon RFDS Site ID: 1989478, dated February 26, 2021</i>
<i>Mount Mapping Report</i>	<i>Roaming Networks INC., Site ID: SBA:CT467330, dated March 25, 2021</i>

Analysis Criteria:

Codes and Standards:	ANSI/TIA-222-H
Wind Parameters:	Basic Wind Speed (Ultimate 3-sec. Gust), V_{ULT} : 120 mph Ice Wind Speed (3-sec. Gust): 50 mph Design Ice Thickness: 1.00 in Risk Category: II Exposure Category: B Topographic Category: 1 Topographic Feature Considered: N/A Topographic Method: N/A Ground Elevation Factor, K_e : 0.984
Seismic Parameters:	S_s : 0.21 S_1 : 0.055
Maintenance Parameters:	Wind Speed (3-sec. Gust): 30 mph Maintenance Live Load, L_v : 250 lbs. Maintenance Live Load, L_m : 500 lbs.
Analysis Software:	RISA-3D (V17)

Final Loading Configuration:

The following equipment has been considered for the analysis of the mount:

Mount Elevation (ft)	Equipment Elevation (ft)	Quantity	Manufacturer	Model	Status
107.00	107.00	6	Commscope	JAHH-65B-R3B	Added
		3	Samsung	MT6407-77A	
		3	Commscope	CBC78T-DS-43	
		3	Samsung	RFV01U-D2A	
		3	Samsung	RFV01U-D1A	
		2	Raycap	RRFDC-3315-PF-48	Retained

Standard Conditions:

1. All engineering services are performed on the basis that the information provided to Maser Consulting Connecticut and used in this analysis is current and correct. The existing equipment loading has been applied at locations determined from the supplied documentation. Any deviation from the loading locations specified in this report shall be communicated to Maser Consulting Connecticut to verify deviation will not adversely impact the analysis.
2. Mounts are assumed to have been properly fabricated, installed and maintained in good condition, twist free and plumb in accordance with its original design and manufacturer’s specifications.

Obvious safety and structural issues/deficiencies noticed at the time of the mount mapping and reported in the Mount Mapping Report are assumed to be corrected and documented as part of the PMI process and are not considered in the mount analysis.

The mount analysis and the mount mapping are not a condition assessment of the mount. Proper maintenance and condition assessments are still required post analysis.

3. For mount analyses completed from other data sources (including new replacement mounts) and not specifically mapped by Maser Consulting Connecticut, the mounts are assumed to have been properly fabricated, installed and maintained in good condition, twist free and plumb in accordance with its original design and manufacturer’s specifications.
4. All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
5. The mount was checked up to, and including, the bolts that fasten it to the mount collar/attachment and threaded rod connections in collar members if applicable. Local deformation and interaction between the mount collar/attachment and the supporting tower structure are outside the scope of this analysis.
6. All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. Maser Consulting Connecticut is not responsible for the conclusion, opinions, and recommendations made by others based on the information supplied.

7. Structural Steel Grades have been assumed as follows, if applicable, unless otherwise noted in this analysis:
- Channel, Solid Round, Angle, Plate ASTM A36 (Gr. 36)
 - HSS (Rectangular) ASTM 500 (Gr. B-46)
 - Pipe ASTM A53 (Gr. B-35)
 - Threaded Rod F1554 (Gr. 36)
 - Bolts ASTM A325

Discrepancies between in-field conditions and the assumptions listed above may render this analysis invalid unless explicitly approved by Maser Consulting Connecticut.

Analysis Results:

Component	Utilization %	Pass/Fail
<i>Standoff Arm</i>	<i>17.6 %</i>	<i>Pass</i>
<i>Horizontal</i>	<i>29.9 %</i>	<i>Pass</i>
<i>Antenna Pipe</i>	<i>18.8 %</i>	<i>Pass</i>
<i>Connection Check</i>	<i>41.6%</i>	<i>Pass</i>

Structure Rating – (Controlling Utilization of all Components)	41.6%
---	--------------

This mount has been found structurally adequate for all steel and external connection capacities. Serviceability in accordance with TIA-222-H Section 4.9.11.3 has not been considered.

Recommendation:

The existing mount is **SUFFICIENT** for the final loading configuration and do not require modifications.

ANSI/ASSP rigging plan review services compliant with the requirements of ANSI/TIA 322 are available for a Construction Class IV site or other, if required. Separate review fees will apply.

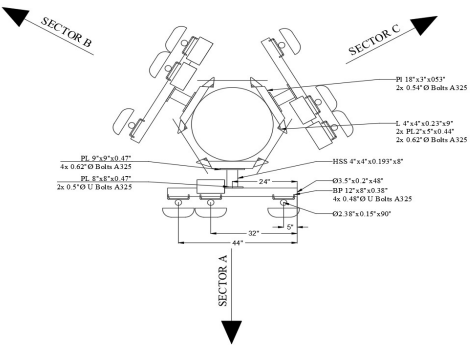
Attachments:

1. Mount Photos
2. Mount Mapping Report (for reference only)
3. Analysis Calculations
4. Contractor Required Post Installation Inspection (PMI) Report Deliverables
5. Antenna Placement Diagrams
6. TIA Adoption and Wind Speed Usage Letter



	Antenna Mount Mapping Form (PATENT PENDING)			FCC #
				1270239
Tower Owner:	SBA:	Mapping Date:	03.25.2021.	
Site Name:	SBA:DURHAM SOUTH CT	Tower Type:	Monopole	
Site Number or ID:	SBA:CT467330	Tower Height (Ft.):		
Mapping Contractor:	Roaming Networks inc.	Mount Elevation (Ft.):	107	

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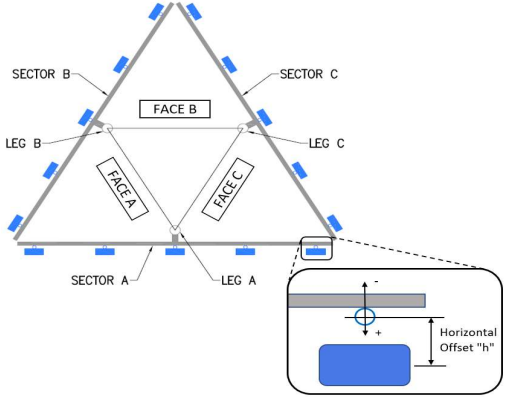


Mount Pipe Configuration and Geometries [Unit = Inches]							
Sector / Position	Mount Pipe Size & Length	Vertical Offset Dimension "U"	Horizontal Offset "C1, C2, C3, etc."	Sector / Position	Mount Pipe Size & Length	Vertical Offset Dimension "U"	Horizontal Offset "C1, C2, C3, etc."
A1	PIPE Ø 2.38 x 0.15" x 90"	41.00	5.00	C1	PIPE Ø 2.38 x 0.15" x 90"	41.00	5.00
A2	PIPE Ø 2.38 x 0.15" x 90"	42.00	32.00	C2	PIPE Ø 2.38 x 0.15" x 90"	42.00	32.00
A3	PIPE Ø 2.38 x 0.15" x 90"	42.00	44.00	C3	PIPE Ø 2.38 x 0.15" x 90"	42.00	44.00
A4				C4			
A5				C5			
A6				C6			
B1	PIPE Ø 2.38 x 0.15" x 90"	41.00	5.00	D1			
B2	PIPE Ø 2.38 x 0.15" x 90"	42.00	32.00	D2			
B3	PIPE Ø 2.38 x 0.15" x 90"	42.00	44.00	D3			
B4				D4			
B5				D5			
B6				D6			

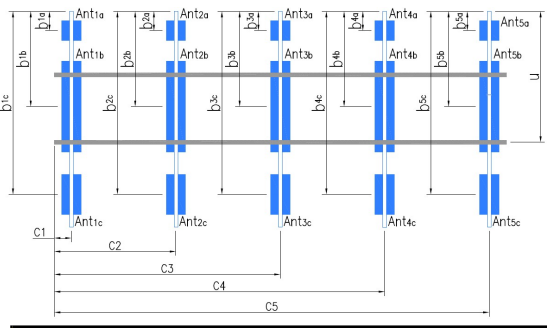
Distance between bottom rail and mount CL elevation (dim d). Unit is inches. See 'Mount Elev Ref' tab for details. :
 Distance from top of bottom support rail to lowest tip of ant./eqpt. of Carrier above. (N/A if > 10 ft.) :
 Distance from top of bottom support rail to highest tip of ant./eqpt. of Carrier below. (N/A if > 10 ft.) : 5.4

Please enter additional information or comments below.

Tower Face Width at Mount Elev. (ft.):	Tower Leg Size or Pole Shaft Diameter at Mount Elev. (in.):	30.25
--	---	-------



		Enter antenna model. If not labeled, enter "Unknown".					Mounting Locations [Units are inches and degrees]			Photos of antennas
Ants. Items	Antenna Models if Known	Width (in.)	Depth (in.)	Height (in.)	Coax Size and Qty	Antenna Center-line (Ft.)	Vertical Distances "b _{1a} , b _{2a} , b _{3a} , b _{1b} ,..." (Inches)		Antenna Azimuth (Degrees)	Photo Numbers
							b _{1a}	b _{2a}		
Sector A										
Ant _{1a}	SBNHH-1D65B	11.85	7.09	72.87		106.667	45.00	8.00	19.00	149
Ant _{1b}										
Ant _{1c}										
Ant _{2a}	SBNHH-1D65B	11.85	7.09	72.87		106.75	45.00	8.00	19.00	149
Ant _{2b}	B66a RRH 4x45	12.00	9.00	21.60		108.5	24.00	7.00		149
Ant _{2c}										
Ant _{3a}	SBNHH-1D65B	11.85	7.09	72.87		106.75	45.00	8.00	19.00	149
Ant _{3b}										
Ant _{3c}										
Ant _{4a}	B13 RRH 4x30	13.80	8.20	72.00		107				149
Ant _{4b}										
Ant _{4c}										
Ant _{5a}										
Ant _{5b}										
Ant _{5c}										
Ant on Standoff										
Ant on Standoff										
Ant on Tower										
Ant on Tower										



Antenna Layout (Looking Out From Tower)

Mount Azimuth (Degree) for Each Sector				Tower Leg Azimuth (Degree) for Each Sector				Sector B																
Sector A:	19.00	Deg	Leg A:		Deg			Ant _{1a}	SBNHH-1D65B	11.85	7.09	72.87		106.667	45.00	8.00	155.00	158						
Sector B:	155.00	Deg	Leg B:		Deg			Ant _{1b}																
Sector C:	258.00	Deg	Leg C:		Deg			Ant _{1c}																
Sector D:		Deg	Leg D:		Deg			Ant _{2a}	SBNHH-1D65B	11.85	7.09	72.87		106.75	45.00	8.00	155.00	158						
Climbing Facility Information								Ant _{2b}	B66a RRH 4x45	12.00	9.00	21.60		108.5	24.00	7.00		158						
Location:	155.00	Deg	Sector B					Ant _{2c}																
Climbing Facility	Corrosion Type:		Good condition.					Ant _{3a}	SBNHH-1D65B	11.85	7.09	72.87		106.75	45.00	8.00	155.00	158						
	Access:		Climbing path was unobstructed.					Ant _{3b}	RRFDC-3315-PF-48	15.73	10.30	28.93		110.5				158						
	Condition:		Loose hardware.					Ant _{3c}																
								Ant _{4a}	B13 RRH 4x30	13.80	8.20	72.00		107										158
								Ant _{4b}																
								Ant _{4c}																
								Ant _{5a}																
								Ant _{5b}																
								Ant _{5c}																
								Ant on Standoff																
								Ant on Standoff																
								Ant on Tower																
								Ant on Tower																
Sector C																								
								Ant _{1a}	SBNHH-1D65B	11.85	7.09	72.87		106.667	45.00	8.00	258.00	170						
								Ant _{1b}																
								Ant _{1c}																
								Ant _{2a}	SBNHH-1D65B	11.85	7.09	72.87		106.75	45.00	8.00	258.00	170						
								Ant _{2b}	B66a RRH 4x45	12.00	9.00	21.60		108.5	24.00	7.00		170						
								Ant _{2c}																
								Ant _{3a}	SBNHH-1D65B	11.85	7.09	72.87		106.75	45.00	8.00	258.00	170						
								Ant _{3b}	RRFDC-3315-PF-48	15.73	10.30	28.93		110.5				170						
								Ant _{3c}																
								Ant _{4a}	B13 RRH 4x30	13.80	8.20	72.00		107					170					
								Ant _{4b}																
								Ant _{4c}																
								Ant _{5a}																
								Ant _{5b}																
								Ant _{5c}																
								Ant on Standoff																
								Ant on Standoff																
								Ant on Tower																
								Ant on Tower																
Sector D																								
								Ant _{1a}																
								Ant _{1b}																
								Ant _{1c}																
								Ant _{2a}																
								Ant _{2b}																
								Ant _{2c}																
								Ant _{3a}																
								Ant _{3b}																
								Ant _{3c}																
								Ant _{4a}																
								Ant _{4b}																
								Ant _{4c}																
								Ant _{5a}																
								Ant _{5b}																
								Ant _{5c}																
								Ant on Standoff																
								Ant on Standoff																
								Ant on Tower																
								Ant on Tower																

Observed Safety and Structural Issues During the Mount Mapping

Issue #	Description of Issue	Photo #
---------	----------------------	---------

1		
2		
3		
4		
5		
6		
7		
8		

Mapping Notes

1. Please report any visible structural or safety issues observed on the antenna mounts (Damaged members, loose connections, tilting mounts, safety climb issues, etc.)
2. If the thickness of the existing pipes or tubing can't be obtained from a general tool (such as Caliper), please use an ultrasonic measurement tool (thickness gauge) to measure the thickness.
3. Please create all required detail sketches of the mounts and insert them into the "Sketches" tab.
4. Please measure and enter the bolt sizes and types under the Members Box in the spreadsheet of the mount type.
5. Take and label the photos of the tower, mounts, connections, antennas and all measurements. Minimum 50 photos are required.
6. Please measure and report the size and length of all existing antenna mounting pipes.
7. Please measure and report the antenna information for all sectors.
8. Don't delete or rearrange any sheet or contents of any sheet from this mapping form.

Standard Conditions

1. Obvious safety and structural issues/deficiencies noticed at the time of the mount mapping are to be reported in this mapping. However, this mount mapping is not a condition assessment of the mount.

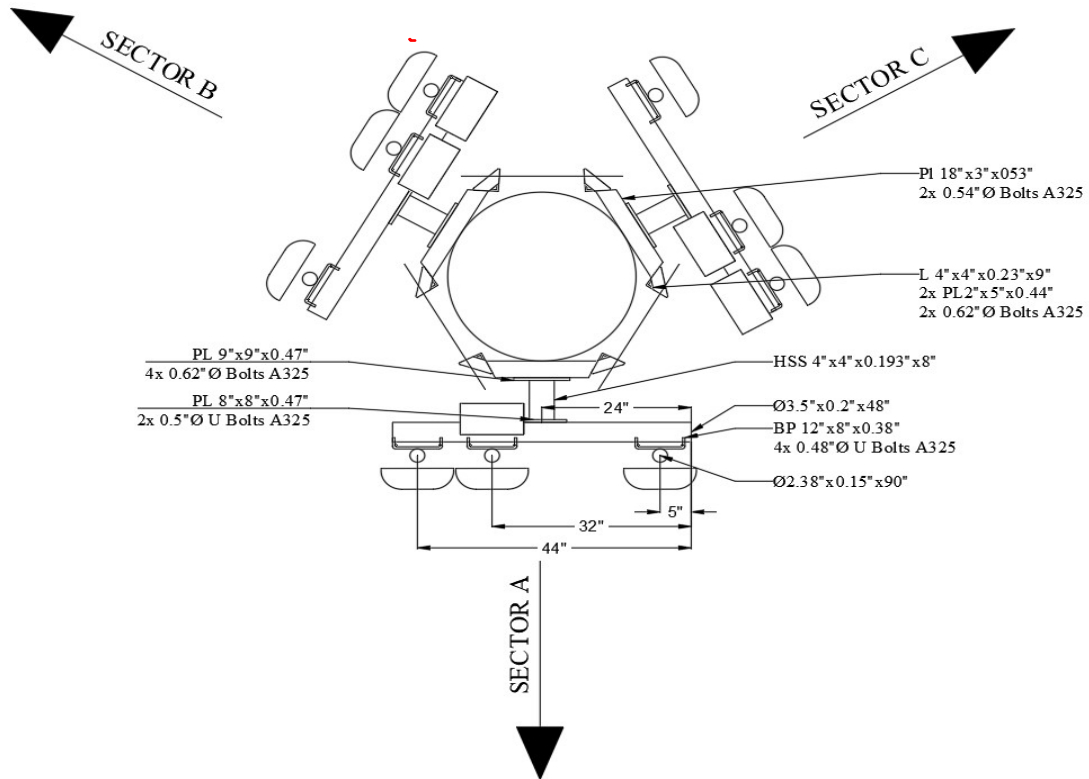
Antenna Mount Mapping Form (PATENT PENDING)

FCC #
1270239

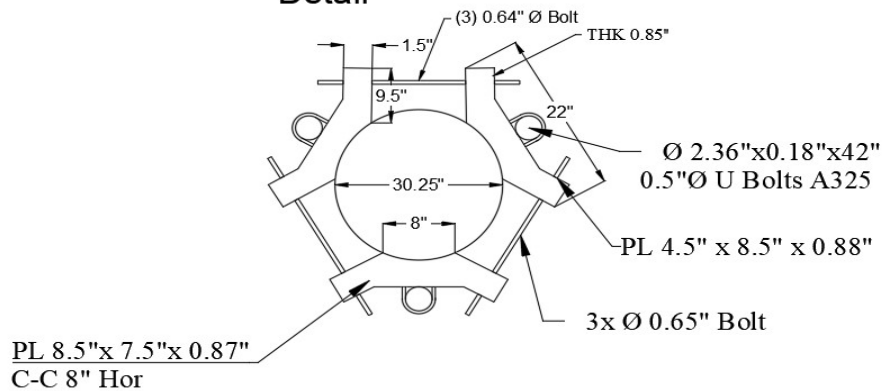
Tower Owner:	SBA:	Mapping Date:	03.25.2021.
Site Name:	SBA:DURHAM SOUTH CT	Tower Type:	Monopole
Site Number or ID:	SBA:CT467330	Tower Height (Ft.):	
Mapping Contractor:	Roaming Networks inc.	Mount Elevation (Ft.):	107

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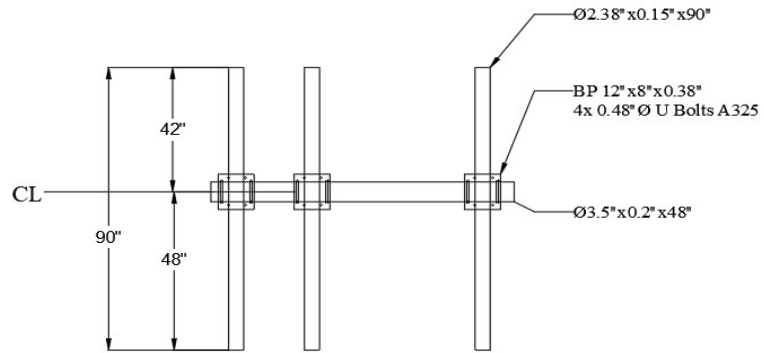
Please Insert Sketches of the Antenna Mount



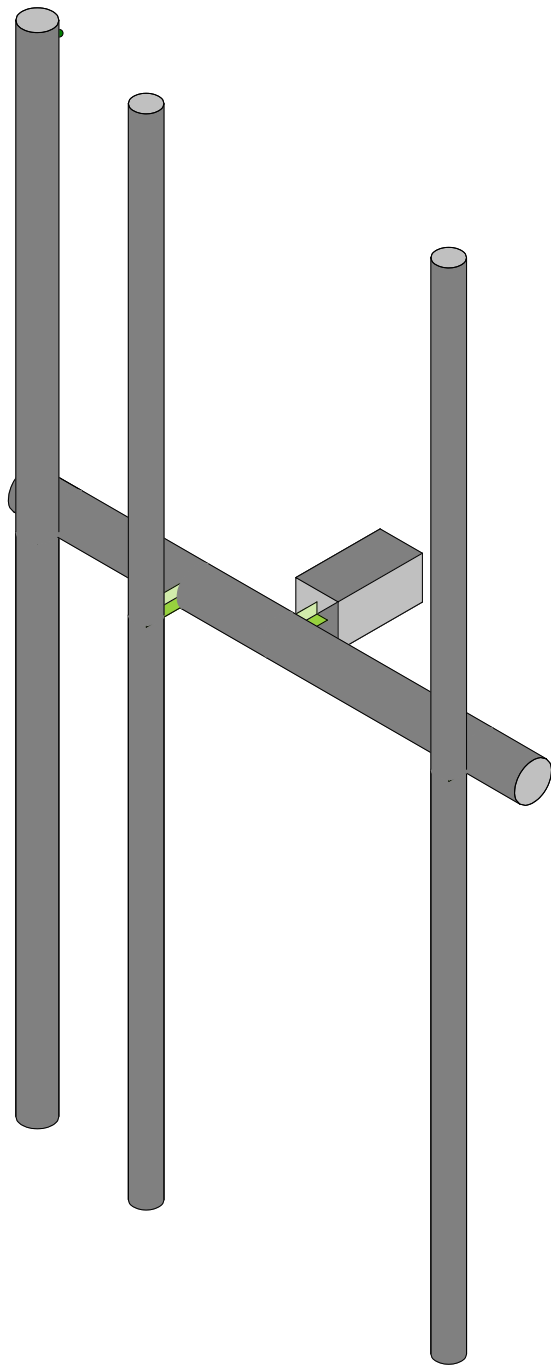
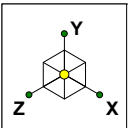
Tower Attachment Detail



RRU
PLAN
VIEW

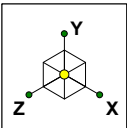


SECTOR A, B and C

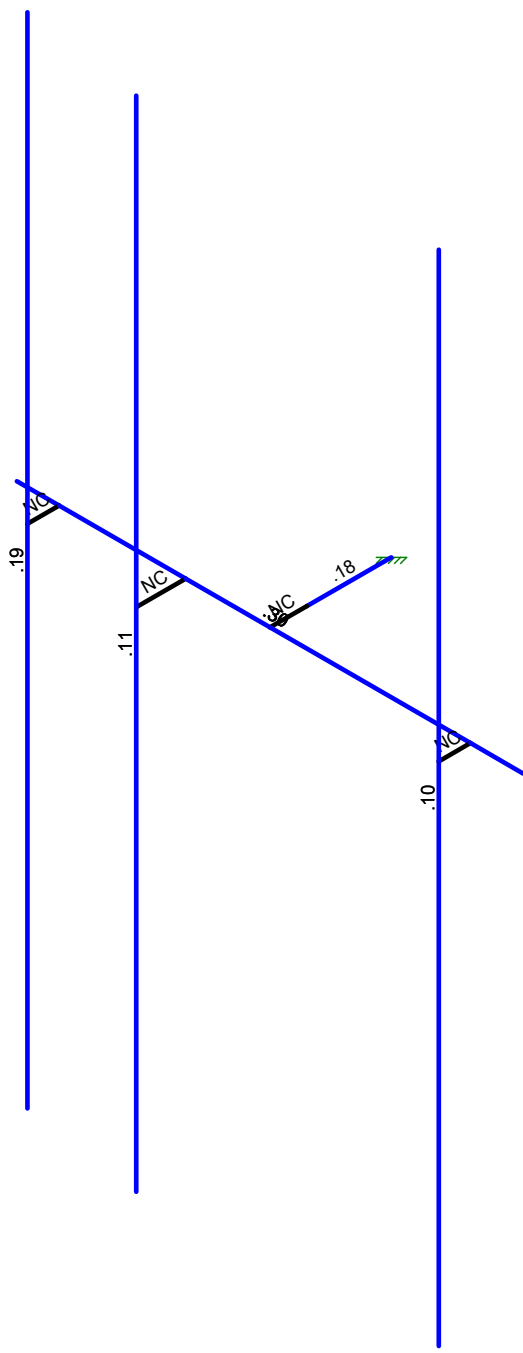


Envelope Only Solution

May 3, 2021 at 11:59 AM
467330-VZW_MT_LOT_A_H.r3d

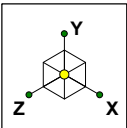


Code Check (Env)	
Black	No Calc
Red	> 1.0
Pink	.90-1.0
Green	.75-.90
Cyan	.50-.75
Blue	0-.50



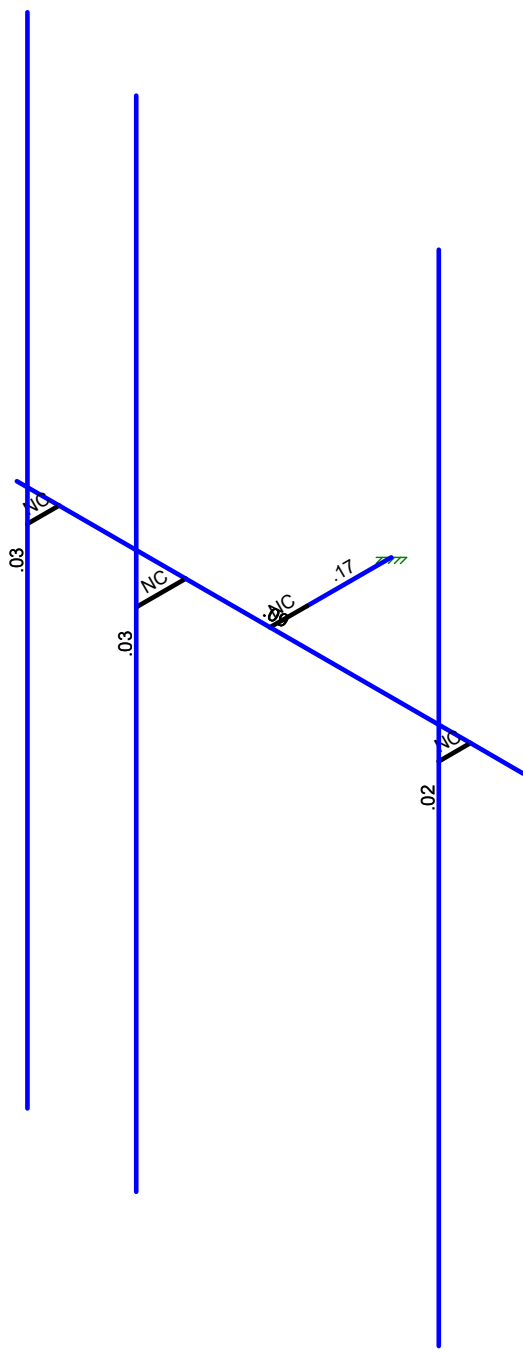
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

		May 3, 2021 at 12:05 PM
		467330-VZW_MT_LOT_A_H.r3d



Shear Check
(Env)

- No Calc
- > 1.0
- .90-1.0
- .75-.90
- .50-.75
- 0-.50



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

May 3, 2021 at 12:06 PM

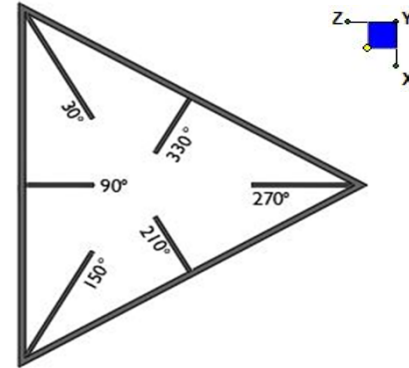
467330-VZW_MT_LOT_A_H.r3d



I. Mount-to-Tower Connection Check

RISA Model Data

Nodes (labeled per RISA)	Orientation (per graphic of typical platform)
N1	90

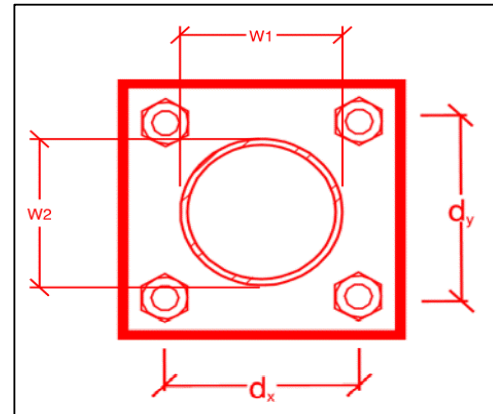


TYPICAL PLATFORM

Tower Connection Bolt Checks

Any moment resistance?:
 Bolt Quantity per Reaction:
 d_x (in) (Delta X of typ. bolt config. sketch) :
 d_y (in) (Delta Y of typ. bolt config. sketch) :
 Bolt Type:
 Bolt Diameter (in):
 Required Tensile Strength (kips):
 Required Shear Strength (kips):
 Tensile Strength / bolt (kips):
 Shear Strength / bolt (kips):
 Tensile Capacity Overall:
 Shear Capacity Overall:

yes
4
6.5
6.5
A307
0.5
6.7
6.4
6.4
3.8
26.0%*
41.6%



*Note: Tension reduction not required if tension or shear capacity < 30%

Tower Connection Plate and Weld Check

Connecting Standoff Member Shape:
 Plate Width (in):
 Plate Height (in):
 W_1 (in):
 W_2 (in):
 F_y (ksi, plate):
 t_{plate} (in):
 Weld Size (1/16 in):
 $\Phi * R_n$ (kip/in):
 Required Weld Strength (kip/in):
 Plate Bending Capacity:
 Weld Capacity:

Rect
9
9
4
3
36
0.47
3
4.18
1.41
40.2%
33.8%

Max Plate Bending Strengths

$M_{u_{xx}}$ (kip-in) :	3.2
$\Phi * M_{n_{xx}}$ (kip-in) :	16.1
$M_{u_{yy}}$ (kip-in) :	3.3
$\Phi * M_{n_{yy}}$ (kip-in) :	16.1

Mount Desktop – Post Modification Inspection (PMI) Report Requirements

Documents & Photos Required from Contractor – **Passing Mount Analysis**

Purpose – to provide Maser Consulting Connecticut the proper documentation in order to complete the required Mount Desktop review of the Post Modification Inspection Report.

- Contractor is responsible for making certain the photos provided as noted below provide confirmation that the installation was completed in accordance with this Passing Mount Analysis.
- Contractor shall relay any data that can impact the performance of the mount, this includes safety issues.


















Base Requirements:

- Any special photos outside of the standard requirements will be indicated on the passing MA
- Verification that loading is as communicated in the Passing Mount Analysis. NOTE If loading is different than what is conveyed contact Maser Consulting Connecticut immediately.
- Each photo should be time and date stamped
- Photos should be high resolution and submitted in a Zip File and should be organized in the file structure as depicted in Schedule A attached.
- Contractor shall ensure that the safety climb wire rope is supported and not adversely impacted by the install of the modification components. This may involve the install of wire rope guides, or other items to protect the wire rope.
- The photos in the file structure should be uploaded to <https://pmi.vzsmart.com> as depicted on the drawings

Photo Requirements:

- Base and “During Installation Photos”
 - Base pictures include
 - Photo of Gate Signs showing the tower owner, site name, and number
 - Photo of carrier shelter showing the carrier site name and number if available
 - Photos of the galvanizing compound and/or paint used (if applicable), clearly showing the label and name
 - “During Installation Photos if provided - must be placed only in this folder
- Photos taken at ground level
 - Overall tower structure before and after installation of the equipment modifications
 - Photos of the appropriate mount before and after installation of the modifications; if the mounts are at different rad elevations, pictures must be provided for all elevations that the modifications were installed
- Photos taken at Mount Elevation
 - Photos showing each individual sector before and also after installation of equipment.

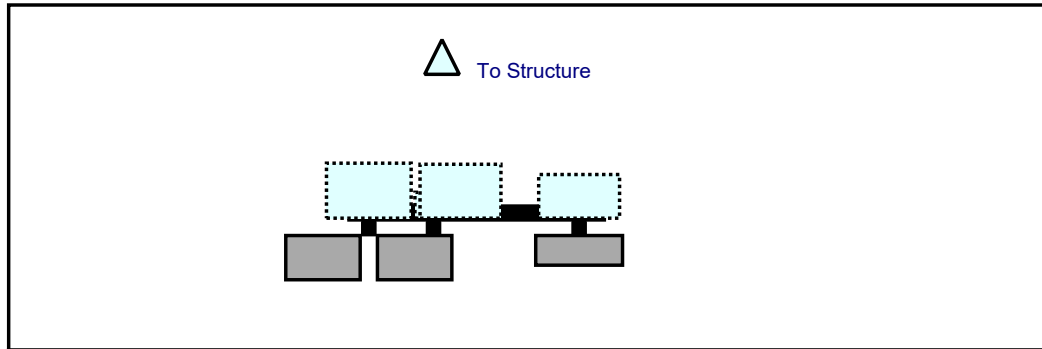
Schedule A – Photo & Document File Structure

-  VzW Site Number / Name
 -  Base & “During Installation” Photos
 -  Pre-Installation Photos
 -  Alpha
 -  Beta
 -  Gamma
 -  Ground Level
 -  Tape Drop
 -  Post-Installation Photos
 -  Alpha
 -  Beta
 -  Gamma
 -  Ground Level
 -  Tape Drop
 -  Photos of climbing facility and safety climb – If Present
-  Certifications – Submission of this document including certifications
-  Specific Required Additional Photos

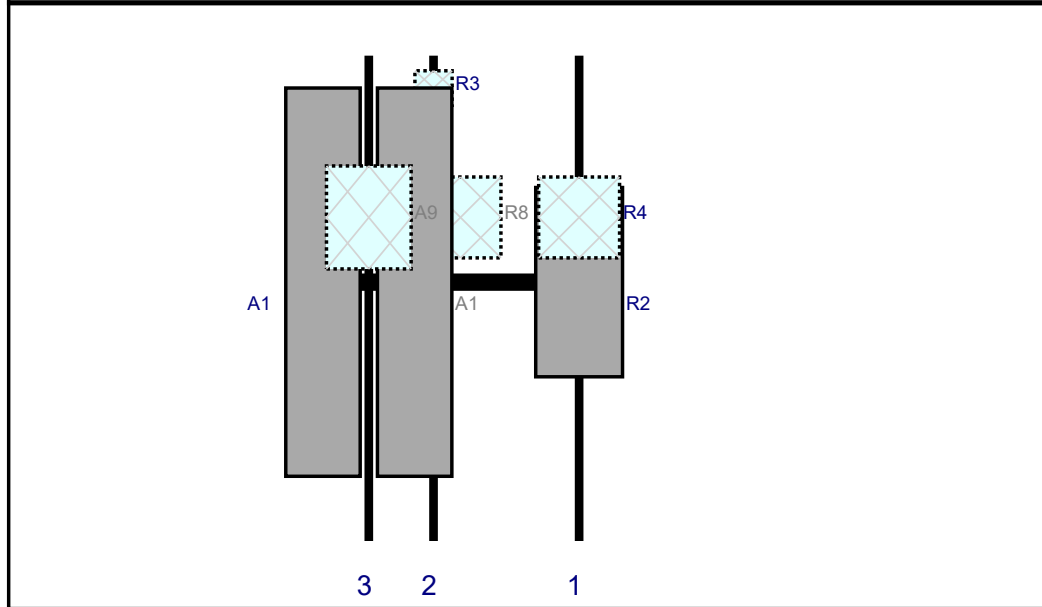
Sector: A
 Structure Type: Self Support
 Mount Elev: 107.00



Plan View



Front View
 Looking at Structure

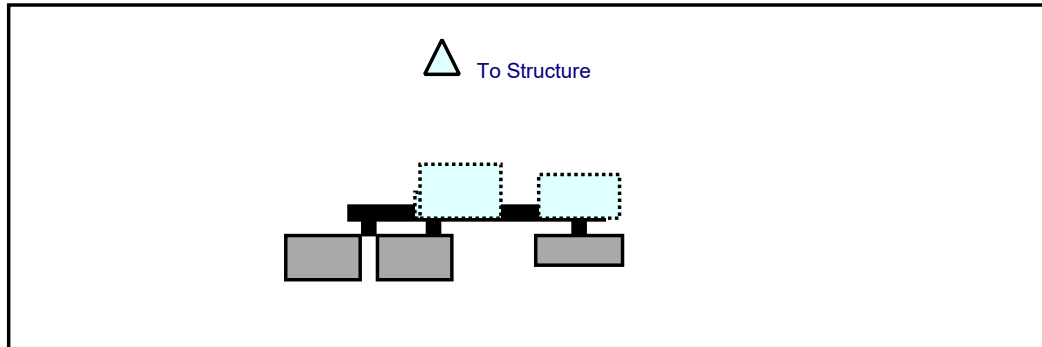


Ref#	Model	Height (in)	Width (in)	H Dist Frm L.	Pipe #	Pipe Pos V	Ant Pos	C. Ant Frm T.	Ant H Off	Status	Validation
R2	MT6407-77A	35.1	16.1	43	1	a	Front	42	0	Added	
R4	RFV01U-D2A	15	15	43	1	a	Behind	30	0	Added	
R3	CBC78T-DS-43	6.4	6.9	16	2	a	Behind	6	0	Added	
R8	RFV01U-D1A	15	15	16	2	a	Behind	30	5	Added	
A1	JAHH-65B-R3B	72	13.8	4	3	a	Front	42	8.5	Added	
A1	JAHH-65B-R3B	72	13.8	4	3	b	Front	42	-8.5	Added	
A9	RRFDC-3315-PF-48	19.1	15.7	4	3	a	Behind	30	0	Retained	03/25/2021

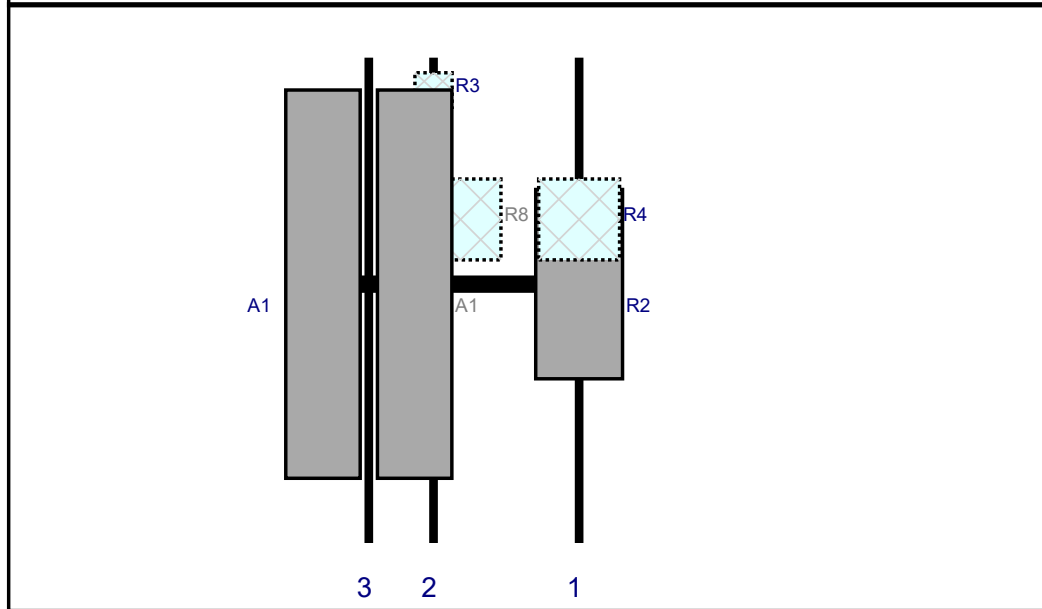
Sector: **B**
 Structure Type: Self Support
 Mount Elev: 107.00



Plan View



Front View
 Looking at Structure

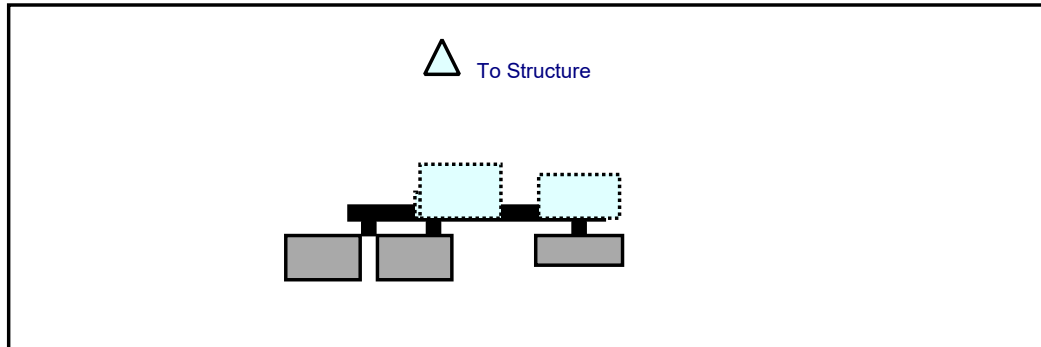


Ref#	Model	Height (in)	Width (in)	H Dist Frm L.	Pipe #	Pipe Pos V	Ant Pos	C. Ant Frm T.	Ant H Off	Status	Validation
R2	MT6407-77A	35.1	16.1	43	1	a	Front	42	0	Added	
R4	RFV01U-D2A	15	15	43	1	a	Behind	30	0	Added	
R3	CBC78T-DS-43	6.4	6.9	16	2	a	Behind	6	0	Added	
R8	RFV01U-D1A	15	15	16	2	a	Behind	30	5	Added	
A1	JAHH-65B-R3B	72	13.8	4	3	a	Front	42	8.5	Added	
A1	JAHH-65B-R3B	72	13.8	4	3	b	Front	42	-8.5	Added	

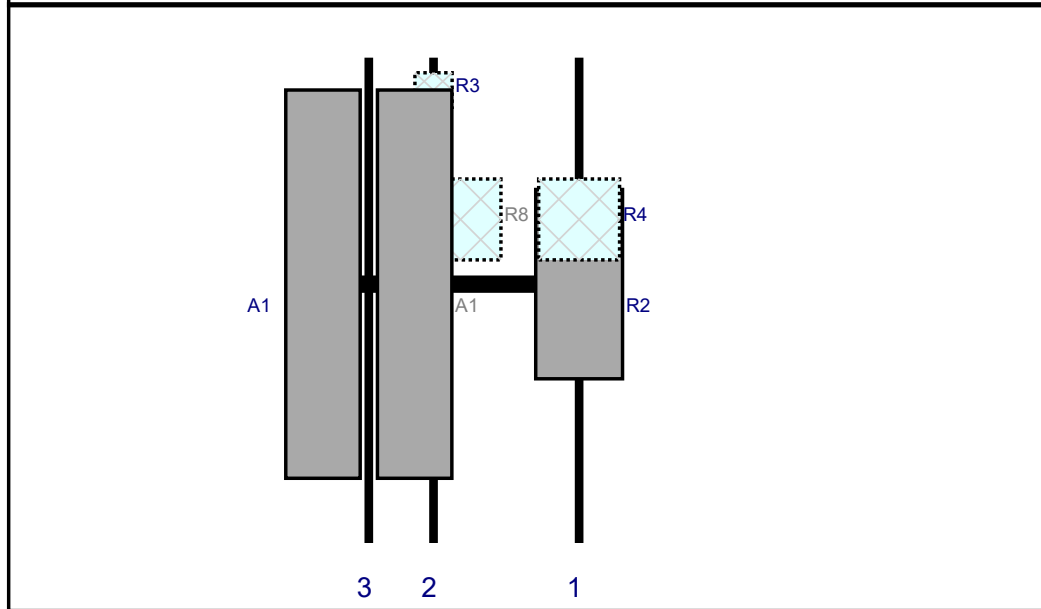
Sector: C
 Structure Type: Self Support
 Mount Elev: 107.00



Plan View



Front View
 Looking at Structure



Ref#	Model	Height (in)	Width (in)	H Dist Frm L.	Pipe #	Pipe Pos V	Ant Pos	C. Ant Frm T.	Ant H Off	Status	Validation
R2	MT6407-77A	35.1	16.1	43	1	a	Front	42	0	Added	
R4	RFV01U-D2A	15	15	43	1	a	Behind	30	0	Added	
R3	CBC78T-DS-43	6.4	6.9	16	2	a	Behind	6	0	Added	
R8	RFV01U-D1A	15	15	16	2	a	Behind	30	5	Added	
A1	JAHH-65B-R3B	72	13.8	4	3	a	Front	42	8.5	Added	
A1	JAHH-65B-R3B	72	13.8	4	3	b	Front	42	-8.5	Added	



Maser Consulting

Subject

TIA-222-H Usage

Site Information

Site ID: 467330-VZW / DURHAM SOUTH CT
Site Name: DURHAM SOUTH CT
Carrier Name: Verizon wireless
Address: 134 R Creamery Rd
Durham, Connecticut 06422
Middlesex County

Latitude: 41.441353°
Longitude: -72.696147°

Structure Information

Tower Type: 110-Ft Self Support
Mount Type: 4.00-Ft T-Arm

To Whom It May Concern,

We respectfully submit the above referenced Antenna Mount Structural Analysis report in conformance with ANSI/TIA-222-H, Structural Standard for Antenna Supporting Structures and Antennas and Small Wind Turbine Support Structures.

The 2021 International Building Code states that, in Section 3108, telecommunication towers shall be designed and constructed in accordance with the provisions of TIA-222. The TIA-222-H is the latest revision of the TIA-222 Standard, effective as of January 01, 2018.

As with all ANSI standards and engineering best practice is to apply the most current revision of the standard. This ensures the engineer is applying all updates. As an example, the TIA-222-H standard includes updates to bring it in line with the latest AISC and ACI standards and it also incorporates the latest wind speed maps by ASCE 7 based on updated studies of the wind data.

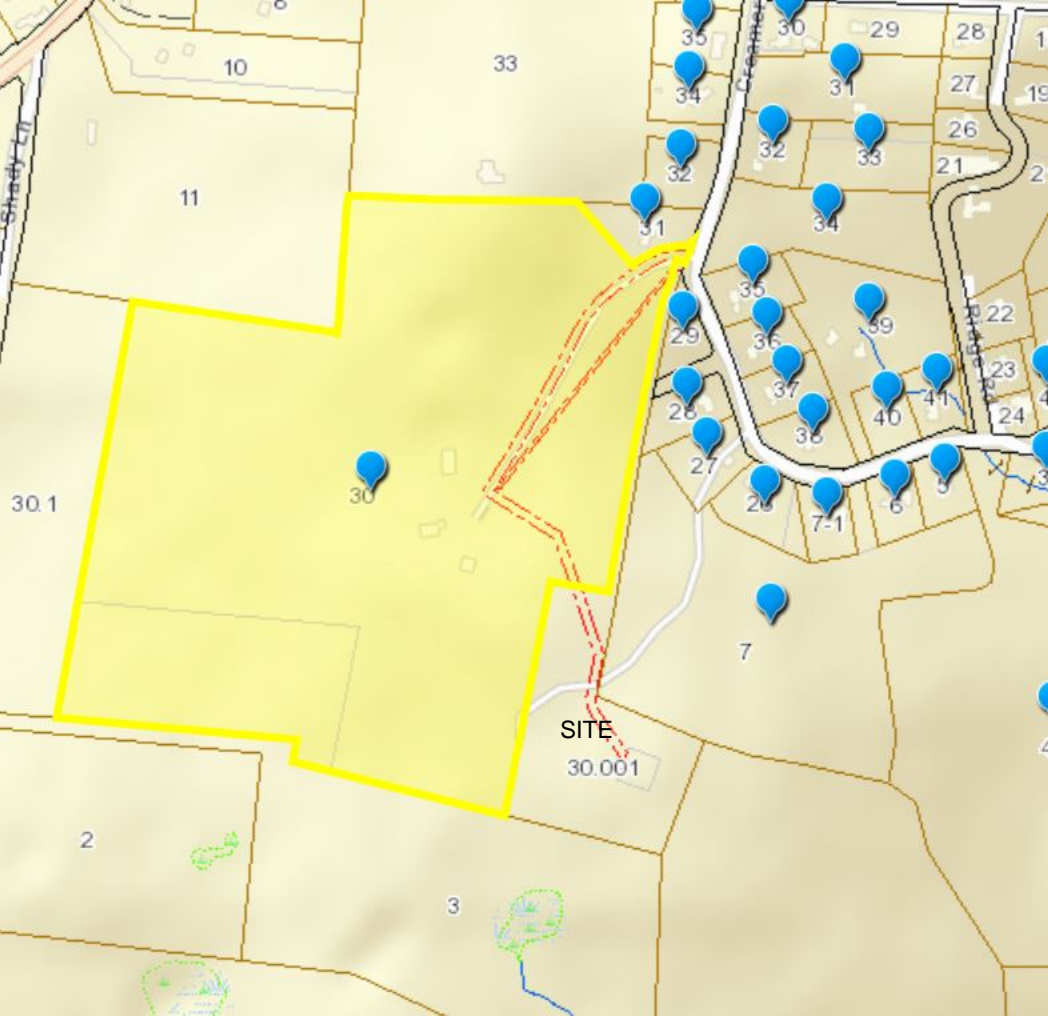
The TIA-222-H standard clarifies these specific requirements for the antenna mount analysis such as modeling methods, seismic analysis, 30-degree increment wind directions and maintenance loading. Therefore, it is our opinion that TIA-222-H is the most appropriate standard for antenna mount structural analysis and is acceptable for use at this tower site to ensure the engineer is taking into account the most current engineering standard available.

Sincerely,

Digitally signed by Justin Linette
Date: 2021.05.21 07:13:29-04'00'

Justin Linette, PE
Senior Technical Manager

ATTACHMENT 5





Property Card: 134 R CREAMERY RD R
Town of Durham, CT

NO PHOTO
AVAILABLE

Parcel ID: 100-30
Account #: L0141900

Owner: ADCT LLC

Mailing Address: 34R GOLDFINCH RD
DURHAM, CT 06422

Land: \$380100
Building: \$649900
Total: \$1030000

Building Details

Building Details

Card Number: 1
Land Use Code: 101
Year Built: 1981
Style: 03:COLONIAL
Units:
SFLA:

Exterior Wall: 1:FRAME
Bedrooms: 3
Baths: 1
Half Baths: 1
Heating: 2:BASIC
Heating System: 7:ELECTR BASEBRD
Fuel: 4:ELECTRIC

Card Number:
Land Use Code: 200
Year Built:
Style:
Units:
SFLA:

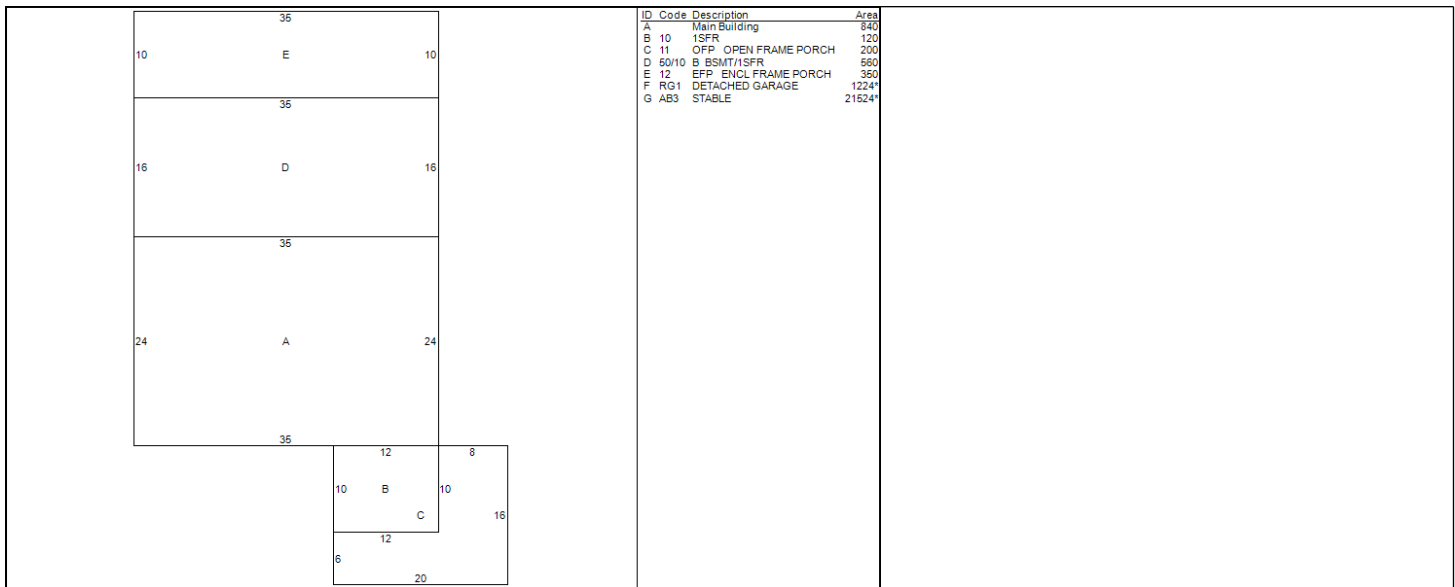
Exterior Wall:
Bedrooms:
Baths:
Half Baths:
Heating:
Heating System:
Fuel:

BUILDING SKETCH



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ATTACHMENT 6



DURHAM SOUTH
Certificate of Mailing — Firm

Name and Address of Sender Kenneth C. Baldwin, Esq. Robinson & Cole LLP 280 Trumbull Street Hartford, CT 06103	TOTAL NO. of Pieces Listed by Sender 3	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here Postmark with Date of Receipt. neopost 07/01/2021 US POSTAGE \$002.89 ⁰ ZIP 06103 041L12208937			
	Postmaster, per (name of receiving employee) 					



USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.	Laura Francis, First Selectman Town of Durham 30 Townhouse Road Durham, CT 06422				
2.	Robin Newton, Town Planner Town of Durham 30 Townhouse Road Durham, CT 06422				
3.	ADCT LLC 34R Goldfinch Road Durham, CT 06422				
4.					
5.					
6.					