Colin Robinson, Site Acquisition Consultant
c/o Cellco Partnership d/b/a Verizon Wireless
Centerline Communications, LLC
750 West Center Street, Floor 3
West Bridgewater, MA 02379
Mobile: (360) 561-3311
crobinson@clinellc.com

7/15/2025

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

RE: Notice of Exempt Modification
Site: Winchester PCS CT (ATC: 413849)
32 Norfolk Road Winsted, CT 06098
Latitude: 41.94019444 **Longitude:** -73.09590277

Dear Ms. Bachman,

Cellco Partnership d/b/a Verizon Wireless currently maintains Fifteen (15) antennas at the 148-foot level on the existing 152-foot tower, located at 32 Norfolk Road Winsted, CT 06098. The tower is owned by American Tower. The property is owned by WIN 21 LLC. The Council approved Verizon Wireless use of the existing tower in 2008.

Proposed Modifications:

Tower:
Install: (9) Antennas, (6) RRH, (1) OVP and (2) 1 5/8" Hybrid Cable

Remove: (15) Antennas and (18) 1 5/8" Coax cables

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Todd Arcelaschi, Mayor, Geoff Green, Zoning Officer; American Tower, tower owner, and WIN 21 LLC, property owner.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2). Enclosed to accommodate this filing are construction drawings dated June 17, 2025, by A.T. Engineering Services, LLC, a structural analysis dated

April 25, 2025, by A.T. Engineering Services, LLC, and a Non-Ionizing Electromagnetic Radiation (NIER) Study dated April 8, 2025, by Tower Engineering Professionals.

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

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the new antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

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

6. The existing structure and its foundation can support the proposed loading, as shown in the attached structural analysis by A.T. Engineering Services, LLC, dated April 25, 2025, pursuant to certain conditions defined therein. Design and engineering are fully illustrated within final construction drawings, signed and stamped dated June 17, 2025.

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

Sincerely,

Colin Robinson

Colin Robinson, Site Acquisition Consultant
c/o Cellco Partnership d/b/a Verizon Wireless
Centerline Communications, LLC
750 West Center Street, Floor 3
West Bridgewater, MA 02379
Mobile: (360) 561-3311
crobinson@clinellc.com

Attachments

cc: Todd Arcelaschi, Mayor – Chief Elected Official
C/O Town Manager
338 Main Street
Winsted, CT 06098
(860) 379-2713

Geoff Green, Zoning Officer – Planning Official
Planning Department
338 Main Street
Winsted, CT 06098
(860) 379-2713

American Tower Corporation – Tower Owner
10 Presidential Way
Woburn, MA 01801

WIN 21 LLC –Ground Owner
156 Roosevelt DR
Seymour, CT 06483

Exhibit A

Original Facility Approval

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

Internet: ct.gov/csc

Daniel F. Caruso
Chairman

CERTIFICATE

OF

ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED

DOCKET NO. 361

Pursuant to General Statutes § 16-50k, as amended, the Connecticut Siting Council hereby issues a Certificate of Environmental Compatibility and Public Need to Cellco Partnership d/b/a Verizon Wireless for the construction, maintenance and operation of a telecommunications facility located off Norfolk Road (Route 44), Winchester, Connecticut.

This Certificate is issued in accordance with and subject to the terms and conditions set forth in the Decision and Order of the Council on September 11, 2008.

By order of the Council,

Daniel F. Caruso, Chairman

September 11, 2008

Exhibit B

Property Card

32 NORFOLK RD

Location	32 NORFOLK RD	**Mblu**	016/ 152/ 026-1/ /
Acct#	005370	**Owner**	WIN 21 LLC
Assessment	$311,180	**Appraisal**	$748,600
PID	4218	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2023	$117,400	$631,200	$748,600
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2023	$82,180	$229,000	$311,180

Owner of Record

Owner	WIN 21 LLC	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	156 ROOSEVELT DR SEYMOUR, CT 06483	**Book & Page**	417/888
		Sale Date	04/07/2014
		Instrument	03

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
WIN 21 LLC	$0		417/888	03	04/07/2014
WIN 21 LLC	$85,000		324/277	00	06/06/2003
HORNE JONATHAN A	$0		216/6		06/29/1989

Building Information

Building 1 : Section 1

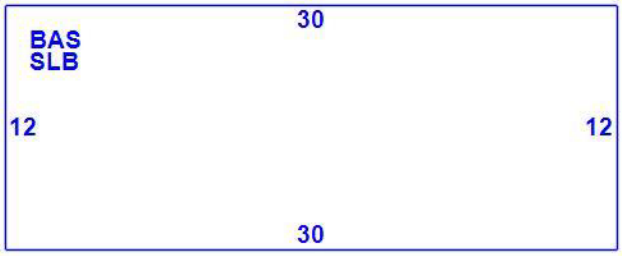
Year Built:	2009
Living Area:	360
Replacement Cost Less Depreciation:	$25,400

Building Attributes	
Field	**Description**
Style:	Warehse Prefab
Model	Comm/Ind
Grade	Good
Stories:	1
Occupancy	1.00
Exterior Wall 1	Pre-cast Concr
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Metal/Tin
Interior Wall 1	Minimum
Interior Wall 2	
Interior Floor 1	Concrete Slab
Interior Floor 2	
Heating Fuel	Gas/Oil
Heating Type	Hot Air-no Duc
AC Type	None
Bldg Use	Tele Tower
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	
Heat/AC	NONE
Frame Type	MASONRY
Baths/Plumbing	NONE
Ceiling/Wall	NONE
Rooms/Prtns	LIGHT
Wall Height	12.00
% Comn Wall	

Building Photo

(https://images.vgsi.com/photos/WinchesterCTPhotos//\0008\IMG_0066_8

Building Layout



(ParcelSketch.ashx?pid=4218&bid=5192)

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	360	360
SLB	Slab	360	0
		720	360

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
GEN	GENERATOR	1.00 UNIT	$92,000	1

Land

Land Use

Use Code 4310

Land Line Valuation

Size (Acres) 56

Description	Tele Tower	**Depth**	
Zone	RR	**Assessed Value**	$229,000
Alt Land Appr	No	**Appraised Value**	$631,200
Category			

Outbuildings

Outbuildings	Legend
No Data for Outbuildings	

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2023	$117,400	$631,200	$748,600
2022	$25,400	$631,200	$656,600
2021	$19,700	$478,200	$497,900

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2023	$82,180	$229,000	$311,180
2022	$17,780	$229,000	$246,780
2021	$13,790	$116,210	$130,000

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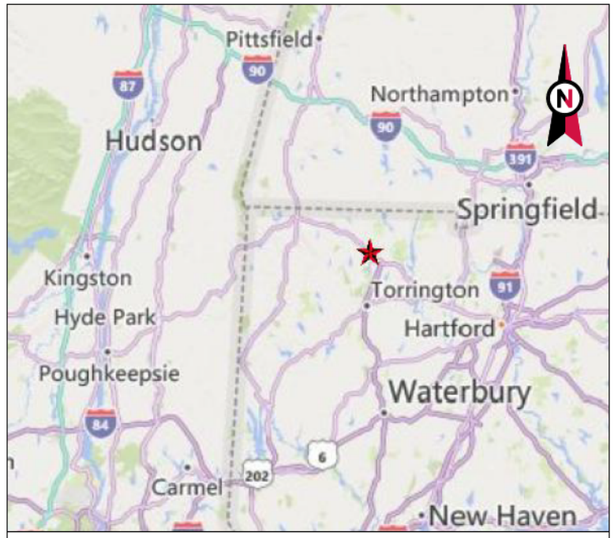
Exhibit C

Construction Drawings



VICINITY MAP

AMERICAN TOWER®

ATC SITE NAME: WINCHESTER PCS CT
ATC SITE NUMBER: 413849
VERIZON SITE NAME: WINCHESTER CT
VERIZON SITE NUMBER: 5000027694
VERIZON FUZE PID: 16272062
SITE ADDRESS: 32 NORFOLK ROAD
WINSTED, CT 06098

LOCATION MAP

VERIZON AMENDMENT DRAWINGS

COMPLIANCE CODE

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNMENT AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES.

INTERNATIONAL BUILDING CODE (IBC 2021)
NATIONAL ELECTRICAL CODE (NFPA 70, NEC 2020 W/ AMND)
2022 CONNECTICUT STATE BUILDING CODE, IMC PORTION (IMC 2021 W/ AMND)
2022 CONNECTICUT STATE BUILDING CODE, IPC PORTION (IPC 2021 W/ AMND)
2022 CONNECTICUT STATE BUILDING CODE, IECC PORTION (IECC 2021 W/ AMND)
PART III OF THE 2022 CT STATE FIRE SAFETY CODE (IFC 2021 W/ AMND)
2022 CONNECTICUT STATE BUILDING CODE
2022 CONNECTICUT STATE BUILDING CODE, IRC PORTION (IRC 2021 W/ AMND)
CONNECTICUT STATE FUEL GAS CODE (IFGC 2021 W/ AMND)
2022 CONNECTICUT STATE BUILDING CODE, IEBC PORTION (IEBC 2021 W/ AMND)

UTILITY COMPANIES

POWER COMPANY: EVERSOURCE
PHONE: (888) 783-6617

TELEPHONE COMPANY: AT&T
PHONE: (866) 593-1383

811 Know what's below. Call before you dig.

PROJECT SUMMARY

SITE ADDRESS:

32 NORFOLK ROAD
WINSTED, CT 06098
COUNTY: LITCHFIELD

REGISTERED COORDINATES:

LATITUDE: 41.94019444
41° 56' 24.7" N
LONGITUDE: -73.09590277
73° 5' 45.25" W
GROUND ELEVATION: 1145' AMSL

PROJECT TEAM

TOWER OWNER:

AMERICAN TOWER
10 PRESIDENTIAL WAY
WOBURN, MA 01801

APPLICANT:

VERIZON WIRELESS

ENGINEER:

A.T. ENGINEERING SERVICES LLC
1 FENTON MAIN, STE 300
CARY, NC 27511

PROPERTY OWNER:

A DIAMOND INFRA LLC
32 NORFOLK ROAD
WINSTED, CT 06098

PROJECT DESCRIPTION

THE PROPOSED PROJECT INCLUDES MODIFYING GROUND BASED AND TOWER MOUNTED EQUIPMENT AS INDICATED PER BELOW:

REMOVE (15) ANTENNA(s) AND (18) 1 5/8" COAX CABLE(s)

INSTALL MOUNT MODS, (9) ANTENNA(s), (6) RRH(s), (1) OVP(s), AND (2) 1 5/8" 6X12 HYBRID CABLE(s)

PROJECT NOTES

1. THE FACILITY IS UNMANNED.
2. A TECHNICIAN WILL VISIT THE SITE APPROXIMATELY ONCE A MONTH FOR ROUTINE INSPECTION AND MAINTENANCE.
3. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT LAND DISTURBANCE OR EFFECT OF STORM WATER DRAINAGE.
4. NO SANITARY SEWER, POTABLE WATER OR TRASH DISPOSAL IS REQUIRED.
5. HANDICAP ACCESS IS NOT REQUIRED.
6. THE PROJECT DEPICTED IN THESE PLANS QUALIFIES AS AN ELIGIBLE FACILITIES REQUEST ENTITLED TO EXPEDITED REVIEW UNDER 47 U.S.C. § 1455(A) AS A MODIFICATION OF AN EXISTING WIRELESS TOWER THAT INVOLVES THE COLLOCATION, REMOVAL, AND/OR REPLACEMENT OF TRANSMISSION EQUIPMENT THAT IS NOT A SUBSTANTIAL CHANGE UNDER CFR § 1.61000 (B)(7).

PROJECT LOCATION DIRECTIONS

FROM EAST HARTFORD TAKE 84 WEST MERGE ONTO ROUTE 8 NORTH AND HEAD TO THE END TAKE THE EXIT TOWARDS U.S. 44 W AND MAKE A RIGHT TAKE U.S. 44 WEST FOR ROUGHLY 4 MILES YOU WILL SEE A TALL TREE POLE ON THE RIGHT DRIVEWAY IS RIGHT AFTER RIGHT LANE ENDS 700 FT YELLOW SIGN METAL GATE TO ACCESS ROAD FOLLOW DRIVEWAY UP THE HILL GATE COMBO IS 4667

SHEET INDEX

SHEET NO:	DESCRIPTION:	REV:	DATE:	BY:
G-001	TITLE SHEET	0	06/17/25	AP
G-002	GENERAL NOTES	0	06/17/25	AP
C-101	DETAILED SITE PLAN	0	06/17/25	AP
C-201	TOWER ELEVATION	0	06/17/25	AP
C-401	ANTENNA INFORMATION & SCHEDULE	0	06/17/25	AP
C-501	CONSTRUCTION DETAILS	0	06/17/25	AP
E-501	GROUNDING DETAILS	0	06/17/25	AP
	SUPPLEMENTAL SHEETS (3 PAGES)			

CONTRACTOR PMI REQUIREMENTS

PMI ACCESSED AT: HTTPS://PMI.VZWSMART.COM

SMART TOOL VENDOR PROJECT NUMBER: 10278815

VZW LOCATION CODE (PSLC): 5000027694

***PMI AND REQUIREMENTS ALSO EMBEDDED IN MOUNT ANALYSIS REPORT

MOUNT MODIFICATION REQUIRED: YES

VZW APPROVED SMART KIT VENDORS: REFER TO MOUNT MODIFICATION DRAWINGS PAGES FOR VZW SMART KIT APPROVED VENDORS

AMERICAN TOWER®
A.T. ENGINEERING SERVICES LLC
1 FENTON MAIN
SUITE 300
CARY, NC 27511
PHONE: (919) 468-0112
PEC.0001553

THE USE AND PUBLICATION OF THESE DRAWINGS SHALL BE RESTRICTED TO THE ORIGINAL SITE FOR WHICH THEY ARE PREPARED. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO AMERICAN TOWER OR THE SPECIFIED CARRIER IS STRICTLY PROHIBITED. NEITHER THE ARCHITECT NOR THE ENGINEER WILL BE PROVIDING ON-SITE CONSTRUCTION REVIEW OF THIS PROJECT. CONTRACTOR(S) MUST VERIFY ALL DIMENSIONS AND ADVISE AMERICAN TOWER OR THE SPECIFIED CARRIER OF ANY DISCREPANCIES. ANY PRIOR ISSUANCE OF THIS DRAWING IS SUPERSEDED BY THE LATEST VERSION.

REV.	DESCRIPTION	BY	DATE
0	FOR CONSTRUCTION	AP	06/17/25

ATC SITE NUMBER:
413849
ATC SITE NAME:
WINCHESTER PCS CT
VERIZON SITE NAME:
WINCHESTER CT
SITE ADDRESS:
32 NORFOLK ROAD
WINSTED, CT 06098

SEAL:

verizon

ATC JOB NO:	15110567_G0
CUSTOMER ID:	WINCHESTER CT
CUSTOMER #:	5000027694

TITLE SHEET

SHEET NUMBER:	REVISION:
G-001	0

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GENERAL CONSTRUCTION NOTES:

1. OWNER FURNISHED MATERIALS, VERIZON "THE COMPANY" WILL PROVIDE AND THE CONTRACTOR WILL INSTALL
   - A. BTS EQUIPMENT FRAME (PLATFORM) AND ICEBRIDGE SHELTER (GROUND BUILD/CO-LOCATE ONLY)
   - B. AC/TELCO INTERFACE BOX (PPC)
   - C. ICE BRIDGE (CABLE TRAY WITH COVER) (GROUND BUILD/CO-LOCATE ONLY, GC TO FURNISH AND INSTALL FOR ROOFTOP INSTALLATION)
   - D. TOWERS, MONOPOLES
   - E. TOWER LIGHTING
   - F. GENERATORS & LIQUID PROPANE TANK
   - G. ANTENNA STANDARD BRACKETS, FRAMES AND PIPES FOR MOUNTING
   - H. ANTENNAS (INSTALLED BY OTHERS)
   - I. TRANSMISSION LINE
   - J. TRANSMISSION LINE JUMPERS
   - K. TRANSMISSION LINE CONNECTORS WITH WEATHERPROOFING KITS
   - L. TRANSMISSION LINE GROUND KITS
   - M. HANGERS
   - N. HOISTING GRIPS
   - O. BTS EQUIPMENT
2. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL OTHER MATERIALS FOR THE COMPLETE INSTALLATION OF THE SITE INCLUDING, BUT NOT LIMITED TO, SUCH MATERIALS AS FENCING, STRUCTURAL STEEL SUPPORTING SUB-FRAME FOR PLATFORM, ROOFING LABOR AND MATERIALS, GROUNDING RINGS, GROUNDING WIRES, COPPER-CLAD OR XIT CHEMICAL GROUND ROD(S), BUSS BARS, TRANSFORMERS AND DISCONNECT SWITCHES WHERE APPLICABLE, TEMPORARY ELECTRICAL POWER, CONDUIT, LANDSCAPING COMPOUND STONE, CRANES, CORE DRILLING, SLEEPERS AND RUBBER MATTING, REBAR, CONCRETE CAISSONS, PADS AND/OR AUGER MOUNTS, MISCELLANEOUS FASTENERS, CABLE TRAYS, NON-STANDARD ANTENNA FRAMES AND ALL OTHER MATERIAL AND LABOR REQUIRED TO COMPLETE THE JOB ACCORDING TO THE DRAWINGS AND SPECIFICATIONS. IT IS THE POSITION OF VERIZON TO APPLY FOR PERMITTING AND CONTRACTOR RESPONSIBLE FOR PICKUP AND PAYMENT OF REQUIRED PERMITS.
3. ALL WORK SHALL CONFORM TO ALL CURRENT APPLICABLE FEDERAL, STATE, AND LOCAL CODES, INCLUDING ANSI/EIA/TIA-222, AND COMPLY WITH ATC CONSTRUCTION SPECIFICATIONS.
4. CONTRACTOR SHALL CONTACT LOCAL 811 FOR IDENTIFICATION OF UNDERGROUND UTILITIES PRIOR TO START OF CONSTRUCTION.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL REQUIRED INSPECTIONS.
6. ALL DIMENSIONS TO, OF, AND ON EXISTING BUILDINGS, DRAINAGE STRUCTURES, AND SITE IMPROVEMENTS SHALL BE VERIFIED IN FIELD BY CONTRACTOR WITH ALL DISCREPANCIES REPORTED TO THE ENGINEER.
7. DO NOT CHANGE SIZE OR SPACING OF STRUCTURAL ELEMENTS.
8. DETAILS SHOWN ARE TYPICAL; SIMILAR DETAILS APPLY TO SIMILAR CONDITIONS UNLESS OTHERWISE NOTED.
9. THESE DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY WHICH SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
10. CONTRACTOR SHALL BRACE STRUCTURES UNTIL ALL STRUCTURAL ELEMENTS NEEDED FOR STABILITY ARE INSTALLED. THESE ELEMENTS ARE AS FOLLOWS: LATERAL BRACING, ANCHOR BOLTS, ETC.
11. CONTRACTOR SHALL DETERMINE EXACT LOCATION OF EXISTING UTILITIES, GROUNDS DRAINS, DRAIN PIPES, VENTS, ETC. BEFORE COMMENCING WORK.
12. INCORRECTLY FABRICATED, DAMAGED, OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE VERIZON REP PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH REMEDIAL ACTION SHALL REQUIRE WRITTEN APPROVAL BY THE VERIZON REP PRIOR TO PROCEEDING.
13. EACH CONTRACTOR SHALL COOPERATE WITH THE VERIZON REP, AND COORDINATE HIS WORK WITH THE WORK OF OTHERS.
14. CONTRACTOR SHALL REPAIR ANY DAMAGE CAUSED BY CONSTRUCTION OF THIS PROJECT TO MATCH EXISTING PRE-CONSTRUCTION CONDITIONS TO THE SATISFACTION OF THE VERIZON CONSTRUCTION MANAGER.
15. ALL CABLE/CONDUIT ENTRY/EXIT PORTS SHALL BE WEATHERPROOFED DURING INSTALLATION USING A SILICONE SEALANT.
16. WHERE EXISTING CONDITIONS DO NOT MATCH THOSE SHOWN IN THIS PLAN SET, CONTRACTOR SHALL NOTIFY THE VERIZON REP AND ENGINEER OF RECORD IMMEDIATELY.
17. CONTRACTOR SHALL ENSURE ALL SUBCONTRACTORS ARE PROVIDED WITH A COMPLETE AND CURRENT SET OF DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT.
18. CONTRACTOR SHALL REMOVE ALL RUBBISH AND DEBRIS FROM THE SITE AT THE END OF EACH DAY.
19. CONTRACTOR SHALL COORDINATE WORK SCHEDULE WITH AMERICAN TOWER CORPORATION (ATC) AND TAKE PRECAUTIONS TO MINIMIZE IMPACT AND DISRUPTION OF OTHER OCCUPANTS OF THE FACILITY.
20. CONTRACTOR SHALL FURNISH VERIZON AND AMERICAN TOWER CORPORATION (ATC) WITH A PDF MARKED UP AS-BUILT SET OF DRAWINGS UPON COMPLETION OF WORK.
21. PRIOR TO SUBMISSION OF BID, CONTRACTOR SHALL COORDINATE WITH VERIZON REP TO DETERMINE WHAT, IF ANY, ITEMS WILL BE PROVIDED. ALL ITEMS NOT PROVIDED SHALL BE PROVIDED AND INSTALLED BY THE CONTRACTOR. CONTRACTOR WILL INSTALL ALL ITEMS PROVIDED.
22. PRIOR TO SUBMISSION OF BID, CONTRACTOR SHALL COORDINATE WITH VERIZON REP TO DETERMINE IF ANY PERMITS WILL BE OBTAINED BY CONTRACTOR. ALL REQUIRED PERMITS NOT OBTAINED BY VERIZON MUST BE OBTAINED, AND PAID FOR, BY THE CONTRACTOR.
23. CONTRACTOR SHALL INSTALL ALL SITE SIGNAGE IN ACCORDANCE WITH VERIZON SPECIFICATIONS AND REQUIREMENTS.
24. CONTRACTOR SHALL SUBMIT ALL SHOP DRAWINGS TO VERIZON FOR REVIEW AND APPROVAL PRIOR TO FABRICATION.
25. ALL EQUIPMENT SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS AND LOCATED ACCORDING TO VERIZON SPECIFICATIONS, AND AS SHOWN IN THESE PLANS.
26. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
27. CONTRACTOR SHALL NOTIFY VERIZON REP A MINIMUM OF 48 HOURS IN ADVANCE OF POURING CONCRETE OR BACKFILLING ANY UNDERGROUND UTILITIES, FOUNDATIONS OR SEALING ANY WALL, FLOOR OR ROOF PENETRATIONS FOR ENGINEERING REVIEW AND APPROVAL.
28. WHEN THE PROJECT SCOPE REQUIRES THE USE OF THE SAFETY CLIMB, THE GENERAL CONTRACTOR SHALL ENSURE THE SAFETY CLIMB IS FREE OF OBSTRUCTIONS, NOT RUBBING ON OR TRAPPED BY ANY INSTALLED CUSTOMER EQUIPMENT, IS VISUALLY TAUT, MEETS MANUFACTURER INSTALLATION SPECIFICATIONS, AND IS FIRMLY SECURED AT ALL CABLE GUIDE LOCATIONS UPON PROJECT COMPLETION.
29. COMPLETION OF PROJECT SHALL NOT OBSTRUCT, TRAP, LOOSEN, OR OTHERWISE CAUSE FAILURE TO MEET MANUFACTURER INSTALLATION REQUIREMENTS FOR THE SAFETY CLIMB.
30. CONTRACTOR SHALL BE RESPONSIBLE FOR SITE SAFETY INCLUDING COMPLIANCE WITH ALL APPLICABLE OSHA STANDARDS AND RECOMMENDATIONS AND SHALL PROVIDE ALL NECESSARY SAFETY DEVICES INCLUDING PPE AND PPM AND CONSTRUCTION DEVICES SUCH AS WELDING AND FIRE PREVENTION, TEMPORARY SHORING, SCAFFOLDING, TRENCH BOXES/SLOPING, BARRIERS, ETC.
31. THE CONTRACTOR SHALL PROTECT AT HIS OWN EXPENSE, ALL EXISTING FACILITIES AND SUCH OF HIS NEW WORK LIABLE TO INJURY DURING THE CONSTRUCTION PERIOD. ANY DAMAGE CAUSED BY NEGLECT ON THE PART OF THIS CONTRACTOR OR HIS REPRESENTATIVES, OR BY THE ELEMENTS DUE TO NEGLECT ON THE PART OF THIS CONTRACTOR OR HIS REPRESENTATIVES, EITHER TO THE EXISTING WORK, OR TO HIS WORK OR THE WORK OF ANY OTHER CONTRACTOR, SHALL BE REPAIRED AT HIS EXPENSE TO THE OWNER'S SATISFACTION.
32. ALL WORK SHALL BE INSTALLED IN A FIRST CLASS, NEAT AND WORKMANLIKE MANNER BY MECHANICS SKILLED IN THE TRADE INVOLVED. THE QUALITY OF WORKMANSHIP SHALL BE SUBJECT TO THE APPROVAL OF THE VERIZON REP. ANY WORK FOUND BY THE VERIZON REP TO BE OF INFERIOR QUALITY AND/OR WORKMANSHIP SHALL BE REPLACED AND/OR REWORKED AT CONTRACTOR EXPENSE UNTIL APPROVAL IS OBTAINED.
33. IN ORDER TO ESTABLISH STANDARDS OF QUALITY AND PERFORMANCE, ALL TYPES OF MATERIALS LISTED HEREINAFTER BY MANUFACTURER'S NAMES AND/OR MANUFACTURER'S CATALOG NUMBER SHALL BE PROVIDED BY THESE MANUFACTURERS AS SPECIFIED.
34. VERIZON FURNISHED EQUIPMENT SHALL BE PICKED-UP AT THE VERIZON WAREHOUSE, NO LATER THAN 48HR AFTER BEING NOTIFIED INSURED, STORED, UNCRATE, PROTECTED AND INSTALLED BY THE CONTRACTOR WITH ALL APPURTENANCES REQUIRED TO PLACE THE EQUIPMENT IN OPERATION, READY FOR USE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE EQUIPMENT AFTER PICKING IT UP.
35. VERIZON OR HIS ARCHITECT/ENGINEER RESERVES THE RIGHT TO REJECT ANY EQUIPMENT OR MATERIALS WHICH, IN HIS OWN OPINION ARE NOT IN COMPLIANCE WITH THE CONTRACT DOCUMENTS, EITHER BEFORE OR AFTER INSTALLATION AND THE EQUIPMENT SHALL BE REPLACED WITH EQUIPMENT CONFORMING TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS BY THE CONTRACTOR AT NO COST TO VERIZON OR THEIR ARCHITECT/ENGINEER.

SPECIAL CONSTRUCTION ANTENNA INSTALLATION NOTES:

1. WORK INCLUDED:
   - A. ANTENNA AND COAXIAL/HYBRID CABLES ARE FURNISHED BY VERIZON UNDER A SEPARATE CONTRACT. THE CONTRACTOR SHALL ASSIST ANTENNA INSTALLATION CONTRACTOR IN TERMS OF COORDINATION AND SITE ACCESS. ERECTION SUBCONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PERSONNEL.
   - B. INSTALL ANTENNAS AS INDICATED ON DRAWINGS AND VERIZON SPECIFICATIONS.
   - C. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS.
   - D. INSTALL FURNISHED GALVANIZED STEEL OR ALUMINUM WAVEGUIDE.
   - E. INSTALL COAXIAL/HYBRID CABLES AND TERMINATING BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTIONS BETWEEN THE ANTENNA AND EQUIPMENT PER MANUFACTURER'S REQUIREMENTS. TERMINATE ALL COAXIAL/HYBRID CABLE THREE (3) FEET IN EXCESS OF ENTRY PORT LOCATION UNLESS OTHERWISE STATED.
2. ANTENNA AND COAXIAL/HYBRID CABLE GROUNDING:
   - A. ALL EXTERIOR #6 GREEN GROUND WIRE "DAISY CHAIN" CONNECTIONS ARE TO BE WEATHER SEALED WITH RFS CONNECTORS/SPLICE WEATHERPROOFING KIT #221213 OR EQUAL.
   - B. ALL COAXIAL/HYBRID CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS OF COAXIAL/HYBRID CABLE (NOT WITHIN BENDS)

ALL DISCREPANCIES FROM WHAT IS SHOWN ON THESE CONSTRUCTION DRAWINGS SHALL BE COMMUNICATED TO ATC ENGINEERING IMMEDIATELY FOR CORRECTION OR RE-DESIGN. FAILURE TO COMMUNICATE DIRECTLY WITH ATC ENGINEERING OR ANY CHANGES FROM THE DESIGN CONDUCTED WITHOUT PRIOR APPROVAL FROM ATC ENGINEERING SHALL BE THE SOLE RESPONSIBILITY OF THE GENERAL CONTRACTOR.

AMERICAN TOWER®
A.T. ENGINEERING SERVICES LLC
1 FENTON MAIN
SUITE 300
CARY, NC 27511
PHONE: (919) 468-0112
PEC.0001553

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REV.	DESCRIPTION	BY	DATE
0	FOR CONSTRUCTION	AP	06/17/25

ATC SITE NUMBER:
413849
ATC SITE NAME:
WINCHESTER PCS CT
VERIZON SITE NAME:
WINCHESTER CT
SITE ADDRESS:
32 NORFOLK ROAD
WINSTED, CT 06098

SEAL:

Digitally Signed: 2025-06-17

verizon

ATC JOB NO:	15110567_G0
CUSTOMER ID:	WINCHESTER CT
CUSTOMER #:	5000027694

GENERAL NOTES

SHEET NUMBER:	REVISION:
G-002	0

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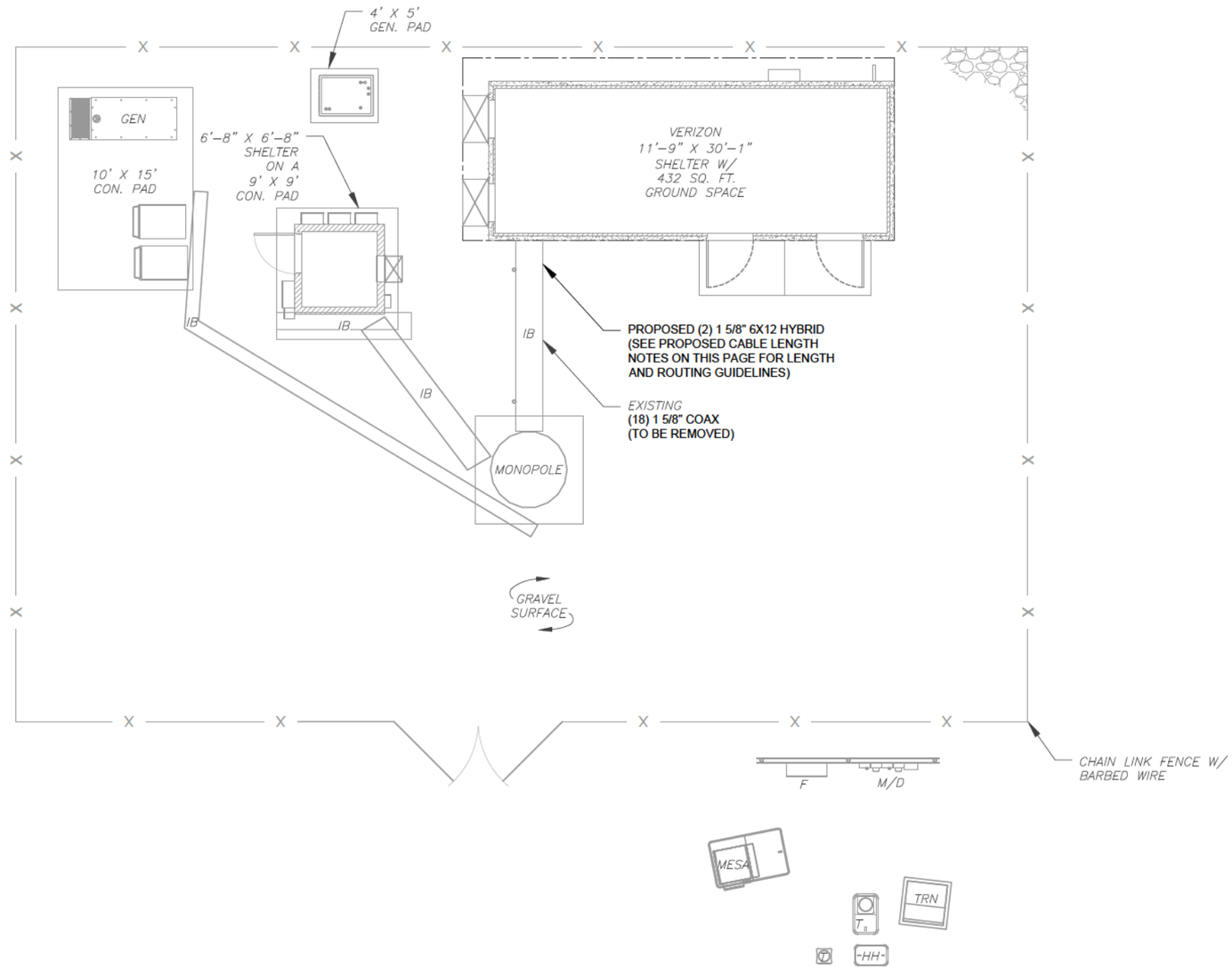
SITE PLAN NOTES:

1. THIS SITE PLAN REPRESENTS THE BEST PRESENT KNOWLEDGE AVAILABLE TO THE ENGINEER AT THE TIME OF THIS DESIGN. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO CONSTRUCTION AND VERIFY ALL EXISTING CONDITIONS RELATED TO THE SCOPE OF WORK FOR THIS PROJECT.

2. ICE BRIDGE, CABLE LADDER, COAX PORT, AND COAX CABLE ARE SHOWN FOR REFERENCE ONLY. CONTRACTOR SHALL CONFIRM THE EXACT LOCATION OF ALL PROPOSED AND EXISTING EQUIPMENT AND STRUCTURES DEPICTED ON THIS PLAN. BEFORE UTILIZING EXISTING CABLE SUPPORTS, COAX PORTS, INSTALLING NEW PORTS OR ANY OTHER EQUIPMENT, CONTRACTOR SHALL VERIFY ALL ASPECTS OF THE COMPONENTS MEET THE ATC SPECIFICATIONS.

3. ALL CONDUITS SHALL BE INSTALLED UNDERGROUND AND PER APPLICABLE NEC AND LOCAL REQUIREMENTS UNLESS SHOWN OTHERWISE ON THESE PLANS. ANY CONDUITS INSTALLED ABOVE GRADE SHALL BE SECURED PER NEC 344 (MAX INTERVAL 10') AND THE ENTIRE CONDUIT SHALL BE PAINTED SAFETY/REFLECTIVE YELLOW OR ORANGE TO INCREASE VISIBILITY AND REDUCE TRIP HAZARDS.

4. NO ELECTRICAL SCOPE IS INCLUDED IN THIS PROJECT.



1 DETAILED SITE PLAN

GRAPHIC SCALE

10 0 5 10

(IN FEET)
1 UNIT = 10 FEET

LEGEND

⊗	GROUNDING TEST WELL
ATS	AUTOMATIC TRANSFER SWITCH
B	BOLLARD
CSC	CELL SITE CABINET
D	DISCONNECT
E	ELECTRICAL
F	FIBER
GEN	GENERATOR
G	GENERATOR RECEPTACLE
HH, V	HAND HOLE, VAULT
IB	ICE BRIDGE
K	KENTROX BOX
LC	LIGHTING CONTROL
M	METER
PB	PULL BOX
PP	POWER POLE
T	TELCO
TRN	TRANSFORMER
	CHAINLINK FENCE

PROPOSED CABLE NOTES:

1. ESTIMATED LENGTH OF PROPOSED CABLE IS 220'. ESTIMATED LENGTH OF CABLE WAS PROVIDED BY CUSTOMER OR CALCULATED BY ADDING THE RAD CENTER AND THE DISTANCE FROM THE SHELTER ENTRY PLATE TO THE TOWER (ALONG THE ICE BRIDGE) AND A SAFETY FACTOR MEASUREMENT OF 15% (OF THE TWO PREVIOUS VALUES), CDS DEFER TO GREATEST CABLE LENGTH.
2. ROUTE PROPOSED CABLES ALONG SAME PATH AS EXISTING CABLES AND IN ACCORDANCE WITH STRUCTURAL ANALYSIS. IF ADEQUATE SPACE EXISTS, ROUTE CABLES THROUGH ENTRY PORT HOLE, UP INSIDE OF MONOPOLE, AND THROUGH EXIT PORT HOLE. IF ROUTING OUTSIDE THE MONOPOLE, ATTACH CABLES USING STAND-OFF ADAPTERS MOUNTED TO TOWER USING STAINLESS STEEL BANDING. ADEQUATELY SECURE CABLES USING EITHER APPROPRIATELY SIZED STAINLESS STEEL SNAP-INS OR MOUNTING HARDWARE AND BRACKETS AS SPECIFIED BY CABLE MANUFACTURER.

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REV.	DESCRIPTION	BY	DATE
0	FOR CONSTRUCTION	AP	06/17/25

ATC SITE NUMBER:
413849

ATC SITE NAME:
WINCHESTER PCS CT

VERIZON SITE NAME:
WINCHESTER CT

SITE ADDRESS:
32 NORFOLK ROAD
WINSTED, CT 06098

SEAL:

Digitally Signed: 2025-06-17

verizon

ATC JOB NO:	15110567_G0
CUSTOMER ID:	WINCHESTER CT
CUSTOMER #:	5000027694

DETAILED SITE PLAN

SHEET NUMBER:	REVISION:
C-101	0

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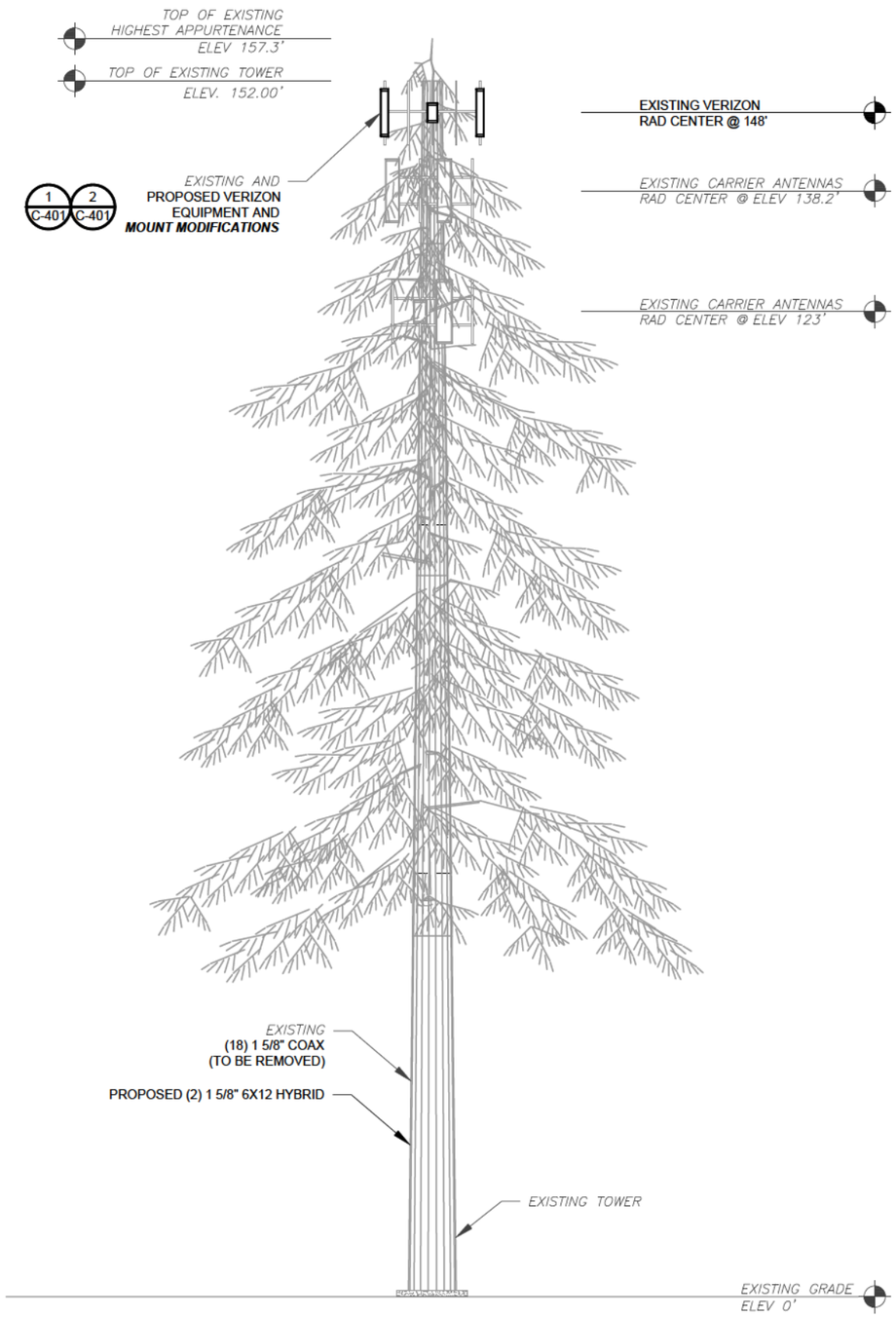
FAA REGISTRATION NOT REQUIRED

PER MOUNT ANALYSIS COMPLETED BY COLLIERS ENGINEERING & DESIGN, DATED 03/04/25, THE EXISTING MOUNT MUST BE MODIFIED TO ADEQUATELY SUPPORT THE PROPOSED LOADING. THE MOUNT MODIFICATION DETAILED AT THE END OF THIS PLAN SET, MUST BE INSTALLED PRIOR TO THE INSTALLATION OF THE PROPOSED ANTENNAS AND OTHER EQUIPMENT.



1 TOWER ELEVATION
SCALE: N.T.S.

ALL ELEVATIONS REFLECT ABOVE GROUND LEVEL (A.G.L.)

TOWER NOTE:

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONFIRM WITH THE PROJECT MANAGER THAT THEY HAVE THE MOST RECENT VERSION OF THE STRUCTURAL ANALYSIS BEFORE COMMENCING WORK. EXISTING AND PROPOSED TOWER APPURTENANCES, MOUNTS, AND ANTENNAS ARE SHOWN BASED ON THE STRUCTURAL ANALYSIS.
2. WHERE APPLICABLE, ALL NEW ANTENNAS, EQUIPMENT, MOUNTS, CABLING, ETC. SHALL BE PAINTED/SOCKED TO MATCH EXISTING EQUIPMENT IN ACCORDANCE WITH FAA, JURISDICTION, AND/OR OTHER LOCAL REQUIREMENTS.
3. ROUTE PROPOSED CABLES ALONG SAME PATH AS EXISTING CABLES AND IN ACCORDANCE WITH STRUCTURAL ANALYSIS.
4. ALL COAX LINES MUST BE TERMINATED AT 2' BELOW THE BASE OF THE BOTTOM CANISTER WITH ½" JUMPERS RUNNING UP TO CUSTOMER'S EQUIPMENT.
5. CONCEALMENT CANISTER CLOSURE MECHANISMS SHALL BE INSPECTED FOR PROPER SEAL AND COMPLETE CLOSURE WHENEVER OPENED/ CLOSED. STRIPPED CLOSURE MECHANISMS OR DAMAGE TO THE CONCEALMENT CANISTER PREVENTING PROPER REINSTALLATION SHALL BE BROUGHT TO THE ATTENTION OF THE ATC OSL (OPERATIONS SITE LEAD) OR ATC CM. CANISTERS WITH STRIPPED CLOSURES SHALL HAVE CLOSURE HARDWARE REPLACED OR BE REINSTALLED WITH WIND-BAND STRAPPING.
6. TOWER ELEVATION DEPICTION MAY NOT REFLECT ALL EQUIPMENT INCLUDED IN STRUCTURAL ANALYSIS. REFER TO STRUCTURAL ANALYSIS FOR FULL TOWER LOADING.

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ATC SITE NAME:
WINCHESTER PCS CT

VERIZON SITE NAME:
WINCHESTER CT

SITE ADDRESS:
32 NORFOLK ROAD
WINSTED, CT 06098

SEAL:

STATE OF CONNECTICUT
PATRICK P. BARRY
28959
LICENSED
PROFESSIONAL ENGINEER

Digitally Signed: 2025-06-17

verizon

ATC JOB NO:	15110567_G0
CUSTOMER ID:	WINCHESTER CT
CUSTOMER #:	5000027694

TOWER ELEVATION

SHEET NUMBER:	REVISION:
C-201	0

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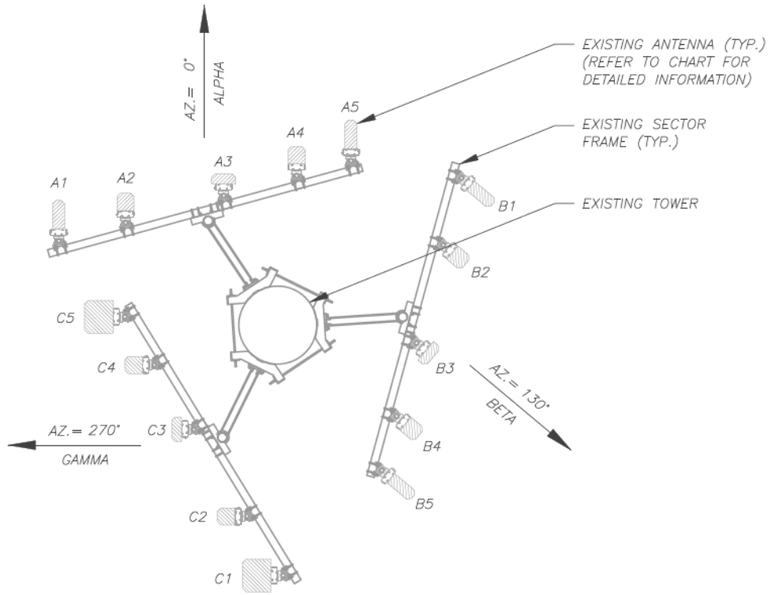
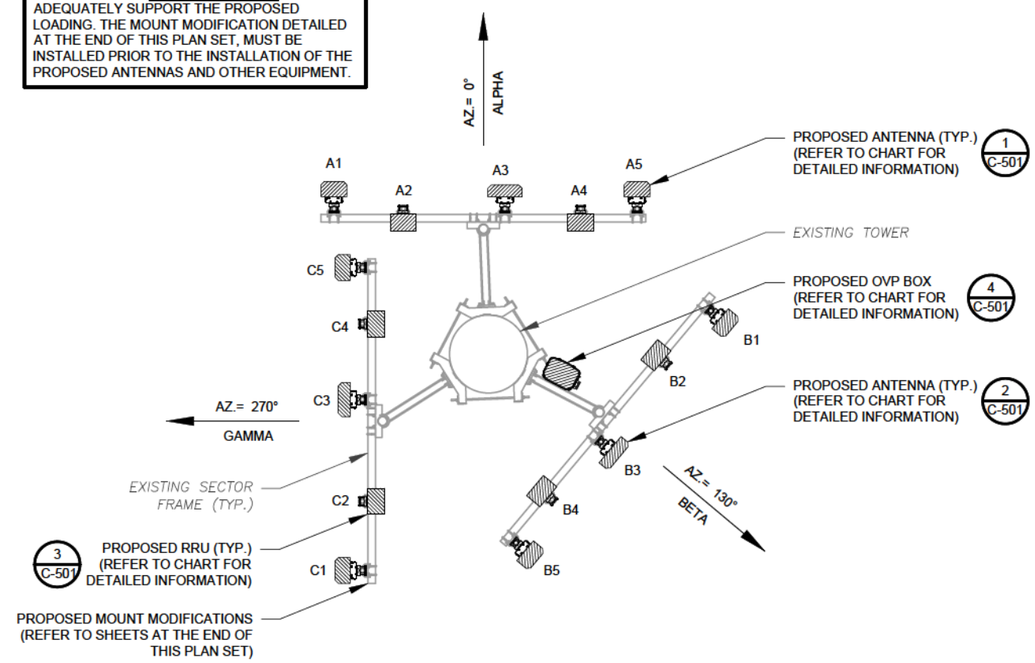


1 EXISTING ANTENNA PLAN

SCALE: N.T.S.

PER MOUNT ANALYSIS COMPLETED BY COLLIERS ENGINEERING & DESIGN, DATED 03/04/25, THE EXISTING MOUNT MUST BE MODIFIED TO ADEQUATELY SUPPORT THE PROPOSED LOADING. THE MOUNT MODIFICATION DETAILED AT THE END OF THIS PLAN SET, MUST BE INSTALLED PRIOR TO THE INSTALLATION OF THE PROPOSED ANTENNAS AND OTHER EQUIPMENT.

CONTRACTOR SHALL RE-ORIENT ANTENNA MOUNT(s) AS NECESSARY TO ACHIEVE PROPOSED ANTENNA AZIMUTHS



2 FINAL ANTENNA PLAN

SCALE: N.T.S.

EXISTING ANTENNA SCHEDULE

LOCATION			ANTENNA SUMMARY				NON ANTENNA SUMMARY	
SECTOR	RAD	AZ	POS	ANTENNA	BAND	STATUS	ADDITIONAL TOWER MOUNTED EQUIPMENT	STATUS
ALPHA	148'	0°	A1	LPA-80080/6CF _	–	RMV	–	–
			A2	LPA-171063-12CF-EDIN	–	RMV	–	–
			A3	BXA-70063/6CF_	L700	RMV	–	–
			A4	LPA-171063-12CF-EDIN	–	RMV	–	–
			A	LPA-80080/6CF _	–	RMV	–	–
BETA	148'	130°	B1	LPA-80080/6CF _	–	RMV	–	–
			B2	LPA-171063-12CF-EDIN	–	RMV	–	–
			B3	BXA-70063/6CF_	L700	RMV	–	–
			B4	LPA-171063-12CF-EDIN	–	RMV	–	–
			B5	LPA-80080/6CF _	–	RMV	–	–
GAMMA	148'	270°	C1	LPA-80063/6CF	–	RMV	–	–
			C2	LPA-171063-12CF-EDIN	–	RMV	–	–
			C3	BXA-70063/6CF_	L700	RMV	–	–
			C4	LPA-171063-12CF-EDIN	–	RMV	–	–
			C5	LPA-80063/6CF	–	RMV	–	–

NOTES

1. GC TO VERIFY THE FINAL RFDS MATCHES THE FINAL CONSTRUCTION DRAWINGS. GC TO NOTIFY ATC PM OF ANY DISCREPANCY PRIOR TO INSTALLING THE EQUIPMENT.
2. GC TO CAP ALL UNUSED PORTS.
3. GC TO CONFIRM SPACING OF PROPOSED EQUIP DOES NOT CAUSE TOWER CONFLICTS NOR IMPEDE TOWER CLIMBING PEGS.

STATUS ABBREVIATIONS

RMV: TO BE REMOVED
RMN: TO REMAIN
REL: TO BE RELOCATED
ADD: TO BE ADDED

CABLE LENGTHS FOR JUMPERS

JUNCTION BOX TO RRU: 15'
RRU TO ANTENNA: 10'

FINAL ANTENNA SCHEDULE

LOCATION			ANTENNA SUMMARY				NON ANTENNA SUMMARY	
SECTOR	RAD	AZ	POS	ANTENNA	BAND	STATUS	ADDITIONAL TOWER MOUNTED EQUIPMENT	STATUS
ALPHA	248'	0°	A1	NHH-65B-HG-R2B	L700/L850/L1900/LAWS/ 5G 850	ADD	-	-
			A2	-	-	-	RF 4439D-25A	ADD
			A3	MT6413-77A	5G CBAND	ADD	-	-
			A4	-	-	-	RF4461D-13A	ADD
			A5	NHH-65B-HG-R2B	L700/L850/L1900/LAWS/ 5G 850	ADD	-	-
BETA	248'	130°	B1	NHH-65B-HG-R2B	L700/L850/L1900/LAWS/ 5G 850	ADD	-	-
			B2	-	-	-	RF 4439D-25A	ADD
			B3	MT6413-77A	5G CBAND	ADD	-	-
			B4	-	-	-	RF4461D-13A	ADD
			B5	NHH-65B-HG-R2B	L700/L850/L1900/LAWS/ 5G 850	ADD	-	-
GAMMA	248'	270°	C1	NHH-65B-HG-R2B	L700/L850/L1900/LAWS/ 5G 850	ADD	-	-
			C2	-	-	-	RF 4439D-25A	ADD
			C3	MT6413-77A	5G CBAND	ADD	-	-
			C4	-	-	-	RF4461D-13A	ADD
			C5	NHH-65B-HG-R2B	L700/L850/L1900/LAWS/ 5G 850	ADD	-	-

EXISTING FIBER DISTRIBUTION / OVP BOX

MODEL NUMBER	STATUS
–	–

EXISTING CABLING SUMMARY

CABLE QTY, SIZE, TYPE	STATUS
(18) 1 5/8" COAX	RMV

3 EQUIPMENT SCHEDULES

FINAL FIBER DISTRIBUTION / OVP BOX

MODEL NUMBER	STATUS
RVZDC-6627-PF-48 (OVP 12)	ADD

FINAL CABLING SUMMARY

CABLE QTY, SIZE, TYPE	STATUS
(2) 1 5/8" 6X12 HYBRID	ADD

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32 NORFOLK ROAD
WINSTED, CT 06098

SEAL:

Digitally Signed: 2025-06-17

verizon

ATC JOB NO:	15110567_G0
CUSTOMER ID:	WINCHESTER CT
CUSTOMER #:	5000027694

ANTENNA INFORMATION & SCHEDULE

SHEET NUMBER:	REVISION:
C-401	0

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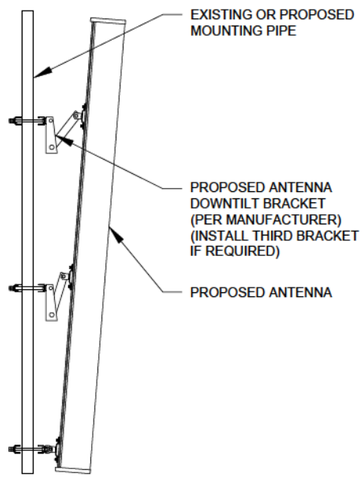
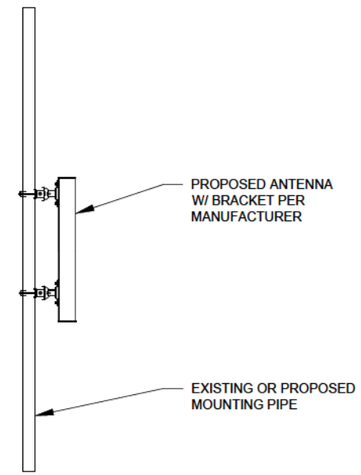
EXISTING/PROPOSED MOUNTS AND/OR MOUNT MODIFICATIONS NOT SHOWN FOR CLARITY. REFER TO ANTENNA PLANS, MOUNT ANALYSES AND/OR MOUNT MODIFICATION DOCUMENTS FOR ADDITIONAL DETAIL.



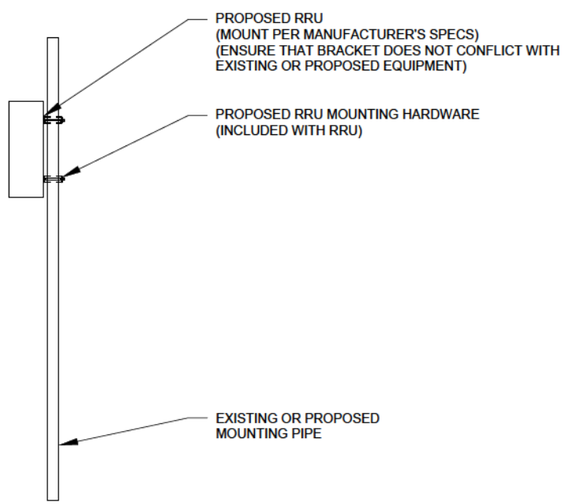
1 PROPOSED ANTENNA MOUNTING DETAIL - TYPICAL

SCALE: N.T.S.



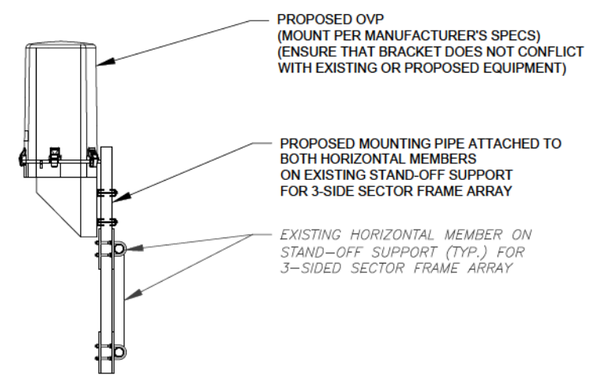
2 PROPOSED 5G ANTENNA MOUNTING DETAIL - TYPICAL

SCALE: N.T.S.



3 PROPOSED RRU MOUNTING DETAIL - TYPICAL

SCALE: N.T.S.



4 PROPOSED OVP MOUNTING DETAIL - TYPICAL

SCALE: N.T.S.

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SEAL:

Digitally Signed: 2025-06-17

verizon

ATC JOB NO:	15110567_G0
CUSTOMER ID:	WINCHESTER CT
CUSTOMER #:	5000027694

CONSTRUCTION DETAILS

SHEET NUMBER:	REVISION:
C-501	0

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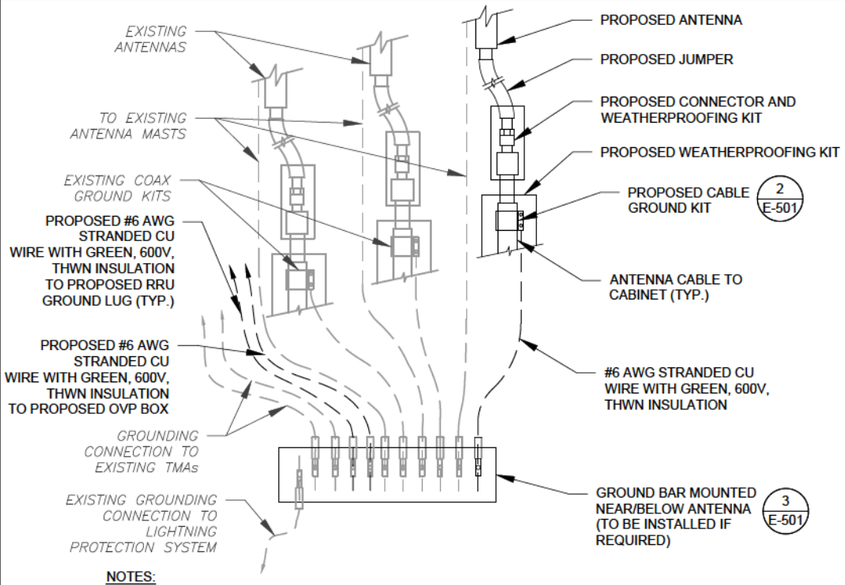
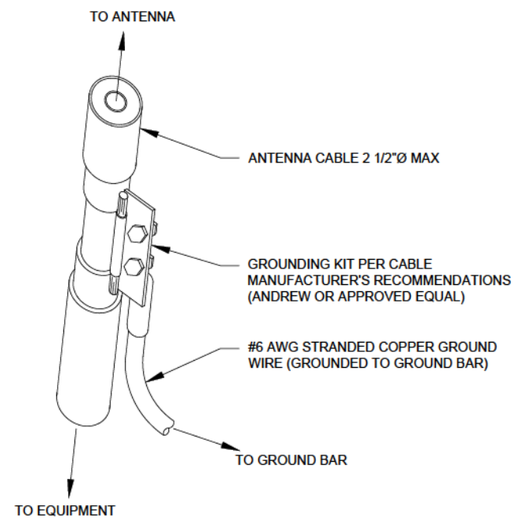


NOTES:

1. THIS DETAIL IS INTENDED TO SHOW THE GENERAL GROUNDING REQUIREMENTS. SLIGHT ADJUSTMENTS MAY BE REQUIRED BASED ON EXISTING SITE CONDITIONS. THE CONTRACTOR SHALL MAKE FIELD ADJUSTMENTS AS NEEDED AND INFORM THE CONSTRUCTION MANAGER OF ANY CONFLICTS.
2. SITE GROUNDING SHALL COMPLY WITH VERIZON GROUNDING STANDARDS, LATEST EDITION, AND COMPLY WITH VERIZON GROUNDING CHECKLIST, LATEST VERSION. WHEN NATIONAL AND LOCAL GROUNDING CODES ARE MORE STRINGENT THEY SHALL GOVERN.

1 TYPICAL ANTENNA GROUNDING DIAGRAM

SCALE: N.T.S.

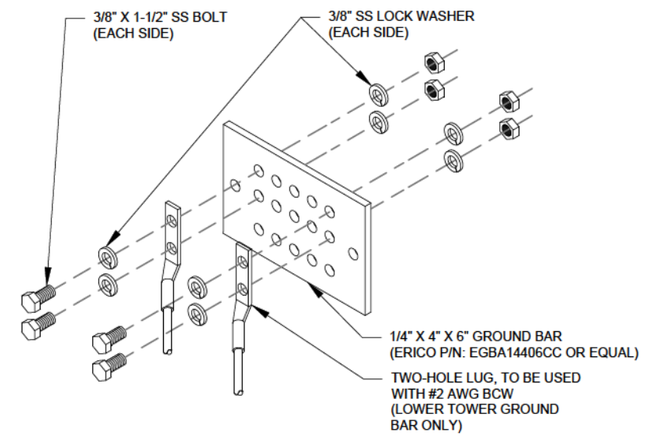


GROUND KIT NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. CONTRACTOR SHALL PROVIDE WEATHERPROOFING KIT (ANDREW PART NUMBER 221213) AND INSTALL/TAPE PER MANUFACTURER'S SPECIFICATIONS.

2 CABLE GROUND KIT CONNECTION DETAIL

SCALE: N.T.S.



GROUND BAR NOTES:

1. GROUND BAR KITS COME WITH ALL HARDWARE, NUTS, BOLTS, WASHERS, ETC. EXCEPT THE STRUCTURAL MOUNTING MEMBER(S).
2. GROUND BAR TO BE BONDED DIRECTLY TO TOWER.

3 TOWER GROUND BAR DETAIL

SCALE: N.T.S.

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verizon

ATC JOB NO:	15110567_G0
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CUSTOMER #:	5000027694

GROUNDING DETAILS

SHEET NUMBER:	REVISION:
E-501	0

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Colliers Engineering & Design, Architecture,
Landscape Architecture, Surveying, CT P.C.
2000 Midlantic Drive Suite 100
Mt. Laurel, NJ 08054
856.797.0412
sean.osullivan@collierseng.com

Post-Modification Antenna Mount Analysis Report and PMI Requirements

Mount Fix

SMART Tool Project #: 10278815
Colliers Engineering & Design Project #: 21777617 (Rev. 1)

March 3, 2025

Site Information	*Site ID:*	*5000027694-VZW / WINCHESTER CT*
	Site Name:	*WINCHESTER CT*
	Carrier Name:	*Verizon Wireless*
	Address:	*32 Norfolk Road* *Winchester, Connecticut 06098* *Litchfield County*
	Latitude:	*41.940194°*
	Longitude:	*-73.095903°*
Structure Information	*Tower Type:*	*Monopole*
	Mount Type:	*12.50-Ft T-Arm*

FUZE ID # 16272062

Analysis Results

T-Arm: **91.1% Pass w/ Modifications***

***Antennas and equipment to be installed in compliance with PMI Requirements of this mount analysis.**

******Contractor PMI Requirements*:**
Included at the end of this MA report
Available & Submitted via portal at https://pmi.vzwsmart.com
For additional questions and support, please reach out to:
pmisupport@colliersengineering.com

Report Prepared By: Madison Shell

Digitally signed by Grant Walters
Date: 2025.03.04 08:08:34-06'00'

Mount Steel (EPA)a per ANSI/TIA-222-H Section 2.6.11.2:

Ice Thickness (In)	Mount Pipes Excluded		Mount Pipes Included	
	Front (EPA)a (Sq. Ft.)	Side (EPA)a (Sq. Ft.)	Front (EPA)a (Sq. Ft.)	Side (EPA)a (Sq. Ft.)
0	15.4	6.2	27.8	18.6
0.5	20.1	8.4	37.6	25.9
1	24.3	10.1	46.9	32.6

Notes:
- (EPA)a values listed above may be used in the absence of more precise information
- (EPA)a values in the table above include 1 sector.
- Ka factors included in (EPA)a calculations

Requirements:

The existing mounts will be **SUFFICIENT** for the final loading configuration (attachment 2) after the modifications detailed in attachment 3 are successfully completed.

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. **Contractor Required PMI Report Deliverables**
2. Antenna Placement Diagrams
3. Mount Modification Drawings
4. Mount Photos
5. Mount Mapping Report (for reference only)
6. Analysis Calculations

1 MOUNT ANALYSIS

NOTE: THIS SHEET WAS CREATED BY OTHERS AND PROVIDED AT THE REQUEST OF THE CUSTOMER WITHOUT EDIT. PLEASE REFERENCE THE MOUNT ANALYSIS REPORT FOR COMPLETE MOUNT ANALYSIS CALCULATIONS AND DETAILS. SUPPLEMENTAL PAGES INCLUDED IN THE CONSTRUCTION DRAWINGS ARE FOR REFERENCE ONLY. GENERAL CONTRACTOR IS TO VERIFY THEY HAVE THE MOST RECENT MOUNT ANALYSIS PRIOR TO CONTRUCTION.

SUPPLEMENTAL

SHEET NUMBER:	REVISION:
R-601	0

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verizon

MOUNT MODIFICATION DRAWINGS
EXISTING 12.50' T-FRAME

TOWER OWNER: AMERICAN TOWER CORPORATION
TOWER OWNER SITE NUMBER: 413849

CARRIER SITE NAME: WINCHESTER CT
CARRIER SITE NUMBER: 467661
FUZE ID: 16272062

32 NORFOLK ROAD
WINCHESTER, CT 06098
LITCHFIELD COUNTY

LATITUDE: 41.940194° N
LONGITUDE: 73.095903° W

DESIGN CRITERIA

WIND LOADS
BASIC WIND SPEED (3 SECOND GUST), V = 115 MPH
EXPOSURE CATEGORY: C
TOPOGRAPHIC CATEGORY: 1
MEAN RAMB ELEVATION (MRELV) = 1146.3'

ICE LOADS
ICE WIND SPEED (3 SECOND GUST), V = 50 MPH
ICE THICKNESS = 1.00 IN

SEISMIC LOADS
SEISMIC DESIGN CATEGORY B
SHORT TERM MCER GROUND MOTION, S_s = .167
LONG TERM MCER GROUND MOTION, S_1 = .054

PROJECT INFORMATION

APPLICANT/LESSEE
COMPANY: VERIZON WIRELESS

CLIENT REPRESENTATIVE
COMPANY: VERIZON WIRELESS

PROJECT MANAGER
COMPANY: COLLIERS ENGINEERING & DESIGN CT, P.C.
CONTACT: SEAN COLLIGNAN
PHONE: 856-390-2098
EMAIL: SEAN.COLLIGNAN@COLLIERSENG.COM

CONTRACTOR PMI REQUIREMENTS

PM LOCATION	HTTPS://PM.VZWSMART.COM
SMART TOOL PROJECT #:	10270818
VZW MSO #:	00000274NM
ANALYSIS DATE:	03/05/2025

PM REQUIREMENTS IMBEDDED WITHIN MOUNT MODIFICATION REPORT

SHEET INDEX

SHEET	DESCRIPTION
ST-1	TITLE SHEET
SBOM-1	BILL OF MATERIALS
SGN-1	GENERAL NOTES
SCF-1	CLIMBING FACILITY DETAIL
SS-1	MODIFICATION DETAILS
SS-2	MOUNT PHOTOS
	SPECIFICATION SHEETS

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Colliers Engineering & Design
www.collierselectricalengineering.com
Dial Big Blue Dot on Your Success
verizon
PROJECT NUMBER
811 Know what's below. Call before you dig.
DATE: AS SHOWN REVISED: 2/27/27

REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
0	03/05/25	CONSTRUCTION DRAWINGS	MKS	SDR
A	2/27/27	CONSTRUCTION DRAWINGS	MKS	SDR

COLLIERS ENGINEERING & DESIGN CT, P.C.
CT LICENSE #
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF THE RESPONSIBLE LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.
SITE NAME:
WINCHESTER CT
467661
32 NORFOLK ROAD
WINCHESTER, CT 06098
LITCHFIELD COUNTY
Colliers International Engineering & Design
AT LARGE
MICHAEL J. BUTLER
No. 34
Date of License: 10/10/2012
Date of Expiration: 09/30/2027
AT LARGE
DAVID M. SCHOFIELD
No. 35
Date of License: 10/10/2012
Date of Expiration: 09/30/2027
DRAWING:
TITLE SHEET
DRAWING NUMBER:
ST-1
PLOTTED ON 11X17 SCALE DRAWINGS FOR CONSTRUCTION

BILL OF MATERIALS

SECTION 1 - VZWSMART KITS

QUANTITY	MANUFACTURER	PART NUMBER	DESCRIPTION	NOTES	UNIT WEIGHT (LBS.)	WEIGHT (LBS.)
2	VZWSMART	VWSMART-P48-2012X120	120" LONG, PIPE 2 SCH40 (2.0"OD X 0.216" THK)		114	242
3		VWSMART-P48-3.750X246	96" LONG, PIPE 2 1/2 SCH40 (2.875"OD X 0.203" THK)		46	138
1		VZWSMART-P40-2.375X48-48	48" LONG, PIPE 2 SCH40 (2.375"OD X 0.154" THK)		15	15
3		VZWSMART-SPK4	T-ARM KIT	CONTRACTOR TO VERIFY THE LENGTH REQUIRED AND TRIM AS NECESSARY IN ACCORDANCE WITH THE "STRUCTURAL STEEL" NOTES ON SHEET SGN-1.	106	318
1		VZWSMART-PLK3	KICKER KIT	CONTRACTOR TO VERIFY THE LENGTH REQUIRED AND TRIM AS NECESSARY IN ACCORDANCE WITH THE "STRUCTURAL STEEL" NOTES ON SHEET SGN-1.	291	291
2		VZWSMART-PLK7	MONOPOLE COLLAR MOUNT ASSEMBLY		150	300
15		VZWSMART-MSC2	CROSSOVER PLATE		14	210
4		VZWSMART-MSC6	BACK TO BACK CROSSOVER PLATE		34	136
				-		

SECTION 2 - OTHER REQUIRED PARTS

QUANTITY	MANUFACTURER	PART NUMBER	DESCRIPTION	NOTES	UNIT WEIGHT (LBS.)	WEIGHT (LBS.)

SECTION 3 - REQUIRED SAFETY CLIMB PARTS

QUANTITY	MANUFACTURER	PART NUMBER	DESCRIPTION	NOTES	UNIT WEIGHT (LBS.)	WEIGHT (LBS.)
					TOTAL:	1756

NOTES:

1. THE MANUFACTURERS LISTED ARE THE APPROVED VENDORS FOR THE VZW MOUNT KITS. EACH MANUFACTURER WILL BE AWARE OF WHICH KITS HAVE BEEN THROUGH THE VZW APPROVAL PROCESS AND THEY ARE IN TURN APPROVED TO SELL. PLEASE NOTE THAT THE MATERIAL UTILIZED ON THE MOUNT MODIFICATIONS WILL BE REVIEWED AS A PART OF THE DESKTOP PMI COMPLETED BY THE SMART TOOL VENDOR. IT WILL BE REQUIRED THAT THE VZW KITS SPECIFIED ARE UTILIZED IN THE MODIFICATIONS.
2. ALL MATERIALS REQUIRED FOR THE DESIGNED MODIFICATIONS BUT NOT LISTED IN THIS SHEET ARE ASSUMED TO BE PROVIDED BY THE CONTRACTOR.

VZWSMART KITS - APPROVED VENDORS

COMMSCOPE	
CONTACT	SALVADOR, ANGUIANO
PHONE	(813) 304-2402
EMAIL	SALVADOR.ANGUIANO@COMMSCOPE.COM
WEBSITE	WWW.COMMSCOPE.COM

METROSITE FABRICATORS, LLC	
CONTACT	KENT RAMEY
PHONE	(706) 326-9595 (O), (706) 905-9798 (M)
EMAIL	KEN@METROSITELLC.COM
WEBSITE	HTTPS://METROSITEFABRICATORS.COM

PERFECTVISION	
CONTACT	WHOLESALE SALES
PHONE	(844) 889-4723
EMAIL	WWW.PERFECT-VISION.COM
WEBSITE	WHOLESALESALES@PERFECT-VISION.COM

SABRE INDUSTRIES, INC.	
CONTACT	ANGIE WELCH
PHONE	(844) 438-6959
EMAIL	AE.WELCH@SABRE-INDUSTRIES.COM
WEBSITE	WWW.SABREBTSOLUTIONS.COM

SITE PRO 1	
CONTACT	PAULA BODWELL
PHONE	(972) 236-8965
EMAIL	PAULA.BODWELL@SITEPRO1.COM
WEBSITE	WWW.SITEPRO1.COM

DRAWING:
BILL OF MATERIALS
DRAWING NUMBER:
SBOM-1

GENERAL NOTES

1. THESE MODIFICATIONS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE GOVERNING PROVISIONS OF THE TIA222 CODE IN INDUSTRY STANDARD TIA-222-H. MATERIALS AND SERVICES PROVIDED BY THE CONTRACTOR SHALL CONFORM TO THE ABOVE MENTIONED CODES.
2. CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PREVENT DAMAGE TO EXISTING STRUCTURES. ANY DAMAGE TO EXISTING STRUCTURES AS A RESULT OF THE CONTRACTOR'S WORK, OR FROM DAMAGE DUE TO CD-108 CAUSES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
3. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS BEFORE BEGINNING WORK, ORDERING MATERIAL, AND PREPARING OF SHOP DRAWINGS. ANY DISCREPANCIES BETWEEN REQUIRED CONDITIONS AND THE CONTRACT DOCUMENTS SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ENGINEER. IF THE CONTRACTOR DISCOVERS ANY EXISTING CONDITIONS THAT ARE NOT REPRESENTED ON THESE DRAWINGS, OR ANY CONDITION THAT WOULD INTERFERE WITH THE INSTALLATION OF THE MODIFICATIONS, NOTIFY THE ENGINEER IMMEDIATELY.
4. IT IS ASSUMED THAT ANY STRUCTURAL MODIFICATION WORK SPECIFIED ON THESE PLANS WILL BE ACCOMPLISHED BY KNOWLEDGEABLE WORKMEN WITH TOWER CONSTRUCTION EXPERIENCE.
5. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION METHODS, MEANS, TECHNIQUES, SEQUENCES, AND PROCEDURES.
6. ALL CONSTRUCTION MEANS AND METHODS, INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/TIA-322 (LATEST EDITION), OSHA, AND GENERAL INDUSTRY STANDARDS. ALL RIGGING PLANS SHALL ADHERE TO ANSI/TIA-322 (LATEST EDITION) INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS III CONSTRUCTION.
7. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PROGRAMS IN ACCORDANCE WITH APPLICABLE SAFETY CODES.
8. WORK SHALL ONLY BE PERFORMED DURING DAYLIGHT DAYS (WHICH IS LESS THAN 24 HRS). THE STRUCTURE SHOWN ON THE DRAWINGS IS STRUCTURALLY SOUND ONLY IN THE COMPUTED FORM. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STRENGTH AND STABILITY OF THE STRUCTURE DURING ERECTION. CONTRACTOR SHALL PROVIDE TEMPORARY SUPPORT, SHORING, BRACING AND ANY OTHER STRUCTURAL SYSTEMS AS REQUIRED TO RESIST ALL FORCES THAT MAY OCCUR DURING HANDLING AND ERECTION UNTIL THE STRUCTURE IS FULLY COMPLETED. TEMPORARY SUPPORTS, BRACING AND OTHER STRUCTURAL SYSTEMS REQUIRED DURING CONSTRUCTION SHALL REMAIN THE CONTRACTOR'S PROPERTY AFTER THEIR USE.
9. ALL INSTALLATIONS PERFORMED ON THE STRUCTURE SHALL BE COMPLETED IN ACCORDANCE WITH THE GOVERNING PROVISIONS OF THE ZONA GUIDE FOR INSTALLATION, ALTERATION AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, ANSI/TIA-222.
10. CONTRACTOR SHALL RESTORE BACK TO EXISTING CONDITION UNDER SUPERVISION OF OWNER, ALL FENCE, STONE, GROWING, GROUND AND SURROUNDING GRADE SHALL BE REPLACED AND REPAIRED AS REQUIRED TO ACHIEVE OWNER APPROVAL. POSITIVE DRAINAGE AWAY FROM TOWER SITE SHALL BE MAINTAINED.
11. CONNECTIONS BETWEEN ITEMS SUPPORTED BY THE STRUCTURE AND THE STRUCTURE NOT SPECIFICALLY DETAILED BY THE CONTRACT DOCUMENTS ARE THE RESPONSIBILITY OF THE CONTRACTOR. SUCH CONNECTIONS SHALL BE DESIGNED, COORDINATED AND INSPECTED BY A PROFESSIONAL STRUCTURAL ENGINEER LICENSED IN THE STATE OF THE PROJECT. SUBMIT SIGNED AND SEALED CALCULATIONS DURING SHOP DRAWING REVIEW.
12. DO NOT SCALE DRAWINGS.
13. DO NOT USE THESE DRAWINGS FOR ANY OTHER SITE.
14. ALL MATERIAL UTILIZED FOR THE PROJECT MUST BE NEW AND FREE OF ANY DEFECTS. ANY MATERIAL SUBSTITUTIONS, INCLUDING BUT NOT LIMITED TO ALTERED SIZE AND/OR STRENGTHS, MUST BE APPROVED BY THE OWNER AND ENGINEER IN WRITING.
15. THE MOUNT LS-008, MO CIRCUMSTANCES SHOULD BE USED AS A TIE OFF POINT.

STRUCTURAL STEEL

1. DESIGN, DETAILING, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING PUBLICATIONS EXCEPT AS SPECIFICALLY INDICATED IN THE CONTRACT DOCUMENTS.
   a. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) MANUAL OF STEEL CONSTRUCTION (15TH EDITION)
   b. SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS
   c. AISC CODE OF STANDARD PRACTICE
2. STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING GRADES OTHERWISE SHOWN:

CHANNELS, ANGLES, PLATES, ETC.	ASTM A36 (OR 36)
STEEL PIPE	ASTM A53 (GR. 35)
BOLTS	ASTM A325
NUTS	ASTM A563
LOCK WASHERS	LOCKING STRUCTURAL GRADE

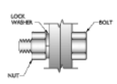
3. ALL SUBSTITUTIONS PROPOSED BY THE CONTRACTOR SHALL BE APPROVED IN WRITING BY THE ENGINEER. CONTRACTOR SHALL PROVIDE DOCUMENTATION TO ENGINEER FOR VERIFYING THE SUBSTITUTE IS SUITABLE FOR USE AND MEETS ORIGINAL DESIGN CRITERIA. DIFFERENCES FROM THE ORIGINAL DESIGN, INCLUDING MAINTENANCE, REPAIR AND REPLACEMENT, SHALL BE NOTED. BETWEEN THE COST DIFFERENTS ASSOCIATED WITH THE SUBSTITUTION (INCLUDING RE-DESIGN COSTS AND COSTS TO SUB-CONTRACTORS) SHALL BE PROVIDED TO THE ENGINEER. CONTRACTOR SHALL PROVIDE ADDITIONAL DOCUMENTATION AND/OR SPECIFICATIONS TO THE ENGINEER AS REQUESTED.
4. PROVIDE STRUCTURAL STEEL SHOP DRAWINGS TO ENGINEER FOR APPROVAL PRIOR TO FABRICATION.
   a. SUBMIT SHOP DRAWINGS TO
      TEAM COLLIERS@COLLIERSENG.COM
   b. PROVIDE COLLIERS ENGINEERING & DESIGN PROJECT # AND COLLIERS ENGINEERING & DESIGN PROJECT ENGINEER CONTACT IN THE BODY OF THE EMAIL
5. DRILL NO HOLES IN ANY NEW OR EXISTING STRUCTURAL STEEL MEMBERS OTHER THAN THOSE SHOWN ON STRUCTURAL DRAWINGS WITHOUT THE APPROVAL OF THE ENGINEER OF RECORD.
6. GALVANIZED ASTM A325 BOLTS SHALL NOT BE REUSED.
7. ALL NEW STEEL SHALL BE PAINTED TO MATCH EXISTING STEEL. CONTRACTOR SHALL OBTAIN WRITTEN PERMISSION TO PROTECT STEEL BY ANY OTHER FINISHES.
8. ALL BOLT ASSEMBLIES FOR STRUCTURAL MEMBERS REPRESENTED IN THIS DRAWING REQUIRE LOCKING DEVICES TO BE INSTALLED IN ACCORDANCE WITH TIA-222-H SECTION 4.3.3 REQUIREMENTS.
9. WHERE CONNECTIONS ARE NOT FULLY DETAILED ON THESE DRAWINGS, FABRICATOR SHALL DESIGN CONNECTIONS TO RESIST LOADS AND FORCES WHICH EXIST ON DRAWINGS AND AS OUTLINED IN SPECIFICATION.
10. FOR MEMBERS BEING REPLACED, PROVIDE NEW BOLTS AND MATCH EXISTING SIZE AND GRADE. MAINTAIN AISC REQUIREMENTS FOR MINIMUM BOLT EDTANCE AND SPACING.
11. ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH SUCH THAT THE END OF THE BOLT IS AT LEAST FLUSH WITH THE FACE OF THE NUT. IT IS NOT PERMITTED FOR THE BOLT END TO BE BELOW THE FACE OF THE NUT AFTER TIGHTENING IS COMPLETED.
12. GALVANIZED ASTM A325 BOLTS SHALL NOT BE REUSED.
13. ALL NEW STEEL SHALL BE HOT DIP PRE-GALVANIZED FOR FULL WEATHER PROTECTION. CONTRACTOR SHALL OBTAIN WRITTEN PERMISSION TO PROTECT STEEL BY ANY OTHER FINISHES.
14. ALL EXISTING PAINTED/GALVANIZED SURFACES DAMAGED DURING REPAIR INCLUDING AREAS UNDER STIFFENER PLATES SHALL BE WIRE BRUSHED CLEAN, REPAINTED BY ZINC COTE, OR BOR APPROVED EQUAL, AND REPAINTED TO MATCH THE EXISTING FINISH (IF APPLICABLE).
15. ALL HOLES IN STEEL MEMBERS SHALL BE SIZED 1/16" LARGER THAN THE BOLT DIAMETER. 3/4" DIA BOLT HOLES SHALL BE USED VIA SIZED HOTTED OTHERWISE.

BOLT SCHEDULE (IN.)

BOLT DIAMETER	STANDARD HOLE	SHORT SLOT	MIN. EDGE DISTANCE	SPACING
1/2	9/16	9/16 x 11/16	7/8	1 1/2
5/8	11/16	11/16 x 7/8	1 1/8	1 7/8
3/4	13/16	13/16 x 1	1 1/4	2 1/4
7/8	15/16	15/16 x 1 1/8	1 1/2	2 5/8
1	1 1/16	1 1/16 x 1 5/16	1 3/4	3

WORKABLE GAGES (IN.)

LEG	GAGE
4	2 1/2
3 1/2	2
3	1 3/4
2 1/2	1 3/8
2	1 1/8

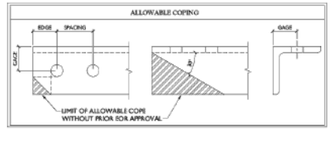


TYP. BOLT ASSEMBLY

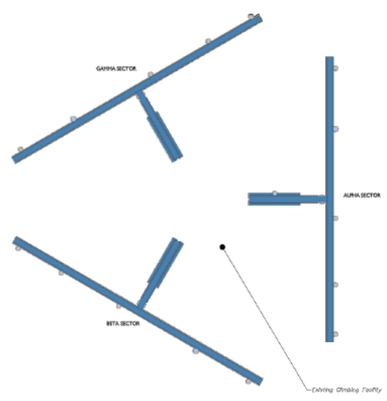
NOTES:

1. ALL DIMENSIONS REPRESENTED IN THE ABOVE TABLES ARE ABSOLUTE MINIMUM REQUIREMENTS. CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN THE FIELD AND NOTIFY ENGINEER IF DEVIATIONS ARE LESS THAN THOSE PROVIDED.
2. THE DIMENSIONS PROVIDED ARE MINIMUM REQUIREMENTS. ACTUAL DIMENSIONS OF PROPOSED MEMBERS MAY VARY. THESE DRAWINGS MAY VARY WITH THE AISC MINIMUM REQUIREMENTS.
3. SHORT SLOT HOLES SHALL ONLY BE USED WHEN INDICATED ON THE DRAWINGS.
4. MATCH EXISTING GAGES WHEN APPLICABLE. UNLESS OTHERWISE GIVEN DISTANCES ARE COMPUTED.

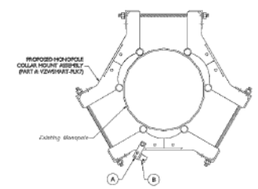
ALLOWABLE COPING



DRAWING:
MODIFICATION NOTES
DRAWING NUMBER:
SGN-1



1 CLIMBING FACILITY LOCATION
SCALE: N.T.S.



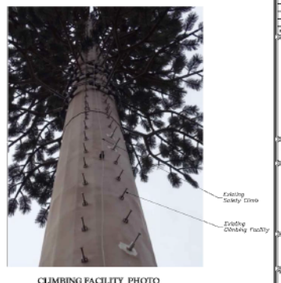
ITEM #	QTY	PART NUMBER	DESCRIPTIONS
A	1	HQ-0859-46	STANDOFF CLAMP BRACKET (PERFECT VISION OR BOR APPROVED EQ.)
B	1	PV-CMC-CG-80	WIRE ROPE GUIDE (PERFECT VISION OR BOR APPROVED EQ.)

2 PROPOSED WIRE ROPE GUIDE ATTACHMENT - PLAN VIEW
SCALE: N.T.S.

NOTE: CONTRACTOR SHALL ENSURE THAT WIRE ROPE GUIDE DOES NOT PUSH THE WIRE ROPE OUTSIDE OF THE VERTICAL PLANE OF THE SAFETY CLIMB. CONTRACT FOR WITH PHOTOS OF SAFETY CLIMB AND COLLAR FOR FURTHER DIRECTION IF NEEDED.

STRUCTURAL NOTES:

1. PER THE MOUNT MAPPING COMPLETED BY STRUCTURAL COMPONENTS ON 4/1/2021, THE SAFETY CLIMB AND CLIMBING FACILITIES UP TO THE VERIZON MOUNT ELEVATION (149'-0") ARE IN GOOD CONDITION. MASER DOES NOT WARRANT THIS INFORMATION.
2. INSTALL SHALL NOT CAUSE HARM TO THE STRUCTURE, CLIMBING FACILITY, SAFETY CLIMB, OR ANY SYSTEM INSTALLED ON THE STRUCTURE. TIMELY NOTICE AND DOCUMENTATION SHALL BE PROVIDED BY CONTRACTORS TO THE EOR (OF STRUCTURAL DESIGN) IF AN OBSTRUCTION WAS REQUIRED TO MEET THE RF SYSTEM DESIGN REQUIRMENTS AND PERFORMANCES.
3. CONTRACTOR SHALL GRIND OFF BRANCH RECEPTACLES AS NEEDED TO INSTALL PROPOSED MODIFICATION COLLARS. CONTRACTOR SHALL MINIMIZE THE QUANTITY OF RECEPTACLES BEING REMOVED. ONLY REMOVE RECEPTACLES DIRECTLY INTERFERING WITH PROPOSED COLLAR LOCATION.
4. COAX IS FLAMMABLE AND CAN CATCH FIRE IF PROPER PRECAUTIONS ARE NOT MADE TO SHIELD COAX FROM GRINDING PROCEDURES. ALL COAX SHALL BE SHIELDED AT AND BELOW EACH GRINDING PROCEDURE AND ELEVATION. IN ADDITION, COAX SHALL BE PUSHED AWAY FROM TOWER FACE WHERE WELDING OR GRINDING IS BEING PREFORMED. INSTALL 3000" (NFPA701) FIRE BLANKET AROUND ALL COAX.



CLIMBING FACILITY PHOTO

DRAWING:
CLIMBING FACILITY DETAIL
DRAWING NUMBER:
SCF-1

1 MOUNT MODIFICATIONS

NOTE: THIS SHEET WAS CREATED BY OTHERS AND PROVIDED AT THE REQUEST OF THE CUSTOMER WITHOUT EDIT. PLEASE REFERENCE THE MOUNT ANALYSIS REPORT FOR COMPLETE MOUNT ANALYSIS CALCULATIONS AND DETAILS. SUPPLEMENTAL PAGES INCLUDED IN THE CONSTRUCTION DRAWINGS ARE FOR REFERENCE ONLY. GENERAL CONTRACTOR IS TO VERIFY THEY HAVE THE MOST RECENT MOUNT ANALYSIS PRIOR TO CONTRUCTION.

SUPPLEMENTAL

SHEET NUMBER:	REVISION:
R-602	0

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LEGEND:

- PROPOSED
- RELOCATED
- EXISTING

TOTAL VERTICAL ENVELOPE:

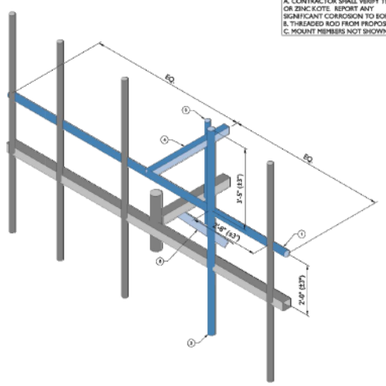
CONTRACTOR SHALL VERIFY AND CONFIRM IN FIELD THAT VERIZON'S OVERALL TIP TO TIP VERTICAL SPACE CONFIGURATION (EQUIPMENT AND STEEL COMBINED) DOES NOT EXCEED THE VERTICAL ENVELOPE LISTED IN THESE DRAWINGS. IF THE SITE'S EXISTING OR PROPOSED CONFIGURATION EXCEEDS THE ALLOWED VERTICAL ENVELOPE LISTED IN THESE DRAWINGS, CONTRACTOR SHALL CONTACT BOR IMMEDIATELY FOR A SOLUTION ON HOW TO CORRECT THE ISSUE PRIOR TO LEAVING THE SITE.

MOUNT MODIFICATION SCHEDULE

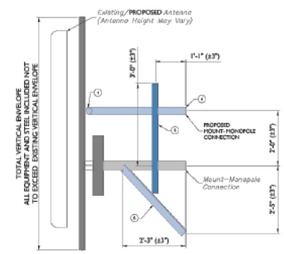
NO.	ELEVATION	QUANTITY	DESCRIPTION	NOTES
1	149'-0"	3	PROPOSED 150" LONG P3 STD PIPE (PART #: VZWSMART-P60-3120X150)	RADIO AND/OR THE POSITIONS SHALL BE ADJUSTED VERTICALLY AS NEEDED IN ORDER TO ACHIEVE INSTALLATION OF HORIZONTAL AS SHOWN. EOR SHALL BE NOTIFIED IF EQUIPMENT NEEDS TO BE RELOCATED TO ANOTHER MOUNT PIPE. CONNECT NEW HORIZONTAL TO ALL EXISTING AND PROPOSED VERTICAL MOUNT PIPES WITH CROSSOVER PLATES (PART #: VZWSMART-MSK2).
2		3	PROPOSED 96" LONG P2 1/2 STD PIPE (PART #: VZWSMART-P60-2780X96)	CONNECT NEW MOUNT PIPE TO EXISTING HORIZONTAL WITH CROSSOVER PLATES (PART #: VZWSMART-MSK6) AND CONNECT TO PROPOSED FACE HORIZONTAL PIPE WITH CROSSOVER PLATES (PART #: VZWSMART-MSK2).
3		1	PROPOSED 48" LONG P2 STD PIPE (PART #: VZWSMART-P60-2380X48)	CONNECT NEW OVP PIPE TO EXISTING ALPHA STANDOFF HORIZONTAL WITH BACK TO BACK CROSSOVER PLATE (VZWSMART-MSK6). ALPHA SECTOR ONLY.
4		3	PROPOSED T-ARM KIT (PART #: VZWSMART-SPK4)	CONTRACTOR TO VERIFY THE LENGTH REQUIRED AND TRIM AS NECESSARY IN ACCORDANCE WITH THE STRUCTURAL STEEL! NOTES ON SHEET SGN-1. CONNECT OTHER END OF T-ARM KIT TO MONOPOLE COLLAR MOUNT ASSEMBLY (PART #: VZWSMART-PLK7).
5		1	PROPOSED KICKER KIT (PART #: VZWSMART-PLK3)	CONTRACTOR TO VERIFY THE LENGTH REQUIRED AND TRIM AS NECESSARY IN ACCORDANCE WITH THE STRUCTURAL STEEL! NOTES ON SHEET SGN-1. CONNECT OTHER END OF KICKER KIT TO MONOPOLE COLLAR MOUNT ASSEMBLY (PART #: VZWSMART-PLK7).

GENERAL NOTES:

A. CONTRACTOR SHALL VERIFY THAT NEW & EXISTING STEEL IS FREE OF CORROSION. VISIBLE MINOR CORROSION SHALL BE WIRE BRUSHED CLEAN AND TREATED WITH ZINGA OR ZINC KOTE. REPORT ANY SIGNIFICANT CORROSION TO EOR.
B. THREADED ROD FROM PROPOSED KITS SHALL BE TRIMMED TO EXTEND NO MORE THAN 3" BEYOND THE LOCK NUT. TREAT ALL CUT ENDS WITH ZINGA OR ZINC KOTE.
C. MOUNT MEMBERS NOT SHOWN FOR CLARITY U.N.O.



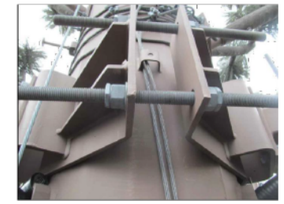
1 PROPOSED ISOMETRIC VIEW (TYP. ALL SECTORS)
SCALE: N.T.S.



2 PROPOSED SIDE ELEVATION VIEW (SIM. ALL SECTORS)
SCALE: N.T.S.

Colliers Engineering & Design
verizon
MODIFICATION DETAILS
SS-1

MOUNT PHOTO 1



MOUNT PHOTO 2

MOUNT PHOTO 3

MOUNT PHOTO 4

Colliers Engineering & Design
verizon
MOUNT PHOTOS
SS-2

SITE NAME:
WINCHESTER CT
609661
32 NORFOLK ROAD
WINCHESTER, CT 06098
LITCHFIELD COUNTY

1 MOUNT MODIFICATIONS

NOTE: THIS SHEET WAS CREATED BY OTHERS AND PROVIDED AT THE REQUEST OF THE CUSTOMER WITHOUT EDIT. PLEASE REFERENCE THE MOUNT ANALYSIS REPORT FOR COMPLETE MOUNT ANALYSIS CALCULATIONS AND DETAILS. SUPPLEMENTAL PAGES INCLUDED IN THE CONSTRUCTION DRAWINGS ARE FOR REFERENCE ONLY. GENERAL CONTRACTOR IS TO VERIFY THEY HAVE THE MOST RECENT MOUNT ANALYSIS PRIOR TO CONTRUCTION.

SUPPLEMENTAL

SHEET NUMBER:	REVISION:
R-603	0

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Exhibit D

Structural Analysis

AMERICAN TOWER®
CORPORATION

Structural Analysis Report

Structure	:	151 ft Monopine
ATC Asset Name	:	Winchester PCS CT
ATC Asset Number	:	413849
Engineering Number	:	15110567_C3_03
Proposed Carrier	:	VERIZON WIRELESS
Carrier Site Name	:	WINCHESTER CT
Carrier Site Number	:	5000027694
Site Location	:	32 Norfolk Road WINSTED, CT 06098-2227 41.9403° N, 73.0959° W
County	:	Litchfield
Date	:	April 25, 2025
Max Usage	:	62%
Analysis Result	:	Pass

Created By:

Taylor Kellner
Structural Engineer II

STATE OF CONNECTICUT
ESHA KAUSHAL MODI
32593
LICENSED
PROFESSIONAL ENGINEER

COA: PEC.0001553

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Supporting Documents 3

Analysis 3

Conclusion 3

Structure Usages 4

Maximum Reactions 4

Tower Loading 5

Standard Conditions ..... Attached

Calculations ..... Attached

Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 151 ft Monopine tower to reflect the change in loading by VERIZON WIRELESS.

Supporting Documents

Tower:	EEI Project #15692, dated November 19, 2008 Baseplate thickness verified per field photos, dated June 30, 2021
Foundation:	EEI Project #15692, dated November 19, 2008
Geotechnical:	Terracon Project #J2085192, dated October 31, 2008

Analysis

The tower was analyzed using American Tower Corporation's tower analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

Basic Wind Speed:	114 mph (3-second gust)
Basic Wind Speed w/ Ice:	48 mph (3-second gust) w/ 1.18" radial ice concurrent
Code(s):	ANSI/TIA-222-I / 2021 IBC / 2022 Connecticut State Building Code
Exposure Category:	B
Risk Category:	II
Topographic Factor Procedure:	Method 1
Feature:	Rolling Hill
Crest Height (H):	209 ft
Crest Length (L):	489 ft
Spectral Response:	S_{DS} = 0.16, S_{D1} = 0.07
Site Class:	Default

Conclusion

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report.

If you have any questions or require additional information, please reach out to your American Tower contact. If you do not have an American Tower contact and have an Engineering question, please contact **Engineering@americantower.com** Please include the American Tower asset name, asset number, and engineering number in the subject line for any questions.

Structure Usages

Structural Component	Usage	Control	Result
Pole Shaft	60.9%	1.2D + 1.0W	Pass
Serviceability Usage	30.1%	1.0D + 1.0W	Pass
Base Plate @ 0.0 ft	38.2%	Rods	Pass
Mat & Pier	61.7%	Flexure [Steel (Pier)]	Pass

Maximum Reactions

Foundation	Moment (k-ft)	Axial (k)	Shear (k)
Monopole Base	6,471.3	72.3	59.5

Reactions shown reflect the results from the Load Case with maximum Moment excluding Overstrength Load Cases

Structure base reactions were analyzed using available geotechnical and foundation information.

VERIZON WIRELESS Final Loading

Elev (ft)	Qty	Equipment	Lines
148.0	1	Raycap RVZDC-6627-PF-48	(2) 1 5/8" Hybriflex
	1	Unused Reserve (16675.610 sqin)	
	3	Light Sector Frame	
	3	Samsung B2/B66A RRH ORAN (RF 4439d-25A)	
	3	Samsung MT6413-77A	
	3	Samsung RF4461d-13A	
	6	Commscope NHH-65B-HG-R2B	

Install proposed lines inside the pole shaft.

Other Existing/Reserved Loading

Elev (ft)	Qty	Equipment	Lines
138.6	-	-	(1) 2 1/2" conduit
137.0	1	Raycap DC9-48-60-24-8C-EV (Enclosure)	(1) 0.39" (10mm) Fiber Trunk (3) 0.92" (23.4mm) Cable (1) 2 1/2" conduit
	3	CCI DMP65R-BU8D	
	3	CCI TPA65R-BU8D	
	3	Ericsson RRUS 4449 B5, B12	
	3	Ericsson RRUS 4478 B14 (16.5" Height)	
	3	Ericsson RRUS 8843 B2, B66A	
	3	Sector Frame	
127.0	1	Andrew VHLP2-11W-2GR	(3) 1.99" (50.7mm) Hybrid (4) 1/2" Coax
	1	Ceragon FibeAir IP-20C	
	3	Ericsson 4460 BAND 2/25	
	3	Ericsson 4480 BAND 71	
	3	Ericsson AIR 6419 B41	
	3	Sector Frame	
	3	RFS APXVAALL24 43-U-NA20	
125.0	1	Ceragon FibeAir IP-20C	-

(If table breaks across pages, please see previous page for data in merged cells)

AMERICAN TOWER®
CORPORATION

Standard Conditions

All engineering services performed by A.T. Engineering Services LLC are prepared on the basis that the information used is current and correct. This information may consist of, but is not limited to the following:

- Information supplied by the client regarding antenna, mounts, and feed line loading
- Information from drawings, design and analysis documents, and field notes in the possession of A.T. Engineering Services LLC

It is the responsibility of the client to ensure that the information provided to A.T. Engineering Services LLC and used in the performance of our engineering services is correct and complete.

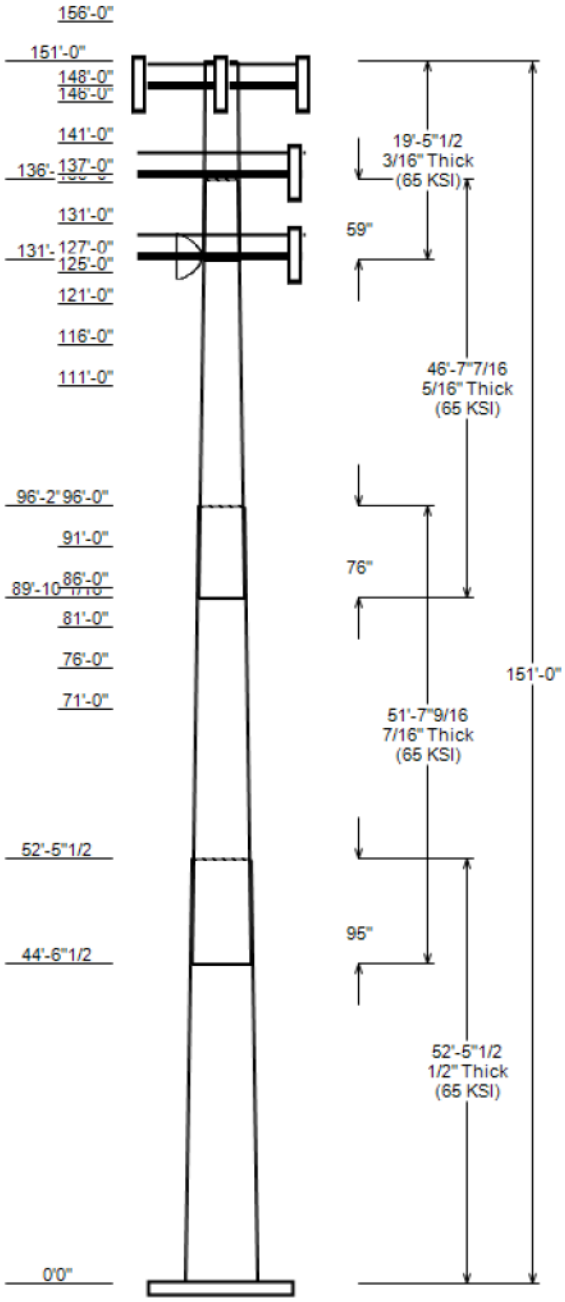
All assets of American Tower Corporation, its affiliates, and subsidiaries (collectively "American Tower") are inspected at regular intervals. Based upon these inspections and in the absence of information to the contrary, American Tower assumes that all structures were constructed in accordance with the drawings and specifications.

Unless explicitly agreed by both the client and A.T. Engineering Services LLC, all services will be performed in accordance with the current revision of ANSI/TIA-222.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. A.T. Engineering Services LLC is not responsible for the conclusions, opinions and recommendations made by others based on the information supplied herein.

ANALYSIS PARAMETERS

Design Wind:	114 mph	**Ice Wind:**	48 mph w/ 1.2" ice	**Service Wind:**	60 mph
Risk Category:	II	**Exposure:**	B	**S_{D1}:** 0.067	**S_{Ds}:** 0.160
Topo Factor:	Method 1	**Topo Feature:**	Rolling Hill		
Structure Height:	151.0 ft	**Base Elevation:**	0.00 ft	**Structure Type:**	Taper
Base Diameter:	71.00 in	**Base Rotation:**	0.00°	**Taper:**	0.2910 (in/ft)



POLE SECTION PROPERTIES

Section	Length (ft)	Flat Diameter (in) Top	Flat Diameter (in) Bottom	Thick (in)	Joint Type	Joint Length (in)	Pole Shape	Yield Strength (ksi)
1	52.460	55.76	71.00	0.500		0.00	18 Sides	65
2	51.630	43.93	58.93	0.438	Slip Joint	95.00	18 Sides	65
3	46.620	32.85	46.40	0.312	Slip Joint	76.00	18 Sides	65
4	19.457	29.00	34.65	0.188	Slip Joint	59.00	18 Sides	65

DISCRETE APPURTENANCE

Elev (ft)	Description
156.0	(1) Pine Branches
151.0	(1) Pine Branches
148.0	(3) Samsung MT6413-77A
148.0	(1) Unused Reserve (16675.610 sqin)
148.0	(1) Raycap RVZDC-6627-PF-48
148.0	(6) Commscope NHH-65B-HG-R2B
148.0	(3) Generic Flat Light Sector Frame
148.0	(3) Samsung RF4461d-13A
148.0	(3) Samsung B2/B66A RRH ORAN (RF 4
146.0	(1) Pine Branches
141.0	(1) Pine Branches
137.0	(3) Ericsson RRUS 8843 B2, B66A
137.0	(3) CCI TPA65R-BU8D
137.0	(3) Ericsson RRUS 4449 B5, B12
137.0	(3) CCI DMP65R-BU8D
137.0	(3) Ericsson RRUS 4478 B14 (16.5" Heig
137.0	(1) Raycap DC9-48-60-24-8C-EV (Enclo
137.0	(3) Generic Round Sector Frame
136.0	(1) Pine Branches
131.0	(1) Pine Branches
127.0	(3) RFS APXVAALL24 43-U-NA20
127.0	(3) Ericsson 4460 BAND 2/25
127.0	(3) Ericsson 4480 BAND 71
127.0	(3) Ericsson AIR 6419 B41
127.0	(3) Generic Round Sector Frame
127.0	(1) Andrew VHLP2-11W-2GR
127.0	(1) Ceragon FibeAir IP-20C
126.0	(1) Pine Branches
125.0	(1) Ceragon FibeAir IP-20C
121.0	(1) Pine Branches
116.0	(1) Pine Branches
111.0	(1) Pine Branches
96.0	(1) Pine Branches
91.0	(1) Pine Branches
86.0	(1) Pine Branches
81.0	(1) Pine Branches
76.0	(1) Pine Branches
71.0	(1) Pine Branches

LINEAR APPURTENANCE

Elev To (ft)	Description
148.0	(2) 1 5/8" Hybriflex
138.6	(1) 2 1/2" conduit
137.0	(1) 2 1/2" conduit
137.0	(1) 0.39" (10mm) Fiber Trunk
137.0	(3) 0.92" (23.4mm) Cable
127.0	(3) 1.99" (50.7mm) Hybrid
127.0	(4) 1/2" Coax

DISH SERVICEABILITY

Load Case	Elevation (ft)	Deflection (in)	Rotation (°)
1.0D + 1.0W	127.0	11.6984	0.8849

GLOBAL BASE REACTIONS

Load Case	Moment (kip-ft)	Axial (kip)	Shear (kip)
1.2D + 1.0W	6471.30	72.27	59.47
0.9D + 1.0W	6431.52	54.18	59.45
1.2D + 1.0Di + 1.0Wi	1834.45	100.03	16.85
1.2D + 1.0Ev + 1.0Eh	215.89	71.80	1.81
0.9D - 1.0Ev + 1.0Eh	214.29	50.59	1.81
1.0D + 1.0W	1598.20	60.28	14.74

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ANALYSIS PARAMETERS

Location:	Litchfield County,CT	**Height:**	151 ft
Type and Shape:	Taper, 18 Sides	**Base Diameter:**	71.00 in
Manufacturer:	EEI	**Top Diameter:**	29.00 in
K_d (non-service):	0.95	**Taper:**	0.2910 in/ft
K_e:	0.96	**Rotation:**	0.000°

ICE & WIND PARAMETERS

Risk Category:	II	**Design Wind Speed:**	114 mph
Exposure Category:	B	**Design Wind Speed w/ Ice:**	48 mph
Design Ice Thickness:	1.18 in		
Topo Factor Procedure:	Method 1		
Crest Height(H):	209 ft	**Service Wind Speed:**	60 mph
Crest Length(L):	489 ft	**HMSL:**	1145.00 ft
Feature:	Rolling Hill	**Distance from Apex (x):**	0 ft
		Upwind/Downwind:	Upwind

SEISMIC PARAMETERS

Analysis Method:	Equivalent Lateral Force Method				
Site Class:	Default		**Period Based on Rayleigh Method (sec):**		1.76
T_L (sec):	6	**P:**	1	**C_s:**	0.030
S_{ds}:	0.160	**S_{d1}:**	0.067	**C_s Max:**	0.030
				C_s Min:	0.030

LOAD CASES

1.2D + 1.0W	114 mph Wind with No Ice
0.9D + 1.0W	114 mph Wind with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	48 mph Wind with 1.18" Radial Ice
1.2D + 1.0Ev + 1.0Eh	Seismic
0.9D - 1.0Ev + 1.0Eh	Seismic (Reduced DL)
1.0D + 1.0W	60 mph Wind with No Ice
1.2D + 1.0Ev + 1.5Eh	Seismic Overstrength
0.9D - 1.0Ev + 1.5Eh	Seismic Overstrength (Reduced DL)

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SHAFT SECTION PROPERTIES

							Bottom						Top						
Section	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Joint Len (in)	Weight (lb)	Dia (in)	Elev (ft)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Taper (in/ft)
1-18	52.46	0.5000	65		0.00	17,813	71.00	0.000	111.88	70,255.7	23.28	142.00	55.76	52.46	87.69	33,828.	17.90	111.51	0.2906
2-18	51.63	0.4375	65	Slip	95.00	12,440	58.93	44.540	81.22	35,113.8	21.99	134.70	43.93	96.17	60.39	14,434.	15.94	100.41	0.2906
3-18	46.62	0.3125	65	Slip	76.00	6,185	46.40	89.840	45.71	12,264.0	24.42	148.47	32.85	136.46	32.27	4,316.7	16.77	105.12	0.2906
4-18	19.46	0.1875	65	Slip	59.00	1,247	34.65	131.543	20.51	3,078.4	30.83	184.82	29.00	151.00	17.15	1,798.5	25.51	154.67	0.2906
			Total Shaft Weight			**37,685**													

DISCRETE APPURTENANCE PROPERTIES

Attach Elev (ft)	Description	Qty	Ka	Vert Ecc (ft)	No Ice Weight (lb)	No Ice EPAa (sf)	No Ice Orientation Factor	Ice Weight (lb)	Ice EPAa (sf)	Ice Orientation Factor
156.00	Pine Branches	1	1.00	0.000	600.00	46.800	1.00	944.60	73.679	1.00
151.00	Pine Branches	1	1.00	0.000	600.00	46.800	1.00	944.60	73.679	1.00
148.00	Generic Flat Light Sector Fram	3	0.75	0.000	800.00	17.900	0.67	1718.27	30.331	0.67
148.00	Unused Reserve (16675.610 sqin	1	0.80	0.000	1146.00	115.803	0.90	1803.71	182.264	0.90
148.00	Commscope NHH-65B-HG-R2B	6	0.80	0.000	45.20	8.079	0.69	188.84	10.374	0.69
148.00	Samsung MT6413-77A	3	0.80	0.000	57.30	3.805	0.61	127.25	4.899	0.61
148.00	Raycap RVZDC-6627-PF-48	1	0.80	0.000	32.00	3.781	1.00	122.34	4.870	1.00
148.00	Samsung B2/B66A RRH ORAN (RF 4	3	0.80	0.000	74.70	1.875	0.50	127.35	2.616	0.50
148.00	Samsung RF4461d-13A	3	0.80	0.000	79.10	1.875	0.50	132.21	2.619	0.50
146.00	Pine Branches	1	1.00	0.000	600.00	46.800	1.00	944.24	73.651	1.00
141.00	Pine Branches	1	1.00	0.000	600.00	46.800	1.00	943.88	73.623	1.00
137.00	CCI TPA65R-BU8D	3	0.80	0.000	82.50	18.089	0.63	365.93	21.124	0.63
137.00	Ericsson RRUS 8843 B2, B66A	3	0.80	0.000	72.00	1.639	0.50	122.39	2.334	0.50
137.00	Generic Round Sector Frame	3	0.75	0.000	700.00	14.400	0.75	1501.75	28.007	0.75
137.00	CCI DMP65R-BU8D	3	0.80	0.000	95.70	17.871	0.63	375.10	20.900	0.63
137.00	Ericsson RRUS 4478 B14 (16.5"	3	0.80	0.000	59.90	1.842	0.50	105.35	2.579	0.50
137.00	Ericsson RRUS 4449 B5, B12	3	0.80	0.000	71.00	1.969	0.50	123.98	2.736	0.50
137.00	Raycap DC9-48-60-24-8C-EV (Enc	1	0.80	0.000	18.50	2.676	1.00	87.36	3.612	1.00
136.00	Pine Branches	1	1.00	0.000	600.00	46.800	1.00	943.52	73.594	1.00
131.00	Pine Branches	1	1.00	0.000	600.00	46.800	1.00	943.15	73.566	1.00
127.00	RFS APXVAALL24 43-U-NA20	3	0.80	0.000	122.80	20.243	0.63	442.29	23.285	0.63
127.00	Ericsson AIR 6419 B41	3	0.80	0.000	68.50	5.600	0.63	167.61	6.899	0.63
127.00	Generic Round Sector Frame	3	0.75	0.000	300.00	14.400	0.75	601.71	27.977	0.75
127.00	Ceragon FibeAir IP-20C	1	0.80	0.000	14.30	0.690	0.50	30.47	1.149	0.50
127.00	Ericsson 4460 BAND 2/25	3	0.80	0.000	109.00	2.564	0.50	181.50	3.428	0.50
127.00	Andrew VHLP2-11W-2GR	1	1.00	0.000	25.00	4.610	1.00	103.93	5.648	1.00
127.00	Ericsson 4480 BAND 71	3	0.80	0.000	81.00	2.878	0.50	143.44	3.799	0.50
126.00	Pine Branches	1	1.00	0.000	600.00	46.800	1.00	942.78	73.537	1.00
125.00	Ceragon FibeAir IP-20C	1	0.80	0.000	14.30	0.690	0.50	30.46	1.149	0.50
121.00	Pine Branches	1	1.00	0.000	600.00	46.800	1.00	942.41	73.508	1.00
116.00	Pine Branches	1	1.00	0.000	600.00	46.800	1.00	942.02	73.478	1.00
111.00	Pine Branches	1	1.00	0.000	600.00	46.800	1.00	941.63	73.447	1.00
96.00	Pine Branches	1	1.00	0.000	600.00	46.800	1.00	940.34	73.346	1.00
91.00	Pine Branches	1	1.00	0.000	600.00	46.800	1.00	939.85	73.308	1.00
86.00	Pine Branches	1	1.00	0.000	600.00	46.800	1.00	939.33	73.268	1.00
81.00	Pine Branches	1	1.00	0.000	600.00	46.800	1.00	938.76	73.223	1.00
76.00	Pine Branches	1	1.00	0.000	600.00	46.800	1.00	938.13	73.174	1.00
71.00	Pine Branches	1	1.00	0.000	600.00	46.800	1.00	937.42	73.119	1.00
Totals	**Row Count: 38**	**73**			**19,441.80**			**37,086.36**		

LINEAR APPURTENANCE PROPERTIES

Load Case Azimuth (deg): 0.00

Elev From (ft)	Elev To (ft)	Qty	Description	Diameter (in)	Weight (lb/ft)	Flat	Max/ Row	Distance Between Rows(in)	Distance Between Cols(in)	Azimuth (deg)	Distance From Face (in)	Exposed To Wind	Carrier
0.00	148.00	2	1 5/8" Hybriflex	1.98	1.3	N	0	0	0	0	0	N	VERIZON WIRELESS
0.00	138.60	1	2 1/2" conduit	2.88	5.79	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	137.00	3	0.92" (23.4mm) Cable	0.92	0.89	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	137.00	1	2 1/2" conduit	2.88	5.79	N	0	0	0	0	0	N	AT&T MOBILITY

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LINEAR APPURTENANCE PROPERTIES

Load Case Azimuth (deg): 0.00

Elev From (ft)	Elev To (ft)	Qty	Description	Diameter (in)	Weight (lb/ft)	Flat	Max/ Row	Distance Between Rows(in)	Distance Between Cols(in)	Azimuth (deg)	Distance From Face (in)	Exposed To Wind	Carrier
0.00	137.00	1	0.39" (10mm) Fiber Tr	0.39	0.06	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	127.00	4	1/2" Coax	0.63	0.15	N	0	0	0	0	0	N	T-MOBILE
0.00	127.00	3	1.99" (50.7mm) Hybrid	1.99	1.9	N	0	0	0	0	0	N	T-MOBILE

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SEGMENT PROPERTIES

Seg Top Elev (ft)	Description (Max Length: 5 ft)	Thick (in)	Flat Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	F'y (ksi)	S (in^3)	Z (in^3)	Weight (lb)
0.00		0.5000	71.000	111.879	70,255.70	23.28	142.00	74	1949.0	0.0	0.0
5.00		0.5000	69.547	109.574	66,001.30	22.76	139.09	74.6	1869.2	0.0	1,883.9
10.00		0.5000	68.094	107.268	61,922.20	22.25	136.19	75.2	1791.1	0.0	1,844.7
15.00		0.5000	66.642	104.963	58,014.80	21.74	133.28	75.8	1714.6	0.0	1,805.4
20.00		0.5000	65.189	102.657	54,275.20	21.23	130.38	76.4	1639.9	0.0	1,766.2
25.00		0.5000	63.736	100.352	50,700.00	20.71	127.47	77	1566.8	0.0	1,727.0
30.00		0.5000	62.283	98.046	47,285.20	20.20	124.57	77.6	1495.3	0.0	1,687.8
35.00		0.5000	60.830	95.741	44,027.40	19.69	121.66	78.2	1425.6	0.0	1,648.5
40.00		0.5000	59.378	93.435	40,922.70	19.18	118.76	78.8	1357.4	0.0	1,609.3
44.54	Bot - Section 2	0.5000	58.057	91.340	38,231.40	18.71	116.11	79.4	1297.0	0.0	1,428.3
45.00		0.5000	57.925	91.130	37,967.60	18.66	115.85	79.4	1291.0	0.0	267.8
50.00		0.5000	56.472	88.824	35,158.20	18.15	112.94	80.1	1226.2	0.0	2,892.5
52.46	Top - Section 1	0.4375	56.632	78.031	31,132.10	21.06	129.45	76.6	1082.7	0.0	1,396.1
55.00		0.4375	55.894	77.006	29,921.60	20.76	127.76	77	1054.4	0.0	670.0
60.00		0.4375	54.441	74.988	27,631.10	20.18	124.44	77.7	999.7	0.0	1,293.0
65.00		0.4375	52.989	72.971	25,460.60	19.59	121.12	78.4	946.4	0.0	1,258.7
70.00		0.4375	51.536	70.954	23,406.80	19.01	117.80	79	894.6	0.0	1,224.4
71.00		0.4375	51.245	70.550	23,009.80	18.89	117.13	79.2	884.4	0.0	240.8
75.00		0.4375	50.083	68.936	21,466.50	18.42	114.48	79.7	844.2	0.0	949.3
76.00		0.4375	49.792	68.533	21,091.80	18.30	113.81	79.9	834.3	0.0	233.9
80.00		0.4375	48.630	66.919	19,636.60	17.84	111.15	80.4	795.3	0.0	921.8
81.00		0.4375	48.340	66.516	19,283.60	17.72	110.49	80.6	785.7	0.0	227.0
85.00		0.4375	47.177	64.902	17,913.70	17.25	107.83	81.1	747.9	0.0	894.4
86.00		0.4375	46.887	64.498	17,581.70	17.13	107.17	81.2	738.6	0.0	220.2
89.84	Bot - Section 3	0.4375	45.771	62.949	16,344.90	16.68	104.62	81.8	703.4	0.0	832.7
90.00		0.4375	45.725	62.885	16,294.70	16.67	104.51	81.8	701.9	0.0	59.1
91.00		0.4375	45.434	62.481	15,983.10	16.55	103.85	81.9	692.9	0.0	368.2
95.00		0.4375	44.272	60.867	14,776.30	16.08	101.19	82.5	657.4	0.0	1,449.2
96.00		0.4375	43.981	60.464	14,484.40	15.96	100.53	82.6	648.7	0.0	356.4
96.17	Top - Section 2	0.3125	44.556	43.882	10,852.70	23.38	142.58	73.9	479.8	0.0	61.5
100.00		0.3125	43.444	42.780	10,054.90	22.75	139.02	74.6	455.9	0.0	564.2
105.00		0.3125	41.991	41.339	9,072.70	21.93	134.37	75.6	425.6	0.0	715.6
110.00		0.3125	40.538	39.898	8,156.60	21.11	129.72	76.6	396.3	0.0	691.1
111.00		0.3125	40.248	39.609	7,981.20	20.95	128.79	76.8	390.6	0.0	135.3
115.00		0.3125	39.086	38.457	7,304.40	20.29	125.07	77.5	368.1	0.0	531.3
116.00		0.3125	38.795	38.168	7,141.40	20.13	124.14	77.7	362.6	0.0	130.4
120.00		0.3125	37.633	37.016	6,513.70	19.47	120.42	78.5	340.9	0.0	511.7
121.00		0.3125	37.342	36.728	6,362.80	19.31	119.50	78.7	335.6	0.0	125.5
125.00		0.3125	36.180	35.575	5,782.30	18.65	115.78	79.5	314.8	0.0	492.1
126.00		0.3125	35.889	35.287	5,642.90	18.49	114.85	79.7	309.7	0.0	120.6
127.00		0.3125	35.599	34.998	5,505.70	18.32	113.92	79.8	304.6	0.0	119.6
130.00		0.3125	34.727	34.134	5,107.70	17.83	111.13	80.4	289.7	0.0	352.9
131.00		0.3125	34.437	33.846	4,979.40	17.67	110.20	80.6	284.8	0.0	115.7
131.54	Bot - Section 4	0.3125	34.279	33.689	4,910.60	17.58	109.69	80.7	282.2	0.0	62.4
135.00		0.3125	33.274	32.693	4,487.80	17.01	106.48	81.4	265.6	0.0	628.1
136.00		0.3125	32.984	32.405	4,370.10	16.85	105.55	81.6	261.0	0.0	178.2
136.46	Top - Section 3	0.1875	33.225	19.661	2,711.30	29.48	177.20	66.7	160.7	0.0	81.5
137.00		0.1875	33.068	19.567	2,672.80	29.33	176.36	66.9	159.2	0.0	36.0
140.00		0.1875	32.197	19.049	2,465.80	28.51	171.72	67.9	150.8	0.0	197.1
141.00		0.1875	31.906	18.876	2,399.30	28.24	170.17	68.2	148.1	0.0	64.5
145.00		0.1875	30.744	18.184	2,145.10	27.15	163.97	69.5	137.4	0.0	252.2
146.00		0.1875	30.453	18.011	2,084.50	26.88	162.42	69.8	134.8	0.0	61.6
148.00		0.1875	29.872	17.665	1,966.70	26.33	159.32	70.4	129.7	0.0	121.4
150.00		0.1875	29.291	17.320	1,853.50	25.78	156.22	71.1	124.6	0.0	119.0
151.00		0.1875	29.000	17.147	1,798.50	25.51	154.67	71.4	122.1	0.0	58.6
										Total:	**37,684.7**

CALCULATED FORCES

Load Case: 1.2D + 1.0W 114 mph Wind with No Ice 22 Iterations

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Gust Response Factor: 1.10
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 (deg)	Ratio
0.00	-72.27	-59.47	0.00	-6,471.3	0.00	6,471.30	7,453.69	1,963.48	12,502.68	10,820.43	0	0	0.609
5.00	-69.74	-58.78	0.00	-6,173.9	0.00	6,173.94	7,359.51	1,923.02	11,992.75	10,462.01	0.07	-0.13	0.601
10.00	-67.25	-58.11	0.00	-5,880.1	0.00	5,880.07	7,262.84	1,882.56	11,493.44	10,105.78	0.27	-0.26	0.592
15.00	-64.82	-57.46	0.00	-5,589.6	0.00	5,589.55	7,163.66	1,842.10	11,004.75	9,751.97	0.62	-0.39	0.583
20.00	-62.43	-56.85	0.00	-5,302.2	0.00	5,302.24	7,061.99	1,801.64	10,526.68	9,400.81	1.1	-0.52	0.574
25.00	-60.10	-56.25	0.00	-5,018.0	0.00	5,018.01	6,957.81	1,761.18	10,059.22	9,052.53	1.72	-0.66	0.564
30.00	-57.81	-55.68	0.00	-4,736.8	0.00	4,736.75	6,851.13	1,720.71	9,602.38	8,707.34	2.48	-0.8	0.553
35.00	-55.57	-55.11	0.00	-4,458.4	0.00	4,458.36	6,741.95	1,680.25	9,156.15	8,365.48	3.39	-0.93	0.542
40.00	-53.38	-54.56	0.00	-4,182.8	0.00	4,182.81	6,630.28	1,639.79	8,720.54	8,027.17	4.45	-1.07	0.530
44.54	-51.48	-54.26	0.00	-3,934.9	0.00	3,934.92	6,526.63	1,603.02	8,333.92	7,723.03	5.53	-1.2	0.519
45.00	-51.08	-53.96	0.00	-3,910.1	0.00	3,910.14	6,516.10	1,599.33	8,295.55	7,692.64	5.65	-1.21	0.517
50.00	-47.38	-53.47	0.00	-3,640.4	0.00	3,640.35	6,399.42	1,558.87	7,881.17	7,362.11	7	-1.36	0.503
52.46	-45.58	-53.16	0.00	-3,508.8	0.00	3,508.82	5,381.44	1,369.44	6,950.77	6,222.71	7.71	-1.43	0.574
55.00	-44.61	-52.74	0.00	-3,373.8	0.00	3,373.80	5,335.01	1,351.45	6,769.42	6,087.38	8.49	-1.5	0.564
60.00	-42.80	-52.17	0.00	-3,110.1	0.00	3,110.11	5,241.73	1,316.05	6,419.43	5,823.03	10.15	-1.65	0.544
65.00	-41.03	-51.61	0.00	-2,849.3	0.00	2,849.26	5,145.95	1,280.64	6,078.73	5,561.60	11.97	-1.81	0.522
70.00	-39.36	-51.25	0.00	-2,591.2	0.00	2,591.23	5,047.66	1,245.24	5,747.32	5,303.31	13.94	-1.96	0.498
71.00	-38.33	-49.17	0.00	-2,540.0	0.00	2,539.98	5,027.70	1,238.16	5,682.15	5,252.05	14.36	-1.99	0.493
75.00	-37.02	-48.87	0.00	-2,343.3	0.00	2,343.31	4,946.88	1,209.84	5,425.19	5,048.40	16.08	-2.11	0.473
76.00	-36.01	-46.78	0.00	-2,294.4	0.00	2,294.44	4,926.42	1,202.75	5,361.88	4,997.84	16.53	-2.14	0.468
80.00	-34.75	-46.49	0.00	-2,107.3	0.00	2,107.30	4,843.59	1,174.43	5,112.36	4,797.08	18.37	-2.26	0.448
81.00	-33.75	-44.40	0.00	-2,060.8	0.00	2,060.81	4,822.63	1,167.35	5,050.91	4,747.27	18.85	-2.29	0.443
85.00	-32.53	-44.11	0.00	-1,883.2	0.00	1,883.23	4,737.80	1,139.03	4,808.82	4,549.58	20.82	-2.41	0.422
86.00	-31.55	-42.02	0.00	-1,839.1	0.00	1,839.12	4,716.34	1,131.95	4,749.22	4,500.56	21.33	-2.44	0.417
89.84	-30.42	-41.78	0.00	-1,677.8	0.00	1,677.78	4,633.02	1,104.76	4,523.84	4,313.86	23.34	-2.55	0.397
90.00	-30.33	-41.72	0.00	-1,671.1	0.00	1,671.10	4,629.51	1,103.62	4,514.56	4,306.14	23.42	-2.55	0.396
91.00	-29.19	-39.60	0.00	-1,629.4	0.00	1,629.39	4,607.56	1,096.54	4,456.83	4,257.95	23.96	-2.58	0.390
95.00	-27.31	-39.28	0.00	-1,471.0	0.00	1,470.98	4,518.73	1,068.22	4,229.60	4,066.96	26.17	-2.69	0.369
96.00	-26.21	-37.34	0.00	-1,431.7	0.00	1,431.70	4,492.15	1,061.14	4,173.72	4,015.98	26.74	-2.72	0.364
96.17	-26.11	-37.15	0.00	-1,425.2	0.00	1,425.23	2,918.81	770.13	3,077.52	2,659.20	26.84	-2.72	0.547
100.00	-25.26	-36.71	0.00	-1,283.1	0.00	1,283.08	2,873.87	750.78	2,924.80	2,551.99	29.06	-2.83	0.514
105.00	-24.18	-36.22	0.00	-1,099.5	0.00	1,099.54	2,812.94	725.49	2,731.11	2,413.14	32.11	-2.99	0.467
110.00	-23.18	-35.90	0.00	-918.4	0.00	918.45	2,749.50	700.20	2,544.05	2,275.90	35.34	-3.15	0.415
111.00	-22.34	-33.80	0.00	-882.6	0.00	882.55	2,736.52	695.15	2,507.43	2,248.66	36	-3.18	0.403
115.00	-21.56	-33.55	0.00	-747.3	0.00	747.34	2,683.57	674.91	2,363.62	2,140.48	38.72	-3.3	0.360
116.00	-20.74	-31.44	0.00	-713.8	0.00	713.80	2,670.09	669.86	2,328.34	2,113.63	39.41	-3.33	0.348
120.00	-20.00	-31.19	0.00	-588.0	0.00	588.05	2,615.14	649.63	2,189.84	2,007.11	42.25	-3.43	0.303
121.00	-19.20	-29.08	0.00	-556.9	0.00	556.86	2,601.15	644.57	2,155.88	1,980.71	42.97	-3.46	0.291
125.00	-18.47	-28.82	0.00	-440.6	0.00	440.56	2,544.21	624.34	2,022.69	1,876.03	45.91	-3.55	0.244
126.00	-17.69	-26.83	0.00	-411.7	0.00	411.74	2,529.72	619.28	1,990.05	1,850.11	46.65	-3.57	0.231
127.00	-15.20	-23.53	0.00	-384.9	0.00	384.92	2,515.13	614.22	1,957.68	1,824.28	47.4	-3.59	0.219
130.00	-14.72	-23.34	0.00	-314.3	0.00	314.32	2,470.77	599.05	1,862.17	1,747.45	49.67	-3.64	0.187
131.00	-13.96	-21.36	0.00	-291.0	0.00	290.98	2,455.79	593.99	1,830.86	1,722.05	50.44	-3.66	0.176
131.54	-13.87	-21.20	0.00	-279.4	0.00	279.38	2,447.60	591.24	1,813.96	1,708.30	50.85	-3.67	0.170
135.00	-13.05	-20.97	0.00	-206.1	0.00	206.10	2,394.84	573.76	1,708.29	1,621.60	53.53	-3.72	0.134
136.00	-12.22	-18.98	0.00	-185.1	0.00	185.14	2,379.35	568.70	1,678.31	1,596.78	54.31	-3.73	0.122
136.46	-12.11	-18.94	0.00	-176.4	0.00	176.41	1,180.68	345.05	1,029.57	804.33	54.67	-3.73	0.233
137.00	-8.38	-15.06	0.00	-166.2	0.00	166.18	1,178.13	343.41	1,019.82	798.76	55.09	-3.74	0.217
140.00	-8.13	-14.89	0.00	-121.0	0.00	120.99	1,163.42	334.31	966.47	767.76	57.46	-3.79	0.167
141.00	-7.46	-12.78	0.00	-106.1	0.00	106.10	1,158.32	331.27	949.00	757.42	58.25	-3.8	0.148
145.00	-7.15	-12.57	0.00	-55.0	0.00	54.97	1,136.92	319.13	880.73	716.02	61.45	-3.84	0.085
146.00	-6.49	-10.54	0.00	-42.4	0.00	42.40	1,131.32	316.10	864.07	705.68	62.25	-3.84	0.067
148.00	-1.39	-4.01	0.00	-21.3	0.00	21.33	1,119.81	310.03	831.21	685.01	63.87	-3.85	0.033
150.00	-1.25	-3.89	0.00	-13.3	0.00	13.31	1,107.91	303.96	798.98	664.38	65.48	-3.86	0.021
151.00	0.00	-3.80	0.00	-9.4	0.00	9.42	1,101.81	300.92	783.11	654.08	66.29	-3.86	0.015

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CALCULATED FORCES

Load Case: 0.9D + 1.0W — 114 mph Wind with No Ice (Reduced DL) — 22 Iterations

Gust Response Factor: 1.10
Dead load Factor: 0.90
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 (deg)	Ratio
0.00	-54.18	-59.45	0.00	-6,431.5	0.00	6,431.52	7,453.69	1,963.48	12,502.68	10,820.43	0	0	0.603
5.00	-52.25	-58.71	0.00	-6,134.3	0.00	6,134.27	7,359.51	1,923.02	11,992.75	10,462.01	0.07	-0.13	0.594
10.00	-50.36	-58.01	0.00	-5,840.7	0.00	5,840.70	7,262.84	1,882.56	11,493.44	10,105.78	0.27	-0.26	0.586
15.00	-48.50	-57.33	0.00	-5,550.7	0.00	5,550.67	7,163.66	1,842.10	11,004.75	9,751.97	0.61	-0.39	0.577
20.00	-46.68	-56.68	0.00	-5,264.0	0.00	5,264.02	7,061.99	1,801.64	10,526.68	9,400.81	1.09	-0.52	0.568
25.00	-44.90	-56.06	0.00	-4,980.6	0.00	4,980.62	6,957.81	1,761.18	10,059.22	9,052.53	1.71	-0.65	0.558
30.00	-43.15	-55.45	0.00	-4,700.4	0.00	4,700.35	6,851.13	1,720.71	9,602.38	8,707.34	2.47	-0.79	0.547
35.00	-41.44	-54.86	0.00	-4,423.1	0.00	4,423.09	6,741.95	1,680.25	9,156.15	8,365.48	3.37	-0.93	0.536
40.00	-39.78	-54.29	0.00	-4,148.8	0.00	4,148.81	6,630.28	1,639.79	8,720.54	8,027.17	4.41	-1.07	0.524
44.54	-38.34	-53.97	0.00	-3,902.2	0.00	3,902.17	6,526.63	1,603.02	8,333.92	7,723.03	5.49	-1.19	0.512
45.00	-38.02	-53.66	0.00	-3,877.5	0.00	3,877.52	6,516.10	1,599.33	8,295.55	7,692.64	5.61	-1.21	0.511
50.00	-35.23	-53.17	0.00	-3,609.2	0.00	3,609.23	6,399.42	1,558.87	7,881.17	7,362.11	6.95	-1.35	0.497
52.46	-33.86	-52.85	0.00	-3,478.4	0.00	3,478.44	5,381.44	1,369.44	6,950.77	6,222.71	7.66	-1.42	0.567
55.00	-33.12	-52.41	0.00	-3,344.2	0.00	3,344.20	5,335.01	1,351.45	6,769.42	6,087.38	8.43	-1.49	0.557
60.00	-31.73	-51.83	0.00	-3,082.1	0.00	3,082.13	5,241.73	1,316.05	6,419.43	5,823.03	10.08	-1.64	0.537
65.00	-30.37	-51.25	0.00	-2,823.0	0.00	2,823.00	5,145.95	1,280.64	6,078.73	5,561.60	11.88	-1.79	0.515
70.00	-29.10	-50.88	0.00	-2,566.8	0.00	2,566.76	5,047.66	1,245.24	5,747.32	5,303.31	13.84	-1.94	0.491
71.00	-28.33	-48.80	0.00	-2,515.9	0.00	2,515.88	5,027.70	1,238.16	5,682.15	5,252.05	14.25	-1.98	0.486
75.00	-27.34	-48.50	0.00	-2,320.7	0.00	2,320.68	4,946.88	1,209.84	5,425.19	5,048.40	15.96	-2.1	0.467
76.00	-26.59	-46.41	0.00	-2,272.2	0.00	2,272.18	4,926.42	1,202.75	5,361.88	4,997.84	16.4	-2.13	0.462
80.00	-25.63	-46.12	0.00	-2,086.5	0.00	2,086.53	4,843.59	1,174.43	5,112.36	4,797.08	18.24	-2.24	0.442
81.00	-24.89	-44.02	0.00	-2,040.4	0.00	2,040.41	4,822.63	1,167.35	5,050.91	4,747.27	18.71	-2.27	0.436
85.00	-23.96	-43.73	0.00	-1,864.3	0.00	1,864.31	4,737.80	1,139.03	4,808.82	4,549.58	20.66	-2.39	0.416
86.00	-23.24	-41.64	0.00	-1,820.6	0.00	1,820.58	4,716.34	1,131.95	4,749.22	4,500.56	21.17	-2.42	0.411
89.84	-22.38	-41.41	0.00	-1,660.7	0.00	1,660.67	4,633.02	1,104.76	4,523.84	4,313.86	23.16	-2.53	0.391
90.00	-22.31	-41.35	0.00	-1,654.0	0.00	1,654.04	4,629.51	1,103.62	4,514.56	4,306.14	23.24	-2.53	0.390
91.00	-21.47	-39.24	0.00	-1,612.7	0.00	1,612.70	4,607.56	1,096.54	4,456.83	4,257.95	23.78	-2.56	0.385
95.00	-20.05	-38.93	0.00	-1,455.8	0.00	1,455.75	4,518.73	1,068.22	4,229.60	4,066.96	25.97	-2.67	0.364
96.00	-19.24	-37.00	0.00	-1,416.8	0.00	1,416.82	4,492.15	1,061.14	4,173.72	4,015.98	26.53	-2.7	0.358
96.17	-19.16	-36.80	0.00	-1,410.4	0.00	1,410.41	2,918.81	770.13	3,077.52	2,659.20	26.63	-2.7	0.539
100.00	-18.51	-36.36	0.00	-1,269.6	0.00	1,269.58	2,873.87	750.78	2,924.80	2,551.99	28.83	-2.8	0.506
105.00	-17.69	-35.86	0.00	-1,087.8	0.00	1,087.80	2,812.94	725.49	2,731.11	2,413.14	31.86	-2.97	0.460
110.00	-16.92	-35.55	0.00	-908.5	0.00	908.51	2,749.50	700.20	2,544.05	2,275.90	35.06	-3.13	0.408
111.00	-16.31	-33.45	0.00	-873.0	0.00	872.96	2,736.52	695.15	2,507.43	2,248.66	35.71	-3.16	0.396
115.00	-15.72	-33.20	0.00	-739.2	0.00	739.16	2,683.57	674.91	2,363.62	2,140.48	38.41	-3.27	0.354
116.00	-15.13	-31.10	0.00	-706.0	0.00	705.96	2,670.09	669.86	2,328.34	2,113.63	39.1	-3.3	0.342
120.00	-14.57	-30.85	0.00	-581.6	0.00	581.58	2,615.14	649.63	2,189.84	2,007.11	41.91	-3.4	0.298
121.00	-13.99	-28.75	0.00	-550.7	0.00	550.73	2,601.15	644.57	2,155.88	1,980.71	42.62	-3.43	0.285
125.00	-13.44	-28.49	0.00	-435.7	0.00	435.73	2,544.21	624.34	2,022.69	1,876.03	45.53	-3.51	0.240
126.00	-12.88	-26.52	0.00	-407.2	0.00	407.24	2,529.72	619.28	1,990.05	1,850.11	46.27	-3.54	0.227
127.00	-11.06	-23.26	0.00	-380.7	0.00	380.72	2,515.13	614.22	1,957.68	1,824.28	47.01	-3.56	0.215
130.00	-10.69	-23.08	0.00	-310.9	0.00	310.94	2,470.77	599.05	1,862.17	1,747.45	49.26	-3.61	0.184
131.00	-10.15	-21.11	0.00	-287.9	0.00	287.86	2,455.79	593.99	1,830.86	1,722.05	50.02	-3.63	0.173
131.54	-10.09	-20.95	0.00	-276.4	0.00	276.39	2,447.60	591.24	1,813.96	1,708.30	50.43	-3.63	0.167
135.00	-9.47	-20.73	0.00	-204.0	0.00	203.98	2,394.84	573.76	1,708.29	1,621.60	53.08	-3.68	0.131
136.00	-8.88	-18.76	0.00	-183.3	0.00	183.26	2,379.35	568.70	1,678.31	1,596.78	53.86	-3.69	0.120
136.46	-8.80	-18.71	0.00	-174.6	0.00	174.63	1,180.68	345.05	1,029.57	804.33	54.21	-3.7	0.228
137.00	-6.06	-14.91	0.00	-164.5	0.00	164.52	1,178.13	343.41	1,019.82	798.76	54.63	-3.71	0.213
140.00	-5.87	-14.74	0.00	-119.8	0.00	119.80	1,163.42	334.31	966.47	767.76	56.98	-3.75	0.163
141.00	-5.40	-12.64	0.00	-105.1	0.00	105.07	1,158.32	331.27	949.00	757.42	57.76	-3.76	0.145
145.00	-5.17	-12.43	0.00	-54.5	0.00	54.50	1,136.92	319.13	880.73	716.02	60.93	-3.8	0.082
146.00	-4.71	-10.41	0.00	-42.1	0.00	42.07	1,131.32	316.10	864.07	705.68	61.73	-3.81	0.065
148.00	-0.98	-3.98	0.00	-21.2	0.00	21.24	1,119.81	310.03	831.21	685.01	63.33	-3.82	0.032
150.00	-0.88	-3.87	0.00	-13.3	0.00	13.28	1,107.91	303.96	798.98	664.38	64.93	-3.82	0.021
151.00	0.00	-3.80	0.00	-9.4	0.00	9.42	1,101.81	300.92	783.11	654.08	65.73	-3.82	0.015

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CALCULATED FORCES

Load Case: 1.2D + 1.0Di + 1.0Wi — 48 mph Wind with 1.18" Radial Ice — 21 Iterations

Gust Response Factor: 1.10 — Ice Dead Load Factor 1.00
Dead load Factor: 1.20 — Ice Importance 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 (deg)	Ratio
0.00	-100.03	-16.85	0.00	-1,834.4	0.00	1,834.45	7,453.69	1,963.48	12,502.68	10,820.43	0	0	0.183
5.00	-97.14	-16.65	0.00	-1,750.2	0.00	1,750.22	7,359.51	1,923.02	11,992.75	10,462.01	0.02	-0.04	0.181
10.00	-94.24	-16.46	0.00	-1,667.0	0.00	1,666.96	7,262.84	1,882.56	11,493.44	10,105.78	0.08	-0.07	0.178
15.00	-91.39	-16.28	0.00	-1,584.6	0.00	1,584.64	7,163.66	1,842.10	11,004.75	9,751.97	0.17	-0.11	0.175
20.00	-88.57	-16.11	0.00	-1,503.2	0.00	1,503.23	7,061.99	1,801.64	10,526.68	9,400.81	0.31	-0.15	0.173
25.00	-85.81	-15.94	0.00	-1,422.7	0.00	1,422.68	6,957.81	1,761.18	10,059.22	9,052.53	0.49	-0.19	0.170
30.00	-83.10	-15.78	0.00	-1,343.0	0.00	1,342.96	6,851.13	1,720.71	9,602.38	8,707.34	0.7	-0.23	0.166
35.00	-80.44	-15.62	0.00	-1,264.1	0.00	1,264.06	6,741.95	1,680.25	9,156.15	8,365.48	0.96	-0.26	0.163
40.00	-77.84	-15.47	0.00	-1,186.0	0.00	1,185.95	6,630.28	1,639.79	8,720.54	8,027.17	1.26	-0.3	0.160
44.54	-75.53	-15.38	0.00	-1,115.7	0.00	1,115.68	6,526.63	1,603.02	8,333.92	7,723.03	1.57	-0.34	0.156
45.00	-75.14	-15.29	0.00	-1,108.7	0.00	1,108.66	6,516.10	1,599.33	8,295.55	7,692.64	1.6	-0.34	0.156
50.00	-71.01	-15.15	0.00	-1,032.2	0.00	1,032.19	6,399.42	1,558.87	7,881.17	7,362.11	1.98	-0.38	0.151
52.46	-69.02	-15.07	0.00	-994.9	0.00	994.91	5,381.44	1,369.44	6,950.77	6,222.71	2.19	-0.4	0.173
55.00	-67.88	-14.95	0.00	-956.6	0.00	956.64	5,335.01	1,351.45	6,769.42	6,087.38	2.41	-0.43	0.170
60.00	-65.69	-14.79	0.00	-881.9	0.00	881.91	5,241.73	1,316.05	6,419.43	5,823.03	2.88	-0.47	0.164
65.00	-63.56	-14.62	0.00	-808.0	0.00	807.98	5,145.95	1,280.64	6,078.73	5,561.60	3.39	-0.51	0.158
70.00	-61.48	-14.52	0.00	-734.9	0.00	734.86	5,047.66	1,245.24	5,747.32	5,303.31	3.95	-0.56	0.151
71.00	-60.07	-13.94	0.00	-720.3	0.00	720.34	5,027.70	1,238.16	5,682.15	5,252.05	4.07	-0.56	0.149
75.00	-58.45	-13.85	0.00	-664.6	0.00	664.59	4,946.88	1,209.84	5,425.19	5,048.40	4.56	-0.6	0.144
76.00	-57.06	-13.27	0.00	-650.7	0.00	650.74	4,926.42	1,202.75	5,361.88	4,997.84	4.69	-0.61	0.142
80.00	-55.48	-13.18	0.00	-597.7	0.00	597.68	4,843.59	1,174.43	5,112.36	4,797.08	5.21	-0.64	0.136
81.00	-54.10	-12.59	0.00	-584.5	0.00	584.50	4,822.63	1,167.35	5,050.91	4,747.27	5.35	-0.65	0.134
85.00	-52.56	-12.51	0.00	-534.1	0.00	534.12	4,737.80	1,139.03	4,808.82	4,549.58	5.9	-0.68	0.129
86.00	-51.19	-11.92	0.00	-521.6	0.00	521.61	4,716.34	1,131.95	4,749.22	4,500.56	6.05	-0.69	0.127
89.84	-49.76	-11.85	0.00	-475.8	0.00	475.84	4,633.02	1,104.76	4,523.84	4,313.86	6.62	-0.72	0.121
90.00	-49.67	-11.83	0.00	-473.9	0.00	473.94	4,629.51	1,103.62	4,514.56	4,306.14	6.64	-0.72	0.121
91.00	-48.12	-11.24	0.00	-462.1	0.00	462.11	4,607.56	1,096.54	4,456.83	4,257.95	6.79	-0.73	0.119
95.00	-45.94	-11.14	0.00	-417.2	0.00	417.17	4,518.73	1,068.22	4,229.60	4,066.96	7.42	-0.76	0.113
96.00	-44.41	-10.59	0.00	-406.0	0.00	406.03	4,492.15	1,061.14	4,173.72	4,015.98	7.58	-0.77	0.111
96.17	-44.31	-10.54	0.00	-404.2	0.00	404.19	2,918.81	770.13	3,077.52	2,659.20	7.61	-0.77	0.167
100.00	-43.22	-10.41	0.00	-363.9	0.00	363.86	2,873.87	750.78	2,924.80	2,551.99	8.24	-0.8	0.158
105.00	-41.83	-10.27	0.00	-311.8	0.00	311.81	2,812.94	725.49	2,731.11	2,413.14	9.11	-0.85	0.144
110.00	-40.48	-10.17	0.00	-260.5	0.00	260.48	2,749.50	700.20	2,544.05	2,275.90	10.02	-0.89	0.129
111.00	-39.22	-9.58	0.00	-250.3	0.00	250.31	2,736.52	695.15	2,507.43	2,248.66	10.21	-0.9	0.126
115.00	-38.18	-9.50	0.00	-212.0	0.00	212.00	2,683.57	674.91	2,363.62	2,140.48	10.98	-0.94	0.113
116.00	-36.93	-8.90	0.00	-202.5	0.00	202.51	2,670.09	669.86	2,328.34	2,113.63	11.18	-0.94	0.110
120.00	-35.93	-8.82	0.00	-166.9	0.00	166.90	2,615.14	649.63	2,189.84	2,007.11	11.98	-0.97	0.097
121.00	-34.68	-8.23	0.00	-158.1	0.00	158.07	2,601.15	644.57	2,155.88	1,980.71	12.19	-0.98	0.093
125.00	-33.68	-8.14	0.00	-125.2	0.00	125.16	2,544.21	624.34	2,022.69	1,876.03	13.02	-1.01	0.080
126.00	-32.45	-7.58	0.00	-117.0	0.00	117.02	2,529.72	619.28	1,990.05	1,850.11	13.23	-1.01	0.076
127.00	-27.53	-6.69	0.00	-109.4	0.00	109.44	2,515.13	614.22	1,957.68	1,824.28	13.44	-1.02	0.071
130.00	-26.85	-6.63	0.00	-89.4	0.00	89.38	2,470.77	599.05	1,862.17	1,747.45	14.09	-1.03	0.062
131.00	-25.64	-6.07	0.00	-82.8	0.00	82.75	2,455.79	593.99	1,830.86	1,722.05	14.31	-1.04	0.059
131.54	-25.51	-6.01	0.00	-79.5	0.00	79.46	2,447.60	591.24	1,813.96	1,708.30	14.42	-1.04	0.057
135.00	-24.47	-5.94	0.00	-58.7	0.00	58.66	2,394.84	573.76	1,708.29	1,621.60	15.18	-1.05	0.047
136.00	-23.18	-5.38	0.00	-52.7	0.00	52.72	2,379.35	568.70	1,678.31	1,596.78	15.4	-1.06	0.043
136.46	-23.05	-5.36	0.00	-50.2	0.00	50.25	1,180.68	345.05	1,029.57	804.33	15.51	-1.06	0.082
137.00	-15.26	-4.31	0.00	-47.4	0.00	47.35	1,178.13	343.41	1,019.82	798.76	15.63	-1.06	0.072
140.00	-14.82	-4.25	0.00	-34.4	0.00	34.43	1,163.42	334.31	966.47	767.76	16.3	-1.07	0.058
141.00	-13.69	-3.65	0.00	-30.2	0.00	30.18	1,158.32	331.27	949.00	757.42	16.52	-1.08	0.052
145.00	-13.14	-3.58	0.00	-15.6	0.00	15.59	1,136.92	319.13	880.73	716.02	17.43	-1.09	0.033
146.00	-12.02	-3.00	0.00	-12.0	0.00	12.01	1,131.32	316.10	864.07	705.68	17.66	-1.09	0.028
148.00	-2.37	-1.14	0.00	-6.0	0.00	6.01	1,119.81	310.03	831.21	685.01	18.12	-1.09	0.011
150.00	-2.11	-1.10	0.00	-3.7	0.00	3.73	1,107.91	303.96	798.98	664.38	18.58	-1.09	0.008
151.00	0.00	-1.06	0.00	-2.6	0.00	2.63	1,101.81	300.92	783.11	654.08	18.8	-1.09	0.004

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CALCULATED FORCES

Load Case: 1.0D + 1.0W — 60 mph Wind with No Ice — 21 Iterations

Gust Response Factor: 1.10
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 (deg)	Ratio
0.00	-60.28	-14.74	0.00	-1,598.2	0.00	1,598.20	7,453.69	1,963.48	12,502.68	10,820.43	0	0	0.156
5.00	-58.27	-14.56	0.00	-1,524.5	0.00	1,524.52	7,359.51	1,923.02	11,992.75	10,462.01	0.02	-0.03	0.154
10.00	-56.30	-14.39	0.00	-1,451.7	0.00	1,451.73	7,262.84	1,882.56	11,493.44	10,105.78	0.07	-0.06	0.151
15.00	-54.37	-14.22	0.00	-1,379.8	0.00	1,379.81	7,163.66	1,842.10	11,004.75	9,751.97	0.15	-0.1	0.149
20.00	-52.48	-14.06	0.00	-1,308.7	0.00	1,308.71	7,061.99	1,801.64	10,526.68	9,400.81	0.27	-0.13	0.147
25.00	-50.63	-13.91	0.00	-1,238.4	0.00	1,238.40	6,957.81	1,761.18	10,059.22	9,052.53	0.42	-0.16	0.144
30.00	-48.82	-13.76	0.00	-1,168.8	0.00	1,168.85	6,851.13	1,720.71	9,602.38	8,707.34	0.61	-0.2	0.141
35.00	-47.05	-13.62	0.00	-1,100.0	0.00	1,100.03	6,741.95	1,680.25	9,156.15	8,365.48	0.84	-0.23	0.139
40.00	-45.31	-13.48	0.00	-1,031.9	0.00	1,031.94	6,630.28	1,639.79	8,720.54	8,027.17	1.1	-0.26	0.135
44.54	-43.78	-13.40	0.00	-970.7	0.00	970.70	6,526.63	1,603.02	8,333.92	7,723.03	1.37	-0.3	0.132
45.00	-43.49	-13.33	0.00	-964.6	0.00	964.58	6,516.10	1,599.33	8,295.55	7,692.64	1.39	-0.3	0.132
50.00	-40.48	-13.21	0.00	-898.0	0.00	897.95	6,399.42	1,558.87	7,881.17	7,362.11	1.73	-0.33	0.128
52.46	-39.02	-13.13	0.00	-865.5	0.00	865.46	5,381.44	1,369.44	6,950.77	6,222.71	1.9	-0.35	0.146
55.00	-38.29	-13.02	0.00	-832.1	0.00	832.12	5,335.01	1,351.45	6,769.42	6,087.38	2.1	-0.37	0.144
60.00	-36.87	-12.88	0.00	-767.0	0.00	767.01	5,241.73	1,316.05	6,419.43	5,823.03	2.51	-0.41	0.139
65.00	-35.49	-12.74	0.00	-702.6	0.00	702.61	5,145.95	1,280.64	6,078.73	5,561.60	2.95	-0.45	0.133
70.00	-34.15	-12.65	0.00	-638.9	0.00	638.93	5,047.66	1,245.24	5,747.32	5,303.31	3.44	-0.48	0.127
71.00	-33.28	-12.13	0.00	-626.3	0.00	626.28	5,027.70	1,238.16	5,682.15	5,252.05	3.54	-0.49	0.126
75.00	-32.24	-12.06	0.00	-577.8	0.00	577.75	4,946.88	1,209.84	5,425.19	5,048.40	3.97	-0.52	0.121
76.00	-31.38	-11.54	0.00	-565.7	0.00	565.69	4,926.42	1,202.75	5,361.88	4,997.84	4.08	-0.53	0.120
80.00	-30.36	-11.47	0.00	-519.5	0.00	519.53	4,843.59	1,174.43	5,112.36	4,797.08	4.53	-0.56	0.115
81.00	-29.52	-10.95	0.00	-508.1	0.00	508.06	4,822.63	1,167.35	5,050.91	4,747.27	4.65	-0.57	0.113
85.00	-28.53	-10.88	0.00	-464.3	0.00	464.26	4,737.80	1,139.03	4,808.82	4,549.58	5.14	-0.59	0.108
86.00	-27.68	-10.36	0.00	-453.4	0.00	453.38	4,716.34	1,131.95	4,749.22	4,500.56	5.26	-0.6	0.107
89.84	-26.76	-10.30	0.00	-413.6	0.00	413.59	4,633.02	1,104.76	4,523.84	4,313.86	5.76	-0.63	0.102
90.00	-26.70	-10.29	0.00	-412.0	0.00	411.95	4,629.51	1,103.62	4,514.56	4,306.14	5.78	-0.63	0.102
91.00	-25.71	-9.76	0.00	-401.7	0.00	401.66	4,607.56	1,096.54	4,456.83	4,257.95	5.91	-0.64	0.100
95.00	-24.16	-9.69	0.00	-362.6	0.00	362.60	4,518.73	1,068.22	4,229.60	4,066.96	6.46	-0.66	0.095
96.00	-23.19	-9.21	0.00	-352.9	0.00	352.92	4,492.15	1,061.14	4,173.72	4,015.98	6.6	-0.67	0.093
96.17	-23.12	-9.16	0.00	-351.3	0.00	351.32	2,918.81	770.13	3,077.52	2,659.20	6.62	-0.67	0.140
100.00	-22.47	-9.05	0.00	-316.3	0.00	316.27	2,873.87	750.78	2,924.80	2,551.99	7.17	-0.7	0.132
105.00	-21.63	-8.93	0.00	-271.0	0.00	271.02	2,812.94	725.49	2,731.11	2,413.14	7.93	-0.74	0.120
110.00	-20.82	-8.85	0.00	-226.4	0.00	226.38	2,749.50	700.20	2,544.05	2,275.90	8.72	-0.78	0.107
111.00	-20.07	-8.33	0.00	-217.5	0.00	217.52	2,736.52	695.15	2,507.43	2,248.66	8.88	-0.79	0.104
115.00	-19.44	-8.27	0.00	-184.2	0.00	184.20	2,683.57	674.91	2,363.62	2,140.48	9.56	-0.81	0.093
116.00	-18.69	-7.75	0.00	-175.9	0.00	175.93	2,670.09	669.86	2,328.34	2,113.63	9.73	-0.82	0.090
120.00	-18.09	-7.69	0.00	-144.9	0.00	144.94	2,615.14	649.63	2,189.84	2,007.11	10.43	-0.85	0.079
121.00	-17.34	-7.16	0.00	-137.2	0.00	137.25	2,601.15	644.57	2,155.88	1,980.71	10.6	-0.85	0.076
125.00	-16.74	-7.10	0.00	-108.6	0.00	108.59	2,544.21	624.34	2,022.69	1,876.03	11.33	-0.87	0.065
126.00	-16.01	-6.61	0.00	-101.5	0.00	101.49	2,529.72	619.28	1,990.05	1,850.11	11.51	-0.88	0.061
127.00	-13.79	-5.80	0.00	-94.9	0.00	94.89	2,515.13	614.22	1,957.68	1,824.28	11.7	-0.88	0.058
130.00	-13.39	-5.75	0.00	-77.5	0.00	77.49	2,470.77	599.05	1,862.17	1,747.45	12.26	-0.9	0.050
131.00	-12.66	-5.26	0.00	-71.7	0.00	71.74	2,455.79	593.99	1,830.86	1,722.05	12.45	-0.9	0.047
131.54	-12.59	-5.22	0.00	-68.9	0.00	68.88	2,447.60	591.24	1,813.96	1,708.30	12.55	-0.9	0.046
135.00	-11.90	-5.17	0.00	-50.8	0.00	50.83	2,394.84	573.76	1,708.29	1,621.60	13.21	-0.92	0.036
136.00	-11.12	-4.68	0.00	-45.7	0.00	45.66	2,379.35	568.70	1,678.31	1,596.78	13.4	-0.92	0.033
136.46	-11.03	-4.67	0.00	-43.5	0.00	43.51	1,180.68	345.05	1,029.57	804.33	13.49	-0.92	0.064
137.00	-7.74	-3.71	0.00	-41.0	0.00	40.99	1,178.13	343.41	1,019.82	798.76	13.6	-0.92	0.058
140.00	-7.52	-3.67	0.00	-29.8	0.00	29.85	1,163.42	334.31	966.47	767.76	14.18	-0.93	0.045
141.00	-6.86	-3.15	0.00	-26.2	0.00	26.17	1,158.32	331.27	949.00	757.42	14.38	-0.94	0.041
145.00	-6.60	-3.10	0.00	-13.6	0.00	13.57	1,136.92	319.13	880.73	716.02	15.17	-0.95	0.025
146.00	-5.94	-2.60	0.00	-10.5	0.00	10.47	1,131.32	316.10	864.07	705.68	15.36	-0.95	0.020
148.00	-1.36	-0.99	0.00	-5.3	0.00	5.28	1,119.81	310.03	831.21	685.01	15.76	-0.95	0.009
150.00	-1.24	-0.96	0.00	-3.3	0.00	3.30	1,107.91	303.96	798.98	664.38	16.16	-0.95	0.006
151.00	0.00	-0.94	0.00	-2.3	0.00	2.33	1,101.81	300.92	783.11	654.08	16.36	-0.95	0.004

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EQUIVALENT LATERAL FORCES METHOD ANALYSIS

Design Spectral Response Acceleration at Short Period (S_{ds}):	0.160
Design Spectral Response Acceleration at 1.0 Second Period (S_{d1}):	0.067
Long-Period Transition Period (T_L – Seconds):	6
Importance Factor (I_e):	1.000
Response Modification Coefficient (R):	1.500
Seismic Response Coefficient (C_s):	0.030
Upper Limit C_S:	0.030
Lower Limit C_S:	0.030
Period based on Rayleigh Method (sec):	1.760
Redundancy Factor (p):	1.000
Seismic Force Distribution Exponent (k):	1.630
Total Unfactored Dead Load:	60.280 k
Seismic Base Shear (E):	1.810 k

SEISMIC FORCES

1.2D + 1.0Ev + 1.0Eh **Seismic**

Segment	Height Above Base (ft)	Weight (lb)	W_z (lb-ft)	C_{vx}	Horizontal Force (lb)	Vertical Force (lb)
54	150.5	59	207	0.002	4	72
53	149	119	414	0.004	8	147
52	147	127	430	0.005	9	156
51	145.5	64	215	0.002	4	79
50	143	263	853	0.009	17	324
49	140.5	67	212	0.002	4	83
48	138.5	214	661	0.007	13	264
47	136.73	45	136	0.002	3	56
46	136.23	89	268	0.003	5	110
45	135.5	195	581	0.006	12	240
44	133.2717	687	1,989	0.022	40	846
43	131.2717	72	202	0.002	4	88
42	130.5	133	371	0.004	7	163
41	128.5	404	1,102	0.012	22	497
40	126.5	143	380	0.004	8	176
39	125.5	144	378	0.004	8	177
38	123	585	1,487	0.016	30	721
37	120.5	149	365	0.004	7	183
36	118	605	1,436	0.016	29	745
35	115.5	154	352	0.004	7	189
34	113	624	1,382	0.015	27	769
33	110.5	158	338	0.004	7	195
32	107.5	807	1,647	0.018	33	994
31	102.5	832	1,571	0.017	31	1,025
30	98.0867	653	1,148	0.013	23	805
29	96.0867	66	111	0.001	2	81
28	95.5	380	639	0.007	13	468
27	93	1,542	2,486	0.027	49	1,900
26	90.5	391	603	0.007	12	482
25	89.92	63	96	0.001	2	77
24	87.92	922	1,356	0.015	27	1,136
23	85.5	243	342	0.004	7	300
22	83	987	1,322	0.014	26	1,216
21	80.5	250	319	0.004	6	308
20	78	1,015	1,228	0.014	24	1,250
19	75.5	257	295	0.003	6	317
18	73	1,042	1,132	0.012	22	1,284
17	70.5	264	271	0.003	5	325
16	67.5	1,340	1,282	0.014	25	1,651
15	62.5	1,375	1,160	0.013	23	1,694
14	57.5	1,409	1,038	0.011	21	1,736
13	53.73	729	481	0.005	10	898

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SEISMIC FORCES

1.2D + 1.0Ev + 1.0Eh **Seismic**

Segment	Height Above Base (ft)	Weight (lb)	W_z (lb-ft)	C_{vx}	Horizontal Force (lb)	Vertical Force (lb)
12	51.23	1,453	887	0.010	18	1,790
11	47.5	3,009	1,623	0.018	32	3,707
10	44.7717	278	136	0.002	3	343
9	42.2717	1,534	684	0.008	14	1,890
8	37.5	1,725	633	0.007	13	2,126
7	32.5	1,765	513	0.006	10	2,174
6	27.5	1,804	399	0.004	8	2,222
5	22.5	1,843	294	0.003	6	2,271
4	17.5	1,882	200	0.002	4	2,319
3	12.5	1,921	118	0.001	2	2,367
2	7.5	1,961	52	0.001	1	2,416
1	2.5	2,000	9	0.000	0	2,464
Pine Branches	151	600	2,130	0.023	42	739
Pine Branches	151	600	2,130	0.023	42	739
Pine Branches	146	600	2,017	0.022	40	739
Pine Branches	141	600	1,905	0.021	38	739
Pine Branches	136	600	1,796	0.020	36	739
Pine Branches	131	600	1,690	0.019	34	739
Pine Branches	126	600	1,586	0.017	32	739
Pine Branches	121	600	1,485	0.016	29	739
Pine Branches	116	600	1,386	0.015	28	739
Pine Branches	111	600	1,290	0.014	26	739
Pine Branches	96	600	1,018	0.011	20	739
Pine Branches	91	600	933	0.010	19	739
Pine Branches	86	600	851	0.009	17	739
Pine Branches	81	600	772	0.008	15	739
Pine Branches	76	600	696	0.008	14	739
Pine Branches	71	600	623	0.007	12	739
Samsung RF4461d-13A	148	237	815	0.009	16	292
Samsung B2/B66A RRH ORAN (RF 4439d-25A)	148	224	770	0.008	15	276
Raycap RVZDC-6627-PF-48	148	32	110	0.001	2	39
Samsung MT6413-77A	148	172	591	0.006	12	212
Commscope NHH-65B-HG-R2B	148	271	932	0.010	19	334
Generic Flat Light Sector Frame	148	2,400	8,247	0.091	164	2,957
Unused Reserve (16675.610 sqin)	148	1,146	3,938	0.043	78	1,412
Ericsson RRUS 8843 B2, B66A	137	216	654	0.007	13	266
Ericsson RRUS 4478 B14 (16.5" Height)	137	180	544	0.006	11	221
Ericsson RRUS 4449 B5, B12	137	213	645	0.007	13	262
Raycap DC9-48-60-24-8C-EV (Enclosure)	137	18	56	0.001	1	23
Generic Round Sector Frame	137	2,100	6,363	0.070	126	2,587
Generic Round Sector Frame	127	900	2,410	0.026	48	1,109
CCI DMP65R-BU8D	137	287	870	0.010	17	354
CCI TPA65R-BU8D	137	248	750	0.008	15	305
Ceragon FibeAir IP-20C	127	14	38	0.000	1	18
Ceragon FibeAir IP-20C	125	14	37	0.000	1	18
Ericsson 4460 BAND 2/25	127	327	876	0.010	17	403
Ericsson 4480 BAND 71	127	243	651	0.007	13	299
Andrew VHLP2-11W-2GR	127	25	67	0.001	1	31
Ericsson AIR 6419 B41	127	206	550	0.006	11	253
RFS APXVAALL24 43-U-NA20	127	368	987	0.011	20	454
	Totals:	**60,281**	**91,047**	**1.000**	**1,808**	**74,266**

SEISMIC FORCES

0.9D - 1.0Ev + 1.0Eh **Seismic (Reduced DL)**

Segment	Height Above Base (ft)	Weight (lb)	W_z (lb-ft)	C_{vx}	Horizontal Force (lb)	Vertical Force (lb)
54	150.5	59	207	0.002	4	51
53	149	119	414	0.004	8	103
52	147	127	430	0.005	9	110
51	145.5	64	215	0.002	4	56
50	143	263	853	0.009	17	228

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SEISMIC FORCES

0.9D - 1.0Ev + 1.0Eh **Seismic (Reduced DL)**

Segment	Height Above Base (ft)	Weight (lb)	W_z (lb-ft)	C_{vx}	Horizontal Force (lb)	Vertical Force (lb)
49	140.5	67	212	0.002	4	58
48	138.5	214	661	0.007	13	186
47	136.73	45	136	0.002	3	39
46	136.23	89	268	0.003	5	77
45	135.5	195	581	0.006	12	169
44	133.2717	687	1,989	0.022	40	596
43	131.2717	72	202	0.002	4	62
42	130.5	133	371	0.004	7	115
41	128.5	404	1,102	0.012	22	350
40	126.5	143	380	0.004	8	124
39	125.5	144	378	0.004	8	125
38	123	585	1,487	0.016	30	508
37	120.5	149	365	0.004	7	129
36	118	605	1,436	0.016	29	525
35	115.5	154	352	0.004	7	133
34	113	624	1,382	0.015	27	542
33	110.5	158	338	0.004	7	138
32	107.5	807	1,647	0.018	33	701
31	102.5	832	1,571	0.017	31	722
30	98.0867	653	1,148	0.013	23	567
29	96.0867	66	111	0.001	2	57
28	95.5	380	639	0.007	13	330
27	93	1,542	2,486	0.027	49	1,338
26	90.5	391	603	0.007	12	340
25	89.92	63	96	0.001	2	55
24	87.92	922	1,356	0.015	27	800
23	85.5	243	342	0.004	7	211
22	83	987	1,322	0.014	26	857
21	80.5	250	319	0.004	6	217
20	78	1,015	1,228	0.014	24	881
19	75.5	257	295	0.003	6	223
18	73	1,042	1,132	0.012	22	905
17	70.5	264	271	0.003	5	229
16	67.5	1,340	1,282	0.014	25	1,163
15	62.5	1,375	1,160	0.013	23	1,193
14	57.5	1,409	1,038	0.011	21	1,223
13	53.73	729	481	0.005	10	633
12	51.23	1,453	887	0.010	18	1,261
11	47.5	3,009	1,623	0.018	32	2,611
10	44.7717	278	136	0.002	3	242
9	42.2717	1,534	684	0.008	14	1,331
8	37.5	1,725	633	0.007	13	1,498
7	32.5	1,765	513	0.006	10	1,532
6	27.5	1,804	399	0.004	8	1,566
5	22.5	1,843	294	0.003	6	1,600
4	17.5	1,882	200	0.002	4	1,634
3	12.5	1,921	118	0.001	2	1,668
2	7.5	1,961	52	0.001	1	1,702
1	2.5	2,000	9	0.000	0	1,736
Pine Branches	151	600	2,130	0.023	42	521
Pine Branches	151	600	2,130	0.023	42	521
Pine Branches	146	600	2,017	0.022	40	521
Pine Branches	141	600	1,905	0.021	38	521
Pine Branches	136	600	1,796	0.020	36	521
Pine Branches	131	600	1,690	0.019	34	521
Pine Branches	126	600	1,586	0.017	32	521
Pine Branches	121	600	1,485	0.016	29	521
Pine Branches	116	600	1,386	0.015	28	521
Pine Branches	111	600	1,290	0.014	26	521
Pine Branches	96	600	1,018	0.011	20	521
Pine Branches	91	600	933	0.010	19	521

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SEISMIC FORCES

0.9D - 1.0Ev + 1.0Eh **Seismic (Reduced DL)**

Segment	Height Above Base (ft)	Weight (lb)	W_z (lb-ft)	C_{vx}	Horizontal Force (lb)	Vertical Force (lb)
Pine Branches	86	600	851	0.009	17	521
Pine Branches	81	600	772	0.008	15	521
Pine Branches	76	600	696	0.008	14	521
Pine Branches	71	600	623	0.007	12	521
Samsung RF4461d-13A	148	237	815	0.009	16	206
Samsung B2/B66A RRH ORAN (RF 4439d-25A)	148	224	770	0.008	15	195
Raycap RVZDC-6627-PF-48	148	32	110	0.001	2	28
Samsung MT6413-77A	148	172	591	0.006	12	149
Commscope NHH-65B-HG-R2B	148	271	932	0.010	19	235
Generic Flat Light Sector Frame	148	2,400	8,247	0.091	164	2,083
Unused Reserve (16675.610 sqin)	148	1,146	3,938	0.043	78	995
Ericsson RRUS 8843 B2, B66A	137	216	654	0.007	13	187
Ericsson RRUS 4478 B14 (16.5" Height)	137	180	544	0.006	11	156
Ericsson RRUS 4449 B5, B12	137	213	645	0.007	13	185
Raycap DC9-48-60-24-8C-EV (Enclosure)	137	18	56	0.001	1	16
Generic Round Sector Frame	137	2,100	6,363	0.070	126	1,823
Generic Round Sector Frame	127	900	2,410	0.026	48	781
CCI DMP65R-BU8D	137	287	870	0.010	17	249
CCI TPA65R-BU8D	137	248	750	0.008	15	215
Ceragon FibeAir IP-20C	127	14	38	0.000	1	12
Ceragon FibeAir IP-20C	125	14	37	0.000	1	12
Ericsson 4460 BAND 2/25	127	327	876	0.010	17	284
Ericsson 4480 BAND 71	127	243	651	0.007	13	211
Andrew VHLP2-11W-2GR	127	25	67	0.001	1	22
Ericsson AIR 6419 B41	127	206	550	0.006	11	178
RFS APXVAALL24 43-U-NA20	127	368	987	0.011	20	320
	Totals:	**60,281**	**91,047**	**1.000**	**1,808**	**52,324**

SEISMIC FORCES

1.2D + 1.0Ev + 1.5Eh **Seismic Overstrength**

Segment	Height Above Base (ft)	Weight (lb)	W_z (lb-ft)	C_{vx}	Horizontal Force (lb)	Vertical Force (lb)
54	150.5	59	207	0.002	6	72
53	149	119	414	0.004	12	147
52	147	127	430	0.005	13	156
51	145.5	64	215	0.002	6	79
50	143	263	853	0.009	25	324
49	140.5	67	212	0.002	6	83
48	138.5	214	661	0.007	20	264
47	136.73	45	136	0.002	4	56
46	136.23	89	268	0.003	8	110
45	135.5	195	581	0.006	17	240
44	133.2717	687	1,989	0.022	59	846
43	131.2717	72	202	0.002	6	88
42	130.5	133	371	0.004	11	163
41	128.5	404	1,102	0.012	33	497
40	126.5	143	380	0.004	11	176
39	125.5	144	378	0.004	11	177
38	123	585	1,487	0.016	44	721
37	120.5	149	365	0.004	11	183
36	118	605	1,436	0.016	43	745
35	115.5	154	352	0.004	10	189
34	113	624	1,382	0.015	41	769
33	110.5	158	338	0.004	10	195
32	107.5	807	1,647	0.018	49	994
31	102.5	832	1,571	0.017	47	1,025
30	98.0867	653	1,148	0.013	34	805
29	96.0867	66	111	0.001	3	81
28	95.5	380	639	0.007	19	468
27	93	1,542	2,486	0.027	74	1,900
26	90.5	391	603	0.007	18	482

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SEISMIC FORCES

1.2D + 1.0Ev + 1.5Eh **Seismic Overstrength**

Segment	Height Above Base (ft)	Weight (lb)	W_z (lb-ft)	C_{vx}	Horizontal Force (lb)	Vertical Force (lb)
25	89.92	63	96	0.001	3	77
24	87.92	922	1,356	0.015	40	1,136
23	85.5	243	342	0.004	10	300
22	83	987	1,322	0.014	39	1,216
21	80.5	250	319	0.004	9	308
20	78	1,015	1,228	0.014	37	1,250
19	75.5	257	295	0.003	9	317
18	73	1,042	1,132	0.012	34	1,284
17	70.5	264	271	0.003	8	325
16	67.5	1,340	1,282	0.014	38	1,651
15	62.5	1,375	1,160	0.013	35	1,694
14	57.5	1,409	1,038	0.011	31	1,736
13	53.73	729	481	0.005	14	898
12	51.23	1,453	887	0.010	26	1,790
11	47.5	3,009	1,623	0.018	48	3,707
10	44.7717	278	136	0.002	4	343
9	42.2717	1,534	684	0.008	20	1,890
8	37.5	1,725	633	0.007	19	2,126
7	32.5	1,765	513	0.006	15	2,174
6	27.5	1,804	399	0.004	12	2,222
5	22.5	1,843	294	0.003	9	2,271
4	17.5	1,882	200	0.002	6	2,319
3	12.5	1,921	118	0.001	4	2,367
2	7.5	1,961	52	0.001	2	2,416
1	2.5	2,000	9	0.000	0	2,464
Pine Branches	151	600	2,130	0.023	63	739
Pine Branches	151	600	2,130	0.023	63	739
Pine Branches	146	600	2,017	0.022	60	739
Pine Branches	141	600	1,905	0.021	57	739
Pine Branches	136	600	1,796	0.020	54	739
Pine Branches	131	600	1,690	0.019	50	739
Pine Branches	126	600	1,586	0.017	47	739
Pine Branches	121	600	1,485	0.016	44	739
Pine Branches	116	600	1,386	0.015	41	739
Pine Branches	111	600	1,290	0.014	38	739
Pine Branches	96	600	1,018	0.011	30	739
Pine Branches	91	600	933	0.010	28	739
Pine Branches	86	600	851	0.009	25	739
Pine Branches	81	600	772	0.008	23	739
Pine Branches	76	600	696	0.008	21	739
Pine Branches	71	600	623	0.007	19	739
Samsung RF4461d-13A	148	237	815	0.009	24	292
Samsung B2/B66A RRH ORAN (RF 4439d-25A)	148	224	770	0.008	23	276
Raycap RVZDC-6627-PF-48	148	32	110	0.001	3	39
Samsung MT6413-77A	148	172	591	0.006	18	212
Commscope NHH-65B-HG-R2B	148	271	932	0.010	28	334
Generic Flat Light Sector Frame	148	2,400	8,247	0.091	246	2,957
Unused Reserve (16675.610 sqin)	148	1,146	3,938	0.043	117	1,412
Ericsson RRUS 8843 B2, B66A	137	216	654	0.007	19	266
Ericsson RRUS 4478 B14 (16.5" Height)	137	180	544	0.006	16	221
Ericsson RRUS 4449 B5, B12	137	213	645	0.007	19	262
Raycap DC9-48-60-24-8C-EV (Enclosure)	137	18	56	0.001	2	23
Generic Round Sector Frame	137	2,100	6,363	0.070	190	2,587
Generic Round Sector Frame	127	900	2,410	0.026	72	1,109
CCI DMP65R-BU8D	137	287	870	0.010	26	354
CCI TPA65R-BU8D	137	248	750	0.008	22	305
Ceragon FibeAir IP-20C	127	14	38	0.000	1	18
Ceragon FibeAir IP-20C	125	14	37	0.000	1	18
Ericsson 4460 BAND 2/25	127	327	876	0.010	26	403
Ericsson 4480 BAND 71	127	243	651	0.007	19	299
Andrew VHLP2-11W-2GR	127	25	67	0.001	2	31

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SEISMIC FORCES

1.2D + 1.0Ev + 1.5Eh **Seismic Overstrength**

Segment	Height Above Base (ft)	Weight (lb)	W_z (lb-ft)	C_{vx}	Horizontal Force (lb)	Vertical Force (lb)
Ericsson AIR 6419 B41	127	206	550	0.006	16	253
RFS APXVAALL24 43-U-NA20	127	368	987	0.011	29	454
	Totals:	**60,281**	**91,047**	**1.000**	**2,713**	**74,266**

SEISMIC FORCES

0.9D - 1.0Ev + 1.5Eh **Seismic Overstrength (Reduced DL)**

Segment	Height Above Base (ft)	Weight (lb)	W_z (lb-ft)	C_{vx}	Horizontal Force (lb)	Vertical Force (lb)
54	150.5	59	207	0.002	6	51
53	149	119	414	0.004	12	103
52	147	127	430	0.005	13	110
51	145.5	64	215	0.002	6	56
50	143	263	853	0.009	25	228
49	140.5	67	212	0.002	6	58
48	138.5	214	661	0.007	20	186
47	136.73	45	136	0.002	4	39
46	136.23	89	268	0.003	8	77
45	135.5	195	581	0.006	17	169
44	133.2717	687	1,989	0.022	59	596
43	131.2717	72	202	0.002	6	62
42	130.5	133	371	0.004	11	115
41	128.5	404	1,102	0.012	33	350
40	126.5	143	380	0.004	11	124
39	125.5	144	378	0.004	11	125
38	123	585	1,487	0.016	44	508
37	120.5	149	365	0.004	11	129
36	118	605	1,436	0.016	43	525
35	115.5	154	352	0.004	10	133
34	113	624	1,382	0.015	41	542
33	110.5	158	338	0.004	10	138
32	107.5	807	1,647	0.018	49	701
31	102.5	832	1,571	0.017	47	722
30	98.0867	653	1,148	0.013	34	567
29	96.0867	66	111	0.001	3	57
28	95.5	380	639	0.007	19	330
27	93	1,542	2,486	0.027	74	1,338
26	90.5	391	603	0.007	18	340
25	89.92	63	96	0.001	3	55
24	87.92	922	1,356	0.015	40	800
23	85.5	243	342	0.004	10	211
22	83	987	1,322	0.014	39	857
21	80.5	250	319	0.004	9	217
20	78	1,015	1,228	0.014	37	881
19	75.5	257	295	0.003	9	223
18	73	1,042	1,132	0.012	34	905
17	70.5	264	271	0.003	8	229
16	67.5	1,340	1,282	0.014	38	1,163
15	62.5	1,375	1,160	0.013	35	1,193
14	57.5	1,409	1,038	0.011	31	1,223
13	53.73	729	481	0.005	14	633
12	51.23	1,453	887	0.010	26	1,261
11	47.5	3,009	1,623	0.018	48	2,611
10	44.7717	278	136	0.002	4	242
9	42.2717	1,534	684	0.008	20	1,331
8	37.5	1,725	633	0.007	19	1,498
7	32.5	1,765	513	0.006	15	1,532
6	27.5	1,804	399	0.004	12	1,566
5	22.5	1,843	294	0.003	9	1,600
4	17.5	1,882	200	0.002	6	1,634
3	12.5	1,921	118	0.001	4	1,668
2	7.5	1,961	52	0.001	2	1,702

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SEISMIC FORCES

0.9D - 1.0Ev + 1.5Eh **Seismic Overstrength (Reduced DL)**

Segment	Height Above Base (ft)	Weight (lb)	W_z (lb-ft)	C_{vx}	Horizontal Force (lb)	Vertical Force (lb)
1	2.5	2,000	9	0.000	0	1,736
Pine Branches	151	600	2,130	0.023	63	521
Pine Branches	151	600	2,130	0.023	63	521
Pine Branches	146	600	2,017	0.022	60	521
Pine Branches	141	600	1,905	0.021	57	521
Pine Branches	136	600	1,796	0.020	54	521
Pine Branches	131	600	1,690	0.019	50	521
Pine Branches	126	600	1,586	0.017	47	521
Pine Branches	121	600	1,485	0.016	44	521
Pine Branches	116	600	1,386	0.015	41	521
Pine Branches	111	600	1,290	0.014	38	521
Pine Branches	96	600	1,018	0.011	30	521
Pine Branches	91	600	933	0.010	28	521
Pine Branches	86	600	851	0.009	25	521
Pine Branches	81	600	772	0.008	23	521
Pine Branches	76	600	696	0.008	21	521
Pine Branches	71	600	623	0.007	19	521
Samsung RF4461d-13A	148	237	815	0.009	24	206
Samsung B2/B66A RRH ORAN (RF 4439d-25A)	148	224	770	0.008	23	195
Raycap RVZDC-6627-PF-48	148	32	110	0.001	3	28
Samsung MT6413-77A	148	172	591	0.006	18	149
Commscope NHH-65B-HG-R2B	148	271	932	0.010	28	235
Generic Flat Light Sector Frame	148	2,400	8,247	0.091	246	2,083
Unused Reserve (16675.610 sqin)	148	1,146	3,938	0.043	117	995
Ericsson RRUS 8843 B2, B66A	137	216	654	0.007	19	187
Ericsson RRUS 4478 B14 (16.5" Height)	137	180	544	0.006	16	156
Ericsson RRUS 4449 B5, B12	137	213	645	0.007	19	185
Raycap DC9-48-60-24-8C-EV (Enclosure)	137	18	56	0.001	2	16
Generic Round Sector Frame	137	2,100	6,363	0.070	190	1,823
Generic Round Sector Frame	127	900	2,410	0.026	72	781
CCI DMP65R-BU8D	137	287	870	0.010	26	249
CCI TPA65R-BU8D	137	248	750	0.008	22	215
Ceragon FibeAir IP-20C	127	14	38	0.000	1	12
Ceragon FibeAir IP-20C	125	14	37	0.000	1	12
Ericsson 4460 BAND 2/25	127	327	876	0.010	26	284
Ericsson 4480 BAND 71	127	243	651	0.007	19	211
Andrew VHLP2-11W-2GR	127	25	67	0.001	2	22
Ericsson AIR 6419 B41	127	206	550	0.006	16	178
RFS APXVAALL24 43-U-NA20	127	368	987	0.011	29	320
	Totals:	**60,281**	**91,047**	**1.000**	**2,713**	**52,324**

1.2D + 1.0Ev + 1.0Eh **Seismic**

CALCULATED FORCES

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (fr-kips)	Mu Mx (ft-kips)	Resultant Moment (ft-kips)	Phi Pn (kips)	Phi Vn (kips)	Phi Tn (kips)	Phi Mn (kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-71.80	-1.81	0.00	-215.89	0.00	215.89	7,453.69	1,963.48	12,503	10,820.43	0.00	0.00	0.03
5.00	-69.39	-1.81	0.00	-206.84	0.00	206.84	7,359.51	1,923.02	11,993	10,462.01	0.00	0.00	0.03
10.00	-67.02	-1.82	0.00	-197.77	0.00	197.77	7,262.84	1,882.56	11,493	10,105.78	0.01	-0.01	0.03
15.00	-64.70	-1.82	0.00	-188.69	0.00	188.69	7,163.66	1,842.10	11,005	9,751.97	0.02	-0.01	0.03
20.00	-62.43	-1.82	0.00	-179.61	0.00	179.61	7,061.99	1,801.64	10,527	9,400.81	0.04	-0.02	0.03
25.00	-60.21	-1.81	0.00	-170.53	0.00	170.53	6,957.81	1,761.18	10,059	9,052.53	0.06	-0.02	0.03
30.00	-58.03	-1.81	0.00	-161.47	0.00	161.47	6,851.13	1,720.71	9,602	8,707.34	0.08	-0.03	0.03
35.00	-55.91	-1.80	0.00	-152.45	0.00	152.45	6,741.95	1,680.25	9,156	8,365.48	0.11	-0.03	0.03
40.00	-54.02	-1.79	0.00	-143.47	0.00	143.47	6,630.28	1,639.79	8,721	8,027.17	0.15	-0.04	0.03
44.54	-53.67	-1.79	0.00	-135.35	0.00	135.35	6,526.63	1,603.02	8,334	7,723.03	0.19	-0.04	0.03
45.00	-49.97	-1.75	0.00	-134.54	0.00	134.54	6,516.10	1,599.33	8,296	7,692.64	0.19	-0.04	0.03
50.00	-48.18	-1.74	0.00	-125.77	0.00	125.77	6,399.42	1,558.87	7,881	7,362.11	0.24	-0.05	0.03
52.46	-47.28	-1.73	0.00	-121.50	0.00	121.50	5,381.44	1,369.44	6,951	6,222.71	0.26	-0.05	0.03
55.00	-45.54	-1.71	0.00	-117.11	0.00	117.11	5,335.01	1,351.45	6,769	6,087.38	0.29	-0.05	0.03

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CALCULATED FORCES

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (fr-kips)	Mu Mx (ft-kips)	Resultant Moment (ft-kips)	Phi Pn (kips)	Phi Vn (kips)	Phi Tn (kips)	Phi Mn (kips)	Total Deflect (in)	Rotation (deg)	Ratio
60.00	-43.85	-1.69	0.00	-108.56	0.00	108.56	5,241.73	1,316.05	6,419	5,823.03	0.34	-0.06	0.03
65.00	-42.20	-1.67	0.00	-100.12	0.00	100.12	5,145.95	1,280.64	6,079	5,561.60	0.41	-0.06	0.03
70.00	-41.87	-1.66	0.00	-91.79	0.00	91.79	5,047.66	1,245.24	5,747	5,303.31	0.47	-0.07	0.03
71.00	-39.85	-1.63	0.00	-90.12	0.00	90.12	5,027.70	1,238.16	5,682	5,252.05	0.49	-0.07	0.03
75.00	-39.53	-1.62	0.00	-83.62	0.00	83.62	4,946.88	1,209.84	5,425	5,048.40	0.55	-0.07	0.03
76.00	-37.54	-1.58	0.00	-81.99	0.00	81.99	4,926.42	1,202.75	5,362	4,997.84	0.56	-0.07	0.02
80.00	-37.23	-1.58	0.00	-75.66	0.00	75.66	4,843.59	1,174.43	5,112	4,797.08	0.63	-0.08	0.02
81.00	-35.28	-1.54	0.00	-74.08	0.00	74.08	4,822.63	1,167.35	5,051	4,747.27	0.64	-0.08	0.02
85.00	-34.98	-1.53	0.00	-67.93	0.00	67.93	4,737.80	1,139.03	4,809	4,549.58	0.71	-0.08	0.02
86.00	-33.10	-1.49	0.00	-66.40	0.00	66.40	4,716.34	1,131.95	4,749	4,500.56	0.73	-0.08	0.02
89.84	-33.03	-1.48	0.00	-60.70	0.00	60.70	4,633.02	1,104.76	4,524	4,313.86	0.80	-0.09	0.02
90.00	-32.54	-1.47	0.00	-60.46	0.00	60.46	4,629.51	1,103.62	4,515	4,306.14	0.80	-0.09	0.02
91.00	-29.91	-1.40	0.00	-58.99	0.00	58.99	4,607.56	1,096.54	4,457	4,257.95	0.82	-0.09	0.02
95.00	-29.44	-1.39	0.00	-53.38	0.00	53.38	4,518.73	1,068.22	4,230	4,066.96	0.90	-0.09	0.02
96.00	-28.62	-1.37	0.00	-51.99	0.00	51.99	4,492.15	1,061.14	4,174	4,015.98	0.92	-0.09	0.02
96.17	-27.81	-1.34	0.00	-51.76	0.00	51.76	2,918.81	770.13	3,078	2,659.20	0.92	-0.09	0.03
100.00	-26.79	-1.31	0.00	-46.62	0.00	46.62	2,873.87	750.78	2,925	2,551.99	1.00	-0.10	0.03
105.00	-25.79	-1.28	0.00	-40.06	0.00	40.06	2,812.94	725.49	2,731	2,413.14	1.10	-0.10	0.03
110.00	-25.60	-1.28	0.00	-33.66	0.00	33.66	2,749.50	700.20	2,544	2,275.90	1.22	-0.11	0.02
111.00	-24.09	-1.22	0.00	-32.38	0.00	32.38	2,736.52	695.15	2,507	2,248.66	1.24	-0.11	0.02
115.00	-23.90	-1.21	0.00	-27.50	0.00	27.50	2,683.57	674.91	2,364	2,140.48	1.33	-0.12	0.02
116.00	-22.42	-1.16	0.00	-26.29	0.00	26.29	2,670.09	669.86	2,328	2,113.63	1.36	-0.12	0.02
120.00	-22.23	-1.15	0.00	-21.66	0.00	21.66	2,615.14	649.63	2,190	2,007.11	1.46	-0.12	0.02
121.00	-20.77	-1.09	0.00	-20.51	0.00	20.51	2,601.15	644.57	2,156	1,980.71	1.48	-0.12	0.02
125.00	-20.58	-1.08	0.00	-16.16	0.00	16.16	2,544.21	624.34	2,023	1,876.03	1.59	-0.12	0.02
126.00	-19.67	-1.04	0.00	-15.08	0.00	15.08	2,529.72	619.28	1,990	1,850.11	1.61	-0.13	0.02
127.00	-16.60	-0.90	0.00	-14.04	0.00	14.04	2,515.13	614.22	1,958	1,824.28	1.64	-0.13	0.01
130.00	-16.44	-0.89	0.00	-11.34	0.00	11.34	2,470.77	599.05	1,862	1,747.45	1.72	-0.13	0.01
131.00	-15.61	-0.85	0.00	-10.45	0.00	10.45	2,455.79	593.99	1,831	1,722.05	1.75	-0.13	0.01
131.54	-14.77	-0.81	0.00	-9.99	0.00	9.99	2,447.60	591.24	1,814	1,708.30	1.76	-0.13	0.01
135.00	-14.52	-0.80	0.00	-7.18	0.00	7.18	2,394.84	573.76	1,708	1,621.60	1.85	-0.13	0.01
136.00	-13.68	-0.76	0.00	-6.38	0.00	6.38	2,379.35	568.70	1,678	1,596.78	1.88	-0.13	0.01
136.46	-13.62	-0.76	0.00	-6.03	0.00	6.03	1,180.68	345.05	1,030	804.33	1.89	-0.13	0.02
137.00	-9.34	-0.54	0.00	-5.62	0.00	5.62	1,178.13	343.41	1,020	798.76	1.91	-0.13	0.02
140.00	-9.26	-0.53	0.00	-4.01	0.00	4.01	1,163.42	334.31	966	767.76	1.99	-0.13	0.01
141.00	-8.19	-0.47	0.00	-3.48	0.00	3.48	1,158.32	331.27	949	757.42	2.02	-0.13	0.01
145.00	-8.11	-0.47	0.00	-1.58	0.00	1.58	1,136.92	319.13	881	716.02	2.13	-0.13	0.01
146.00	-7.22	-0.42	0.00	-1.11	0.00	1.11	1,131.32	316.10	864	705.68	2.16	-0.14	0.01
148.00	-1.55	-0.09	0.00	-0.27	0.00	0.27	1,119.81	310.03	831	685.01	2.22	-0.14	0.00
150.00	-1.48	-0.09	0.00	-0.09	0.00	0.09	1,107.91	303.96	799	664.38	2.28	-0.14	0.00
151.00	0.00	-0.08	0.00	0.00	0.00	0.00	1,101.81	300.92	783	654.08	2.30	-0.14	0.00

0.9D - 1.0Ev + 1.0Eh **Seismic (Reduced DL)**

CALCULATED FORCES

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (fr-kips)	Mu Mx (ft-kips)	Resultant Moment (ft-kips)	Phi Pn (kips)	Phi Vn (kips)	Phi Tn (kips)	Phi Mn (kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-50.59	-1.81	0.00	-214.29	0.00	214.29	7,453.69	1,963.48	12,503	10,820.43	0.00	0.00	0.03
5.00	-48.89	-1.81	0.00	-205.25	0.00	205.25	7,359.51	1,923.02	11,993	10,462.01	0.00	0.00	0.03
10.00	-47.22	-1.81	0.00	-196.19	0.00	196.19	7,262.84	1,882.56	11,493	10,105.78	0.01	-0.01	0.03
15.00	-45.58	-1.81	0.00	-187.13	0.00	187.13	7,163.66	1,842.10	11,005	9,751.97	0.02	-0.01	0.03
20.00	-43.98	-1.81	0.00	-178.07	0.00	178.07	7,061.99	1,801.64	10,527	9,400.81	0.04	-0.02	0.03
25.00	-42.42	-1.80	0.00	-169.02	0.00	169.02	6,957.81	1,761.18	10,059	9,052.53	0.06	-0.02	0.03
30.00	-40.89	-1.80	0.00	-160.00	0.00	160.00	6,851.13	1,720.71	9,602	8,707.34	0.08	-0.03	0.02
35.00	-39.39	-1.79	0.00	-151.02	0.00	151.02	6,741.95	1,680.25	9,156	8,365.48	0.11	-0.03	0.02
40.00	-38.06	-1.77	0.00	-142.09	0.00	142.09	6,630.28	1,639.79	8,721	8,027.17	0.15	-0.04	0.02
44.54	-37.82	-1.77	0.00	-134.02	0.00	134.02	6,526.63	1,603.02	8,334	7,723.03	0.19	-0.04	0.02
45.00	-35.20	-1.74	0.00	-133.21	0.00	133.21	6,516.10	1,599.33	8,296	7,692.64	0.19	-0.04	0.02
50.00	-33.94	-1.72	0.00	-124.51	0.00	124.51	6,399.42	1,558.87	7,881	7,362.11	0.23	-0.05	0.02
52.46	-33.31	-1.72	0.00	-120.26	0.00	120.26	5,381.44	1,369.44	6,951	6,222.71	0.26	-0.05	0.03

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CALCULATED FORCES

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (fr-kips)	Mu Mx (ft-kips)	Resultant Moment (ft-kips)	Phi Pn (kips)	Phi Vn (kips)	Phi Tn (kips)	Phi Mn (kips)	Total Deflect (in)	Rotation (deg)	Ratio
55.00	-32.09	-1.70	0.00	-115.91	0.00	115.91	5,335.01	1,351.45	6,769	6,087.38	0.28	-0.05	0.03
60.00	-30.89	-1.68	0.00	-107.42	0.00	107.42	5,241.73	1,316.05	6,419	5,823.03	0.34	-0.06	0.02
65.00	-29.73	-1.65	0.00	-99.04	0.00	99.04	5,145.95	1,280.64	6,079	5,561.60	0.40	-0.06	0.02
70.00	-29.50	-1.65	0.00	-90.79	0.00	90.79	5,047.66	1,245.24	5,747	5,303.31	0.47	-0.07	0.02
71.00	-28.07	-1.61	0.00	-89.14	0.00	89.14	5,027.70	1,238.16	5,682	5,252.05	0.48	-0.07	0.02
75.00	-27.85	-1.61	0.00	-82.69	0.00	82.69	4,946.88	1,209.84	5,425	5,048.40	0.54	-0.07	0.02
76.00	-26.45	-1.57	0.00	-81.08	0.00	81.08	4,926.42	1,202.75	5,362	4,997.84	0.56	-0.07	0.02
80.00	-26.23	-1.56	0.00	-74.81	0.00	74.81	4,843.59	1,174.43	5,112	4,797.08	0.62	-0.08	0.02
81.00	-24.86	-1.52	0.00	-73.24	0.00	73.24	4,822.63	1,167.35	5,051	4,747.27	0.64	-0.08	0.02
85.00	-24.64	-1.52	0.00	-67.16	0.00	67.16	4,737.80	1,139.03	4,809	4,549.58	0.70	-0.08	0.02
86.00	-23.32	-1.47	0.00	-65.64	0.00	65.64	4,716.34	1,131.95	4,749	4,500.56	0.72	-0.08	0.02
89.84	-23.27	-1.47	0.00	-60.00	0.00	60.00	4,633.02	1,104.76	4,524	4,313.86	0.79	-0.09	0.02
90.00	-22.93	-1.46	0.00	-59.76	0.00	59.76	4,629.51	1,103.62	4,515	4,306.14	0.79	-0.09	0.02
91.00	-21.07	-1.39	0.00	-58.31	0.00	58.31	4,607.56	1,096.54	4,457	4,257.95	0.81	-0.09	0.02
95.00	-20.74	-1.37	0.00	-52.76	0.00	52.76	4,518.73	1,068.22	4,230	4,066.96	0.89	-0.09	0.02
96.00	-20.16	-1.35	0.00	-51.38	0.00	51.38	4,492.15	1,061.14	4,174	4,015.98	0.91	-0.09	0.02
96.17	-19.60	-1.33	0.00	-51.15	0.00	51.15	2,918.81	770.13	3,078	2,659.20	0.91	-0.09	0.03
100.00	-18.87	-1.30	0.00	-46.06	0.00	46.06	2,873.87	750.78	2,925	2,551.99	0.99	-0.10	0.03
105.00	-18.17	-1.27	0.00	-39.57	0.00	39.57	2,812.94	725.49	2,731	2,413.14	1.09	-0.10	0.02
110.00	-18.04	-1.26	0.00	-33.24	0.00	33.24	2,749.50	700.20	2,544	2,275.90	1.20	-0.11	0.02
111.00	-16.97	-1.21	0.00	-31.98	0.00	31.98	2,736.52	695.15	2,507	2,248.66	1.23	-0.11	0.02
115.00	-16.84	-1.20	0.00	-27.16	0.00	27.16	2,683.57	674.91	2,364	2,140.48	1.32	-0.11	0.02
116.00	-15.79	-1.14	0.00	-25.96	0.00	25.96	2,670.09	669.86	2,328	2,113.63	1.35	-0.12	0.02
120.00	-15.66	-1.13	0.00	-21.39	0.00	21.39	2,615.14	649.63	2,190	2,007.11	1.44	-0.12	0.02
121.00	-14.64	-1.07	0.00	-20.26	0.00	20.26	2,601.15	644.57	2,156	1,980.71	1.47	-0.12	0.02
125.00	-14.50	-1.07	0.00	-15.96	0.00	15.96	2,544.21	624.34	2,023	1,876.03	1.57	-0.12	0.01
126.00	-13.85	-1.03	0.00	-14.90	0.00	14.90	2,529.72	619.28	1,990	1,850.11	1.60	-0.12	0.01
127.00	-11.70	-0.89	0.00	-13.87	0.00	13.87	2,515.13	614.22	1,958	1,824.28	1.62	-0.12	0.01
130.00	-11.58	-0.88	0.00	-11.20	0.00	11.20	2,470.77	599.05	1,862	1,747.45	1.70	-0.13	0.01
131.00	-11.00	-0.84	0.00	-10.32	0.00	10.32	2,455.79	593.99	1,831	1,722.05	1.73	-0.13	0.01
131.54	-10.40	-0.80	0.00	-9.86	0.00	9.86	2,447.60	591.24	1,814	1,708.30	1.74	-0.13	0.01
135.00	-10.23	-0.79	0.00	-7.09	0.00	7.09	2,394.84	573.76	1,708	1,621.60	1.84	-0.13	0.01
136.00	-9.63	-0.75	0.00	-6.30	0.00	6.30	2,379.35	568.70	1,678	1,596.78	1.86	-0.13	0.01
136.46	-9.60	-0.75	0.00	-5.96	0.00	5.96	1,180.68	345.05	1,030	804.33	1.88	-0.13	0.02
137.00	-6.58	-0.53	0.00	-5.55	0.00	5.55	1,178.13	343.41	1,020	798.76	1.89	-0.13	0.01
140.00	-6.52	-0.53	0.00	-3.96	0.00	3.96	1,163.42	334.31	966	767.76	1.97	-0.13	0.01
141.00	-5.77	-0.47	0.00	-3.44	0.00	3.44	1,158.32	331.27	949	757.42	2.00	-0.13	0.01
145.00	-5.72	-0.46	0.00	-1.56	0.00	1.56	1,136.92	319.13	881	716.02	2.11	-0.13	0.01
146.00	-5.09	-0.41	0.00	-1.10	0.00	1.10	1,131.32	316.10	864	705.68	2.14	-0.13	0.01
148.00	-1.09	-0.09	0.00	-0.27	0.00	0.27	1,119.81	310.03	831	685.01	2.20	-0.13	0.00
150.00	-1.04	-0.09	0.00	-0.09	0.00	0.09	1,107.91	303.96	799	664.38	2.25	-0.13	0.00
151.00	0.00	-0.08	0.00	0.00	0.00	0.00	1,101.81	300.92	783	654.08	2.28	-0.13	0.00

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ANALYSIS SUMMARY

	Base Reactions						Max Usage	
Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)	Elev (ft)	Interaction Ratio
1.2D + 1.0W	59.47	0.00	72.27	0.00	0.00	6471.30	0.00	0.61
0.9D + 1.0W	59.45	0.00	54.18	0.00	0.00	6431.52	0.00	0.6
1.2D + 1.0Di + 1.0Wi	16.85	0.00	100.03	0.00	0.00	1834.45	0.00	0.18
1.2D + 1.0Ev + 1.0Eh	1.81	0.00	71.80	0.00	0.00	215.89	0.00	0.03
0.9D - 1.0Ev + 1.0Eh	1.81	0.00	50.59	0.00	0.00	214.29	0.00	0.03
1.0D + 1.0W	14.74	0.00	60.28	0.00	0.00	1598.20	0.00	0.16

ANALYSIS SUMMARY – OVERSTRENGTH LOAD CASES

	Base 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 + 1.0Ev + 1.5Eh	2.71	0.00	71.80	0.00	0.00	323.84
0.9D - 1.0Ev + 1.5Eh	2.71	0.00	50.59	0.00	0.00	321.43

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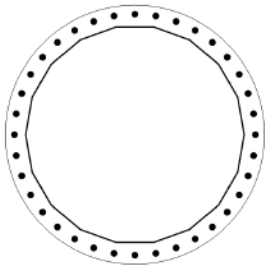
BASE PLATE ANALYSIS @ 0 FT

APPLIED REACTIONS

Moment (k-ft)	Axial (k)	Shear (k)
6471.3	72.27	59.47

PLATE PARAMETERS (ID# 18082)

Width:	85	in
Shape:	Round	
Thickness:	3	in
Grade:	A572-50	
Yield Strength:	50	ksi
Tensile Strength:	65	ksi
Rod Detail Type:	d	
Clear Distance	3	in
Base Weld Size:	0.125	in
Orientation Offset:	-	°
Analysis Type:	Plastic	
Neutral Axis:	0	°



ANCHOR ROD PARAMETERS

Class	Arrangement	Quantity	Diameter (in)	Circle (in)	Grade	F_y (ksi)	F_u (ksi)	Spacing (in)	Offset (°)
Original [ID#18535]	Radial	36	2.25	79	A615-75	75	100	-	-

COMPONENT PROPERTIES

Component	ID	Gross Area (in^2)	Net Area (in^2)	Individual Inertia (in^4)	Moment of Inertia (in^4)	Threads/in
Pole	71"ø x 0.5" (18 Sides)	110.1798	-	-	68461.84	-
Bolt Group	Original (36) 2.25"ø	3.9761	3.2477	0.8393	85279.25	4.5

REACTION DISTRIBUTION

Component	ID	Moment M_u (k-ft)	Axial Load P_u (k)	Shear V_u (k)	Moment Factor
Pole	71"ø x 0.5" (18 Sides)	6471.3	72.27	59.47	1.000
Bolt Group	Original (36) 2.25"ø	6471.3	-	59.47	1.000

BASE PLATE BEND LINE ANALYSIS @ 0 FT

POLE PROPERTIES

Flat-to-Flat Diameter:	71.12	in	Flat Width:	12.541	in
Point-to-Point Diameter:	72.22	in	Flat Radians:	0.349	rad
Orientation Offset:	-	°			

PLATE PROPERTIES

Neutral Axis:	0	°
Bend Line Limits:	1.160 to 1.981	rad

Bend Line	Chord Length (in)	Additional Length (in)	Section Modulus (in^3)	Applied Moment M_u (k-in)	Moment Capacity ΦM_n (k-in)	Flexure Result $M_u/\Phi M_n$
Flats	41.585	0.00	93.567	834.4	4210.5	19.8% ✓
Corners	39.649	0.00	89.211	577.5	4014.5	14.4% ✓
Circumferential	45.601	0.00	102.602	1157.9	4617.1	25.1% ✓

PLASTIC ANCHOR ROD ANALYSIS

Class	Group Quantity	Rod Diameter (in)	Applied Axial Load P_u (k)	Applied Shear Load V_u (k)	Compressive Capacity ΦP_n (k)	Interaction Result
Original	36	2.25	84.5	2.6	243.6	34.7% ✓

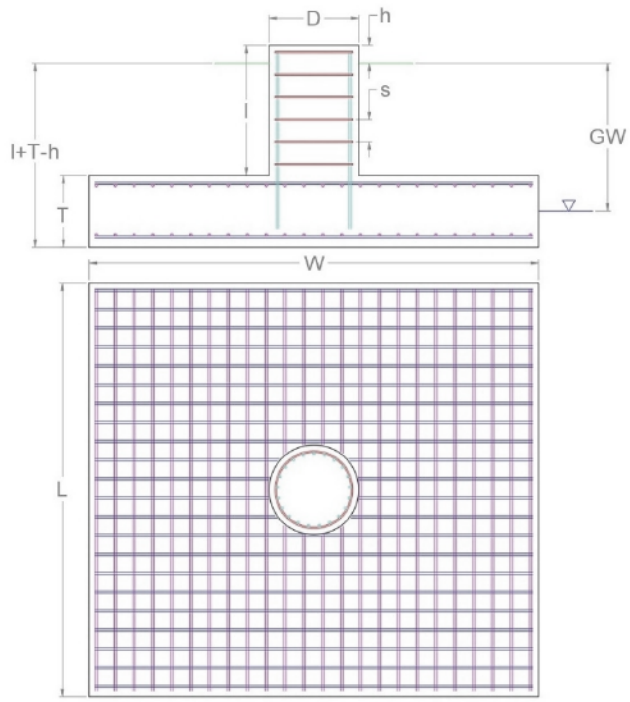
MONOLITHIC MAT & PIER FOUNDATION ANALYSIS

APPLIED GLOBAL REACTIONS

Moment (k-ft)	Axial (k)	Shear (k)
6,471.30	72.27	59.47

FOUNDATION PARAMETERS

Mat Length:	L	34	ft
Mat Width:	W	34	ft
Mat Thickness:	T	3	ft
Base Depth:	L+T-h	5	ft
Pier Shape:		Square	
Pier Width:	D	8.5	ft
Pier Height above Grade:	h	1	ft
Concrete Compressive Strength:		4,000	psi
Mat Top Rebar:		(35) #8 bars [60 ksi]	
Mat Bottom Rebar:		(68) #8 bars [60 ksi]	
Pier Vertical Rebar:		(66) #8 bars [60 ksi]	
Pier Rebar Ties:	s	#4 bars @ 6.0" c/c [60 ksi]	
Rebar Clear Cover:		3.0	in
Tower Eccentricity:	ecc	0	ft
Tower Leg Count		1	



SOIL PARAMETERS

Water Table Depth [BGL]:	GW	3	ft
Soil Unit Weight:		125	pcf
Ultimate Skin Friction:		0	psf
Ultimate Bearing Pressure:		16,000	psf
Bearing Pressure Type:		Net	
Coefficient of Shear Friction:		0.5	

SOIL STRENGTH ANALYSIS

Soil Strength Reduction Factor, Φ_s	Uplift Strength Reduction Factor, Φ_s	Asset Dead Load Factor	Dead Load Factor
0.75	0.75	0.9	1.2

SOIL OVERTURNING ANALYSIS

Design Moment, $M_{u,Design}$ (k-ft)	Nominal Overturning Capacity, $\Phi_m M_n$ (k-ft)	Soil Overturning Usage, $M_{u,Design} / \Phi_m M_n$	
6,828.12	11,729.92	**58.2%**	✓

SOIL BEARING ANALYSIS

Net Bearing Pressure, $P_{u,Net}$ (psf)	Nominal Bearing Capacity, $\Phi_b P_n$ (psf)	Bearing Pressure Controlling Load Direction	Soil Bearing Usage, $P_{u,net} / \Phi_b P_n$	
1,472.00	12,469.00	Diagonal to Pad Edge	**11.8%**	✓

SOIL SLIDING SHEAR ANALYSIS

Applied Shear Force, V_u (k)	Friction Resistance (k)	Passive Pressure (psf)	Passive Pressure Resistance (k)	Nominal Shear Capacity, $\Phi_s V_n$ (k)	Soil Sliding Shear Usage, $V_u / \Phi_s V_n$	
59.47	369.80	406.3	41.44	308.43	**19.0%**	✓

MAT REINFORCING STEEL STRENGTH ANALYSIS

Steel Elastic Modulus, E (ksi)	Strength Bending/Tension Reduction Factor, Φ_b	Strength Shear Reduction Factor, Φ_v	Strength Compression Reduction Factor, Φ_c
29,000	0.9	0.75	0.65

MAT REINFORCING ONE WAY SHEAR ANALYSIS

One Way Design Shear, V_u (k)	Nominal One Way Shear Capacity, $\Phi_c V_n$ (k)	One Way Shear Controlling Load Direction	Mat One Way Shear Usage, $V_u / \Phi_c V_n$
285.04	1,247.71	Diagonal to Pad Edge	**22.8%**

MAT REINFORCING PUNCHING SHEAR ANALYSIS

Punching Shear Design Stress, v_u (psi)	Nominal Punching Shear Capacity, $\Phi_c v_n$ (psi)	Mat Punching Shear Usage, $v_u / \Phi_c v_n$
47.3	189.7	**24.9%**

MAT REINFORCING MOMENT TRANSFER ANALYSIS

Moment Transfer Effective Flexural Width, w_f (in)	Neutral Axis Depth (in)	Pier Moment at Joint, M_{ut} (k-in)	Nominal Moment Transfer Capacity, $\Phi M_{sc,f}$ (k-in)	Mat Moment Transfer Usage, $0.6\ M_{ut} / \Phi M_{sc,f}$
17.50	2.39	0.00	47,640.2	**0.0%**

MAT REINFORCING FLEXURE ANALYSIS – UPPER STEEL

Factored Moment, M_u (k-ft)	Nominal Flexural Capacity, ΦM_n (k-ft)	Flexural Steel Controlling Load Direction	Mat Upper Rebar Flexure Usage, $M_u / \Phi M_n$
1,589.60	3,918.36	Parallel to Pad Edge	**40.6%**

MAT REINFORCING FLEXURE ANALYSIS – LOWER STEEL

Factored Moment, M_u (k-ft)	Nominal Flexural Capacity, ΦM_n (k-ft)	Flexural Steel Controlling Load Direction	Mat Lower Rebar Flexure Usage, $M_u / \Phi M_n$
3,352.40	7,496.96	Parallel to Pad Edge	**44.7%**

PIER REINFORCING STEEL STRENGTH ANALYSIS

Rebar Cage Diameter (in)	Steel Elastic Modulus, E (ksi)	Strength Bending/Tension Reduction Factor, Φ_b	Strength Shear Reduction Factor, Φ_v	Strength Compression Reduction Factor, Φ_c
94.00	29,000	0.9	0.75	0.65

PIER REINFORCING MOMENT ANALYSIS

Design Moment, M_u (k-ft)	Nominal Moment Capacity, $\Phi_b M_n$ (k-ft)	Bending Reinforcement Ratio	Pier Rebar Flexure Usage, $M_u/\Phi_b M_n$
6,649.71	10,782.61	0.005	**61.7%**

PIER REINFORCING COMPRESSION ANALYSIS

Design Compression, P_u (k)	Nominal Compressive Capacity, $\Phi_p P_n$ (k)	Pier Rebar Compressive Usage, $P_u / \Phi_p P_n$
72.27	18,326.74	**0.4%**

PIER REINFORCING SHEAR ANALYSIS

Design Shear, V_u (k)	Nominal Shear Capacity, $\Phi_v V_n$ (k)	Pier Rebar Shear Usage, $V_u / \Phi_v V_n$
59.47	1,235.24	**4.8%**

Exhibit E

Power Density Study

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Non-Ionizing Radiation (NIER) Study

Site Number:

413849

Site Name:

Winchester PCS CT

Location:

Winsted, Connecticut

Tenants:

T-Mobile, AT&T Mobility & Verizon Wireless

Prepared For:

American Tower, Inc.
Woburn, Massachusetts

April 8th, 2025

199882 P-266442

Prepared By:

Gautam J. Sopal, EIT.

Tower Engineering Professionals

Approved By:

TEP Engineering, PLLC MCO.0904636

STATE OF CONNECTICUT
SCOTT C. BRANTLEY
35536
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PROFESSIONAL ENGINEER

04/08/25

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RALIEGH, NORTH CAROLINA

RF DESIGN & SERVICES

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Non-Ionizing Electromagnetic Radiation (NIER) Study

413849 Winchester PCS CT
Winsted, Connecticut

INTRODUCTION

Tower Engineering Professionals RF Design & Services Division (TEP-RF) of Raleigh, North Carolina, has been retained by American Tower, Inc. (ATC), of Woburn, Massachusetts to evaluate the RF emissions compared to the Maximum Permissible Exposure (MPE) limit for facilities at this location. This evaluation uses compliance standards as outlined in Federal Communications Commission (FCC) document OET-65.

SITE AND FACILITY CONSIDERATIONS

Site 413849 Winchester PCS CT is located at 32 Norfolk Rd. in Winsted, Connecticut at coordinates 41.940252, -73.095876. The support structure is a 151' stealth monopine. An aerial view of the monopine can be found in Appendix 1, Site Photos. The tenants are T-Mobile (TMO), AT&T Mobility (AT&T) & Verizon Wireless (VZW). A table listing all antennae and effective radiated power (ERP) levels that were used in this study may be found in Appendix 2, Antenna Inventory.

POWER DENSITY CALCULATIONS

Power densities were calculated based on FCC MPE limits for both General Population/Uncontrolled and Occupational/Controlled environments.

For the purpose of this study, a radius of 100' from the base of the monopine with a height of 6' above ground level was used, beyond 100' the MPE levels become *di minimus*. This study utilized FCC recognized and accepted software programs using the maximum ERP levels for the antenna models provided by ATC. Diagrams depicting the predicted spatial average power density level at any specific location may be found in Appendix 3, MPE Limit Study. Descriptions of RF signage can be found in Appendix 4, Barrier & Sign Types. A discussion regarding the FCC limits may be found in Appendix 5, Information Pertaining to MPE Studies. Prediction Models used in this study may be found in Appendix 6, MPE Standards Methodology.

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All data used in this study was collected from one or more of the following sources:

- ATC furnished data and does not include other unidentified communication facilities.
- Load List at 413849 Winchester PCS CT RF NIER Study 04/04/2025.
- FCC databases.
- Carrier standard configurations.
- Empirical data collected by TEP.

SITE MITIGATION & CONTROL

In order to comply with FCC, tenant, & ATC requirements, TEP recommends the placement of signage at the following points:

Site Entrance

1. Site ID Sign (tower owner defined)
2. RF Information Sign (Green)

Tower Access Point

1. RF Exposure Sign (Red)

Alpha Sector
No additional mitigation is required.

Beta Sector
No additional mitigation is required.

Gamma Sector
No additional mitigation is required

COMPLIANCE DETERMINATION

With the above mitigation implemented, this installation ***WILL BE*** in compliance with current FCC MPE limits as described in FCC OET-65.

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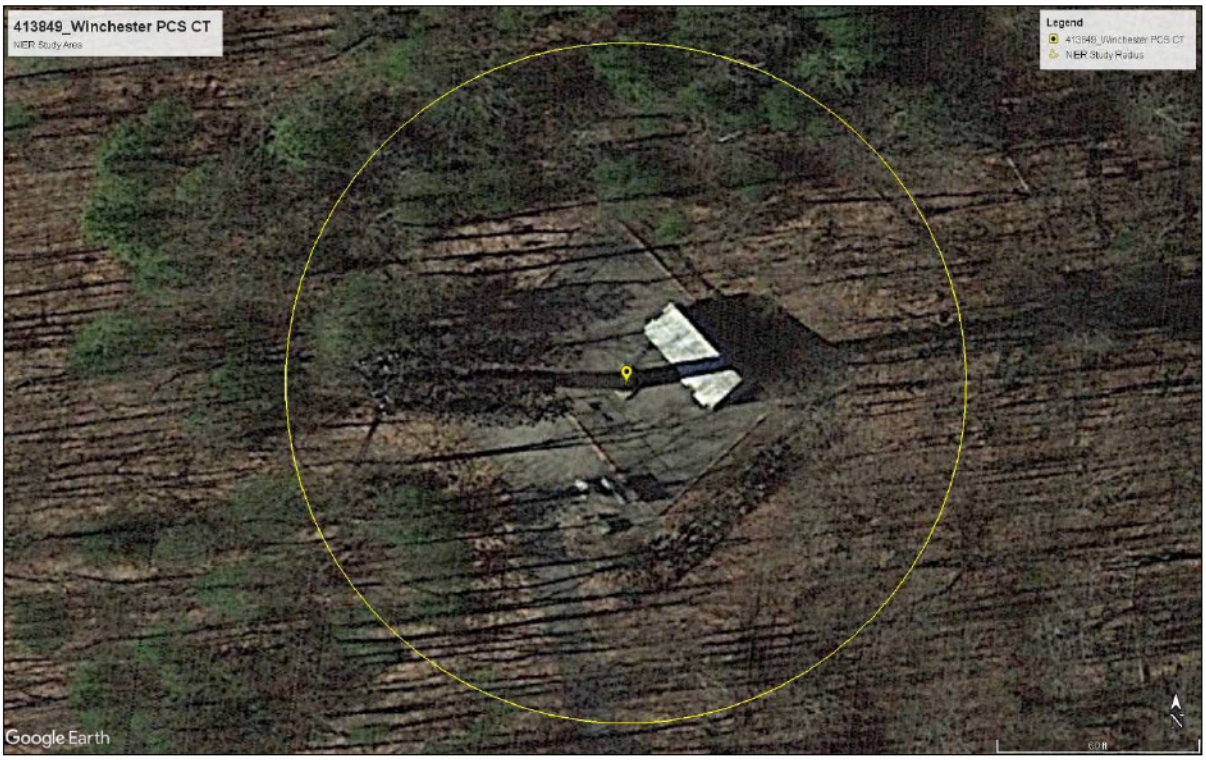
Appendix 1 Site Photos



Aerial View of the Site

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Appendix 2.1 Antenna Inventory

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Antenna Inventory								
Antenna #	Carrier	Antenna Manufacturer	Antenna Model	Azmiuth (°)	TX Frequencies (MHz)	RX Frequencies (MHz)	Effective Radiated Power (W)	Radiation Center (ft)
1	VZW	Samsung	MT6413-77A	000	3700-3980	3700-3980	95294	148
2	VZW	Samsung	MT6413-77A	130	3700-3980	3700-3980	95294	148
3	VZW	Samsung	MT6413-77A	270	3700-3980	3700-3980	95294	148
4	VZW	Commscope	NHH-65B-HG-R2B	000	746-757	776-787	6639	148
					824-835	869-880	6952	
					835-845	880-890	6952	
					845-846	890-891	6952	
					1720-1740	1970-1980	11039	
					1755-1760	2120-2140	11039	
					1890-1900	2155-2160	11559	
5	VZW	Commscope	NHH-65B-HG-R2B	130	746-757	776-787	6639	148
					824-835	869-880	6952	
					835-845	880-890	6952	
					845-846	890-891	6952	
					1720-1740	1970-1980	11039	
					1755-1760	2120-2140	11039	
					1890-1900	2155-2160	11559	
6	VZW	Commscope	NHH-65B-HG-R2B	270	746-757	776-787	6639	148
					824-835	869-880	6952	
					835-845	880-890	6952	
					845-846	890-891	6952	
					1720-1740	1970-1980	11039	
					1755-1760	2120-2140	11039	
					1890-1900	2155-2160	11559	
7	VZW	Commscope	NHH-65B-HG-R2B	000	746-757	776-787	6639	148
					824-835	869-880	6952	
					835-845	880-890	6952	
					845-846	890-891	6952	
					1720-1740	1970-1980	11039	
					1755-1760	2120-2140	11039	
					1890-1900	2155-2160	11559	

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Appendix 2.2 Antenna Inventory

413849 Winchester PCS CT								
Antenna Inventory								
Antenna #	Carrier	Antenna Manufacturer	Antenna Model	Azmiuth (°)	TX Frequencies (MHz)	RX Frequencies (MHz)	Effective Radiated Power (W)	Radiation Center (ft)
8	VZW	Commscope	NHH-65B-HG-R2B	130	746-757	776-787	6639	148
					824-835	869-880	6952	
					835-845	880-890	6952	
					845-846	890-891	6952	
					1720-1740	1970-1980	11039	
					1755-1760	2120-2140	11039	
					1890-1900	2155-2160	11559	
9	VZW	Commscope	NHH-65B-HG-R2B	270	746-757	776-787	6639	148
					824-835	869-880	6952	
					835-845	880-890	6952	
					845-846	890-891	6952	
					1720-1740	1970-1980	11039	
					1755-1760	2120-2140	11039	
					1890-1900	2155-2160	11559	
10	AT&T	CCI	DMP65R-BU8D	000	704-710	722-728	9862	137
					710-716	734-740	9862	
					716-722	740-746	9862	
					824-835	845-846	12133	
					835-845	846-849	12133	
					869-880	890-891	12133	
					880-890	891-894	12133	
					1710-1720	1710-1720	11018	
					1730-1735	2135-2140	11018	
11	AT&T	CCI	DMP65R-BU8D	150	704-710	722-728	9862	137
					710-716	734-740	9862	
					716-722	740-746	9862	
					824-835	845-846	12133	
					835-845	846-849	12133	
					869-880	890-891	12133	
					880-890	891-894	12133	
					1710-1720	1710-1720	11018	
					1730-1735	2135-2140	11018	

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Appendix 2.3 Antenna Inventory

413849 Winchester PCS CT								
Antenna Inventory								
Antenna #	Carrier	Antenna Manufacturer	Antenna Model	Azmiuth (°)	TX Frequencies (MHz)	RX Frequencies (MHz)	Effective Radiated Power (W)	Radiation Center (ft)
12	AT&T	CCI	DMP65R-BU8D	250	704-710	722-728	9862	137
					710-716	734-740	9862	
					716-722	740-746	9862	
					824-835	845-846	12133	
					835-845	846-849	12133	
					869-880	890-891	12133	
					880-890	891-894	12133	
					1710-1720	1710-1720	11018	
					1730-1735	2135-2140	11018	
13	AT&T	CCI	TPA65R-BU8D	000	704-710	722-728	11065	137
					710-716	734-740	11065	
					716-722	740-746	11065	
					824-835	845-846	13930	
					835-845	846-849	13930	
					869-880	890-891	13930	
					880-890	891-894	13930	
					1710-1720	1710-1720	11537	
					1730-1735	2135-2140	11537	
14	AT&T	CCI	TPA65R-BU8D	150	704-710	722-728	11065	137
					710-716	734-740	11065	
					716-722	740-746	11065	
					824-835	845-846	13930	
					835-845	846-849	13930	
					869-880	890-891	13930	
					880-890	891-894	13930	
					1710-1720	1710-1720	11537	
					1730-1735	2135-2140	11537	
15	AT&T	CCI	TPA65R-BU8D	250	704-710	722-728	11065	137
					710-716	734-740	11065	
					716-722	740-746	11065	
					824-835	845-846	13930	
					835-845	846-849	13930	
					869-880	890-891	13930	
					880-890	891-894	13930	
					1710-1720	1710-1720	11537	
					1730-1735	2135-2140	11537	

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Appendix 2.4 Antenna Inventory

413849 Winchester PCS CT								
Antenna Inventory								
Antenna #	Carrier	Antenna Manufacturer	Antenna Model	Azmiuth (°)	TX Frequencies (MHz)	RX Frequencies (MHz)	Effective Radiated Power (W)	Radiation Center (ft)
16	TMO	Andrew	VHLP2-11W-2GR	030	10125-11700	10125-11700	20183	127
17	TMO	Ericsson	AIR 6419 B41	030	2496-2690	2496-2690	58904	127
18	TMO	Ericsson	AIR 6419 B41	140	2496-2690	2496-2690	58904	127
19	TMO	Ericsson	AIR 6419 B41	280	2496-2690	2496-2690	58904	127
20	TMO	RFS	APXVAALL24 43-U-NA20	030	622-642	668-688	18926	127
					698-704	728-734	16108	
					1930-1990	1710-1755	14194	
					2110-2155	1850-1910	12081	
21	TMO	RFS	APXVAALL24 43-U-NA20	140	622-642	668-688	18926	127
					698-704	728-734	16108	
					1930-1990	1710-1755	14194	
					2110-2155	1850-1910	12081	
22	TMO	RFS	APXVAALL24 43-U-NA20	280	622-642	668-688	18926	127
					698-704	728-734	16108	
					1930-1990	1710-1755	14194	
					2110-2155	1850-1910	12081	

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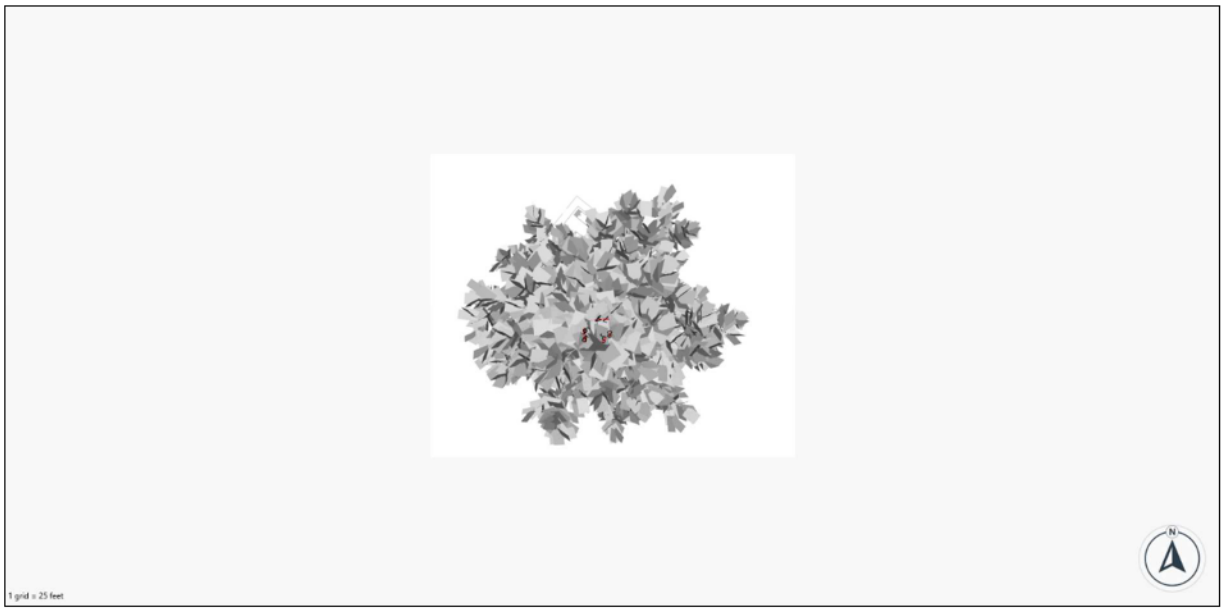
Appendix 3.1 MPE Limit Study General Population



Legend

Study Zone	Elev. (ft)	Type	Exposure Profile	Max MPE	Att	Carriers
Floor Study Zone	0.0	Floor	2D Sula 9 General...	2.32%	0.00	VZW, AT&T, TMO

5%-100%	100%-500%	500%-5000%	5000%+

Exposure Profile Name	Model	Exposure Area	Standard	Resolution	RCF
2D Sula 9 General Population - 0.25...	Sula 9	Spatial Avg. (6 ft)	FCC General Public	0.25	1.0

VZW AT&T TMO

Mitigation Existing Proposed Installed To Remove Max MPE

Grid Size: 25.00 feet

Floor = Elevation +6' | Mid-Level = Elevation +/- 3'

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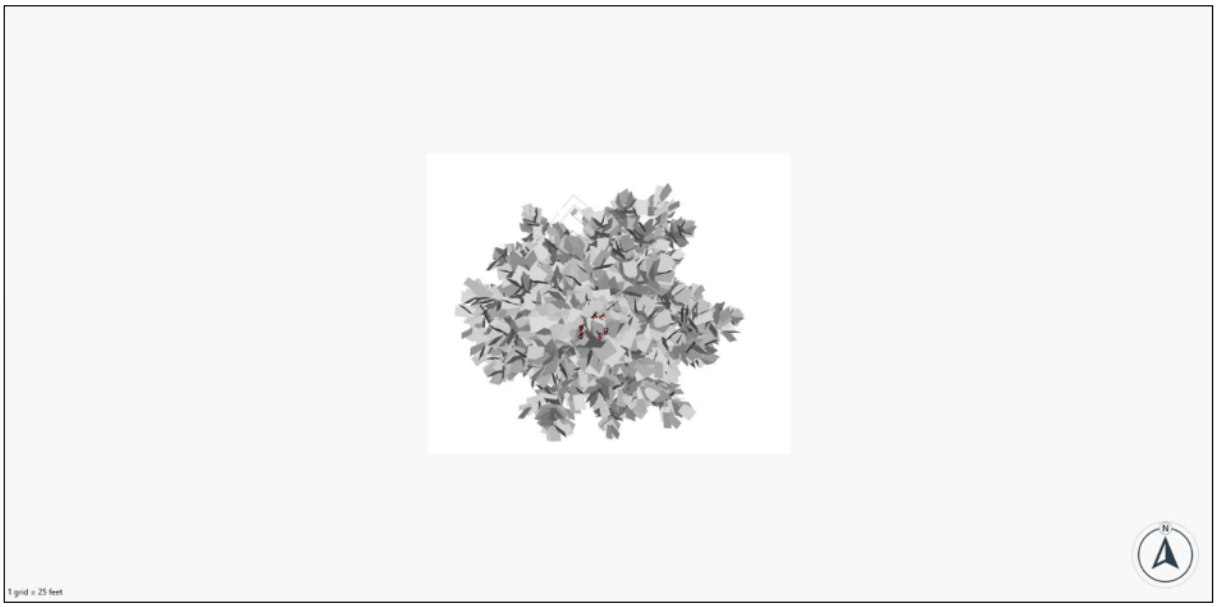
Appendix 3.2 MPE Limit Study Occupational Limit



Legend

Study Zone	Elev. (ft)	Type	Exposure Profile	Max MPE	Att	Carriers
Floor Study Zone	0.0	Floor	2D Sula 9 Occupational -...	0.46%	0.00	VZW, AT&T, TMO

5%-100%	100%-500%	500%-5000%	5000%+

Exposure Profile Name	Model	Exposure Area	Standard	Resolution	RCF
2D Sula 9 Occupational - 0.25 Res	Sula 9	Spatial Avg. (6 ft)	FCC Occupational	0.25	1.0

VZW AT&T TMO

Mitigation Existing Proposed Installed To Remove Max MPE

Grid Size: 25.00 feet

Floor = Elevation +6' | Mid-Level = Elevation +/- 3'

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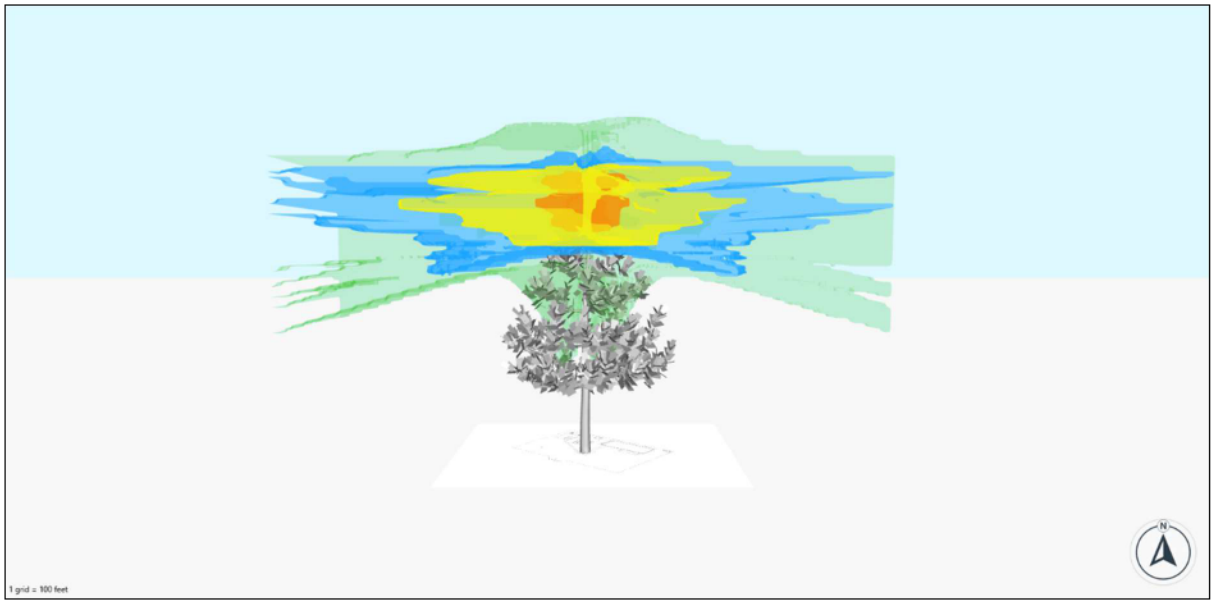
Appendix 3.3 MPE Limit Study General Population – Horizontal View



Legend

Study Zone	Elev. (ft)	Type	Exposure Profile	Max MPE	Att	Carriers
3D Study Zone	0.0 - 175.0	3D Area	3D Sula 9 General...	111858.41%	0.00	VZW, AT&T, TMO

5%-100%	100%-500%	500%-5000%	5000%+

Exposure Profile Name	Model	Exposure Area	Standard	Resolution	RCF
3D Sula 9 General Population - 2.5 Res	Sula 9	Spatial Avg. (6 ft)	FCC General Public	2.5	1.0

VZW AT&T TMO

Mitigation Existing Proposed Installed To Remove Max MPE

Grid Size: 100.00 feet

Floor = Elevation +6' | Mid-Level = Elevation +/- 3'

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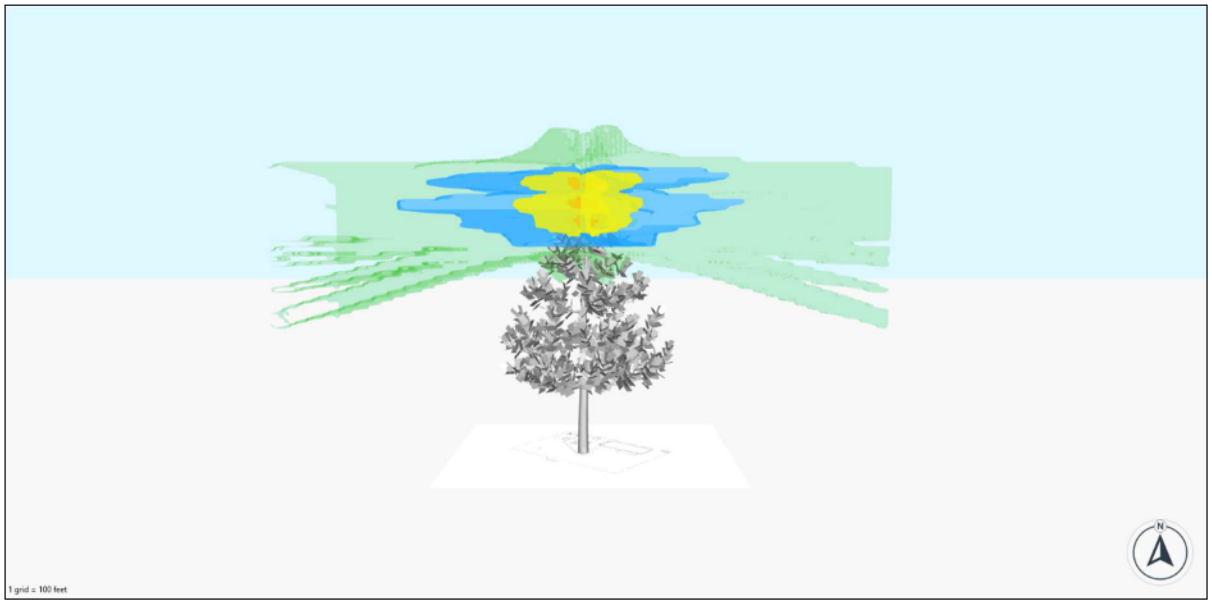
Appendix 3.4 MPE Limit Study Occupational Limit – Horizontal View



Legend

Study Zone	Elev. (ft)	Type	Exposure Profile	Max MPE	Att	Carriers
3D Study Zone	0.0 - 175.0	3D Area	3D Sula 9 Occupational -...	22371.68%	0.00	VZW, AT&T, TMO

5%-100%	100%-500%	500%-5000%	5000%+

Exposure Profile Name	Model	Exposure Area	Standard	Resolution	RCF
3D Sula 9 Occupational - 2.5 Res	Sula 9	Spatial Avg. (6 ft)	FCC Occupational	2.5	1.0

VZW AT&T TMO

Mitigation Existing Proposed Installed To Remove Max MPE

Grid Size: 100.00 feet

Floor = Elevation +6' | Mid-Level = Elevation +/- 3'

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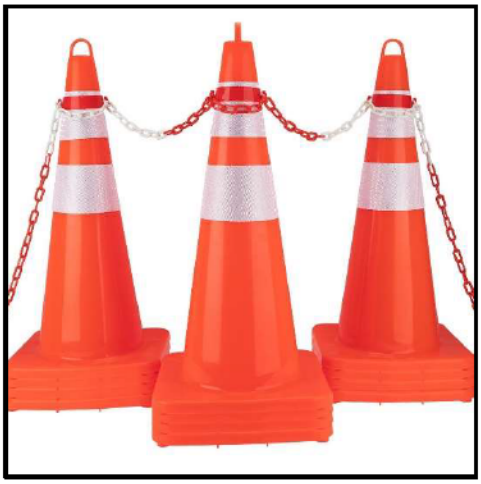
Appendix 4.1 Barrier & Sign Types

Stanchion Type



Cone Type

A-Frame Type

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Appendix 4.2 Barrier & Sign Types

RF Safety Exposure Categorization

Exposure Conditions	Control Measures	Signage
• Operational of the source(s) or locations where RF fields are too weak to cause exposures greater than General Public limit. Cat. | Occupational Worker | General Public 1 | <20% | <100% • Green zone is where the time and spatial-average is below 20% of Occupational Worker limit or <100% of General Public limit.	• RF Safety Guideline/NIER report must be submitted to RFSO for approval. • No special EME safety practices required in these areas. • No signage required except Information sign.	 *the antenna owner information and Antenna Structure Registration Number and must be displayed on the sign. INFORMATION sign for access to rooftop/access door.
• Operational of the source(s) or locations where RF exposure could cause exposure greater than General Public limit but not the Occupational Worker limit to be exceeded in accessible areas. Cat. | Occupational Worker | General 2 | ≥20% but <100% | >100% • Blue zone is where the spatial average is between 20%-100% of Occupational Worker limit. This limit MUST be less than the Occupational limit.	• RF Safety Guideline/NIER report must be submitted to RFSO for approval. • *Recommended* RF safety awareness training for all workers in this area. • Controlled areas with barriers and/or signage required in these area. • Do not walk in front of the antenna face or no loitering in this controlled area. • Individual MUST have full control over any area where the exposure levels exceed the limit.	 NOTICE signage shall be posted on the barriers/stanchion to prevent anyone from entering into the area (must be cordon off around the antennas - 4 posts /3 signs). Or must be posted in location that can be easily viewed by individuals that enter the areas of concerns.
• Operational of the source(s) or locations where RF exposure exceeded the Occupational Worker limit in accessible areas. Cat. | Occupational Worker | General Public 3 | ≥100% | ≥500% • Yellow zone is where the spatial average is above 100% of Occupational Worker limit.	• RF Safety Guideline/NIER report must be submitted to RFSO for approval. • Individual **shall not** enter and work in these areas without RS approval • Required RF safety training and access area is restricted only for authorized worker. • Controlled areas with barriers and signage required in these area. • Do not walk in front of the antenna face. • Require reduction of RF power and approval from Radiation Safety prior any work on the antennas.	 CAUTION signage shall be posted on the barriers/stanchion to prevent anyone from entering into the area (must be cordon off around the antennas - 4 posts /3 signs).
• Exposure will exceed exposure limit in accessible areas. Cat. | Occupational Worker | General Public 4 | >500% | >1000% • Red zone is where the time and spatial-averaged levels fall above 500% of Occupational Worker limit or is not feasible to prevent exposures.	• RF Safety Guideline/NIER report must be submitted to RFSO for approval. • MUST re-engineer site to reduce the EME fields. • **No access allowed-Prohibited access!** There must be controls to detect any unauthorized enter and terminate the RF energy in the area. • Lock out tag out of transmitters during the maintenance of the antenna system. • PPE is not sufficient. • Special RF training and PPE are required. (Applies only to individuals trained by RS).	 RF WARNING & Pacemaker DANGER signage or appropriate DANGER sign shall be posted very near radiation RF sources or if appropriate DANGER sign.

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Appendix 5 Information Pertaining to MPE Studies

In 1985, the FCC first adopted guidelines to be used for evaluating human exposure to RF emissions. The FCC revised and updated these guidelines on August 1, 1996, as a result of a rule-making proceeding initiated in 1993. The new guidelines incorporate limits for Maximum Permissible Exposure (MPE) in terms of electric and magnetic field strength and power density for transmitters operating at frequencies between 300 kHz and 100 GHz.

The FCC's MPE limits are based on exposure limits recommended by the National Council on Radiation Protection and Measurements (NCRP), and, over a wide range of frequencies, the exposure limits were developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI) to replace the 1982 ANSI guidelines. Limits for localized absorption are based on recommendations of both ANSI/IEEE and NCRP.

The FCC's limits, and the NCRP and ANSI/IEEE limits on which they are based, are derived from exposure criteria quantified in terms of specific absorption rate (SAR). The basis for these limits is a whole-body averaged SAR threshold level of 4 watts per kilogram (4 W/kg), as averaged over the entire mass of the body, above which expert organizations have determined that potentially hazardous exposures may occur. The MPE limits are derived by incorporating safety factors that lead, in some cases, to limits that are more conservative than the limits originally adopted by the FCC in 1985. Where more conservative limits exist, they do not arise from a fundamental change in the RF safety criteria for whole-body averaged SAR, but from a precautionary desire to protect subgroups of the general population who, potentially, may be more at risk.

The FCC exposure limits are also based on data showing that the human body absorbs RF energy at some frequencies more efficiently than at others. The most restrictive limits occur in the frequency range of 30-300 MHz where whole-body absorption of RF energy by human beings is most efficient. At other frequencies, whole-body absorption is less efficient, and consequently, the MPE limits are less restrictive.

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MPE limits are defined in terms of power density (units of milliwatts per centimeter squared: mW/cm^2), electric field strength (units of volts per meter: V/m) and magnetic field strength (units of amperes per meter: A/m). The far-field of a transmitting antenna is where the electric field vector (E), the magnetic field vector (H), and the direction of propagation can be considered to be all mutually orthogonal ("plane-wave" conditions).

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

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment-related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area. Additional details can be found in FCC OET 65.

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Appendix 6 MPE Standards Methodology

This study predicts RF field strength and power density levels that emanate from communications system antennae. It considers all transmitter power levels (less filter and line losses) delivered to each active transmitting antenna at the communications site. Calculations are performed to determine power density and MPE levels for each antenna as well as composite levels from all antennas. The calculated levels are based on where a human (Observer) would be standing at various locations at the site. The point of interest where the MPE level is predicted is based on the height of the Observer.

Compliance with the FCC limits on RF emissions are determined by spatially averaging a person's exposure over the projected area of an adult human body, that is approximately six-feet or two-meters, as defined in the ANSI/IEEE C95.1 standard. The MPE limits are specified as time-averaged exposure limits. This means that exposure is averaged over an identifiable time interval. It is 30 minutes for the general population/uncontrolled RF environment and 6 minutes for the occupational/controlled RF environment. However, in the case of the general public, time averaging should not be applied because the general public is typically not aware of RF exposure, and they do not have control of their exposure time. Therefore, it should be assumed that any RF exposure to the general public will be continuous.

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The FCC's limits for exposure at different frequencies are shown in the following Tables.

Limits for Occupational/Controlled Exposure				
Frequency Range (MHz)	**Electric Field Strength (E) (V/m)**	**Magnetic Field Strength (H) (A/m)**	**Power Density (S) (mW/cm^2)**	**Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)**
0.3 - 3.0	614	1.63	100*	6
3.0 - 30	1842/f	4.89/f	$900/F^2$	6
30 - 300	61.4	0.163	1.0	6
300 - 1500	--	--	f/300	6
1500 - 100,000	--	--	5	6

f = frequency

* = Plane-wave equivalent power density

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Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (E) (V/m)**	**Magnetic Field Strength (H) (A/m)**	**Power Density (S) (mW/cm^2)**	**Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)**
0.3 - 1.34	614	1.63	100*	30
1.34 - 30	824/f	2.19/f	$180/F^2$	30
30 -300	27.5	0.073	0.2	30
300 -1500	--	--	f/1500	30
1500 -100,000	--	--	1.0	30

f = frequency

* = Plane-wave equivalent power density

General population/uncontrolled exposures apply in situations in which the general public may be exposed or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

It is important to understand that these limits apply cumulatively to all sources of RF emissions affecting a given area. For example, if several different communications system antennas occupy a shared facility such as a tower or rooftop, then the total exposure from all systems at the facility must be within compliance of the FCC guidelines.

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The field strength emanating from an antenna can be estimated based on the characteristics of an antenna radiating in free space. There are basically two field areas associated with a radiating antenna. When close to the antenna, the region is known as the Near Field. Within this region, the characteristics of the RF fields are very complex, and the wave front is extremely curved. As you move further from the antenna, the wave front has less curvature and becomes planar. The wave front still has a curvature, but it appears to occupy a flat plane in space (plane-wave radiation). This region is known as the Far Field.

Two models are utilized to predict Near and Far field power densities. They are based on the formulae in FCC OET 65.

Cylindrical Model (Near Field Predictions)

Spatially averaged plane-wave equivalent power densities parallel to the antenna may be estimated by dividing the antenna input power by the surface area of an imaginary cylinder surrounding the length of the radiating antenna. While the actual power density will vary along the height of the antenna, the average value along its length will closely follow the relation given by the following equation:

$$S = P \div 2\pi RL$$

Where:

S = Power Density

P = Total Power into antenna

R = Distance from the antenna

L = Antenna aperture length

For directional-type antennas, power densities can be estimated by dividing the input power by that portion of a cylindrical surface area corresponding to the angular beam width of the antenna.

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For example, for the case of a 120-degree azimuthal beam width, the surface area should correspond to 1/3 that of a full cylinder. This would increase the power density near the antenna by a factor of three over that for a purely omni-directional antenna. Mathematically, this can be represented by the following formula:

$$S = (180 / \theta_{BW}) P \div \pi R L$$

Where:

S = Power Density

θ_{BW} = Beam width of antenna in degrees (3 dB half-power point)

P = Total Power into antenna

R = Distance from the antenna

L = Antenna aperture length

If the antenna is a 360-degree omni-directional antenna, this formula would be equivalent to the previous formula.

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Spherical Model (Far Field Predictions)

Spatially averaged plane-wave power densities in the Far Field of an antenna may be estimated by considering the additional factors of antenna gain and reflective waves that would contribute to exposure.

The radiation pattern of an antenna has developed in the Far Field region and the power gain needs to be considered in exposure predictions. Also, if the vertical radiation pattern of the antenna is considered, the exposure predictions would most likely be reduced significantly at ground level, resulting in a more realistic estimate of the actual exposure levels.

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

These additional factors are considered, and the Far Field prediction model is determined by the following equation:

$$S = EIRP \times Rc \div 4\pi R^2$$

Where:

S = Power Density

EIRP = Effective Radiated Power from antenna

Rc = Reflection Coefficient (2.56)

R = Distance from the antenna

The EIRP includes the antenna gain. If the antenna pattern is considered, the antenna gain is relative based on the horizontal and vertical pattern gain values at that particular location in space, on a rooftop or on the ground. However, it is recommended that the antenna radiation pattern characteristics not be considered to provide a conservative "worst case" prediction. This is the equation is utilized for the Far Field exposure predictions herein.

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