Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

June 29, 2020

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

RE: **Notice of Exempt Modification for AT&T - 845455**
85 Quaker Farms Road, Oxford, CT 06478
Latitude: 41° 23′ 2.36″ / Longitude: -73° 8′ 14.54″

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 149-foot mount on the existing 149-foot Monopole Tower, located at 85 Quaker Farms Road, Oxford, CT. The tower is owned by Crown Castle and the property is owned by William & Elaine Schiavi. AT&T now intends to remove and replace six (6) existing antennas with six (6) new antennas. The new antennas will be installed at the 149-ft level of the tower.

The facility was approved by the Connecticut Siting Council in Docket No. 261 on December 22, 2003. The approval was given with conditions which this proposed exempt modification is following.

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 George R. Temple, First Selectman for the Town of Oxford, Steven S. Macary, Zoning Enforcement Official, the property owners and Crown Castle is the tower owner.

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

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

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

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, AT&T respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Anne Marie Zsamba.

Sincerely,

Anne Marie Zsamba
Network Real Estate Specialist
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
(201) 236-9224
AnneMarie.Zsamba@crowncastle.com

Attachments
cc:

The Honorable George Temple, First Selectman
Oxford Town Hall
486 Oxford Road
Oxford, CT 06478

Steven S. Macary, Zoning Enforcement Official (*via email only to zoningenforce@oxford-ct.gov*)
Oxford Town Hall
486 Oxford Road
Oxford, CT 06478

William & Elaine Schiavi, Property Owners (*via email only to jwsct@yahoo.com)*
85 Quaker Farms Road
Oxford, CT 06478

Crown Castle, Tower Owner

From:	Zsamba, Anne Marie
To:	zoningenforce@oxford-ct.gov
Subject:	Notice of Exempt Modification - 85 Quaker Farms Rd, Town of Oxford - AT&T - 845455
Date:	Monday, June 29, 2020 4:53:00 PM
Attachments:	EM-AT&T-845455-85 QUAKER FARMS RD OXFORD_notice.pdf

Dear ZEO Macary:

Attached please find AT&T's exempt modification application that is being submitted to the Connecticut Siting Council, today June 29, 2020.

In light of the present circumstances with Covid-19, The Council has advised that electronic notification of this filing is acceptable. If you could kindly confirm receipt. Thank you.

Best,
Anne Marie Zsamba

ANNE MARIE ZSAMBA
Site Acquisition Specialist
T: (201) 236-9224
M: (518) 350-3639
F: (724) 416-6112

CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

From:	Zsamba, Anne Marie
To:	jwsct@yahoo.com
Subject:	Notice of Exempt Modification - 85 Quaker Farms Rd, Town of Oxford - AT&T - 845455
Date:	Monday, June 29, 2020 4:53:00 PM
Attachments:	EM-AT&T-845455-85 QUAKER FARMS RD OXFORD_notice.pdf

Dear Mr. & Mrs. Schiavi:

Attached please find AT&T's exempt modification application that is being submitted to the Connecticut Siting Council, today June 29, 2020.

In light of the present circumstances with Covid-19, The Council has advised that electronic notification of this filing is acceptable. If you could kindly confirm receipt. Thank you.

Best,
Anne Marie Zsamba

ANNE MARIE ZSAMBA
Site Acquisition Specialist
T: (201) 236-9224
M: (518) 350-3639
F: (724) 416-6112

CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

ORIGIN ID:ONHA (585) 445-5896
RICHARD ZAJAC
CROWN CASTLE
629 KAYLEIGH DR

WEBSTER, NY 14580
UNITED STATES US

SHIP DATE: 29JUN20
ACTWGT: 1.00 LB
CAD: 104924194/INET4220

BILL SENDER

TO **GEORGE TEMPLE, FIRST SELECTMAN**
OXFORD TOWN HALL
486 OXFORD ROAD
OXFORD CT 06478
(201) 236-9224 REF: 1734.7680
INV:
PO: DEPT:

56BJ2/17B7/FE4A

FedEx Express

J201120042401uv

TRK# 0201 **7708 2958 5385**

TUE - 30 JUN 10:30A
PRIORITY OVERNIGHT

XE HFDA

06478
CT-US **BDL**

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.

Exhibit A

Original Facility Approval

PLANNING & ZONING COMMISSION
TOWN OF OXFORD
486 Oxford Road
Oxford, CT 06478
(203) 888-2543

Z#:	Z-05-116
Date Rec'd:	4-28-05
Date on Agenda:	
65-Day Expiration:	

ZONING PERMIT APPLICATION

(This permit is hereby applied for in accordance with the requirements of the Oxford Zoning Regulations)

Property Identification

Street Address: 85 QUAKER FARMS RD
Subdivision Name: _____ Date Approved: _____
Map: 23 Block: 7 Lot: 8 Zoning district: R-A

Owner/Applicant

Owner Name: SCHIAVI
Owner Address: 85 QUAKER FARMS RD
Owner Telephone: _____

Applicant Name: NEW CINGULAR WIRELESS PCS, LLC
Applicant Address: 500 ENTERPRISE DR., ROCKY HILL CT 06067
Applicant Telephone: 860-513-7636

Miscellaneous Information

* CT SITING COUNCIL CERTIFICATE

Special Exception: Article _____ Section _____ Yes (No) *
Site Plan Approval: Article _____ Section _____ Yes (No)
Estimated Cost of Construction: $150,000-
Variance Granted: _____ Date Granted: _____

Signatures/Authorization

Application for Zoning Permit approval as described herein is hereby made. The Oxford Planning & Zoning Commission and its technical staff are authorized to enter the property for the purpose of evaluating this application.

Permit Void If: a) Work or activity not commenced within 1 year of the date of issuance or b) Authorized construction not completed within 2 years of the date of issuance.

This permit, if issued, is based upon the plot plan submitted. Falsification, by misrepresentation or omission, or failure to comply with the conditions of approval of this permit constitute a violation of the Oxford Zoning Regulations.

[signature] for Cingular Wireless 4-28-05
Property Owner or Agent (Date)

Purpose
- ___ New Home
- ___ Addition
- ___ Garage
- ___ Cottage Business
- ___ Swimming Pool IG AG
- ___ Sign
- ___ Shed
- ___ Barn
- ___ Change of Use
- ___ Excavating/Filling
- ___ Trailer
- ✓ Other CELL SITE

Use
- ___ Single-Family Residence
- ___ Multi-Family Residence
- ✓ Commercial
- ___ Industrial
- ___ Residential/POD
- ✓ Other CELL SITE

Required Approvals and Dates
- ✓ Inland Wetlands _____
- ___ P.D.D.H. _____
- ___ Fire Marshal _____
- ___ Z.B.A. _____
- ___ W.P.C.A. _____
- ___ Floodplain _____
- ___ Copy of Deed _____
- ✓ Driveway Existing
- ___ Erosion Control Plan
- ✓ Plot Plan * 4-26-05
- ___ Other _____

100.00 Town Fee
30.00 State Fee
130.00 Total Fee

*Draw plot plan of proposed construction and attach. Plan must show property boundaries and dimensions; location of proposed buildings on property with respect to boundaries; location of existing buildings on property; outside dimensions of all buildings proposed or now existing; location of water supply; location of sewage system. All copies must have a complete sketch. Construction and use must be exactly as described in this application. If later changes from this plan are desired prior approval of an amended application is necessary.

Denied (Approved) By: Doug Volk Date: 4-28-05
Title: ZEO
Reason for Denial _____

ZPA-1
(Adopted 5/15/97)

White - P&Z Files / Yellow - Building Department / Pink - Applicant

DOCKET NO. 261 - AT&T Wireless PCS, LLC d/b/a AT&T Wireless application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a wireless telecommunications facility at one of two sites at 85 Quaker Farms Road, Oxford, Connecticut.	}	Connecticut Siting Council December 22, 2003

Decision and Order

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a telecommunications facility including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate either alone or cumulatively with other effects when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the the application and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes § 16-50k, be issued to AT&T Wireless PCS d/b/a AT&T Wireless for the construction, maintenance and operation of a wireless telecommunications facility at Site B, located at 85 Quaker Farms Road, Oxford, Connecticut. The Council denies certification of Site A, also located at 85 Quaker Farms Road, Oxford, Connecticut.

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

1. The tower shall be constructed as a monopole, no taller than necessary to provide the proposed telecommunications services, sufficient to accommodate the antennas of AT&T and other entities, both public and private, but such tower shall not exceed a height of 153 feet above ground level, including appurtenances. Antennas installed on the monopole shall be flush mounted.

2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be submitted to and approved by the Council prior to the commencement of facility construction and shall include:
    a) color options for painting the tower, including the color option preferred by the Town of Oxford;
    b) a final site plan(s) of site development to include specifications for the tower, tower foundation, antennas, equipment building, access road, utility line, and landscaping; and
    c) construction plans for site clearing, water drainage, and erosion and sedimentation control consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.

3. The Certificate Holder shall, prior to the commencement of operation, provide the Council worst-case modeling of electromagnetic radio frequency power density of all proposed entities' antennas at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall ensure a recalculated report of electromagnetic radio frequency power density is submitted to the Council if and when circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order.

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

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

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

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

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

Pursuant to General Statutes § 16-50p, we hereby direct that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below, and notice of issuance shall be published in the Waterbury Republican-American.

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

The party to this proceeding is:

Applicant	**Its Representative**
AT&T Wireless PCS, LLC d/b/a AT&T Wireless (AT&T)	Christopher B. Fisher, Esq. Cuddy & Feder LLP 90 Maple Avenue White Plains, New York 10601

Exhibit B

Property Card

Town of Oxford
Property Listing Report

Parcel ID 23/57/8

Account J0181100

Property Information

Owner	SCHIAVI WILLIAM & ELAINE W
Address	85 QUAKER FARMS RD
Mailing Address	85 QUAKER FARMS RD OXFORD , CT 06478
Land Use	- Res Dwelling
Land Class	R

Census Tract	L 6
Neighborhood	090
Zoning	RESA
Acreage	12.5
Utilities	
Lot Setting/ Desc	/ Clear

Photo

PARCEL VALUATIONS (Assessed value = 70% of Appraised Value)

	Appraised	Assessed
Buildings	206200	144300
Outbuildings	41600	29200
Improvements	247800	173500
Extras	0	0
Land	388300	203000
Total	636100	376500
Previous		

Construction Details

Year Built	
Stories	2
Building Style	Colonial
Building Use	Residential
Building Condition	B-
Total Rooms	
Bedrooms	4 Bedrooms
Full Bathrooms	0
Half Bathrooms	
Bath Style	Average
Kitchen Style	Average
Roof Style	Gable
Roof Cover	Arch Shingles

EXTERIOR WALLS:	
Primary	Clapboard
Secondary	Wood Shingle
INTERIOR WALLS:	
Primary	Drywall
Secondary	
FLOORS:	
Primary	Hardwood
Secondary	Carpet
HEATING/AC:	
Heating Type	Hot Water
Heating Fuel	Oil
AC Type	None

BUILDING AREA:	
Effective Building Area	
Gross Building Area	
Total Living Area	

SALES HISTORY:	
Sale Date	4/1/1996
Sale Price	0
Book/ Page	187/ 390

Report Created On 6/29/2020

Town of Oxford
Property Listing Report

Parcel ID 23/57/8/CELL

Account 23578CELL

Property Information

Owner	AT&T
Address	85 QUAKER FARMS RD
Mailing Address	575 MOROSGO DR ATLANTA , GA 30324
Land Use	- Cell Tower
Land Class	I

Census Tract	
Neighborhood	090
Zoning	
Acreage	0
Utilities	
Lot Setting/ Desc	/

Photo

PARCEL VALUATIONS (Assessed value = 70% of Appraised Value)

	Appraised	Assessed
Buildings	0	0
Outbuildings	655600	458900
Improvements	655600	458900
Extras	0	0
Land	0	0
Total	655600	458900
Previous		

Construction Details

Year Built	
Stories	
Building Style	
Building Use	
Building Condition	
Total Rooms	
Bedrooms	
Full Bathrooms	0
Half Bathrooms	
Bath Style	
Kitchen Style	
Roof Style	
Roof Cover	

EXTERIOR WALLS:	
Primary	
Secondary	
INTERIOR WALLS:	
Primary	
Secondary	
FLOORS:	
Primary	
Secondary	
HEATING/AC:	
Heating Type	
Heating Fuel	
AC Type	

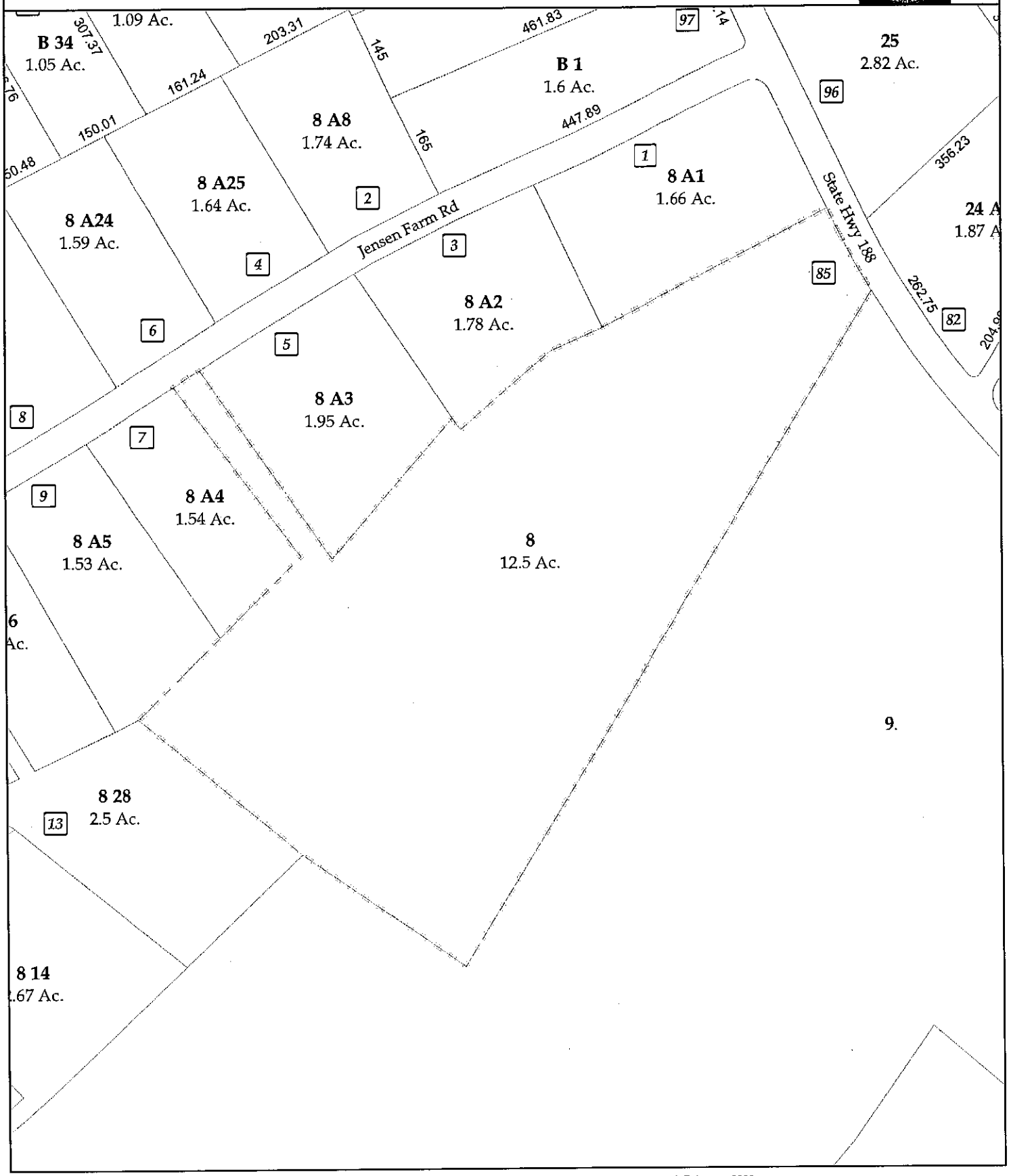
BUILDING AREA:	
Effective Building Area	
Gross Building Area	
Total Living Area	

SALES HISTORY:	
Sale Date	10/1/2010
Sale Price	0
Book/ Page	000/ 000

Report Created On 6/29/2020

Town of Oxford, Connecticut - Assessment Parcel Map

Parcel: 23-57-8 **Location: 85 QUAKER FARMS RD**



Approximate Scale: 1 inch = 200 feet

0 100 200 300 400 Feet

Map Produced: February 2020

Disclaimer: This map is for informational purposes only All Information is subject to verification by any user. The Town of Oxford and its mapping contractors assume no legal responsibility for the information contained herein.

Exhibit C

Construction Drawings

AT&T

AT&T SITE NUMBER: CTL02256
AT&T SITE NAME: OXFORD-QUAKER FARMS
AT&T FA CODE: 10087531
AT&T PACE NUMBER: MRCTB045093, MRCTB045019, MRCTB045076, MRCTB045080, MRCTB045132
SITE TYPE: MONOPOLE

BUSINESS UNIT #: 845455
SITE ADDRESS: 85 QUAKER FARMS ROAD OXFORD, CT 06478
COUNTY: NEW HAVEN
TOWER HEIGHT: 149'-0"

PROJECT: AT&T LTE 3C/4C/4TX4RX/5G NR 1DR-1

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	OXFORD-QUAKER FARMS
SITE ADDRESS:	85 QUAKER FARMS ROAD OXFORD, CT 06478
COUNTY:	NEW HAVEN
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41.3848889
LONGITUDE:	-73.1380989
LAT/LONG TYPE:	NAD83
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
TOWER OWNER:	CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	AT&T MOBILITY ONE AT&T WAY BEDMINSTER, NJ 07921
CROWN CASTLE USA INC. APPLICATION ID:	509315

PROJECT TEAM

A&E FIRM:	B+T GROUP 1717 SOUTH BOULDER, SUITE 300 TULSA, OK 74119 MIKE OAKES (918) 217-8574
CROWN CASTLE USA INC. DISTRICT CONTACTS:	3200 HORIZON SRIVE, SUITE 150 KING OF PRUSSIA, PA 19406

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1	SITE PLAN
C-2	EQUIPMENT PLAN
C-3	TOWER ELEVATIONS
C-4	ANTENNA ORIENTATION
C-5	ANTENNA SCHEDULE
C-6	ANTENNA AND RRH SPECS.
C-7	ANTENNA AND RRH DETAIL
C-8	PLUMBING DIAGRAM
C-9	COLOR CODE STANDARD
G-1	GROUNDING DETAILS
G-2	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11x17. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

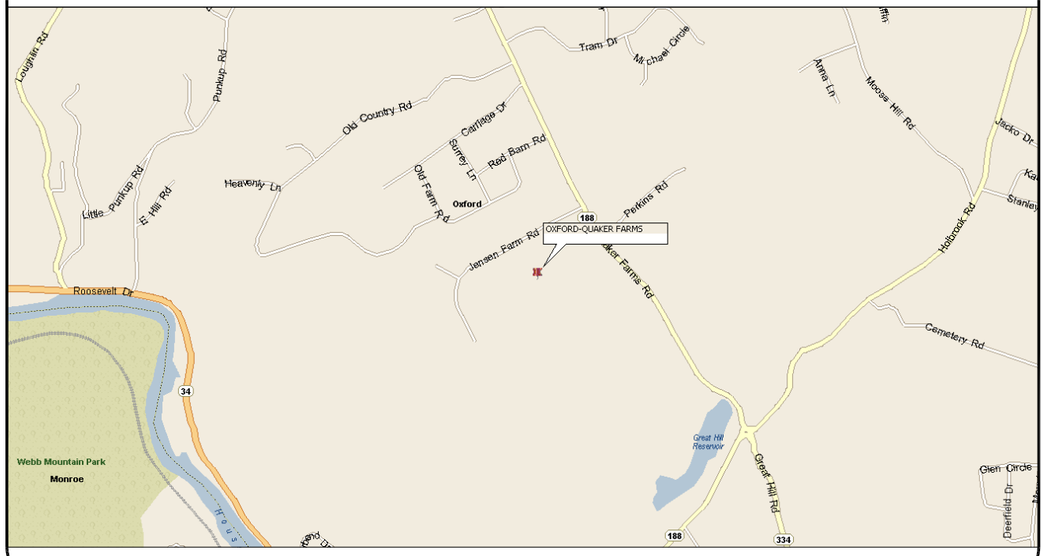
PROJECT DESCRIPTION

THE PURPOSE OF THIS PROJECT IS TO PROPOSE AN ANTENNA MODIFICATION ON AN EXISTING WIRELESS SITE.

TOWER SCOPE OF WORK
- REMOVE (1) KMW AM-X-CD-16-65-00T-RET ANTENNA
- REMOVE (3) POWERWAVE 7770 ANTENNAS
- REMOVE (2) ANDREW SBNH-1D6565C ANTENNAS
- REMOVE (3) ERICSSON RRUS-11 B12 ANTENNAS
- REMOVE (3) ERICSSON RRUS-12 B2 ANTENNAS
- INSTALL (1) CCI DMP65R-BU6DA ANTENNA
- INSTALL (1) ANDREW NNH4-65B-R6 ANTENNA
- INSTALL (2) CCI DMP65R-BU8DA ANTENNAS
- INSTALL (2) ANDREW NNH4-65C-R6 ANTENNAS
- INSTALL (3) ERICSSON 4415 B30 RRHS
- INSTALL (3) ERICSSON 4449 B5/B12 RRHS
- INSTALL (3) ERICSSON 8843 B2/B66A RRHS
- INSTALL (1) RAYCAP DC9-48-60-24-PC16-EV SURGE SUPPRESSOR
- INSTALL (1) ROSENBERGER LEONI FB-L98B-034-XXX FIBER TRUNK
- INSTALL (3) DC TRUNKS

GROUND SCOPE OF WORK
- REMOVE (1) DUS41
- INSTALL (2) 6630
- INSTALL (1) XMU03 + (1) IDLe

LOCATION MAP



NO SCALE

APPLICABLE CODES/REFERENCE DOCUMENTS

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

CODE TYPE	CODE
BUILDING	2018 CT SBC (2015 IBC)
MECHANICAL	2018 CT SBC (2015 IMC)
ELECTRICAL	2017 NEC

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:	CROWN CASTLE JUNE 2, 2020
MOUNT ANALYSIS:	B+T GROUP MAY 26, 2020

DESIGN PACKAGE BASED ON THE RFDS
REVISION: PRELIMINARY
DATE: 2/21/20

DESIGN PACKAGE BASED ON THE APPLICATION
ID: 509315
REVISION: 3

NOTE:
PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN NOC AT (800) 788-7011 & CROWN CONSTRUCTION MANAGER

CALL CONNECTICUT ONE CALL
(800) 922-4455
CALL 3 WORKING DAYS BEFORE YOU DIG!
811

AT&T
ONE AT&T WAY
BEDMINSTER, NJ 07921

CROWN CASTLE
3200 HORIZON DRIVE, SUITE 150
KING OF PRUSSIA, PA 19406

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

AT&T SITE NUMBER:
CTL02256

BU #: **845455**
OXFORD-QUAKER FARMS

85 QUAKER FARMS ROAD
OXFORD, CT 06478

EXISTING 149'-0"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/3/20	BLB	CONSTRUCTION	RMC
1	6/25/20	GEH	CONSTRUCTION	RMC

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
6/25/20

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: T-1
REVISION: 1

SITE WORK GENERAL NOTES:

1. THE SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
2. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE SUBCONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES, SUBCONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION.
3. ALL SITE WORK TO COMPLY WITH QAS-STD-10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE" AND LATEST VERSION OF TIA 1019 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
4. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS.
5. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
6. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, OWNER AND/OR LOCAL UTILITIES.
7. THE SUBCONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE.
8. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE BTS EQUIPMENT AND TOWER AREAS.
9. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
10. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
11. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE PROJECT SPECIFICATIONS.
12. SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
13. NOTICE TO PROCEED– NO WORK TO COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED AND THE ISSUANCE OF A PURCHASE ORDER.
14. 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 GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN STANDARD CED-STD-10253 INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH THE ANSI/TIA-322 (LATEST EDITION).

STRUCTURAL STEEL NOTES:

1. ALL STEEL WORK SHALL BE PAINTED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND IN ACCORDANCE WITH ASTM A36 UNLESS OTHERWISE NOTED.
2. BOLTED CONNECTIONS SHALL BE ASTM A325 BEARING TYPE (3/4"ø) CONNECTIONS AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
3. NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8"ø ASTM A307 BOLTS UNLESS NOTED OTHERWISE.
4. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS.

CONCRETE AND REINFORCING STEEL NOTES:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.
2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE. SLAB FOUNDATION DESIGN ASSUMING ALLOWABLE SOIL BEARING PRESSURE OF 2000 PSF.
3. REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE. SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.
4. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

   CONCRETE CAST AGAINST EARTH.....3 IN.
   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #6 AND LARGER.....2 IN.
   #5 AND SMALLER & WWF.....1 1/2 IN.
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:
   SLAB AND WALLS.....3/4 IN.
   BEAMS AND COLUMNS.....1 1/2 IN.

5. A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE. IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

MASONRY NOTES:

1. HOLLOW CONCRETE MASONRY UNITS SHALL MEET A.S.T.M. SPECIFICATION C90, GRADE N. TYPE 1. THE SPECIFIED DESIGN COMPRESSIVE STRENGTH OF CONCRETE MASONRY (F'm) SHALL BE 1500 PSI.
2. MORTAR SHALL MEET THE PROPERTY SPECIFICATION OF A.S.T.M. C270 TYP. "S" MORTAR AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI.
3. GROUT SHALL MEET A.S.T.M. SPECIFICATION C475 AND HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 2000 PSI.
4. CONCRETE MASONRY SHALL BE LAID IN RUNNING (COMMON) BOND.
5. WALL SHALL RECEIVE TEMPORARY BRACING. TEMPORARY BRACING SHALL NOT BE REMOVED UNTIL GROUT IS FULLY CURED.

GENERAL NOTES:

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

CONTRACTOR–	
SUBCONTRACTOR–	GENERAL CONTRACTOR (CONSTRUCTION)
CARRIER–	AT&T
TOWER OWNER–	CROWN CASTLE USA INC.
OEM–	ORIGINAL EQUIPMENT MANUFACTURER

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR AND CROWN CASTLE USA INC.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO SCALE AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CONTRACTOR AND CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWINGS.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

ABBREVIATIONS AND SYMBOLS:

ABBREVIATIONS:

AGL	ABOVE GRADE LEVEL
BTS	BASE TRANSCEIVER STATION
EXISTING	EXISTING
MIN.	MINIMUM
REF	REFERENCE
RF	RADIO FREQUENCY
T.B.D.	TO BE DETERMINED
T.B.R.	TO BE RESOLVED
TYP	TYPICAL
REQ	REQUIRED
EGR	EQUIPMENT GROUND RING
AWG	AMERICAN WIRE GAUGE
MGB	MASTER GROUND BAR
EG	EQUIPMENT GROUND
BCW	BARE COPPER WIRE
SIAD	SMART INTEGRATED ACCESS DEVICE
GEN	GENERATOR
IGR	INTERIOR GROUND RING (HALO)
RBS	RADIO BASE STATION

SYMBOLS:

S/G	SOLID GROUND BUS BAR
S/N	SOLID NEUTRAL BUS BAR
	SUPPLEMENTAL GROUND CONDUCTOR
	2–POLE THERMAL–MAGNETIC CIRCUIT BREAKER
	SINGLE–POLE THERMAL–MAGNETIC CIRCUIT BREAKER
	CHEMICAL GROUND ROD
	TEST WELL
	DISCONNECT SWITCH
M	METER
	EXOTHERMIC WELD (CADWELD) (UNLESS OTHERWISE NOTED)
	MECHANICAL CONNECTION
	GROUNDING WIRE

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. SUBCONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC. HILTI EPOXY ANCHORS ARE REQUIRED BY CROWN CASTLE USA INC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
5. CABLES SHALL NOT BE ROUTED THROUGH LADDER-STYLE CABLE TRAY RUNGS.
6. EACH END OF EVERY POWER, POWER PHASE CONDUCTOR (I.E., HOTS), GROUNDING AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
7. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH PLASTIC TAPE PER COLOR SCHEDULE. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (I.E. PANEL BOARD AND CIRCUIT ID'S).
8. PANEL BOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
9. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
10. POWER, CONTROL AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (#14 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90° C (WET & DRY) OPERATION LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED UNLESS OTHERWISE SPECIFIED.
11. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (#6 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN-2 GREEN INSULATION CLASS B STRANDED COPPER CABLE RATED FOR 90° C (WET AND DRY) OPERATION LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (#14 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90° C (WET AND DRY) OPERATION WITH OUTER JACKET LISTED OR LABELED FOR THE LOCATION USED UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT) OR RIGID NONMETALLIC CONDUIT (I.E. RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80 FOR LOCATIONS SUBJECT TO PHYSICAL DAMAGE) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT) OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
21. WIREWAYS SHALL BE EPOXY-COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS; SHALL BE PANDUIT TYPE E (OR EQUAL); AND RATED NEMA 1 (OR BETTER).
22. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHIN ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
23. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL; SHALL MEET OR EXCEED UL 50 AND RATED NEMA 1 (OR BETTER) INDOORS OR NEMA 3R (OR BETTER) OUTDOORS.
24. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1; AND RATED NEMA 1 (OR BETTER) INDOORS OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
25. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
26. THE SUBCONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CONTRACTOR BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
27. THE SUBCONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
28. INSTALL PLASTIC LABEL ON THE METER CENTER TO SHOW "AT&T".
29. ALL CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

GREENFIELD GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE SUBCONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 AWG SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 AWG SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (I.E. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 FT. OF MAIN GROUND WIRES WITH 1-#2 AWG TIN-PLATED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS, WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 TINNED SOLID IN 3/4" LIQUID TIGHT CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD-WELD TERMINATION POINT. THE EXPOSED END OF THE LIQUID TIGHT CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).

NEC INSULATOR COLOR CODE

DESCRIPTION	PHASE/CODE LETTER	WIRE COLOR
240/120 1Ø	LEG 1	BLACK
	LEG 2	RED
AC NEUTRAL	N	WHITE
GROUND (EGC)	G	GREEN
VDC POS	+	*RED–POLARITY MARK AT TERMINATION
VDC NEG	–	*BLACK–POLARITY MARK AT TERMINATION
240V OR 208V, 3Ø	PHASE A	BLACK
	PHASE B	RED(ORG. IF HI LEG)
	PHASE C	BLUE
480V, 3Ø	PHASE A	BROWN
	PHASE B	ORANGE OR PURPLE
	PHASE C	YELLOW

* SEE NEC 210.5(C)(1) AND (2)

AT&T
ONE AT&T WAY
BEDMINSTER, NJ 07921

CROWN CASTLE
3200 HORIZON DRIVE, SUITE 150
KING OF PRUSSIA, PA 19406

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

AT&T SITE NUMBER:
CTL02256

BU #: **845455**
OXFORD-QUAKER FARMS

85 QUAKER FARMS ROAD
OXFORD, CT 06478

EXISTING 149'-0"
MONOPOLE

ISSUED FOR:

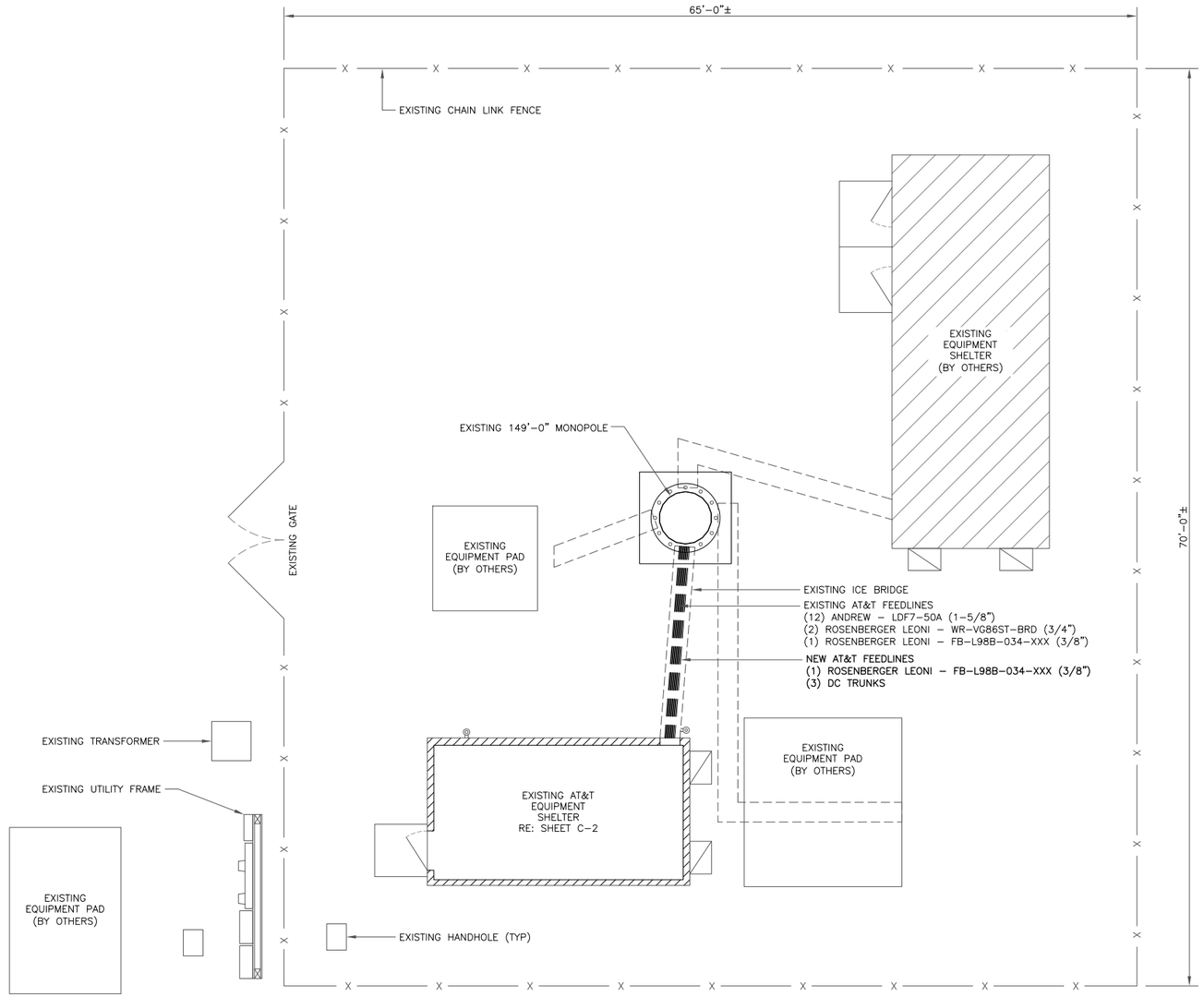
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/3/20	BLB	CONSTRUCTION	RMC
1	6/25/20	GEH	CONSTRUCTION	RMC

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
6/25/20

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: T-2

REVISION: 1



1 SITE PLAN
SCALE: 4' 2' 0 4' 3/16"=1'-0" (FULL SIZE) 3/32"=1'-0" (11x17)

N

AT&T
ONE AT&T WAY
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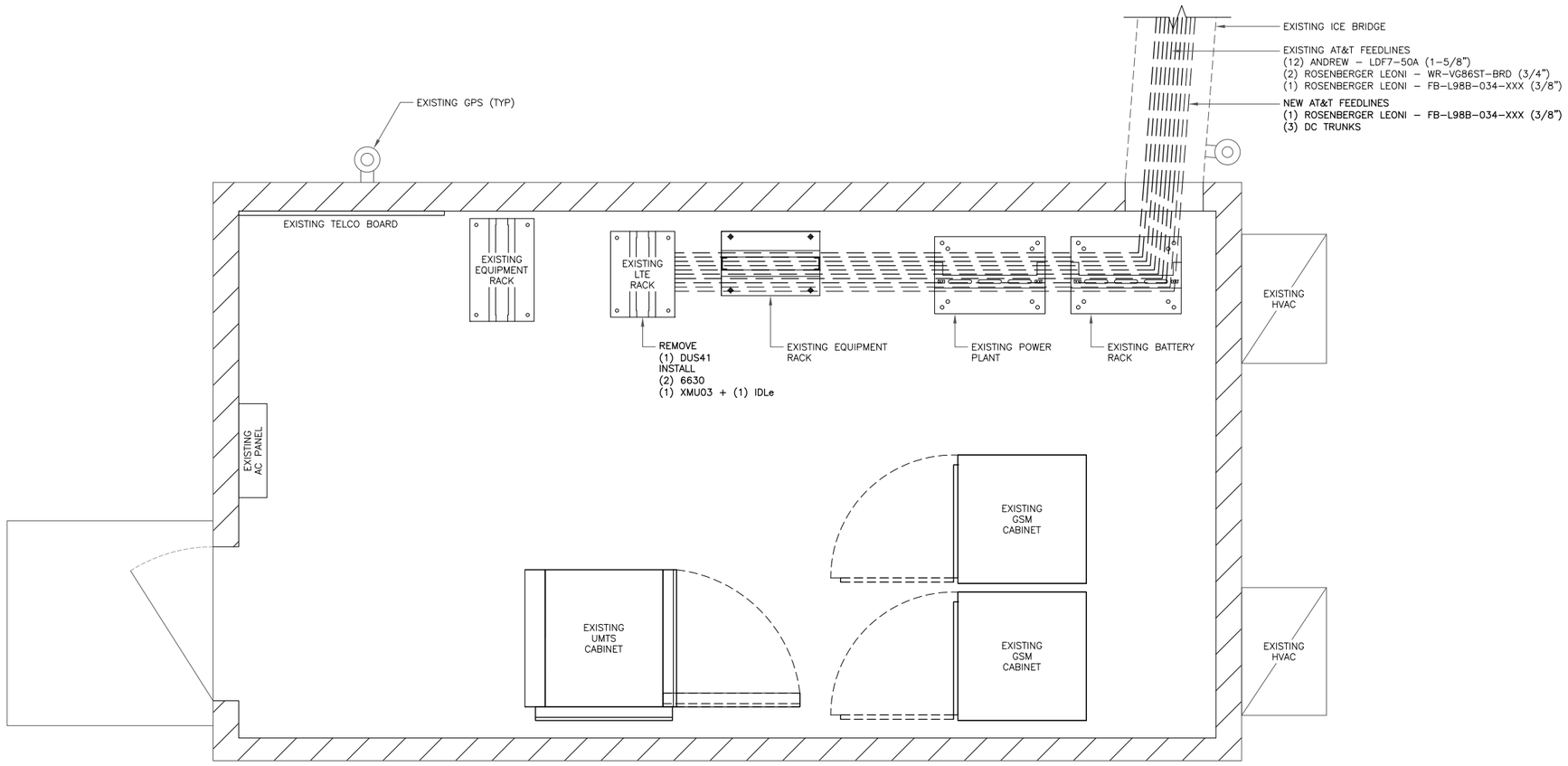
6/25/20

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: C-1

REVISION: 1



1 EXISTING EQUIPMENT PLAN

SCALE: 1' 6" 0 1' 3/4"=1'-0" (FULL SIZE) 3/8"=1'-0" (11x17)

N

AT&T
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EXISTING 149'-0"
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31627
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PROFESSIONAL ENGINEER
6/25/20

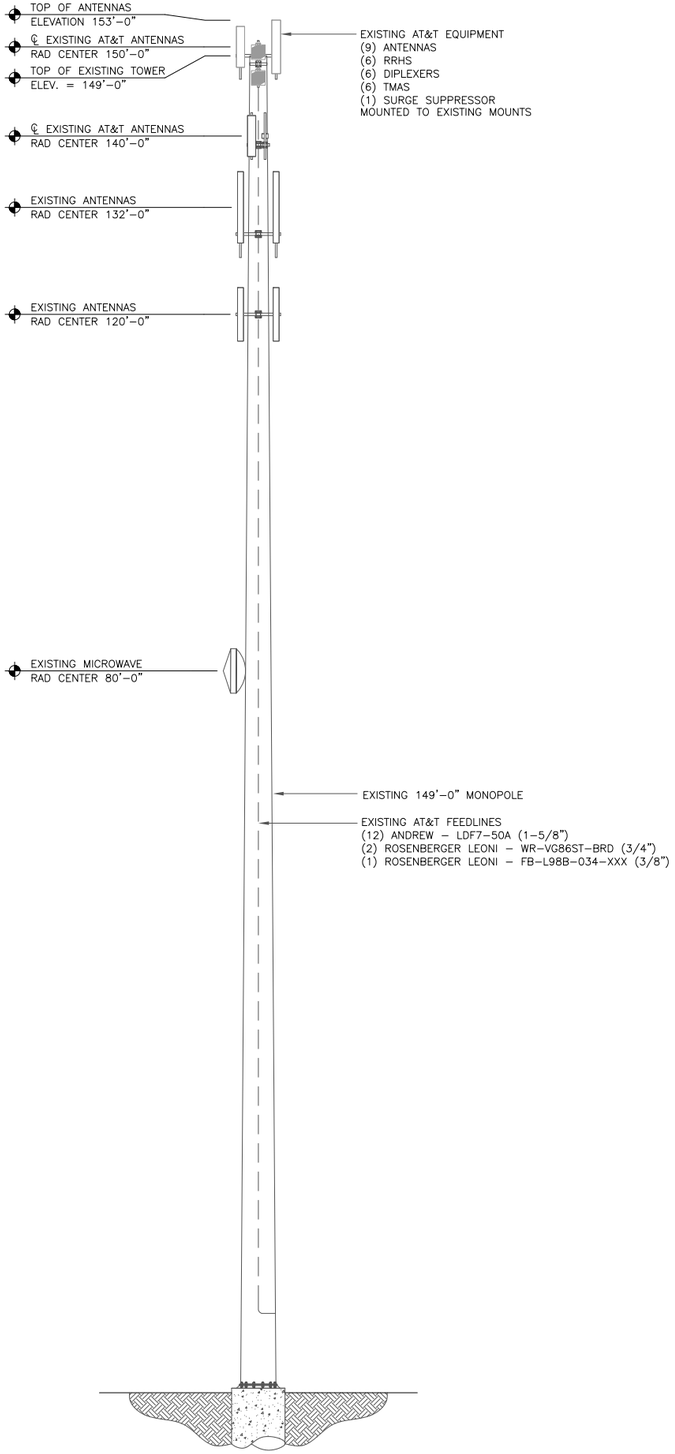
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: C-2

REVISION: 1

AT&T EQUIPMENT

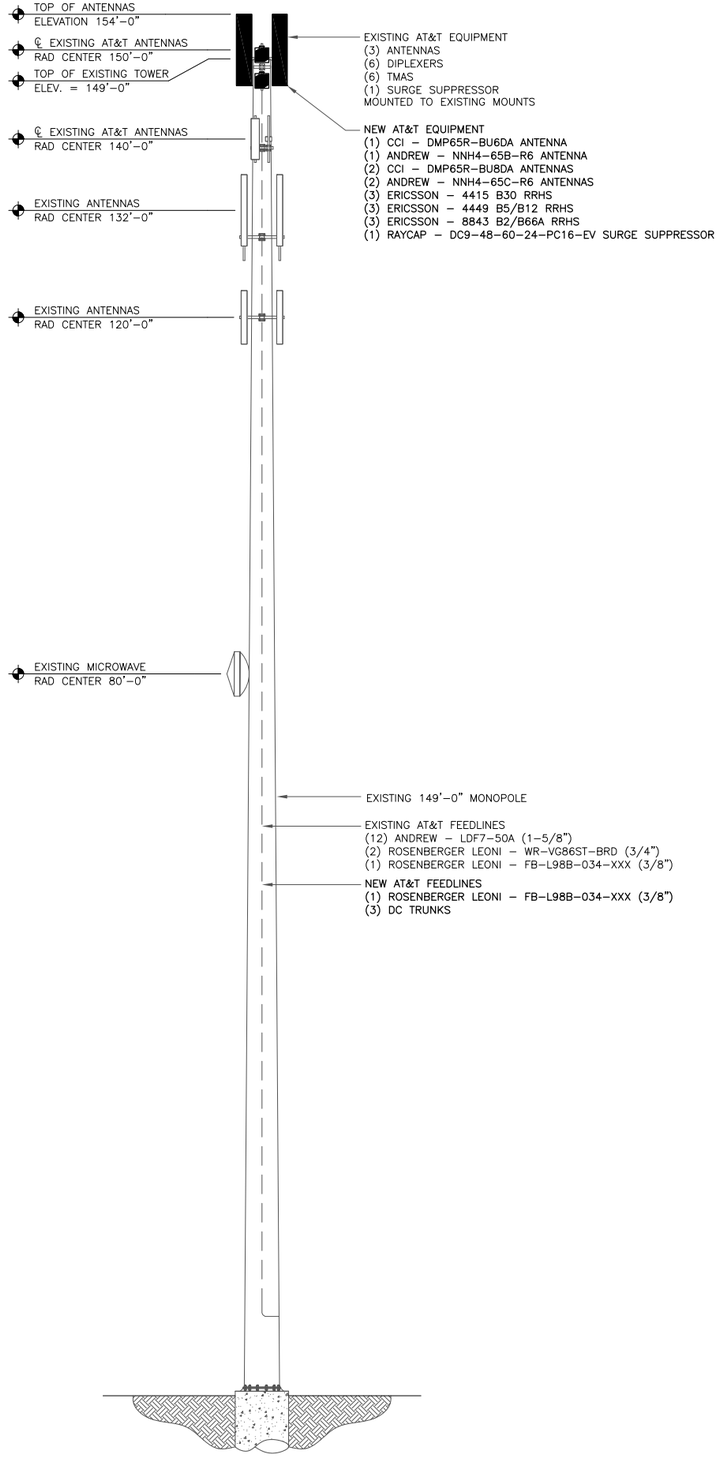
ANTENNA CL: 150'–0"
ANTENNA CL: 140'–0"
MOUNT CL: 149'–0"
MOUNT CL: 139'–0"



1 EXISTING ELEVATION
SCALE: NOT TO SCALE

AT&T EQUIPMENT

ANTENNA CL: 150'–0"
ANTENNA CL: 140'–0"
MOUNT CL: 149'–0"
MOUNT CL: 139'–0"



2 FINAL ELEVATION
SCALE: NOT TO SCALE

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EXISTING 149'-0" MONOPOLE

ISSUED FOR:

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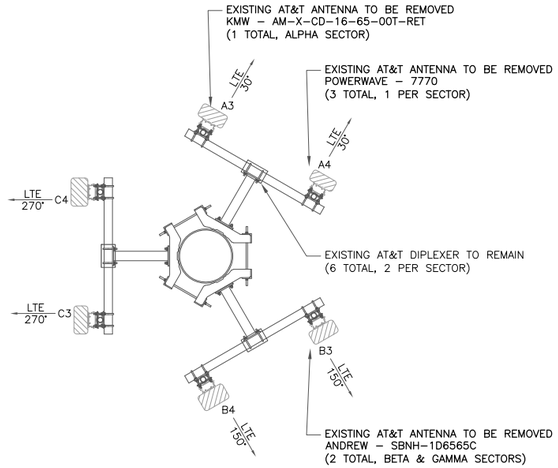
1	6/25/20	GEH	CONSTRUCTION	RMC

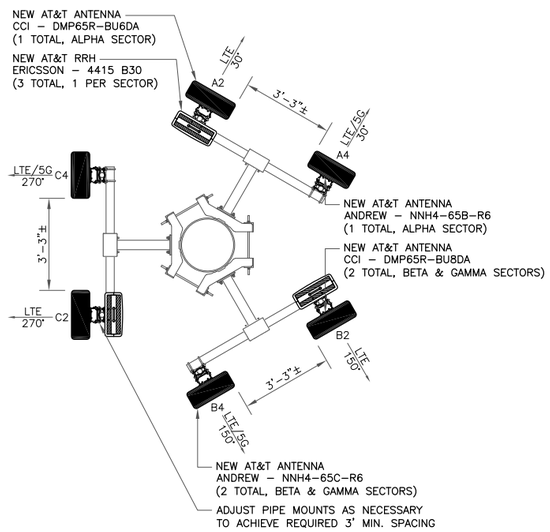
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: C-3

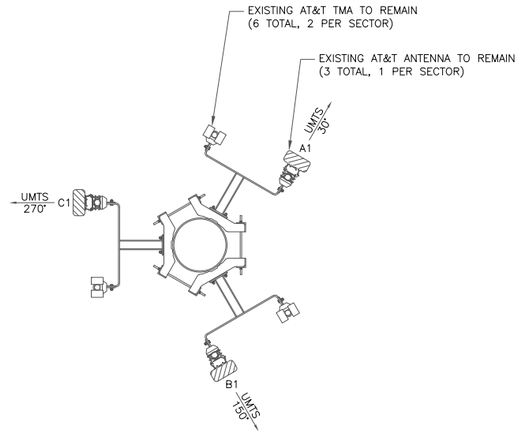
REVISION: 1



150'–0" EXISTING



150'–0" PROPOSED

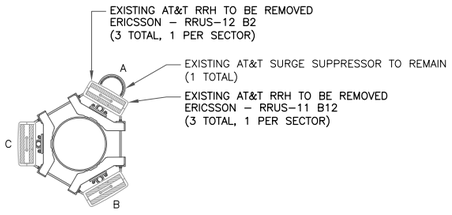


140'–0" EXISTING

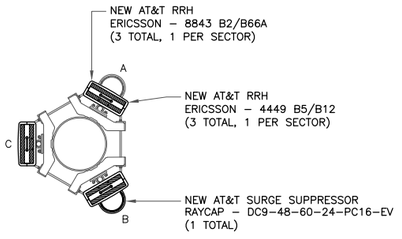
1 ANTENNA LAYOUTS
SCALE: NOT TO SCALE

N

PIM ISSUES EXIST DUE TO INSUFFICIENT SPACE



EXISTING



PROPOSED

2 RRH LAYOUT
SCALE: NOT TO SCALE

N

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CROWN CASTLE
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SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

AT&T SITE NUMBER:
CTL02256

BU #: **845455**
OXFORD-QUAKER FARMS

85 QUAKER FARMS ROAD
OXFORD, CT 06478

EXISTING 149'-0"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/3/20	BLB	CONSTRUCTION	RMC
1	6/25/20	GEH	CONSTRUCTION	RMC

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
6/25/20

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: C-4

REVISION: 1

FINAL ANTENNA AND COAXIAL CABLE SCHEDULE

POS.	TECH	STATUS	AZIMUTH	ANTENNA TYPE	ANTENNA RAD CENTER	MECHANICAL DOWNTILT	ELECTRICAL DOWNTILT	MAIN COAX SIZE	MAIN COAX LENGTH	COAX QTY	TMA QTY AND MODEL	RAYCAP	DC (WR-VG86ST-BRD) FIBER CABLES (FB-L98B-034-XXXXXX)	RRHS	DIPLEXER	RET CABLE
ALPHA SECTOR																
A1	UMTS	EXISTING	30°	POWERWAVE 7770	140'–0"	0°	4°	1–5/8"	175'–0"	2	(2) LGP 21401	DC6–48–60–18–8F	(1) FIBER (2) DC LINES	–	(2) LGP 13519 (SHELTER)	Y
A2	LTE	NEW	30°	CCI DMP65R–BU6DA	150'–0"	0°	3°	1–5/8"	175'–0"	2	–			(1) 4415 B30	–	Y
A3	–	–	–	–	–	–	–	–	–	–	–			–	–	–
A4	LTE/5G	NEW	30°	ANDREW NNH4–65B–R6	150'–0"	0°	8°/8°/6°/6°/8°/6°	–	–	–	–			(1) 4449 B5/B12 (1) 8843 B2/B66A	–	Y
BETA SECTOR																
B1	UMTS	EXISTING	150°	POWERWAVE 7770	140'–0"	0°	4°	1–5/8"	175'–0"	2	(2) LGP 21401	DC9–48–60–24–PC 16–EV	(1) FIBER (3) DC LINES	–	(2) LGP 13519 (SHELTER)	Y
B2	LTE	NEW	150°	CCI DMP65R–BU8DA	150'–0"	0°	3°	1–5/8"	175'–0"	2	–			(1) 4415 B30	–	Y
B3	–	–	–	–	–	–	–	–	–	–	–			–	–	–
B4	LTE/5G	NEW	150°	ANDREW NNH4–65C–R6	150'–0"	0°	5°/5°/3°/3°/5°/3°	–	–	–	–			(1) 4449 B5/B12 (1) 8843 B2/B66A	–	Y
GAMMA SECTOR																
C1	UMTS	EXISTING	270°	POWERWAVE 7770	140'–0"	0°	4°	1–5/8"	175'–0"	2	(2) LGP 21401	–	–	–	(2) LGP 13519 (SHELTER)	Y
C2	LTE	NEW	270°	CCI DMP65R–BU8DA	150'–0"	0°	3°	1–5/8"	175'–0"	2	–			(1) 4415 B30	–	Y
C3	–	–	–	–	–	–	–	–	–	–	–			–	–	–
C4	LTE/5G	NEW	270°	ANDREW NNH4–65C–R6	150'–0"	0°	9°/9°/2°/2°/9°/2°	–	–	–	–			(1) 4449 B5/B12 (1) 8843 B2/B66A	–	Y

NOTE: BOLD DENOTES NEW EQUIPMENT

1 FINAL ANTENNA AND COAXIAL CABLE SCHEDULE
SCALE: NOT TO SCALE

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BU #: **845455**
OXFORD-QUAKER FARMS

85 QUAKER FARMS ROAD
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EXISTING 149'-0"
MONOPOLE

ISSUED FOR:

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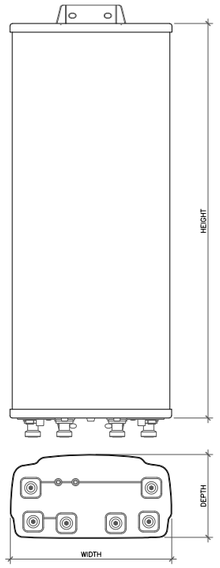
1	6/25/20	GEH	CONSTRUCTION	RMC

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
6/25/20

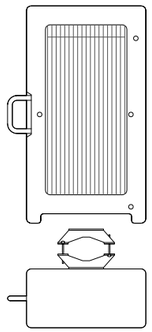
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: C-5
REVISION: 1



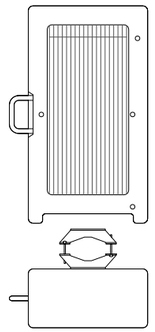
ANTENNA DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
DMP65R-BU6DA	71.2"	20.7"	7.7"	79.4 lbs
NNH4-65B-R6	72"	19.6"	7.8"	89.7 lbs
DMP65R-BU8DA	96"	20.7"	7.7"	95.7 lbs
NNH4-65C-R6	96"	19.6"	7.8"	99.2 lbs

1 ANTENNA DETAIL
SCALE: NOT TO SCALE



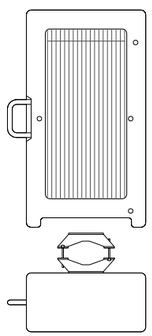
ERICSSON – 4415 B30
WEIGHT (FULLY EQUIPPED): 42.9 LBS
SIZE (HxWxD): 15.0x13.2x5.0 IN.

2 RRH DETAIL
SCALE: NOT TO SCALE



ERICSSON – 4449 B5/B12
WEIGHT (FULLY EQUIPPED): 71.0 LBS
SIZE (HxWxD): 17.9x13.19x9.44 IN.

3 RRH DETAIL
SCALE: NOT TO SCALE



ERICSSON – 8843 B2/B66A
WEIGHT (FULLY EQUIPPED): 72.0 LBS
SIZE (HxWxD): 14.9x13.2x10.9 IN.

4 RRH DETAIL
SCALE: NOT TO SCALE

DATA SHEET DC Surge Protection Solutions - Outdoor Rated
DC9-48-60-24-PC16-EV
Overvoltage Protection and Fiber Distribution/Cable Management Junction Box

Rooftop

The DC9-48-60-24-PC16-EV is designed to be the most robust lightning and power surge protector available for rooftop equipment in distributed node B or e-node B applications. The flexible design provides electrical protection and fiber distribution cable management at rooftop or towertop sectors. The solution employs the patented Strikesorb® 30-V1-2CEV surge proteotive device (SPD), capable of providing 12.5kA (10/350µs) of surge capacity for up to 9 -48V DC circuits.

powered by Strikesorb

Features
- Provides protection for nine individual -48V DC Remote Radio Heads
- Fiber connections for up to 24 pair of fiber
- Simplifies inter-connectivity and cable management for DC conductors
- Impulse discharge current of 12.5kA 10/350 µs
- UL 1449 4th Edition Type 2 surge protective device
- IEC 61643-11 Class I protection for DC applications
- NEMA 4x rated enclosure
- Unit ships with conduit fittings for input of DC power and fiber. Gland kits available for applications needing glands.
- Galvanized steel bracket with mounting options to include Pole Mount, Wood Pole, Wall Mount or Banding.
- Patent pending

Benefits
- Strikesorb modules are fully recognized components to UL 1449 4th Edition, meeting all intermediate and high current fault requirements to facilitate use in original equipment manufacturers (OEM) applications. Strikesorb modules are also VDE certified according to IEC 61643-11 standard
- Strikesorb offers unique maintenance-free protection against direct lightning currents
- NEMA 4x enclosure allows for indoor or outdoor installation

Raycap www.raycap.com

Strikesorb is a registered trademark of Raycap
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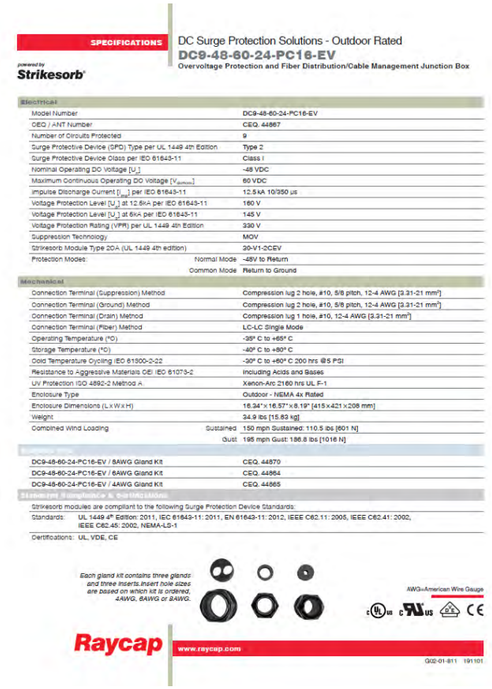
G02-01-811 191101



SPECIFICATIONS DC Surge Protection Solutions - Outdoor Rated
DC9-48-60-24-PC16-EV
Overvoltage Protection and Fiber Distribution/Cable Management Junction Box

powered by Strikesorb

Electrical	
Model Number	DC9-48-60-24-PC16-EV
CEG / ANT Number	CEQ. 44867
Number of Circuits Protected	9
Surge Protective Device (SPD) Type per UL 1449 4th Edition	Type 2
Surge Protective Device Class per IEC 61643-11	Class I
Nominal Operating DC Voltage [U_n]	-48 VDC
Maximum Continuous Operating DC Voltage [$V_{cpv(dc)}$]	60 VDC
Impulse Discharge Current [I_{n}] per IEC 61643-11	12.5 kA 10/350 us
Voltage Protection Level [U_p] at 12.5kA per IEC 61643-11	180 V
Voltage Protection Level [U_p] at 6kA per IEC 61643-11	145 V
Voltage Protection Rating (VPR) per UL 1449 4th Edition	330 V
Suppression Technology	MOV
Strikesorb Module Type 2DA (UL 1449 4th edition)	30-V1-2CEV
Protection Modes: Normal Mode	-48V to Return
Protection Modes: Common Mode	Return to Ground
Mechanical	
Connection Terminal (Suppression) Method	Compression lug 2 hole, #10, 5/8 pitch, 12-4 AWG [3.31-21 mm²]
Connection Terminal (Ground) Method	Compression lug 2 hole, #10, 5/8 pitch, 12-4 AWG [3.31-21 mm²]
Connection Terminal (Drain) Method	Compression lug 1 hole, #10, 12-4 AWG [3.31-21 mm²]
Connection Terminal (Fiber) Method	LC-LC Single Mode
Operating Temperature (°C)	-35° C to +65° C
Storage Temperature (°C)	-40° C to +80° C
Cold Temperature Cycling IEC 61300-2-22	-30° C to +60° C 200 hrs @5 PSI
Resistance to Aggressive Materials QEI IEC 61071-2	Including Acids and Bases
UV Protection ISO 4892-2 Method A	Xenon-Arc 2160 hrs UL F-1
Enclosure Type	Outdoor - NEMA 4x Rated
Enclosure Dimensions (LxWxH)	16.34"x16.57"x8.19" [415x421x208 mm]
Weight	34.9 lbs [15.83 kg]
Combined Wind Loading Sustained:	150 mph Sustained: 110.5 lbs [601 N]
Gust:	195 mph Gust: 186.8 lbs [1016 N]
Ordering	
DC9-48-60-24-PC16-EV / 8AWG Gland Kit	CEQ. 44870
DC9-48-60-24-PC16-EV / 6AWG Gland Kit	CEQ. 44864
DC9-48-60-24-PC16-EV / 4AWG Gland Kit	CEQ. 44868
Standards Compliance & Certifications	
Strikesorb modules are compliant to the following Surge Protection Device Standards:	
Standards:	UL 1449 4th Edition: 2011, IEC 61643-11: 2011, EN 61643-11: 2012, IEEE C62.11: 2005, IEEE C62.41: 2002, IEEE C62.45: 2002, NEMA-LS-1
Certifications:	UL, VDE, CE

Each gland kit contains three glands and three inserts.Insert hole sizes are based on which kit is ordered, 4AWG, 6AWG or 8AWG.

AWG=American Wire Gauge

Raycap www.raycap.com

G02-01-811 191101

5 SURGE SUPPRESSOR DETAIL
SCALE: NOT TO SCALE

AT&T
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BEDMINSTER, NJ 07921

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SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

AT&T SITE NUMBER:
CTL02256

BU #: **845455**
OXFORD-QUAKER FARMS

85 QUAKER FARMS ROAD
OXFORD, CT 06478

EXISTING 149'-0"
MONOPOLE

ISSUED FOR:

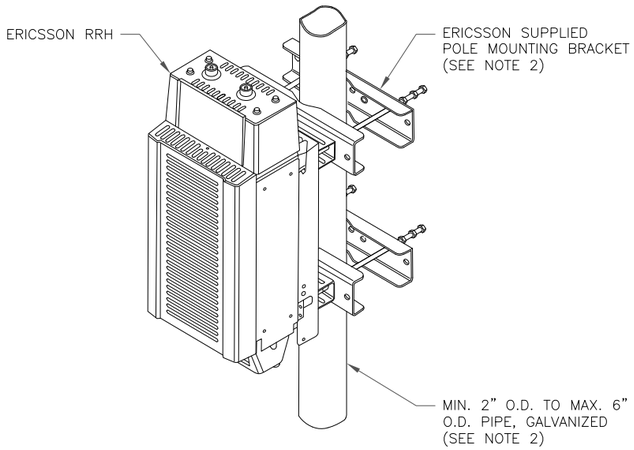
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/3/20	BLB	CONSTRUCTION	RMC
1	6/25/20	GEH	CONSTRUCTION	RMC

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

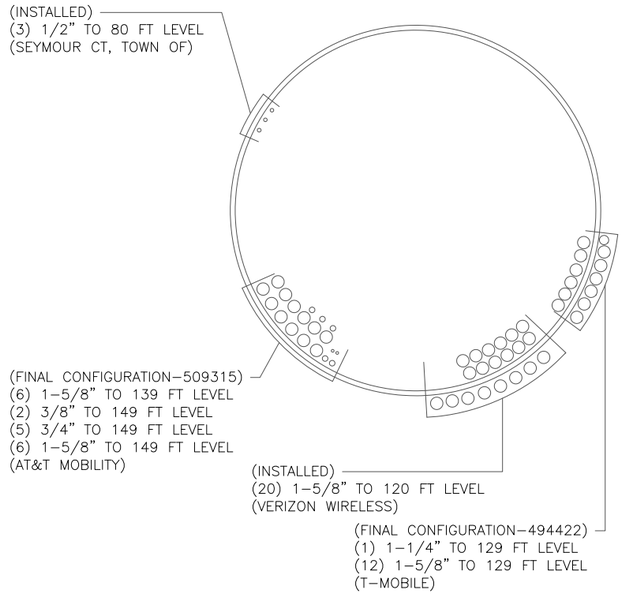
SHEET NUMBER: C-6
REVISION: 1

NOTES:

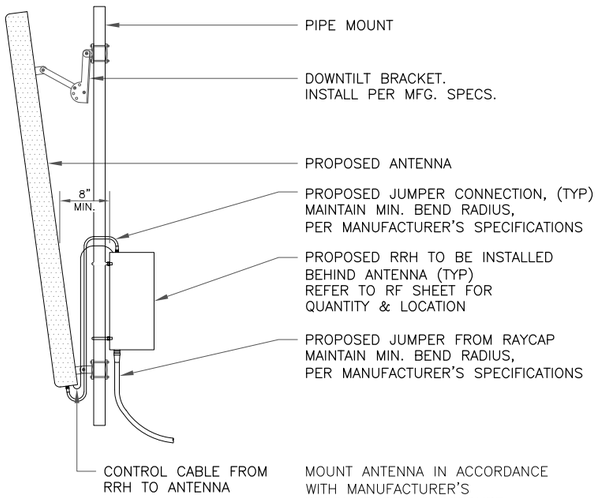
1. ERICSSON VIA AT&T SUPPLIES RRH, RRH POLE–MOUNTING BRACKET. SUBCONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRH POLE–MOUNTING BRACKET. ERICSSON INSTALLS RRH AND MAKES CABLE TERMINATIONS.
2. FOR POLE DIAMETERS FROM 6" TO 15", ERICSSON CAN SUPPLY A PAIR OF POLE MOUNTING METAL BANDS WITH BOLTING WELDMENT.
3. NO PAINTING OF THE RRH OR SOLAR SHIELD IS ALLOWED



1 RRH MOUNTING DETAIL
SCALE: NOT TO SCALE

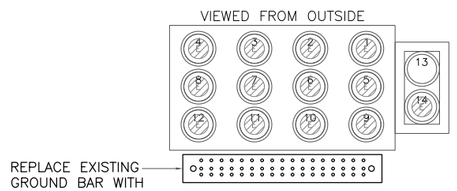


2 BASE LEVEL DRAWING
SCALE: NOT TO SCALE



3 ANTENNA MOUNTING DETAIL
SCALE: NOT TO SCALE

EQUIPMENT LEGEND	
EMPTY PORT	EXISTING HYBRID CABLE
EXISTING COAX TO REMAIN	PROPOSED HYBRID CABLE
EXISTING COAX TO BE REMOVED	PROPOSED COAX
EW EXISTING EWG	PROPOSED EWG



4 HATCH PLATE CONFIGURATION
SCALE: NOT TO SCALE

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BEDMINSTER, NJ 07921

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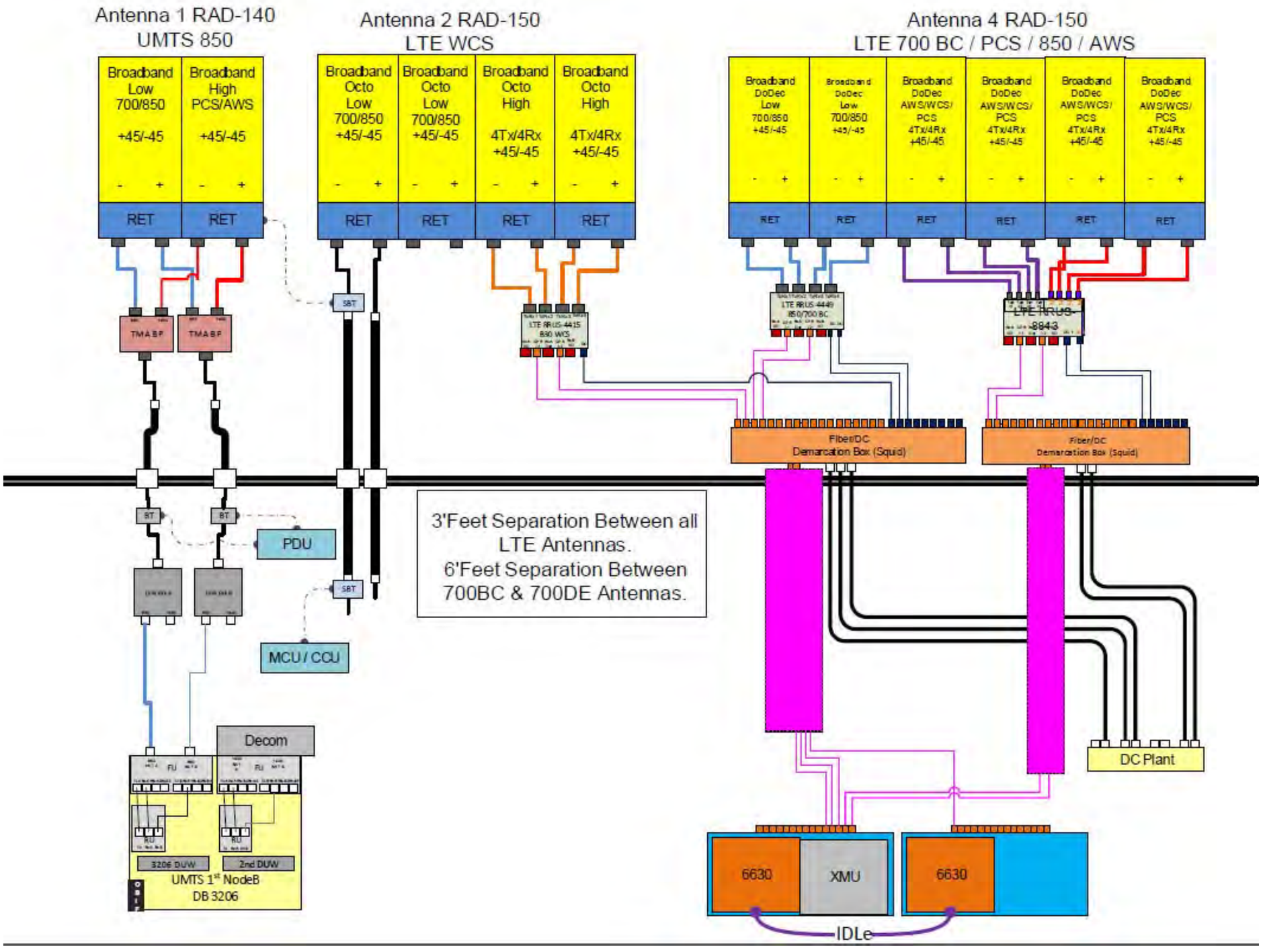
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: C-7
REVISION: 1



1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

AT&T
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LICENSED
PROFESSIONAL ENGINEER
6/25/20

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: C-8
REVISION: 1

SECTOR	TECHNOLOGY	FREQUENCY BAND	COLOR CODE – SECTOR DESIGNATION FOR SECTOR SPLIT	COLOR CODE – SECTOR (AMOUNT OF BANDS BASED ON POSITION)	COLOR CODE – FREQUENCY			45 + COAX	45 – COAX
A	LTE	700 (B/C)	BLANK	GREEN	VIOLET		BLANK	YELLOW	BLANK
A	LTE	850	BLANK	GREEN	YELLOW		BLANK	YELLOW	BLANK
A	LTE	850 – 2ND BLOCK	BLANK	GREEN	YELLOW	YELLOW	BLANK	YELLOW	BLANK
A	LTE	1900 (PCS)	BLANK	GREEN	RED		BLANK	YELLOW	BLANK
A	LTE	1900 (PCS) – 2ND BLOCK	BLANK	GREEN	RED	RED	BLANK	YELLOW	BLANK
A	LTE	2100 (AWS)	BLANK	GREEN	ORANGE		BLANK	YELLOW	BLANK
A	LTE	2100 (AWS) – 2ND BLOCK	BLANK	GREEN	ORANGE	ORANGE	BLANK	YELLOW	BLANK
A	LTE	2300 (WCS)	BLANK	GREEN	SLATE		BLANK	YELLOW	BLANK
A	LTE	2300 (WCS) – 2ND BLOCK	BLANK	GREEN	BROWN		BLANK	YELLOW	BLANK
A	LTE	2300 (WCS) – SXM REPEATER	BLANK	GREEN	BROWN	BROWN	BLANK	YELLOW	BLANK
A	LTE	700 (D/E)	BLANK	GREEN	BROWN	BROWN	BROWN	YELLOW	BLANK
A	LTE	700 FIRSTNET	BLANK	GREEN	VIOLET	BLUE	BLANK	YELLOW	BLANK
A	LTE	700 (B/C) / 700 FIRSTNET (DUAL RRH)	BLANK	GREEN	VIOLET	VIOLET	BLUE	YELLOW	BLANK
A	LTE	1900 (PCS) / 2100 (AWS) (DUAL RRH)	BLANK	GREEN	RED	ORANGE	BLANK	YELLOW	BLANK
A	LTE	8500 / 700 D/E (DUAL RRH)	BLANK	GREEN	YELLOW	SLATE	BLANK	YELLOW	BLANK
A – SPLIT	LTE	700 (B/C)	GREEN	ORANGE	VIOLET		BLANK	YELLOW	BLANK
A – SPLIT	LTE	850	GREEN	ORANGE	YELLOW		BLANK	YELLOW	BLANK
A – SPLIT	LTE	850 – 2ND BLOCK	GREEN	ORANGE	YELLOW	YELLOW	BLANK	YELLOW	BLANK
A – SPLIT	LTE	1900 (PCS)	GREEN	ORANGE	RED		BLANK	YELLOW	BLANK
A – SPLIT	LTE	1900 (PCS) – 2ND BLOCK	GREEN	ORANGE	RED	RED	BLANK	YELLOW	BLANK
A – SPLIT	LTE	2100 (AWS)	GREEN	ORANGE	ORANGE		BLANK	YELLOW	BLANK
A – SPLIT	LTE	2100 (AWS) – 2ND BLOCK	GREEN	ORANGE	ORANGE	ORANGE	BLANK	YELLOW	BLANK
A – SPLIT	LTE	2300 (WCS)	GREEN	ORANGE	SLATE		BLANK	YELLOW	BLANK
A – SPLIT	LTE	2300 (WCS) – 2ND BLOCK	GREEN	ORANGE	BROWN		BLANK	YELLOW	BLANK
A – SPLIT	LTE	2300 (WCS) – SXM REPEATER	GREEN	ORANGE	BROWN	BROWN	BLANK	YELLOW	BLANK
A – SPLIT	LTE	700 (D/E)	GREEN	ORANGE	BROWN	BROWN	BROWN	YELLOW	BLANK
A – SPLIT	LTE	700 FIRSTNET	GREEN	ORANGE	VIOLET	BLUE	BLANK	YELLOW	BLANK
A – SPLIT	LTE	700 (B/C) / 700 FIRSTNET (DUAL RRH)	GREEN	ORANGE	VIOLET	VIOLET	BLUE	YELLOW	BLANK
A – SPLIT	LTE	1900 (PCS) / 2100 (AWS) (DUAL RRH)	GREEN	ORANGE	RED	ORANGE	BLANK	YELLOW	BLANK
A – SPLIT	LTE	8500 / 700 D/E (DUAL RRH)	GREEN	ORANGE	YELLOW	SLATE	BLANK	YELLOW	BLANK
B	LTE	700 (B/C)	BLANK	BLUE	VIOLET		BLANK	YELLOW	BLANK
B	LTE	850	BLANK	BLUE	YELLOW		BLANK	YELLOW	BLANK
B	LTE	850 – 2ND BLOCK	BLANK	BLUE	YELLOW	YELLOW	BLANK	YELLOW	BLANK
B	LTE	1900 (PCS)	BLANK	BLUE	RED		BLANK	YELLOW	BLANK
B	LTE	1900 (PCS) – 2ND BLOCK	BLANK	BLUE	RED	RED	BLANK	YELLOW	BLANK
B	LTE	2100 (AWS)	BLANK	BLUE	ORANGE		BLANK	YELLOW	BLANK
B	LTE	2100 (AWS) – 2ND BLOCK	BLANK	BLUE	ORANGE	ORANGE	BLANK	YELLOW	BLANK
B	LTE	2300 (WCS)	BLANK	BLUE	SLATE		BLANK	YELLOW	BLANK
B	LTE	2300 (WCS) – 2ND BLOCK	BLANK	BLUE	BROWN		BLANK	YELLOW	BLANK
B	LTE	2300 (WCS) – SXM REPEATER	BLANK	BLUE	BROWN	BROWN	BLANK	YELLOW	BLANK
B	LTE	700 (D/E)	BLANK	BLUE	BROWN	BROWN	BROWN	YELLOW	BLANK
B	LTE	700 FIRSTNET	BLANK	BLUE	VIOLET	BLUE	BLANK	YELLOW	BLANK
B	LTE	700 (B/C) / 700 FIRSTNET (DUAL RRH)	BLANK	BLUE	VIOLET	VIOLET	BLUE	YELLOW	BLANK
B	LTE	1900 (PCS) / 2100 (AWS) (DUAL RRH)	BLANK	BLUE	RED	ORANGE	BLANK	YELLOW	BLANK
B	LTE	8500 / 700 D/E (DUAL RRH)	BLANK	BLUE	YELLOW	SLATE	BLANK	YELLOW	BLANK
B – SPLIT	LTE	700 (B/C)	BLUE	BROWN	VIOLET		BLANK	YELLOW	BLANK
B – SPLIT	LTE	850	BLUE	BROWN	YELLOW		BLANK	YELLOW	BLANK
B – SPLIT	LTE	850 – 2ND BLOCK	BLUE	BROWN	YELLOW	YELLOW	BLANK	YELLOW	BLANK
B – SPLIT	LTE	1900 (PCS)	BLUE	BROWN	RED		BLANK	YELLOW	BLANK
B – SPLIT	LTE	1900 (PCS) – 2ND BLOCK	BLUE	BROWN	RED	RED	BLANK	YELLOW	BLANK
B – SPLIT	LTE	2100 (AWS)	BLUE	BROWN	ORANGE		BLANK	YELLOW	BLANK
B – SPLIT	LTE	2100 (AWS) – 2ND BLOCK	BLUE	BROWN	ORANGE	ORANGE	BLANK	YELLOW	BLANK
B – SPLIT	LTE	2300 (WCS)	BLUE	BROWN	SLATE		BLANK	YELLOW	BLANK
B – SPLIT	LTE	2300 (WCS) – 2ND BLOCK	BLUE	BROWN	BROWN		BLANK	YELLOW	BLANK
B – SPLIT	LTE	2300 (WCS) – SXM REPEATER	BLUE	BROWN	BROWN	BROWN	BLANK	YELLOW	BLANK
B – SPLIT	LTE	700 (D/E)	BLUE	BROWN	BROWN	BROWN	BROWN	YELLOW	BLANK
B – SPLIT	LTE	700 FIRSTNET	BLUE	BROWN	VIOLET	BLUE	BLANK	YELLOW	BLANK
B – SPLIT	LTE	700 (B/C) / 700 FIRSTNET (DUAL RRH)	BLUE	BROWN	VIOLET	VIOLET	BLUE	YELLOW	BLANK
B – SPLIT	LTE	1900 (PCS) / 2100 (AWS) (DUAL RRH)	BLUE	BROWN	RED	ORANGE	BLANK	YELLOW	BLANK
B – SPLIT	LTE	8500 / 700 D/E (DUAL RRH)	BLUE	BROWN	YELLOW	SLATE	BLANK	YELLOW	BLANK
C	LTE	700 (B/C)	BLANK	WHITE	VIOLET		BLANK	YELLOW	BLANK
C	LTE	850	BLANK	WHITE	YELLOW		BLANK	YELLOW	BLANK
C	LTE	850 – 2ND BLOCK	BLANK	WHITE	YELLOW	YELLOW	BLANK	YELLOW	BLANK
C	LTE	1900 (PCS)	BLANK	WHITE	RED		BLANK	YELLOW	BLANK
C	LTE	1900 (PCS) – 2ND BLOCK	BLANK	WHITE	RED	RED	BLANK	YELLOW	BLANK
C	LTE	2100 (AWS)	BLANK	WHITE	ORANGE		BLANK	YELLOW	BLANK
C	LTE	2100 (AWS) – 2ND BLOCK	BLANK	WHITE	ORANGE	ORANGE	BLANK	YELLOW	BLANK
C	LTE	2300 (WCS)	BLANK	WHITE	SLATE		BLANK	YELLOW	BLANK
C	LTE	2300 (WCS) – 2ND BLOCK	BLANK	WHITE	BROWN		BLANK	YELLOW	BLANK
C	LTE	2300 (WCS) – SXM REPEATER	BLANK	WHITE	BROWN	BROWN	BLANK	YELLOW	BLANK
C	LTE	700 (D/E)	BLANK	WHITE	BROWN	BROWN	BROWN	YELLOW	BLANK
C	LTE	700 FIRSTNET	BLANK	WHITE	VIOLET	BLUE	BLANK	YELLOW	BLANK
C	LTE	700 (B/C) / 700 FIRSTNET (DUAL RRH)	BLANK	WHITE	VIOLET	VIOLET	BLUE	YELLOW	BLANK
C	LTE	1900 (PCS) / 2100 (AWS) (DUAL RRH)	BLANK	WHITE	RED	ORANGE	BLANK	YELLOW	BLANK
C	LTE	8500 / 700 D/E (DUAL RRH)	BLANK	WHITE	YELLOW	SLATE	BLANK	YELLOW	BLANK
C – SPLIT	LTE	700 (B/C)	WHITE	VIOLET	VIOLET		BLANK	YELLOW	BLANK
C – SPLIT	LTE	850	WHITE	VIOLET	YELLOW		BLANK	YELLOW	BLANK
C – SPLIT	LTE	850 – 2ND BLOCK	WHITE	VIOLET	YELLOW	YELLOW	BLANK	YELLOW	BLANK
C – SPLIT	LTE	1900 (PCS)	WHITE	VIOLET	RED		BLANK	YELLOW	BLANK
C – SPLIT	LTE	1900 (PCS) – 2ND BLOCK	WHITE	VIOLET	RED	RED	BLANK	YELLOW	BLANK
C – SPLIT	LTE	2100 (AWS)	WHITE	VIOLET	ORANGE		BLANK	YELLOW	BLANK
C – SPLIT	LTE	2100 (AWS) – 2ND BLOCK	WHITE	VIOLET	ORANGE	ORANGE	BLANK	YELLOW	BLANK
C – SPLIT	LTE	2300 (WCS)	WHITE	VIOLET	SLATE		BLANK	YELLOW	BLANK
C – SPLIT	LTE	2300 (WCS) – 2ND BLOCK	WHITE	VIOLET	BROWN		BLANK	YELLOW	BLANK
C – SPLIT	LTE	2300 (WCS) – SXM REPEATER	WHITE	VIOLET	BROWN	BROWN	BLANK	YELLOW	BLANK
C – SPLIT	LTE	700 (D/E)	WHITE	VIOLET	BROWN	BROWN	BROWN	YELLOW	BLANK
C – SPLIT	LTE	700 FIRSTNET	WHITE	VIOLET	VIOLET	BLUE	BLANK	YELLOW	BLANK
C – SPLIT	LTE	700 (B/C) / 700 FIRSTNET (DUAL RRH)	WHITE	VIOLET	VIOLET	VIOLET	BLUE	YELLOW	BLANK
C – SPLIT	LTE	1900 (PCS) / 2100 (AWS) (DUAL RRH)	WHITE	VIOLET	RED	ORANGE	BLANK	YELLOW	BLANK
C – SPLIT	LTE	8500 / 700 D/E (DUAL RRH)	WHITE	VIOLET	YELLOW	SLATE	BLANK	YELLOW	BLANK
D	LTE	700 (B/C)	BLANK	ORANGE	VIOLET		BLANK	YELLOW	BLANK
D	LTE	850	BLANK	ORANGE	YELLOW		BLANK	YELLOW	BLANK
D	LTE	850 – 2ND BLOCK	BLANK	ORANGE	YELLOW	YELLOW	BLANK	YELLOW	BLANK
D	LTE	1900 (PCS)	BLANK	ORANGE	RED		BLANK	YELLOW	BLANK
D	LTE	1900 (PCS) – 2ND BLOCK	BLANK	ORANGE	RED	RED	BLANK	YELLOW	BLANK
D	LTE	2100 (AWS)	BLANK	ORANGE	ORANGE		BLANK	YELLOW	BLANK
D	LTE	2100 (AWS) – 2ND BLOCK	BLANK	ORANGE	ORANGE	ORANGE	BLANK	YELLOW	BLANK
D	LTE	2300 (WCS)	BLANK	ORANGE	SLATE		BLANK	YELLOW	BLANK
D	LTE	2300 (WCS) – 2ND BLOCK	BLANK	ORANGE	BROWN		BLANK	YELLOW	BLANK
D	LTE	2300 (WCS) – SXM REPEATER	BLANK	ORANGE	BROWN	BROWN	BLANK	YELLOW	BLANK
D	LTE	700 (D/E)	BLANK	ORANGE	BROWN	BROWN	BROWN	YELLOW	BLANK
D	LTE	700 FIRSTNET	BLANK	ORANGE	VIOLET	BLUE	BLANK	YELLOW	BLANK
D	LTE	700 (B/C) / 700 FIRSTNET (DUAL RRH)	BLANK	ORANGE	VIOLET	VIOLET	BLUE	YELLOW	BLANK
D	LTE	1900 (PCS) / 2100 (AWS) (DUAL RRH)	BLANK	ORANGE	RED	ORANGE	BLANK	YELLOW	BLANK
D	LTE	8500 / 700 D/E (DUAL RRH)	BLANK	ORANGE	YELLOW	SLATE	BLANK	YELLOW	BLANK
E	LTE	700 (B/C)	BLANK	BROWN	VIOLET		BLANK	YELLOW	BLANK
E	LTE	850	BLANK	BROWN	YELLOW		BLANK	YELLOW	BLANK
E	LTE	850 – 2ND BLOCK	BLANK	BROWN	YELLOW	YELLOW	BLANK	YELLOW	BLANK
E	LTE	1900 (PCS)	BLANK	BROWN	RED		BLANK	YELLOW	BLANK
E	LTE	1900 (PCS) – 2ND BLOCK	BLANK	BROWN	RED	RED	BLANK	YELLOW	BLANK
E	LTE	2100 (AWS)	BLANK	BROWN	ORANGE		BLANK	YELLOW	BLANK
E	LTE	2100 (AWS) – 2ND BLOCK	BLANK	BROWN	ORANGE	ORANGE	BLANK	YELLOW	BLANK
E	LTE	2300 (WCS)	BLANK	BROWN	SLATE		BLANK	YELLOW	BLANK
E	LTE	2300 (WCS) – 2ND BLOCK	BLANK	BROWN	BROWN		BLANK	YELLOW	BLANK
E	LTE	2300 (WCS) – SXM REPEATER	BLANK	BROWN	BROWN	BROWN	BLANK	YELLOW	BLANK
E	LTE	700 (D/E)	BLANK	BROWN	BROWN	BROWN	BROWN	YELLOW	BLANK
E	LTE	700 FIRSTNET	BLANK	BROWN	VIOLET	BLUE	BLANK	YELLOW	BLANK
E	LTE	700 (B/C) / 700 FIRSTNET (DUAL RRH)	BLANK	BROWN	VIOLET	VIOLET	BLUE	YELLOW	BLANK
E	LTE	1900 (PCS) / 2100 (AWS) (DUAL RRH)	BLANK	BROWN	RED	ORANGE	BLANK	YELLOW	BLANK
E	LTE	8500 / 700 D/E (DUAL RRH)	BLANK	BROWN	YELLOW	SLATE	BLANK	YELLOW	BLANK
F	LTE	700 (B/C)	BLANK	VIOLET	VIOLET		BLANK	YELLOW	BLANK
F	LTE	850	BLANK	VIOLET	YELLOW		BLANK	YELLOW	BLANK
F	LTE	850 – 2ND BLOCK	BLANK	VIOLET	YELLOW	YELLOW	BLANK	YELLOW	BLANK
F	LTE	1900 (PCS)	BLANK	VIOLET	RED		BLANK	YELLOW	BLANK
F	LTE	1900 (PCS) – 2ND BLOCK	BLANK	VIOLET	RED	RED	BLANK	YELLOW	BLANK
F	LTE	2100 (AWS)	BLANK	VIOLET	ORANGE		BLANK	YELLOW	BLANK
F	LTE	2100 (AWS) – 2ND BLOCK	BLANK	VIOLET	ORANGE	ORANGE	BLANK	YELLOW	BLANK
F	LTE	2300 (WCS)	BLANK	VIOLET	SLATE		BLANK	YELLOW	BLANK
F	LTE	2300 (WCS) – 2ND BLOCK	BLANK	VIOLET	BROWN		BLANK	YELLOW	BLANK
F	LTE	2300 (WCS) – SXM REPEATER	BLANK	VIOLET	BROWN	BROWN	BLANK	YELLOW	BLANK
F	LTE	700 (D/E)	BLANK	VIOLET	BROWN	BROWN	BROWN	YELLOW	BLANK
F	LTE	700 FIRSTNET	BLANK	VIOLET	VIOLET	BLUE	BLANK	YELLOW	BLANK
F	LTE	700 (B/C) / 700 FIRSTNET (DUAL RRH)	BLANK	VIOLET	VIOLET	VIOLET	BLUE	YELLOW	BLANK
F	LTE	1900 (PCS) / 2100 (AWS) (DUAL RRH)	BLANK	VIOLET	RED	ORANGE	BLANK	YELLOW	BLANK
F	LTE	8500 / 700 D/E (DUAL RRH)	BLANK	VIOLET	YELLOW	SLATE	BLANK	YELLOW	BLANK

NOTE 1: PRODUCTS ARE ONLY TO BE USED WHEN ADEQUATE PHYSICAL SPACE EXISTS FOR PROPER INSTALLATION.

NOTE 2: HEAT SHRINK MAY ONLY BE USED AT GROUND LEVEL OR ROOFTOP SITES WHEN APPLIED WITH A HEAT GUN. USE ON TOWERS OR INSTALLING WITH AN OPEN FLAME DEVICE, SUCH AS A TORCH, IS PROHIBITED DUE TO POTENTIAL DAMAGE TO CONNECTORS AND CABLES. HEAT SHRINK IS NOT ALLOWED ON CONNECTIONS TO TOWER TOP EQUIPMENT EVEN IF THE HEAT SHRINK IS APPLIED ON THE GROUND PRIOR TO INSTALLING THE EQUIPMENT ON THE TOWER TOP.

NOTE 3: HEAT SHRINK IS NOT TO BE USED ON RET/AISG CONNECTORS FOUND ON RF DEVICES (RRH/RRU, ANTENNAS, ETC.), DUE TO POSSIBLE DAMAGE BEING CAUSED TO THE DEVICE. IT MAY BE USED ON CONNECTORS ATTACHED TO RET SURGE PROTECTORS.

NOTE 4: WHEN GAMMA ELECTRONICS COLD SHRINK IS USED ON FULLY THREADED DIN CONNECTORS THE THREADS MUST HAVE EITHER ROSENBERGER THREAD ADAPTER OR BUTYL APPLIED PRIOR TO THE COLD SHRINK BEING INSTALLED. REFER TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS INCLUDED WITH THE PRODUCT FOR DETAILS.

TABLE 1: E/ PA / S. NJ / DE – COAX COLOR CODE

SECTOR	ALPHA	GREEN		
	A–SPLIT	GREEN	ORANGE	BLANK
	BETA	BLUE		
	B–SPLIT	BROWN	BROWN	BLANK
	GAMMA	WHITE		
	C–SPLIT	WHITE	VIOLET	BLANK
	D	ORANGE		
	E	BROWN		
	F	VIOLET		
FREQUENCY BAND	DC TRUCNK / DC JUMPER / FIRST FIBER JUMPER			
	700 (B/C)	VIOLET		
	850	YELLOW		
	850 – 2ND BLOCK	YELLOW	YELLOW	BLANK
	1900 (PCS)	RED		
	1900 (PCS) – 2ND BLOCK	RED	RED	BLANK
	2100 (AWS)	ORANGE		
	2100 (AWS) – 2ND BLOCK	ORANGE	ORANGE	BLANK
	2300 (WCS)	BROWN		
	2300 (WCS) – 2ND BLOCK	BROWN	BROWN	BLANK
	2300 (WCS) – SXM REPEATER	BROWN	BROWN	BROWN
	700 (D/E)	SLATE		
	700 FIRSTNET	VIOLET	BLUE	BLANK
	700 (B/C) / 700 FIRSTNET (DUAL RRH)	VIOLET	VIOLET	BLUE
	1900 (PCS) / 2100 (AWS) (DUAL RRH)	RED	ORANGE	BLANK
	8500 / 700 D/E (DUAL RRH)	YELLOW	SLATE	BLANK

WEATHERPROOFING PRODUCT APPLICATION TABLE

PRODUCT	APPLICATION					
	HARDLINE TO JUMPER CONNECTION	7–16 DIN RF CONNECTOR	4.3–10 RF CONNECTOR	RRH/RRU DC CONNECTOR	RRH/RRU FIBER CONNECTOR	RET/AISG
TAPE & BUTYL	YES	YES (1)	YES (1)	NO	NO	NO
SELF–FUSING TAPE	YES	YES (1)	YES (1)	YES	NO	YES
JUMPER BOOT	NO	YES	YES	NO	NO	NO

TORQUE VALUES FOR CONNECTORS

CONNECTOR TYPE	TORQUE Ft–lbs	TORQUE In–lbs
7–16 DIN	19–22	221–265
4.3–10	3.67	44
N	1.25	15
SMA	0.42	5
TNC	0.42	5
RET/AISG	HAND TIGHTEN	HAND TIGHTEN

MINIMUM BENDING RADIUS FOR GROUNDING CONDUCTORS

GROUNDING CONDUCTOR SIZE	MINIMUM BENDING RADIUS (INCHES)
6 AWG	2
4 AWG	3
2 AWG	3
1/0 AWG	4
4/0 AWG	4
750 KCML	7

1 COLOR CODE STANDARD
SCALE: NOT TO SCALE

AT&T
ONE AT&T WAY
BEDMINSTER, NJ 07921

CROWN CASTLE
3200 HORIZON DRIVE, SUITE 150
KING OF PRUSSIA, PA 19406

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

AT&T SITE NUMBER:
CTL02256

BU #: **845455**
OXFORD-QUAKER FARMS

85 QUAKER FARMS ROAD
OXFORD, CT 06478

EXISTING 149'-0"
MONOPOLE

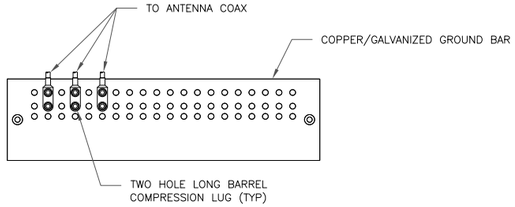
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/3/20	BLB	CONSTRUCTION	RMC
1	6/25/20	GEH	CONSTRUCTION	RMC

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
6/25/20

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

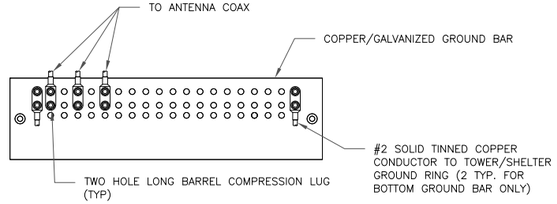
SHEET NUMBER: C-9
REVISION: 1



NOTES:

1. DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
3. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL.

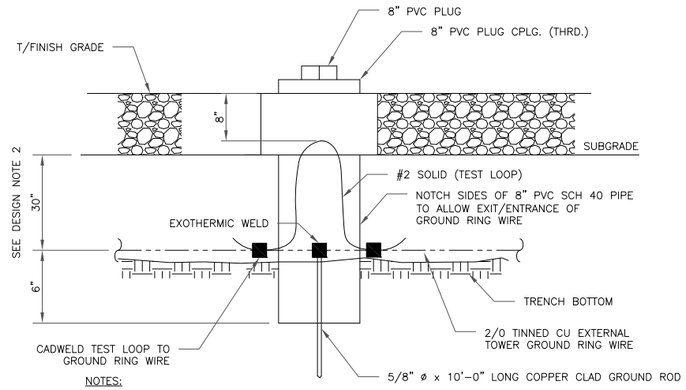
1 ANTENNA GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
2. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
3. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

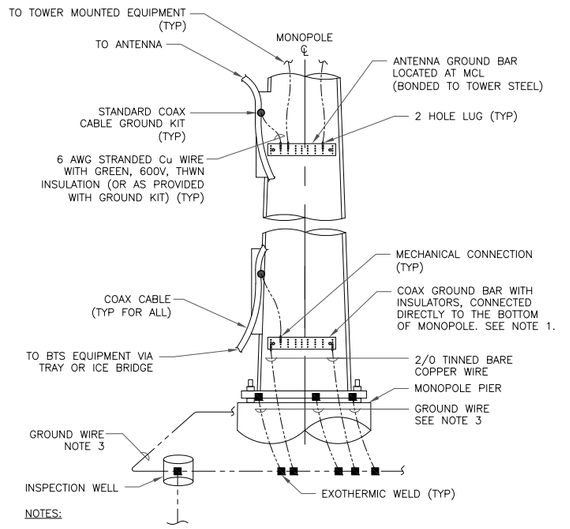
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

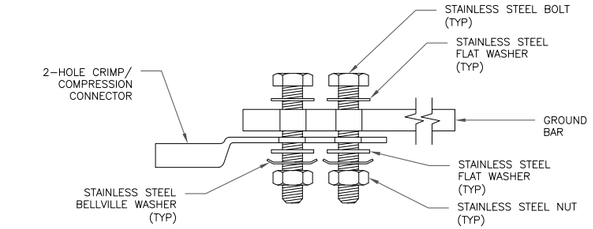
3 INSPECTION WELL DETAIL
SCALE: NOT TO SCALE



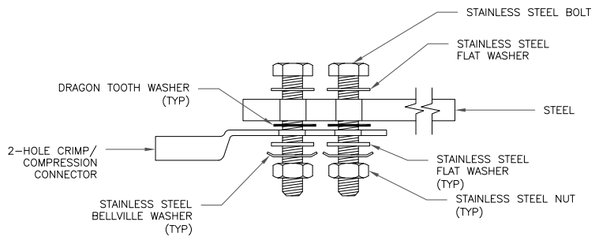
NOTES:

1. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATIONS AND CONNECTION ORIENTATION. COAXIAL CABLES EXCEEDING 200 FEET ON THE TOWER SHALL HAVE GROUND KITS AT THE MIDPOINT. PROVIDE AS REQUIRED.
2. ONLY MECHANICAL CONNECTIONS ARE ALLOWED TO BE MADE TO CROWN CASTLE USA INC. TOWERS. ALL MECHANICAL CONNECTIONS SHALL BE TREATED WITH AN ANTI-OXIDANT COATING.
3. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF THE RECOGNIZED EDITION OF ANSI/TIA 222 AND NFPA 780.

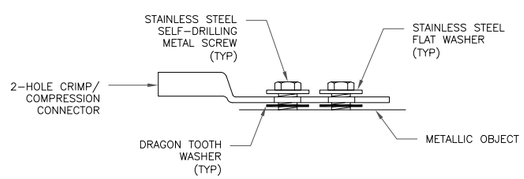
4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



SINGLE CONNECTOR AT GROUND BARS

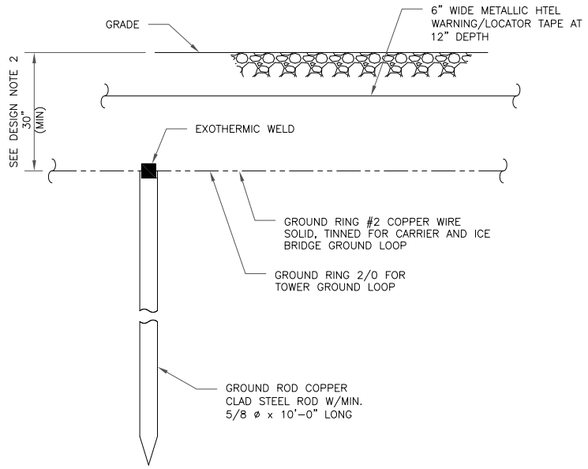


SINGLE CONNECTOR AT STEEL OBJECTS



SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS

5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

6 GROUND ROD DETAIL
SCALE: NOT TO SCALE

AT&T
ONE AT&T WAY
BEDMINSTER, NJ 07921

CROWN CASTLE
3200 HORIZON DRIVE, SUITE 150
KING OF PRUSSIA, PA 19406

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

AT&T SITE NUMBER:
CTL02256

BU #: **845455**
OXFORD-QUAKER FARMS

85 QUAKER FARMS ROAD
OXFORD, CT 06478

EXISTING 149'-0"
MONOPOLE

ISSUED FOR:

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0	6/3/20	BLB	CONSTRUCTION	RMC
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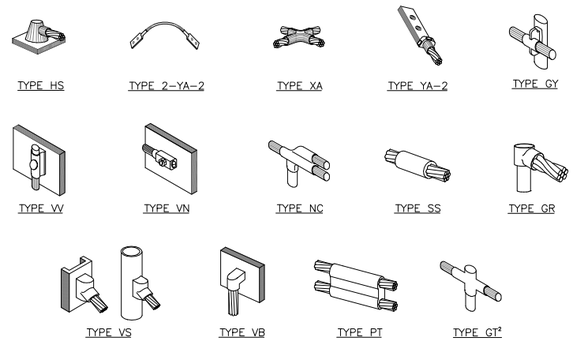
STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
6/25/20

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: G-1
REVISION: 1

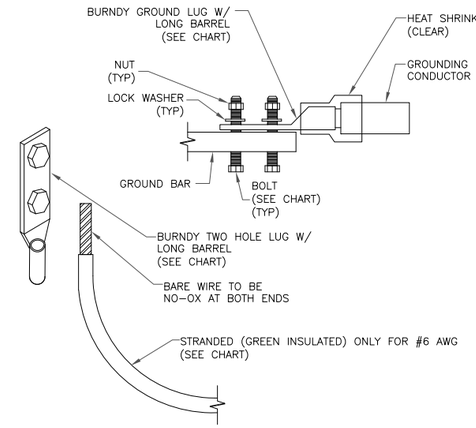


NOTE:

1. ERICO EXOTHERMIC "MOLD TYPES" SHOWN HERE ARE EXAMPLES. CONSULT WITH CONSTRUCTION MANAGER FOR SPECIFIC MOLDS TO BE USED FOR THIS PROJECT.
2. MOLD TYPE ONLY TO BE USED BELOW GRADE WHEN CONNECTING GROUND RING TO GROUND ROD.

1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE

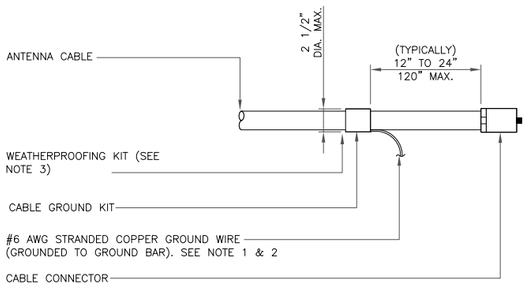
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



NOTES:

1. ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER,GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

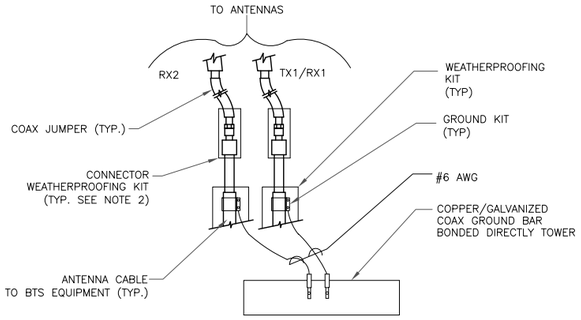
2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

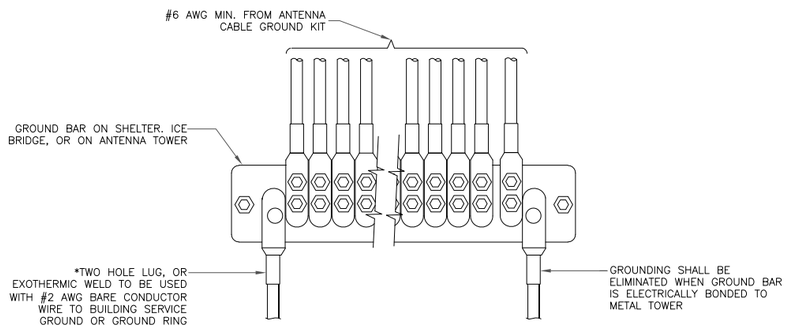
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



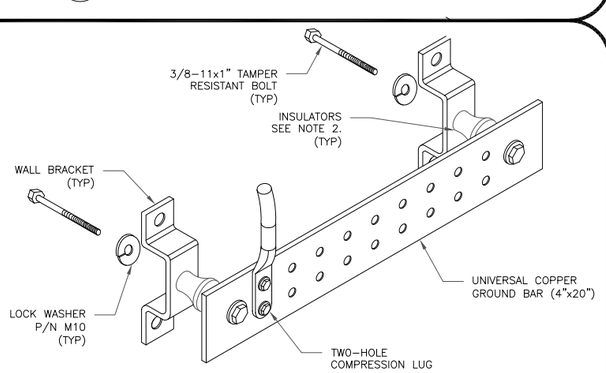
NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



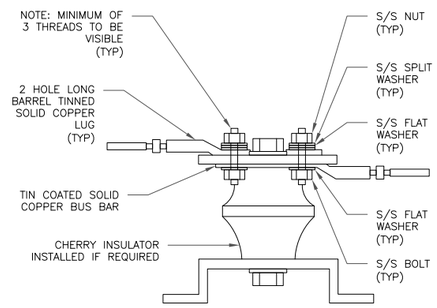
5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



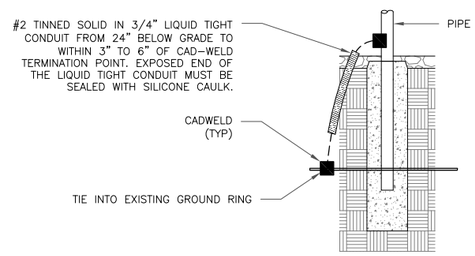
NOTES:

1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

6 GROUND BAR DETAIL
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
SCALE: NOT TO SCALE

AT&T
ONE AT&T WAY
BEDMINSTER, NJ 07921

CROWN CASTLE
3200 HORIZON DRIVE, SUITE 150
KING OF PRUSSIA, PA 19406

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

AT&T SITE NUMBER:
CTL02256

BU #: **845455**
OXFORD-QUAKER FARMS

85 QUAKER FARMS ROAD
OXFORD, CT 06478

EXISTING 149'-0"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/3/20	BLB	CONSTRUCTION	RMC
1	6/25/20	GEH	CONSTRUCTION	RMC

STATE OF CONNECTICUT
31627
LICENSED PROFESSIONAL ENGINEER
6/25/20

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: G-2
REVISION: 1

Exhibit D

Structural Analysis Report

Date: **April 29, 2020**

Denice Nicholson
Crown Castle
3 Corporate Dr
Clifton Park, NY 12065

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
724-416-2000

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	82094
	Carrier Site Name:	CTL02256
Crown Castle Designation:	**Crown Castle BU Number:**	845455
	Crown Castle Site Name:	OXFORD-QUAKER FARMS
	Crown Castle JDE Job Number:	596328
	Crown Castle Work Order Number:	1837617
	Crown Castle Order Number:	509315 Rev. 3
Engineering Firm Designation:	**Crown Castle Project Number:**	1837617
Site Data:	**85 QUAKER FARMS ROAD, OXFORD, New Haven County, CT**	
	Latitude *41° 23' 2.36"*, Longitude *-73° 8' 14.54"*	
	149 Foot - Monopole Tower	

Dear Denice Nicholson,

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Proposed Equipment Configuration **Sufficient Capacity – 75.9%**

This analysis utilizes an ultimate 3-second gust wind speed of 125 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria

Structural analysis prepared by: Bernadette Rossmiller

Respectfully submitted by:

Bradley E. Byrom, P.E., S.E.
Senior Project Engineer

4/29/2020

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 149 ft Monopole tower designed by PAUL J FORD.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	125 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
149.0	150.0	3	cci antennas	DMP65R-BU6D w/ Mount Pipe	2 5 6	3/8 3/4 1-5/8
		3	commscope	NNH4-65B-R6 w/ Mount Pipe		
		3	ericsson	RADIO 4415 B30		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 8843 B2/B66A		
		3	powerwave technologies	1001983		
		6	powerwave technologies	7020.00		
		6	powerwave technologies	LGP21401		
		1	raycap	DC6-48-60-18-8F		
		1	raycap	DC9-48-60-24-PC16-EV		
	149.0	1	tower mounts	T-Arm Mount [TA 702-3]		
139.0	140.0	3	powerwave technologies	7770.00 w/ Mount Pipe	6	1-5/8
		6	powerwave technologies	TMA DD 1900 with 850 BYPASS		
	139.0	1	tower mounts	Side Arm Mount [SO 104-3]		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
129.0	132.0	3	ericsson	KRY 112 489/2	1 12	1-1/4 1-5/8
		3	ericsson	RADIO 4449 B12/B71		
		3	rfs celwave	APXV18-209014-C		
		3	rfs celwave	APXVAARR24_43-U-NA20		
	129.0	1	tower mounts	T-Arm Mount [TA 702-3]		
120.0	120.0	3	alcatel lucent	RRH2X60-AWS	20	1-5/8

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		3	andrew	HBXX-6517DS-A2M w/ Mount Pipe		
		3	andrew	SBNHH-1D65B w/ Mount Pipe		
		3	antel	BXA-80080/6CF w/ Mount Pipe		
		2	rfs celwave	DB-T1-6Z-8AB-0Z		
		1	tower mounts	Side Arm Mount [SO 104-3]		
80.0	80.0	1	PCTel	MPRD2449	3	1/2
		1	antenna systems and solutions inc	FO150-3		
		2	tower mounts	Pipe Mount [PM 601-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Wilkinson Engineering	4546778	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Wilkinson Engineering (Mapped)	5113091	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Paul J. Ford and Company	5110795	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.5.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built and maintained in accordance with the manufacturer's specifications.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	149 - 111.5	Pole	TP29.487x23x0.1875	1	-7.72	1047.35	41.0	Pass
L2	111.5 - 75.25	Pole	TP35.383x28.4633x0.2188	2	-13.34	1466.49	75.3	Pass
L3	75.25 - 39.75	Pole	TP41.086x34.167x0.2813	3	-20.74	2187.66	75.9	Pass
L4	39.75 - 0	Pole	TP47.4x39.6154x0.375	4	-34.06	3438.05	66.4	Pass
							Summary	
						Pole (L3)	75.9	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
						Rating =	75.9	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	68.0	Pass
1	Base Plate	0	58.8	Pass
1	Base Foundation Structure	0	33.6	Pass
1	Base Foundation Soil Interaction	0	63.4	Pass

Structure Rating (max from all components) =	75.9%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

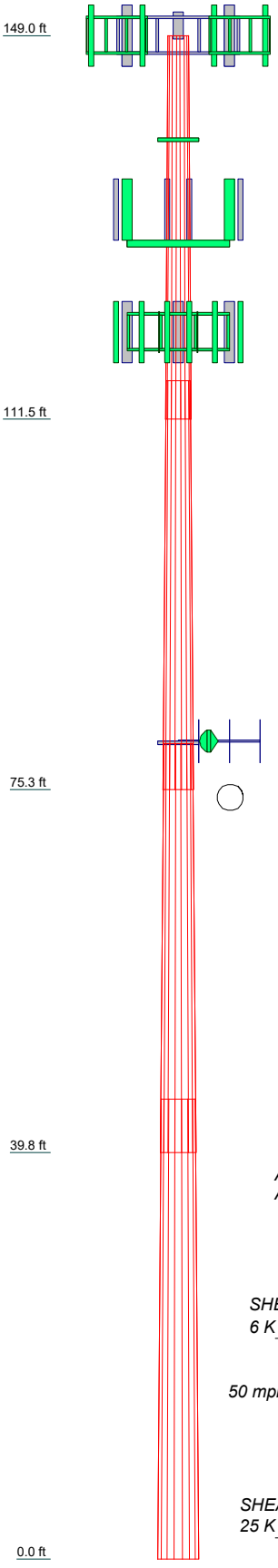
4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	37.50	18	0.1875	3.75	23.0000	29.4870	A607-65	2.0
2	40.00	18	0.2188	4.50	28.4633	35.3830		3.0
3	40.00	18	0.2813	5.25	34.1670	41.0860		4.5
4	45.00	18	0.3750		39.6154	47.4000		7.9
								17.4



ALL REACTIONS ARE FACTORED

AXIAL 59 K

SHEAR 6 K *MOMENT 679 kip-ft*

TORQUE 0 kip-ft

50 mph WIND - 1.5000 in ICE

AXIAL 34 K

SHEAR 25 K *MOMENT 2548 kip-ft*

TORQUE 1 kip-ft

REACTIONS - 125 mph WIND

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 75.9%

CROWN CASTLE
The Pathway to Possible

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: 724-416-2000
FAX:

Job: ***BU 845455***			
Project:			
Client: Crown Castle	Drawn by: BRossmiller		App'd:
Code: TIA-222-H	Date: 04/29/20		Scale: NTS
Path: C:\Users\brossmiller\Desktop\temporary\845455 WO 1837617\production\LC7\LC7 - 845455.eri			Dwg No. E-1

Tower Input Data

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

3) Tower is located in New Haven County, Connecticut.
4) Tower base elevation above sea level: 607.00 ft.
5) Basic wind speed of 125 mph.
6) Risk Category II.
7) Exposure Category C.
8) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
9) Topographic Category: 1.
10) Crest Height: 0.00 ft.
11) Nominal ice thickness of 1.5000 in.
12) Ice thickness is considered to increase with height.
13) Ice density of 56 pcf.
14) A wind speed of 50 mph is used in combination with ice.
15) Temperature drop of 50 °F.
16) Deflections calculated using a wind speed of 60 mph.
17) A non-linear (P-delta) analysis was used.
18) Pressures are calculated at each section.
19) Stress ratio used in pole design is 1.05.
20) Tower analysis based on target reliabilities in accordance with Annex S.
21) Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
22) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-H Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-H Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component	√	Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	149.00-111.50	37.50	3.75	18	23.0000	29.4870	0.1875	0.7500	A607-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L2	111.50-75.25	40.00	4.50	18	28.4633	35.3830	0.2188	0.8750	A607-65 (65 ksi)
L3	75.25-39.75	40.00	5.25	18	34.1670	41.0860	0.2813	1.1250	A607-65 (65 ksi)
L4	39.75-0.00	45.00		18	39.6154	47.4000	0.3750	1.5000	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	23.3259	13.5763	892.6152	8.0984	11.6840	76.3964	1786.4050	6.7894	3.7180	19.829
	29.9130	17.4369	1891.1513	10.4013	14.9794	126.2502	3784.7910	8.7201	4.8597	25.918
L2	29.5274	19.6105	1976.4982	10.0268	14.4594	136.6934	3955.5970	9.8071	4.6245	21.141
	35.8951	24.4150	3814.1390	12.4833	17.9746	212.1965	7633.2967	12.2098	5.8424	26.708
L3	35.4411	30.2494	4388.2314	12.0295	17.3569	252.8241	8782.2369	15.1276	5.5184	19.621
	41.6764	36.4259	7662.4750	14.4857	20.8717	367.1229	15335.0324	18.2164	6.7361	23.951
L4	41.0909	46.7059	9086.0569	13.9303	20.1246	451.4897	18184.0695	23.3574	6.3123	16.833
	48.0734	55.9715	15637.3103	16.6939	24.0792	649.4115	31295.1965	27.9911	7.6824	20.486

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 149.00-111.50				1	1	1			
L2 111.50-75.25				1	1	1			
L3 75.25-39.75				1	1	1			
L4 39.75-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
** 120 ft **										
HB158-1-08U8-S8J18(1-5/8)	C	No	Surface Ar (CaAa)	120.00 - 0.00	8	8	-0.200 0.000	1.9800		1.30
LDF7-50A(1-5/8)	C	No	Surface Ar (CaAa)	129.00 - 0.00	6	6	-0.500 -0.300	1.9800		0.82
HB114-U6S12-XXX-LI(1-1/4)	B	No	Surface Ar (CaAa)	129.00 - 0.00	1	1	0.450 0.500	1.5400		1.70
***										
**										
*										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
** 80 ft **									
LDF4-50A(1/2)	A	No	No	Inside Pole	149.00 - 0.00	3	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
							2" Ice	0.00	0.15
LDF7-50A(1-5/8)	C	No	No	Inside Pole	120.00 - 0.00	12	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
** 129 ft **									
AVA7-50(1-5/8)	C	No	No	Inside Pole	129.00 - 0.00	6	No Ice	0.00	0.70
							1/2" Ice	0.00	0.70
							1" Ice	0.00	0.70
							2" Ice	0.00	0.70
** 139 **									
AVA7-50(1-5/8)	C	No	No	Inside Pole	139.00 - 0.00	6	No Ice	0.00	0.70
							1/2" Ice	0.00	0.70
							1" Ice	0.00	0.70
							2" Ice	0.00	0.70
** 149 **									
LDF4-50A(1/2)	C	No	No	Inside Pole	149.00 - 0.00	3	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
							2" Ice	0.00	0.15
LDF7-50A(1-5/8)	C	No	No	Inside Pole	149.00 - 0.00	6	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
FB-L98B-034-XXX(3/8)	C	No	No	Inside Pole	149.00 - 0.00	2	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	149.00 - 0.00	5	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
							2" Ice	0.00	0.58
***									
**									
*									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	149.00-111.50	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	2.695	0.000	0.03
		C	0.000	0.000	34.254	0.000	0.76
L2	111.50-75.25	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	5.582	0.000	0.06
		C	0.000	0.000	100.485	0.000	1.52
L3	75.25-39.75	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	5.467	0.000	0.06
		C	0.000	0.000	98.406	0.000	1.49
L4	39.75-0.00	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	6.122	0.000	0.07
		C	0.000	0.000	110.187	0.000	1.67

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	149.00-111.50	A	1.462	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	7.812	0.000	0.12
		C		0.000	0.000	52.320	0.000	1.30
L2	111.50-75.25	A	1.414	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	16.181	0.000	0.26
		C		0.000	0.000	152.104	0.000	3.09
L3	75.25-39.75	A	1.347	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	15.507	0.000	0.24
		C		0.000	0.000	148.109	0.000	2.97
L4	39.75-0.00	A	1.213	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	16.833	0.000	0.26
		C		0.000	0.000	164.513	0.000	3.25

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	149.00-111.50	3.1721	4.3897	2.8194	3.6205
L2	111.50-75.25	4.6915	8.4015	4.0924	6.7725
L3	75.25-39.75	5.1132	9.1554	4.4949	7.4545
L4	39.75-0.00	5.4924	9.8334	4.8524	8.0732

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	4	HB158-1-08U8-S8J18(1-5/8)	111.50 - 120.00	1.0000	1.0000
L1	8	LDF7-50A(1-5/8)	111.50 - 129.00	1.0000	1.0000
L1	9	HB114-U6S12-XXX-LI(1-1/4)	111.50 - 129.00	1.0000	1.0000
L2	4	HB158-1-08U8-S8J18(1-5/8)	75.25 - 111.50	1.0000	1.0000
L2	8	LDF7-50A(1-5/8)	75.25 - 111.50	1.0000	1.0000
L2	9	HB114-U6S12-XXX-LI(1-1/4)	75.25 - 111.50	1.0000	1.0000
L3	4	HB158-1-08U8-S8J18(1-5/8)	39.75 - 75.25	1.0000	1.0000
L3	8	LDF7-50A(1-5/8)	39.75 - 75.25	1.0000	1.0000
L3	9	HB114-U6S12-XXX-LI(1-1/4)	39.75 - 75.25	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
*** 149 - ATT ***									
T-Arm Mount [TA 702-3]	C	None		0.0000	149.00	No Ice	4.75	4.75	0.34
						1/2" Ice	5.82	5.82	0.43
						1" Ice	6.98	6.98	0.55
						2" Ice	9.72	9.72	0.87
1001983	A	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.18 0.23 0.30 0.44	0.08 0.13 0.18 0.30	0.00 0.00 0.01 0.01
1001983	B	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.18 0.23 0.30 0.44	0.08 0.13 0.18 0.30	0.00 0.00 0.01 0.01
1001983	C	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.18 0.23 0.30 0.44	0.08 0.13 0.18 0.30	0.00 0.00 0.01 0.01
(2) 7020.00	A	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.10 0.15 0.20 0.33	0.17 0.24 0.31 0.48	0.00 0.01 0.01 0.02
(2) 7020.00	B	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.10 0.15 0.20 0.33	0.17 0.24 0.31 0.48	0.00 0.01 0.01 0.02
(2) 7020.00	C	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.10 0.15 0.20 0.33	0.17 0.24 0.31 0.48	0.00 0.01 0.01 0.02
(2) LGP21401	A	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.10 1.24 1.38 1.69	0.21 0.27 0.35 0.52	0.01 0.02 0.03 0.05
(2) LGP21401	B	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.10 1.24 1.38 1.69	0.21 0.27 0.35 0.52	0.01 0.02 0.03 0.05
(2) LGP21401	C	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.10 1.24 1.38 1.69	0.21 0.27 0.35 0.52	0.01 0.02 0.03 0.05
RRUS 8843 B2/B66A	A	From Leg	4.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.32	1.35 1.50 1.65 1.99	0.07 0.09 0.11 0.16
RRUS 8843 B2/B66A	B	From Leg	4.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.32	1.35 1.50 1.65 1.99	0.07 0.09 0.11 0.16
RRUS 8843 B2/B66A	C	From Leg	4.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice	1.64 1.80 1.97 2.32	1.35 1.50 1.65 1.99	0.07 0.09 0.11 0.16

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
RRUS 4449 B5/B12	A	From Leg	4.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
RRUS 4449 B5/B12	B	From Leg	4.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
RRUS 4449 B5/B12	C	From Leg	4.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
RADIO 4415 B30	A	From Leg	4.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.33	0.64 0.75 0.87 1.13	0.04 0.05 0.07 0.11
RADIO 4415 B30	B	From Leg	4.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.33	0.64 0.75 0.87 1.13	0.04 0.05 0.07 0.11
RADIO 4415 B30	C	From Leg	4.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.33	0.64 0.75 0.87 1.13	0.04 0.05 0.07 0.11
DMP65R-BU6D w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	11.96 12.70 13.46 15.02	5.97 6.63 7.30 8.69	0.11 0.20 0.30 0.53
DMP65R-BU6D w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	11.96 12.70 13.46 15.02	5.97 6.63 7.30 8.69	0.11 0.20 0.30 0.53
DMP65R-BU6D w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	11.96 12.70 13.46 15.02	5.97 6.63 7.30 8.69	0.11 0.20 0.30 0.53
NNH4-65B-R6 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.55 8.04 8.53 9.56	4.23 4.67 5.12 6.05	0.12 0.21 0.30 0.53
NNH4-65B-R6 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.55 8.04 8.53 9.56	4.23 4.67 5.12 6.05	0.12 0.21 0.30 0.53
NNH4-65B-R6 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.55 8.04 8.53 9.56	4.23 4.67 5.12 6.05	0.12 0.21 0.30 0.53
DC9-48-60-24-PC16-EV	A	From Leg	4.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice	2.26 2.44 2.64 3.05	1.12 1.26 1.40 1.72	0.03 0.05 0.08 0.13

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
DC6-48-60-18-8F	A	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.21 1.89 2.11 2.57	1.21 1.89 2.11 2.57	0.02 0.04 0.07 0.13
** 139 - ATT **									
7770.00 w/ Mount Pipe	A	From Leg	3.00 0.00 1.00	0.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	B	From Leg	3.00 0.00 1.00	0.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	C	From Leg	3.00 0.00 1.00	0.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
(2) TMA DD 1900 with 850 BYPASS	A	From Leg	1.00 0.00 1.00	0.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.31 0.41 0.51 0.75	0.15 0.21 0.27 0.42	0.02 0.02 0.03 0.05
(2) TMA DD 1900 with 850 BYPASS	B	From Leg	1.00 0.00 1.00	0.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.31 0.41 0.51 0.75	0.15 0.21 0.27 0.42	0.02 0.02 0.03 0.05
(2) TMA DD 1900 with 850 BYPASS	C	From Leg	1.00 0.00 1.00	0.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.31 0.41 0.51 0.75	0.15 0.21 0.27 0.42	0.02 0.02 0.03 0.05
4.5' x 2" Mount Pipe	A	From Leg	1.00 0.00 0.00	0.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.02 1.30 1.58 2.17	1.02 1.30 1.58 2.17	0.00 0.01 0.02 0.05
4.5' x 2" Mount Pipe	B	From Leg	1.00 0.00 0.00	0.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.02 1.30 1.58 2.17	1.02 1.30 1.58 2.17	0.00 0.01 0.02 0.05
4.5' x 2" Mount Pipe	C	From Leg	1.00 0.00 0.00	0.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.02 1.30 1.58 2.17	1.02 1.30 1.58 2.17	0.00 0.01 0.02 0.05
Side Arm Mount [SO 104-3]	C	None		0.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.62 3.30 3.98 5.35	2.62 3.30 3.98 5.35	0.29 0.41 0.53 0.77
** 129 - TMO **									
T-Arm Mount [TA 702-3]	C	None		0.0000	129.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.75 5.82 6.98 9.72	4.75 5.82 6.98 9.72	0.34 0.43 0.55 0.87
9' x 2" Pipe Mount	A	From Leg	3.00 0.00	0.0000	129.00	No Ice 1/2"	2.14 3.07	2.14 3.07	0.07 0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	4.01	4.01	0.10
						1" Ice	5.13	5.13	0.17
						2" Ice			
9' x 2" Pipe Mount	B	From Leg	3.00	0.0000	129.00	No Ice	2.14	2.14	0.07
			0.00			1/2"	3.07	3.07	0.08
			0.00			Ice	4.01	4.01	0.10
						1" Ice	5.13	5.13	0.17
						2" Ice			
9' x 2" Pipe Mount	C	From Leg	3.00	0.0000	129.00	No Ice	2.14	2.14	0.07
			0.00			1/2"	3.07	3.07	0.08
			0.00			Ice	4.01	4.01	0.10
						1" Ice	5.13	5.13	0.17
						2" Ice			
APXVAARR24_43-U-NA20	A	From Leg	3.00	0.0000	129.00	No Ice	14.67	5.32	0.15
			0.00			1/2"	15.43	5.99	0.27
			3.00			Ice	16.21	6.68	0.39
						1" Ice	17.81	8.08	0.66
						2" Ice			
APXVAARR24_43-U-NA20	B	From Leg	3.00	0.0000	129.00	No Ice	14.67	5.32	0.15
			0.00			1/2"	15.43	5.99	0.27
			3.00			Ice	16.21	6.68	0.39
						1" Ice	17.81	8.08	0.66
						2" Ice			
APXVAARR24_43-U-NA20	C	From Leg	3.00	0.0000	129.00	No Ice	14.67	5.32	0.15
			0.00			1/2"	15.43	5.99	0.27
			3.00			Ice	16.21	6.68	0.39
						1" Ice	17.81	8.08	0.66
						2" Ice			
APXV18-209014-C	A	From Face	3.00	0.0000	129.00	No Ice	2.57	1.21	0.03
			0.00			1/2"	3.01	1.63	0.05
			3.00			Ice	3.46	2.05	0.07
						1" Ice	4.41	2.95	0.14
						2" Ice			
APXV18-209014-C	B	From Face	3.00	0.0000	129.00	No Ice	2.57	1.21	0.03
			0.00			1/2"	3.01	1.63	0.05
			3.00			Ice	3.46	2.05	0.07
						1" Ice	4.41	2.95	0.14
						2" Ice			
APXV18-209014-C	C	From Face	3.00	0.0000	129.00	No Ice	2.57	1.21	0.03
			0.00			1/2"	3.01	1.63	0.05
			3.00			Ice	3.46	2.05	0.07
						1" Ice	4.41	2.95	0.14
						2" Ice			
RADIO 4449 B12/B71	A	From Leg	3.00	0.0000	129.00	No Ice	1.65	1.16	0.07
			0.00			1/2"	1.81	1.30	0.09
			3.00			Ice	1.98	1.45	0.11
						1" Ice	2.34	1.76	0.16
						2" Ice			
RADIO 4449 B12/B71	B	From Leg	3.00	0.0000	129.00	No Ice	1.65	1.16	0.07
			0.00			1/2"	1.81	1.30	0.09
			3.00			Ice	1.98	1.45	0.11
						1" Ice	2.34	1.76	0.16
						2" Ice			
RADIO 4449 B12/B71	C	From Leg	3.00	0.0000	129.00	No Ice	1.65	1.16	0.07
			0.00			1/2"	1.81	1.30	0.09
			3.00			Ice	1.98	1.45	0.11
						1" Ice	2.34	1.76	0.16
						2" Ice			
KRY 112 489/2	A	From Leg	3.00	0.0000	129.00	No Ice	0.56	0.37	0.02
			0.00			1/2"	0.66	0.45	0.02
			3.00			Ice	0.76	0.54	0.03
						1" Ice	1.00	0.75	0.05
						2" Ice			
KRY 112 489/2	B	From Leg	3.00	0.0000	129.00	No Ice	0.56	0.37	0.02
			0.00			1/2"	0.66	0.45	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			3.00			Ice	0.76	0.54	0.03
						1" Ice	1.00	0.75	0.05
						2" Ice			
KRY 112 489/2	C	From Leg	3.00	0.0000	129.00	No Ice	0.56	0.37	0.02
			0.00			1/2"	0.66	0.45	0.02
			3.00			Ice	0.76	0.54	0.03
						1" Ice	1.00	0.75	0.05
						2" Ice			
** 120 - VZW **									
SBNHH-1D65B w/ Mount Pipe	A	From Leg	3.00	30.0000	120.00	No Ice	4.09	3.30	0.07
			-5.00			1/2"	4.49	3.68	0.13
			0.00			Ice	4.89	4.07	0.20
						1" Ice	5.72	4.87	0.39
						2" Ice			
SBNHH-1D65B w/ Mount Pipe	B	From Leg	3.00	30.0000	120.00	No Ice	4.09	3.30	0.07
			-5.00			1/2"	4.49	3.68	0.13
			0.00			Ice	4.89	4.07	0.20
						1" Ice	5.72	4.87	0.39
						2" Ice			
SBNHH-1D65B w/ Mount Pipe	C	From Leg	3.00	30.0000	120.00	No Ice	4.09	3.30	0.07
			-5.00			1/2"	4.49	3.68	0.13
			0.00			Ice	4.89	4.07	0.20
						1" Ice	5.72	4.87	0.39
						2" Ice			
BXA-80080/6CF w/ Mount Pipe	A	From Leg	3.00	0.0000	120.00	No Ice	8.01	5.60	0.05
			0.00			1/2"	8.57	6.78	0.11
			0.00			Ice	9.10	7.67	0.18
						1" Ice	10.17	9.48	0.34
						2" Ice			
BXA-80080/6CF w/ Mount Pipe	B	From Leg	3.00	30.0000	120.00	No Ice	8.01	5.60	0.05
			0.00			1/2"	8.57	6.78	0.11
			0.00			Ice	9.10	7.67	0.18
						1" Ice	10.17	9.48	0.34
						2" Ice			
BXA-80080/6CF w/ Mount Pipe	C	From Leg	3.00	30.0000	120.00	No Ice	8.01	5.60	0.05
			0.00			1/2"	8.57	6.78	0.11
			0.00			Ice	9.10	7.67	0.18
						1" Ice	10.17	9.48	0.34
						2" Ice			
HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	3.00	30.0000	120.00	No Ice	7.97	5.99	0.08
			5.00			1/2"	8.73	6.72	0.14
			0.00			Ice	9.51	7.47	0.21
						1" Ice	11.11	9.02	0.40
						2" Ice			
HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	3.00	30.0000	120.00	No Ice	7.97	5.99	0.08
			5.00			1/2"	8.73	6.72	0.14
			0.00			Ice	9.51	7.47	0.21
						1" Ice	11.11	9.02	0.40
						2" Ice			
HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	3.00	30.0000	120.00	No Ice	7.97	5.99	0.08
			5.00			1/2"	8.73	6.72	0.14
			0.00			Ice	9.51	7.47	0.21
						1" Ice	11.11	9.02	0.40
						2" Ice			
RRH2X60-AWS	A	From Leg	3.00	0.0000	120.00	No Ice	3.50	1.82	0.06
			0.00			1/2"	3.76	2.05	0.08
			0.00			Ice	4.03	2.29	0.11
						1" Ice	4.58	2.79	0.17
						2" Ice			
RRH2X60-AWS	B	From Leg	3.00	0.0000	120.00	No Ice	3.50	1.82	0.06
			0.00			1/2"	3.76	2.05	0.08
			0.00			Ice	4.03	2.29	0.11
						1" Ice	4.58	2.79	0.17
						2" Ice			
RRH2X60-AWS	C	From Leg	3.00	0.0000	120.00	No Ice	3.50	1.82	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 0.00			1/2" Ice	3.76 4.03	2.05 2.29	0.08 0.11
						1" Ice	4.58	2.79	0.17
						2" Ice			
DB-T1-6Z-8AB-0Z	A	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.80 5.07 5.35 5.93	2.00 2.19 2.39 2.81	0.04 0.08 0.12 0.21
DB-T1-6Z-8AB-0Z	B	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.80 5.07 5.35 5.93	2.00 2.19 2.39 2.81	0.04 0.08 0.12 0.21
(2) 4' x 2" Pipe Mount	A	From Leg	1.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.79 1.03 1.28 1.81	0.79 1.03 1.28 1.81	0.03 0.04 0.04 0.07
(2) 4' x 2" Pipe Mount	B	From Leg	1.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.79 1.03 1.28 1.81	0.79 1.03 1.28 1.81	0.03 0.04 0.04 0.07
(2) 4' x 2" Pipe Mount	C	From Leg	1.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.79 1.03 1.28 1.81	0.79 1.03 1.28 1.81	0.03 0.04 0.04 0.07
(2) 6' x 2" Horizontal Mount Pipe	A	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.14 1.76 2.14 2.90	0.01 0.04 0.09 0.21	0.02 0.03 0.04 0.08
(2) 6' x 2" Horizontal Mount Pipe	B	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.14 1.76 2.14 2.90	0.01 0.04 0.09 0.21	0.02 0.03 0.04 0.08
(2) 6' x 2" Horizontal Mount Pipe	C	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.14 1.76 2.14 2.90	0.01 0.04 0.09 0.21	0.02 0.03 0.04 0.08
Side Arm Mount [SO 104-3]	C	None		0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.62 3.30 3.98 5.35	2.62 3.30 3.98 5.35	0.29 0.41 0.53 0.77
***** ** 80 - Seymour CT ** FO150-3	B	From Leg	0.50 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.09 1.35 1.62 2.20	1.09 1.35 1.62 2.20	0.00 0.01 0.02 0.06
6' x 2" Mount Pipe	A	From Leg	0.50 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
Pipe Mount [PM 601-1]	A	From Leg	0.50 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice	1.32 1.58 1.84 2.40	1.32 1.58 1.84 2.40	0.07 0.08 0.09 0.13

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
6' x 2" Mount Pipe	A	From Leg	0.50	0.00	0.0000	80.00	2" Ice			
							No Ice	1.43	1.43	0.02
							1/2" Ice	1.92	1.92	0.03
							1" Ice	2.29	2.29	0.05
							2" Ice	3.06	3.06	0.09
Pipe Mount [PM 601-1]	A	From Leg	0.50	0.00	0.0000	80.00	No Ice	1.32	1.32	0.07
							1/2" Ice	1.58	1.58	0.08
							1" Ice	1.84	1.84	0.09
							2" Ice	2.40	2.40	0.13
*****										

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
MPRD2449	B	Paraboloid w/Radome	From Leg	1.00	0.00	0.0000		80.00	2.17	No Ice	3.69	0.04
										1/2" Ice	3.98	0.06
										1" Ice	4.27	0.08
										2" Ice	4.84	0.12

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	149 - 111.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-20.70	-0.80	0.39
			Max. Mx	8	-7.75	-266.25	-0.40
			Max. My	2	-7.72	0.33	268.95
			Max. Vy	8	13.74	-266.25	-0.40
			Max. Vx	14	13.92	-0.70	-268.65
			Max. Torque	22			-0.79
L2	111.5 - 75.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-30.30	-1.49	-1.99
			Max. Mx	8	-13.36	-816.14	-4.33
			Max. My	14	-13.34	-4.33	-825.07
			Max. Vy	20	-17.68	815.37	3.56
			Max. Vx	2	-17.82	3.57	824.40
			Max. Torque	22			-1.22
L3	75.25 - 39.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.43	-1.91	-5.46
			Max. Mx	20	-20.76	1488.96	6.07
			Max. My	14	-20.75	-7.61	-1502.94
			Max. Vy	20	-21.02	1488.96	6.07
			Max. Vx	2	-21.15	7.49	1501.82
			Max. Torque	22			-1.22
L4	39.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-59.43	-2.43	-10.21
			Max. Mx	20	-34.06	2521.82	9.03
			Max. My	14	-34.06	-11.77	-2541.38
			Max. Vy	20	-24.67	2521.82	9.03
			Max. Vx	2	-24.80	12.47	2539.32
			Max. Torque	22			-1.22

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	33	59.43	-0.01	-6.40
	Max. H_x	21	25.56	24.64	0.10
	Max. H_z	2	34.08	0.11	24.77
	Max. M_x	2	2539.32	0.11	24.77
	Max. M_z	8	2519.21	-24.59	-0.10
	Max. Torsion	10	1.22	-21.36	-12.47
	Min. Vert	7	25.56	-21.34	12.36
	Min. H_x	8	34.08	-24.59	-0.10
	Min. H_z	15	25.56	-0.09	-24.72
	Min. M_x	14	-2541.38	-0.09	-24.72
	Min. M_z	20	-2521.82	24.64	0.10
	Min. Torsion	22	-1.22	21.38	12.48

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	28.40	0.00	0.00	2.32	-0.54	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	34.08	-0.11	-24.77	-2539.32	12.47	0.76
0.9 Dead+1.0 Wind 0 deg - No Ice	25.56	-0.11	-24.77	-2512.32	12.51	0.76
1.2 Dead+1.0 Wind 30 deg - No Ice	34.08	12.22	-21.45	-2197.68	-1250.83	0.16
0.9 Dead+1.0 Wind 30 deg - No Ice	25.56	12.22	-21.45	-2174.41	-1237.02	0.16
1.2 Dead+1.0 Wind 60 deg - No Ice	34.08	21.34	-12.36	-1263.94	-2185.62	-0.47
0.9 Dead+1.0 Wind 60 deg - No Ice	25.56	21.34	-12.36	-1250.86	-2161.64	-0.46
1.2 Dead+1.0 Wind 90 deg - No Ice	34.08	24.59	0.10	14.76	-2519.21	-0.96
0.9 Dead+1.0 Wind 90 deg - No Ice	25.56	24.59	0.10	13.89	-2491.58	-0.95
1.2 Dead+1.0 Wind 120 deg - No Ice	34.08	21.36	12.47	1284.35	-2188.80	-1.22
0.9 Dead+1.0 Wind 120 deg - No Ice	25.56	21.36	12.47	1269.63	-2164.77	-1.21
1.2 Dead+1.0 Wind 150 deg - No Ice	34.08	12.38	21.49	2209.40	-1270.16	-1.15
0.9 Dead+1.0 Wind 150 deg - No Ice	25.56	12.38	21.49	2184.58	-1256.15	-1.15
1.2 Dead+1.0 Wind 180 deg - No Ice	34.08	0.09	24.72	2541.38	-11.77	-0.75
0.9 Dead+1.0 Wind 180 deg - No Ice	25.56	0.09	24.72	2512.93	-11.47	-0.75
1.2 Dead+1.0 Wind 210 deg - No Ice	34.08	-12.26	21.43	2201.52	1252.75	-0.16
0.9 Dead+1.0 Wind 210 deg - No Ice	25.56	-12.26	21.43	2176.79	1239.27	-0.16
1.2 Dead+1.0 Wind 240 deg - No Ice	34.08	-21.40	12.36	1269.76	2188.47	0.46
0.9 Dead+1.0 Wind 240 deg - No Ice	25.56	-21.40	12.36	1255.21	2164.81	0.45
1.2 Dead+1.0 Wind 270 deg - No Ice	34.08	-24.64	-0.10	-9.03	2521.82	0.96
0.9 Dead+1.0 Wind 270 deg - No Ice	25.56	-24.64	-0.10	-9.64	2494.50	0.95
1.2 Dead+1.0 Wind 300 deg - No Ice	34.08	-21.38	-12.48	-1279.81	2189.58	1.22
0.9 Dead+1.0 Wind 300 deg - No Ice	25.56	-21.38	-12.48	-1266.55	2165.89	1.21
1.2 Dead+1.0 Wind 330 deg - No Ice	34.08	-12.40	-21.53	-2207.06	1270.85	1.15

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.0 Wind 330 deg - No Ice	25.56	-12.40	-21.53	-2183.69	1257.16	1.15
1.2 Dead+1.0 Ice+1.0 Temp	59.43	0.00	0.00	10.21	-2.43	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	59.43	-0.02	-6.40	-657.91	-0.59	0.13
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	59.43	3.17	-5.54	-567.22	-332.74	-0.04
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	59.43	5.51	-3.19	-322.18	-576.53	-0.19
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	59.43	6.38	0.01	11.89	-666.86	-0.30
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	59.43	5.53	3.21	345.79	-578.88	-0.33
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	59.43	3.20	5.55	589.55	-336.05	-0.27
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	59.43	0.01	6.40	677.73	-3.90	-0.13
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	59.43	-3.18	5.53	587.41	328.49	0.04
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	59.43	-5.52	3.19	342.77	572.48	0.19
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	59.43	-6.39	-0.01	8.68	662.76	0.30
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	59.43	-5.54	-3.22	-325.46	574.41	0.32
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	59.43	-3.20	-5.56	-569.67	331.55	0.27
Dead+Wind 0 deg - Service	28.40	-0.02	-5.37	-546.22	2.27	0.17
Dead+Wind 30 deg - Service	28.40	2.65	-4.65	-472.48	-270.34	0.03
Dead+Wind 60 deg - Service	28.40	4.63	-2.68	-270.98	-472.06	-0.10
Dead+Wind 90 deg - Service	28.40	5.34	0.02	4.95	-544.04	-0.21
Dead+Wind 120 deg - Service	28.40	4.63	2.71	278.92	-472.75	-0.27
Dead+Wind 150 deg - Service	28.40	2.69	4.66	478.55	-274.52	-0.25
Dead+Wind 180 deg - Service	28.40	0.02	5.36	550.19	-2.96	-0.17
Dead+Wind 210 deg - Service	28.40	-2.66	4.65	476.84	269.92	-0.03
Dead+Wind 240 deg - Service	28.40	-4.64	2.68	275.77	471.84	0.10
Dead+Wind 270 deg - Service	28.40	-5.35	-0.02	-0.18	543.77	0.21
Dead+Wind 300 deg - Service	28.40	-4.64	-2.71	-274.41	472.09	0.27
Dead+Wind 330 deg - Service	28.40	-2.69	-4.67	-474.52	273.83	0.25

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-28.40	0.00	0.00	28.40	0.00	0.000%
2	-0.11	-34.08	-24.77	0.11	34.08	24.77	0.000%
3	-0.11	-25.56	-24.77	0.11	25.56	24.77	0.000%
4	12.22	-34.08	-21.45	-12.22	34.08	21.45	0.000%
5	12.22	-25.56	-21.45	-12.22	25.56	21.45	0.000%
6	21.34	-34.08	-12.36	-21.34	34.08	12.36	0.000%
7	21.34	-25.56	-12.36	-21.34	25.56	12.36	0.000%
8	24.59	-34.08	0.10	-24.59	34.08	-0.10	0.000%
9	24.59	-25.56	0.10	-24.59	25.56	-0.10	0.000%
10	21.36	-34.08	12.47	-21.36	34.08	-12.47	0.000%
11	21.36	-25.56	12.47	-21.36	25.56	-12.47	0.000%
12	12.38	-34.08	21.49	-12.38	34.08	-21.49	0.000%
13	12.38	-25.56	21.49	-12.38	25.56	-21.49	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
14	0.09	-34.08	24.72	-0.09	34.08	-24.72	0.000%
15	0.09	-25.56	24.72	-0.09	25.56	-24.72	0.000%
16	-12.26	-34.08	21.43	12.26	34.08	-21.43	0.000%
17	-12.26	-25.56	21.43	12.26	25.56	-21.43	0.000%
18	-21.40	-34.08	12.36	21.40	34.08	-12.36	0.000%
19	-21.40	-25.56	12.36	21.40	25.56	-12.36	0.000%
20	-24.64	-34.08	-0.10	24.64	34.08	0.10	0.000%
21	-24.64	-25.56	-0.10	24.64	25.56	0.10	0.000%
22	-21.38	-34.08	-12.48	21.38	34.08	12.48	0.000%
23	-21.38	-25.56	-12.48	21.38	25.56	12.48	0.000%
24	-12.40	-34.08	-21.53	12.40	34.08	21.53	0.000%
25	-12.40	-25.56	-21.53	12.40	25.56	21.53	0.000%
26	0.00	-59.43	0.00	-0.00	59.43	-0.00	0.000%
27	-0.02	-59.43	-6.40	0.02	59.43	6.40	0.000%
28	3.17	-59.43	-5.54	-3.17	59.43	5.54	0.000%
29	5.51	-59.43	-3.19	-5.51	59.43	3.19	0.000%
30	6.38	-59.43	0.01	-6.38	59.43	-0.01	0.000%
31	5.53	-59.43	3.21	-5.53	59.43	-3.21	0.000%
32	3.20	-59.43	5.55	-3.20	59.43	-5.55	0.000%
33	0.01	-59.43	6.40	-0.01	59.43	-6.40	0.000%
34	-3.18	-59.43	5.53	3.18	59.43	-5.53	0.000%
35	-5.52	-59.43	3.19	5.52	59.43	-3.19	0.000%
36	-6.39	-59.43	-0.01	6.39	59.43	0.01	0.000%
37	-5.54	-59.43	-3.22	5.54	59.43	3.22	0.000%
38	-3.20	-59.43	-5.56	3.20	59.43	5.56	0.000%
39	-0.02	-28.40	-5.37	0.02	28.40	5.37	0.000%
40	2.65	-28.40	-4.65	-2.65	28.40	4.65	0.000%
41	4.63	-28.40	-2.68	-4.63	28.40	2.68	0.000%
42	5.34	-28.40	0.02	-5.34	28.40	-0.02	0.000%
43	4.63	-28.40	2.71	-4.63	28.40	-2.71	0.000%
44	2.69	-28.40	4.66	-2.69	28.40	-4.66	0.000%
45	0.02	-28.40	5.36	-0.02	28.40	-5.36	0.000%
46	-2.66	-28.40	4.65	2.66	28.40	-4.65	0.000%
47	-4.64	-28.40	2.68	4.64	28.40	-2.68	0.000%
48	-5.35	-28.40	-0.02	5.35	28.40	0.02	0.000%
49	-4.64	-28.40	-2.71	4.64	28.40	2.71	0.000%
50	-2.69	-28.40	-4.67	2.69	28.40	4.67	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00063090
3	Yes	4	0.00000001	0.00028435
4	Yes	6	0.00000001	0.00008926
5	Yes	5	0.00000001	0.00078176
6	Yes	6	0.00000001	0.00009012
7	Yes	5	0.00000001	0.00078954
8	Yes	4	0.00000001	0.00082311
9	Yes	4	0.00000001	0.00044955
10	Yes	6	0.00000001	0.00008827
11	Yes	5	0.00000001	0.00077217
12	Yes	6	0.00000001	0.00009248
13	Yes	5	0.00000001	0.00080974
14	Yes	5	0.00000001	0.00006617
15	Yes	4	0.00000001	0.00082016
16	Yes	6	0.00000001	0.00008907
17	Yes	5	0.00000001	0.00077977
18	Yes	6	0.00000001	0.00008847
19	Yes	5	0.00000001	0.00077441
20	Yes	5	0.00000001	0.00007884
21	Yes	4	0.00000001	0.00099009
22	Yes	6	0.00000001	0.00009229
23	Yes	5	0.00000001	0.00080878

24	Yes	6	0.00000001	0.00008832
25	Yes	5	0.00000001	0.00077275
26	Yes	4	0.00000001	0.00006736
27	Yes	5	0.00000001	0.00056345
28	Yes	5	0.00000001	0.00079999
29	Yes	5	0.00000001	0.00080186
30	Yes	5	0.00000001	0.00057033
31	Yes	5	0.00000001	0.00082434
32	Yes	5	0.00000001	0.00083692
33	Yes	5	0.00000001	0.00057695
34	Yes	5	0.00000001	0.00081338
35	Yes	5	0.00000001	0.00080996
36	Yes	5	0.00000001	0.00056492
37	Yes	5	0.00000001	0.00080346
38	Yes	5	0.00000001	0.00079340
39	Yes	4	0.00000001	0.00007024
40	Yes	4	0.00000001	0.00056336
41	Yes	4	0.00000001	0.00057760
42	Yes	4	0.00000001	0.00008087
43	Yes	4	0.00000001	0.00054440
44	Yes	4	0.00000001	0.00062201
45	Yes	4	0.00000001	0.00007887
46	Yes	4	0.00000001	0.00055986
47	Yes	4	0.00000001	0.00054954
48	Yes	4	0.00000001	0.00008978
49	Yes	4	0.00000001	0.00061245
50	Yes	4	0.00000001	0.00053802

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 111.5	24.391	44	1.4008	0.0028
L2	115.25 - 75.25	14.852	44	1.2483	0.0017
L3	79.75 - 39.75	6.898	44	0.8431	0.0009
L4	45 - 0	2.143	44	0.4352	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.00	T-Arm Mount [TA 702-3]	44	24.391	1.4008	0.0028	42827
139.00	7770.00 w/ Mount Pipe	44	21.468	1.3716	0.0025	21413
129.00	T-Arm Mount [TA 702-3]	44	18.601	1.3332	0.0021	10706
120.00	SBNHH-1D65B w/ Mount Pipe	44	16.114	1.2831	0.0018	7383
80.00	MPRD2449	44	6.944	0.8462	0.0009	4720

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 111.5	112.633	12	6.4876	0.0129
L2	115.25 - 75.25	68.612	12	5.7781	0.0077
L3	79.75 - 39.75	31.883	12	3.9010	0.0041
L4	45 - 0	9.907	12	2.0122	0.0016

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.00	T-Arm Mount [TA 702-3]	12	112.633	6.4876	0.0129	9470
139.00	7770.00 w/ Mount Pipe	12	99.145	6.3511	0.0112	4734
129.00	T-Arm Mount [TA 702-3]	12	85.914	6.1721	0.0097	2364
120.00	SBNHH-1D65B w/ Mount Pipe	12	74.438	5.9393	0.0084	1628
80.00	MPRD2449	12	32.094	3.9157	0.0042	1031

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	149 - 111.5 (1)	TP29.487x23x0.1875	37.50	0.00	0.0	17.0508	-7.72	997.47	0.008
L2	111.5 - 75.25 (2)	TP35.383x28.4633x0.2188	40.00	0.00	0.0	23.8745	-13.34	1396.66	0.010
L3	75.25 - 39.75 (3)	TP41.086x34.167x0.2813	40.00	0.00	0.0	35.6152	-20.74	2083.49	0.010
L4	39.75 - 0 (4)	TP47.4x39.6154x0.375	45.00	0.00	0.0	55.9715	-34.06	3274.33	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	149 - 111.5 (1)	TP29.487x23x0.1875	268.95	639.10	0.421	0.00	639.10	0.000
L2	111.5 - 75.25 (2)	TP35.383x28.4633x0.2188	826.39	1060.37	0.779	0.00	1060.37	0.000
L3	75.25 - 39.75 (3)	TP41.086x34.167x0.2813	1506.81	1917.64	0.786	0.00	1917.64	0.000
L4	39.75 - 0 (4)	TP47.4x39.6154x0.375	2548.48	3714.79	0.686	0.00	3714.79	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	149 - 111.5 (1)	TP29.487x23x0.1875	13.92	299.24	0.047	0.47	750.83	0.001
L2	111.5 - 75.25 (2)	TP35.383x28.4633x0.2188	17.85	419.00	0.043	1.16	1261.74	0.001
L3	75.25 - 39.75 (3)	TP41.086x34.167x0.2813	21.18	625.05	0.034	1.15	2183.88	0.001
L4	39.75 - 0 (4)	TP47.4x39.6154x0.375	24.82	982.30	0.025	1.15	4045.32	0.000

Pole Interaction Design Data

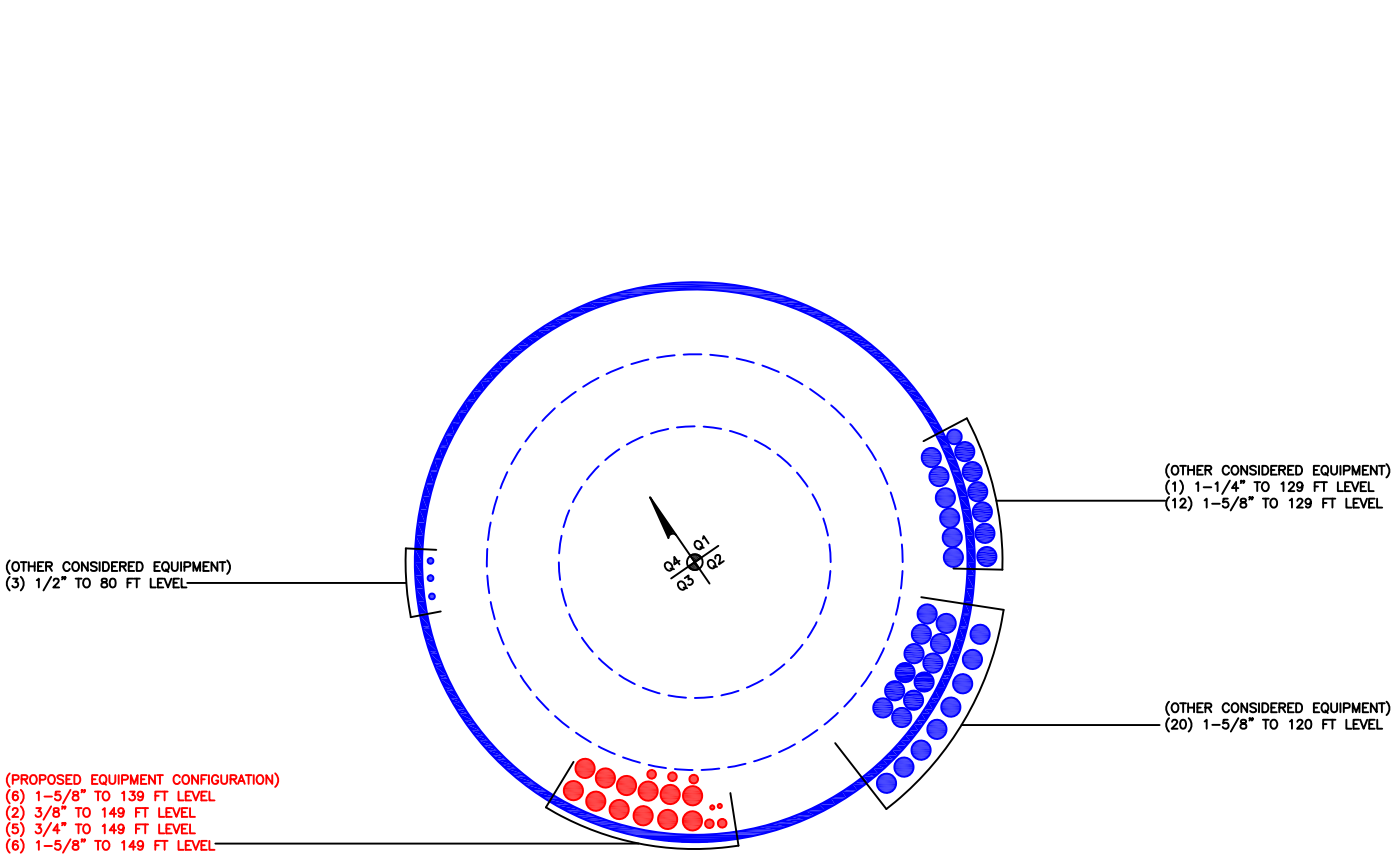
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	149 - 111.5 (1)	0.008	0.421	0.000	0.047	0.001	0.431	1.050	4.8.2
L2	111.5 - 75.25 (2)	0.010	0.779	0.000	0.043	0.001	0.791	1.050	4.8.2
L3	75.25 - 39.75 (3)	0.010	0.786	0.000	0.034	0.001	0.797	1.050	4.8.2
L4	39.75 - 0 (4)	0.010	0.686	0.000	0.025	0.000	0.697	1.050	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	149 - 111.5	Pole	TP29.487x23x0.1875	1	-7.72	1047.35	41.0	Pass
L2	111.5 - 75.25	Pole	TP35.383x28.4633x0.2188	2	-13.34	1466.49	75.3	Pass
L3	75.25 - 39.75	Pole	TP41.086x34.167x0.2813	3	-20.74	2187.66	75.9	Pass
L4	39.75 - 0	Pole	TP47.4x39.6154x0.375	4	-34.06	3438.05	66.4	Pass
							Summary	
						Pole (L3)	75.9	Pass
						RATING =	**75.9**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(OTHER CONSIDERED EQUIPMENT)
(3) 1/2" TO 80 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1-1/4" TO 129 FT LEVEL
(12) 1-5/8" TO 129 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(20) 1-5/8" TO 120 FT LEVEL
(PROPOSED EQUIPMENT CONFIGURATION)
(6) 1-5/8" TO 139 FT LEVEL
(2) 3/8" TO 149 FT LEVEL
(5) 3/4" TO 149 FT LEVEL
(6) 1-5/8" TO 149 FT LEVEL
Q1
Q2
Q3
Q4

APPENDIX C

ADDITIONAL CALCULATIONS

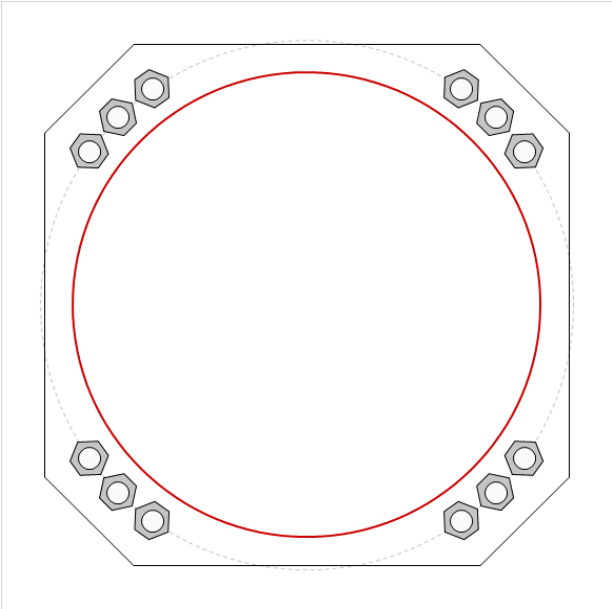
Monopole Base Plate Connection

Site Info	
BU #	845455
Site Name	OXFORD-QUAKER FARM
Order #	509315, rev 3

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0.5

Applied Loads	
Moment (kip-ft)	2548.48
Axial Force (kips)	34.06
Shear Force (kips)	24.83

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(12) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 54" BC

Anchor Spacing: 4.5 in

Base Plate Data

53" OD x 2.75" Plate (A572-60; Fy=60 ksi, Fu=75 ksi)

Stiffener Data

N/A

Pole Data

47.4" x 0.375" 18-sided pole (A607-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_c = 191.48	ϕPn_c = 268.39	**Stress Rating**
Vu = 2.07	ϕVn = 120.77	**68.0%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	33.34	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**58.8%**	**Pass**

Pier and Pad Foundation

BU # :	845455
Site Name:	OXFORD-QUAKER
App. Number:	509315, rev 3

TIA-222 Revision:	H
Tower Type:	Monopole

Top & Bot. Pad Rein. Different?:	☑
Block Foundation?:	☐

Superstructure Analysis Reactions

Compression, P_{comp}:	34	kips
Base Shear, Vu_comp:	25	kips
Moment, M_u:	2548	ft-kips
Tower Height, **H**:	149	ft
BP Dist. Above Fdn, bp_{dist}:	2.5	in

Pier Properties

Pier Shape:	Square	
Pier Diameter, **dpier**:	7	ft
Ext. Above Grade, **E**:	0.5	ft
Pier Rebar Size, **Sc**:	11	
Pier Rebar Quantity, **mc**:	32	
Pier Tie/Spiral Size, **St**:	5	
Pier Tie/Spiral Quantity, **mt**:	10	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties

Depth, **D**:	7.5	ft
Pad Width, **W**:	20	ft
Pad Thickness, **T**:	3.5	ft
Pad Rebar Size (Top), Sp_{top}:	10	
Pad Top Rebar Quantity (Top), mp_{top}:	21	
Pad Rebar Size (Bottom), **Sp**:	10	
Pad Rebar Quantity (Bottom), **mp**:	21	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties

Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	3	ksi
Dry Concrete Density, δc:	150	pcf

Soil Properties

Total Soil Unit Weight, γ:	125	pcf
Ultimate Gross Bearing, Qult:	30.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	36	degrees
SPT Blow Count, N_{blows}:	59	
Base Friction, μ:		
Neglected Depth, **N**:	3.50	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	none	ft

<--Toggle between Gross and Net

Foundation Analysis Checks

	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	284.40	25.00	**8.4%**	**Pass**
Bearing Pressure (ksf)	22.50	3.19	**14.2%**	**Pass**
*Overturning (kip*ft)*	4341.25	2753.21	**63.4%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	7540.69	2660.50	**33.6%**	**Pass**
Pier Compression (kip)	23390.64	73.69	**0.3%**	**Pass**
*Pad Flexure (kip*ft)*	4295.05	994.69	**22.1%**	**Pass**
Pad Shear - 1-way (kips)	731.44	174.66	**22.7%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.164	0.000	**0.0%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	7386.86	1596.30	**20.6%**	**Pass**

**Rating per TIA-222-H Section 15.5*

Soil Rating*:	**63.4%**
Structural Rating*:	**33.6%**

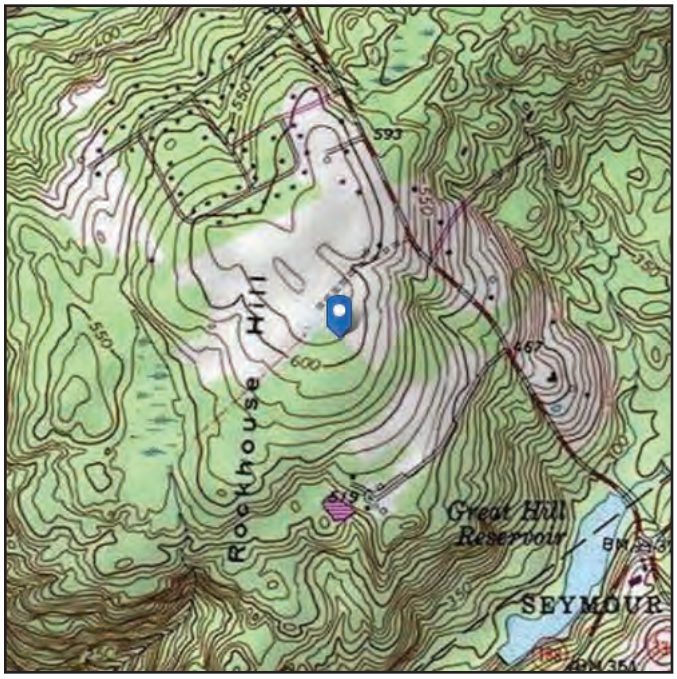
Version 3.3.2

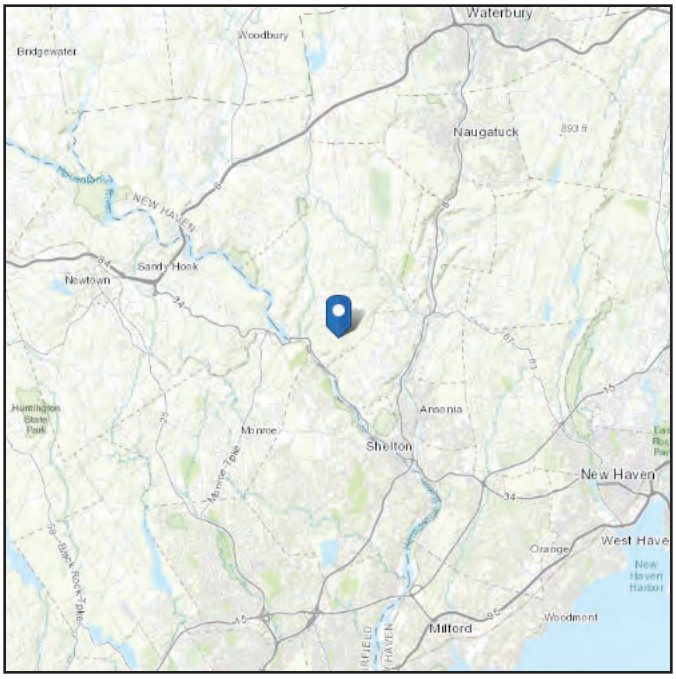
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 607.1 ft (NAVD 88)
Latitude: 41.383989
Longitude: -73.137372





Wind

Results:

Wind Speed:	121 Vmph (Use 125 mph per Connecticut State Building Code)
10-year MRI	76 Vmph
25-year MRI	86 Vmph
50-year MRI	92 Vmph
100-year MRI	99 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Mon Apr 27 2020

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

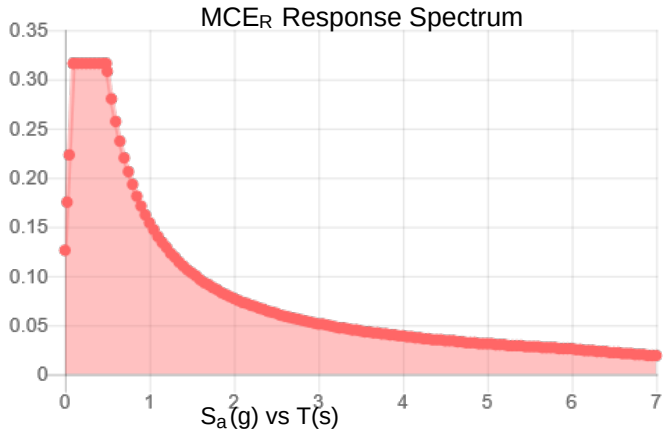
Seismic

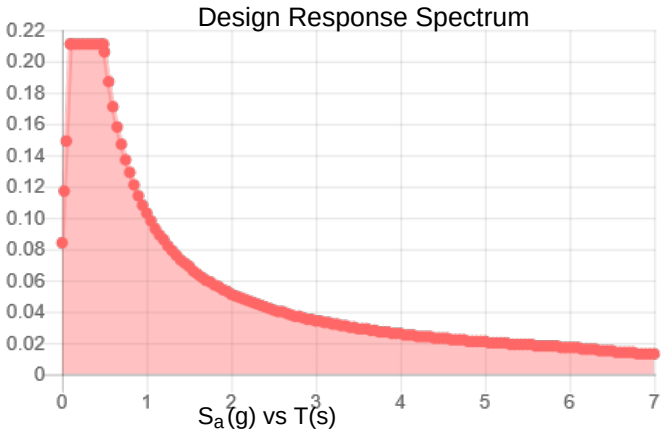
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.197	S_{DS} :	0.211
S_1 :	0.064	S_{D1} :	0.103
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.105
S_{MS} :	0.316	PGA_M :	0.166
S_{M1} :	0.154	F_{PGA} :	1.591
		I_e :	1

Seismic Design Category B





Data Accessed: Mon Apr 27 2020

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Mon Apr 27 2020

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Exhibit E

Mount Analysis

Date: April 21, 2020

Kevin Morrow
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 406-6619

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
btwo@btgrp.com

Subject:	**Mount Analysis Report**	
Carrier Designation:	**AT&T Mobility Equipment Change-Out**	
	Carrier Site Number:	82094
	Carrier Site Name:	CTL02256
Crown Castle Designation:	**Crown Castle BU Number:**	845455
	Crown Castle Site Name:	Oxford Quaker Farms
	Crown Castle JDE Job Number:	596328
	Crown Castle Order Number:	509315, Rev.3
Engineering Firm Designation:	**B+T Group Report Designation:**	136377.008.01
Site Data:	**85 Quaker Farms Road, Oxford, CT, New Haven, 06478** **Latitude 41° 23' 2.36" Longitude -73° 8' 14.54"**	
Structure Information:	**Tower Height & Type:**	**149 ft. Monopole**
	Mount Elevation:	**149 ft. & 139 ft.**
	Mount Type:	**(2)-5 ft. T-Arm Mount** **(1)- 1.25 ft. T- Arm**

Dear Mr. Morrow,

B+T Group is pleased to submit this **"Mount Analysis Report"** to determine the structural integrity of AT&T Mobility's antenna mounting system with the proposed appurtenance and equipment addition on the above mentioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

The purpose of the analysis is to determine acceptability of the mount's stress level. Based on our analysis we have determined the stress level to be:

T-Arm Mount (Multiple) **Sufficient**

This analysis has been performed in accordance with the 2018 International Building Code based upon an ultimate 3-second gust wind speed of 118 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount structural analysis prepared by: Suman Rana, E.I.T

Respectfully submitted by: B&T Engineering, Inc.
COA: PEC.0001564 Expires: 02/10/2021

Scott S. Vance, P.E.

STATE OF CONNECTICUT SCOTT S. VANCE 31627 LICENSED PROFESSIONAL ENGINEER

4/21/20

TABLE OF CONTENTS

1) INTRODUCTION

This is a 5 ft. T-Arm Mount, Designed by Site Pro1 (Part# RMV5) at 149 ft. and 1.25 ft. T-arm mount at 139 ft. mapped by B+T Group.

2) ANALYSIS CRITERIA

Building Code: 2018 IBC
TIA-222 Revision: TIA-222-H
Risk Category: II
Ultimate Wind Speed: 118 mph
Exposure Category: C
Topographic Factor at Base: 1
Topographic Factor at Mount: 1
Ice Thickness: 1 in
Wind Speed with Ice: 50 mph
Seismic S_s: 0.202
Seismic S_1: 0.054
Live Loading Wind Speed: 30 mph
Man Live Load at Mid/End-Points: 250 lb.
Man Live Load at Mount Pipes: 0 lb.

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft.)	Antenna Centerline (ft.)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
149	150	3	CCI Antennas	DMP65R-BU6D	5 ft. & 1.25 ft. T-Arm Mount
		3	CommScope	NNH4-65B-R6	
		3	Ericsson	RADIO 4415 B30	
		3	Ericsson	RRUS 4449 B5/B12	
		3	Ericsson	RRUS 8843 B2/B66A	
		3	Powerwave	1001983	
		1	Raycap	DC6-48-60-18-8F	
		1	Raycap	DC9-48-60-24-PC16-EV	
139	140	3	Powerwave	7770.00	
		6	Powerwave	TMA DD 1900 WITH 850 BYPASS	
		6	Powerwave	7020.00	
		6	Powerwave	LGP21401	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
CCI Order	Existing Loading Proposed Loading	Date: 03/16/2020	Crown Castle
RFDS		Date: 02/21/2020	

3.1) Analysis Method

RISA-3D (Version 17.0.4), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

A tool internally developed by B+T Group, was used to calculate wind loading on all appurtenances, dishes and mount members for various loading cases. Selected output from the analysis is included in Appendix B "Software Input Calculations".

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 *Tower Mount Analysis* (Revision C). In addition, this analysis is in accordance with *AT&T's Mount Technical Directive – R15.*

Manufacturer's drawings were used to create the model.

3.2) Assumptions

1. The mount was properly fabricated and installed in accordance with its original design and manufacturer's specifications.
2. The mount has been maintained in accordance with the manufacturer's specifications and is free of damage.
3. The configuration of antennas, mounts, and other appurtenances are as specified in Table-1.
4. All mount components have been assumed to be in sufficient condition to carry their full design capacity for the analysis.
5. Mount areas and weights are determined from field measurements, standard material properties, and/or manufacturer product data.
6. Serviceability with respect to antenna twist, tilt, roll or lateral translation is not checked and is left to the carrier or tower owner to ensure conformance.
7. All prior structural modifications, if any are assumed to be correctly installed and fully effective.
8. All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
9. The analysis will be required to be revised if the existing conditions in the field differ from those shown in the above-referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.
10. The following material grades were assumed (Unless Noted Otherwise):
    (a) Connection Bolts : ASTM A325
    (b) Steel Pipe : ASTM A53 (GR. 35)
    (c) HSS (Round) : ASTM 500 (GR. B-42)
    (d) HSS (Rectangular) : ASTM 500 (GR. B-46)
    (e) Channel : ASTM A36 (GR. 36)
    (f) Steel Solid Rod : ASTM A36 (GR. 36)
    (g) Steel Plate : ASTM A36 (GR. 36)
    (h) Steel Angle : ASTM A36 (GR. 36)
    (i) UNISTRUT : ASTM A570 (GR. 33)

This analysis may be affected if any assumptions are not valid or have been made in error. B+T Group should be notified to determine the effect on the structural integrity of the antenna mounting system.

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (T-Arm Mount at 149 ft.)

Notes	Component	Critical Member	Centerline (ft.)	% Capacity	Pass / Fail
1,2	Main Horizontal	5	149	30.2	Pass
	Support Tube	1	149	43.9	Pass
	Mount Pipes	6	149	46.9	Pass

Structure Rating (max from all components) =	46.9%

Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.

2) All sectors are typical

Table 4 - Mount Component Stresses vs. Capacity (T-Arm Mount at 139 ft.)

Notes	Component	Critical Member	Centerline (ft.)	% Capacity	Pass / Fail
1,2	Main Horizontal	5	139	16.6	Pass
	Support Tube	1	139	4.7	Pass
	Mount Pipes	7	139	12.4	Pass

Structure Rating (max from all components) =	16.6%

Notes:
3) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
4) All sectors are typical

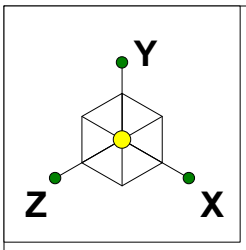
4.1) Recommendations

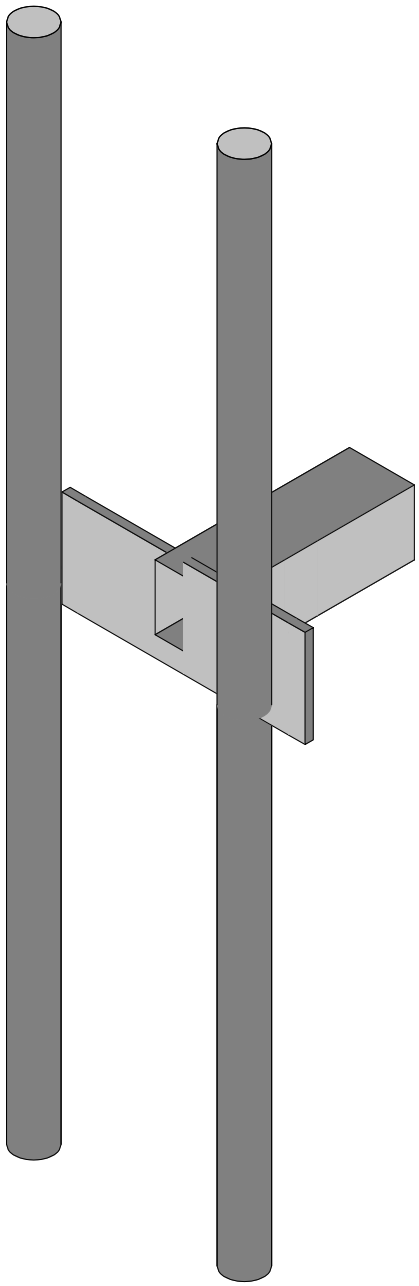
The T-arm mount, designed by Site Pro1 (Part# RMV5) and existing T-arm has sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

APPENDIX A

WIRE FRAME AND RENDERED MODELS

(AT 139 FT.)





Envelope Only Solution

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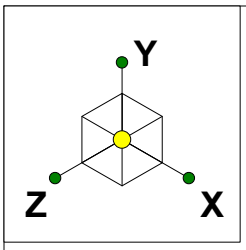

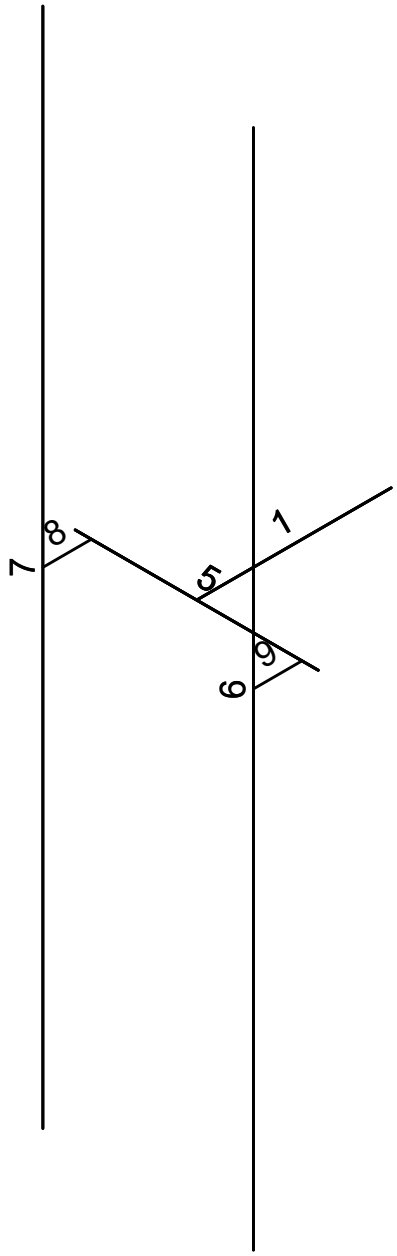

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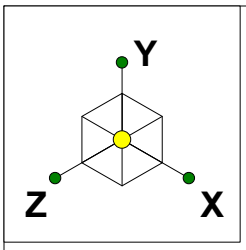
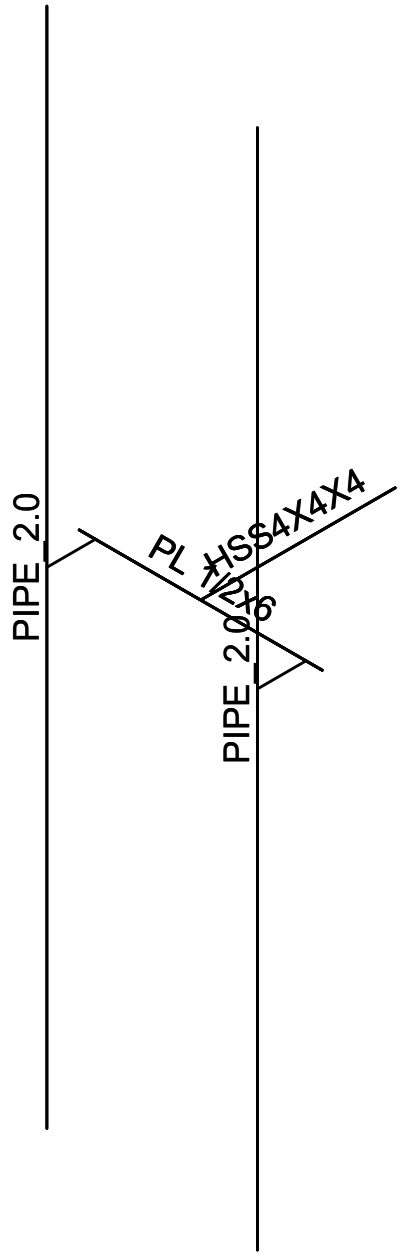


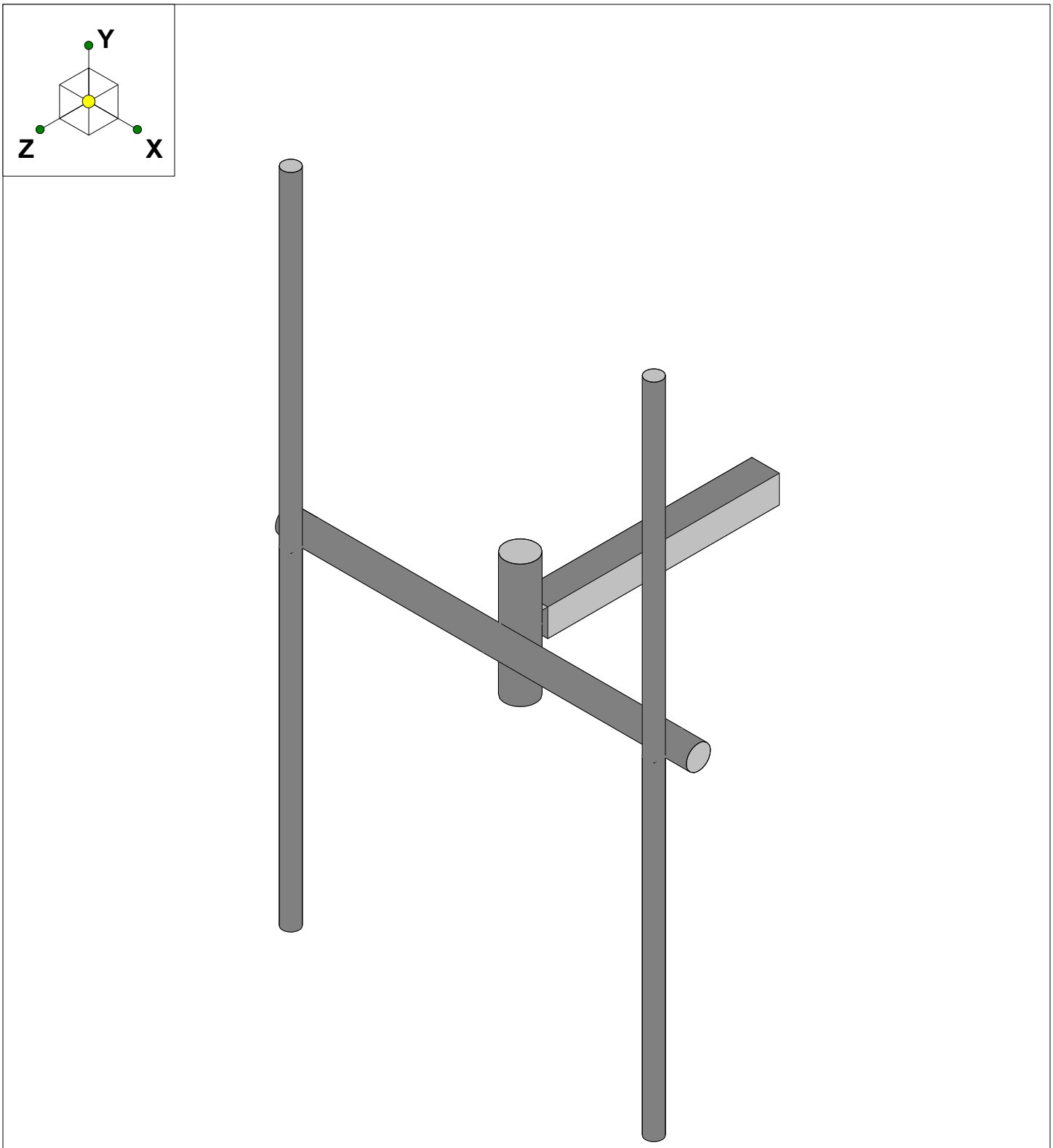


Envelope Only Solution

B+T Group	845455 - Oxford Quaker Farms	SK - 5
SR		Apr 21, 2020 at 5:05 PM
136377.008.01		136377_008_01_Oxford Quaker F...

WIRE FRAME AND RENDERED MODELS

(AT 149 FT.)



Envelope Only Solution

B+T Group	845455 - Oxford Quaker Farms	SK - 5
SR		Apr 20, 2020 at 2:19 PM
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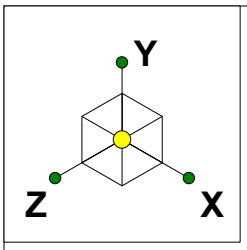

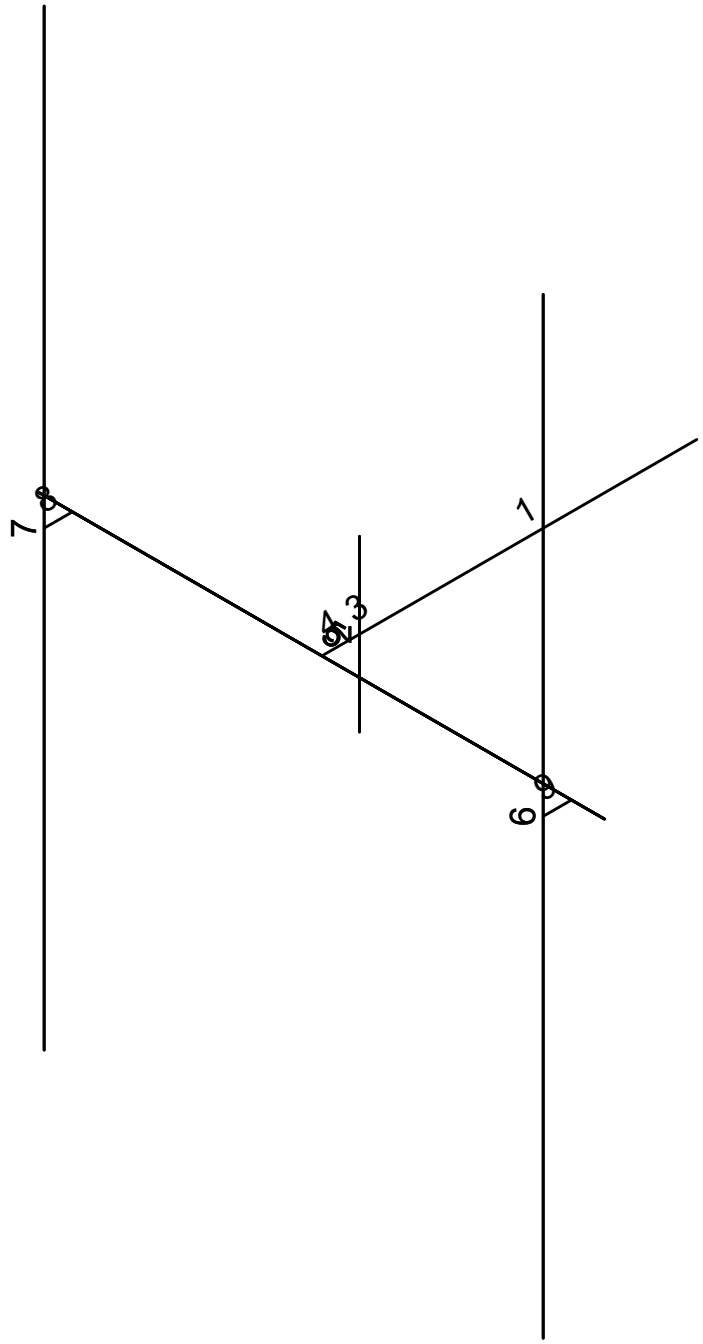

Envelope Only Solution

B+T Group	845455 - Oxford Quaker Farms	SK - 6
SR		Apr 20, 2020 at 2:19 PM
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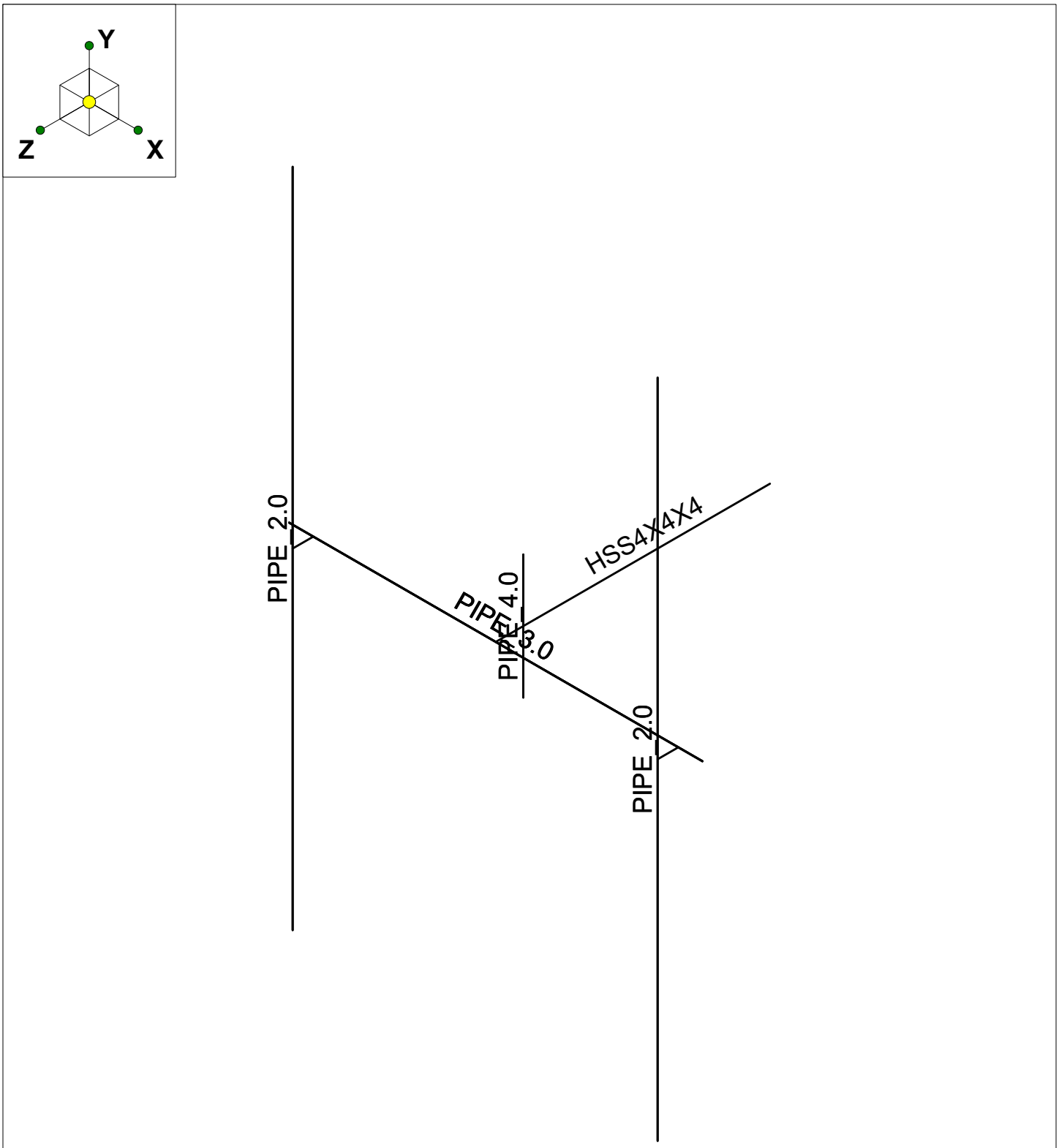


Envelope Only Solution

B+T Group	845455 - Oxford Quaker Farms	SK - 7
SR		Apr 20, 2020 at 2:19 PM
136377.008.01		136377_008_01_Oxford Quaker F...

APPENDIX B

SOFTWARE INPUT CALCULATIONS

(AT 139 FT.)

PROJECT	**136377.008.01 - Oxford Qual**		**SR**
SUBJECT	**T-Arm Mount Mount Analysis**		
DATE	**04/21/20**	PAGE	OF

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

Tower Type		:	Monopole		
Ground Elevation	z_s	:	607	ft	[ASCE7 Hazard Tool]
Tower Height		:	149.00	ft	
Mount Elevation		:	139.00	ft	
Antenna Elevation		:	139.00	ft	
Crest Height		:	0	ft	
Risk Category		:	II		[Table 2-1]
Exposure Category		:	C		[Sec. 2.6.5.1.2]
Topography Category		:	1.00		[Sec. 2.6.6.2]
Wind Velocity	V	:	118	mph	[ASCE7 Hazard Tool]
Ice wind Velocity	V_i	:	50	mph	[ASCE7 Hazard Tool]
Service Velocity	V_s	:	30	mph	[ASCE7 Hazard Tool]
Base Ice thickness	t_i	:	1.00	in	[ASCE7 Hazard Tool]
Seismic Design Cat.		:	B		[ASCE7 Hazard Tool]
	S_S	:	0.20		
	S_1	:	0.05		
	S_{DS}	:	0.22		
	S_{D1}	:	0.09		

Gust Factor	G_h	:	1.00		[Sec. 16.6]
Pressure Coefficient	K_z	:	1.36		[Sec. 2.6.5.2]
Topography Factor	K_{zt}	:	1.00		[Sec. 2.6.6]
Elevation Factor	K_e	:	0.98		[Sec. 2.6.8]
Directionality Factor	K_d	:	0.95		[Sec. 16.6]
Shielding Factor	K_a	:	0.90		[Sec. 16.6]
Design Ice Thickness	t_{iz}	:	1.15	in	[Sec. 2.6.10]

Importance Factor	I_e	:	1		[Table 2-3]
Response Coefficient	C_s	:	0.108		[Sec. 2.7.7.1]
Amplification	A_s	:	2.731544		[Sec. 16.7]

PROJECT	**136377.008.01 - Oxford Qual**		**SR**
SUBJECT	**T-Arm Mount Mount Analysis**		
DATE	**04/21/20**	PAGE	OF

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

Manufacturer	Model	Qty	Aspect Ratio	C_a flat/round	EPA_N (ft^2)	EPA_T (ft^2)	$EPA_{N\text{-}Ice}$ (ft^2)	$EPA_{T\text{-}Ice}$ (ft^2)	$F_{A\ No\ Ice\ (N)}$	$F_{A\ No\ Ice\ (T)}$	$F_{A\ Ice\ (N)}$	$F_{A\ Ice\ (T)}$
ERWAVE TECHNOLO	7770.00	0.5	5.00	1.31	2.10	0.95	2.65	1.45	0.11	0.05	0.02	0.01
ERWAVE TECHNOLO	7770.00	0.5	5.00	1.31	2.10	0.95	2.65	1.45	0.11	0.05	0.02	0.01
ERWAVE TECHNOLOMA DD	1900 WITH 850 BY PA	2	0.18	1.20	0.52	0.25	1.14	0.63	0.03	0.01	0.00	0.00
POWERWAVE	7020	2	0.51	1.20	0.17	0.29	0.48	0.72	0.01	0.01	0.00	0.00
POWERWAVE	TME-LGP21401	1	1.57	1.20	0.92	0.26	1.34	0.57	0.04	0.01	0.01	0.00

SOFTWARE INPUT CALCULATIONS

(AT 149 FT.)

PROJECT	**136377.008.01 - Oxford Qual**		**SR**
SUBJECT	**T-Arm Mount Mount Analysis**		
DATE	**04/20/20**	PAGE	OF

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

Tower Type		:	Monopole		
Ground Elevation	z_s	:	607	ft	[ASCE7 Hazard Tool]
Tower Height		:	149.00	ft	
Mount Elevation		:	149.00	ft	
Antenna Elevation		:	150.00	ft	
Crest Height		:	0	ft	
Risk Category		:	II		[Table 2-1]
Exposure Category		:	C		[Sec. 2.6.5.1.2]
Topography Category		:	1.00		[Sec. 2.6.6.2]
Wind Velocity	V	:	118	mph	[ASCE7 Hazard Tool]
Ice wind Velocity	V_i	:	50	mph	[ASCE7 Hazard Tool]
Service Velocity	V_s	:	30	mph	[ASCE7 Hazard Tool]
Base Ice thickness	t_i	:	1.00	in	[ASCE7 Hazard Tool]
Seismic Design Cat.		:	B		[ASCE7 Hazard Tool]
	S_S	:	0.20		
	S_1	:	0.05		
	S_{DS}	:	0.22		
	S_{D1}	:	0.09		
Gust Factor	G_h	:	1.00		[Sec. 16.6]
Pressure Coefficient	K_z	:	1.38		[Sec. 2.6.5.2]
Topography Factor	K_{zt}	:	1.00		[Sec. 2.6.6]
Elevation Factor	K_e	:	0.98		[Sec. 2.6.8]
Directionality Factor	K_d	:	0.95		[Sec. 16.6]
Shielding Factor	K_a	:	0.90		[Sec. 16.6]
Design Ice Thickness	t_{iz}	:	1.16	in	[Sec. 2.6.10]
Importance Factor	I_e	:	1		[Table 2-3]
Response Coefficient	C_s	:	0.108		[Sec. 2.7.7.1]
Amplification	A_s	:	3		[Sec. 16.7]

PROJECT	**136377.008.01 - Oxford Qual**		**SR**
SUBJECT	**T-Arm Mount Mount Analysis**		
DATE	**04/20/20**	PAGE	OF

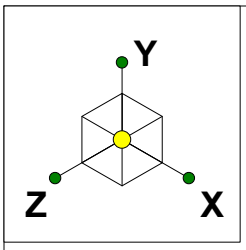
B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

Manufacturer	Model	Qty	Aspect Ratio	C_a flat/round	EPA_N (ft^2)	EPA_T (ft^2)	$EPA_{N\text{-}Ice}$ (ft^2)	$EPA_{T\text{-}Ice}$ (ft^2)	$F_{A\ No\ Ice\ (N)}$	$F_{A\ No\ Ice\ (T)}$	$F_{A\ Ice\ (N)}$	$F_{A\ Ice\ (T)}$
CCI ANTENNAS	DMP65R-BU6D	0.5	3.44	6.72	5.12	1.90	5.88	2.56	0.27	0.10	0.06	0.02
CCI ANTENNAS	DMP65R-BU6D	0.5	3.44	1.24	5.12	1.90	5.88	2.56	0.27	0.10	0.01	0.01
ERICSSON	RADIO 4415 B30	1	1.14	1.20	1.37	0.52	1.86	0.88	0.07	0.03	0.01	0.00
ERWAVE TECHNOLO	1001983	1	1.54	1.20	0.15	0.07	0.34	0.22	0.01	0.00	0.00	0.00
COMMSCOPE	NNH4-65B-R6	0.5	3.67	1.25	4.90	1.95	5.66	2.61	0.17	0.07	0.01	0.01
COMMSCOPE	NNH4-65B-R6	0.5	3.67	1.25	4.90	1.95	5.66	2.61	0.17	0.07	0.04	0.02
ERICSSON	RRUS 8843 B2/B66A	1	1.13	1.20	1.37	1.13	1.86	1.58	0.07	0.06	0.01	0.01
ERICSSON	RRUS 4449 B5/B12	1	1.36	1.20	1.64	1.17	2.18	1.65	0.08	0.06	0.01	0.01
RAYCAP	TME-DC6-48-60-18-8F	1	2.84	1.22	2.39	2.39	3.11	3.11	0.12	0.12	0.02	0.02

APPENDIX C

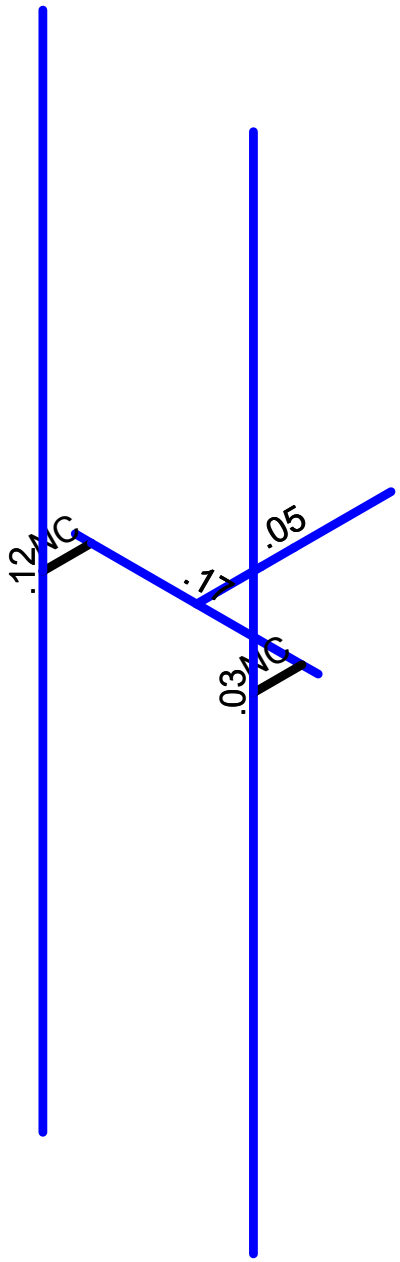
SOFTWARE ANALYSIS OUTPUT

(AT 139 FT.)



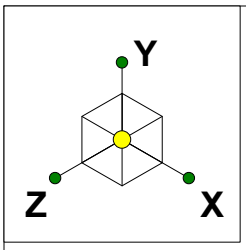
Code Check
(Env)

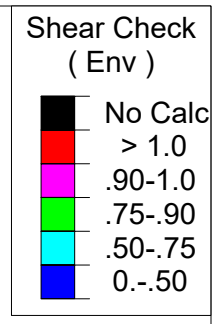
No Calc
> 1.0
.90-1.0
.75-.90
.50-.75
0.-.50

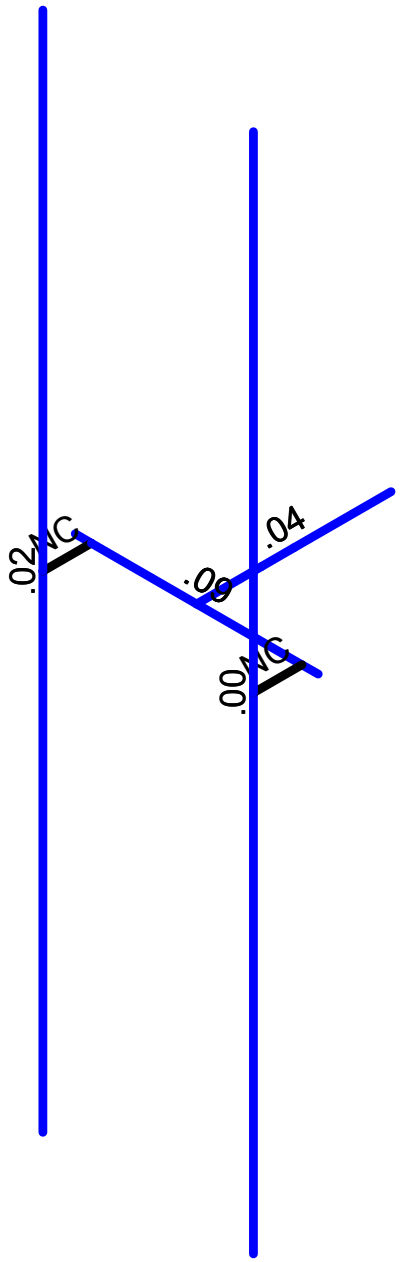


Member Code Checks Displayed (Enveloped)
Envelope Only Solution

B+T Group	845455 - Oxford Quaker Farms	SK - 6
SR		Apr 21, 2020 at 5:06 PM
136377.008.01		136377_008_01_Oxford Quaker F...







Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

B+T Group	845455 - Oxford Quaker Farms	SK - 7
SR		Apr 21, 2020 at 5:07 PM
136377.008.01		136377_008_01_Oxford Quaker F...

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	MF-H1	PL 1/2x6	Beam	RECT	A36 Gr.36	Typical	3	.063	9	.237
2	SF-H1	HSS4X4X4	Beam	Tube	A53 Gr.B	Typical	3.37	7.8	7.8	12.8
3	MF-P1	PIPE_2.0	Column	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	1	6	N18			SF-H1	Beam	Tube	A53 Gr.B	Typical
2	5	N20	N19			MF-H1	Beam	RECT	A36 Gr.36	Typical
3	6	13	15			MF-P1	Column	Pipe	A53 Gr.B	Typical
4	7	14	16			MF-P1	Column	Pipe	A53 Gr.B	Typical
5	8	12	9			RIGID	None	None	RIGID	Typical
6	9	11	7			RIGID	None	None	RIGID	Typical

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Grav...	Joint	Point	Distribut...	Area(Me...	Surface(...
1	Dead	DL		-1			10			
2	0 Wind - No Ice	WLZ					10	4		
3	90 Wind - No Ice	WLX					10	4		
4	0 Wind - Ice	WLZ					10	4		
5	90 Wind - Ice	WLX					10	4		
6	0 Wind - Service	WLZ					10	4		
7	90 Wind - Service	WLX					10	4		
8	Ice	OL1					10	4		
9	0 Seismic	ELZ					10	4		
10	90 Seismic	ELX					10	4		
11	Live Load a	LL								
12	Live Load b	LL								
13	Live Load c	LL								
14	Live Load d	LL								
15	Maint LL 1	LL					1			
16	Maint LL 2	LL					1			
17	Maint LL 3	LL					1			
18	Maint LL 4	LL								
19	Maint LL 5	LL								
20	Maint LL 6	LL								

Load Combinations

	Description	S...	PDelta	S...	B...	Factor	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...
1	1.4 Dead	Y...	Y		1	1.4																				
2	1.2 D + 1.0 - 0 W	Y...	Y		1	1.2	2	1																		
3	1.2 D + 1.0 - 30 W	Y...	Y		1	1.2	2	.8...	3	.5																
4	1.2 D + 1.0 - 60 W	Y...	Y		1	1.2	3	.8...	2	.5																
5	1.2 D + 1.0 - 90 W	Y...	Y		1	1.2	3	1																		
6	1.2 D + 1.0 - 120 W	Y...	Y		1	1.2	3	.8...	2	-.5																
7	1.2 D + 1.0 - 150 W	Y...	Y		1	1.2	2	-....	3	.5																
8	1.2 D + 1.0 - 180 W	Y...	Y		1	1.2	2	-1																		
9	1.2 D + 1.0 - 210 W	Y...	Y		1	1.2	2	-....	3	-.5																
10	1.2 D + 1.0 - 240 W	Y...	Y		1	1.2	3	-....	2	-.5																
11	1.2 D + 1.0 - 270 W	Y...	Y		1	1.2	3	-1																		
12	1.2 D + 1.0 - 300 W	Y...	Y		1	1.2	3	-....	2	.5																
13	1.2 D + 1.0 - 330 W	Y...	Y		1	1.2	2	.8...	3	-.5																

Load Combinations (Continued)

	Description	S...	PDelta	S...	B...	Factor	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...
14	1.2 D + 1.0 - 0 W/Ice	Y...	Y		1	1.2	4	1			8	1														
15	1.2 D + 1.0 - 30 W/Ice	Y...	Y		1	1.2	4	.8...	5	.5	8	1														
16	1.2 D + 1.0 - 60 W/Ice	Y...	Y		1	1.2	5	.8...	4	.5	8	1														
17	1.2 D + 1.0 - 90 W/Ice	Y...	Y		1	1.2	5	1			8	1														
18	1.2 D + 1.0 - 120 W/Ice	Y...	Y		1	1.2	5	.8...	4	-.5	8	1														
19	1.2 D + 1.0 - 150 W/Ice	Y...	Y		1	1.2	4	-....	5	.5	8	1														
20	1.2 D + 1.0 - 180 W/Ice	Y...	Y		1	1.2	4	-1			8	1														
21	1.2 D + 1.0 - 210 W/Ice	Y...	Y		1	1.2	4	-....	5	-.5	8	1														
22	1.2 D + 1.0 - 240 W/Ice	Y...	Y		1	1.2	5	-....	4	-.5	8	1														
23	1.2 D + 1.0 - 270 W/Ice	Y...	Y		1	1.2	5	-1			8	1														
24	1.2 D + 1.0 - 300 W/Ice	Y...	Y		1	1.2	5	-....	4	.5	8	1														
25	1.2 D + 1.0 - 330 W/Ice	Y...	Y		1	1.2	4	.8...	5	-.5	8	1														
26	1.2 D + 1.0 E - 0	Y...	Y		1	1.2	9	1																		
27	1.2 D + 1.0 E - 30	Y...	Y		1	1.2	9	.8...	10	.5																
28	1.2 D + 1.0 E - 60	Y...	Y		1	1.2	10	.8...	9	.5																
29	1.2 D + 1.0 E - 90	Y...	Y		1	1.2	10	1																		
30	1.2 D + 1.0 E - 120	Y...	Y		1	1.2	10	.8...	9	-.5																
31	1.2 D + 1.0 E - 150	Y...	Y		1	1.2	9	-....	10	.5																
32	1.2 D + 1.0 E - 180	Y...	Y		1	1.2	9	-1																		
33	1.2 D + 1.0 E - 210	Y...	Y		1	1.2	9	-....	10	-.5																
34	1.2 D + 1.0 E - 240	Y...	Y		1	1.2	10	-....	9	-.5																
35	1.2 D + 1.0 E - 270	Y...	Y		1	1.2	10	-1																		
36	1.2 D + 1.0 E - 300	Y...	Y		1	1.2	10	-....	9	.5																
37	1.2 D + 1.0 E - 330	Y...	Y		1	1.2	9	.8...	10	-.5																
38	1.2 D + 1.5 LL a + Service - 0 W	Y...	Y		1	1.2	6	1			11	1.5														
39	1.2 D + 1.5 LL a + Service - 30 W	Y...	Y		1	1.2	6	.8...	7	.5	11	1.5														
40	1.2 D + 1.5 LL a + Service - 60 W	Y...	Y		1	1.2	7	.8...	6	.5	11	1.5														
41	1.2 D + 1.5 LL a + Service - 90 W	Y...	Y		1	1.2	7	1			11	1.5														
42	1.2 D + 1.5 LL a + Service - 120 W	Y...	Y		1	1.2	7	.8...	6	-.5	11	1.5														
43	1.2 D + 1.5 LL a + Service - 150 W	Y...	Y		1	1.2	6	-....	7	.5	11	1.5														
44	1.2 D + 1.5 LL a + Service - 180 W	Y...	Y		1	1.2	6	-1			11	1.5														
45	1.2 D + 1.5 LL a + Service - 210 W	Y...	Y		1	1.2	6	-....	7	-.5	11	1.5														
46	1.2 D + 1.5 LL a + Service - 240 W	Y...	Y		1	1.2	7	-....	6	-.5	11	1.5														
47	1.2 D + 1.5 LL a + Service - 270 W	Y...	Y		1	1.2	7	-1			11	1.5														
48	1.2 D + 1.5 LL a + Service - 300 W	Y...	Y		1	1.2	7	-....	6	.5	11	1.5														
49	1.2 D + 1.5 LL a + Service - 330 W	Y...	Y		1	1.2	6	.8...	7	-.5	11	1.5														
50	1.2 D + 1.5 LL b + Service - 0 W	Y...	Y		1	1.2	6	1			12	1.5														
51	1.2 D + 1.5 LL b + Service - 30 W	Y...	Y		1	1.2	6	.8...	7	.5	12	1.5														
52	1.2 D + 1.5 LL b + Service - 60 W	Y...	Y		1	1.2	7	.8...	6	.5	12	1.5														
53	1.2 D + 1.5 LL b + Service - 90 W	Y...	Y		1	1.2	7	1			12	1.5														
54	1.2 D + 1.5 LL b + Service - 120 W	Y...	Y		1	1.2	7	.8...	6	-.5	12	1.5														
55	1.2 D + 1.5 LL b + Service - 150 W	Y...	Y		1	1.2	6	-....	7	.5	12	1.5														
56	1.2 D + 1.5 LL b + Service - 180 W	Y...	Y		1	1.2	6	-1			12	1.5														
57	1.2 D + 1.5 LL b + Service - 210 W	Y...	Y		1	1.2	6	-....	7	-.5	12	1.5														
58	1.2 D + 1.5 LL b + Service - 240 W	Y...	Y		1	1.2	7	-....	6	-.5	12	1.5														
59	1.2 D + 1.5 LL b + Service - 270 W	Y...	Y		1	1.2	7	-1			12	1.5														
60	1.2 D + 1.5 LL b + Service - 300 W	Y...	Y		1	1.2	7	-....	6	.5	12	1.5														
61	1.2 D + 1.5 LL b + Service - 330 W	Y...	Y		1	1.2	6	.8...	7	-.5	12	1.5														
62	1.2 D + 1.5 LL c + Service - 0 W	Y...	Y		1	1.2	6	1			13	1.5														
63	1.2 D + 1.5 LL c + Service - 30 W	Y...	Y		1	1.2	6	.8...	7	.5	13	1.5														
64	1.2 D + 1.5 LL c + Service - 60 W	Y...	Y		1	1.2	7	.8...	6	.5	13	1.5														
65	1.2 D + 1.5 LL c + Service - 90 W	Y...	Y		1	1.2	7	1			13	1.5														
66	1.2 D + 1.5 LL c + Service - 120 W	Y...	Y		1	1.2	7	.8...	6	-.5	13	1.5														
67	1.2 D + 1.5 LL c + Service - 150 W	Y...	Y		1	1.2	6	-....	7	.5	13	1.5														
68	1.2 D + 1.5 LL c + Service - 180 W	Y...	Y		1	1.2	6	-1			13	1.5														
69	1.2 D + 1.5 LL c + Service - 210 W	Y...	Y		1	1.2	6	-....	7	-.5	13	1.5														
70	1.2 D + 1.5 LL c + Service - 240 W	Y...	Y		1	1.2	7	-....	6	-.5	13	1.5														

Load Combinations (Continued)

	Description	S...	PDelta	S...	B...	Factor	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...
71	1.2 D + 1.5 LL c + Service - 270 W	Y...	Y		1	1.2	7	-1			13	1.5														
72	1.2 D + 1.5 LL c + Service - 300 W	Y...	Y		1	1.2	7	-....	6	.5	13	1.5														
73	1.2 D + 1.5 LL c + Service - 330 W	Y...	Y		1	1.2	6	.8...	7	-.5	13	1.5														
74	1.2 D + 1.5 LL d + Service - 0 W	Y...	Y		1	1.2	6	1			14	1.5														
75	1.2 D + 1.5 LL d + Service - 30 W	Y...	Y		1	1.2	6	.8...	7	.5	14	1.5														
76	1.2 D + 1.5 LL d + Service - 60 W	Y...	Y		1	1.2	7	.8...	6	.5	14	1.5														
77	1.2 D + 1.5 LL d + Service - 90 W	Y...	Y		1	1.2	7	1			14	1.5														
78	1.2 D + 1.5 LL d + Service - 120 W	Y...	Y		1	1.2	7	.8...	6	-.5	14	1.5														
79	1.2 D + 1.5 LL d + Service - 150 W	Y...	Y		1	1.2	6	-....	7	.5	14	1.5														
80	1.2 D + 1.5 LL d + Service - 180 W	Y...	Y		1	1.2	6	-1			14	1.5														
81	1.2 D + 1.5 LL d + Service - 210 W	Y...	Y		1	1.2	6	-....	7	-.5	14	1.5														
82	1.2 D + 1.5 LL d + Service - 240 W	Y...	Y		1	1.2	7	-....	6	-.5	14	1.5														
83	1.2 D + 1.5 LL d + Service - 270 W	Y...	Y		1	1.2	7	-1			14	1.5														
84	1.2 D + 1.5 LL d + Service - 300 W	Y...	Y		1	1.2	7	-....	6	.5	14	1.5														
85	1.2 D + 1.5 LL d + Service - 330 W	Y...	Y		1	1.2	6	.8...	7	-.5	14	1.5														
86	1.2 D + 1.5 LL Maint (1)	Y...	Y		1	1.2					15	1.5														
87	1.2 D + 1.5 LL Maint (2)	Y...	Y		1	1.2					16	1.5														
88	1.2 D + 1.5 LL Maint (3)	Y...	Y		1	1.2					17	1.5														
89	1.2 D + 1.5 LL Maint (4)	Y...	Y		1	1.2					18	1.5														
90	1.2 D + 1.5 LL Maint (5)	Y...	Y		1	1.2					19	1.5														
91	1.2 D + 1.5 LL Maint (6)	Y...	Y		1	1.2					20	1.5														
92	1.2 D + 1.5 LL Maint (7)	Y...	Y		1	1.2					21	1.5														
93	1.2 D + 1.5 LL Maint (8)	Y...	Y		1	1.2					22	1.5														
94	1.2 D + 1.5 LL Maint (9)	Y...	Y		1	1.2					23	1.5														
95	1.2 D + 1.5 LL Maint (10)	Y...	Y		1	1.2					24	1.5														
96	1.2 D + 1.5 LL Maint (11)	Y...	Y		1	1.2					25	1.5														
97	1.2 D + 1.5 LL Maint (12)	Y...	Y		1	1.2					26	1.5														
98	1.2 D + 1.5 LL Maint (13)	Y...	Y		1	1.2					27	1.5														
99	1.2 D + 1.5 LL Maint (14)	Y...	Y		1	1.2					28	1.5														
100	1.2 D + 1.5 LL Maint (15)	Y...	Y		1	1.2					29	1.5														
101	1.2 D + 1.5 LL Maint (16)	Y...	Y		1	1.2					30	1.5														
102	1.2 D + 1.5 LL Maint (17)	Y...	Y		1	1.2					31	1.5														
103	1.2 D + 1.5 LL Maint (18)	Y...	Y		1	1.2					32	1.5														
104	1.2 D + 1.5 LL Maint (19)	Y...	Y		1	1.2					33	1.5														
105	1.2 D + 1.5 LL Maint (20)	Y...	Y		1	1.2					34	1.5														
106	1.2 D + 1.5 LL Maint (21)	Y...	Y		1	1.2					35	1.5														
107	1.2 D + 1.5 LL Maint (22)	Y...	Y		1	1.2					36	1.5														
108	1.2 D + 1.5 LL Maint (23)	Y...	Y		1	1.2					37	1.5														
109	1.2 D + 1.5 LL Maint (24)	Y...	Y		1	1.2					38	1.5														

Member Point Loads (BLC 1 : Dead)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	7	Y	-.018	%20
2	7	Y	-.018	%80
3	7	Y	-.035	%25
4	7	Y	0	0
5	7	Y	0	0
6	6	Y	-.004	%20
7	6	Y	-.014	%50
8	6	Y	0	0
9	6	Y	0	0
10	6	Y	0	0

Member Point Loads (BLC 2 : 0 Wind - No Ice)

Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]

Member Point Loads (BLC 2 : 0 Wind - No Ice) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	7	Z	-.111	%20
2	7	Z	-.111	%80
3	7	Z	-.025	%25
4	7	Z	0	0
5	7	Z	0	0
6	6	Z	-.008	%20
7	6	Z	-.045	%50
8	6	Z	0	0
9	6	Z	0	0
10	6	Z	0	0

Member Point Loads (BLC 3 : 90 Wind - No Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	7	X	-.051	%20
2	7	X	-.051	%80
3	7	X	-.012	%25
4	7	X	0	0
5	7	X	0	0
6	6	X	-.014	%20
7	6	X	-.013	%50
8	6	X	0	0
9	6	X	0	0
10	6	X	0	0

Member Point Loads (BLC 4 : 0 Wind - Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	7	Z	-.02	%20
2	7	Z	-.02	%80
3	7	Z	-.004	%25
4	7	Z	0	0
5	7	Z	0	0
6	6	Z	-.002	%20
7	6	Z	-.008	%50
8	6	Z	0	0
9	6	Z	0	0
10	6	Z	0	0

Member Point Loads (BLC 5 : 90 Wind - Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	7	X	-.009	%20
2	7	X	-.009	%80
3	7	X	-.002	%25
4	7	X	0	0
5	7	X	0	0
6	6	X	-.003	%20
7	6	X	-.002	%50
8	6	X	0	0
9	6	X	0	0
10	6	X	0	0

Member Point Loads (BLC 6 : 0 Wind - Service)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	7	Z	-.007	%20
2	7	Z	-.007	%80
3	7	Z	-.002	%25

Member Point Loads (BLC 6 : 0 Wind - Service) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
4	7	Z	0	0
5	7	Z	0	0
6	6	Z	-.0005	%20
7	6	Z	-.003	%50
8	6	Z	0	0
9	6	Z	0	0
10	6	Z	0	0

Member Point Loads (BLC 7 : 90 Wind - Service)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	7	X	-.003	%20
2	7	X	-.003	%80
3	7	X	-.0008	%25
4	7	X	0	0
5	7	X	0	0
6	6	X	-.0009	%20
7	6	X	-.0008	%50
8	6	X	0	0
9	6	X	0	0
10	6	X	0	0

Member Point Loads (BLC 8 : Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	7	Y	-.043	%20
2	7	Y	-.043	%80
3	7	Y	-.011	%25
4	7	Y	0	0
5	7	Y	0	0
6	6	Y	-.006	%20
7	6	Y	-.018	%50
8	6	Y	0	0
9	6	Y	0	0
10	6	Y	0	0

Member Point Loads (BLC 9 : 0 Seismic)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	7	Z	-.01	%20
2	7	Z	-.01	%80
3	7	Z	-.005	%25
4	7	Z	0	0
5	7	Z	0	0
6	6	Z	-.0006	%20
7	6	Z	-.004	%50
8	6	Z	0	0
9	6	Z	0	0
10	6	Z	0	0

Member Point Loads (BLC 10 : 90 Seismic)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	7	X	-.01	%20
2	7	X	-.01	%80
3	7	X	-.005	%25
4	7	X	0	0
5	7	X	0	0
6	6	X	-.0006	%20

Member Point Loads (BLC 10 : 90 Seismic) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
7	6	X	-.004	%50
8	6	X	0	0
9	6	X	0	0
10	6	X	0	0

Member Point Loads (BLC 15 : Maint LL 1)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	5	Y	-.25	%5

Member Point Loads (BLC 16 : Maint LL 2)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	5	Y	-.25	%95

Member Point Loads (BLC 17 : Maint LL 3)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	1	Y	-.25	%5

Member Distributed Loads (BLC 2 : 0 Wind - No Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	Z	-.019	-.019	0	0
2	5	Z	-.01	-.01	0	0
3	6	Z	-.01	-.01	0	0
4	7	Z	-.01	-.01	0	0

Member Distributed Loads (BLC 3 : 90 Wind - No Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	X	-.019	-.019	0	0
2	5	X	-.01	-.01	0	0
3	6	X	-.01	-.01	0	0
4	7	X	-.01	-.01	0	0

Member Distributed Loads (BLC 4 : 0 Wind - Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	Z	-.006	-.006	0	0
2	5	Z	-.002	-.002	0	0
3	6	Z	-.002	-.002	0	0
4	7	Z	-.002	-.002	0	0

Member Distributed Loads (BLC 5 : 90 Wind - Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	X	-.006	-.006	0	0
2	5	X	-.002	-.002	0	0
3	6	X	-.002	-.002	0	0
4	7	X	-.002	-.002	0	0

Member Distributed Loads (BLC 6 : 0 Wind - Service)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	Z	-.001	-.001	0	0
2	5	Z	-.0005	-.0005	0	0
3	6	Z	-.0003	-.0003	0	0
4	7	Z	-.0003	-.0003	0	0

Member Distributed Loads (BLC 7 : 90 Wind - Service)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	X	-.001	-.001	0	0
2	5	X	-.0005	-.0005	0	0
3	6	X	-.0003	-.0003	0	0
4	7	X	-.0003	-.0003	0	0

Member Distributed Loads (BLC 8 : Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	Y	-.01	-.01	0	0
2	5	Y	-.007	-.007	0	0
3	6	Y	-.005	-.005	0	0
4	7	Y	-.005	-.005	0	0

Member Distributed Loads (BLC 9 : 0 Seismic)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	Z	-.004	-.004	0	0
2	5	Z	-.003	-.003	0	0
3	6	Z	-.001	-.001	0	0
4	7	Z	-.001	-.001	0	0

Member Distributed Loads (BLC 10 : 90 Seismic)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	X	-.004	-.004	0	0
2	5	X	-.003	-.003	0	0
3	6	X	-.001	-.001	0	0
4	7	X	-.001	-.001	0	0

Joint Loads and Enforced Displacements

Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
No Data to Print ...			

Envelope Joint Reactions

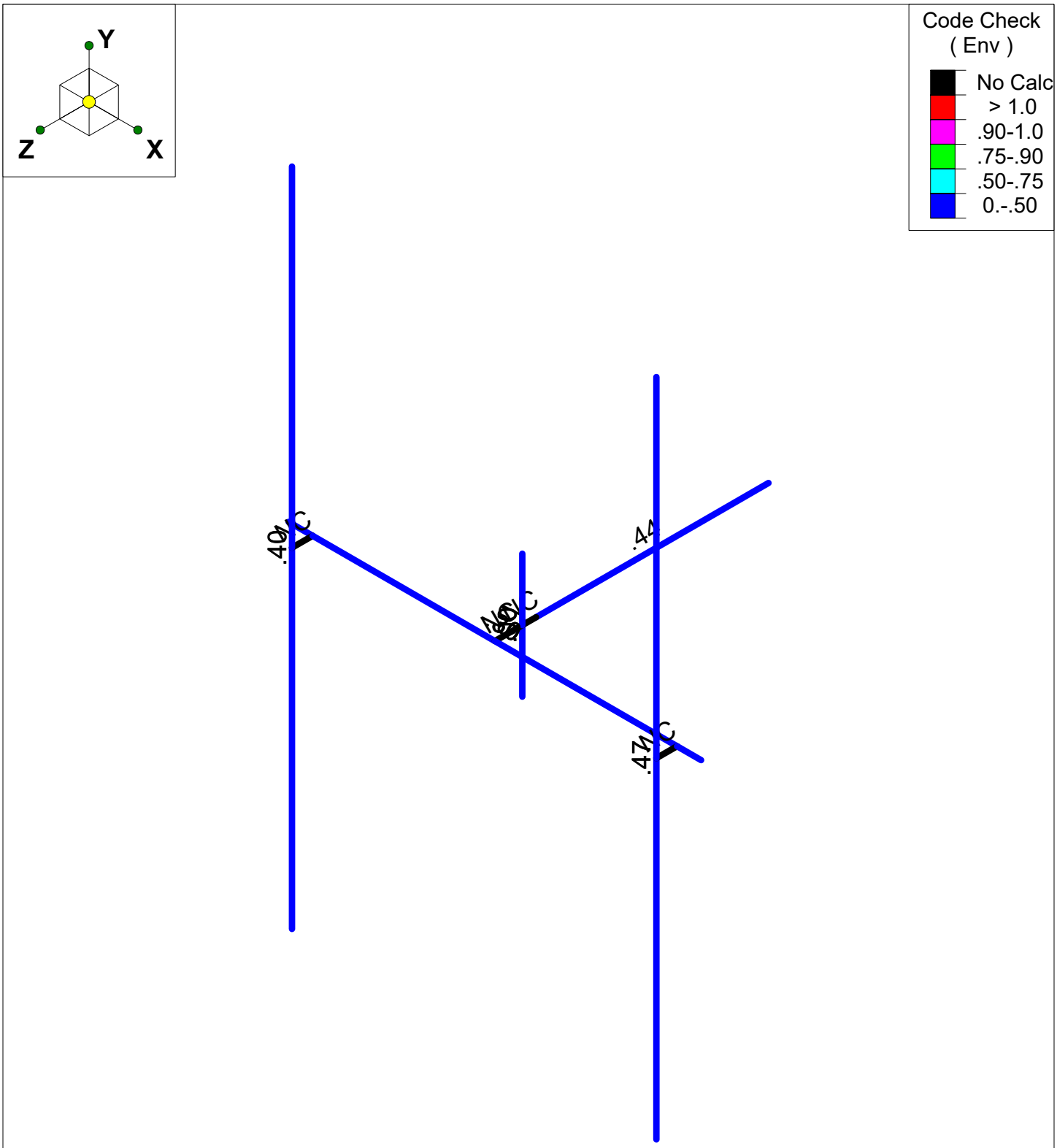
	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	1	max	0	109	0	109	0	109	0	109	0	109	0	109
2		min	0	1	0	1	0	1	0	1	0	1	0	1
3	N17	max	0	109	0	109	0	109	0	109	0	109	0	109
4		min	0	1	0	1	0	1	0	1	0	1	0	1
5	N18	max	.27	5	.552	88	.43	2	-.163	2	.329	4	.177	87
6		min	-.27	11	.177	2	-.43	8	-.583	86	-.329	10	-.245	86
7	Totals:	max	.27	5	.552	88	.43	2						
8		min	-.27	11	.177	2	-.43	8						

Envelope AISC 15th(360-16): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear C...	Loc[ft]	Dir	LC	phi*P...	phi*P...	phi*...	phi*...	...	Eqn
1	1	HSS4X4X4	.047	1	87	.042	1	y	86	105....	106....	12.311	12.311	...	H1-...
2	5	PL 1/2x6	.166	.625	2	.087	.625	y	20	55.048	97.2	1.012	12.15	...	H1-...
3	6	PIPE_2.0	.028	2.5	5	.004	2.5		5	23.809	32.13	1.872	1.872	...	H1-...
4	7	PIPE_2.0	.124	2.5	8	.017	2.5		8	23.809	32.13	1.872	1.872	1	H1-...

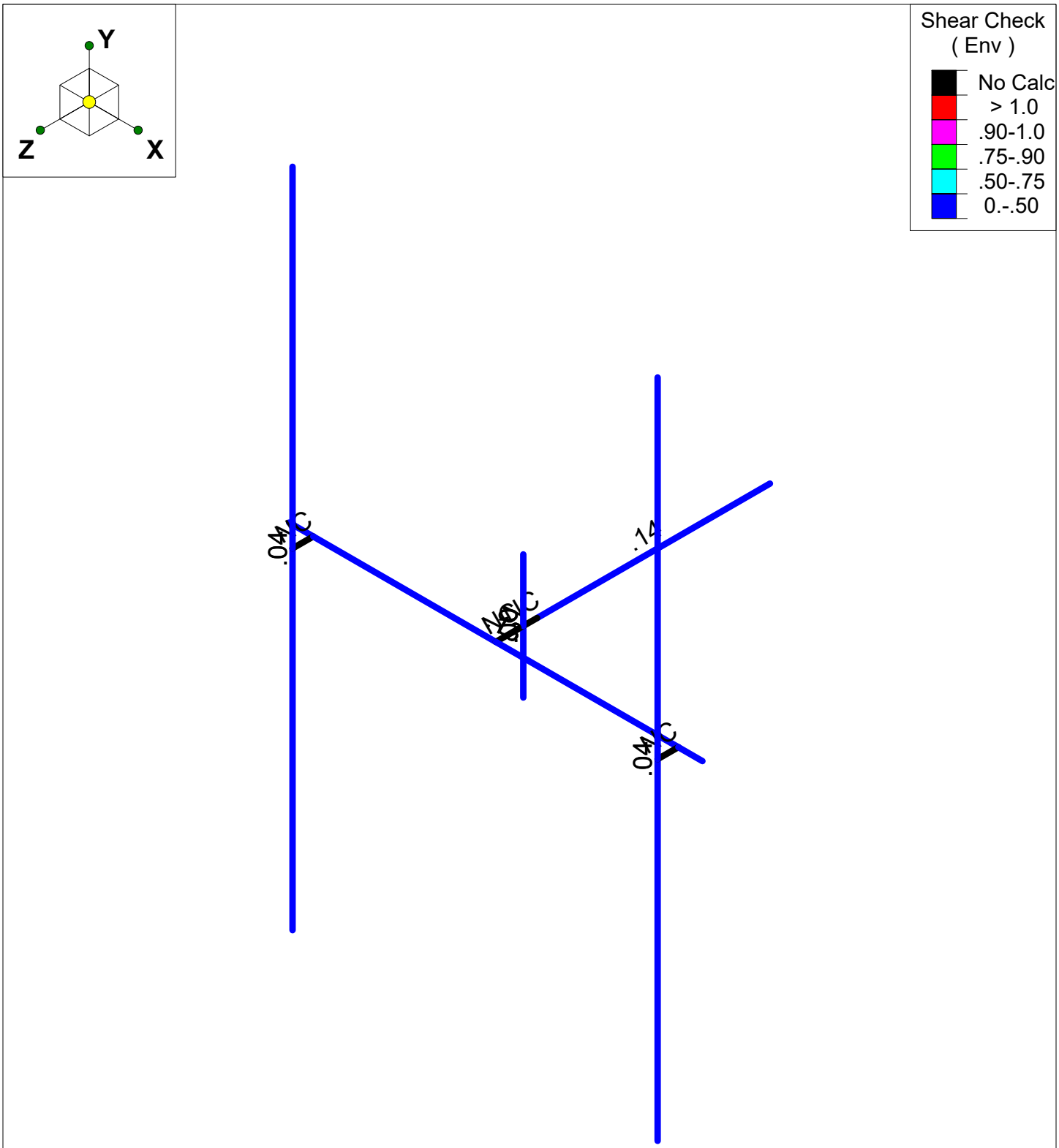
SOFTWARE ANALYSIS OUTPUT

(AT 149 FT.)



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

B+T Group	845455 - Oxford Quaker Farms	SK - 8
SR		Apr 20, 2020 at 2:19 PM
136377.008.01		136377_008_01_Oxford Quaker F...



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

B+T Group	845455 - Oxford Quaker Farms	SK - 9
SR		Apr 20, 2020 at 2:19 PM
136377.008.01		136377_008_01_Oxford Quaker F...

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	MF-H1	PIPE_3.0	Beam	Pipe	A53 Gr.B	Typical	2.07	2.85	2.85	5.69
2	SF-H1	HSS4X4X4	Beam	Tube	A53 Gr.B	Typical	3.37	7.8	7.8	12.8
3	MF-P1	PIPE_2.0	Column	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
4	MV-1	PIPE_4.0	Column	Pipe	A53 Gr.B	Typical	2.96	6.82	6.82	13.6

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	1	2	1			SF-H1	Beam	Tube	A53 Gr.B	Typical
2	2	5	4			MV-1	Column	Pipe	A53 Gr.B	Typical
3	3	3	2			RIGID	None	None	RIGID	Typical
4	4	6	3			RIGID	None	None	RIGID	Typical
5	5	10	8			MF-H1	Beam	Pipe	A53 Gr.B	Typical
6	6	13	15			MF-P1	Column	Pipe	A53 Gr.B	Typical
7	7	14	16			MF-P1	Column	Pipe	A53 Gr.B	Typical
8	8	12	9			RIGID	None	None	RIGID	Typical
9	9	11	7			RIGID	None	None	RIGID	Typical

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Grav...	Joint	Point	Distribut...	Area(Me...	Surface(...
1	Dead	DL		-1			15			
2	0 Wind - No Ice	WLZ					15	5		
3	90 Wind - No Ice	WLX					15	5		
4	0 Wind - Ice	WLZ					15	5		
5	90 Wind - Ice	WLX					15	5		
6	0 Wind - Service	WLZ					15	5		
7	90 Wind - Service	WLX					15	5		
8	Ice	OL1					15	5		
9	0 Seismic	ELZ					15	5		
10	90 Seismic	ELX					15	5		
11	Live Load a	LL								
12	Live Load b	LL								
13	Live Load c	LL								
14	Live Load d	LL								
15	Maint LL 1	LL					1			
16	Maint LL 2	LL					1			
17	Maint LL 3	LL					1			
18	Maint LL 4	LL								
19	Maint LL 5	LL								
20	Maint LL 6	LL								

Load Combinations

	Description	S...	PDelta	S...	B...	Factor	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...
1	1.4 Dead	Y...	Y		1	1.4																				
2	1.2 D + 1.0 - 0 W	Y...	Y		1	1.2	2	1																		
3	1.2 D + 1.0 - 30 W	Y...	Y		1	1.2	2	.8...	3	.5																
4	1.2 D + 1.0 - 60 W	Y...	Y		1	1.2	3	.8...	2	.5																
5	1.2 D + 1.0 - 90 W	Y...	Y		1	1.2	3	1																		
6	1.2 D + 1.0 - 120 W	Y...	Y		1	1.2	3	.8...	2	-.5																
7	1.2 D + 1.0 - 150 W	Y...	Y		1	1.2	2	-....	3	.5																
8	1.2 D + 1.0 - 180 W	Y...	Y		1	1.2	2	-1																		
9	1.2 D + 1.0 - 210 W	Y...	Y		1	1.2	2	-....	3	-.5																

Load Combinations (Continued)

	Description	S...	PDelta	S...	B...	Factor	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...
10	1.2 D + 1.0 - 240 W	Y...	Y		1	1.2	3	-....	2	-.5																		
11	1.2 D + 1.0 - 270 W	Y...	Y		1	1.2	3	-1																				
12	1.2 D + 1.0 - 300 W	Y...	Y		1	1.2	3	-....	2	.5																		
13	1.2 D + 1.0 - 330 W	Y...	Y		1	1.2	2	.8...	3	-.5																		
14	1.2 D + 1.0 - 0 W/Ice	Y...	Y		1	1.2	4	1			8	1																
15	1.2 D + 1.0 - 30 W/Ice	Y...	Y		1	1.2	4	.8...	5	.5	8	1																
16	1.2 D + 1.0 - 60 W/Ice	Y...	Y		1	1.2	5	.8...	4	.5	8	1																
17	1.2 D + 1.0 - 90 W/Ice	Y...	Y		1	1.2	5	1			8	1																
18	1.2 D + 1.0 - 120 W/Ice	Y...	Y		1	1.2	5	.8...	4	-.5	8	1																
19	1.2 D + 1.0 - 150 W/Ice	Y...	Y		1	1.2	4	-....	5	.5	8	1																
20	1.2 D + 1.0 - 180 W/Ice	Y...	Y		1	1.2	4	-1			8	1																
21	1.2 D + 1.0 - 210 W/Ice	Y...	Y		1	1.2	4	-....	5	-.5	8	1																
22	1.2 D + 1.0 - 240 W/Ice	Y...	Y		1	1.2	5	-....	4	-.5	8	1																
23	1.2 D + 1.0 - 270 W/Ice	Y...	Y		1	1.2	5	-1			8	1																
24	1.2 D + 1.0 - 300 W/Ice	Y...	Y		1	1.2	5	-....	4	.5	8	1																
25	1.2 D + 1.0 - 330 W/Ice	Y...	Y		1	1.2	4	.8...	5	-.5	8	1																
26	1.2 D + 1.0 E - 0	Y...	Y		1	1.2	9	1																				
27	1.2 D + 1.0 E - 30	Y...	Y		1	1.2	9	.8...	10	.5																		
28	1.2 D + 1.0 E - 60	Y...	Y		1	1.2	10	.8...	9	.5																		
29	1.2 D + 1.0 E - 90	Y...	Y		1	1.2	10	1																				
30	1.2 D + 1.0 E - 120	Y...	Y		1	1.2	10	.8...	9	-.5																		
31	1.2 D + 1.0 E - 150	Y...	Y		1	1.2	9	-....	10	.5																		
32	1.2 D + 1.0 E - 180	Y...	Y		1	1.2	9	-1																				
33	1.2 D + 1.0 E - 210	Y...	Y		1	1.2	9	-....	10	-.5																		
34	1.2 D + 1.0 E - 240	Y...	Y		1	1.2	10	-....	9	-.5																		
35	1.2 D + 1.0 E - 270	Y...	Y		1	1.2	10	-1																				
36	1.2 D + 1.0 E - 300	Y...	Y		1	1.2	10	-....	9	.5																		
37	1.2 D + 1.0 E - 330	Y...	Y		1	1.2	9	.8...	10	-.5																		
38	1.2 D + 1.5 LL a + Service - 0 W	Y...	Y		1	1.2	6	1			11	1.5																
39	1.2 D + 1.5 LL a + Service - 30 W	Y...	Y		1	1.2	6	.8...	7	.5	11	1.5																
40	1.2 D + 1.5 LL a + Service - 60 W	Y...	Y		1	1.2	7	.8...	6	.5	11	1.5																
41	1.2 D + 1.5 LL a + Service - 90 W	Y...	Y		1	1.2	7	1			11	1.5																
42	1.2 D + 1.5 LL a + Service - 120 W	Y...	Y		1	1.2	7	.8...	6	-.5	11	1.5																
43	1.2 D + 1.5 LL a + Service - 150 W	Y...	Y		1	1.2	6	-....	7	.5	11	1.5																
44	1.2 D + 1.5 LL a + Service - 180 W	Y...	Y		1	1.2	6	-1			11	1.5																
45	1.2 D + 1.5 LL a + Service - 210 W	Y...	Y		1	1.2	6	-....	7	-.5	11	1.5																
46	1.2 D + 1.5 LL a + Service - 240 W	Y...	Y		1	1.2	7	-....	6	-.5	11	1.5																
47	1.2 D + 1.5 LL a + Service - 270 W	Y...	Y		1	1.2	7	-1			11	1.5																
48	1.2 D + 1.5 LL a + Service - 300 W	Y...	Y		1	1.2	7	-....	6	.5	11	1.5																
49	1.2 D + 1.5 LL a + Service - 330 W	Y...	Y		1	1.2	6	.8...	7	-.5	11	1.5																
50	1.2 D + 1.5 LL b + Service - 0 W	Y...	Y		1	1.2	6	1			12	1.5																
51	1.2 D + 1.5 LL b + Service - 30 W	Y...	Y		1	1.2	6	.8...	7	.5	12	1.5																
52	1.2 D + 1.5 LL b + Service - 60 W	Y...	Y		1	1.2	7	.8...	6	.5	12	1.5																
53	1.2 D + 1.5 LL b + Service - 90 W	Y...	Y		1	1.2	7	1			12	1.5																
54	1.2 D + 1.5 LL b + Service - 120 W	Y...	Y		1	1.2	7	.8...	6	-.5	12	1.5																
55	1.2 D + 1.5 LL b + Service - 150 W	Y...	Y		1	1.2	6	-....	7	.5	12	1.5																
56	1.2 D + 1.5 LL b + Service - 180 W	Y...	Y		1	1.2	6	-1			12	1.5																
57	1.2 D + 1.5 LL b + Service - 210 W	Y...	Y		1	1.2	6	-....	7	-.5	12	1.5																
58	1.2 D + 1.5 LL b + Service - 240 W	Y...	Y		1	1.2	7	-....	6	-.5	12	1.5																
59	1.2 D + 1.5 LL b + Service - 270 W	Y...	Y		1	1.2	7	-1			12	1.5																
60	1.2 D + 1.5 LL b + Service - 300 W	Y...	Y		1	1.2	7	-....	6	.5	12	1.5																
61	1.2 D + 1.5 LL b + Service - 330 W	Y...	Y		1	1.2	6	.8...	7	-.5	12	1.5																
62	1.2 D + 1.5 LL c + Service - 0 W	Y...	Y		1	1.2	6	1			13	1.5																
63	1.2 D + 1.5 LL c + Service - 30 W	Y...	Y		1	1.2	6	.8...	7	.5	13	1.5																
64	1.2 D + 1.5 LL c + Service - 60 W	Y...	Y		1	1.2	7	.8...	6	.5	13	1.5																
65	1.2 D + 1.5 LL c + Service - 90 W	Y...	Y		1	1.2	7	1			13	1.5																
66	1.2 D + 1.5 LL c + Service - 120 W	Y...	Y		1	1.2	7	.8...	6	-.5	13	1.5																

Load Combinations (Continued)

	Description	S...	PDelta	S...	B...	Factor	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...
67	1.2 D + 1.5 LL c + Service - 150 W	Y...	Y		1	1.2	6	-....	7	.5	13	1.5														
68	1.2 D + 1.5 LL c + Service - 180 W	Y...	Y		1	1.2	6	-1			13	1.5														
69	1.2 D + 1.5 LL c + Service - 210 W	Y...	Y		1	1.2	6	-....	7	-.5	13	1.5														
70	1.2 D + 1.5 LL c + Service - 240 W	Y...	Y		1	1.2	7	-....	6	-.5	13	1.5														
71	1.2 D + 1.5 LL c + Service - 270 W	Y...	Y		1	1.2	7	-1			13	1.5														
72	1.2 D + 1.5 LL c + Service - 300 W	Y...	Y		1	1.2	7	-....	6	.5	13	1.5														
73	1.2 D + 1.5 LL c + Service - 330 W	Y...	Y		1	1.2	6	.8...	7	-.5	13	1.5														
74	1.2 D + 1.5 LL d + Service - 0 W	Y...	Y		1	1.2	6	1			14	1.5														
75	1.2 D + 1.5 LL d + Service - 30 W	Y...	Y		1	1.2	6	.8...	7	.5	14	1.5														
76	1.2 D + 1.5 LL d + Service - 60 W	Y...	Y		1	1.2	7	.8...	6	.5	14	1.5														
77	1.2 D + 1.5 LL d + Service - 90 W	Y...	Y		1	1.2	7	1			14	1.5														
78	1.2 D + 1.5 LL d + Service - 120 W	Y...	Y		1	1.2	7	.8...	6	-.5	14	1.5														
79	1.2 D + 1.5 LL d + Service - 150 W	Y...	Y		1	1.2	6	-....	7	.5	14	1.5														
80	1.2 D + 1.5 LL d + Service - 180 W	Y...	Y		1	1.2	6	-1			14	1.5														
81	1.2 D + 1.5 LL d + Service - 210 W	Y...	Y		1	1.2	6	-....	7	-.5	14	1.5														
82	1.2 D + 1.5 LL d + Service - 240 W	Y...	Y		1	1.2	7	-....	6	-.5	14	1.5														
83	1.2 D + 1.5 LL d + Service - 270 W	Y...	Y		1	1.2	7	-1			14	1.5														
84	1.2 D + 1.5 LL d + Service - 300 W	Y...	Y		1	1.2	7	-....	6	.5	14	1.5														
85	1.2 D + 1.5 LL d + Service - 330 W	Y...	Y		1	1.2	6	.8...	7	-.5	14	1.5														
86	1.2 D + 1.5 LL Maint (1)	Y...	Y		1	1.2					15	1.5														
87	1.2 D + 1.5 LL Maint (2)	Y...	Y		1	1.2					16	1.5														
88	1.2 D + 1.5 LL Maint (3)	Y...	Y		1	1.2					17	1.5														
89	1.2 D + 1.5 LL Maint (4)	Y...	Y		1	1.2					18	1.5														
90	1.2 D + 1.5 LL Maint (5)	Y...	Y		1	1.2					19	1.5														
91	1.2 D + 1.5 LL Maint (6)	Y...	Y		1	1.2					20	1.5														
92	1.2 D + 1.5 LL Maint (7)	Y...	Y		1	1.2					21	1.5														
93	1.2 D + 1.5 LL Maint (8)	Y...	Y		1	1.2					22	1.5														
94	1.2 D + 1.5 LL Maint (9)	Y...	Y		1	1.2					23	1.5														
95	1.2 D + 1.5 LL Maint (10)	Y...	Y		1	1.2					24	1.5														
96	1.2 D + 1.5 LL Maint (11)	Y...	Y		1	1.2					25	1.5														
97	1.2 D + 1.5 LL Maint (12)	Y...	Y		1	1.2					26	1.5														
98	1.2 D + 1.5 LL Maint (13)	Y...	Y		1	1.2					27	1.5														
99	1.2 D + 1.5 LL Maint (14)	Y...	Y		1	1.2					28	1.5														
100	1.2 D + 1.5 LL Maint (15)	Y...	Y		1	1.2					29	1.5														
101	1.2 D + 1.5 LL Maint (16)	Y...	Y		1	1.2					30	1.5														
102	1.2 D + 1.5 LL Maint (17)	Y...	Y		1	1.2					31	1.5														
103	1.2 D + 1.5 LL Maint (18)	Y...	Y		1	1.2					32	1.5														
104	1.2 D + 1.5 LL Maint (19)	Y...	Y		1	1.2					33	1.5														
105	1.2 D + 1.5 LL Maint (20)	Y...	Y		1	1.2					34	1.5														
106	1.2 D + 1.5 LL Maint (21)	Y...	Y		1	1.2					35	1.5														
107	1.2 D + 1.5 LL Maint (22)	Y...	Y		1	1.2					36	1.5														
108	1.2 D + 1.5 LL Maint (23)	Y...	Y		1	1.2					37	1.5														
109	1.2 D + 1.5 LL Maint (24)	Y...	Y		1	1.2					38	1.5														

Member Point Loads (BLC 1 : Dead)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	6	Y	-.045	%20
2	6	Y	-.045	%80
3	6	Y	-.043	%25
4	6	Y	-.002	%75
5	6	Y	0	0
6	7	Y	-.048	%30
7	7	Y	-.048	%70
8	7	Y	-.072	%25
9	7	Y	-.071	%15

Member Point Loads (BLC 1 : Dead) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
10	7	Y	0	0
11	1	Y	-.033	%50
12	1	Y	0	0
13	1	Y	0	0
14	1	Y	0	0
15	1	Y	0	0

Member Point Loads (BLC 2 : 0 Wind - No Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	6	Z	-.272	%20
2	6	Z	-.272	%80
3	6	Z	-.068	%25
4	6	Z	-.007	%75
5	6	Z	0	0
6	7	Z	-.174	%30
7	7	Z	-.174	%70
8	7	Z	-.067	%25
9	7	Z	-.081	%15
10	7	Z	0	0
11	1	Z	-.119	%50
12	1	Z	0	0
13	1	Z	0	0
14	1	Z	0	0
15	1	Z	0	0

Member Point Loads (BLC 3 : 90 Wind - No Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	6	X	-.102	%20
2	6	X	-.102	%80
3	6	X	-.026	%25
4	6	X	-.003	%75
5	6	X	0	0
6	7	X	-.069	%30
7	7	X	-.069	%70
8	7	X	-.056	%25
9	7	X	-.058	%15
10	7	X	0	0
11	1	X	-.119	%50
12	1	X	0	0
13	1	X	0	0
14	1	X	0	0
15	1	X	0	0

Member Point Loads (BLC 4 : 0 Wind - Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	6	Z	-.055	%20
2	6	Z	-.055	%80
3	6	Z	-.012	%25
4	6	Z	-.001	%75
5	6	Z	0	0
6	7	Z	-.035	%30
7	7	Z	-.035	%70
8	7	Z	-.012	%25
9	7	Z	-.015	%15
10	7	Z	0	0

Member Point Loads (BLC 4 : 0 Wind - Ice) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
11	1	Z	-.021	%50
12	1	Z	0	0
13	1	Z	0	0
14	1	Z	0	0
15	1	Z	0	0

Member Point Loads (BLC 5 : 90 Wind - Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	6	X	-.024	%20
2	6	X	-.024	%80
3	6	X	-.005	%25
4	6	X	-.0006	%75
5	6	X	0	0
6	7	X	-.016	%30
7	7	X	-.016	%70
8	7	X	-.01	%25
9	7	X	-.01	%15
10	7	X	0	0
11	1	X	-.021	%50
12	1	X	0	0
13	1	X	0	0
14	1	X	0	0
15	1	X	0	0

Member Point Loads (BLC 6 : 0 Wind - Service)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	6	Z	-.018	%20
2	6	Z	-.018	%80
3	6	Z	-.004	%25
4	6	Z	-.0005	%75
5	6	Z	0	0
6	7	Z	-.011	%30
7	7	Z	-.011	%70
8	7	Z	-.004	%25
9	7	Z	-.005	%15
10	7	Z	0	0
11	1	Z	-.008	%50
12	1	Z	0	0
13	1	Z	0	0
14	1	Z	0	0
15	1	Z	0	0

Member Point Loads (BLC 7 : 90 Wind - Service)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	6	X	-.007	%20
2	6	X	-.007	%80
3	6	X	-.002	%25
4	6	X	-.0002	%75
5	6	X	0	0
6	7	X	-.004	%30
7	7	X	-.004	%70
8	7	X	-.004	%25
9	7	X	-.004	%15
10	7	X	0	0
11	1	X	-.008	%50

Member Point Loads (BLC 7 : 90 Wind - Service) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
12	1	X	0	0
13	1	X	0	0
14	1	X	0	0
15	1	X	0	0

Member Point Loads (BLC 8 : Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	6	Y	-.122	%20
2	6	Y	-.122	%80
3	6	Y	-.027	%25
4	6	Y	-.004	%75
5	6	Y	0	0
6	7	Y	-.124	%30
7	7	Y	-.124	%70
8	7	Y	-.032	%25
9	7	Y	-.037	%15
10	7	Y	0	0
11	1	Y	-.062	%50
12	1	Y	0	0
13	1	Y	0	0
14	1	Y	0	0
15	1	Y	0	0

Member Point Loads (BLC 9 : 0 Seismic)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	6	Z	-.029	%20
2	6	Z	-.029	%80
3	6	Z	-.014	%25
4	6	Z	-.0006	%75
5	6	Z	0	0
6	7	Z	-.031	%30
7	7	Z	-.031	%70
8	7	Z	-.023	%25
9	7	Z	-.023	%15
10	7	Z	0	0
11	1	Z	-.011	%50
12	1	Z	0	0
13	1	Z	0	0
14	1	Z	0	0
15	1	Z	0	0

Member Point Loads (BLC 10 : 90 Seismic)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	6	X	-.029	%20
2	6	X	-.029	%80
3	6	X	-.014	%25
4	6	X	-.0006	%75
5	6	X	0	0
6	7	X	-.031	%30
7	7	X	-.031	%70
8	7	X	-.023	%25
9	7	X	-.023	%15
10	7	X	0	0
11	1	X	-.011	%50
12	1	X	0	0

Member Point Loads (BLC 10 : 90 Seismic) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
13	1	X	0	0
14	1	X	0	0
15	1	X	0	0

Member Point Loads (BLC 15 : Maint LL 1)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	5	Y	-.25	%5

Member Point Loads (BLC 16 : Maint LL 2)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	5	Y	-.25	%95

Member Point Loads (BLC 17 : Maint LL 3)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	1	Y	-.25	%5

Member Distributed Loads (BLC 2 : 0 Wind - No Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	Z	-.019	-.019	0	0
2	2	Z	-.01	-.01	0	0
3	5	Z	-.01	-.01	0	0
4	6	Z	-.01	-.01	0	0
5	7	Z	-.01	-.01	0	0

Member Distributed Loads (BLC 3 : 90 Wind - No Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	X	-.019	-.019	0	0
2	2	X	-.01	-.01	0	0
3	5	X	-.01	-.01	0	0
4	6	X	-.01	-.01	0	0
5	7	X	-.01	-.01	0	0

Member Distributed Loads (BLC 4 : 0 Wind - Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	Z	-.006	-.006	0	0
2	2	Z	-.003	-.003	0	0
3	5	Z	-.002	-.002	0	0
4	6	Z	-.002	-.002	0	0
5	7	Z	-.002	-.002	0	0

Member Distributed Loads (BLC 5 : 90 Wind - Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	X	-.006	-.006	0	0
2	2	X	-.003	-.003	0	0
3	5	X	-.002	-.002	0	0
4	6	X	-.002	-.002	0	0
5	7	X	-.002	-.002	0	0

Member Distributed Loads (BLC 6 : 0 Wind - Service)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	Z	-.001	-.001	0	0
2	2	Z	-.0005	-.0005	0	0

Member Distributed Loads (BLC 6 : 0 Wind - Service) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
3	5	Z	-.0005	-.0005	0	0
4	6	Z	-.0003	-.0003	0	0
5	7	Z	-.0003	-.0003	0	0

Member Distributed Loads (BLC 7 : 90 Wind - Service)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	X	-.001	-.001	0	0
2	2	X	-.0005	-.0005	0	0
3	5	X	-.0005	-.0005	0	0
4	6	X	-.0003	-.0003	0	0
5	7	X	-.0003	-.0003	0	0

Member Distributed Loads (BLC 8 : Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	Y	-.01	-.01	0	0
2	2	Y	-.008	-.008	0	0
3	5	Y	-.007	-.007	0	0
4	6	Y	-.005	-.005	0	0
5	7	Y	-.005	-.005	0	0

Member Distributed Loads (BLC 9 : 0 Seismic)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	Z	-.004	-.004	0	0
2	2	Z	-.004	-.004	0	0
3	5	Z	-.003	-.003	0	0
4	6	Z	-.001	-.001	0	0
5	7	Z	-.001	-.001	0	0

Member Distributed Loads (BLC 10 : 90 Seismic)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	X	-.004	-.004	0	0
2	2	X	-.004	-.004	0	0
3	5	X	-.003	-.003	0	0
4	6	X	-.001	-.001	0	0
5	7	X	-.001	-.001	0	0

Joint Loads and Enforced Displacements

Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
No Data to Print ...			

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	1	max	.878	5	1.462	20	1.509	2	-1.661	2	2.738	5	.565	87
2		min	-.878	11	.654	13	-1.509	8	-4.906	20	-2.738	11	-1.125	86
3	Totals:	max	.878	5	1.462	20	1.509	2						
4		min	-.878	11	.654	13	-1.509	8						

Envelope AISC 15th(360-16): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear C...	Loc[ft]	Dir	LC	phi*P...	phi*P...	phi*...	phi*...	...	Eqn
1	1	HSS4X4X4	.439	2.818	18	.143	2.818	y	86	103....	106....	12.311	12.311	...	H1-...
2	2	PIPE_4.0	.000	.75	8	.000	.75		8	92.571	93.24	10.631	10.631	1	H1-...
3	5	PIPE_3.0	.302	2.5	2	.126	2.5		8	57.037	65.205	5.749	5.749	...	H1-...
4	6	PIPE_2.0	.469	4	8	.039	4		8	14.916	32.13	1.872	1.872	...	H1-...
5	7	PIPE_2.0	.395	4	8	.038	4		8	14.916	32.13	1.872	1.872	...	H1-...

Exhibit F

Power Density/RF Emissions Report

SITESAFE
RF COMPLIANCE EXPERTS

8618 Westwood Center Drive, Suite 315, Vienna, VA 22182
703.276.1100 • 703.276.1169 fax
info@sitesafe.com • www.sitesafe.com

Crown Castle on behalf of AT&T Mobility, LLC
Site BU – 845455
Application ID – ATT order 509315
Site Name – OXFORD-QUAKER FARMS
Site Compliance Report

85 Quaker Farms Road
Oxford, CT 06478

Latitude: N41-23-02.36
Longitude: W73-08-14.54
Structure Type: Monopole

Report generated date: March 24, 2020
Report by: Zyotty Thamsil
Customer Contact: Anne Marie Zsamba

AT&T Mobility, LLC will be compliant upon completion of the remediation identified in Section 3.2.

Michael Fischer, P.E.
Registered Professional Engineer (Electrical)
Connecticut License Number 33928
Expires January 31, 2021

Signed 24 March 2020

Crown Castle on behalf of AT&T Mobility, LLC
OXFORD-QUAKER FARMS - 845455
Radio Frequency (RF) Site Compliance Report

85 Quaker Farms Road, Oxford, CT 06478

8618 Westwood Center Drive • Suite 315 • Vienna, VA 22182
703.276.1100 • info@sitesafe.com

Table of Contents

1 Executive Summary

AT&T Mobility, LLC has contracted with Site Safe, LLC (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine whether the proposed communications site, 845455 - OXFORD-QUAKER FARMS, located at 85 Quaker Farms Road, Oxford, CT, is in compliance with the Federal Communication Commission (FCC) Rules and Regulations for RF emissions.

This report contains a detailed summary of the RF environment at the site including:

- Diagram of the site
- Inventory of the make / model of all antennas
- Theoretical MPE based on modeling

This report addresses exposure to radio frequency electromagnetic fields in accordance with the FCC Rules and Regulations for all individuals, classified in two groups, "Occupational or Controlled" and "General Public or Uncontrolled." **AT&T Mobility, LLC will be compliant** with the FCC Rules and Regulations, as described in OET Bulletin 65, **upon implementation of the proposed remediation.** The corrective actions needed to make this site compliant are located in Section 3.2.

AT&T Mobility, LLC proposes to make modifications to an existing site. The proposed antennas are noted as "proposed" in the antenna table under Section 6.

This document and the conclusions herein are based on the information provided by AT&T Mobility, LLC.

If you have any questions regarding RF safety and regulatory compliance, please do not hesitate to contact Sitesafe's Customer Support Department at (703) 276-1100.

2 Regulatory Basis

2.1 FCC Rules and Regulations

In 1996, the Federal Communications Commission (FCC) adopted regulations for evaluating the effects of RF emissions in 47 CFR § 1.1307 and 1.1310. The guideline from the FCC Office of Engineering and Technology is Bulletin 65 ("OET Bulletin 65"), *Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields*, Edition 97-01, published August 1997. Since 1996, the FCC periodically reviews these rules and regulations as per their congressional mandate.

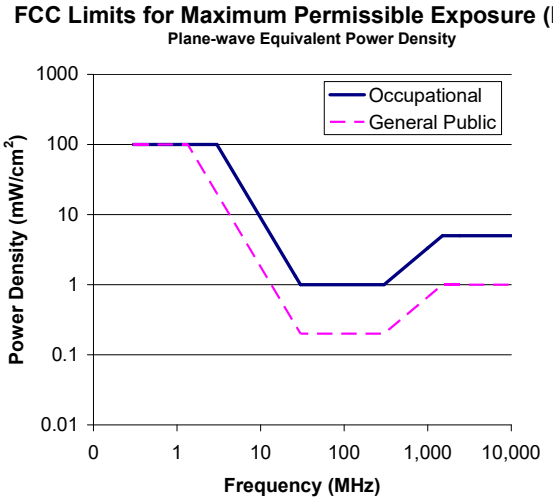
FCC regulations define two separate tiers of exposure limits: Occupational or "Controlled environment" and General Public or "Uncontrolled environment". The General Public limits are generally five times more conservative or restrictive than the Occupational limit. These limits apply to *accessible* areas where workers or the general public may be exposed to Radio Frequency (RF) electromagnetic fields.

Occupational or Controlled limits apply in situations in which persons are exposed as a consequence of their employment and where those persons exposed have been made fully aware of the potential for exposure and can exercise control over their exposure.

An area is considered a Controlled environment when access is limited to these aware personnel. Typical criteria are restricted access (i.e. locked or alarmed doors, barriers, etc.) to the areas where antennas are located coupled with proper RF warning signage. A site with Controlled environments is evaluated with Occupational limits.

All other areas are considered Uncontrolled environments. If a site has no access controls or no RF warning signage it is evaluated with General Public limits.

The theoretical modeling of the RF electromagnetic fields has been performed in accordance with OET Bulletin 65. The Maximum Permissible Exposure (MPE) limits utilized in this analysis are outlined in the following diagram:



Limits for Occupational/Controlled Exposure (MPE)

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

Limits for General Population/Uncontrolled Exposure (MPE)

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 in MHz *Plane-wave equivalent power density

2.2 OSHA Statement

The General Duty clause of the OSHA Act (Section 5) outlines the occupational safety and health responsibilities of the employer and employee. The General Duty clause in Section 5 states:

(a) Each employer –

(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;

(2) shall comply with occupational safety and health standards promulgated under this Act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA has defined Radiofrequency and Microwave Radiation safety standards for workers who may enter hazardous RF areas. Regulation Standards 29 CFR § 1910.147 identify a generic lockout/tagout procedure aimed to control the unexpected energization or startup of machines when maintenance or service is being performed.

3 Site Compliance

3.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, Sitesafe has determined that:

AT&T Mobility, LLC will be compliant with the FCC Rules and Regulations, as described in OET Bulletin 65, **upon implementation of the proposed remediation.** The corrective actions needed to make this site compliant are located in Section 3.2.

The compliance determination is based on theoretical modeling, RF signage placement recommendations, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the proposed AT&T Mobility, LLC deployment plan could result in the site being rendered non-compliant.

3.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. RF alert signage recommendations have been proposed based on theoretical analysis of MPE levels. Where applicable, barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

The site will be made compliant if the following changes are implemented:

Monopole Access Location

Ensure that a Warning sign is installed.
Ensure that a NOC Information sign is installed.
Ensure that the monopole access point or gate is locked/restricted.

4 Safety Plan and Procedures

The following items are general safety recommendations that should be administered on a site by site basis as needed by the carrier.

General Maintenance Work: Any maintenance personnel required to work immediately in front of antennas and / or in areas indicated as above 100% of the Occupational MPE limits should coordinate with the wireless operators to disable transmitters during their work activities.

Training and Qualification Verification: All personnel accessing areas indicated as exceeding the General Population MPE limits should have a basic understanding of EME awareness and RF Safety procedures when working around transmitting antennas. Awareness training increases a worker's understanding to potential RF exposure scenarios. Awareness can be achieved in a number of ways (e.g. videos, formal classroom lecture or internet-based courses).

Physical Access Control: Access restrictions to transmitting antennas locations is the primary element in a site safety plan. Examples of access restrictions are as follows:

- Locked door or gate
- Alarmed door
- Locked ladder access
- Restrictive Barrier at antenna (e.g. Chain link with posted RF Sign)

RF Signage: Everyone should obey all posted signs at all times. RF signs play an important role in properly warning a worker prior to entering into a potential RF Exposure area.

Assume all antennas are active: Due to the nature of telecommunications transmissions, an antenna transmits intermittently. Always assume an antenna is transmitting. Never stop in front of an antenna. If you have to pass by an antenna, move through as quickly and safely as possible thereby reducing any exposure to a minimum.

Maintain a 3-foot clearance from all antennas: There is a direct correlation between the strength of an EME field and the distance from the transmitting antenna. The farther away from an antenna, the lower the corresponding EME field is.

Site RF Emissions Diagram(s): Section 5 of this report contains RF Diagram(s) that outline various theoretical Maximum Permissible Exposure (MPE) areas at the site. The modeling is a worst-case scenario assuming a duty cycle of 100% for each transmitting antenna at full power. This analysis is based on one of two access control criteria: General Public criteria means the access to the site is uncontrolled and anyone can gain access. Occupational criteria means the access is restricted and only properly trained individuals can gain access to the antenna locations.

5 Analysis

5.1 RF Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

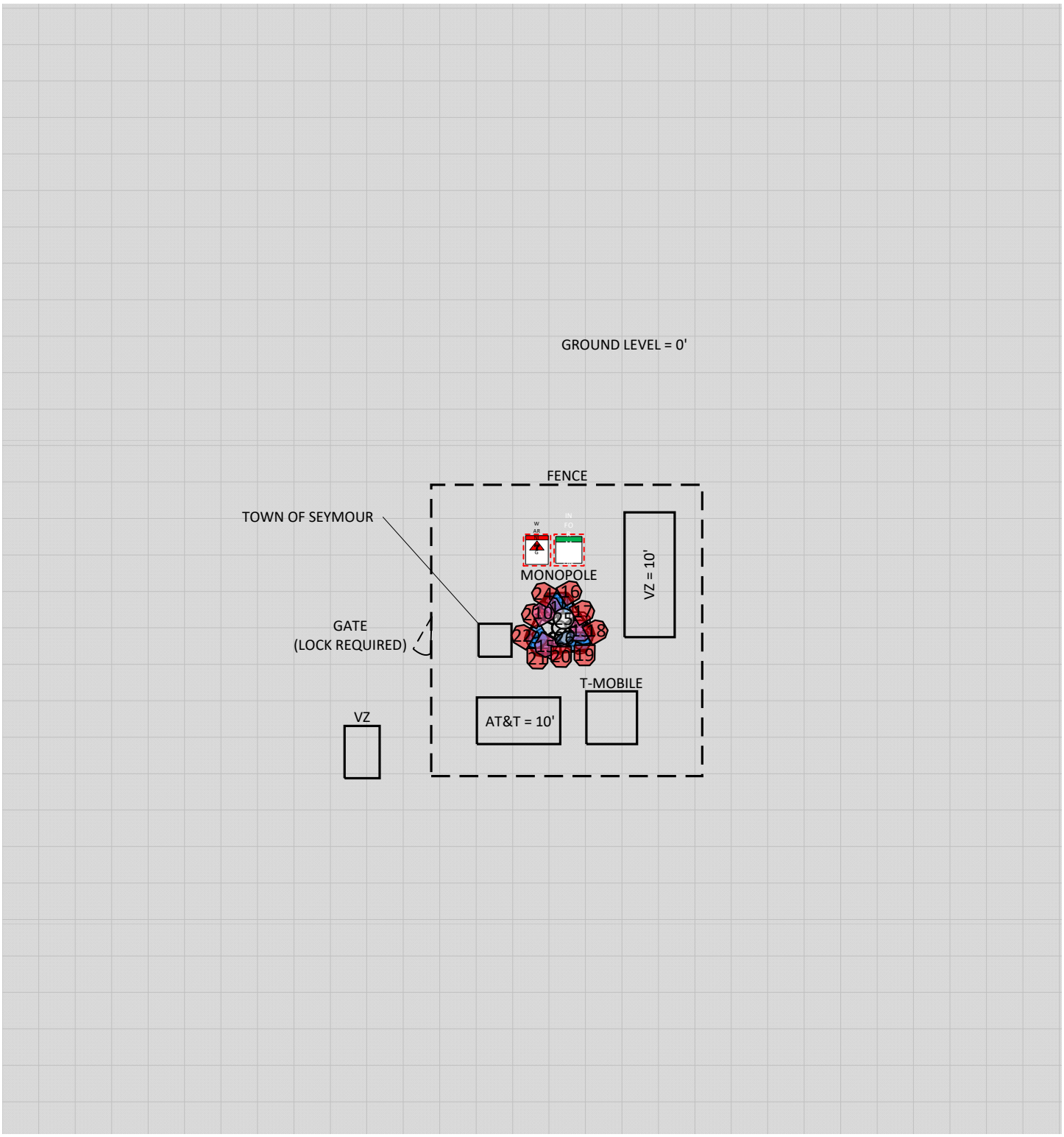
The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC **General Public** Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

This table displays the maximum theoretical percentage of the FCC's General Public MPE limits:

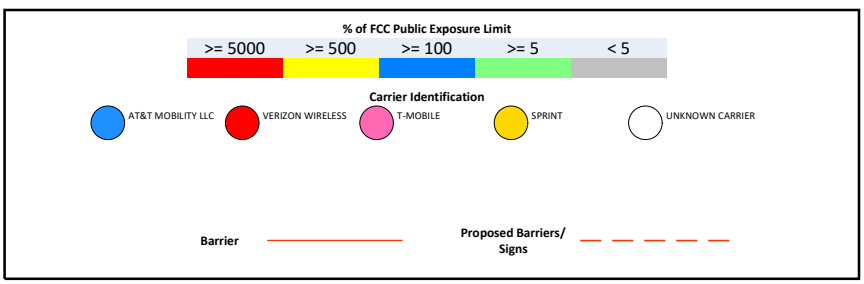
	General Public Levels:	
Exposure Type:	**Maximum**	**Spatial Average**
Reference Level:	**Antenna**	**Ground**
AT&T Mobility, LLC:	15,305.2%	<1%
Composite:	15,305.3%	<1%

Note: On the diagrams shown below, each level is marked with a height. For all diagrams that are marked as *Spatial Average 0' – 6'*, the modeling program will spatially average the emissions within the area six feet above each set level. This provides an accurate spatial average of the percentage of the FCC's MPE limits within an accessible area.

RF Exposure Simulation For: OXFORD-QUAKER FARMS
Composite Diagram



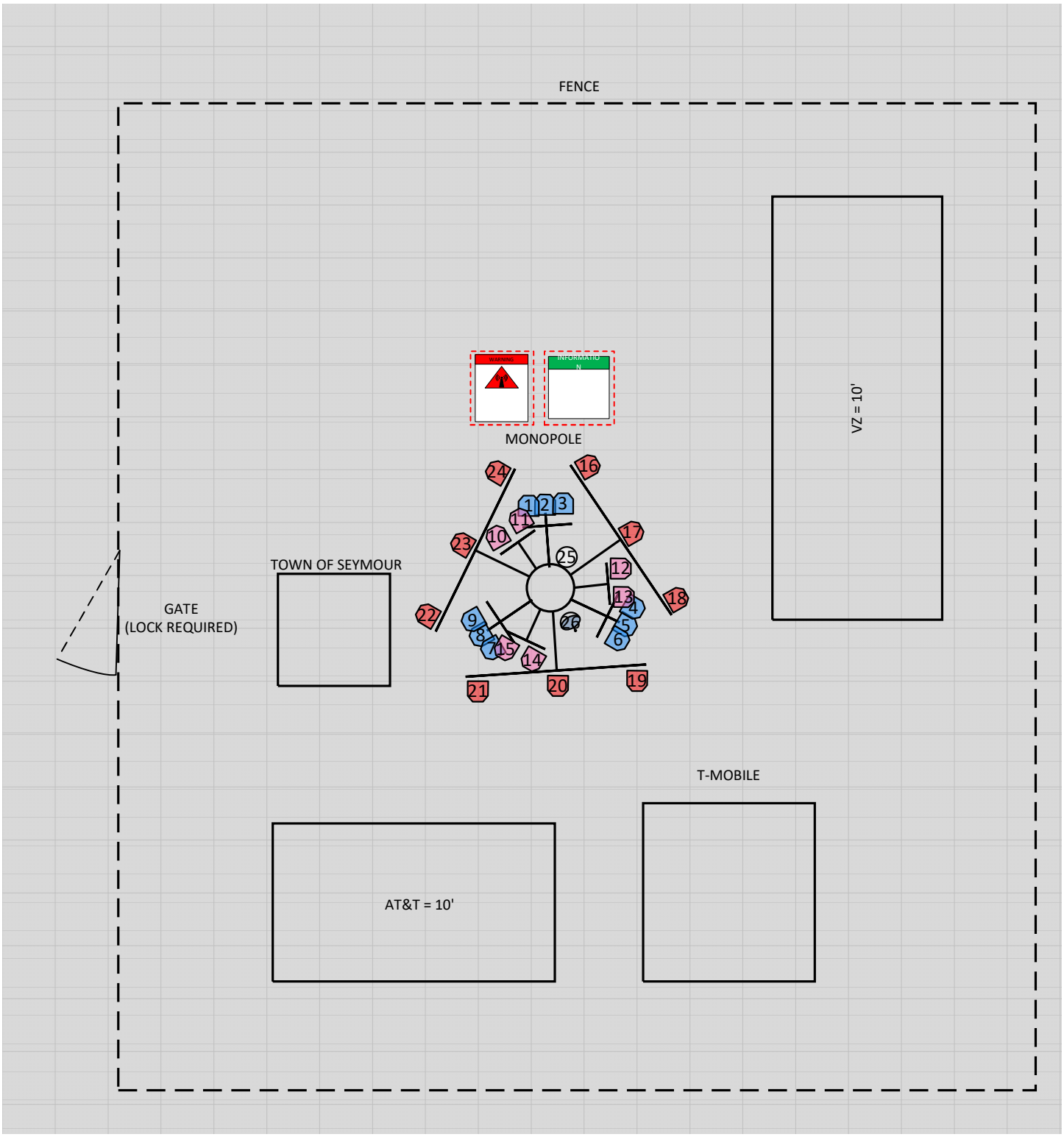
% of FCC Public Exposure Limit
Spatial Average 0' - 6'



(Feet)
0 18 36
www.sitesafe.com
Site Name:OXFORD-QUAKER FARMS
3/24/2020 2:17:10 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: OXFORD-QUAKER FARMS
All Sector Detailed View



% of FCC Public Exposure Limit
Spatial Average 0' - 6'

% of FCC Public Exposure Limit

>= 5000	>= 500	>= 100	>= 5	< 5

Carrier Identification

AT&T MOBILITY LLC | VERIZON WIRELESS | T-MOBILE | SPRINT | UNKNOWN CARRIER

Barrier

Proposed Barriers/ Signs

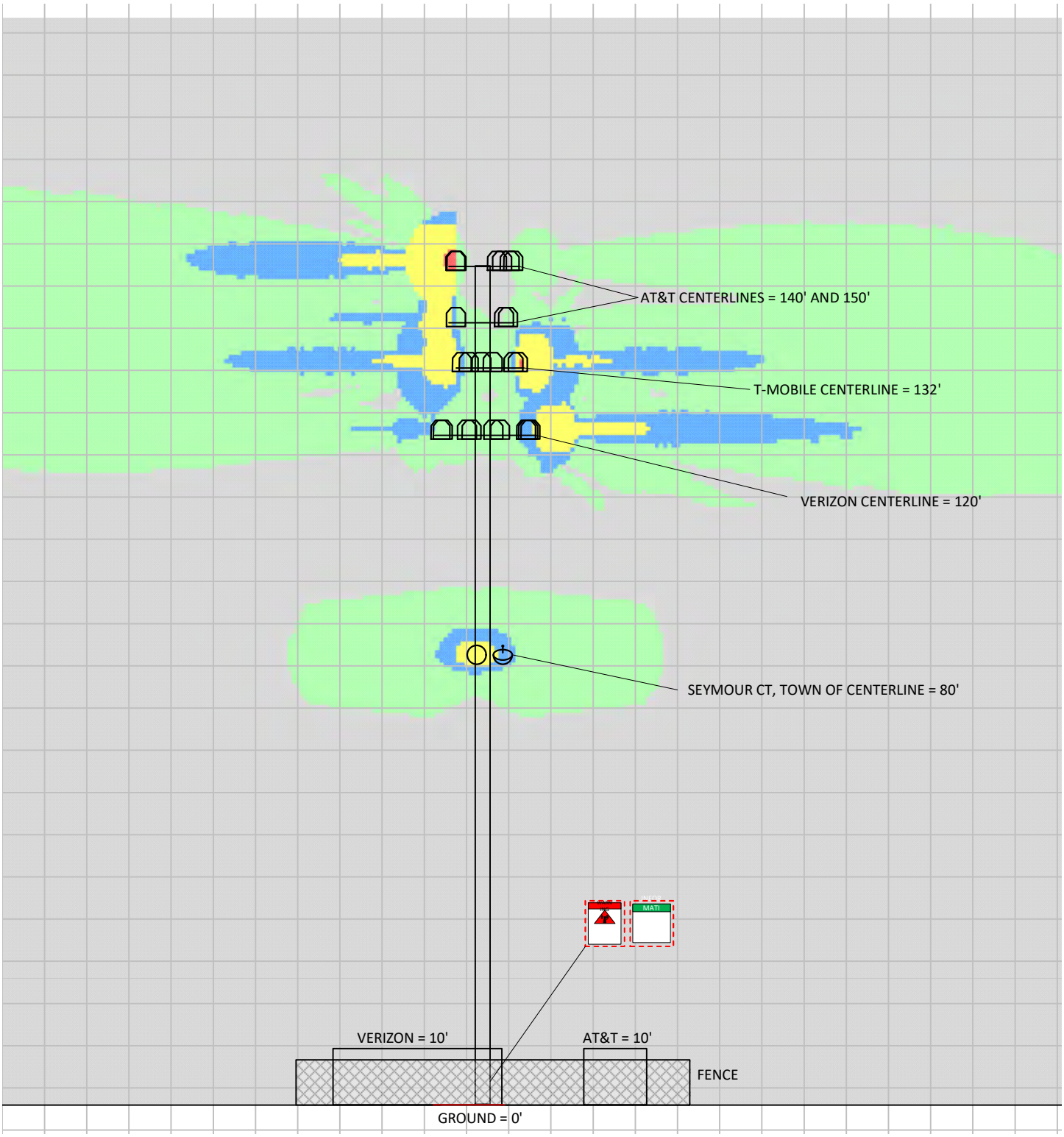
(Feet)

0 7.1 14.2

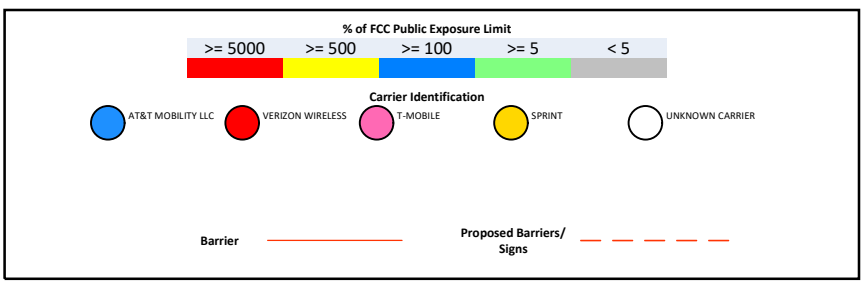
www.sitesafe.com
Site Name:OXFORD-QUAKER FARMS
3/24/2020 2:18:04 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: OXFORD-QUAKER FARMS
Elevation View



% of FCC Public Exposure Limit



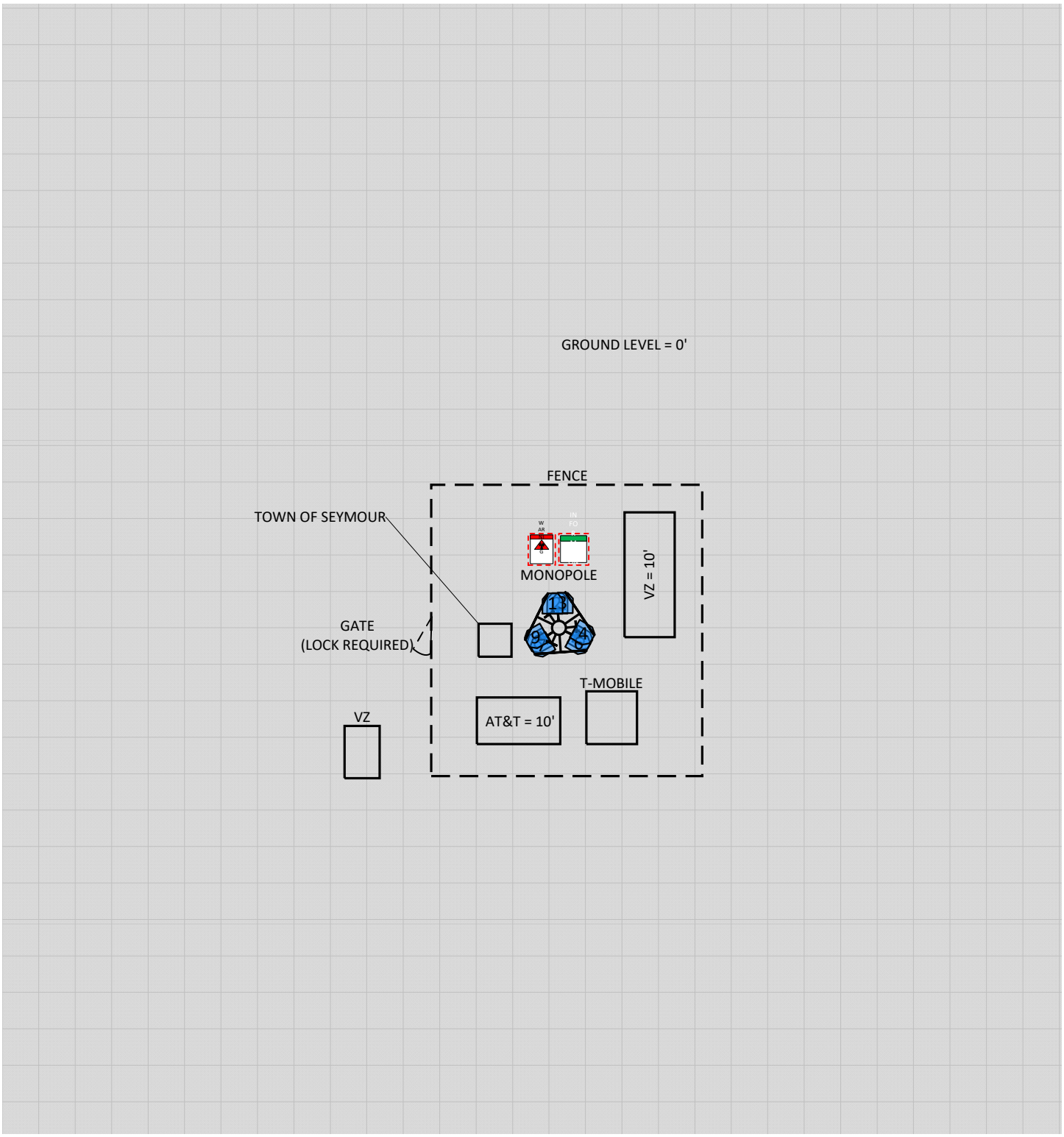
(Feet)

0 14.1 28.2

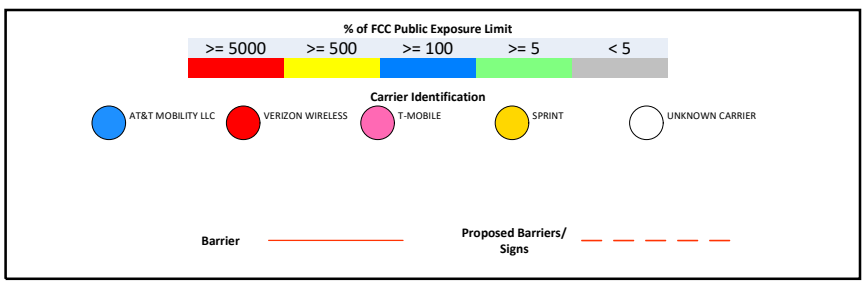
www.sitesafe.com
Site Name:OXFORD-QUAKER FARMS
3/24/2020 2:32:13 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Single Level (0)

RF Exposure Simulation For: OXFORD-QUAKER FARMS
AT&T Mobility, LLC Contribution



% of FCC Public Exposure Limit
Spatial Average 0' - 6'



(Feet)
0 18 36

www.sitesafe.com
Site Name:OXFORD-QUAKER FARMS
3/24/2020 2:20:59 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

6 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was provided by the customer and was utilized by Sitesafe to perform theoretical modeling of RF emissions. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 845455 - OXFORD-QUAKER FARMS. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Transmitter Power Output ("TPO"), Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP")
- Antenna manufacturer make, model, and gain

For other carriers at this site, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information with regard to carrier, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.

The following antenna inventory was provided by the customer and was utilized to create the site model diagrams:

Antenna Inventory																	
Ant #	Operator	Antenna Make and Model	Ant Type	Len (ft)	TX Freq (MHz)	Tech	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power BW (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z(ft) (AGL)	MDT	EDT
1	AT&T MOBILITY LLC (PROPOSED)	Cci DMP65R-BU6D	Panel	5.9	734	LTE	30	11.76	65.7	160	TPO	Watt	1	2399.5	150	0	0
1	AT&T MOBILITY LLC (PROPOSED)	Cci DMP65R-BU6D	Panel	5.9	763	LTE	30	11.76	65.7	160	TPO	Watt	1	2399.5	150	0	0
2	AT&T MOBILITY LLC (PROPOSED)	Powerwave 7770	Panel	4.6	1930	LTE	30	13.41	86	160	TPO	Watt	1	3508.5	140	0	0
3	AT&T MOBILITY LLC (PROPOSED)	Commscope NNH4-65B-R6	Panel	6	2110	LTE	30	14.11	60	160	TPO	Watt	1	4122.1	150	0	0
3	AT&T MOBILITY LLC (PROPOSED)	Commscope NNH4-65B-R6	Panel	6	2345	LTE	30	14.68	58	100	TPO	Watt	1	2937.6	150	0	0
4	AT&T MOBILITY LLC (PROPOSED)	Cci DMP65R-BU6D	Panel	5.9	734	LTE	150	11.76	65.7	160	TPO	Watt	1	2399.5	150	0	0
4	AT&T MOBILITY LLC (PROPOSED)	Cci DMP65R-BU6D	Panel	5.9	763	LTE	150	11.76	65.7	160	TPO	Watt	1	2399.5	150	0	0
5	AT&T MOBILITY LLC (PROPOSED)	Powerwave 7770	Panel	4.6	1930	LTE	150	13.41	86	160	TPO	Watt	1	3508.5	140	0	0
6	AT&T MOBILITY LLC (PROPOSED)	Commscope NNH4-65B-R6	Panel	6	2110	LTE	150	14.11	60	160	TPO	Watt	1	4122.1	150	0	0
6	AT&T MOBILITY LLC (PROPOSED)	Commscope NNH4-65B-R6	Panel	6	2345	LTE	150	14.68	58	100	TPO	Watt	1	2937.6	150	0	0
7	AT&T MOBILITY LLC (PROPOSED)	Cci DMP65R-BU6D	Panel	5.9	734	LTE	270	11.76	65.7	160	TPO	Watt	1	2399.5	150	0	0
7	AT&T MOBILITY LLC (PROPOSED)	Cci DMP65R-BU6D	Panel	5.9	763	LTE	270	11.76	65.7	160	TPO	Watt	1	2399.5	150	0	0
8	AT&T MOBILITY LLC (PROPOSED)	Powerwave 7770	Panel	4.6	1930	LTE	270	13.41	86	160	TPO	Watt	1	3508.5	140	0	0
9	AT&T MOBILITY LLC (PROPOSED)	Commscope NNH4-65B-R6	Panel	6	2110	LTE	270	14.11	60	160	TPO	Watt	1	4122.1	150	0	0
9	AT&T MOBILITY LLC (PROPOSED)	Commscope NNH4-65B-R6	Panel	6	2345	LTE	270	14.68	58	100	TPO	Watt	1	2937.6	150	0	0

Antenna Inventory																	
Ant #	Operator	Antenna Make and Model	Ant Type	Len (ft)	TX Freq (MHz)	Tech	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power BW (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z(ft) (AGL)	MDT	EDT
10	T-MOBILE	RFS APXV18-209014-C	Panel	4.4	1900		0	14.41	88	160	TPO	Watt	1	4416.9	132	0	0
10	T-MOBILE	RFS APXV18-209014-C	Panel	4.4	2100		0	14.41	88	160	TPO	Watt	1	4416.9	132	0	0
11	T-MOBILE	RFS APXVAARR24_43-U-NA20	Panel	8	600		0	13.2	62.76	120	TPO	Watt	1	2507.2	132	0	0
11	T-MOBILE	RFS APXVAARR24_43-U-NA20	Panel	8	700		0	13.39	62	160	TPO	Watt	1	3492.4	132	0	0
12	T-MOBILE	RFS APXV18-209014-C	Panel	4.4	1900		120	14.41	88	160	TPO	Watt	1	4416.9	132	0	0
12	T-MOBILE	RFS APXV18-209014-C	Panel	4.4	2100		120	14.41	88	160	TPO	Watt	1	4416.9	132	0	0
13	T-MOBILE	RFS APXVAARR24_43-U-NA20	Panel	8	600		120	13.2	62.76	120	TPO	Watt	1	2507.2	132	0	0
13	T-MOBILE	RFS APXVAARR24_43-U-NA20	Panel	8	700		120	13.39	62	160	TPO	Watt	1	3492.4	132	0	0
14	T-MOBILE	RFS APXV18-209014-C	Panel	4.4	1900		240	14.41	88	160	TPO	Watt	1	4416.9	132	0	0
14	T-MOBILE	RFS APXV18-209014-C	Panel	4.4	2100		240	14.41	88	160	TPO	Watt	1	4416.9	132	0	0
15	T-MOBILE	RFS APXVAARR24_43-U-NA20	Panel	8	600		240	13.2	62.76	120	TPO	Watt	1	2507.2	132	0	0
15	T-MOBILE	RFS APXVAARR24_43-U-NA20	Panel	8	700		240	13.39	62	160	TPO	Watt	1	3492.4	132	0	0
16	VERIZON WIRELESS	Andrew SBNHH-1D65B	Panel	6	751		90	12.31	68	160	TPO	Watt	1	2723.5	120	0	0
16	VERIZON WIRELESS	Andrew SBNHH-1D65B	Panel	6	1900		90	15.82	66	160	TPO	Watt	1	6111.1	120	0	0
17	VERIZON WIRELESS	Antel BXA-80080-6CF	Panel	5.9	850		90	13.51	80	160	TPO	Watt	1	3590.2	120	0	0
18	VERIZON WIRELESS	Andrew HBXX-6517DS-VTM	Panel	6.2	2100		90	16.72	65	160	TPO	Watt	1	7518.3	120	0	0
19	VERIZON WIRELESS	Andrew SBNHH-1D65B	Panel	6	751		210	12.31	68	160	TPO	Watt	1	2723.5	120	0	0
19	VERIZON WIRELESS	Andrew SBNHH-1D65B	Panel	6	1900		210	15.82	66	160	TPO	Watt	1	6111.1	120	0	0
20	VERIZON WIRELESS	Antel BXA-80080-6CF	Panel	5.9	850		210	13.51	80	160	TPO	Watt	1	3590.2	120	0	0
21	VERIZON WIRELESS	Andrew HBXX-6517DS-VTM	Panel	6.2	2100		210	16.72	65	160	TPO	Watt	1	7518.3	120	0	0
22	VERIZON WIRELESS	Andrew SBNHH-1D65B	Panel	6	751		330	12.31	68	160	TPO	Watt	1	2723.5	120	0	0
22	VERIZON WIRELESS	Andrew SBNHH-1D65B	Panel	6	1900		330	15.82	66	160	TPO	Watt	1	6111.1	120	0	0

Antenna Inventory																	
Ant #	Operator	Antenna Make and Model	Ant Type	Len (ft)	TX Freq (MHz)	Tech	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power BW (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z(ft) (AGL)	MDT	EDT
23	VERIZON WIRELESS	Antel BXA-80080-6CF	Panel	5.9	850		330	13.51	80	160	TPO	Watt	1	3590.2	120	0	0
24	VERIZON WIRELESS	Andrew HBXX-6517DS-VTM	Panel	6.2	2100		330	16.72	65	160	TPO	Watt	1	7518.3	120	0	0
25	SEYMOUR CT, TOWN OF	Antenna Systems and Solutions F0150-3	Omni	3	156		62	0	360	80	ERP	Watt	1	80	80	0	0
26	SEYMOUR CT, TOWN OF	Pctel MPRD2449	Aperture	2	5800		180	25.95	6	0.01	TPO	Watt	1	8.1	80	0	0

Note: The Z reference indicates antenna height **above ground level (AGL)**. ERP values provided by the client and used in the modeling may be greater than are currently deployed. For additional modeling information, refer to Appendix B. Proposed equipment is tagged as *(Proposed)* under *Operator* or *Antenna Make and Model*.

7 Engineer Certification

The professional engineer whose seal appears on the cover of this document hereby certifies and affirms:

That I am registered as a Professional Engineer in the jurisdiction indicated in the professional engineering stamp on the cover of this document; and

That I am an employee of Site Safe, LLC, in Vienna, Virginia, at which place the staff and I provide RF compliance services to clients in the wireless communications industry; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission (FCC) as well as the regulations of the Occupational Safety and Health Administration (OSHA), both in general and specifically as they apply to the FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields; and

That I have thoroughly reviewed this Site Compliance Report and believe it to be true and accurate to the best of my knowledge as assembled by and attested to by Zyotty Thamsil.

March 24, 2020

Appendix A – Statement of Limiting Conditions

Sitesafe will not be responsible for matters of a legal nature that affect the site or property.

Due to the complexity of some wireless sites, Sitesafe performed this analysis and created this report utilizing best industry practices and due diligence. Sitesafe cannot be held accountable or responsible for anomalies or discrepancies due to actual site conditions (i.e. mislabeling of antennas or equipment, inaccessible cable runs, inaccessible antennas or equipment, etc.) or information or data supplied by AT&T Mobility, LLC, the site manager, or their affiliates, subcontractors or assigns.

Sitesafe has provided computer generated model(s) in this Site Compliance Report to show approximate dimensions of the site, and the model is included to assist the reader of the compliance report to visualize the site area, and to provide supporting documentation for Sitesafe's recommendations.

Sitesafe may note in the Site Compliance Report any adverse physical conditions, such as needed repairs, observed during the survey of the subject property or that Sitesafe became aware of during the normal research involved in performing this survey. Sitesafe will not be responsible for any such conditions that do exist or for any engineering or testing that might be required to discover whether such conditions exist. Because Sitesafe is not an expert in the field of mechanical engineering or building maintenance, the Site Compliance Report must not be considered a structural or physical engineering report.

Sitesafe obtained information used in this Site Compliance Report from sources that Sitesafe considers reliable and believes them to be true and correct. Sitesafe does not assume any responsibility for the accuracy of such items that were furnished by other parties. When conflicts in information occur between data provided by a second party and physical data collected by Sitesafe, the physical data will be used.

Appendix B – Assumptions and Definitions

General Model Assumptions

In this site compliance report, it is assumed that all antennas are operating at **full power at all times**. Software modeling was performed for all transmitting antennas located on the site. Sitesafe has further assumed a 100% duty cycle and maximum radiated power.

The site has been modeled with these assumptions to show the maximum RF energy density. Sitesafe believes this to be a *worst-case* analysis, based on best available data. Areas modeled to predict emissions greater than 100% of the applicable MPE level may not actually occur but are shown as a *worst-case* prediction that could be realized real time. Sitesafe believes these areas to be safe for entry by occupationally trained personnel utilizing appropriate personal protective equipment (in most cases, a personal monitor).

Thus, at any time, if power density measurements were made, we believe the real-time measurements would indicate levels below those depicted in the RF emission diagram(s) in this report. By modeling in this way, Sitesafe has conservatively shown exclusion areas – areas that should not be entered without the use of a personal monitor, carriers reducing power, or performing real-time measurements to indicate real-time exposure levels.

Use of Generic Antennas

For the purposes of this report, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information about a carrier, their FCC license and/or antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use our industry specific knowledge of equipment, antenna models, and transmit power to model the site. If more specific information can be obtained for the unknown measurement criteria, Sitesafe recommends remodeling of the site utilizing the more complete and accurate data. Information about similar facilities is used when the service is identified and associated with a particular antenna. If no information is available regarding the transmitting service associated with an unidentified antenna, using the antenna manufacturer's published data regarding the antenna's physical characteristics makes more conservative assumptions.

Where the frequency is unknown, Sitesafe uses the closest frequency in the antenna's range that corresponds to the highest MPE, resulting in a conservative analysis.

Definitions

5% Rule – The rules adopted by the FCC specify that, in general, at multiple transmitter sites actions necessary to bring the area into compliance with the guidelines are the shared responsibility of all licensees whose transmitters produce field strengths or power density levels at the area in question in excess of 5% of the exposure limits. In other words, any wireless operator that contributes 5% or greater of the MPE limit in an area that is identified to be greater than 100% of the MPE limit is responsible for taking corrective actions to bring the site into compliance.

Compliance – The determination of whether a site complies with FCC standards with regards to Human Exposure to Radio Frequency Electromagnetic Fields from transmitting antennas.

Decibel (dB) – A unit for measuring power or strength of a signal.

Duty Cycle – The percent of pulse duration to the pulse period of a periodic pulse train. Also, may be a measure of the temporal transmission characteristic of an intermittently transmitting RF source such as a paging antenna by dividing average transmission duration by the average period for transmission. A duty cycle of 100% corresponds to continuous operation.

Effective (or Equivalent) Isotropic Radiated Power (EIRP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.

Effective Radiated Power (ERP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to a half-wave dipole antenna.

Gain (of an antenna) – The ratio, usually expressed in decibels, of the power required at the input of a loss-free reference antenna to the power supplied to the input of the given antenna to produce, in a given direction, the same field strength or the same power density at the same distance. When not specified otherwise, the gain refers to the direction of maximum radiation. Gain may be considered for a specified polarization. Gain may be referenced to an isotropic antenna (dBi) or a half-wave dipole (dBd) antenna.

General Population/Uncontrolled Environment – Defined by the FCC as an area where RF exposure may occur to persons who are *unaware* of the potential for exposure and who have no control over their exposure. General Population is also referenced as General Public.

Generic Antenna – For the purposes of this report, the use of "Generic" as an antenna model means the antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use its industry specific knowledge of antenna models to select a worst-case scenario antenna to model the site.

Isotropic Antenna – An antenna that is completely non-directional. In other words, an antenna that radiates energy equally in all directions.

Maximum Measurement – This measurement represents the single largest measurement recorded when performing a spatial average measurement.

Maximum Permissible Exposure (MPE) – The rms and peak electric and magnetic field strength, their squares, or the plane-wave equivalent power densities associated with these fields to which a person may be exposed without harmful effect and with acceptable safety factor.

Occupational/Controlled Environment – Defined by the FCC as an area where RF exposure may occur to persons who are **aware** of the potential for exposure as a condition of employment or specific activity and can exercise control over their exposure.

OET Bulletin 65 – Technical guideline developed by the FCC's Office of Engineering and Technology to determine the impact of RF exposure on humans. The guideline was published in August 1997.

OSHA (Occupational Safety and Health Administration) – Under the Occupational Safety and Health Act of 1970, employers are responsible for providing a safe and healthy workplace for their employees. OSHA's role is to promote the safety and health of America's working men and women by setting and enforcing standards; providing training, outreach and education; establishing partnerships; and encouraging continual process improvement in workplace safety and health. For more information, visit www.osha.gov.

Radio Frequency Exposure or Electromagnetic Fields – Electromagnetic waves that are propagated from antennas through space.

Spatial Average Measurement – A technique used to average a minimum of ten (10) measurements taken in a ten (10) second interval from zero (0) to six (6) feet. This measurement is intended to model the average energy a 6-foot tall human body will absorb while present in an electromagnetic field of energy.

Transmitter Power Output (TPO) – The radio frequency output power of a transmitter's final radio frequency stage as measured at the output terminal while connected to a load.

Appendix C – Rules & Regulations

Explanation of Applicable Rules and Regulations

The FCC has set forth guidelines in OET Bulletin 65 for human exposure to radio frequency electromagnetic fields. Specific regulations regarding this topic are listed in Part 1, Subpart I, of Title 47 in the Code of Federal Regulations. Currently, there are two different levels of MPE - General Public MPE and Occupational MPE. An individual classified as Occupational can be defined as an individual who has received appropriate RF training and meets the conditions outlined below. General Public is defined as anyone who does not meet the conditions of being Occupational. FCC and OSHA Rules and Regulations define compliance in terms of total exposure to total RF energy, regardless of location of or proximity to the sources of energy.

It is the responsibility of all licensees to ensure these guidelines are maintained at all times. It is the ongoing responsibility of all licensees composing the site to maintain ongoing compliance with the FCC Rules and Regulations. Individual licensees that contribute less than 5% MPE to any total area out of compliance are not responsible for corrective actions.

OSHA has adopted and enforces the FCC's exposure guidelines. A building owner or site manager can use this report as part of an overall RF Health and Safety Policy. It is important for building owners/site managers to identify areas in excess of the General Population MPE and ensure that only persons qualified as Occupational are granted access to those areas.

Occupational Environment Explained

The FCC definition of Occupational exposure limits apply to persons who:

- are exposed to RF energy as a consequence of their employment;
- have been made aware of the possibility of exposure; and
- can exercise control over their exposure.

OSHA guidelines go further to state that persons must complete RF Safety Awareness training and must be trained in the use of appropriate personal protective equipment.

In order to consider this site an Occupational Environment, the site must be controlled to prevent access by any individuals classified as the General Public. Compliance is also maintained when any non-occupational individuals (the General Public) are prevented from accessing areas indicated as Red or Yellow in the attached RF Emissions diagram. In addition, a person must be aware of the RF environment into which they are entering. This can be accomplished by an RF Safety Awareness class, and by appropriate written documentation such as this Site Compliance Report.

All AT&T Mobility, LLC employees who require access to this site must complete RF Safety Awareness training and must be trained in the use of appropriate personal protective equipment.

Appendix D – General Safety Recommendations

The following are *general recommendations* appropriate for any site with accessible areas in excess of 100% General Public MPE. These recommendations are not specific to this site. These are safety recommendations appropriate for typical site management, building management, and other tenant operations.

1. All individuals needing access to the main site (or the area indicated to be in excess of General Public MPE) should wear a personal protective monitor (PPM), successfully complete proper RF Safety Awareness training, and have and be trained in the use of appropriate personal protective equipment.

2. All individuals needing access to the main site should be instructed to read and obey all posted placards and signs.

3. The site should be routinely inspected and this or similar report updated with the addition of any antennas or upon any changes to the RF environment including:

- adding new antennas that may have been located on the site
- removing of any existing antennas
- changes in the radiating power or number of RF emitters

4. Post the appropriate **NOTICE**, **CAUTION,** or **WARNING** sign at the main site access point(s) and other locations as required. Note: Please refer to RF Exposure Diagrams in Section 5.1 to inform <u>everyone</u> who has access to this site that beyond posted signs there may be levels in excess of the limits prescribed by the FCC. In addition to RF Advisory Signage, a RF Guideline Signage is recommended to be posted at the main site access point(s). The signs below are examples of signs meeting FCC guidelines.

5. Ensure that the site door remains locked (or appropriately controlled) to deny access to the general public if deemed as policy by the building/site owner.

Keep a copy of this report available for all persons who must access the site. They should read this report and be aware of the potential hazards with regards to RF and MPE limits.

Additional Information

Additional RF information is available at the following sites:
https://www.fcc.gov/general/radio-frequency-safety-0
https://www.fcc.gov/engineering-technology/electromagnetic-compatibility-division/radio-frequency-safety/faq/rf-safety

OSHA has additional information available at:
https://www.osha.gov/SLTC/radiofrequencyradiation/index.html