



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

April 6, 2020

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

**RE: Notice of Exempt Modification for AT&T - 825998**  
**234 Melba Street, Milford, CT 06460**  
**Latitude: 41° 12' 36.02" / Longitude: -73° 1' 8.45"**

Dear Ms. Bachman:

AT&T currently maintains six (6) antennas at the 90-foot mount and 100-foot mount on the existing 125-foot concealed Flagpole Tower, located at 234 Melba Street, Milford, CT. The tower is owned by Crown Castle and the property is owned by 17 Mile 04 LLC. AT&T now intends to remove and replace six (6) antennas to their existing configuration. The new antennas will be installed at the 90-foot and 100-foot mount level of the tower. AT&T is also proposing structural modifications to the tower pursuant to the enclosed Structural Analysis Report which details the proposed canister expansions.

The facility was approved by the City of Milford Planning & Zoning Board by way of a Special Exception on December 5, 2000. The approval was given with conditions which this exempt modification complies with.

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 Benjamin Blake, Mayor for the City of Milford, Stephen Harris, City of Milford Zoning Enforcement Officer, Crown Castle as the tower owner, and 17 Mile 04 LLC, the property 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.

**The Foundation for a Wireless World.**

CrownCastle.com

Melanie A. Bachman

Page 2

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:

Benjamin Blake, Mayor (*via email only to jrosen@milfordct.gov Mayor's Chief of Staff*)  
110 River Street  
Milford, CT 06460

Stephen Harris, Zoning Enforcement Officer (*via email only to shharris@ci.milford.ct.us*)  
70 West River Street  
Milford, CT 06460

17 Mile 04 LLC  
PO Box 826  
Ardmore, PA 19003

Crown Castle, Tower Owner

ORIGIN ID: SCHA (518) 350-3639  
ANNE MARIE ZSAMBRA  
CROWN CASTLE  
21 HEATHER DRIVE  
GANSEVOORT, NY 12831  
UNITED STATES US

SHIP DATE: 06APR20  
ACTWGT: 1.00 LB  
CAD: 104924194/IN/ET4220

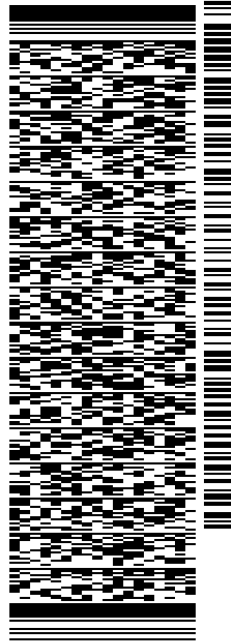
BILL SENDER

TO 17 MILE 04 LLC

POST OFFICE BOX 826

ARDMORE PA 19003

(201) 236-9224 REF: 1734.7890  
INV/ PO: DEPT:



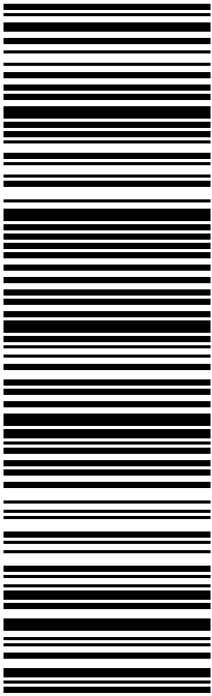
J201020011301uv

56BJ39C25/FE4A

TRK# 7701 7573 7345  
0201  
TUE - 07 APR 3:00P  
STANDARD OVERNIGHT

EEHARA

19003  
PA-US PHL



**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.

Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com. FedEx will not be responsible for any claim in excess of \$100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim. Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental, consequential, or special is limited to the greater of \$100 or the authorized declared value. Recovery cannot exceed actual documented loss. Maximum for items of extraordinary value is \$1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our Service Guide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

**From:** [Zsamba, Anne Marie](#)  
**To:** [jrosen@milfordct.gov](mailto:jrosen@milfordct.gov)  
**Subject:** 234 Melba Street - Exempt Modification Application  
**Date:** Monday, April 6, 2020 8:47:00 AM  
**Attachments:** [EM-AT&T-234 MELBA STREET-MILFORD-825998 2.pdf](#)

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Good morning Mr. Rosen,

Pursuant to our conversation today, attached please find AT&T's exempt modification application that is being submitted to the Connecticut Siting Council, today April 6, 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**  
Network Real Estate 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](http://CrownCastle.com)



**From:** [Zsamba, Anne Marie](#)  
**To:** [sharris@ci.milford.ct.us](mailto:sharris@ci.milford.ct.us)  
**Subject:** 234 Melba Street - Exempt Modification Application  
**Date:** Monday, April 6, 2020 8:48:00 AM  
**Attachments:** [EM-AT&T-234 MELBA STREET-MILFORD-825998 2.pdf](#)

---

Good morning Mr. Harris,

Attached please find AT&T's exempt modification application that is being submitted to the Connecticut Siting Council, today April 6, 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**  
Network Real Estate 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](http://CrownCastle.com)

# Exhibit A

## **Original Facility Approval**

11738  
DEC 27 2000

Vol 2443 P49

DEC 27 AM 11:33 19s

# CITY OF MILFORD, CONNECTICUT

THIS IS TO CERTIFY THAT VOICE STREAM WIRELESS CORPORATION  
WAS GRANTED A SPECIAL EXCEPTION BY THE  
MILFORD PLANNING & ZONING BOARD ON DECEMBER 5, 2000 FOR  
PROPERTY LOCATED AT 234 MELBA STREET  
MAP 39 BLOCK 542 PARCEL 38A  
IN THE CITY OF MILFORD, COUNTY OF NEW HAVEN, STATE OF  
CONNECTICUT FOR WHICH MELBA REALTY, LLC IS THE OWNER.

**THE SPECIAL EXCEPTION WAS GRANTED:**

To install a 125' tall monopole communications tower to also function as a flag pole structure with 15'x25' American Flag flown atop daily. It will be incumbent upon the applicant to maintain the flag and to submit an appropriate lighting plan which will illuminate, but not "over" illuminate the flag. If the applicant elects not to light the flag at night, the flag must be removed before nightfall; to be promptly re-flown during the daylight hours. Any proposed lighting system shall be submitted to Planning & Zoning Staff for review before installation is commenced. All construction shall be in accordance with plan prepared by Carter Burgess consisting of the following sheets: Title sheet dated June 2000; General Location Map Survey by Design Professionals, Inc. dated June 21, 2000; Specifications dated July 13, 2000, sheet C-0; Proposed Site Diagram dated July 13, 2000, sheet C-1; Site Details dated July 13, 2000, sheet C-2. The applicant will be required to weave grass insert strips between the links of the proposed chain link surround fence. Additional antennas, if any, must be installed within the interior of the flagpole (as shown). No further Planning & Zoning Board approval is required for "interior" antennas unless the associated equipment buildings exceed 6 ft. in height or are constructed beyond the proposed 20'x41' enclosure area. A variance was granted for the pole height to be at 125 ft. from 45 ft. allowed. The waiver was granted on September 12, 2000.

"NO VARIANCE, SPECIAL PERMIT OR SPECIAL EXCEPTION GRANTED PURSUANT TO CHAPTER 124 OF ANY SPECIAL ACT SHALL BE EFFECTIVE UNTIL A COPY THEREOF...IS RECORDED IN THE LAND RECORDS OF THE TOWN IN WHICH SUCH PREMISES ARE LOCATED."

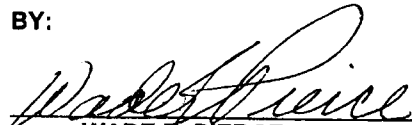
P.A. 75-317

PLANNING & ZONING BOARD

RECORDED \_\_\_\_\_

CITY CLERK REC. NO. \_\_\_\_\_

BY:

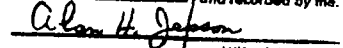


WADE E. PIERCE

EXECUTIVE SECRETARY

Received for record **DEC 27 2000**

at 11:33:19 AM and recorded by me.



Milford City Clerk

00 DEC 27 2008 11:54 11S



# City of Milford, Connecticut

Founded 1639

ZONING BOARD OF APPEALS

70 West River Street  
Milford, CT 06460-3317  
Telephone (203) 783-3246  
Fax (203) 783-3303

**THIS IS TO CERTIFY THAT**, Bruce Hoben Agent for VoiceStream Wireless appellant, was granted a variance by the Zoning Board of Appeals on September 12, 2000, for the property located at: **234 Melba Street, Assessor's Map 39, Block 542, Parcel 38A**, in the City of Milford, County of New Haven, State of Connecticut, of which Melba Realty, LLC, 20 E. Main Street, Suite 300, Waterbury, CT, are the owners.

**A VARIANCE WAS GRANTED TO:**

**Vary Section 4.1.13 to allow flag pole with antenna concealed within to be 125 ft. tall where a maximum height of 45 ft. is allowed.**

**"NO VARIANCE, SPECIAL PERMIT OR SPECIAL EXCEPTION GRANTED PURSUANT TO CHAPTER 124 OF ANY SPECIAL ACT SHALL BE EFFECTIVE UNTIL A COPY THEREOF...IS RECORDED IN THE LAND RECORDS OF THE TOWN IN WHICH SUCH PREMISES ARE LOCATED." P.A. 75-317**

RECORDED: \_\_\_\_\_  
DATE

ZONING BOARD OF APPEALS

CITY CLERK REC. NO. \_\_\_\_\_

BY: Errol Van Hise  
Errol Van Hise, Chairman

Received for record **DEC 27 2008**  
at 11:54:11 AM and recorded by me.  
Alan H. Johnson  
Milford City Clerk

20672

VOL 2814 PG 467

2005



# City of Milford, Connecticut

Founded 1639

70 West River Street  
Milford, CT 06480-3317  
Telephone (203) 783-3245  
Fax (203) 783-3303

70 West River Street  
Milford, CT 06480-3317  
Telephone (203) 783-3245  
Fax (203) 783-3303

THIS IS TO CERTIFY THAT, Ronald Lombard, appellant, was granted a variance by the Zoning Board of Appeals on October 14, 2003, for the property located at: 232 – 234 Melba Street, Assessor's Map 39, Block 542, Parcel 38A, in the City of Milford, County of New Haven, State of Connecticut, of which, Melba Realty, LLC, 20 East Main Street, Waterbury, CT is the owner.

**A VARIANCE WAS GRANTED TO:**

**Vary Sect. 3.9.4.2(3)(a) front yard setback (for parking) from 20 ft. to 0 ft.**

"NO VARIANCE, SPECIAL PERMIT OR SPECIAL EXCEPTION GRANTED PURSUANT TO CHAPTER 124 OF ANY SPECIAL ACT SHALL BE EFFECTIVE UNTIL A COPY THEREOF...IS RECORDED IN THE LAND RECORDS OF THE TOWN IN WHICH SUCH PREMISES ARE LOCATED." P.A. 75-317

RECORDED: \_\_\_\_\_ ZONING BOARD OF APPEALS  
DATE

CITY CLERK REC. NO. \_\_\_\_\_ BY: Fred Katen /BK  
Fred Katen, Chairman

VOL. \_\_\_\_\_ PAGE \_\_\_\_\_

Received for record OCT 21 2003  
at 8:38.25 AM and recorded by me.  
Alan H. Johnson  
Milford City Clerk

# Exhibit B

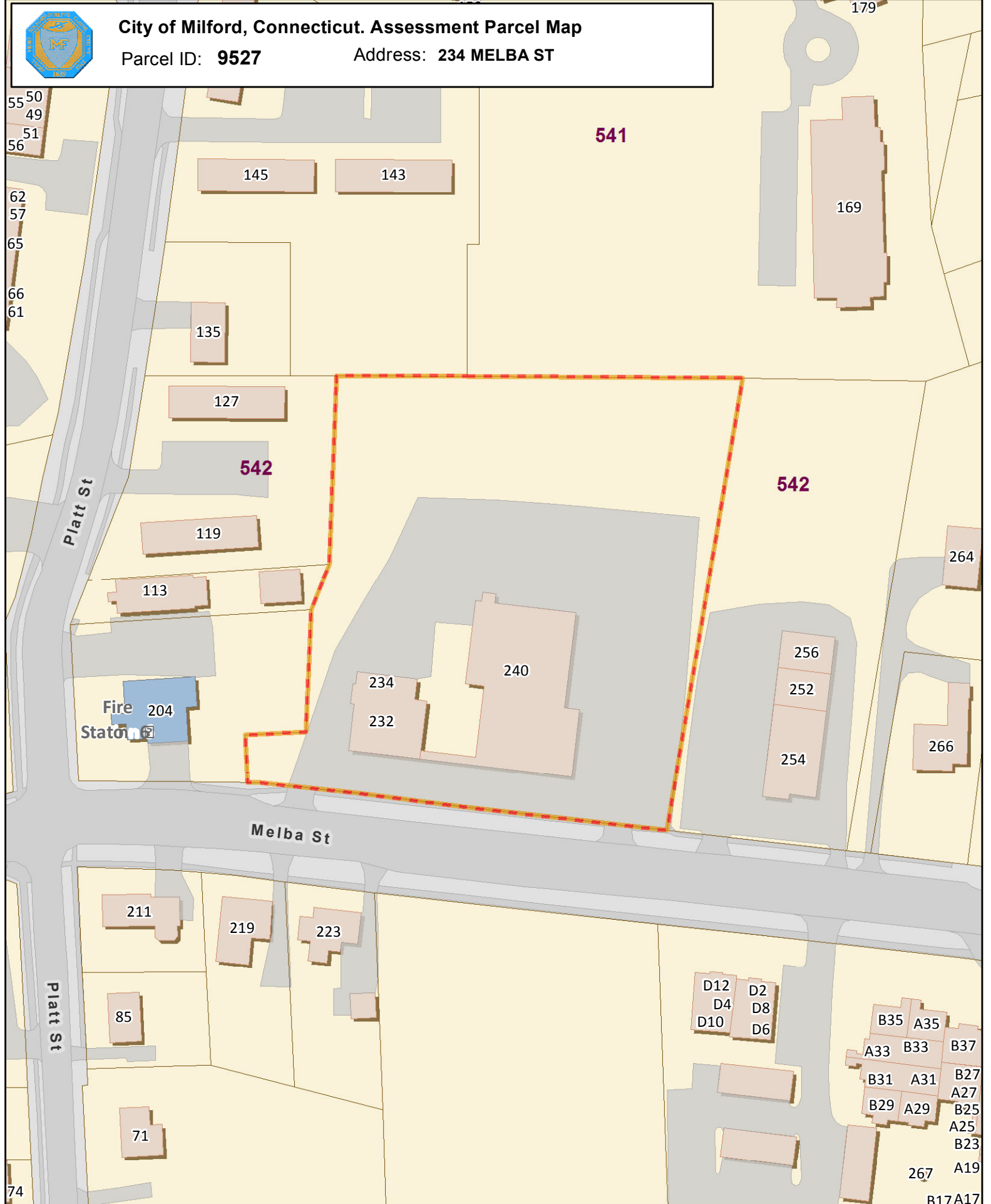
## Property Card



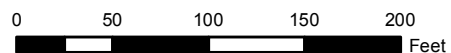
# City of Milford, Connecticut. Assessment Parcel Map

Parcel ID: **9527**

Address: **234 MELBA ST**



**1 inch = 100 feet**



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

Map Produced: July 2016



Property Information

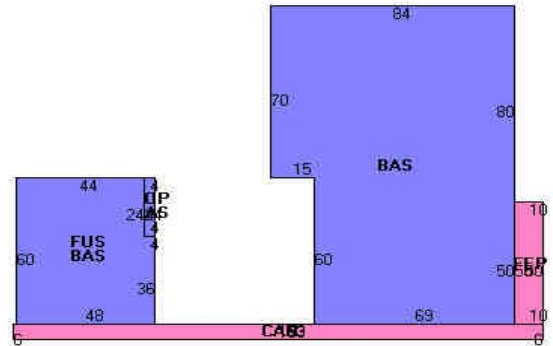
Property Location	234 MELBA ST
Owner	17 MILE 04 LLC
Co-Owner	
Mailing Address	P O BOX 826 ARDMORE PA 19003
Land Use	3220 STORE/SHOP MDL-94
Land Class	C
Zoning Code	BD
Census Tract	1510

Neighborhood	J
Acreage	2.71
Utilities	All Public,Public Sewer
Lot Setting/Desc	Level
Additional Info	

Photo



Sketch



Primary Construction Details

Year Built	1970
Stories	2
Building Style	Stores/Apt Com
Building Use	Commercial
Building Condition	AVERAGE
Floors	Linoleum
Total Rooms	

Bedrooms	
Full Bathrooms	2
Half Bathrooms	
Bath Style	n/a
Kitchen Style	n/a
Roof Style	Flat
Roof Cover	Tar & Gravel

Exterior Walls	Vinyl Siding
Interior Walls	Drywall/Sheet
Heating Type	Forced Air-Duc
Heating Fuel	Gas
AC Type	Central
Gross Bldg Area	17378
Total Living Area	15684





**Valuation Summary** (Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	677820	474470
Extras	0	0
Improvements		
Outbuildings	813180	569230
Land	453620	317530
<b>Total</b>	<b>1944620</b>	<b>1361230</b>

**Sub Areas**

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Canopy	1098	0
Porch, Open, Finished	96	0
First Floor	12900	12900
Porch, Enclosed, Finished	500	0
Upper Story, Finished	2784	2784
<b>Total Area</b>	<b>17378</b>	<b>15684</b>

**Outbuilding and Extra Items**

Type	Description
PAVING-ASPHALT	9500 S.F.
CEL TWR SITE	2 UNITS

**Sales History**

Owner of Record	Book/ Page	Sale Date	Sale Price
17 MILE 04 LLC	03670/0238	3/4/2016	
17 MILE 04 LLC	03670/0233	3/4/2016	2490000
MELBA REALTY LLC	02273/0471	4/16/1998	
LOJAC LLC	02252/0466	12/12/1997	20000
SADL ANTON	01169/0031	8/31/1982	0

# Exhibit C

## **Construction Drawings**



**AT&T SITE NUMBER:** CT5601  
**AT&T SITE NAME:** SHERMAN-ANDERSON R D EXIT  
**AT&T FA CODE:** 10071133  
**AT&T PACE NUMBER:** MRCTB031136, MRCTB031896,  
 MRCTB031334  
**SITE TYPE:** FLAG POLE

**BUSINESS UNIT #:** 825998  
**SITE ADDRESS:** 234 MELBA STREET  
 MILFORD, CT 06460  
**COUNTY:** NEW HAVEN  
**TOWER HEIGHT:** 125'-0"

**PROJECT: AT&T LTE 3C, 4C, 5C**



**AT&T SITE NUMBER:** CT5601

**BU #:** 825998  
**MILFORD SHORE AREA**

234 MELBA STREET  
 MILFORD, CT 06460

EXISTING 125'-0" FLAG POLE

**ISSUED FOR:**

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	3/20/20	STH	CONSTRUCTION	RMC
1	4/3/20	GEH	CONSTRUCTION	RMC

**SITE INFORMATION**

CROWN CASTLE USA INC.  
 SITE NAME: MILFORD SHORE AREA  
 SITE ADDRESS: 234 MELBA STREET, MILFORD, CT 06460  
 COUNTY: NEW HAVEN  
 AREA OF CONSTRUCTION: EXISTING  
 LATITUDE: 41.2100380  
 LONGITUDE: -73.0190580  
 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: 467531

**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
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.

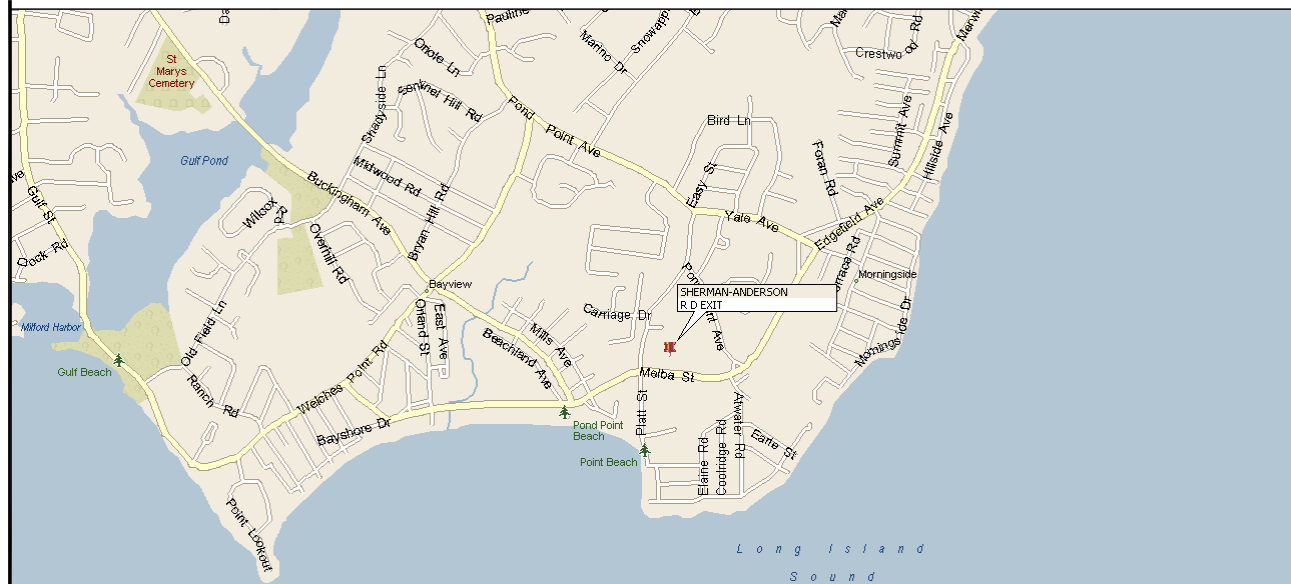
- TOWER SCOPE OF WORK**
- REMOVE (3) KMW AM-X-CD-16-65-00T-RET ANTENNAS
  - REMOVE (3) POWERWAVE P45-16-XLH-RR ANTENNAS
  - REMOVE (6) CCI DTMAPB7819VG12A TMAS
  - INSTALL (3) KATHREIN 800-10864-K ANTENNAS
  - INSTALL (3) CCI OPA65R-BU6A ANTENNAS
  - INSTALL (12) CCI TMABPD7823VG12A TMAS

- GROUND SCOPE OF WORK**
- REMOVE (12) POWERWAVE CM1007-DBPXC-003 DIPLEXERS
  - REMOVE (1) DUS
  - INSTALL (3) ERICSSON 4478 B5 RRHS
  - INSTALL (3) ERICSSON 4426 B66 RRHS
  - INSTALL (3) ERICSSON RRUS-32 B30 RRHS
  - INSTALL (1) 5216
  - INSTALL (1) RBS 6630
  - INSTALL 2ND XMU
  - INSTALL (12) KAELUS TBC0030F2V1-1 TRIPLEXERS
  - INSTALL (12) KAELUS TBC0042F1V51-1 TRIPLEXERS

DESIGN PACKAGE BASED ON THE RFDS  
 REVISION: 3.02  
 DATE: 5/8/19

DESIGN PACKAGE BASED ON THE APPLICATION  
 ID: 467531  
 REVISION: 11

**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	2018 CT SBC (2017 NEC)

**REFERENCE DOCUMENTS:**

STRUCTURAL ANALYSIS: TOWER ENGINEERING PROFESSIONALS  
 OCTOBER 25, 2019

**MOUNT ANALYSIS:**

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!



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

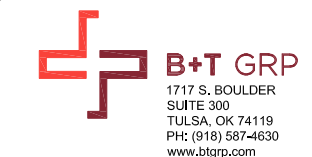
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

**SHEET NUMBER:** T-1 **REVISION:** 1

T-1 1







AT&T SITE NUMBER:  
**CT5601**

BU #: 825998  
**MILFORD SHORE AREA**

234 MELBA STREET  
MILFORD, CT 06460

EXISTING 125'-0" FLAG POLE

**ISSUED FOR:**

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	3/20/20	STH	CONSTRUCTION	RMC
1	4/3/20	GEH	CONSTRUCTION	RMC

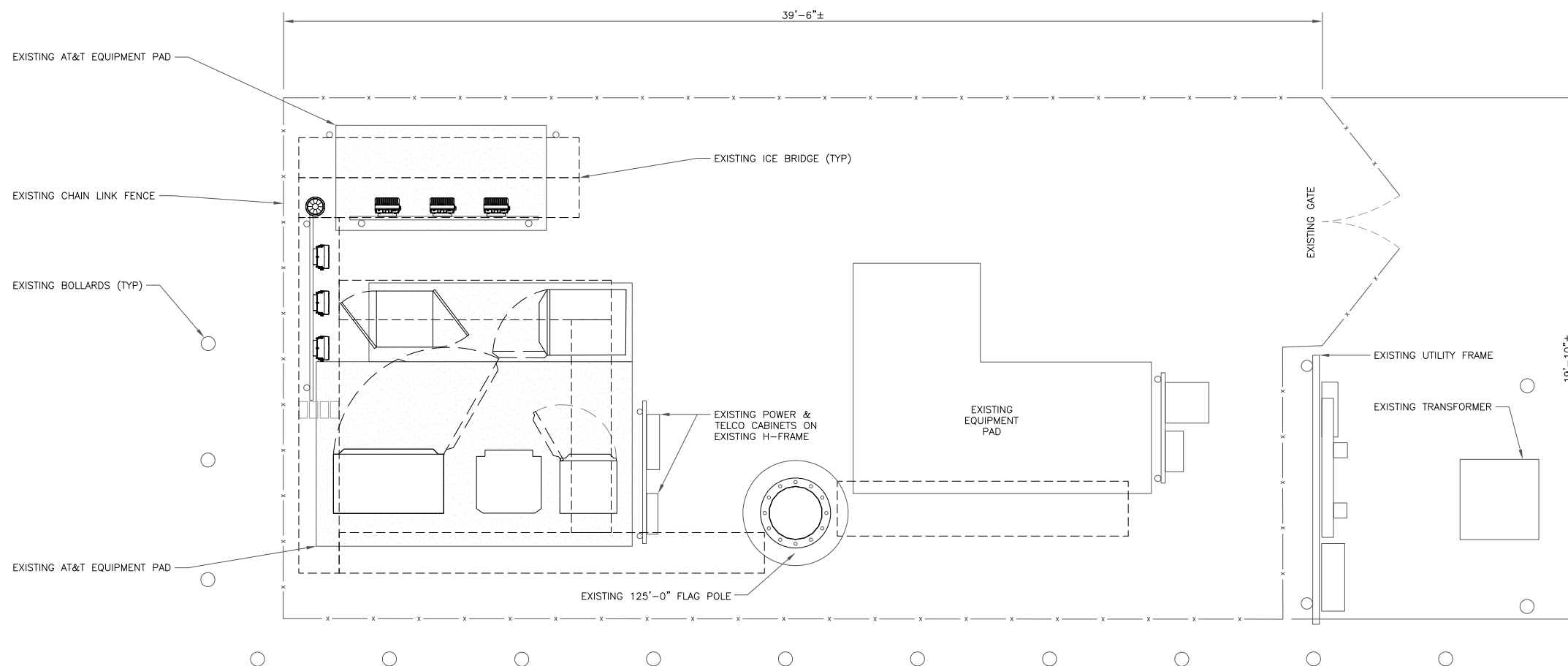


B&T ENGINEERING, INC.  
PEC.0001564  
Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON,  
UNLESS THEY ARE ACTING UNDER THE DIRECTION  
OF A LICENSED PROFESSIONAL ENGINEER,  
TO ALTER THIS DOCUMENT.

SHEET NUMBER: REVISION:

**C-1** **1**



1 SITE PLAN  
SCALE: 3/8"=1'-0" (FULL SIZE)  
3/16"=1'-0" (11x17)





AT&T SITE NUMBER:  
**CT5601**

BU #: 825998  
**MILFORD SHORE AREA**

234 MELBA STREET  
 MILFORD, CT 06460

EXISTING 125'-0" FLAG POLE

**ISSUED FOR:**

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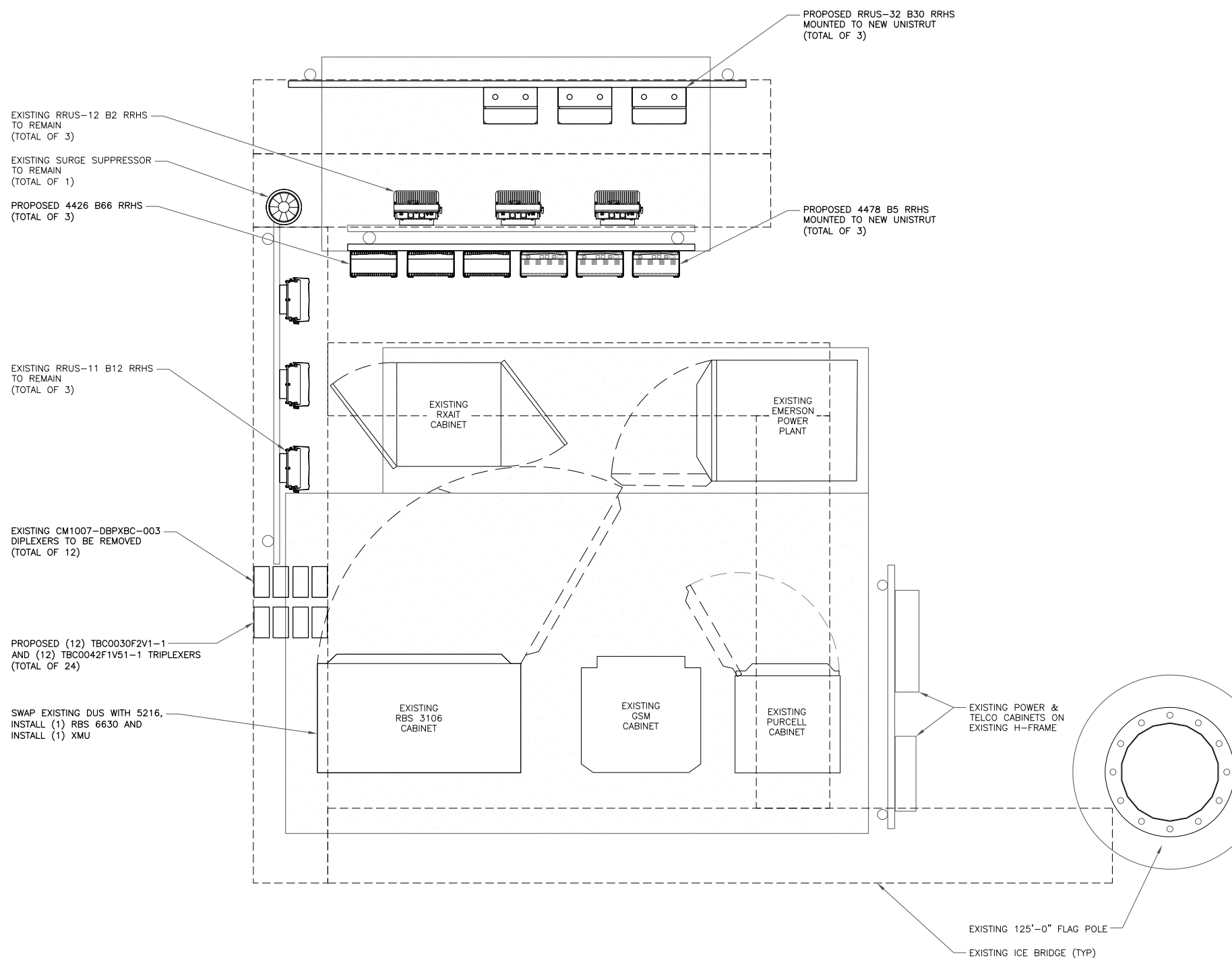


B&T ENGINEERING, INC.  
 PEC.0001564  
 Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON,  
 UNLESS THEY ARE ACTING UNDER THE DIRECTION  
 OF A LICENSED PROFESSIONAL ENGINEER,  
 TO ALTER THIS DOCUMENT.

SHEET NUMBER: REVISION:

**C-2** **1**



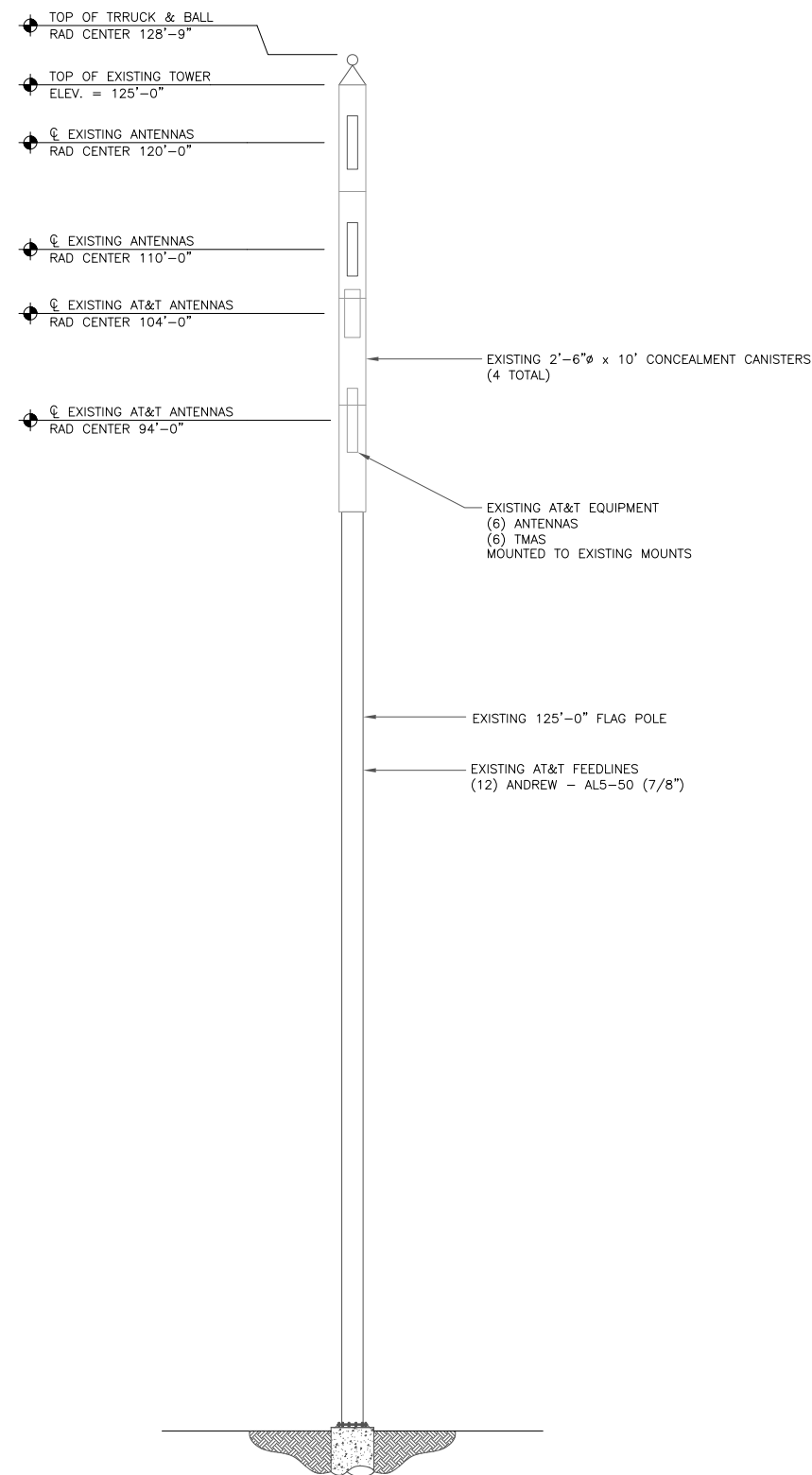
1 EXISTING EQUIPMENT PLAN  
 SCALE: 3/4"=1'-0" (FULL SIZE)  
 3/8"=1'-0" (11x17)



142070\_825998\_Milford Shore Area.dwg - Sheet: C-2 - User: ghayes - Apr 03, 2020 - 8:31am

**AT&T EQUIPMENT**

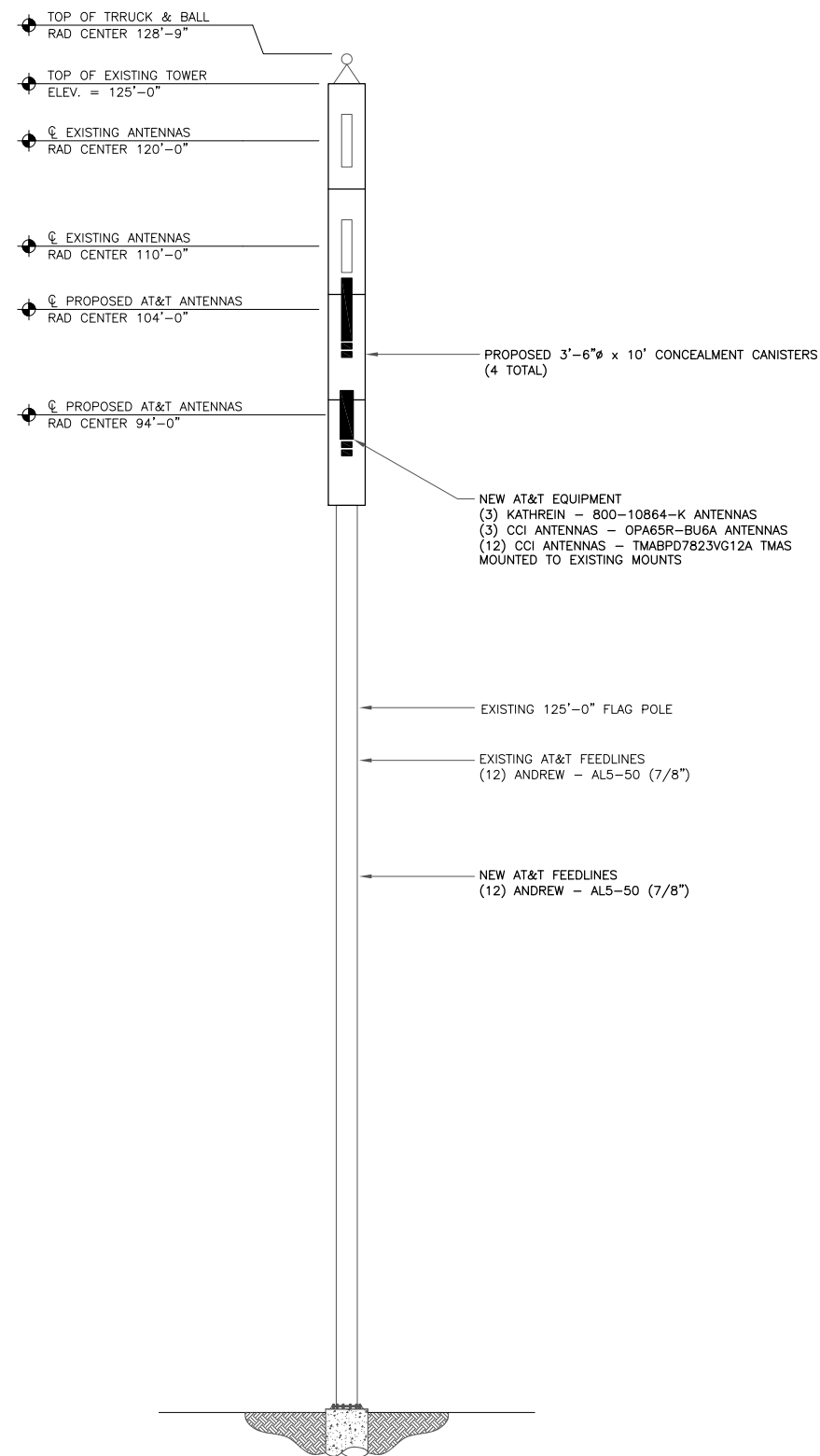
ANTENNA CL: 94'-0"  
 MOUNT CL: 90'-0"  
 ANTENNA CL: 104'-0"  
 MOUNT CL: 100'-0"



1 EXISTING ELEVATION  
 SCALE: NOT TO SCALE

**AT&T EQUIPMENT**

ANTENNA CL: 94'-0"  
 MOUNT CL: 90'-0"  
 ANTENNA CL: 104'-0"  
 MOUNT CL: 100'-0"



2 FINAL ELEVATION  
 SCALE: NOT TO SCALE



ONE AT&T WAY  
 BEDMINSTER, NJ 07921



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



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

AT&T SITE NUMBER:  
**CT5601**

BU #: 825998  
**MILFORD SHORE  
 AREA**

234 MELBA STREET  
 MILFORD, CT 06460

EXISTING 125'-0" FLAG  
 POLE

**ISSUED FOR:**

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	3/20/20	STH	CONSTRUCTION	RMC
1	4/3/20	GEH	CONSTRUCTION	RMC



4/3/20

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SHEET NUMBER: REVISION:

**C-3**

**1**



ONE AT&T WAY  
BEDMINSTER, NJ 07921



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



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

AT&T SITE NUMBER:  
**CT5601**

BU #: 825998  
**MILFORD SHORE  
AREA**

234 MELBA STREET  
MILFORD, CT 06460

EXISTING 125'-0" FLAG  
POLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	3/20/20	STH	CONSTRUCTION	RMC
1	4/3/20	GEH	CONSTRUCTION	RMC



4/3/20

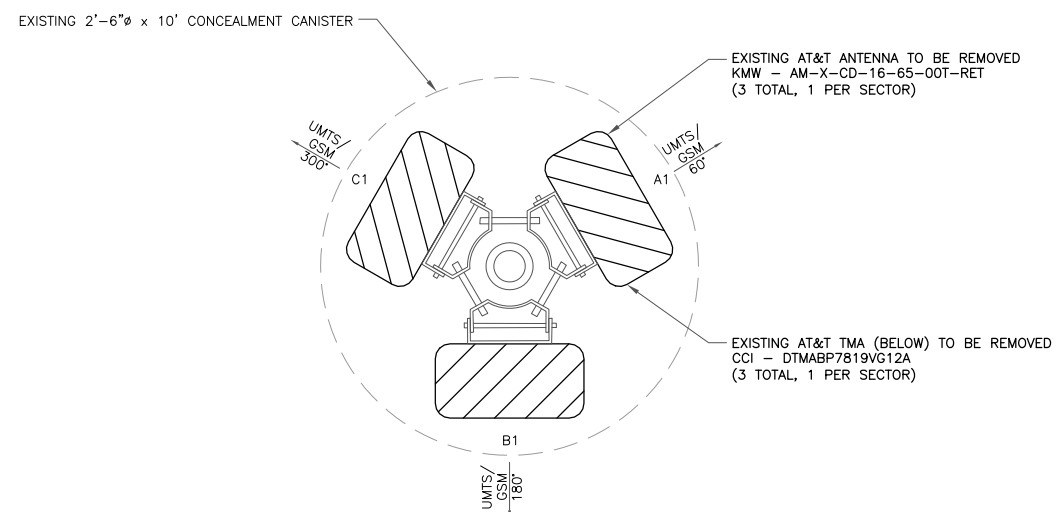
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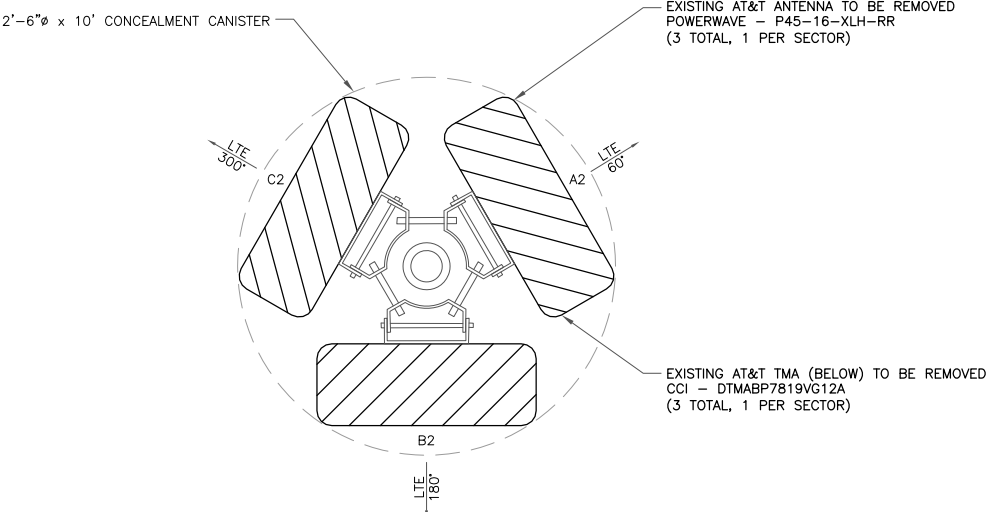
C-4

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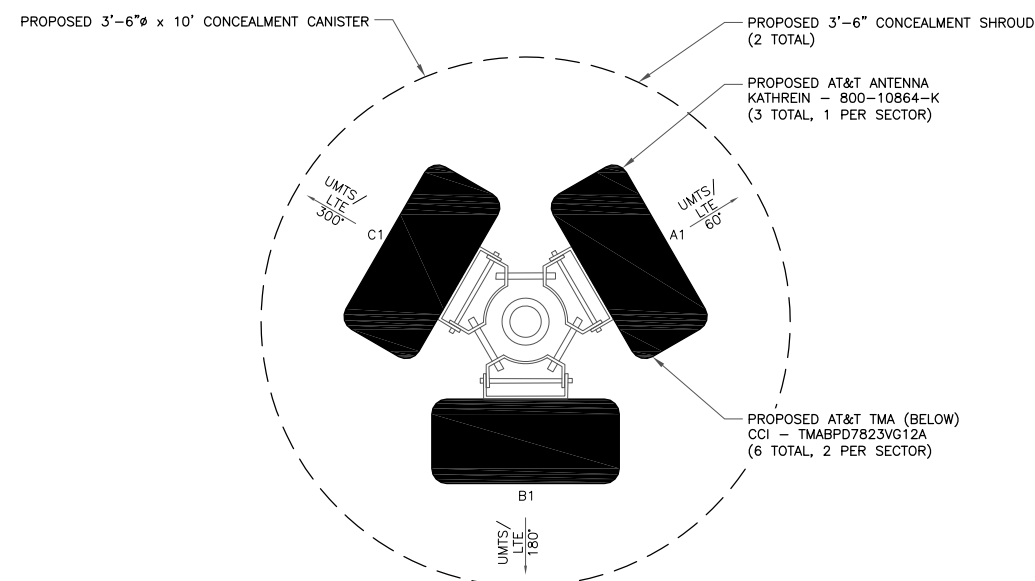


@ 94'-0"

1 EXISTING ANTENNA LAYOUT  
SCALE: NOT TO SCALE

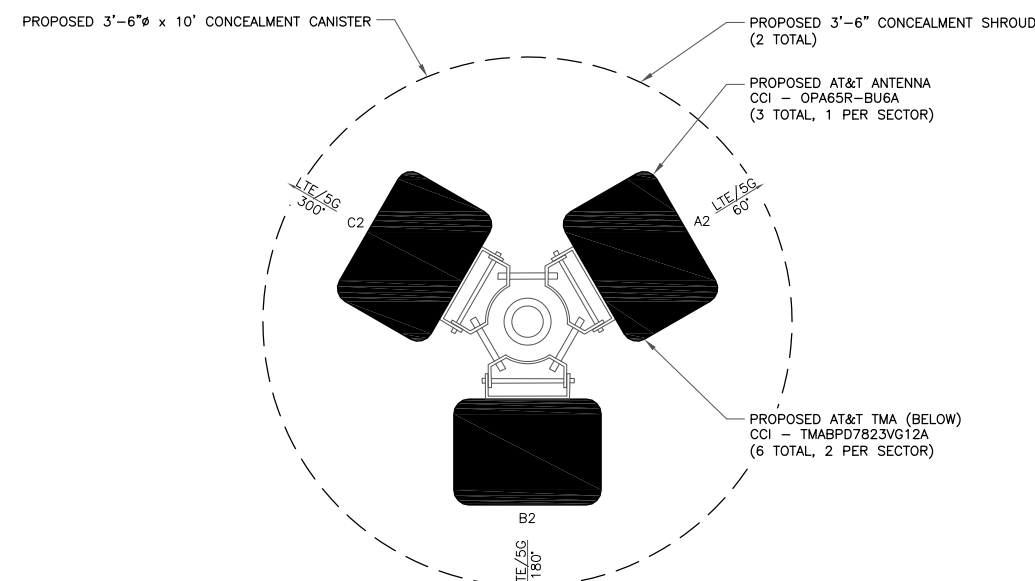


@ 104'-0"



@ 94'-0"

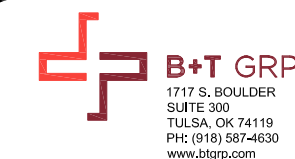
2 FINAL ANTENNA LAYOUT  
SCALE: NOT TO SCALE



@ 104'-0"







AT&T SITE NUMBER:  
**CT5601**

BU #: **825998**  
**MILFORD SHORE AREA**

234 MELBA STREET  
MILFORD, CT 06460

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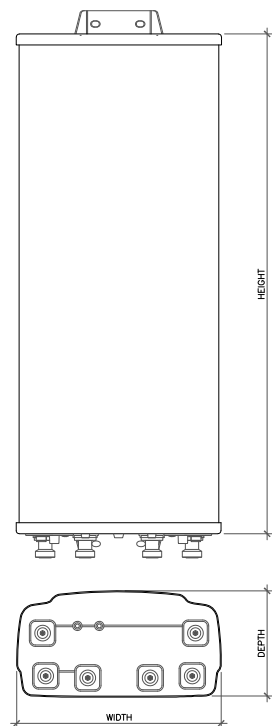
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**FINAL ANTENNA AND COAXIAL CABLE SCHEDULE**

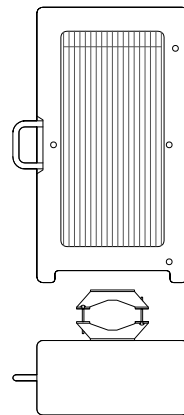
POS.	TECH	STATUS	AZIMUTH	ANTENNA TYPE	ANTENNA RAD CENTER	MECHANICAL DOWNTILT	ELECTRICAL DOWNTILT	MAIN COAX SIZE	MAIN COAX LENGTH	COAX QTY	TMA QTY AND MODEL	RAYCAP	DC (WR-VG86ST-BRD) FIBER CABLES (FB-L98B-034-XXXXXX)	RRHs QTY ON TOWER	RRHs ON GROUND	DIPLEXER ON TOWER	DIPLEXER ON GROUND	RET CABLE
ALPHA SECTOR																		
A1	UMTS/LTE	NEW	60°	KATHREIN 800-10894-K	94'-0"	0°	2'/4'/4'/8"	7/8"	125'-0"	4	(2) TMABPD7823VG12A	DC6-48-60-18-8F	(1) FIBER (2) DC LINES	-	RRUS-12 B2 4426 B66	-	(4) TBC0030 F2V1-1	YES
A2	LTE/5G	NEW	60°	CCI OPA65R-BU6A	104'-0"	0°	10'/10'/7'/10'	7/8"	125'-0"	4	(2) TMABPD7823VG12A			-	RRUS-11 B12 4478 B5 RRUS-32 B30	-	(4) TBC0042 F1V51-1	YES
BETA SECTOR																		
B1	UMTS/LTE	NEW	180°	KATHREIN 800-10894-K	94'-0"	0°	2'/5'/5'/8"	7/8"	125'-0"	4	(2) TMABPD7823VG12A			-	RRUS-12 B2 4426 B66	-	(4) TBC0030 F2V1-1	YES
B2	LTE/5G	NEW	180°	CCI OPA65R-BU6A	104'-0"	0°	10'/10'/8'/10'	7/8"	125'-0"	4	(2) TMABPD7823VG12A			-	RRUS-11 B12 4478 B5 RRUS-32 B30	-	(4) TBC0042 F1V51-1	YES
GAMMA SECTOR																		
C1	UMTS/LTE	NEW	300°	KATHREIN 800-10894-K	94'-0"	0°	2'/4'/4'/8"	7/8"	125'-0"	4	(2) TMABPD7823VG12A			-	RRUS-12 B2 4426 B66	-	(4) TBC0030 F2V1-1	YES
C2	LTE/5G	NEW	300°	CCI OPA65R-BU6A	104'-0"	0°	10'/10'/8'/10'	7/8"	125'-0"	4	(2) TMABPD7823VG12A			-	RRUS-11 B12 4478 B5 RRUS-32 B30	-	(4) TBC0042 F1V51-1	YES

NOTE: BOLD DENOTES NEW EQUIPMENT



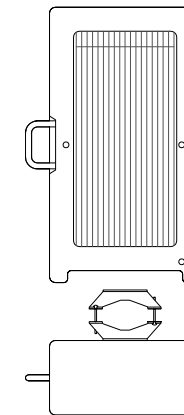
ANTENNA DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
800-10864-K	55.2"	14.8"	6.7"	55.1 lbs
OPA65R-BU6A	71.1"	11.7"	8.4"	70.1 lbs

1 ANTENNA DETAIL  
SCALE: NOT TO SCALE



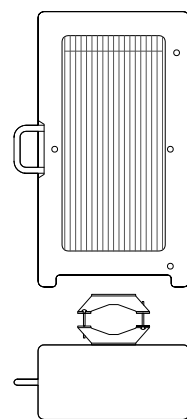
ERICSSON - 4478 B5  
WEIGHT (FULLY EQUIPPED): 59.9 LBS  
SIZE (HxWxD): 16.5x13.4x7.7 IN.

2 RRH DETAIL  
SCALE: NOT TO SCALE



ERICSSON - 4426 B66  
WEIGHT (FULLY EQUIPPED): 53.0 LBS  
SIZE (HxWxD): 27.2x12.1x7.0 IN.

3 RRH DETAIL  
SCALE: NOT TO SCALE




ERICSSON - RRUS-32 B30  
WEIGHT (FULLY EQUIPPED): 60.0 LBS  
SIZE (HxWxD): 26.7x12.1x6.7 IN.

4 RRH DETAIL  
SCALE: NOT TO SCALE

 **AT&T**  
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 **CROWN CASTLE**  
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AT&T SITE NUMBER:  
**CT5601**

BU #: **825998**  
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234 MELBA STREET  
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EXISTING 125'-0" FLAG  
POLE

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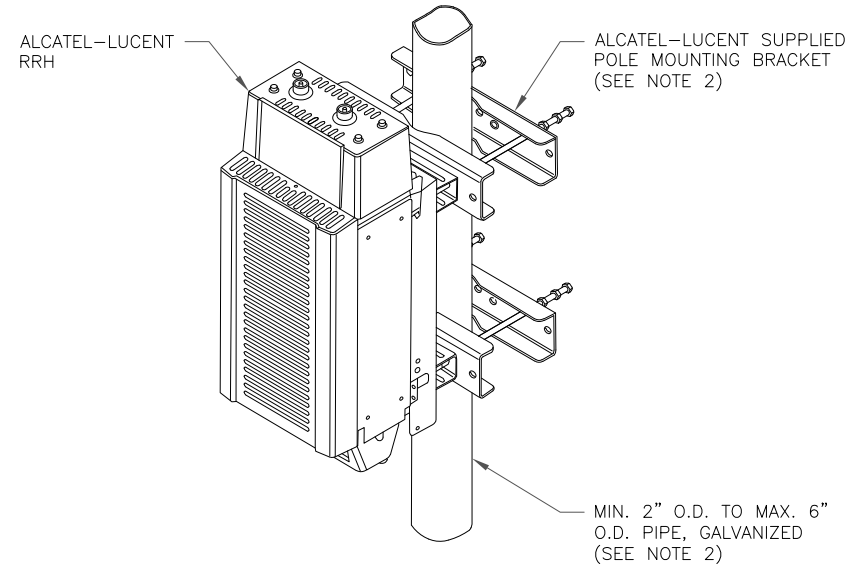
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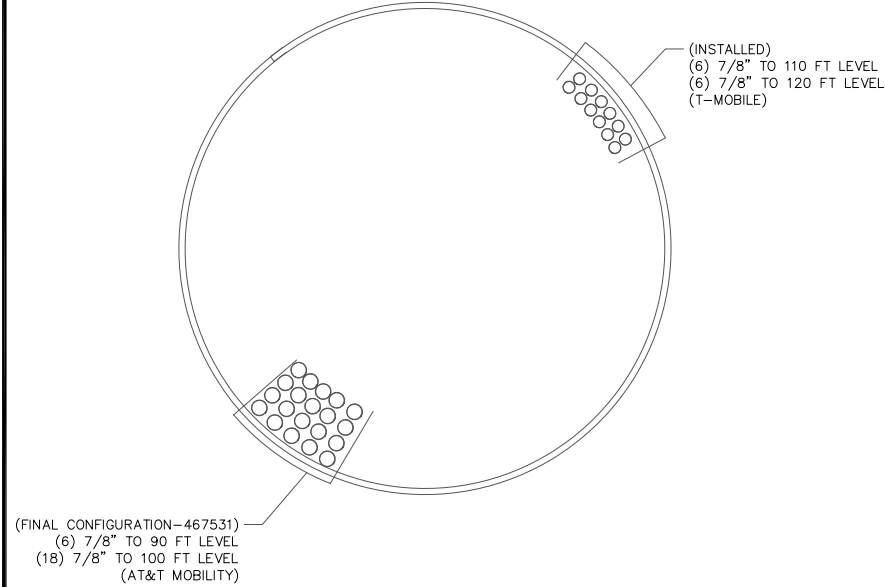
SHEET NUMBER: **C-6** REVISION: **1**

NOTES:

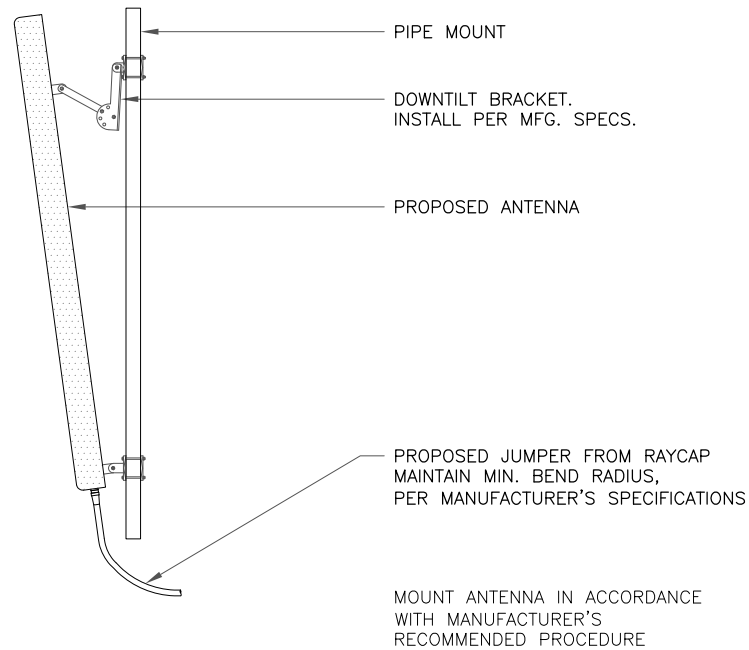
1. ALCATEL-LUCENT (ALU) VIA AT&T SUPPLIES RRH, RRH POLE-MOUNTING BRACKET. SUBCONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ALU RRH POLE-MOUNTING BRACKET. ALU INSTALLS RRH AND MAKES CABLE TERMINATIONS.
2. FOR POLE DIAMETERS FROM 6" TO 15", ALCATEL-LUCENT CAN SUPPLY A PAIR 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

ONE AT&T WAY  
BEDMINSTER, NJ 07921

3200 HORIZON DRIVE, SUITE 150  
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MILFORD, CT 06460

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POLE

ISSUED FOR:

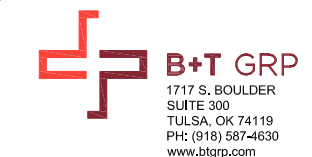
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AT&T SITE NUMBER:  
**CT5601**

BU #: 825998  
**MILFORD SHORE AREA**

234 MELBA STREET  
MILFORD, CT 06460

EXISTING 125'-0" FLAG  
POLE

ISSUED FOR:

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1	4/3/20	GEH	CONSTRUCTION	RMC



4/3/20

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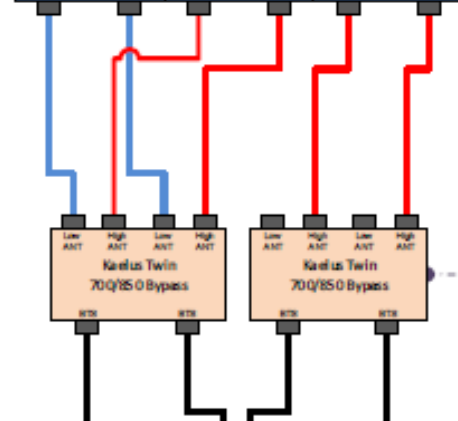
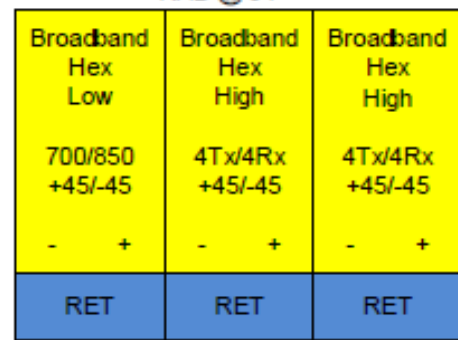
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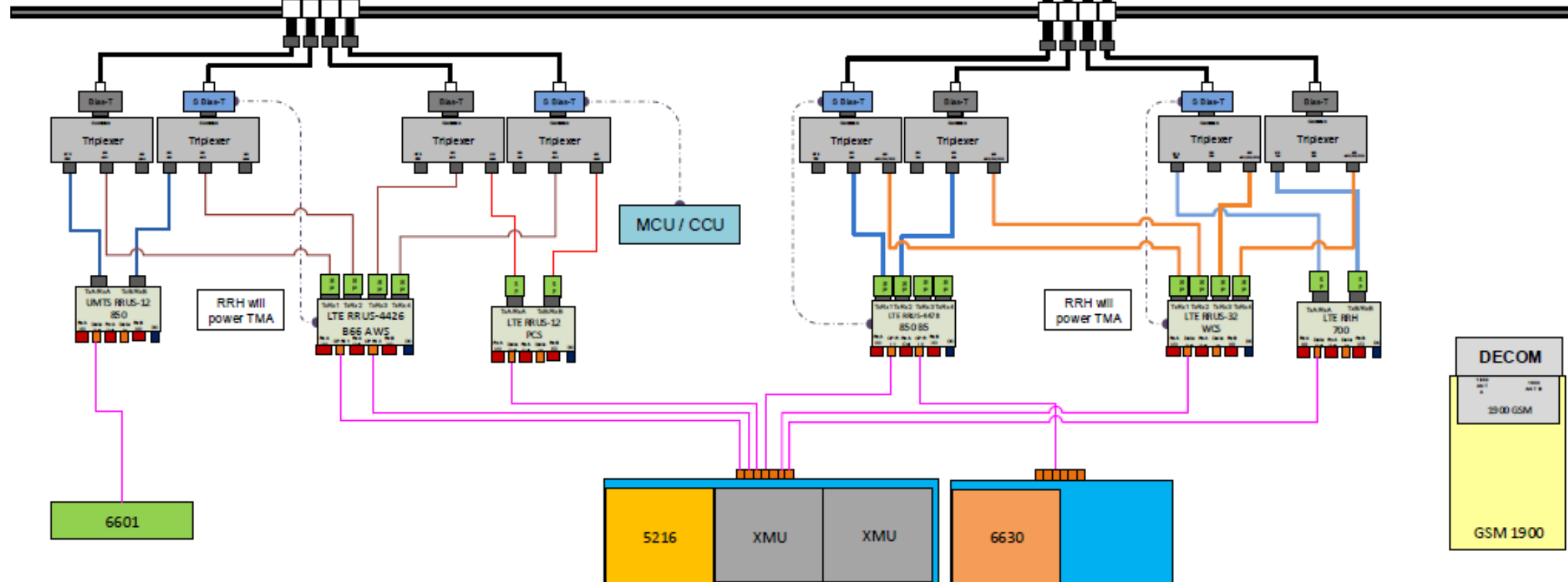
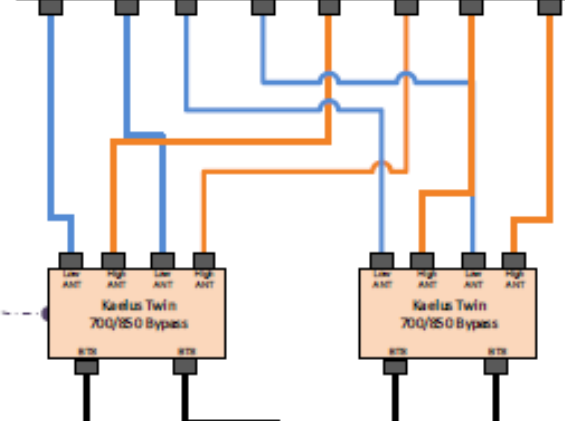
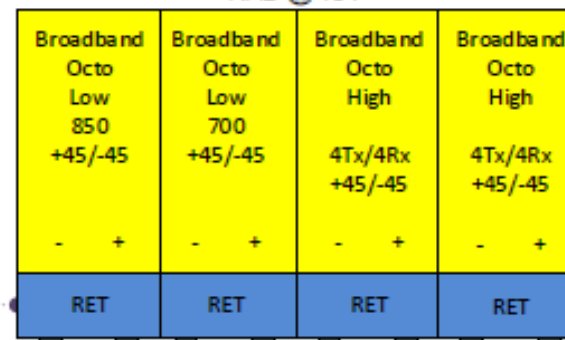
C-8

1

Antenna 1  
UMTS 850, LTE PCS / AWS  
RAD @ 94

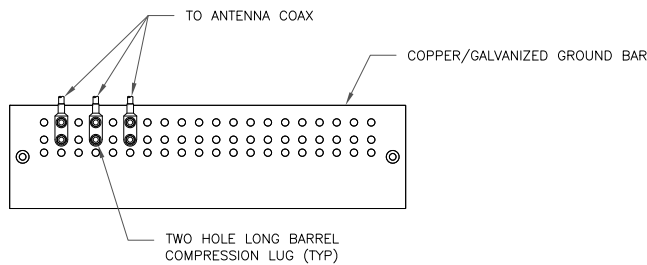


Antenna 2  
LTE 700 BC / 850 / WCS  
RAD @ 104



1 PLUMBING DIAGRAM  
SCALE: NOT TO SCALE

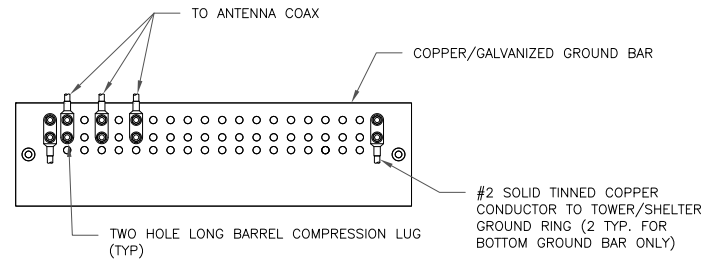




**NOTES:**

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.

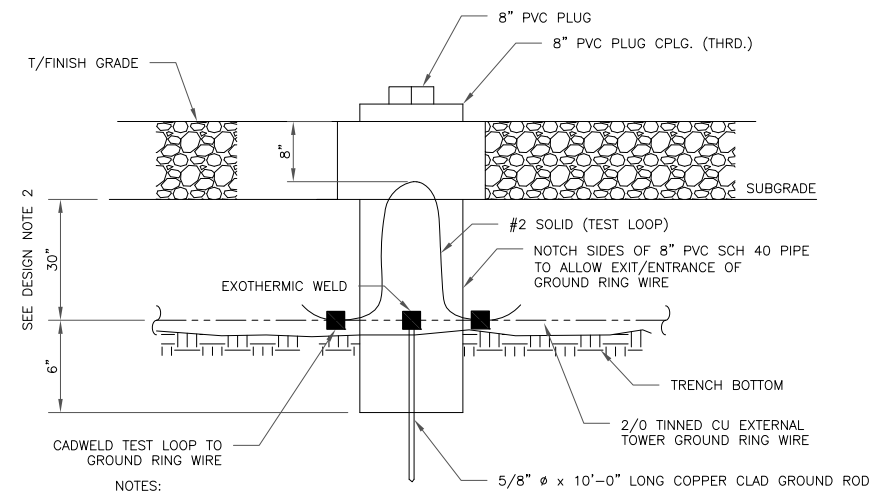
1 ANTENNA GROUND BAR DETAIL  
SCALE: NOT TO SCALE



**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.

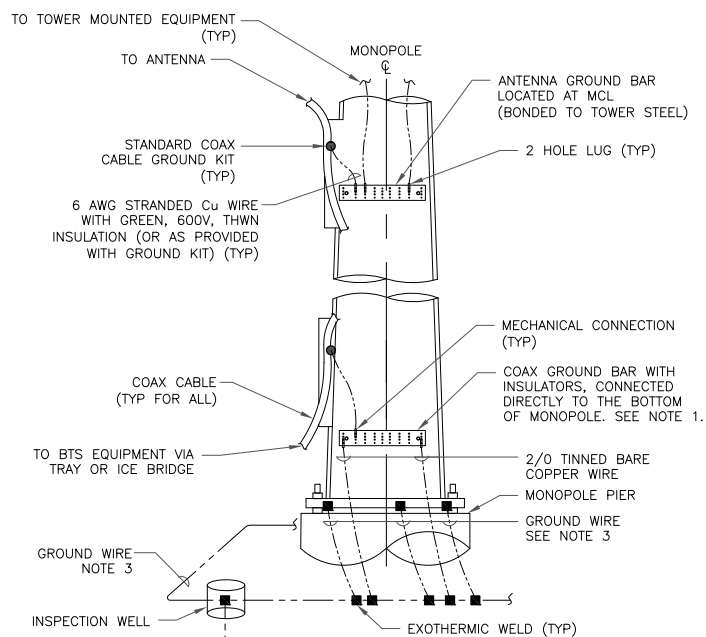
2 TOWER/SHELTER GROUND BAR DETAIL  
SCALE: NOT TO SCALE



**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).

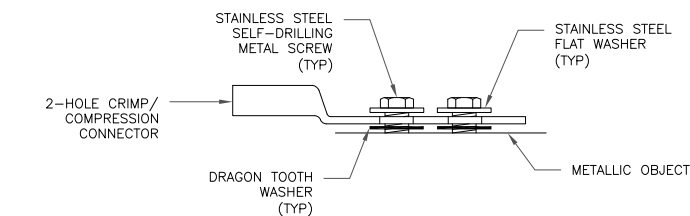
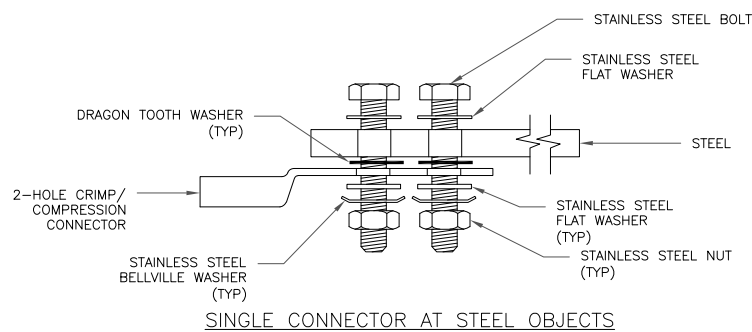
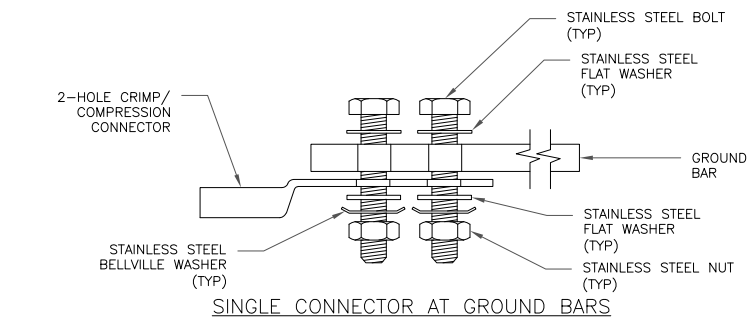
3 INSPECTION WELL DETAIL  
SCALE: NOT TO SCALE



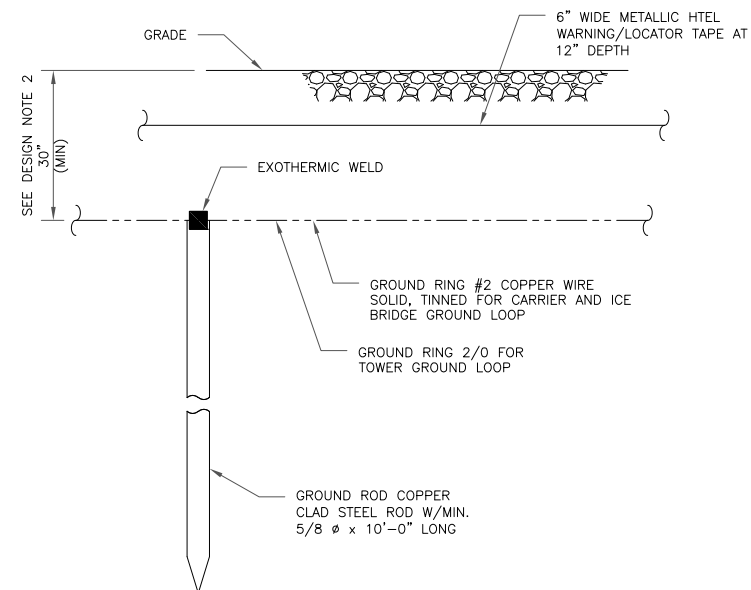
**NOTES:**

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



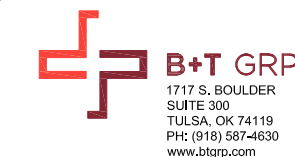
5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS  
SCALE: NOT TO SCALE



**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



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234 MELBA STREET  
MILFORD, CT 06460

EXISTING 125'-0" FLAG POLE

**ISSUED FOR:**

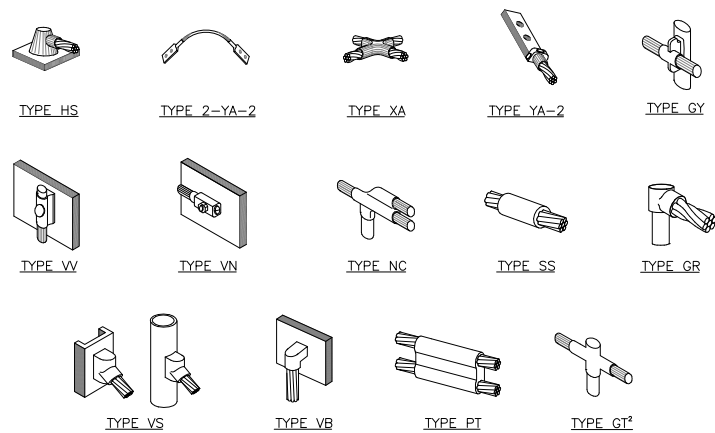
REV	DATE	DRWN	DESCRIPTION	DES./QA
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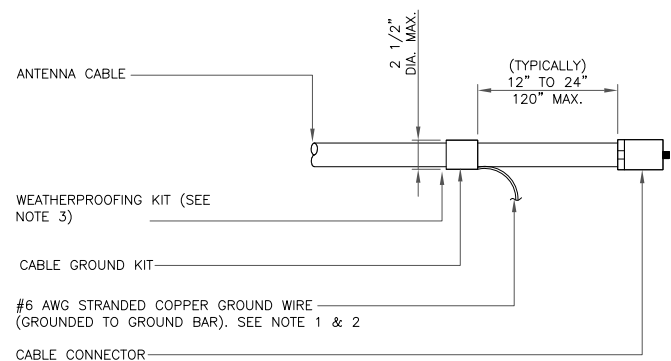
SHEET NUMBER: **G-1** REVISION: **1**



**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.

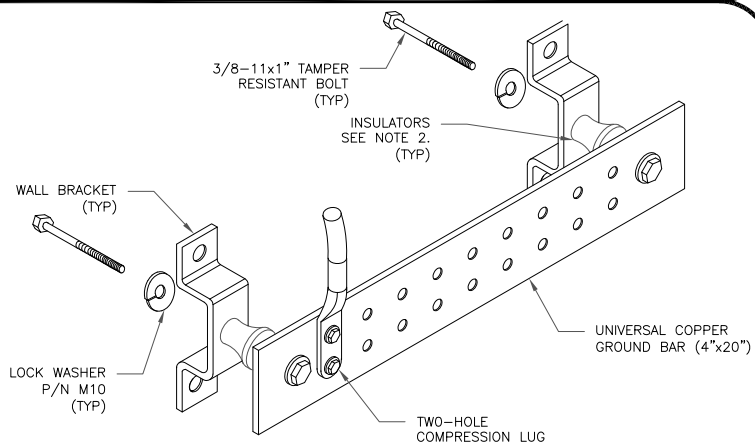
**1 CADWELD GROUNDING CONNECTIONS**  
SCALE: NOT TO SCALE



**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.

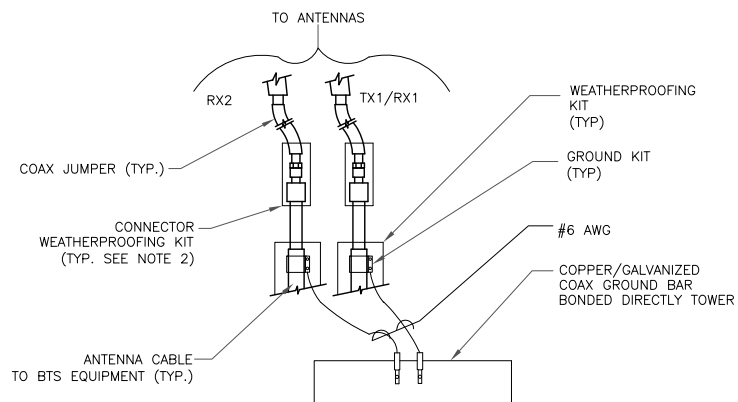
**3 CABLE GROUND KIT CONNECTION**  
SCALE: NOT TO SCALE



**NOTES:**

1. 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.

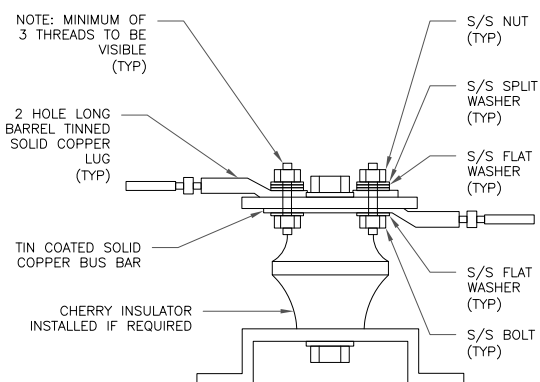
**6 GROUND BAR DETAIL**  
SCALE: NOT TO SCALE



**NOTES:**

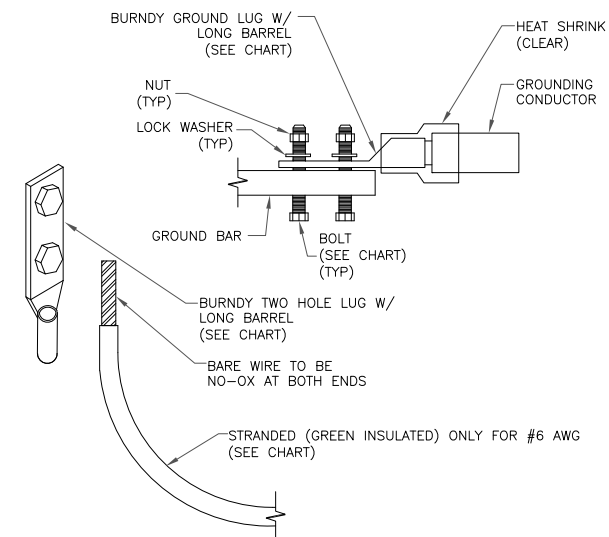
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

**4 GROUND CABLE CONNECTION**  
SCALE: NOT TO SCALE



**7 LUG DETAIL**  
SCALE: NOT TO SCALE

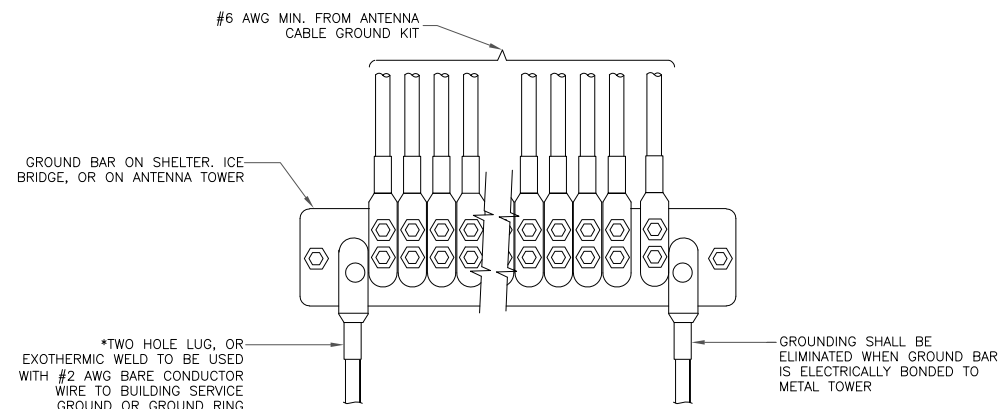
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



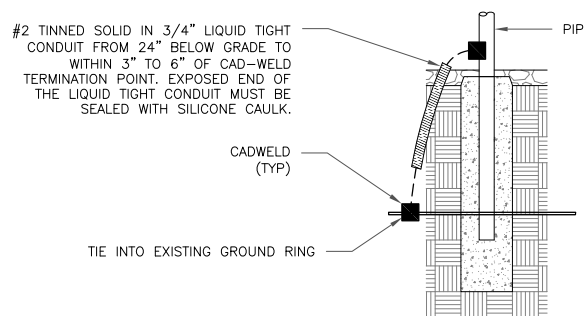
**NOTES:**

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.

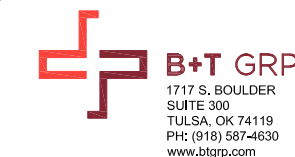
**2 MECHANICAL LUG CONNECTION**  
SCALE: NOT TO SCALE



**5 GROUNDWIRE INSTALLATION**  
SCALE: NOT TO SCALE



**8 TRANSITIONING GROUND DETAIL**  
SCALE: NOT TO SCALE



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SHEET NUMBER: REVISION:

**G-2 1**

# Exhibit D

## **Structural Analysis Report**

Date: **October 25, 2019**

Rebecca Klein  
Crown Castle  
3530 Toringdon Way, Suite 300  
Charlotte, NC 28277



Tower Engineering Professionals  
326 Tryon Road  
Raleigh, NC 27603  
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**Subject: Structural Analysis Report**

**Carrier Designation:** **AT&T Mobility Co-Locate**  
**Carrier Site Number:** CT5601  
**Carrier Site Name:** Sherman-Anderson R D Exit

**Crown Castle Designation:** **Crown Castle BU Number:** 825998  
**Crown Castle Site Name:** Milford Shore Area  
**Crown Castle JDE Job Number:** 544259  
**Crown Castle Work Order Number:** 1801819  
**Crown Castle Order Number:** 467531 Rev. 11

**Engineering Firm Designation:** **TEP Project Number:** 53131.316287

**Site Data:** **234 Melba Street, Milford, New Haven County, CT 06460**  
**Latitude 41° 12' 36.02", Longitude -73° 1' 8.45"**  
**125 Foot - Concealment Tower**

Dear Rebecca Klein,

Tower Engineering Professionals 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:

LC4.5: Modified Structure w/ Proposed Equipment Configuration

**Sufficient Capacity**

Structure Capacity	Foundation Capacity
96.4%	72.2%

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

Structural analysis prepared by: Scott R. Perry / JCR

Respectfully submitted by:

Aaron T. Rucker, P.E.



Electronic Copy

10/25/2019



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## INTRODUCTION

This is a 125-ft concealment tower designed by PiRod, Inc. and mapped by Tower Engineering Professionals in December of 2018. The base tower is 85-ft and the concealment spine extends from 85-ft to 125-ft. The base tower and canister sections were designed by PiRod for 85 mph wind under EIA/TIA-222-F and modified by Tower Engineering Professionals in September of 2012. The proposed modifications designed by GPD Engineering in September of 2019 were considered in this analysis, including a canister expansion enlarging the canister sections to 42-in diameter. All information provided to TEP was assumed to be accurate and complete.

## 2) ANALYSIS CRITERIA

<b>TIA-222 Revision:</b>	TIA-222-H
<b>Risk Category:</b>	II
<b>Wind Speed:</b>	125 mph
<b>Exposure Category:</b>	D
<b>Topographic Factor:</b>	1.0
<b>Ice Thickness:</b>	1.5 in
<b>Wind Speed with Ice:</b>	50 mph
<b>Service Wind Speed:</b>	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)
120.0	120.0	1	Generic	42" OD x 10' Concealment Canister	-	-
110.0	110.0	1	Generic	42" OD x 10' Concealment Canister	-	-
100.0	104.0	3	CCI Antennas	OPA65R-BU6A	18	7/8
	100.0	1	Generic	42" OD x 10' Concealment Canister		
	97.0	3	CCI Antennas	TMABPDB7823VG12A		
	96.0	3	CCI Antennas	TMABPDB7823VG12A		
90.0	94.0	3	Kathrein	800 10864	6	7/8
	90.0	1	Generic	42" OD x 10' Concealment Canister		
	87.0	3	CCI Antennas	TMABPDB7823VG12A		
	86.0	3	CCI Antennas	TMABPDB7823VG12A		

**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)
120.0	123.0	3	Ericsson	KRY 112 144/1	6	7/8
	120.0	3	RFS Celwave	APXV18-206516L-A		
110.0	113.0	3	Ericsson	KRY 112 144/1	6	7/8
	110.0	3	RFS Celwave	APXV18-206516L-A		

### 3) ANALYSIS PROCEDURE

**Table 3 - Documents Provided**

Document	Remarks	Reference	Source
Geotechnical Report	Dr. Clarence Welti, P.E., P.C.	3588955	CCISites
Foundation Mapping Report	FDH Engineering, Inc. / Tower Engineering Professionals	3961273	CCISites
Tower Manufacturer Drawings	PiRod, Inc.	3588957	CCISites
Tower Mapping Report	Tower Engineering Professionals		
Tower Reinforcement Drawings	Tower Engineering Professionals	3747239	CCISites
Post Modification Inspection	Sinnott Gering and Schmitt Towers, Inc.	5601155	CCISites
Tower Reinforcement Drawings	GPD Engineering	8682643	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.

tnxTower was used to determine the loads on the modified structure. Additional calculations were performed to determine the stresses in the pole and in the reinforcing elements. These calculations are presented in Appendix C.

#### 3.2) Assumptions

- 1) The tower and foundation were built and maintained in accordance with the manufacturer's specification.
- 2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2, and the referenced drawings.
- 3) All tower components are in sufficient condition to carry their full design capacity.
- 4) 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.
- 5) All antenna mounts and mounting hardware are structurally sufficient to carry the full design capacity requirements of appurtenance wind area and weight as provided by the original manufacturer specifications. It is the carrier's responsibility to ensure compliance to the structural limitations of the existing and/or proposed antenna mounts. TEP did not perform a site visit to verify the size, condition or capacity of the antenna mounts and did not analyze antennas supporting mounts as part of this structural analysis report.
- 6) The existing base plate grout was considered in this analysis. Grout must be maintained and inspected periodically and must be replaced if damaged or cracked. Refer to Crown Castle document ENG-PRC-10012, Base Plate Grout Repair.

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

#### 4) ANALYSIS RESULTS

**Table 4 - Section Capacity (Summary)<sup>1,2</sup>**

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
125 - 120	Pole	TP6.625x6.625x0.432	Pole	11.3%	Pass
120 - 115	Pole	TP6.625x6.625x0.432	Pole	22.9%	Pass
115 - 110	Pole	TP6.625x6.625x0.432	Pole	44.1%	Pass
110 - 105	Pole	TP6.625x6.625x0.432	Pole	65.5%	Pass
105 - 100	Pole	TP10.75x10.75x0.5	Pole	30.5%	Pass
100 - 95	Pole	TP10.75x10.75x0.5	Pole	40.4%	Pass
95 - 90	Pole	TP10.75x10.75x0.5	Pole	53.2%	Pass
90 - 88	Pole	TP10.75x10.75x0.5	Pole	58.3%	Pass
88 - 85	Pole	TP10.75x10.75x0.5	Pole	66.0%	Pass
85 - 80	Pole	TP24x24x0.375	Pole	21.8%	Pass
80 - 75	Pole	TP24x24x0.375	Pole	26.1%	Pass
75 - 70	Pole	TP24x24x0.375	Pole	30.7%	Pass
70 - 65	Pole	TP24x24x0.375	Pole	35.5%	Pass
65 - 60	Pole	TP24x24x0.375	Pole	40.7%	Pass
60 - 55	Pole	TP24x24x0.375	Pole	46.0%	Pass
55 - 50	Pole	TP24x24x0.375	Pole	51.7%	Pass
50 - 45	Pole	TP24x24x0.375	Pole	57.5%	Pass
45 - 40	Pole	TP24x24x0.375	Pole	63.6%	Pass
40 - 35	Pole	TP24x24x0.375	Pole	69.9%	Pass
35 - 30	Pole	TP24x24x0.375	Pole	76.4%	Pass
30 - 25	Pole	TP24x24x0.375	Pole	83.1%	Pass
25 - 20.5	Pole	TP24x24x0.375	Pole	89.4%	Pass
20.5 - 20.23	Pole + Reinf.	TP24x24x0.85	Reinf. 1 Tension Rupture	63.8%	Pass
20.23 - 19.98	Pole + Reinf.	TP24x24x0.9875	Reinf. 1 Tension Rupture	55.2%	Pass
19.98 - 19.75	Pole + Reinf.	TP24x24x0.9875	Reinf. 1 Tension Rupture	55.4%	Pass
19.75 - 19.5	Pole + Reinf.	TP24x24x0.7125	Reinf. 1 Tension Rupture	57.8%	Pass
19.5 - 19.25	Pole	TP24x24x0.5	Pole	65.4%	Pass
19.25 - 14.25	Pole	TP24x24x0.5	Pole	70.7%	Pass
14.25 - 9.25	Pole	TP24x24x0.5	Pole	76.0%	Pass
9.25 - 4.25	Pole	TP24x24x0.5	Pole	81.4%	Pass
4.25 - 0	Pole	TP24x24x0.5	Pole	86.1%	Pass
				Summary	
			Pole	89.4%	Pass
			Reinforcement	63.8%	Pass
			<b>Overall</b>	<b>89.4%</b>	<b>Pass</b>

**Table 5 - Tower Component Stresses vs. Capacity - LC4.5**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Flange Bolts	105.0	82.9	Pass
1,2	Flange Bolts	85.0	80.0	Pass
1,2	Flange Connection	50.0	89.1	Pass
1,2	Flange Connection	20.0	85.1	Pass
1,2	Anchor Rods	-	76.3	Pass
1,2	Base Plate	-	94.6	Pass
1,2	Base Foundation Soil Interaction	-	72.2	Pass
1,2	Base Foundation Structural	-	69.6	Pass

<b>Structure Rating (max from all components) =</b>	<b>94.6%</b>
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Notes:

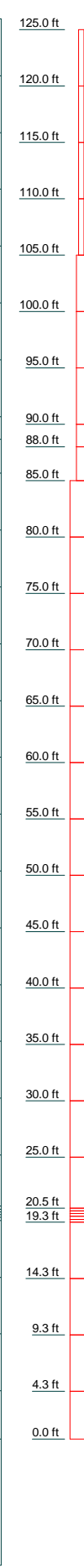
- 1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.
- 2) Rating per TIA-222-H Section 15.5

**4.1) Recommendations**

- 1) If the load differs from that described in Tables 1 and 2 of this report, the referenced drawings, or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
- 2) The tower and its foundation have sufficient capacity to carry the proposed load configuration. No further modifications are required once the proposed modifications are installed.
- 3) The existing base plate grout was considered in this analysis. Grout must be maintained and inspected periodically and must be replaced if damaged or cracked. Refer to Crown Castle document ENG-PRC-10012, Base Plate Grout Repair.

**APPENDIX A**  
**TNXTOWER OUTPUT**

Section	Size	Length (ft)	Grade	Weight (lb)
1		5.00		143.0
2		5.00		143.0
3		5.00		143.0
4		5.00		143.0
5		5.00		273.9
6		5.00		273.9
7		5.00		273.9
8		2.00		
9		3.00		164.41096
10		5.00		473.5
11		5.00		473.5
12		5.00		473.5
13		5.00		473.5
14		5.00		473.5
15		5.00		473.5
16		5.00		473.5
17		5.00		473.5
18		5.00		473.5
19		5.00		473.5
20		5.00		473.5
21		5.00		473.5
22		4.50		628.0
28	P24x0.5	5.00		628.0
29	P24x0.5	5.00		628.0
30	P24x0.5	5.00		628.0
31	P24x0.5	4.25		533.8
				10433.9



### DESIGNED APPURTENANCE LOADING

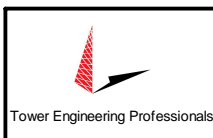
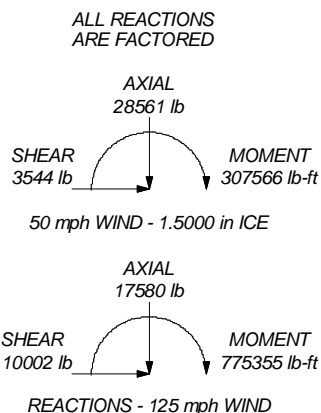
TYPE	ELEVATION	TYPE	ELEVATION
Truck Ball	125.75	OPA65R-BU6A	100
Canister Load1	125	OPA65R-BU6A	100
Flag	125	42" OD x 10' Concealment Canister	100
KRY 112 144/1	120	OPA65R-BU6A	100
KRY 112 144/1	120	TMABPDB7823VG12A	100
KRY 112 144/1	120	TMABPDB7823VG12A	100
42" OD x 10' Concealment Canister	120	TMABPDB7823VG12A	100
APXV18-206516L-A	120	TMABPDB7823VG12A	100
APXV18-206516L-A	120	Canister Load4	95
APXV18-206516L-A	120	800 10864	90
Canister Load2	115	800 10864	90
KRY 112 144/1	110	800 10864	90
APXV18-206516L-A	110	42" OD x 10' Concealment Canister	90
42" OD x 10' Concealment Canister	110	TMABPDB7823VG12A	90
APXV18-206516L-A	110	TMABPDB7823VG12A	90
KRY 112 144/1	110	TMABPDB7823VG12A	90
APXV18-206516L-A	110	TMABPDB7823VG12A	90
KRY 112 144/1	110	TMABPDB7823VG12A	90
Canister Load3	105	TMABPDB7823VG12A	90
TMABPDB7823VG12A	100	Canister Load5	85
TMABPDB7823VG12A	100		

### MATERIAL STRENGTH

GRADE	F <sub>y</sub>	F <sub>u</sub>	GRADE	F <sub>y</sub>	F <sub>u</sub>
A53-B-42	42 ksi	63 ksi			

### TOWER DESIGN NOTES

1. Tower designed for Exposure D to the TIA-222-H Standard.
2. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
3. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category II.
6. Topographic Category 1 with Crest Height of 0.00 ft



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Job: **Milford Shore Area (BU 825998)**

Project: **TEP No. 53131.316287**

Client: Crown Castle	Drawn by: Scott R. Perry	App'd:
Code: TIA-222-H	Date: 10/25/19	Scale: NTS
Path:		Dwg No. E-1

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<b>tnxTower</b>  <b>Tower Engineering Professionals</b> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b> Milford Shore Area (BU 825998)	<b>Page</b> 1 of 19
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	<b>Client</b> Crown Castle	<b>Designed by</b> Scott R. Perry

## Tower Input Data

The tower is a monopole.

This tower is designed using the TIA-222-H standard.

The following design criteria apply:

- Tower base elevation above sea level: 29.00 ft.
- Basic wind speed of 125 mph.
- Risk Category II.
- Exposure Category D.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 1.5000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.05.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used:  $K_{es}(F_w) = 0.95$ ,  $K_{es}(t_i) = 0.85$ .
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

- |  |   |   |
|--|---|---|
| <ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Horizontals</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Magnification</li> <li>Use Code Stress Ratios</li> <li>√ Use Code Safety Factors - Guys</li> <li>Escalate Ice</li> <li>Always Use Max Kz</li> <li>Use Special Wind Profile</li> <li>Include Bolts In Member Capacity</li> <li>Leg Bolts Are At Top Of Section</li> <li>Secondary Horizontal Braces Leg</li> <li>Use Diamond Inner Bracing (4 Sided)</li> <li>SR Members Have Cut Ends</li> <li>SR Members Are Concentric</li> </ul> | <ul style="list-style-type: none"> <li>Distribute Leg Loads As Uniform</li> <li>Assume Legs Pinned</li> <li>√ Assume Rigid Index Plate</li> <li>√ Use Clear Spans For Wind Area</li> <li>Use Clear Spans For KL/r</li> <li>Retension Guys To Initial Tension</li> <li>√ Bypass Mast Stability Checks</li> <li>√ Use Azimuth Dish Coefficients</li> <li>√ Project Wind Area of Appurt.</li> <li>Autocalc Torque Arm Areas</li> <li>Add IBC .6D+W Combination</li> <li>√ Sort Capacity Reports By Component</li> <li>Triangulate Diamond Inner Bracing</li> <li>Treat Feed Line Bundles As Cylinder</li> <li>Ignore KL/ry For 60 Deg. Angle Legs</li> </ul> | <ul style="list-style-type: none"> <li>Use ASCE 10 X-Brace Ly Rules</li> <li>Calculate Redundant Bracing Forces</li> <li>Ignore Redundant Members in FEA</li> <li>SR Leg Bolts Resist Compression</li> <li>All Leg Panels Have Same Allowable</li> <li>Offset Girt At Foundation</li> <li>√ Consider Feed Line Torque</li> <li>Include Angle Block Shear Check</li> <li>Use TIA-222-H Bracing Resist. Exemption</li> <li>Use TIA-222-H Tension Splice Exemption</li> <li style="text-align: center;">Poles</li> <li>√ Include Shear-Torsion Interaction</li> <li>Always Use Sub-Critical Flow</li> <li>Use Top Mounted Sockets</li> <li>Pole Without Linear Attachments</li> <li>√ Pole With Shroud Or No Appurtenances</li> <li>Outside and Inside Corner Radii Are Known</li> </ul> |
|--|---|---|

## Pole Section Geometry



<b><i>tnxTower</i></b>  <b><i>Tower Engineering Professionals</i></b> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b> Milford Shore Area (BU 825998)	<b>Page</b> 2 of 19
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	<b>Client</b> Crown Castle	<b>Designed by</b> Scott R. Perry

<i>Section</i>	<i>Elevation</i> <i>ft</i>	<i>Section Length</i> <i>ft</i>	<i>Pole Size</i>	<i>Pole Grade</i>	<i>Socket Length</i> <i>ft</i>
L1	125.00-120.00	5.00	P6.625x0.432	A53-B-42 (42 ksi)	
L2	120.00-115.00	5.00	P6.625x0.432	A53-B-42 (42 ksi)	
L3	115.00-110.00	5.00	P6.625x0.432	A53-B-42 (42 ksi)	
L4	110.00-105.00	5.00	P6.625x0.432	A53-B-42 (42 ksi)	
L5	105.00-100.00	5.00	P10.75x0.5	A53-B-42 (42 ksi)	
L6	100.00-95.00	5.00	P10.75x0.5	A53-B-42 (42 ksi)	
L7	95.00-90.00	5.00	P10.75x0.5	A53-B-42 (42 ksi)	
L8	90.00-88.00	2.00	P10.75x0.5	A53-B-42 (42 ksi)	
L9	88.00-85.00	3.00	P10.75x0.5	A53-B-42 (42 ksi)	
L10	85.00-80.00	5.00	P24x0.375	A53-B-42 (42 ksi)	
L11	80.00-75.00	5.00	P24x0.375	A53-B-42 (42 ksi)	
L12	75.00-70.00	5.00	P24x0.375	A53-B-42 (42 ksi)	
L13	70.00-65.00	5.00	P24x0.375	A53-B-42 (42 ksi)	
L14	65.00-60.00	5.00	P24x0.375	A53-B-42 (42 ksi)	
L15	60.00-55.00	5.00	P24x0.375	A53-B-42 (42 ksi)	
L16	55.00-50.00	5.00	P24x0.375	A53-B-42 (42 ksi)	
L17	50.00-45.00	5.00	P24x0.375	A53-B-42 (42 ksi)	
L18	45.00-40.00	5.00	P24x0.375	A53-B-42 (42 ksi)	
L19	40.00-35.00	5.00	P24x0.375	A53-B-42 (42 ksi)	
L20	35.00-30.00	5.00	P24x0.375	A53-B-42 (42 ksi)	
L21	30.00-25.00	5.00	P24x0.375	A53-B-42 (42 ksi)	
L22	25.00-20.50	4.50	P24x0.375	A53-B-42 (42 ksi)	
L23	20.50-20.23	0.27	P24x0.85	A53-B-42 (42 ksi)	
L24	20.23-19.98	0.25	P24x0.9875	A53-B-42 (42 ksi)	
L25	19.98-19.75	0.23	P24x0.9875	A53-B-42 (42 ksi)	
L26	19.75-19.50	0.25	P24x0.7125	A53-B-42 (42 ksi)	
L27	19.50-19.25	0.25	P24x0.5	A53-B-42 (42 ksi)	
L28	19.25-14.25	5.00	P24x0.5	A53-B-42 (42 ksi)	
L29	14.25-9.25	5.00	P24x0.5	A53-B-42 (42 ksi)	
L30	9.25-4.25	5.00	P24x0.5	A53-B-42 (42 ksi)	
L31	4.25-0.00	4.25	P24x0.5	A53-B-42	





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	<b>Client</b>	Crown Castle	<b>Designed by</b>	Scott R. Perry

### Feed Line/Linear Appurtenances Section Areas

<i>Tower Section</i>	<i>Tower Elevation ft</i>	<i>Face</i>	<i>A<sub>R</sub> ft<sup>2</sup></i>	<i>A<sub>F</sub> ft<sup>2</sup></i>	<i>C<sub>AA</sub> In Face ft<sup>2</sup></i>	<i>C<sub>AA</sub> Out Face ft<sup>2</sup></i>	<i>Weight lb</i>
L1	125.00-120.00	A	0.000	0.000	0.000	0.000	0
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	0.188	0.000	2
L2	120.00-115.00	A	0.000	0.000	0.000	0.000	0
		B	0.000	0.000	0.000	0.000	9
		C	0.000	0.000	0.188	0.000	2
L3	115.00-110.00	A	0.000	0.000	0.000	0.000	0
		B	0.000	0.000	0.000	0.000	9
		C	0.000	0.000	0.188	0.000	2
L4	110.00-105.00	A	0.000	0.000	0.000	0.000	9
		B	0.000	0.000	0.000	0.000	9
		C	0.000	0.000	0.188	0.000	2
L5	105.00-100.00	A	0.000	0.000	0.000	0.000	9
		B	0.000	0.000	0.000	0.000	9
		C	0.000	0.000	0.188	0.000	2
L6	100.00-95.00	A	0.000	0.000	0.000	0.000	9
		B	0.000	0.000	0.000	0.000	9
		C	0.000	0.000	0.188	0.000	26
L7	95.00-90.00	A	0.000	0.000	0.000	0.000	9
		B	0.000	0.000	0.000	0.000	9
		C	0.000	0.000	0.188	0.000	26
L8	90.00-88.00	A	0.000	0.000	0.000	0.000	4
		B	0.000	0.000	0.000	0.000	4
		C	0.000	0.000	0.075	0.000	13
L9	88.00-85.00	A	0.000	0.000	0.000	0.000	5
		B	0.000	0.000	0.000	0.000	5
		C	0.000	0.000	0.112	0.000	20
L10	85.00-80.00	A	0.000	0.000	0.000	0.000	9
		B	0.000	0.000	0.000	0.000	9
		C	0.000	0.000	0.188	0.000	33
L11	80.00-75.00	A	0.000	0.000	0.000	0.000	9
		B	0.000	0.000	0.000	0.000	9
		C	0.000	0.000	0.188	0.000	33
L12	75.00-70.00	A	0.000	0.000	0.000	0.000	9
		B	0.000	0.000	0.000	0.000	9
		C	0.000	0.000	0.188	0.000	33
L13	70.00-65.00	A	0.000	0.000	0.000	0.000	9
		B	0.000	0.000	0.000	0.000	9
		C	0.000	0.000	0.188	0.000	33
L14	65.00-60.00	A	0.000	0.000	0.000	0.000	9
		B	0.000	0.000	0.000	0.000	9
		C	0.000	0.000	0.188	0.000	33
L15	60.00-55.00	A	0.000	0.000	0.000	0.000	9
		B	0.000	0.000	0.000	0.000	9
		C	0.000	0.000	0.188	0.000	33
L16	55.00-50.00	A	0.000	0.000	0.000	0.000	9
		B	0.000	0.000	0.000	0.000	9
		C	0.000	0.000	0.188	0.000	33
L17	50.00-45.00	A	0.000	0.000	0.000	0.000	9
		B	0.000	0.000	0.000	0.000	9
		C	0.000	0.000	0.188	0.000	33
L18	45.00-40.00	A	0.000	0.000	0.000	0.000	9
		B	0.000	0.000	0.000	0.000	9
		C	0.000	0.000	0.188	0.000	33

<b>tnxTower</b>  <b>Tower Engineering Professionals</b> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b> Milford Shore Area (BU 825998)	<b>Page</b> 6 of 19
	<b>Project</b> TEP No. 53131.316287	<b>Date</b> 13:57:37 10/25/19
	<b>Client</b> Crown Castle	<b>Designed by</b> Scott R. Perry

Tower Section	Tower Elevation ft	Face	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight lb
L19	40.00-35.00	A	0.000	0.000	0.000	0.000	9
		B	0.000	0.000	0.000	0.000	9
		C	0.000	0.000	0.188	0.000	33
L20	35.00-30.00	A	0.000	0.000	0.000	0.000	9
		B	0.000	0.000	0.000	0.000	9
		C	0.000	0.000	0.188	0.000	33
L21	30.00-25.00	A	0.000	0.000	0.000	0.000	9
		B	0.000	0.000	0.000	0.000	9
		C	0.000	0.000	0.188	0.000	33
L22	25.00-20.50	A	0.000	0.000	0.975	0.000	8
		B	0.000	0.000	2.908	0.000	8
		C	0.000	0.000	1.477	0.000	30
L23	20.50-20.23	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.445	0.000	0
		C	0.000	0.000	0.212	0.000	2
L24	20.23-19.98	A	0.000	0.000	0.139	0.000	0
		B	0.000	0.000	0.412	0.000	0
		C	0.000	0.000	0.196	0.000	2
L25	19.98-19.75	A	0.000	0.000	0.128	0.000	0
		B	0.000	0.000	0.379	0.000	0
		C	0.000	0.000	0.181	0.000	2
L26	19.75-19.50	A	0.000	0.000	0.139	0.000	0
		B	0.000	0.000	0.412	0.000	0
		C	0.000	0.000	0.196	0.000	2
L27	19.50-19.25	A	0.000	0.000	0.139	0.000	0
		B	0.000	0.000	0.412	0.000	0
		C	0.000	0.000	0.196	0.000	2
L28	19.25-14.25	A	0.000	0.000	0.836	0.000	9
		B	0.000	0.000	2.337	0.000	9
		C	0.000	0.000	1.683	0.000	33
L29	14.25-9.25	A	0.000	0.000	0.000	0.000	9
		B	0.000	0.000	0.000	0.000	9
		C	0.000	0.000	0.188	0.000	33
L30	9.25-4.25	A	0.000	0.000	0.000	0.000	9
		B	0.000	0.000	0.000	0.000	9
		C	0.000	0.000	0.188	0.000	33
L31	4.25-0.00	A	0.000	0.000	0.000	0.000	8
		B	0.000	0.000	0.000	0.000	8
		C	0.000	0.000	0.159	0.000	28

**Feed Line/Linear Appurtenances Section Areas - With Ice**

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight lb
L1	125.00-120.00	A	1.454	0.000	0.000	0.000	0.000	0
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	1.641	0.000	35
L2	120.00-115.00	A	1.448	0.000	0.000	0.000	0.000	0
		B		0.000	0.000	0.000	0.000	9
		C		0.000	0.000	1.635	0.000	34
L3	115.00-110.00	A	1.441	0.000	0.000	0.000	0.000	0
		B		0.000	0.000	0.000	0.000	9
		C		0.000	0.000	1.629	0.000	34
L4	110.00-105.00	A	1.435	0.000	0.000	0.000	0.000	9
		B		0.000	0.000	0.000	0.000	9
		C		0.000	0.000	1.622	0.000	34
L5	105.00-100.00	A	1.428	0.000	0.000	0.000	0.000	9

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	<b>Client</b>	Crown Castle	<b>Designed by</b>	Scott R. Perry

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight lb
		B		0.000	0.000	0.000	0.000	9
		C		0.000	0.000	1.616	0.000	34
L6	100.00-95.00	A	1.421	0.000	0.000	0.000	0.000	9
		B		0.000	0.000	0.000	0.000	9
		C		0.000	0.000	1.608	0.000	57
L7	95.00-90.00	A	1.413	0.000	0.000	0.000	0.000	9
		B		0.000	0.000	0.000	0.000	9
		C		0.000	0.000	1.601	0.000	56
L8	90.00-88.00	A	1.408	0.000	0.000	0.000	0.000	4
		B		0.000	0.000	0.000	0.000	4
		C		0.000	0.000	0.638	0.000	26
L9	88.00-85.00	A	1.404	0.000	0.000	0.000	0.000	5
		B		0.000	0.000	0.000	0.000	5
		C		0.000	0.000	0.955	0.000	38
L10	85.00-80.00	A	1.397	0.000	0.000	0.000	0.000	9
		B		0.000	0.000	0.000	0.000	9
		C		0.000	0.000	1.585	0.000	64
L11	80.00-75.00	A	1.389	0.000	0.000	0.000	0.000	9
		B		0.000	0.000	0.000	0.000	9
		C		0.000	0.000	1.576	0.000	63
L12	75.00-70.00	A	1.379	0.000	0.000	0.000	0.000	9
		B		0.000	0.000	0.000	0.000	9
		C		0.000	0.000	1.567	0.000	63
L13	70.00-65.00	A	1.370	0.000	0.000	0.000	0.000	9
		B		0.000	0.000	0.000	0.000	9
		C		0.000	0.000	1.557	0.000	63
L14	65.00-60.00	A	1.359	0.000	0.000	0.000	0.000	9
		B		0.000	0.000	0.000	0.000	9
		C		0.000	0.000	1.547	0.000	62
L15	60.00-55.00	A	1.348	0.000	0.000	0.000	0.000	9
		B		0.000	0.000	0.000	0.000	9
		C		0.000	0.000	1.535	0.000	62
L16	55.00-50.00	A	1.336	0.000	0.000	0.000	0.000	9
		B		0.000	0.000	0.000	0.000	9
		C		0.000	0.000	1.523	0.000	61
L17	50.00-45.00	A	1.322	0.000	0.000	0.000	0.000	9
		B		0.000	0.000	0.000	0.000	9
		C		0.000	0.000	1.510	0.000	61
L18	45.00-40.00	A	1.308	0.000	0.000	0.000	0.000	9
		B		0.000	0.000	0.000	0.000	9
		C		0.000	0.000	1.495	0.000	60
L19	40.00-35.00	A	1.291	0.000	0.000	0.000	0.000	9
		B		0.000	0.000	0.000	0.000	9
		C		0.000	0.000	1.479	0.000	60
L20	35.00-30.00	A	1.273	0.000	0.000	0.000	0.000	9
		B		0.000	0.000	0.000	0.000	9
		C		0.000	0.000	1.461	0.000	59
L21	30.00-25.00	A	1.252	0.000	0.000	0.000	0.000	9
		B		0.000	0.000	0.000	0.000	9
		C		0.000	0.000	1.439	0.000	58
L22	25.00-20.50	A	1.228	0.000	0.000	1.209	0.000	21
		B		0.000	0.000	3.612	0.000	45
		C		0.000	0.000	2.817	0.000	67
L23	20.50-20.23	A	1.215	0.000	0.000	0.186	0.000	2
		B		0.000	0.000	0.551	0.000	6
		C		0.000	0.000	0.313	0.000	5
L24	20.23-19.98	A	1.213	0.000	0.000	0.172	0.000	2
		B		0.000	0.000	0.510	0.000	6
		C		0.000	0.000	0.290	0.000	5
L25	19.98-19.75	A	1.212	0.000	0.000	0.158	0.000	2
		B		0.000	0.000	0.469	0.000	5

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	<b>Client</b> Crown Castle	<b>Designed by</b> Scott R. Perry

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight lb
L26	19.75-19.50	C		0.000	0.000	0.267	0.000	5
		A	1.210	0.000	0.000	0.172	0.000	2
		B		0.000	0.000	0.510	0.000	6
L27	19.50-19.25	C		0.000	0.000	0.290	0.000	5
		A	1.209	0.000	0.000	0.172	0.000	2
		B		0.000	0.000	0.510	0.000	6
L28	19.25-14.25	C		0.000	0.000	0.290	0.000	5
		A	1.191	0.000	0.000	1.030	0.000	20
		B		0.000	0.000	2.885	0.000	38
L29	14.25-9.25	C		0.000	0.000	3.134	0.000	73
		A	1.150	0.000	0.000	0.000	0.000	9
		B		0.000	0.000	0.000	0.000	9
L30	9.25-4.25	C		0.000	0.000	1.337	0.000	55
		A	1.088	0.000	0.000	0.000	0.000	9
		B		0.000	0.000	0.000	0.000	9
L31	4.25-0.00	C		0.000	0.000	1.275	0.000	53
		A	0.969	0.000	0.000	0.000	0.000	8
		B		0.000	0.000	0.000	0.000	8
		C		0.000	0.000	0.983	0.000	42

### Feed Line Center of Pressure

Section	Elevation ft	CP <sub>x</sub> in	CP <sub>z</sub> in	CP <sub>x</sub> Ice in	CP <sub>z</sub> Ice in
L1	125.00-120.00	0.0000	3.8750	0.0000	3.8750
L2	120.00-115.00	0.0000	3.8750	0.0000	3.8750
L3	115.00-110.00	0.0000	3.8750	0.0000	3.8750
L4	110.00-105.00	0.0000	3.8750	0.0000	3.8750
L5	105.00-100.00	0.0000	5.9375	0.0000	5.9375
L6	100.00-95.00	0.0000	5.9375	0.0000	5.9375
L7	95.00-90.00	0.0000	5.9375	0.0000	5.9375
L8	90.00-88.00	0.0000	5.9375	0.0000	5.9375
L9	88.00-85.00	0.0000	5.9375	0.0000	5.9375
L10	85.00-80.00	0.0000	0.3807	0.0000	1.3289
L11	80.00-75.00	0.0000	0.3807	0.0000	1.3231
L12	75.00-70.00	0.0000	0.3807	0.0000	1.3170
L13	70.00-65.00	0.0000	0.3807	0.0000	1.3105
L14	65.00-60.00	0.0000	0.3807	0.0000	1.3035
L15	60.00-55.00	0.0000	0.3807	0.0000	1.2959
L16	55.00-50.00	0.0000	0.3807	0.0000	1.2877
L17	50.00-45.00	0.0000	0.3807	0.0000	1.2788
L18	45.00-40.00	0.0000	0.3807	0.0000	1.2689
L19	40.00-35.00	0.0000	0.3807	0.0000	1.2578
L20	35.00-30.00	0.0000	0.3807	0.0000	1.2453
L21	30.00-25.00	0.0000	0.3807	0.0000	1.2309
L22	25.00-20.50	-0.1620	1.1263	-0.1068	1.4004
L23	20.50-20.23	-0.2127	1.1566	-0.2109	1.5392
L24	20.23-19.98	-0.2127	1.1566	-0.2109	1.5388
L25	19.98-19.75	-0.2127	1.1566	-0.2109	1.5384
L26	19.75-19.50	-0.2127	1.1566	-0.2109	1.5380
L27	19.50-19.25	-0.2127	1.1566	-0.2109	1.5376
L28	19.25-14.25	-0.2869	1.5232	-0.1872	1.6635
L29	14.25-9.25	0.0000	0.3807	0.0000	1.1597
L30	9.25-4.25	0.0000	0.3807	0.0000	1.1155
L31	4.25-0.00	0.0000	0.3807	0.0000	1.0286

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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 <sub>a</sub> No Ice	K <sub>a</sub> Ice
L1	13	Halyard Line 3/8"	120.00 - 125.00	1.0000	1.0000
L2	13	Halyard Line 3/8"	115.00 - 120.00	1.0000	1.0000
L3	13	Halyard Line 3/8"	110.00 - 115.00	1.0000	1.0000
L4	13	Halyard Line 3/8"	105.00 - 110.00	1.0000	1.0000
L5	13	Halyard Line 3/8"	100.00 - 105.00	1.0000	1.0000
L6	13	Halyard Line 3/8"	95.00 - 100.00	1.0000	1.0000
L7	13	Halyard Line 3/8"	90.00 - 95.00	1.0000	1.0000
L8	13	Halyard Line 3/8"	88.00 - 90.00	1.0000	1.0000
L9	13	Halyard Line 3/8"	85.00 - 88.00	1.0000	1.0000
L10	13	Halyard Line 3/8"	80.00 - 85.00	1.0000	1.0000
L11	13	Halyard Line 3/8"	75.00 - 80.00	1.0000	1.0000
L12	13	Halyard Line 3/8"	70.00 - 75.00	1.0000	1.0000
L13	13	Halyard Line 3/8"	65.00 - 70.00	1.0000	1.0000
L14	13	Halyard Line 3/8"	60.00 - 65.00	1.0000	1.0000
L15	13	Halyard Line 3/8"	55.00 - 60.00	1.0000	1.0000
L16	13	Halyard Line 3/8"	50.00 - 55.00	1.0000	1.0000
L17	13	Halyard Line 3/8"	45.00 - 50.00	1.0000	1.0000
L18	13	Halyard Line 3/8"	40.00 - 45.00	1.0000	1.0000
L19	13	Halyard Line 3/8"	35.00 - 40.00	1.0000	1.0000
L20	13	Halyard Line 3/8"	30.00 - 35.00	1.0000	1.0000
L21	13	Halyard Line 3/8"	25.00 - 30.00	1.0000	1.0000
L22	7	PL 1.25x4.25	20.50 - 22.25	1.0000	1.0000
L22	8	PL 1.25x4.25	20.50 - 22.25	1.0000	1.0000
L22	9	PL 1.25x4.25	20.50 - 22.25	1.0000	1.0000
L22	10	PL 1x6	20.50 - 22.25	1.0000	1.0000
L22	11	(Area) CCI-65FP-040125 (H)	20.50 - 22.30	1.0000	1.0000
L22	13	Halyard Line 3/8"	20.50 - 25.00	1.0000	1.0000
L23	7	PL 1.25x4.25	20.23 - 20.50	1.0000	1.0000
L23	8	PL 1.25x4.25	20.23 - 20.50	1.0000	1.0000
L23	9	PL 1.25x4.25	20.23 - 20.50	1.0000	1.0000
L23	10	PL 1x6	20.23 - 20.50	1.0000	1.0000
L23	11	(Area) CCI-65FP-040125 (H)	20.23 - 20.50	1.0000	1.0000
L23	13	Halyard Line 3/8"	20.23 - 20.50	1.0000	1.0000
L24	7	PL 1.25x4.25	19.98 - 20.23	1.0000	1.0000
L24	8	PL 1.25x4.25	19.98 - 20.23	1.0000	1.0000
L24	9	PL 1.25x4.25	19.98 - 20.23	1.0000	1.0000
L24	10	PL 1x6	19.98 - 20.23	1.0000	1.0000
L24	11	(Area) CCI-65FP-040125 (H)	19.98 - 20.23	1.0000	1.0000
L24	13	Halyard Line 3/8"	19.98 - 20.23	1.0000	1.0000
L25	7	PL 1.25x4.25	19.75 - 19.98	1.0000	1.0000
L25	8	PL 1.25x4.25	19.75 - 19.98	1.0000	1.0000
L25	9	PL 1.25x4.25	19.75 - 19.98	1.0000	1.0000
L25	10	PL 1x6	19.75 - 19.98	1.0000	1.0000
L25	11	(Area) CCI-65FP-040125 (H)	19.75 - 19.98	1.0000	1.0000
L25	13	Halyard Line 3/8"	19.75 - 19.98	1.0000	1.0000



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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
L26	7	PL 1.25x4.25	19.50 - 19.75	1.0000	1.0000
L26	8	PL 1.25x4.25	19.50 - 19.75	1.0000	1.0000
L26	9	PL 1.25x4.25	19.50 - 19.75	1.0000	1.0000
L26	10	PL 1x6	19.50 - 19.75	1.0000	1.0000
L26	11	(Area) CCI-65FP-040125 (H)	19.50 - 19.75	1.0000	1.0000
L26	13	Halyard Line 3/8"	19.50 - 19.75	1.0000	1.0000
L27	7	PL 1.25x4.25	19.25 - 19.50	1.0000	1.0000
L27	8	PL 1.25x4.25	19.25 - 19.50	1.0000	1.0000
L27	9	PL 1.25x4.25	19.25 - 19.50	1.0000	1.0000
L27	10	PL 1x6	19.25 - 19.50	1.0000	1.0000
L27	11	(Area) CCI-65FP-040125 (H)	19.25 - 19.50	1.0000	1.0000
L27	13	Halyard Line 3/8"	19.25 - 19.50	1.0000	1.0000
L28	7	PL 1.25x4.25	17.75 - 19.25	1.0000	1.0000
L28	8	PL 1.25x4.25	17.75 - 19.25	1.0000	1.0000
L28	9	PL 1.25x4.25	17.75 - 19.25	1.0000	1.0000
L28	10	PL 1x6	17.25 - 19.25	1.0000	1.0000
L28	11	(Area) CCI-65FP-040125 (H)	18.00 - 19.25	1.0000	1.0000
L28	13	Halyard Line 3/8"	14.25 - 19.25	1.0000	1.0000
L29	13	Halyard Line 3/8"	9.25 - 14.25	1.0000	1.0000
L30	13	Halyard Line 3/8"	4.25 - 9.25	1.0000	1.0000
L31	13	Halyard Line 3/8"	0.00 - 4.25	1.0000	1.0000

### User Defined Loads

Description	Elevation	Offset From Centroid	Azimuth Angle	Weight	F <sub>x</sub>	F <sub>z</sub>	Wind Force	C <sub>A</sub> A <sub>C</sub>	
	ft	ft	°	lb	lb	lb	lb	ft <sup>2</sup>	
Flag	125.00	0.00	0.000	No Ice	39	0	0	641	<b>10.30</b>
				Ice	1239	0	0	106	<b>10.61</b>
				Service	39	0	0	148	<b>11.51</b>

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral	Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight	
			ft ft ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb	
***120***									
APXV18-206516L-A	A	From Leg	0.50	0.000	120.00	No Ice	0.00	0.00	19
			0.00			1/2" Ice	0.00	0.00	39
			0.00			1" Ice	0.00	0.00	63
						2" Ice	0.00	0.00	125
APXV18-206516L-A	B	From Leg	0.50	0.000	120.00	No Ice	0.00	0.00	19
			0.00			1/2" Ice	0.00	0.00	39
			0.00			1" Ice	0.00	0.00	63
						2" Ice	0.00	0.00	125
APXV18-206516L-A	C	From Leg	0.50	0.000	120.00	No Ice	0.00	0.00	19

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Vert					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb
				0.00			1/2" Ice	0.00	39
				0.00			1" Ice	0.00	63
							2" Ice	0.00	125
KRY 112 144/1	A	From Leg	0.50	0.00	0.000	120.00	No Ice	0.00	11
			0.00				1/2" Ice	0.00	14
			3.00				1" Ice	0.00	18
							2" Ice	0.00	32
KRY 112 144/1	B	From Leg	0.50	0.00	0.000	120.00	No Ice	0.00	11
			0.00				1/2" Ice	0.00	14
			3.00				1" Ice	0.00	18
							2" Ice	0.00	32
KRY 112 144/1	C	From Leg	0.50	0.00	0.000	120.00	No Ice	0.00	11
			0.00				1/2" Ice	0.00	14
			3.00				1" Ice	0.00	18
							2" Ice	0.00	32
***110***									
APXV18-206516L-A	A	From Leg	0.50	0.00	0.000	110.00	No Ice	0.00	19
			0.00				1/2" Ice	0.00	39
			0.00				1" Ice	0.00	63
							2" Ice	0.00	125
APXV18-206516L-A	B	From Leg	0.50	0.00	0.000	110.00	No Ice	0.00	19
			0.00				1/2" Ice	0.00	39
			0.00				1" Ice	0.00	63
							2" Ice	0.00	125
APXV18-206516L-A	C	From Leg	0.50	0.00	0.000	110.00	No Ice	0.00	19
			0.00				1/2" Ice	0.00	39
			0.00				1" Ice	0.00	63
							2" Ice	0.00	125
KRY 112 144/1	A	From Leg	0.50	0.00	0.000	110.00	No Ice	0.00	11
			0.00				1/2" Ice	0.00	14
			3.00				1" Ice	0.00	18
							2" Ice	0.00	32
KRY 112 144/1	B	From Leg	0.50	0.00	0.000	110.00	No Ice	0.00	11
			0.00				1/2" Ice	0.00	14
			3.00				1" Ice	0.00	18
							2" Ice	0.00	32
KRY 112 144/1	C	From Leg	0.50	0.00	0.000	110.00	No Ice	0.00	11
			0.00				1/2" Ice	0.00	14
			3.00				1" Ice	0.00	18
							2" Ice	0.00	32
***100***									
OPA65R-BU6A	A	From Leg	0.50	0.00	0.000	100.00	No Ice	0.00	58
			0.00				1/2" Ice	0.00	110
			4.00				1" Ice	0.00	169
							2" Ice	0.00	305
OPA65R-BU6A	B	From Leg	0.50	0.00	0.000	100.00	No Ice	0.00	58
			0.00				1/2" Ice	0.00	110
			4.00				1" Ice	0.00	169
							2" Ice	0.00	305
OPA65R-BU6A	C	From Leg	0.50	0.00	0.000	100.00	No Ice	0.00	58
			0.00				1/2" Ice	0.00	110
			4.00				1" Ice	0.00	169
							2" Ice	0.00	305
TMABPDB7823VG12A	A	From Leg	0.50	0.00	0.000	100.00	No Ice	0.00	22
			0.00				1/2" Ice	0.00	29
			-3.00				1" Ice	0.00	38
							2" Ice	0.00	63

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	CAAA Front ft <sup>2</sup>	CAAA Side ft <sup>2</sup>	Weight lb	
TMABPDB7823VG12A	B	From Leg	0.50 0.00 -3.00	0.000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	22 29 38 63
TMABPDB7823VG12A	C	From Leg	0.50 0.00 -3.00	0.000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	22 29 38 63
TMABPDB7823VG12A	A	From Leg	0.50 0.00 -4.00	0.000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	22 29 38 63
TMABPDB7823VG12A	B	From Leg	0.50 0.00 -4.00	0.000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	22 29 38 63
TMABPDB7823VG12A	C	From Leg	0.50 0.00 -4.00	0.000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	22 29 38 63
***90*** 800 10864	A	From Leg	0.50 0.00 4.00	0.000	90.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	55 99 149 264
800 10864	B	From Leg	0.50 0.00 4.00	0.000	90.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	55 99 149 264
800 10864	C	From Leg	0.50 0.00 4.00	0.000	90.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	55 99 149 264
TMABPDB7823VG12A	A	From Leg	0.50 0.00 -3.00	0.000	90.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	22 29 38 63
TMABPDB7823VG12A	B	From Leg	0.50 0.00 -3.00	0.000	90.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	22 29 38 63
TMABPDB7823VG12A	C	From Leg	0.50 0.00 -3.00	0.000	90.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	22 29 38 63
TMABPDB7823VG12A	A	From Leg	0.50 0.00 -4.00	0.000	90.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	22 29 38 63
TMABPDB7823VG12A	B	From Leg	0.50 0.00 -4.00	0.000	90.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	22 29 38 63
TMABPDB7823VG12A	C	From Leg	0.50 0.00 -4.00	0.000	90.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	22 29 38 63

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	CAAA Front ft <sup>2</sup>	CAAA Side ft <sup>2</sup>	Weight lb
***Canister Loads***								
42" OD x 10' Concealment Canister	C	None		0.000	120.00	No Ice 0.00 1/2" Ice 0.00 1" Ice 0.00 2" Ice 0.00	0.00 0.00 0.00 0.00	0 0 0 0
42" OD x 10' Concealment Canister	C	None		0.000	110.00	No Ice 0.00 1/2" Ice 0.00 1" Ice 0.00 2" Ice 0.00	0.00 0.00 0.00 0.00	0 0 0 0
42" OD x 10' Concealment Canister	C	None		0.000	100.00	No Ice 0.00 1/2" Ice 0.00 1" Ice 0.00 2" Ice 0.00	0.00 0.00 0.00 0.00	0 0 0 0
42" OD x 10' Concealment Canister	C	None		0.000	90.00	No Ice 0.00 1/2" Ice 0.00 1" Ice 0.00 2" Ice 0.00	0.00 0.00 0.00 0.00	0 0 0 0
* Canister Load1	C	None		0.000	125.00	No Ice 7.88 1/2" Ice 19.71 1" Ice 20.17 2" Ice 21.08	7.88 19.71 20.17 21.08	110 240 373 648
Canister Load2	C	None		0.000	115.00	No Ice 15.75 1/2" Ice 39.42 1" Ice 40.33 2" Ice 42.17	15.75 39.42 40.33 42.17	436 696 961 1511
Canister Load3	C	None		0.000	105.00	No Ice 15.75 1/2" Ice 39.42 1" Ice 40.33 2" Ice 42.17	15.75 39.42 40.33 42.17	351 610 876 1426
Canister Load4	C	None		0.000	95.00	No Ice 15.75 1/2" Ice 39.42 1" Ice 40.33 2" Ice 42.17	15.75 39.42 40.33 42.17	436 696 961 1511
Canister Load5	C	None		0.000	85.00	No Ice 7.88 1/2" Ice 19.71 1" Ice 20.17 2" Ice 21.08	7.88 19.71 20.17 21.08	937 1067 1199 1474
Truck Ball	C	None		0.000	125.75	No Ice 0.88 1/2" Ice 1.38 1" Ice 1.53 2" Ice 1.85	0.88 1.38 1.53 1.85	50 67 87 132
***								

## 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

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

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	125 - 120	22.249	46	1.816	0.000
L2	120 - 115	20.357	46	1.792	0.000
L3	115 - 110	18.514	46	1.720	0.000
L4	110 - 105	16.778	46	1.581	0.000
L5	105 - 100	15.233	46	1.356	0.000
L6	100 - 95	13.844	46	1.293	0.000

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L7	95 - 90	12.534	46	1.206	0.000
L8	90 - 88	11.328	46	1.092	0.000
L9	88 - 85	10.882	46	1.038	0.000
L10	85 - 80	10.258	46	0.947	0.000
L11	80 - 75	9.276	46	0.928	0.000
L12	75 - 70	8.316	46	0.905	0.000
L13	70 - 65	7.383	46	0.877	0.000
L14	65 - 60	6.481	46	0.844	0.000
L15	60 - 55	5.616	46	0.807	0.000
L16	55 - 50	4.793	46	0.765	0.000
L17	50 - 45	4.016	46	0.717	0.000
L18	45 - 40	3.293	46	0.664	0.000
L19	40 - 35	2.628	46	0.605	0.000
L20	35 - 30	2.029	46	0.539	0.000
L21	30 - 25	1.501	46	0.468	0.000
L22	25 - 20.5	1.051	46	0.390	0.000
L23	20.5 - 20.23	0.719	46	0.314	0.000
L24	20.23 - 19.98	0.701	46	0.312	0.000
L25	19.98 - 19.75	0.685	46	0.310	0.000
L26	19.75 - 19.5	0.670	46	0.308	0.000
L27	19.5 - 19.25	0.654	46	0.306	0.000
L28	19.25 - 14.25	0.638	46	0.303	0.000
L29	14.25 - 9.25	0.357	46	0.232	0.000
L30	9.25 - 4.25	0.154	46	0.156	0.000
L31	4.25 - 0	0.033	46	0.074	0.000

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
125.75	Truck Ball	46	22.249	1.816	0.000	6029
125.00	Canister Load1	46	22.249	1.816	0.000	6029
120.00	APXV18-206516L-A	46	20.357	1.792	0.000	6029
115.00	Canister Load2	46	18.514	1.720	0.000	2810
110.00	APXV18-206516L-A	46	16.778	1.581	0.000	1575
105.00	Canister Load3	46	15.233	1.356	0.000	1918
100.00	OPA65R-BU6A	46	13.844	1.293	0.000	3830
95.00	Canister Load4	46	12.534	1.206	0.000	2873
90.00	800 10864	46	11.328	1.092	0.000	2217
85.00	Canister Load5	46	10.258	0.947	0.000	3401

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	125 - 120	106.587	16	8.626	0.000
L2	120 - 115	97.651	16	8.517	0.000
L3	115 - 110	88.937	16	8.191	0.000
L4	110 - 105	80.705	16	7.551	0.000
L5	105 - 100	73.344	16	6.502	0.000

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L6	100 - 95	66.705	16	6.206	0.000
L7	95 - 90	60.430	16	5.798	0.000
L8	90 - 88	54.644	16	5.258	0.000
L9	88 - 85	52.499	16	5.001	0.000
L10	85 - 80	49.496	16	4.571	0.000
L11	80 - 75	44.765	16	4.478	0.000
L12	75 - 70	40.140	16	4.366	0.000
L13	70 - 65	35.643	16	4.233	0.000
L14	65 - 60	31.296	16	4.078	0.000
L15	60 - 55	27.123	16	3.899	0.000
L16	55 - 50	23.150	16	3.695	0.000
L17	50 - 45	19.403	16	3.465	0.000
L18	45 - 40	15.910	16	3.208	0.000
L19	40 - 35	12.700	22	2.923	0.000
L20	35 - 30	9.804	22	2.607	0.000
L21	30 - 25	7.253	22	2.262	0.000
L22	25 - 20.5	5.080	22	1.885	0.000
L23	20.5 - 20.23	3.474	22	1.518	0.000
L24	20.23 - 19.98	3.389	22	1.508	0.000
L25	19.98 - 19.75	3.310	22	1.499	0.000
L26	19.75 - 19.5	3.238	22	1.491	0.000
L27	19.5 - 19.25	3.160	22	1.479	0.000
L28	19.25 - 14.25	3.083	22	1.463	0.000
L29	14.25 - 9.25	1.728	22	1.121	0.000
L30	9.25 - 4.25	0.745	22	0.753	0.000
L31	4.25 - 0	0.161	22	0.358	0.000

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
125.75	Truck Ball	16	106.587	8.626	0.000	1380
125.00	Canister Load1	16	106.587	8.626	0.000	1380
120.00	APXV18-206516L-A	16	97.651	8.517	0.000	1380
115.00	Canister Load2	16	88.937	8.191	0.000	637
110.00	APXV18-206516L-A	16	80.705	7.551	0.000	351
105.00	Canister Load3	16	73.344	6.502	0.000	422
100.00	OPA65R-BU6A	16	66.705	6.206	0.000	833
95.00	Canister Load4	16	60.430	5.798	0.000	620
90.00	800 10864	16	54.644	5.258	0.000	475
85.00	Canister Load5	16	49.496	4.571	0.000	725

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
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<b>tnxTower</b>  <b>Tower Engineering Professionals</b> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b>	Milford Shore Area (BU 825998)	<b>Page</b>	17 of 19
	<b>Project</b>	TEP No. 53131.316287	<b>Date</b>	13:57:37 10/25/19
	<b>Client</b>	Crown Castle	<b>Designed by</b>	Scott R. Perry

Section No.	Elevation ft	Size	L ft	$L_u$ ft	$Kl/r$	A $in^2$	$P_u$ lb	$\phi P_n$ lb	Ratio $\frac{P_u}{\phi P_n}$
L1	125 - 120 (1)	P6.625x0.432	5.00	0.00	0.0	8.4049	-233	317707	0.001
L2	120 - 115 (2)	P6.625x0.432	5.00	0.00	0.0	8.4049	-528	317707	0.002
L3	115 - 110 (3)	P6.625x0.432	5.00	0.00	0.0	8.4049	-1115	317707	0.004
L4	110 - 105 (4)	P6.625x0.432	5.00	0.00	0.0	8.4049	-1457	317707	0.005
L5	105 - 100 (5)	P10.75x0.5	5.00	0.00	0.0	16.1007	-2138	608605	0.004
L6	100 - 95 (6)	P10.75x0.5	5.00	0.00	0.0	16.1007	-2904	608605	0.005
L7	95 - 90 (7)	P10.75x0.5	5.00	0.00	0.0	16.1007	-3749	608605	0.006
L8	90 - 88 (8)	P10.75x0.5	2.00	0.00	0.0	16.1007	-4279	608605	0.007
L9	88 - 85 (9)	P10.75x0.5	3.00	0.00	0.0	16.1007	-4545	608605	0.007
L10	85 - 80 (10)	P24x0.375	5.00	0.00	0.0	27.8325	-6243	1052070	0.006
L11	80 - 75 (11)	P24x0.375	5.00	0.00	0.0	27.8325	-6855	1052070	0.007
L12	75 - 70 (12)	P24x0.375	5.00	0.00	0.0	27.8325	-7471	1052070	0.007
L13	70 - 65 (13)	P24x0.375	5.00	0.00	0.0	27.8325	-8092	1052070	0.008
L14	65 - 60 (14)	P24x0.375	5.00	0.00	0.0	27.8325	-8717	1052070	0.008
L15	60 - 55 (15)	P24x0.375	5.00	0.00	0.0	27.8325	-9349	1052070	0.009
L16	55 - 50 (16)	P24x0.375	5.00	0.00	0.0	27.8325	-9986	1052070	0.009
L17	50 - 45 (17)	P24x0.375	5.00	0.00	0.0	27.8325	-10630	1052070	0.010
L18	45 - 40 (18)	P24x0.375	5.00	0.00	0.0	27.8325	-11282	1052070	0.011
L19	40 - 35 (19)	P24x0.375	5.00	0.00	0.0	27.8325	-11941	1052070	0.011
L20	35 - 30 (20)	P24x0.375	5.00	0.00	0.0	27.8325	-12608	1052070	0.012
L21	30 - 25 (21)	P24x0.375	5.00	0.00	0.0	27.8325	-13283	1052070	0.013
L22	25 - 20.5 (22)	P24x0.375	4.50	0.00	0.0	27.8325	-13891	1052070	0.013
L23	20.5 - 20.23 (23)	P24x0.85	0.27	0.00	0.0	61.8187	-13964	2336750	0.006
L24	20.23 - 19.98 (24)	P24x0.9875	0.25	0.00	0.0	71.3922	-14034	2698630	0.005
L25	19.98 - 19.75 (25)	P24x0.9875	0.23	0.00	0.0	71.3922	-14099	2698630	0.005
L26	19.75 - 19.5 (26)	P24x0.7125	0.25	0.00	0.0	52.1264	-14163	1970380	0.007
L27	19.5 - 19.25 (27)	P24x0.5	0.25	0.00	0.0	36.9137	-14205	1395340	0.010
L28	19.25 - 14.25 (28)	P24x0.5	5.00	0.00	0.0	36.9137	-15066	1395340	0.011
L29	14.25 - 9.25 (29)	P24x0.5	5.00	0.00	0.0	36.9137	-15939	1395340	0.011
L30	9.25 - 4.25 (30)	P24x0.5	5.00	0.00	0.0	36.9137	-16818	1395340	0.012
L31	4.25 - 0 (31)	P24x0.5	4.25	0.00	0.0	36.9137	-17572	1395340	0.013

### Pole Bending Design Data

Section No.	Elevation ft	Size	$M_{ux}$ lb-ft	$\phi M_{ux}$ lb-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	$M_{uy}$ lb-ft	$\phi M_{uy}$ lb-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
L1	125 - 120 (1)	P6.625x0.432	6146	52276	0.118	0	52276	0.000
L2	120 - 115 (2)	P6.625x0.432	12457	52276	0.238	0	52276	0.000
L3	115 - 110 (3)	P6.625x0.432	24018	52276	0.459	0	52276	0.000
L4	110 - 105 (4)	P6.625x0.432	35685	52276	0.683	0	52276	0.000
L5	105 - 100 (5)	P10.75x0.5	52379	165605	0.316	0	165605	0.000
L6	100 - 95 (6)	P10.75x0.5	69396	165605	0.419	0	165605	0.000
L7	95 - 90 (7)	P10.75x0.5	91385	165605	0.552	0	165605	0.000
L8	90 - 88 (8)	P10.75x0.5	100243	165605	0.605	0	165605	0.000
L9	88 - 85 (9)	P10.75x0.5	113502	165605	0.685	0	165605	0.000
L10	85 - 80 (10)	P24x0.375	139263	623717	0.223	0	623717	0.000
L11	80 - 75 (11)	P24x0.375	166935	623717	0.268	0	623717	0.000
L12	75 - 70 (12)	P24x0.375	196475	623717	0.315	0	623717	0.000



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	<p><b>Project</b></p> <p>TEP No. 53131.316287</p>	<p><b>Date</b></p> <p>13:57:37 10/25/19</p>
	<p><b>Client</b></p> <p>Crown Castle</p>	<p><b>Designed by</b></p> <p>Scott R. Perry</p>

Section No.	Elevation ft	Size	$M_{ux}$	$\phi M_{ux}$	Ratio	$M_{uy}$	$\phi M_{uy}$	Ratio
			lb-ft	lb-ft	$\frac{M_{ux}}{\phi M_{ux}}$	lb-ft	lb-ft	$\frac{M_{uy}}{\phi M_{uy}}$
L13	70 - 65 (13)	P24x0.375	227837	623717	0.365	0	623717	0.000
L14	65 - 60 (14)	P24x0.375	260964	623717	0.418	0	623717	0.000
L15	60 - 55 (15)	P24x0.375	295799	623717	0.474	0	623717	0.000
L16	55 - 50 (16)	P24x0.375	332274	623717	0.533	0	623717	0.000
L17	50 - 45 (17)	P24x0.375	370314	623717	0.594	0	623717	0.000
L18	45 - 40 (18)	P24x0.375	409838	623717	0.657	0	623717	0.000
L19	40 - 35 (19)	P24x0.375	450754	623717	0.723	0	623717	0.000
L20	35 - 30 (20)	P24x0.375	492963	623717	0.790	0	623717	0.000
L21	30 - 25 (21)	P24x0.375	536352	623717	0.860	0	623717	0.000
L22	25 - 20.5 (22)	P24x0.375	576873	623717	0.925	0	623717	0.000
L23	20.5 - 20.23 (23)	P24x0.85	579366	1435575	0.404	0	1435575	0.000
L24	20.23 - 19.98 (24)	P24x0.9875	581682	1648325	0.353	0	1648325	0.000
L25	19.98 - 19.75 (25)	P24x0.9875	583819	1648325	0.354	0	1648325	0.000
L26	19.75 - 19.5 (26)	P24x0.7125	586149	1217525	0.481	0	1217525	0.000
L27	19.5 - 19.25 (27)	P24x0.5	588487	869925	0.676	0	869925	0.000
L28	19.25 - 14.25 (28)	P24x0.5	635788	869925	0.731	0	869925	0.000
L29	14.25 - 9.25 (29)	P24x0.5	684025	869925	0.786	0	869925	0.000
L30	9.25 - 4.25 (30)	P24x0.5	733087	869925	0.843	0	869925	0.000
L31	4.25 - 0 (31)	P24x0.5	775355	869925	0.891	0	869925	0.000

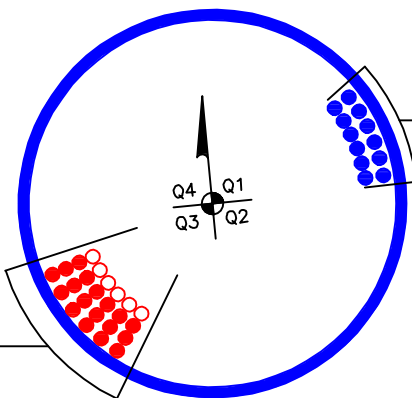
### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual	$\phi V_n$	Ratio	Actual	$\phi T_n$	Ratio
			$V_u$ lb	lb	$\frac{V_u}{\phi V_n}$	$T_u$ lb-ft	lb-ft	$\frac{T_u}{\phi T_n}$
L1	125 - 120 (1)	P6.625x0.432	1234	95312	0.013	0	51895	0.000
L2	120 - 115 (2)	P6.625x0.432	1274	95312	0.013	0	51895	0.000
L3	115 - 110 (3)	P6.625x0.432	2320	95312	0.024	0	51895	0.000
L4	110 - 105 (4)	P6.625x0.432	2335	95312	0.024	0	51895	0.000
L5	105 - 100 (5)	P10.75x0.5	3354	182582	0.018	0	164536	0.000
L6	100 - 95 (6)	P10.75x0.5	3415	182582	0.019	0	164536	0.000
L7	95 - 90 (7)	P10.75x0.5	4402	182582	0.024	0	164536	0.000
L8	90 - 88 (8)	P10.75x0.5	4431	182582	0.024	0	164536	0.000
L9	88 - 85 (9)	P10.75x0.5	4418	182582	0.024	0	164536	0.000
L10	85 - 80 (10)	P24x0.375	5346	315621	0.017	0	655568	0.000
L11	80 - 75 (11)	P24x0.375	5724	315621	0.018	0	655568	0.000
L12	75 - 70 (12)	P24x0.375	6094	315621	0.019	0	655568	0.000
L13	70 - 65 (13)	P24x0.375	6453	315621	0.020	0	655568	0.000
L14	65 - 60 (14)	P24x0.375	6801	315621	0.022	0	655568	0.000
L15	60 - 55 (15)	P24x0.375	7137	315621	0.023	0	655568	0.000
L16	55 - 50 (16)	P24x0.375	7458	315621	0.024	0	655568	0.000
L17	50 - 45 (17)	P24x0.375	7764	315621	0.025	0	655568	0.000
L18	45 - 40 (18)	P24x0.375	8053	315621	0.026	0	655568	0.000
L19	40 - 35 (19)	P24x0.375	8323	315621	0.026	0	655568	0.000
L20	35 - 30 (20)	P24x0.375	8572	315621	0.027	0	655568	0.000
L21	30 - 25 (21)	P24x0.375	8797	315621	0.028	0	655568	0.000
L22	25 - 20.5 (22)	P24x0.375	9229	315621	0.029	0	655568	0.000
L23	20.5 - 20.23 (23)	P24x0.85	9251	701024	0.013	0	1426800	0.000

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	<b>Client</b>	Crown Castle	<b>Designed by</b>	Scott R. Perry

Section No.	Elevation ft	Size	Actual $V_u$ lb	$\phi V_n$ lb	Ratio $\frac{V_u}{\phi V_n}$	Actual $T_u$ lb-ft	$\phi T_n$ lb-ft	Ratio $\frac{T_u}{\phi T_n}$
L24	20.23 - 19.98 (24)	P24x0.9875	9280	809588	0.011	0	1637975	0.000
L25	19.98 - 19.75 (25)	P24x0.9875	9307	809588	0.011	0	1637975	0.000
L26	19.75 - 19.5 (26)	P24x0.7125	9336	591113	0.016	0	1210242	0.000
L27	19.5 - 19.25 (27)	P24x0.5	9363	418602	0.022	0	864867	0.000
L28	19.25 - 14.25 (28)	P24x0.5	9565	418602	0.023	0	864867	0.000
L29	14.25 - 9.25 (29)	P24x0.5	9745	418602	0.023	0	864867	0.000
L30	9.25 - 4.25 (30)	P24x0.5	9899	418602	0.024	0	864867	0.000
L31	4.25 - 0 (31)	P24x0.5	10016	418602	0.024	0	864867	0.000

**APPENDIX B**  
**BASE LEVEL DRAWING**



(OTHER CONSIDERED EQUIPMENT)  
(6) 7/8" TO 110 FT LEVEL  
(6) 7/8" TO 120 FT LEVEL

(PROPOSED EQUIPMENT CONFIGURATION)  
(6) 7/8" TO 90 FT LEVEL  
(18) 7/8" TO 100 FT LEVEL

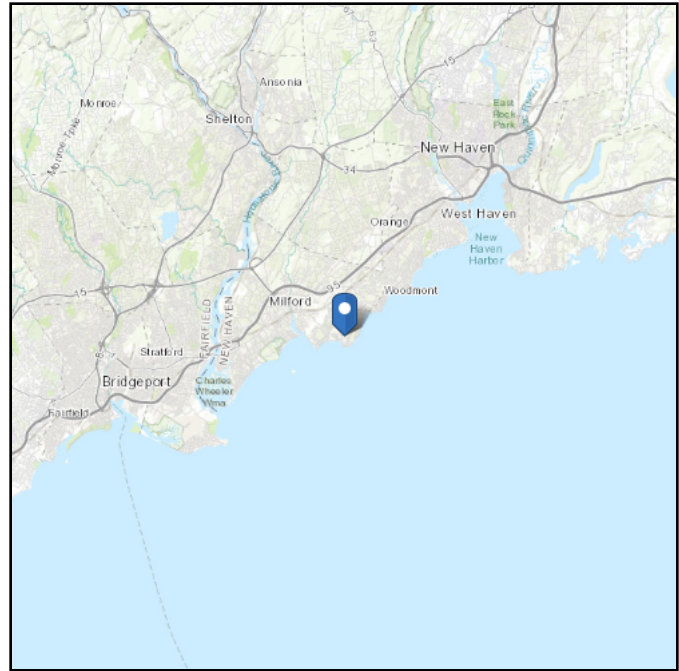
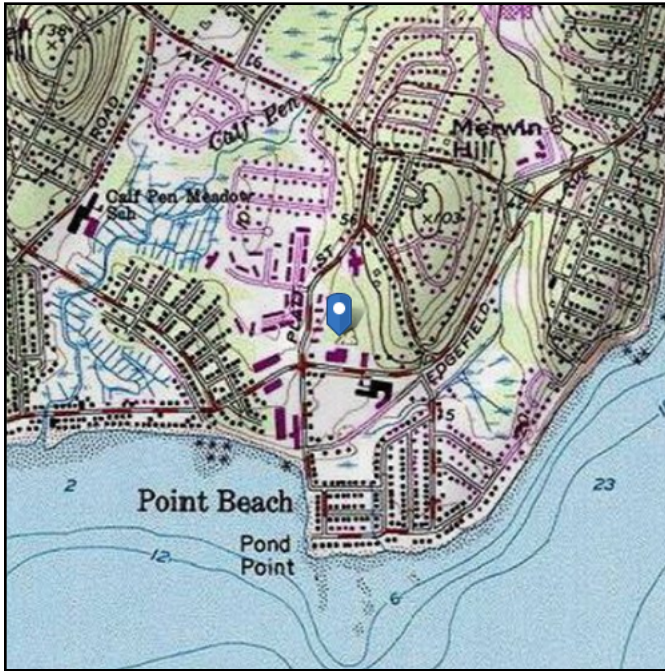
**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

# ASCE 7 Hazards Report

**Address:**  
No Address at This  
Location

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

**Elevation:** 28.9 ft (NAVD 88)  
**Latitude:** 41.210006  
**Longitude:** -73.019014



## Wind

### Results:

Wind Speed:	125 Vmph
10-year MRI	77 Vmph
25-year MRI	87 Vmph
50-year MRI	94 Vmph
100-year MRI	101 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:** Tue Jul 09 2019

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.

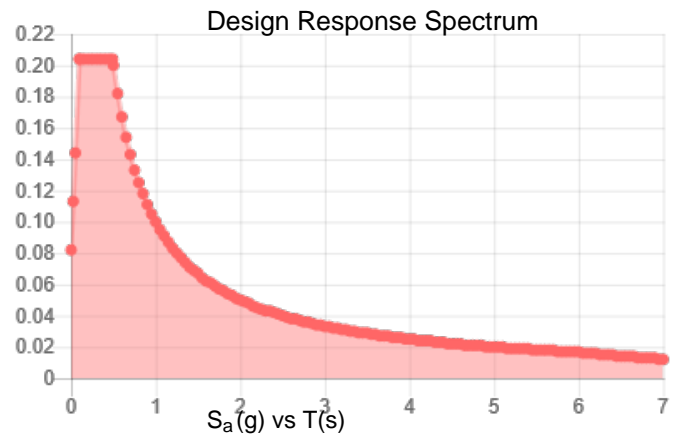
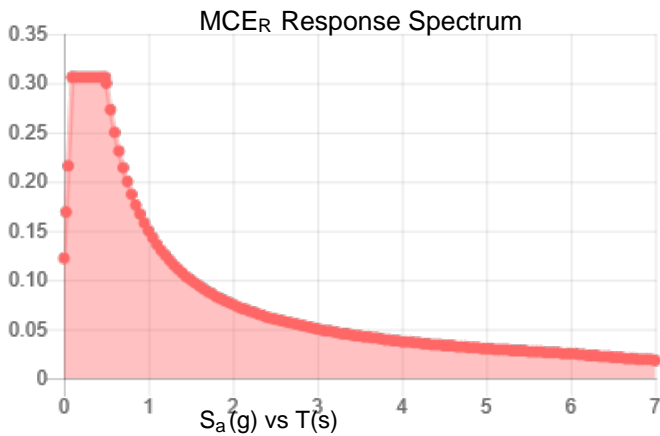
Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

**Site Soil Class:** D - Stiff Soil

**Results:**

$S_S$ :	0.191	$S_{DS}$ :	0.204
$S_1$ :	0.062	$S_{D1}$ :	0.1
$F_a$ :	1.6	$T_L$ :	6
$F_v$ :	2.4	PGA :	0.101
$S_{MS}$ :	0.306	PGA <sub>M</sub> :	0.162
$S_{M1}$ :	0.15	F <sub>PGA</sub> :	1.597
		$I_e$ :	1

**Seismic Design Category** B



**Data Accessed:**

Tue Jul 09 2019

**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

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**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:** Tue Jul 09 2019

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.

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The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

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**Pole Geometry**

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	125	20		0	6.625	6.625	0.432		A53-B-42
2	105	17		0	10.75	10.75	0.5		A53-B-42
3	88	3		0	10.75	10.75	0.5		A53-B-42
4	85	35		0	24.00	24	0.375		A53-B-42
5	50	30		0	24.00	24	0.375		A53-B-42
6	20	20		0	24.00	24	0.5		A53-B-42

**Reinforcement Configuration**

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number																						
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18				
1	19.5	20.5	plate	PL 4.25x1.25	3	0	180	256																			
2	19.75	20.33	plate	PL 6x1	1				76																		
3	19.5	20.5	plate	CCI-SFP-050125	1					310																	
4																											
5																											
6																											
7																											
8																											
9																											
10																											

**Reinforcement Details**

	B (in)	H (in)	Gross Area (in <sup>2</sup> )	Pole Face to Centroid (in)	Bottom Termination Length (in)	Top Termination Length (in)	L <sub>v</sub> (in)	Net Area (in <sup>2</sup> )	Bolt Hole Size (in)	Reinforcement Material
1	4.25	1.25	5.3125	0.625	21.000	21.000	12.000	3.750	1.1875	A572-50
2	6	1	6	0.5	24.000	24.000	7.000	4.750	1.1875	A572-50
3	5	1.25	6.25	0.625	24.000	24.000	23.000	4.688	1.1875	A572-65

# TNX Geometry Input

Increment (ft): 5

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	125 - 120	5		0	6.625	6.625	0.432	A53-B-42	1.000
2	120 - 115	5		0	6.625	6.625	0.432	A53-B-42	1.000
3	115 - 110	5		0	6.625	6.625	0.432	A53-B-42	1.000
4	110 - 105	5	0	0	6.625	6.625	0.432	A53-B-42	1.000
5	105 - 100	5		0	10.750	10.750	0.5	A53-B-42	1.000
6	100 - 95	5		0	10.750	10.750	0.5	A53-B-42	1.000
7	95 - 90	5		0	10.750	10.750	0.5	A53-B-42	1.000
8	90 - 88	2	0	0	10.750	10.750	0.5	A53-B-42	1.000
9	88 - 85	3	0	0	10.750	10.750	0.5	A53-B-42	1.000
10	85 - 80	5		0	24.000	24.000	0.375	A53-B-42	1.000
11	80 - 75	5		0	24.000	24.000	0.375	A53-B-42	1.000
12	75 - 70	5		0	24.000	24.000	0.375	A53-B-42	1.000
13	70 - 65	5		0	24.000	24.000	0.375	A53-B-42	1.000
14	65 - 60	5		0	24.000	24.000	0.375	A53-B-42	1.000
15	60 - 55	5		0	24.000	24.000	0.375	A53-B-42	1.000
16	55 - 50	5	0	0	24.000	24.000	0.375	A53-B-42	1.000
17	50 - 45	5		0	24.000	24.000	0.375	A53-B-42	1.000
18	45 - 40	5		0	24.000	24.000	0.375	A53-B-42	1.000
19	40 - 35	5		0	24.000	24.000	0.375	A53-B-42	1.000
20	35 - 30	5		0	24.000	24.000	0.375	A53-B-42	1.000
21	30 - 25	5		0	24.000	24.000	0.375	A53-B-42	1.000
22	25 - 20.5	4.5		0	24.000	24.000	0.375	A53-B-42	1.000
23	20.5 - 20.23	0.27	0	0	24.000	24.000	0.85	A53-B-42	0.906
24	20.23 - 19.98	0.25		0	24.000	24.000	0.9875	A53-B-42	0.912
25	19.98 - 19.75	0.23		0	24.000	24.000	0.9875	A53-B-42	0.912
26	19.75 - 19.5	0.25		0	24.000	24.000	0.7125	A53-B-42	1.134
27	19.5 - 19.25	0.25		0	24.000	24.000	0.5	A53-B-42	1.000
28	19.25 - 14.25	5		0	24.000	24.000	0.5	A53-B-42	1.000
29	14.25 - 9.25	5		0	24.000	24.000	0.5	A53-B-42	1.000
30	9.25 - 4.25	5		0	24.000	24.000	0.5	A53-B-42	1.000
31	4.25 - 0	4.25		0	24.000	24.000	0.5	A53-B-42	1.000

## TNX Section Forces

Increment (ft):		TNX Output			
	5	Section Height (ft)	P <sub>u</sub> (K)	M <sub>ux</sub> (kip-ft)	V <sub>u</sub> (K)
1	125 - 120	0.23	6.15	1.23	
2	120 - 115	0.53	12.46	1.27	
3	115 - 110	1.12	24.02	2.32	
4	110 - 105	1.46	35.69	2.33	
5	105 - 100	2.14	52.38	3.35	
6	100 - 95	2.90	69.40	3.41	
7	95 - 90	3.75	91.39	4.40	
8	90 - 88	4.28	100.24	4.43	
9	88 - 85	4.54	113.50	4.42	
10	85 - 80	6.24	139.26	5.35	
11	80 - 75	6.85	166.93	5.72	
12	75 - 70	7.47	196.48	6.09	
13	70 - 65	8.09	227.84	6.45	
14	65 - 60	8.72	260.96	6.80	
15	60 - 55	9.35	295.80	7.14	
16	55 - 50	9.99	332.27	7.46	
17	50 - 45	10.63	370.31	7.76	
18	45 - 40	11.28	409.84	8.05	
19	40 - 35	11.94	450.75	8.32	
20	35 - 30	12.61	492.96	8.57	
21	30 - 25	13.28	536.35	8.80	
22	25 - 20.5	13.89	576.87	9.23	
23	20.5 - 20.23	13.96	579.37	9.25	
24	20.23 - 19.98	14.03	581.68	9.28	
25	19.98 - 19.75	14.10	583.82	9.31	
26	19.75 - 19.5	14.16	586.15	9.34	
27	19.5 - 19.25	14.21	588.49	9.36	
28	19.25 - 14.25	15.07	635.79	9.56	
29	14.25 - 9.25	15.94	684.02	9.75	
30	9.25 - 4.25	16.82	733.09	9.90	
31	4.25 - 0	17.57	775.36	10.02	

# Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
125 - 120	Pole	TP6.625x6.625x0.432	Pole	11.3%	Pass
120 - 115	Pole	TP6.625x6.625x0.432	Pole	22.9%	Pass
115 - 110	Pole	TP6.625x6.625x0.432	Pole	44.1%	Pass
110 - 105	Pole	TP6.625x6.625x0.432	Pole	65.5%	Pass
105 - 100	Pole	TP10.75x10.75x0.5	Pole	30.5%	Pass
100 - 95	Pole	TP10.75x10.75x0.5	Pole	40.4%	Pass
95 - 90	Pole	TP10.75x10.75x0.5	Pole	53.2%	Pass
90 - 88	Pole	TP10.75x10.75x0.5	Pole	58.3%	Pass
88 - 85	Pole	TP10.75x10.75x0.5	Pole	66.0%	Pass
85 - 80	Pole	TP24x24x0.375	Pole	21.8%	Pass
80 - 75	Pole	TP24x24x0.375	Pole	26.1%	Pass
75 - 70	Pole	TP24x24x0.375	Pole	30.7%	Pass
70 - 65	Pole	TP24x24x0.375	Pole	35.5%	Pass
65 - 60	Pole	TP24x24x0.375	Pole	40.7%	Pass
60 - 55	Pole	TP24x24x0.375	Pole	46.0%	Pass
55 - 50	Pole	TP24x24x0.375	Pole	51.7%	Pass
50 - 45	Pole	TP24x24x0.375	Pole	57.5%	Pass
45 - 40	Pole	TP24x24x0.375	Pole	63.6%	Pass
40 - 35	Pole	TP24x24x0.375	Pole	69.9%	Pass
35 - 30	Pole	TP24x24x0.375	Pole	76.4%	Pass
30 - 25	Pole	TP24x24x0.375	Pole	83.1%	Pass
25 - 20.5	Pole	TP24x24x0.375	Pole	89.4%	Pass
20.5 - 20.23	Pole + Reinf.	TP24x24x0.85	Reinf. 1 Tension Rupture	63.8%	Pass
20.23 - 19.98	Pole + Reinf.	TP24x24x0.9875	Reinf. 1 Tension Rupture	55.2%	Pass
19.98 - 19.75	Pole + Reinf.	TP24x24x0.9875	Reinf. 1 Tension Rupture	55.4%	Pass
19.75 - 19.5	Pole + Reinf.	TP24x24x0.7125	Reinf. 1 Tension Rupture	57.8%	Pass
19.5 - 19.25	Pole	TP24x24x0.5	Pole	65.4%	Pass
19.25 - 14.25	Pole	TP24x24x0.5	Pole	70.7%	Pass
14.25 - 9.25	Pole	TP24x24x0.5	Pole	76.0%	Pass
9.25 - 4.25	Pole	TP24x24x0.5	Pole	81.4%	Pass
4.25 - 0	Pole	TP24x24x0.5	Pole	86.1%	Pass
				Summary	
			Pole	89.4%	Pass
			Reinforcement	63.8%	Pass
			Overall	89.4%	Pass

## Additional Calculations

Section Elevation (ft)	Moment of Inertia (in <sup>4</sup> )			Area (in <sup>2</sup> )			% Capacity*			
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3
125 - 120	40	n/a	40	8.40	n/a	8.40	11.3%			
120 - 115	40	n/a	40	8.40	n/a	8.40	22.9%			
115 - 110	40	n/a	40	8.40	n/a	8.40	44.1%			
110 - 105	40	n/a	40	8.40	n/a	8.40	65.5%			
105 - 100	212	n/a	212	16.10	n/a	16.10	30.5%			
100 - 95	212	n/a	212	16.10	n/a	16.10	40.4%			
95 - 90	212	n/a	212	16.10	n/a	16.10	53.2%			
90 - 88	212	n/a	212	16.10	n/a	16.10	58.3%			
88 - 85	212	n/a	212	16.10	n/a	16.10	66.0%			
85 - 80	1942	n/a	1942	27.83	n/a	27.83	21.8%			
80 - 75	1942	n/a	1942	27.83	n/a	27.83	26.1%			
75 - 70	1942	n/a	1942	27.83	n/a	27.83	30.7%			
70 - 65	1942	n/a	1942	27.83	n/a	27.83	35.5%			
65 - 60	1942	n/a	1942	27.83	n/a	27.83	40.7%			
60 - 55	1942	n/a	1942	27.83	n/a	27.83	46.0%			
55 - 50	1942	n/a	1942	27.83	n/a	27.83	51.7%			
50 - 45	1942	n/a	1942	27.83	n/a	27.83	57.5%			
45 - 40	1942	n/a	1942	27.83	n/a	27.83	63.6%			
40 - 35	1942	n/a	1942	27.83	n/a	27.83	69.9%			
35 - 30	1942	n/a	1942	27.83	n/a	27.83	76.4%			
30 - 25	1942	n/a	1942	27.83	n/a	27.83	83.1%			
25 - 20.5	1942	n/a	1942	27.83	n/a	27.83	89.4%			
20.5 - 20.23	1971	2169	4140	27.83	28.19	56.02	45.6%	63.8%	55.0%	40.3%
20.23 - 19.98	2578	2178	4756	36.91	28.19	65.10	35.0%	55.2%	47.8%	35.8%
19.98 - 19.75	2578	2178	4756	36.91	28.19	65.10	35.2%	55.4%	48.0%	36.0%
19.75 - 19.5	2683	966	3648	36.91	22.19	59.10	47.8%	57.8%		37.7%
19.5 - 19.25	2549	n/a	2549	36.91	n/a	36.91	65.4%			
19.25 - 14.25	2549	n/a	2549	36.91	n/a	36.91	70.7%			
14.25 - 9.25	2549	n/a	2549	36.91	n/a	36.91	76.0%			
9.25 - 4.25	2549	n/a	2549	36.91	n/a	36.91	81.4%			
4.25 - 0	2549	n/a	2549	36.91	n/a	36.91	86.1%			

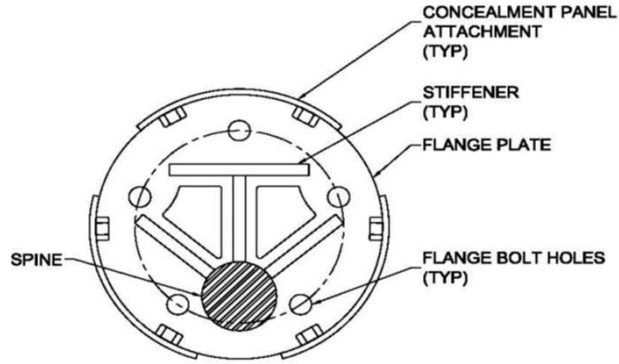
Note: Section capacity checked in 5 degree increments.  
Rating per TIA-222-H Section 15.5.

# CCI Flagpole Tool



Site Data	
BU#:	825998
Site Name:	Milford Shore Area
Order #:	467531 Rev. 11

Code	
Code:	TIA-222-H
Ice Thickness:	1.5 in
Windspeed (V):	125 mph
Ice Wind Speed (V):	50 mph
Exposure Category:	D
Topographic Feature:	N/A
Risk Category:	II



**FLANGE PLATE**  
(TYPE 5: SOLIDITY RATIO 0.9)

Tower Information	
Total Tower Height:	125 ft
Base Tower Height:	85 ft
Total Canister Length:	40 ft
Number of Canister Assembly Sections:	4

Canister Section Number *:	Canister Assembly Length (ft):	Canister Assembly Diameter (in):	Number of Sides Canister Section	Plate Type:	Mating Flange Plate Thickness (in)**:	Mating Flange Plate Diameter (in):	Solidity Ratio	Plate Weight (Kip):	Canister Weight (Kip)	Vent Length (ft):
1	10	42	Round	4	0.50	42	0.55	0.216	0.220	0-0
2	10	42	Round	5	1.50	14.75	0.9	0.131	0.220	0-0
3	10	42	Round	4	0.50	42	0.55	0.216	0.220	0-0
4	10	42	Round	2	2.75	30	0.75	0.827	0.220	0-0

\* Sections are numbered from the top of the tower down

\*\* Mating Flange Plate Thickness at the bottom of canister section

Flag on Tower:	Yes
Flag Width:	25 ft
Flag Height:	15 ft
Flag Elevation(z):	125 ft

Truck Ball on Tower:	Yes
Diameter of Ball:	18 in

Geometry : Base Tower + Spine			
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Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
125	20		0	6.625	6.625	0.432	n/a	A53-B-42
105	17		0	10.75	10.75	0.5	n/a	A53-B-42
88	3		0	10.75	10.75	0.5	n/a	A53-B-42
85	35		0	24	24	0.375	n/a	A53-B-42

Delete  
[x]  
[x]  
[x]  
[x]

50	30		0	24	24	0.375	n/a	A53-B-42
20	20		0	24	24	0.5	n/a	A53-B-42

[x]

[x]

Discrete Loads: Truck Ball	Apply $C_a A_A$ at Elevation(z) (ft)	$C_a A_A$ No Ice (ft <sup>2</sup> )	$C_a A_A$ 1/2" Ice (ft <sup>2</sup> )	$C_a A_A$ 1" Ice (ft <sup>2</sup> )	$C_a A_A$ 2" Ice (ft <sup>2</sup> )	$C_a A_A$ 4" Ice (ft <sup>2</sup> )	Weight No Ice (Kip)	Weight 1/2" Ice (Kip)
		125.75	0.884	1.378	1.527	1.848	2.581	0.05

Discrete Loads : $C_F A_F$ for Canister Assembly								
Canister Loading	Apply $C_F A_F$ at Elevation(z) (ft)	$C_F A_F$ No Ice (ft <sup>2</sup> )	$C_F A_F$ 1/2" Ice (ft <sup>2</sup> )	$C_F A_F$ 1" Ice (ft <sup>2</sup> )	$C_F A_F$ 2" Ice (ft <sup>2</sup> )	$C_F A_F$ 4" Ice (ft <sup>2</sup> )	Canister Assembly Weight No Ice (Kip)	Canister Assembly Weight 1/2" Ice (Kip)
Canister Load 1	125	7.875	19.708	20.167	21.083	22.917	0.110	0.240
Canister Load 2	115	15.750	39.417	40.333	42.167	45.833	0.436	0.696
Canister Load 3	105	15.750	39.417	40.333	42.167	45.833	0.351	0.610
Canister Load 4	95	15.750	39.417	40.333	42.167	45.833	0.436	0.696
Canister Load 5	85	7.875	19.708	20.167	21.083	22.917	0.937	1.067

User Forces: Flag Force Calculation Per ANSI/NAAMM FP 1001-07	
Wind <sub>FORCE</sub> =	0.641 Kip
Weight=	0.039 Kip
Wind <sub>FORCE, ICE</sub> =	0.106 Kip
Weight <sub>ICE</sub> =	1.239 Kip
W <sub>FORCE, SERVICE WIND</sub> =	0.148 Kip
Weight=	0.039 Kip

← Flag force should be included at the top of the flag attachment elevation. If the attachment of the flag to the halyard distributes forces equally to the pole, apply flag forces accordingly in tnx file.

Deflection Check Required:	No
Canister assembly spine deflection check is NOT required per Section 4.1.4, ENG-SOW-10134 Structural Analysis of Flagpole and Concealment Towers.	

# Monopole Flange Plate Connection

Elevation = 105 ft.



BU #	825998
Site Name	Milford Shore Area
Order #	467561 Rev. 11

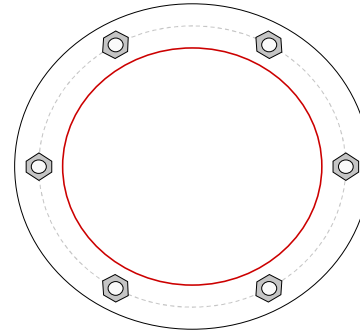
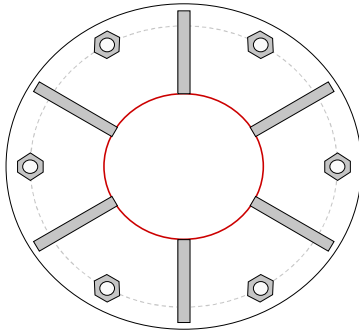
Applied Loads	
Moment (kip-ft)	35.69
Axial Force (kips)	1.46
Shear Force (kips)	2.33

TIA-222 Revision	H
------------------	---

\*TIA-222-H Section 15.5 Applied

Top Plate - External

Bottom Plate - External



## Connection Properties

### Bolt Data

(6) 5/8"  $\phi$  bolts (A490 N; Fy=130 ksi, Fu=150 ksi) on 12.75" BC

### Top Plate Data

14.75" OD x 1.5" Plate (A36; Fy=36 ksi, Fu=58 ksi)

### Bottom Plate Data

14.75" OD x 0.75" Plate (A36; Fy=36 ksi, Fu=58 ksi)

### Top Stiffener Data

(6) 6"H x 3.75"W x 0.5"T, Notch: 0.5"  
 plate: Fy= 36 ksi ; weld: Fy= 70 ksi  
 horiz. weld: 0.25" fillet  
 vert. weld: 0.25" fillet

### Bottom Stiffener Data

N/A

### Top Pole Data

6.625" x 0.432" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

### Bottom Pole Data

10.75" x 0.5" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

## Analysis Results

### Bolt Capacity

Max Load (kips)	22.13
Allowable (kips)	25.42
Stress Rating:	82.9% Pass

### Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	N/A
Tension Side Stress Rating:	N/A

### Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	N/A
Tension Side Stress Rating:	N/A

### Top Stiffener Capacity

Horizontal Weld:	N/A
Vertical Weld:	N/A
Plate Flexure+Shear:	N/A
Plate Tension+Shear:	N/A
Plate Compression:	N/A

### Bottom Stiffener Capacity

Horizontal Weld:	N/A
Vertical Weld:	N/A
Plate Flexure+Shear:	N/A
Plate Tension+Shear:	N/A
Plate Compression:	N/A

### Top Pole Capacity

Punching Shear:	N/A
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### Bottom Pole Capacity

Punching Shear:	N/A
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# Monopole Flange Plate Connection

Elevation = 85 ft.

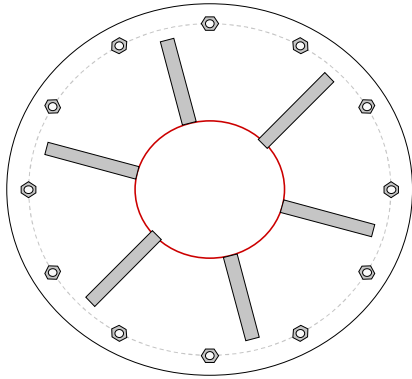


BU #	825998
Site Name	Milford Shore Area
Order #	467561 Rev. 11
TIA-222 Revision	H

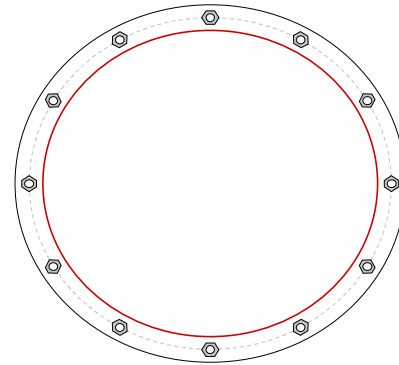
Applied Loads	
Moment (kip-ft)	113.50
Axial Force (kips)	4.54
Shear Force (kips)	4.42

\*TIA-222-H Section 15.5 Applied

Top Plate - External



Bottom Plate - External



## Connection Properties

### Bolt Data

(12) 5/8"  $\phi$  bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 26" BC

### Top Plate Data

29.125" OD x 2.75" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

### Top Stiffener Data

(6) 6.75"H x 6.75"W x 1"T, Notch: 0.5"  
plate: Fy= 50 ksi ; weld: Fy= 70 ksi  
horiz. weld: 0.5" fillet  
vert. weld: 0.5" fillet

### Top Pole Data

10.75" x 0.5" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

### Bottom Plate Data

28" OD x 0.75" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

### Bottom Stiffener Data

N/A

### Bottom Pole Data

24" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

## Analysis Results

### Bolt Capacity

Max Load (kips)	17.08
Allowable (kips)	20.33
Stress Rating:	80.0% Pass

### Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	N/A
Tension Side Stress Rating:	N/A

### Top Stiffener Capacity

Horizontal Weld:	N/A
Vertical Weld:	N/A
Plate Flexure+Shear:	N/A
Plate Tension+Shear:	N/A
Plate Compression:	N/A

### Top Pole Capacity

Punching Shear:	N/A
-----------------	-----

### Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	N/A
Tension Side Stress Rating:	N/A

### Bottom Stiffener Capacity

Horizontal Weld:	N/A
Vertical Weld:	N/A
Plate Flexure+Shear:	N/A
Plate Tension+Shear:	N/A
Plate Compression:	N/A

### Bottom Pole Capacity

Punching Shear:	N/A
-----------------	-----

# Monopole Flange Plate Connection

Elevation = 50 ft.

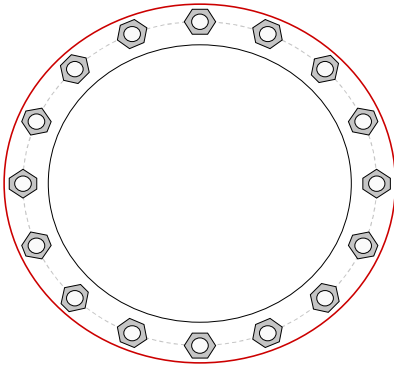


BU #	825998
Site Name	Milford Shore Area
Order #	467561 Rev. 11
TIA-222 Revision	H

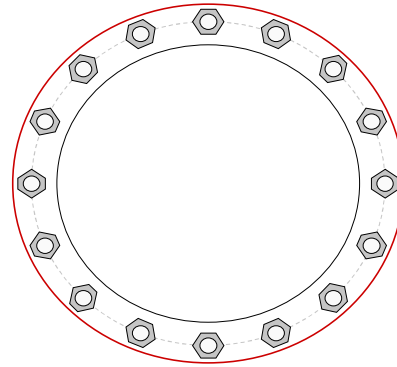
Applied Loads	
Moment (kip-ft)	332.27
Axial Force (kips)	9.99
Shear Force (kips)	7.46

\*TIA-222-H Section 15.5 Applied

Top Plate - Internal



Bottom Plate - Internal



## Connection Properties

### Bolt Data

(16) 1"  $\varnothing$  bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 21" BC

### Top Plate Data

18" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

### Bottom Plate Data

18" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

### Top Stiffener Data

N/A

### Bottom Stiffener Data

N/A

### Top Pole Data

24" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

### Bottom Pole Data

24" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

## Analysis Results

### Bolt Capacity

Max Load (kips)	46.80
Allowable (kips)	54.54
Stress Rating:	81.7% <span style="color: green;">Pass</span>

### Top Plate Capacity

Max Stress (ksi):	30.31	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	89.1%	<span style="color: green;">Pass</span>
Tension Side Stress Rating:	16.9%	<span style="color: green;">Pass</span>

### Bottom Plate Capacity

Max Stress (ksi):	30.31	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	89.1%	<span style="color: green;">Pass</span>
Tension Side Stress Rating:	16.9%	<span style="color: green;">Pass</span>

# Monopole Flange Plate Connection

Elevation = 20 ft.



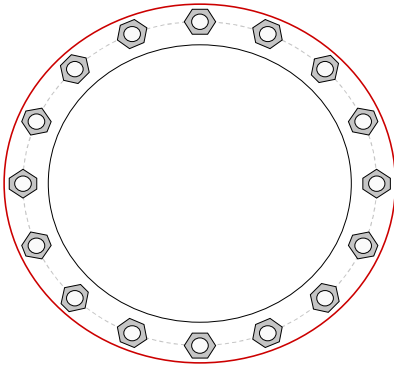
BU #	825998
Site Name	Milford Shore Area
Order #	467561 Rev. 11

Applied Loads	
Moment (kip-ft)	315.30
Axial Force (kips)	14.03
Shear Force (kips)	5.03

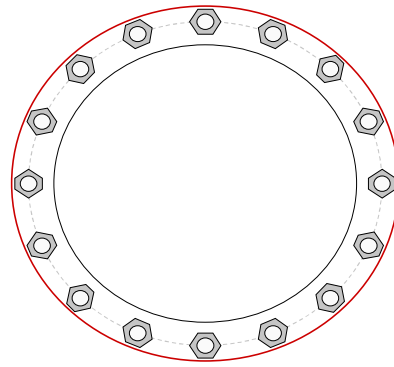
TIA-222 Revision	H
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\*TIA-222-H Section 15.5 Applied

Top Plate - Internal



Bottom Plate - Internal



## Connection Properties

### Bolt Data

(16) 1"  $\varnothing$  bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 21" BC

### Top Plate Data

18" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

### Bottom Plate Data

18" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

### Top Stiffener Data

N/A

### Bottom Stiffener Data

N/A

### Top Pole Data

24" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

### Bottom Pole Data

24" x 0.5" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

## Analysis Results

### Bolt Capacity

Max Load (kips)	44.13
Allowable (kips)	54.54
Stress Rating:	77.1% <span style="color: green;">Pass</span>

### Top Plate Capacity

Max Stress (ksi):	28.94	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	85.1%	<span style="color: green;">Pass</span>
Tension Side Stress Rating:	16.0%	<span style="color: green;">Pass</span>

### Bottom Plate Capacity

Max Stress (ksi):	26.01	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	76.5%	<span style="color: green;">Pass</span>
Tension Side Stress Rating:	12.9%	<span style="color: green;">Pass</span>

# Monopole Base Plate Connection

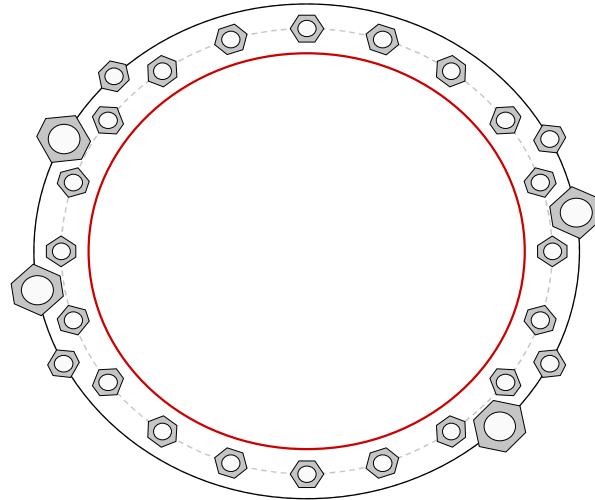


Site Info	
BU #	825998
Site Name	Milford Shore Area
Order #	467561 Rev. 11

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
$I_{ar}$ (in)	0

Applied Loads	
Moment (kip-ft)	775.36
Axial Force (kips)	17.57
Shear Force (kips)	10.02

\*TIA-222-H Section 15.5 Applied



Connection Properties	Analysis Results
-----------------------	------------------

Anchor Rod Data
GROUP 1: (20) 1" $\phi$ bolts (A687 N; $F_y=105$ ksi, $F_u=125$ ksi) on 27" BC
GROUP 2: (4) 1" $\phi$ bolts (A687 N; $F_y=105$ ksi, $F_u=125$ ksi) on 30" BC pos. (deg): 27, 135, 207, 333
GROUP 3: (4) 1-3/4" $\phi$ bolts (A193 Gr. B7 N; $F_y=105$ ksi, $F_u=125$ ksi) on 30" BC pos. (deg): 9, 153, 189, 315
Base Plate Data
30" OD x 1.25" Plate (A36; $F_y=36$ ksi, $F_u=58$ ksi)
Stiffener Data
N/A
Pole Data
24" x 0.5" round pole (A53-B-42; $F_y=42$ ksi, $F_u=63$ ksi)

Anchor Rod Summary	(units of kips, kip-in)	
<b>GROUP 1:</b>		
$Pu_c = 50.98$	$\phi Pn_c = 63.63$	Stress Rating
$Vu = 0.5$	$\phi Vn = 19.09$	76.4%
$Mu = n/a$	$\phi Mn = n/a$	Pass
<b>GROUP 2:</b>		
$Pu_c = 43.84$	$\phi Pn_c = 63.63$	Stress Rating
$Vu = 0$	$\phi Vn = 19.09$	65.6%
$Mu = n/a$	$\phi Mn = n/a$	Pass
<b>GROUP 3:</b>		
$Pu_c = 127.25$	$\phi Pn_c = 199.5$	Stress Rating
$Vu = 0$	$\phi Vn = 59.85$	60.7%
$Mu = n/a$	$\phi Mn = n/a$	Pass
<b>Base Plate Summary</b>		
Max Stress (ksi):	32.22	(Flexural)
Allowable Stress (ksi):	32.4	
Stress Rating:	94.7%	Pass

## Drilled Pier Foundation

BU # :	825998
Site Name:	Milford Shore Area
Order Number:	467531 Rev. 11

TIA-222 Revision:	H
Tower Type:	Monopole



Applied Loads		
	Comp.	Uplift
Moment (kip-ft)	775.355	
Axial Force (kips)	17.58	
Shear Force (kips)	10.002	

Material Properties		
Concrete Strength, f <sub>c</sub> :	3	ksi
Rebar Strength, F <sub>y</sub> :	60	ksi

Pier Design Data		
Depth	18.4	ft
Ext. Above Grade	0.8	ft
Pier Section 1		
<i>From 0.8' above grade to 15.4' below grade</i>		
Pier Diameter	4.5	ft
Rebar Quantity	14	
Rebar Size	7	
Clear Cover to Ties	9	in
Tie Size	4	
Rebar Quantity	4	
Rebar Size	Other	
Rebar Cage Diameter	30	in
Pier Section 2		
<i>From 15.4' below grade to 18.4' below grade</i>		
Pier Diameter	4.5	ft
Rebar Quantity	14	
Rebar Size	7	
Clear Cover to Ties	9	in
Tie Size	4	

Analysis Results		
Soil Lateral Capacity		
	Compression	Uplift
D <sub>v=0</sub> (ft from TOC)	11.03	-
Soil Safety Factor	1.75	-
Max Moment (kip-ft)	896.77	-
Rating*	72.2%	-
Soil Vertical Capacity		
	Compression	Uplift
Skin Friction (kips)	125.43	-
End Bearing (kips)	477.13	-
Weight of Concrete (kips)	34.84	-
Total Capacity (kips)	602.56	-
Axial (kips)	52.42	-
Rating*	8.3%	-
Reinforced Concrete Capacity		
	Compression	Uplift
Critical Depth (ft from TOC)	11.01	-
Critical Moment (kip-ft)	896.76	-
Critical Moment Capacity	1226.37	-
Rating*	69.6%	-
Soil Interaction Rating* <b>72.2%</b>		
Structural Foundation Rating* <b>69.6%</b>		

Check Limitation	
Apply TIA-222-H Section 15.5:	<input checked="" type="checkbox"/>
N/A	<input type="checkbox"/>

\*Rating per TIA-222-H Section 15.5

Soil Profile			
Groundwater Depth	8	ft	# of Layers
			3

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ <sub>soil</sub> (pcf)	γ <sub>concrete</sub> (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	1.5	1.5	135	150	0		0.000	0.000	0.00	0.00			Cohesionless
2	1.5	10	8.5	135	87.6	0		0.000	0.000	0.70	0.70			Cohesionless
3	10	18.4	8.4	75	87.6		38	0.000	0.000	0.70	0.70	40		Cohesionless

# Exhibit E

## **Power Density/RF Emissions Report**



# RF EMISSIONS COMPLIANCE REPORT

## Crown Castle on behalf of AT&T Mobility, LLC

Crown Castle Site Name: Milford Shore Area  
Crown Castle Site BU: 825998  
AT&T Mobility, LLC Site FA #: 10071133  
234 Melba Street  
Milford, CT  
3/19/2020

### Report Status:

**AT&T Mobility, LLC Is Compliant**



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

Signed 19 March 2020

Prepared By:

Site Safe, LLC

Engineering Statement in Re:  
Electromagnetic Energy Analysis  
Crown Castle  
Milford, CT

My signature on the cover of this document indicates:

That I am registered as a Professional Engineer in the jurisdiction indicated; and

That I have extensive professional experience in the wireless communications engineering industry; and

That I am an employee of Site Safe, LLC in Vienna, Virginia; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission ("the FCC" and "the FCC Rules") both in general and specifically as they apply to the FCC's Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields; and

That the technical information serving as the basis for this report was supplied by Crown Castle (see attached Site Summary and Carrier documents) and that AT&T Mobility, LLC's installation involves communications equipment, antennas and associated technical equipment at a location referred to as "Milford Shore Area" ("the site"); and

That AT&T Mobility, LLC proposes to operate at the site with transmit antennas listed in the carrier summary and with a maximum effective radiated power as specified by AT&T Mobility, LLC and shown on the worksheet and that worst-case 100% duty cycle has been assumed; and

That this analysis has been performed with the assumption that the ground immediately surrounding the tower is primarily flat or falling; and

That at this time, the FCC requires that certain licensees address specific levels of radio frequency energy to which workers or members of the public might possibly be exposed (at §1.1307(b) of the FCC Rules); and

That such consideration of possible exposure of humans to radio frequency energy must utilize the standards set by the FCC, which is the federal agency having jurisdiction over communications facilities; and

That the FCC rules define two tiers of permissible exposure guidelines: 1) "uncontrolled environments," which defines situations in which persons may not be aware of (the "general public"), or may not be able to control their exposure to a transmission facility; and 2) "controlled environments," which defines situations in which persons are aware of their potential for exposure (industry personnel); and

That this statement specifically addresses the uncontrolled environment (which is more conservative than the controlled environment) and the limit set forth in the FCC rules for licensees of AT&T Mobility, LLC's operating frequencies as shown on the attached antenna worksheet; and

That when applying the uncontrolled environment standards, the predicted Maximum Power Density at two meters above ground level from the proposed AT&T Mobility, LLC operation is



no more than 4.078% of the maximum permissible exposure limits in any accessible area on the ground; and

That it is understood per FCC Guidelines and OET 65 Appendix A, that regardless of the existent radio frequency environment, only those licensees whose contributions exceed 5% of the exposure limit pertinent to their operation(s) bear any responsibility for bringing any non-compliant area(s) into compliance; and

That when applying the uncontrolled environment standards, the cumulative predicted energy density from the proposed operation is no more than 4.979% of the maximum in any accessible area up to two meters above the ground per OET 65; and

That the calculations provided in this report are based on data provided by the client and antenna pattern data supplied by the antenna manufacturer, in accordance with FCC guidelines listed in OET 65. Horizontal and vertical antenna patterns are combined for modeling purposes to accurately reflect the energy two meters above ground level where on-axis energy refers to maximum energy two meters above the ground along the azimuth of the antenna and where area energy refers to the maximum energy anywhere two meters above the ground regardless of the antenna azimuth, accounting for cumulative energy from multiple antennas for the carrier(s) and frequency range(s) indicated; and

That the Occupational Safety and Health Administration has policies in place which address worker safety in and around communications sites, thus individual companies will be responsible for their employees' training regarding radio frequency safety; and

In summary, it is stated here that the proposed operation at the site will not result in exposure of the public to excessive levels of radio frequency energy as defined in the FCC Rules and Regulations, specifically 47 CFR 1.1307(b), and that AT&T Mobility, LLC's proposed operation is completely compliant.

Finally, it is stated that access to the tower should be restricted to communication industry professionals and approved contractor personnel trained in radio frequency safety and that this instant analysis addresses exposure levels at two meters above ground level and does not address exposure levels on the tower or in the immediate proximity of the antennas.

**Crown Castle  
Milford Shore Area  
Site Summary**

<b>Carrier</b>	<b>Area Maximum Percentage MPE</b>
AT&T Mobility, LLC (Proposed)	0.861 %
AT&T Mobility, LLC (Proposed)	0.632 %
AT&T Mobility, LLC (Proposed)	0.140 %
AT&T Mobility, LLC (Proposed)	0.604 %
AT&T Mobility, LLC (Proposed)	0.947 %
AT&T Mobility, LLC (Proposed)	0.592 %
AT&T Mobility, LLC (Proposed)	0.302 %
T-Mobile	0.409 %
T-Mobile	0.492 %
<b>Composite Site MPE:</b>	<b>4.979 %</b>

**AT&T Mobility, LLC (Proposed)  
Milford Shore Area  
Carrier Summary**

Frequency: 2100 MHz  
 Maximum Permissible Exposure (MPE): 1000  $\mu\text{W}/\text{cm}^2$   
 Maximum power density at ground level: 8.61125  $\mu\text{W}/\text{cm}^2$   
 Highest percentage of Maximum Permissible Exposure: 0.86113 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
Kathrein-Scala	800-10864	94	60	5548	4.703631	0.470363	8.485843	0.848584
Kathrein-Scala	800-10864	94	180	5548	4.703631	0.470363	8.485843	0.848584
Kathrein-Scala	800-10864	94	300	5548	4.703631	0.470363	8.485843	0.848584

**AT&T Mobility, LLC (Proposed)  
Milford Shore Area  
Carrier Summary**

Frequency: 1900 MHz  
 Maximum Permissible Exposure (MPE): 1000  $\mu\text{W}/\text{cm}^2$   
 Maximum power density at ground level: 6.31656  $\mu\text{W}/\text{cm}^2$   
 Highest percentage of Maximum Permissible Exposure: 0.63166 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
Kathrein-Scala	800-10864	94	60	5769	3.500832	0.350083	5.897742	0.589774
Kathrein-Scala	800-10864	94	180	5769	3.500832	0.350083	5.897742	0.589774
Kathrein-Scala	800-10864	94	300	5769	3.500832	0.350083	5.897742	0.589774

**AT&T Mobility, LLC (Proposed)  
Milford Shore Area  
Carrier Summary**

Frequency: 850 MHz  
 Maximum Permissible Exposure (MPE): 566.67  $\mu\text{W}/\text{cm}^2$   
 Maximum power density at ground level: 0.79525  $\mu\text{W}/\text{cm}^2$   
 Highest percentage of Maximum Permissible Exposure: 0.14034 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
Kathrein-Scala	800-10864	94	60	668	0.751697	0.132652	0.788736	0.139189
Kathrein-Scala	800-10864	94	180	668	0.751697	0.132652	0.788736	0.139189
Kathrein-Scala	800-10864	94	300	668	0.751697	0.132652	0.788736	0.139189

**AT&T Mobility, LLC (Proposed)  
Milford Shore Area  
Carrier Summary**

Frequency: 763 MHz  
 Maximum Permissible Exposure (MPE): 508.67  $\mu\text{W}/\text{cm}^2$   
 Maximum power density at ground level: 3.07136  $\mu\text{W}/\text{cm}^2$   
 Highest percentage of Maximum Permissible Exposure: 0.60381 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
Kathrein-Scala	800-10864	94	60	2224	2.911628	0.572404	3.031748	0.596019
Kathrein-Scala	800-10864	94	180	2224	2.911628	0.572404	3.031748	0.596019
Kathrein-Scala	800-10864	94	300	2224	2.911628	0.572404	3.031748	0.596019

**AT&T Mobility, LLC (Proposed)  
Milford Shore Area  
Carrier Summary**

Frequency: 2300 MHz  
 Maximum Permissible Exposure (MPE): 1000  $\mu\text{W}/\text{cm}^2$   
 Maximum power density at ground level: 9.47263  $\mu\text{W}/\text{cm}^2$   
 Highest percentage of Maximum Permissible Exposure: 0.94726 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
CCI Antennas	OPA65R-BU6A	104	60	2924	9.372811	0.937281	9.445894	0.944589
CCI Antennas	OPA65R-BU6A	104	180	2924	9.372811	0.937281	9.445894	0.944589
CCI Antennas	OPA65R-BU6A	104	300	2924	9.372811	0.937281	9.445894	0.944589

**AT&T Mobility, LLC (Proposed)  
Milford Shore Area  
Carrier Summary**

Frequency: 737 MHz  
 Maximum Permissible Exposure (MPE): 491.33  $\mu\text{W}/\text{cm}^2$   
 Maximum power density at ground level: 2.90624  $\mu\text{W}/\text{cm}^2$   
 Highest percentage of Maximum Permissible Exposure: 0.5915 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
CCI Antennas	OPA65R-BU6A	104	60	2692	1.989207	0.404859	2.714682	0.552513
CCI Antennas	OPA65R-BU6A	104	180	2692	1.989207	0.404859	2.714682	0.552513
CCI Antennas	OPA65R-BU6A	104	300	2692	1.989207	0.404859	2.714682	0.552513



**AT&T Mobility, LLC (Proposed)  
Milford Shore Area  
Carrier Summary**

Frequency: 722 MHz  
 Maximum Permissible Exposure (MPE): 481.33  $\mu\text{W}/\text{cm}^2$   
 Maximum power density at ground level: 1.45311  $\mu\text{W}/\text{cm}^2$   
 Highest percentage of Maximum Permissible Exposure: 0.30189 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
CCI Antennas	OPA65R-BU6A	104	60	1346	0.9946	0.206634	1.357336	0.281995
CCI Antennas	OPA65R-BU6A	104	180	1346	0.9946	0.206634	1.357336	0.281995
CCI Antennas	OPA65R-BU6A	104	300	1346	0.9946	0.206634	1.357336	0.281995

## T-Mobile Milford Shore Area Carrier Summary

**Frequency:** 2100 MHz  
**Maximum Permissible Exposure (MPE):** 1000  $\mu\text{W}/\text{cm}^2$   
**Maximum power density at ground level:** 4.08869  $\mu\text{W}/\text{cm}^2$   
**Highest percentage of Maximum Permissible Exposure:** 0.40887 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
RFS	APXV18-206516L-A	120	30	6168	1.927589	0.192759	2.877849	0.287785
RFS	APXV18-206516L-A	120	210	6168	1.927589	0.192759	2.877849	0.287785
RFS	APXV18-206516L-A	120	300	6168	1.927589	0.192759	2.877849	0.287785

## T-Mobile Milford Shore Area Carrier Summary

**Frequency:** 1900 MHz  
**Maximum Permissible Exposure (MPE):** 1000  $\mu\text{W}/\text{cm}^2$   
**Maximum power density at ground level:** 4.91651  $\mu\text{W}/\text{cm}^2$   
**Highest percentage of Maximum Permissible Exposure:** 0.49165 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
RFS	APXV18-206516L-A	110	30	6168	2.2859	0.22859	3.464139	0.346414
RFS	APXV18-206516L-A	110	210	6168	2.2859	0.22859	3.464139	0.346414
RFS	APXV18-206516L-A	110	300	6168	2.2859	0.22859	3.464139	0.346414