



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

March 5, 2021

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

**RE: Notice of Exempt Modification for T-Mobile: 823630**  
**181 Clapboard Ridge Road, Danbury, CT 06811**  
**Latitude: 41° 25' 59.47" / Longitude: -73° 29' 32.76"**

Dear Ms. Bachman:

T-Mobile currently maintains three (3) antennas at the 79-foot mount on the existing 83-foot Stealth pole, located at 181 Clapboard Ridge Road, Danbury, CT. The property is owned by Diocese of Newton For The. The tower is owned by Crown Castle. T-Mobile now intends to replace three (3) antennas and ancillary equipment at the 79-ft level. T-Mobile to also replace the pole canister shroud from the 53' to 83' AGL. The canister shroud will also increase in diameter from the existing 31" O.D. to 42" O.D. This modification/proposal includes hardware that is both 4G (LTE) and 5G capable through remote software configuration and either or both services may be turned on or off at various times.

**Panned Modification:**

**Tower:**

Installed New:

- (3) RFS/Celwave – APXVAR18\_43-C-NA20
- (3) ANDREW – ATSBT-BOTTOM-MF Bias TEE
- (12) ANDREW LDF7-50A\_1-5/8" Coax

Remove:

- (3) ANTENNAS
- (6) TMAS

**Ground:**

Install New:

- (9) RRUs AT H-Frame, ( (3) 4449 B12/B71, (3) 4415 B25 & (3) 4415 B66A).
- (3) TMAS AT H-Frame
- (3) DIPLEXERS AT H-Frame

Remove:

- (1) DUS41

Melanie A. Bachman

Page 2

The facility was approved by the City of Danbury on March 25, 2002. The approval was given without conditions.

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 Sharon B. Calitro, Director of Planning & Zoning for the City Danbury, Joseph M. Cavo, Mayor for the City of Danbury, Diocese Of Newton For The, City of Danbury, CT as the property owner and Crown Castle is the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile 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: Jeffrey Barbadora.

Sincerely,

  
Jeffrey Barbadora  
Site Acquisition Specialist  
1800 W. Park Drive  
Westborough, MA 01581  
(781) 970-0053  
Jeff.Barbadora@crowncastle.com

Attachments

cc:

The Honorable Joseph M. Cavo, Mayor (*via email only*), City Hall 155 Deer Hill Av, Danbury, CT 06810  
Sharon B. Calitro, Director of Planning & Zoning (*via email only*) City Hall 155 Deer Hill Av, Danbury, CT 06810  
Diocese Of Newton For The, Land Owner (*via overnight delivery*) 181 Clapboard Ridge Rd, Danbury, CT 06811  
Crown Castle, Tower Owner

The Foundation for a Wireless World.

CrownCastle.com

## **Barbadora, Jeff**

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**From:** Barbadora, Jeff  
**Sent:** Friday, March 5, 2021 3:37 PM  
**To:** s.calitro@danbury-CT.gov  
**Subject:** 181 Clapboard Ridge Road  
**Attachments:** 181 Clapboard Ridge Rd CSC Filing.pdf

Good Afternoon Sharon,

Please see attached application to the Connecticut Siting Council regarding T-Mobile antenna modification on the existing cell tower located at 181 Clapboard Ridge Road, Danbury, CT.

Please let me know if you have any questions or comments.

Thanks,

**Jeffrey Barbadora**  
Site Acquisition Specialist  
781-970-0053

**Crown Castle**  
1800 W. Park Drive  
Westborough, MA 01581

## **Barbadora, Jeff**

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**From:** Barbadora, Jeff  
**Sent:** Friday, March 5, 2021 3:37 PM  
**To:** j.cavo@danbury-CT.gov  
**Subject:** 181 Clapboard Ridge Road  
**Attachments:** 181 Clapboard Ridge Rd CSC Filing.pdf

Good Afternoon Joseph,

Please see attached application to the Connecticut Siting Council regarding T-Mobile antenna modification on the existing cell tower located at 181 Clapboard Ridge Road, Danbury, CT.

Please let me know if you have any questions or comments.

Thanks,

**Jeffrey Barbadora**  
Site Acquisition Specialist  
781-970-0053

**Crown Castle**  
1800 W. Park Drive  
Westborough, MA 01581

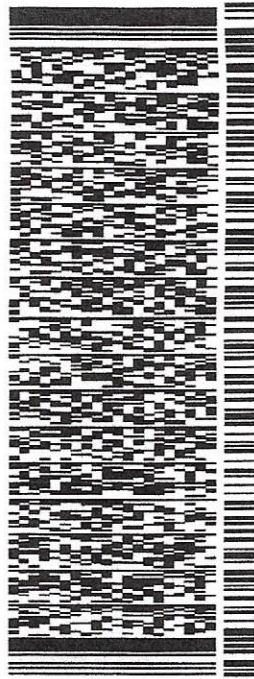
ORIGIN ID:BBFA (781) 970-0053  
JEFF BARBADORA  
1800 W. PARK DRIVE  
WESTBOROUGH, MA 01581  
UNITED STATES US

SHIP DATE: 03MAR21  
ACTWGT: 0.50 LB  
CAD: 108046270INNET4340  
BILL SENDER

TO MELKITES  
DIOCESE OF NEWTON FOR THE  
181 CLAPBOARD RIDGE ROAD

DANBURY CT 06811

(781) 771-2255 REF: 799001.7680  
INV: DEPT:  
PO:



56DJ3/AC39/FE4A

TRK# 7730 8356 0787  
0201

MON - 08 MAR 10:30A  
PRIORITY OVERNIGHT

SH DXRA 06811  
CT-US SWF



**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.

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**CITY OF DANBURY**  
155 DEER HILL AVENUE  
DANBURY, CONNECTICUT 06810

**PLANNING COMMISSION  
CITY OF DANBURY  
CERTIFIED COPY OF GRANT OF SPECIAL EXCEPTION**

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**APPLICANT** – Omnipoint Communications

**RECORD HOLDER OF TITLE** – Diocese of Newton for the Melkites in the USA (St. Ann's Church)

**LEGAL DESCRIPTION OF PREMISES** - SEE ATTACHED

**NATURE OF SPECIAL EXCEPTION** – Application for Special Exception to allow Wireless Communication Facility in the RA-80 Zone - 181 Clapboard Ridge Rd. (#E09073 & #07133) subject to the attached Court Stipulation dated March 5, 2002, signed by Planning Commission Chairman on March 25, 2002.

**SECTION OF CITY OF DANBURY ZONING ORDINANCE UNDER WHICH THIS SPECIAL EXCEPTION IS GRANTED:** 3.E.6.

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**THE EFFECTIVE DATE OF THE SPECIAL EXCEPTION IS THE DATE ON WHICH THE APPLICANT FILES THIS CERTIFIED COPY OF GRANT OF SPECIAL EXCEPTION ON THE LAND RECORDS OF THE CITY OF DANBURY.**

I hereby certify that the foregoing constitutes a true copy of the Special Exception (SE #571) granted by the Planning Commission of the City of Danbury per the attached Court Stipulation of Settlement dated March 5, 2002 and signed and approved by Planning Commission on March 25, 2002.

to Anne V. Read, Secretary to the  
PLANNING COMMISSION - CITY OF DANBURY

Attachments

EXHIBIT A

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DESCRIPTION OF PROPERTY

Forming a part of the Agreement by and between **DIOCESE OF NEWTON FOR THE MELKITES IN THE UNITED STATES**, as Lessor, and **OMNIPOINT COMMUNICATIONS, INC.**, as Lessee.

The Property is described and/or depicted as follows:

Site Address: 181 Clapboard Ridge Road  
Danbury, CT 06811

Section E07, Block 1, Lot 33

ALL THAT CERTAIN piece or parcel of land, together with the improvements located thereon situate in the City of Danbury, County of Fairfield, and State of Connecticut, shown and designated as Parcel B-1 on that certain map entitled, "Subdivision Map Prepared for Saint Ann Melkite - Greek Catholic Church Clapboard Ridge Road - Conn. Route #39 Danbury, Connecticut Area - As Shown RA-80 Zone Scale 1" = 40' June 15, 1989 Rev. October 16, 1989 (Easements)" certified 'Substantially Correct' by David L. Ryan, Connecticut Land Surveyor, and which map is on file in the Office of the Danbury Town Clerk as Map No. 9358.

Being the same premises described in that certain Warranty Deed from Scott Real Estate, Inc. to Diocese of Newton for the Melkites in the United States, Inc. dated December 24, 1987, and recorded December 24, 1987, in the Office of the Danbury Town Clerk. (A Portion)

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DOCKET NO. CV 01 0341337 S	SUPERIOR COURT
OMNIPOINT COMMUNICATIONS, INC.	J.D. OF DANBURY
VS.	AT DANBURY
PLANNING COMMISSION OF THE CITY OF DANBURY	March <u>3<sup>rd</sup></u> , 2002

**STIPULATION**

This Stipulation is made this 25<sup>th</sup> day of March, 2002, by and between the plaintiff Omnipoint Communications, Inc., a Delaware corporation with a principal place of business in Connecticut located at 100 Filley Street, Bloomfield, Connecticut (hereinafter, "Omnipoint"), and the defendant, the Planning Commission of the City of Danbury, an agency of the City of Danbury organized and existing under and pursuant to the laws of the State of Connecticut and the Charter of the City of Danbury, with an office located at 155 Deer Hill Avenue, Danbury, Connecticut 06810 (hereinafter, the "Commission").

**WITNESSETH:**

1. In July, 2000, Omnipoint made application to the Commission for a special exception, special permit and resubdivision to allow it to construct a personal wireless services facility at 181 Clapboard Ridge Road, Danbury, Connecticut.
2. On December 6, 2000, the Commission denied the applications.
3. Omnipoint appealed that decision to the Superior Court, in an action entitled *Omnipoint Communications v. Planning Commission of the City of Danbury*, now



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pending in the Superior Court, judicial district of Danbury at Danbury, as docket no. CV 01 0341337 S.

4. Omnipoint further commenced an action in federal court, entitled *Omnipoint Communications v. Planning Commission of the City of Danbury*, now pending in the United States District Court for the District of Connecticut, as civil action no. 3:01cv00017 (SRU).

5. Omnipoint has since submitted supplemental information to the Commission that satisfies the Commission's concerns as expressed in its denial of the applications.

6. On February 6, 2002, the Commission held a public hearing on whether to resolve this matter through the approval of this Stipulation, and concluded that the supplemental information submitted by Omnipoint would justify an approval of the applications.

7. Omnipoint and the Commission desire to resolve this action and the federal action without further litigation, to avoid the expense and delay associated with continuing the litigation.

NOW THEREFORE, for good and valuable consideration, and for the mutual promises and covenants contained herein, Omnipoint and the Commission stipulate as follows:

1. Omnipoint and the Commission will jointly move the Superior Court to enter a judgment in accordance with this stipulation.

2. The Superior Court may enter a judgment sustaining Omnipoint's appeal from the Commission's denial, and may order that the applications for site plan, for special exception, and for resubdivision may be approved in accordance with the plans submitted to the Commission during the February 6, 2002 public hearing, and as attached hereto as Exhibit A.

3. Upon entering of such judgment by the Superior Court, Omnipoint and the Commission will jointly file a stipulation for dismissal, with prejudice, in the federal action.

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4. Each party is to bear its own costs and attorneys fees associated with both the state and federal litigation.

5. This Stipulation has been approved by the Commission after hearing, notice of which was published in the Danbury News-Times, and notice of such approval will be published in the Danbury News-Times.

In witness whereof, the parties hereto have hereunder set their hands and seals.

Omnipoint Communications, Inc.

By: [Signature]  
Michael Fulton  
Technical Director, duly authorized  
This 22 day of March, 2002

Planning Commission of the City of Danbury

By: [Signature]  
Joseph Justino  
Its Chair, duly authorized  
This 25 day of March, 2002

Received for Record  
at 1:20 P. M.

NOV 22 2002

BPRT/59123.3/PSO/417229v1

Attest: [Signature]  
Danbury Town Clerk

# 179-183 CLAPBOARD RIDGE RD

**Location** 179-183 CLAPBOARD RIDGE RD

**Mblu** E07 / / 93 / /

**Acct#**

**Owner** DIOCESE OF NEWTON FOR THE

**Assessment** \$1,861,500

**Appraisal** \$2,659,200

**PID** 24209

**Building Count** 1

## Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2017	\$1,709,200	\$950,000	\$2,659,200

Assessment			
Valuation Year	Improvements	Land	Total
2017	\$1,196,500	\$665,000	\$1,861,500

## Owner of Record

<b>Owner</b>	DIOCESE OF NEWTON FOR THE	<b>Sale Price</b>	\$0
<b>Co-Owner</b>	MELKITES IN THE US OF AMER INC	<b>Book &amp; Page</b>	0992/0615
<b>Address</b>	181 CLAPBOARD RIDGE RD DANBURY, CT 06811	<b>Sale Date</b>	10/28/1991

## Ownership History

Ownership History			
Owner	Sale Price	Book & Page	Sale Date
DIOCESE OF NEWTON FOR THE	\$0	0992/0615	10/28/1991

## Building Information

### Building 1 : Section 1

<b>Year Built:</b>	1991
<b>Living Area:</b>	9,413
<b>Replacement Cost:</b>	\$2,061,961
<b>Building Percent Good:</b>	81
<b>Replacement Cost</b>	
<b>Less Depreciation:</b>	\$1,670,200

### Building Attributes

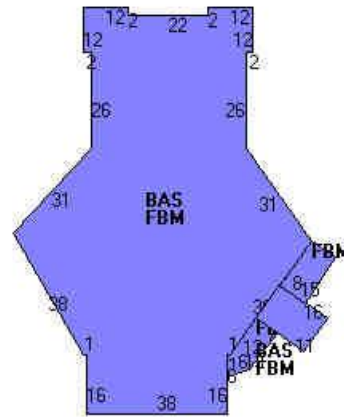
Field	Description
STYLE	Churches
MODEL	Ind/Comm
Grade	Excellent
Stories:	1
Occupancy	1
Exterior Wall 1	Brick/Masonry
Exterior Wall 2	
Roof Structure	Wood Truss
Roof Cover	Asphalt Shngl.
Interior Wall 1	Drywall/Sheet
Interior Wall 2	
Interior Floor 1	Ceram Clay Til
Interior Floor 2	Carpet
Heating Fuel	Gas
Heating Type	Forced Air-Duc
AC Type	Central
Bldg Use	Commercial MDL-96
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	200I
Heat/AC	HEAT/AC PKGS
Frame Type	STEEL
Baths/Plumbing	AVERAGE
Ceiling/Wall	CEIL & WALLS
Rooms/Prtns	AVERAGE
Wall Height	24
% Comn Wall	0

### Building Photo



(<http://images.vgsi.com/photos2/DanburyCTPhotos//00\02\66\49.jpg>)

### Building Layout



([http://images.vgsi.com/photos2/DanburyCTPhotos//Sketches/24209\\_2420](http://images.vgsi.com/photos2/DanburyCTPhotos//Sketches/24209_2420))

Building Sub-Areas (sq ft)			<u>Legend</u>
Code	Description	Gross Area	Living Area
BAS	First Floor	5,799	5,799
FBM	Basement Finished	6,024	3,614
		11,823	9,413

### Extra Features

Extra Features	<u>Legend</u>
No Data for Extra Features	

### Land

#### Land Use

Use Code 918

#### Land Line Valuation

Size (Acres) 2.47

**Description** Church  
**Zone**  
**Neighborhood** 5000  
**Alt Land Appr** No  
**Category**

**Frontage** 0  
**Depth** 0  
**Assessed Value** \$665,000  
**Appraised Value** \$950,000

**Outbuildings**

Outbuildings						<u>Legend</u>
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
PAV1	Paving-Asphalt			30000 S.F.	\$37,800	1
SHD1	Shed-Avg			96 S.F.	\$800	1
LT2	Light 2			2 UNITS	\$400	1

**Valuation History**

Appraisal			
Valuation Year	Improvements	Land	Total
2019	\$1,709,200	\$950,000	\$2,659,200
2018	\$1,709,200	\$950,000	\$2,659,200
2017	\$1,709,200	\$950,000	\$2,659,200

Assessment			
Valuation Year	Improvements	Land	Total
2019	\$1,196,500	\$665,000	\$1,861,500
2018	\$1,196,500	\$665,000	\$1,861,500
2017	\$1,196,500	\$665,000	\$1,861,500



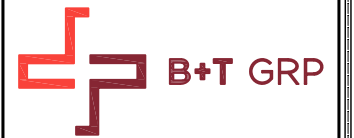
T-MOBILE SITE NAME:  
**DANBURY NORTH/RT37**

T-MOBILE SITE NUMBER:  
**CT11195D**

CROWN BU: 823630 / APP#: 494418  
**67D94BL2 CONFIGURATION**

181 CLAPBOARD RIDGE ROAD  
 DANBURY, CT 06811

EXISTING 83'-2" MONOPOLE



CT11195D  
 BU #: 823630  
 DANBURY NORTH/RT37  
 181 CLAPBOARD RIDGE ROAD  
 DANBURY, CT 06811  
 EXISTING 83'-2" MONOPOLE

PROJECT NO: 137212.003.01  
 CHECKED BY: GEH

ISSUED FOR:			
REV	DATE	DRWN	DESCRIPTION
0	8/12/19	RFC	ISSUE FOR CONSTRUCTION
1	1/19/21	SMM	ISSUE FOR CONSTRUCTION

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**

**PROJECT SUMMARY**

SITE TYPE: EXISTING EQUIPMENT UPGRADE  
 SITE ADDRESS: 181 CLAPBOARD RIDGE ROAD DANBURY, CT 06811  
 JURISDICTION: FAIRFIELD COUNTY

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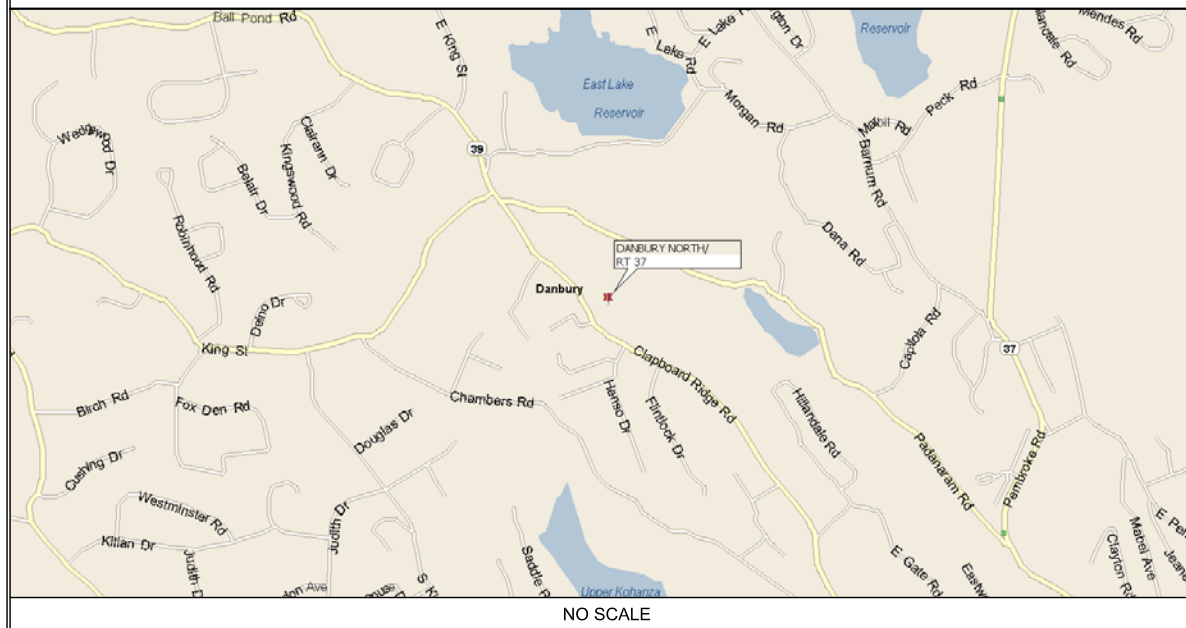
NAD83  
 LATITUDE: 41.433709° N  
 LONGITUDE: 73.492897° W

TOWER OWNER: CROWN CASTLE  
 3200 HORIZON DRIVE, SUITE 150  
 KING OF PRUSSIA, PA 19406  
 JASON SMITH  
 (610) 635-3225

CUSTOMER/APPLICANT: T-MOBILE  
 4 SYLVAN WAY  
 PARSIPPANY, NJ 07054  
 (973) 397-4800

OCCUPANCY TYPE: UNMANNED  
 A.D.A. COMPLIANCE: FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION

**LOCATION MAP**



**DRAWING INDEX**

SHEET #	SHEET DESCRIPTION	REV. #
T-1	TITLE SHEET	1
A-1	OVERALL SITE PLAN	1
A-2	ANTENNA/CABLE SCHEDULE AND AZIMUTH PLANS	1
A-3	TOWER ELEVATION	1
A-4	RRU DETAILS AND CABLING SCHEMATIC	1
E-1	PANEL SCHEUDLE AND ONE-LINE DIAGRAM	1

**CONTACT INFORMATION**

A&E FIRM: B+T GROUP 1717 S. BOULDER, STE. 300 TULSA, OK 74119 CONTACT: MIKE OAKES PHONE: (918) 587-4630	ELECTRIC PROVIDER: UNITED ILLUMINATING CO. 203-499-2000 TELCO PROVIDER: COMCAST PHONE 800-934-6489
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**DRIVING DIRECTIONS**

DEPART FROM BRADLEY INTERNATIONAL AIRPORT ON TERMINAL RD. ROAD NAME CHANGES TO BRADLEY FIELD CONNECTOR. ROAD NAME CHANGES TO CT-20 [BRADLEY FIELD CONNECTOR]. TAKE RAMP (RIGHT) ONTO I-91 [RICHARD P HORAN MEMORIAL HWY]. AT EXIT 32A-32B, TURN RIGHT ONTO RAMP. TAKE RAMP (LEFT) ONTO I-84 [US-6]. AT EXIT 5, TURN RIGHT ONTO RAMP. TURN LEFT ONTO CT-39 [N MAIN ST]. KEEP STRAIGHT ONTO CT-39 [CLAPBOARD RIDGE RD]. TURN RIGHT ONTO LOCAL ROAD(S) AND ARRIVE AT DANBURY NORTH/RT 37.

**A/E DOCUMENT REVIEW STATUS**

TITLE	SIGNATURE	DATE
T-MOBILE PROP:		
T-MOBILE R.F. MGR.:		
T-MOBILE NetOps:		
T-MOBILE CONST. MGR.:		
INTERCONNECT:		
T-MOBILE SITE DEV. MGR.:		
PROPERTY OWNER:		
PLANNING:		

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR MODIFICATIONS.

**CODE COMPLIANCE**

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/DWELLING	2018 CONNECTICUT STATE BUILDING CODE
STRUCTURAL	2018 CONNECTICUT STATE BUILDING CODE
MECHANICAL	2018 CONNECTICUT STATE BUILDING CODE
ELECTRICAL	NEC 2017

**PROJECT DESCRIPTION**

THE PROPOSED PROJECT INCLUDES:

- REMOVE (3) EXISTING ANTENNAS AT 79'-0".
- REMOVE (6) EXISTING TMAS AT 79'-0".
- REMOVE (1) DUS41.
- INSTALL (3) NEW ANTENNAS AT 79'-0".
- INSTALL (3) NEW ANDREW SMART BIAS TS AT 79'-0".
- INSTALL (9) NEW RRUS AT H-FRAME.
- INSTALL (3) NEW TMAS AT H-FRAME.
- INSTALL (3) NEW DIPLEXERS AT H-FRAME.

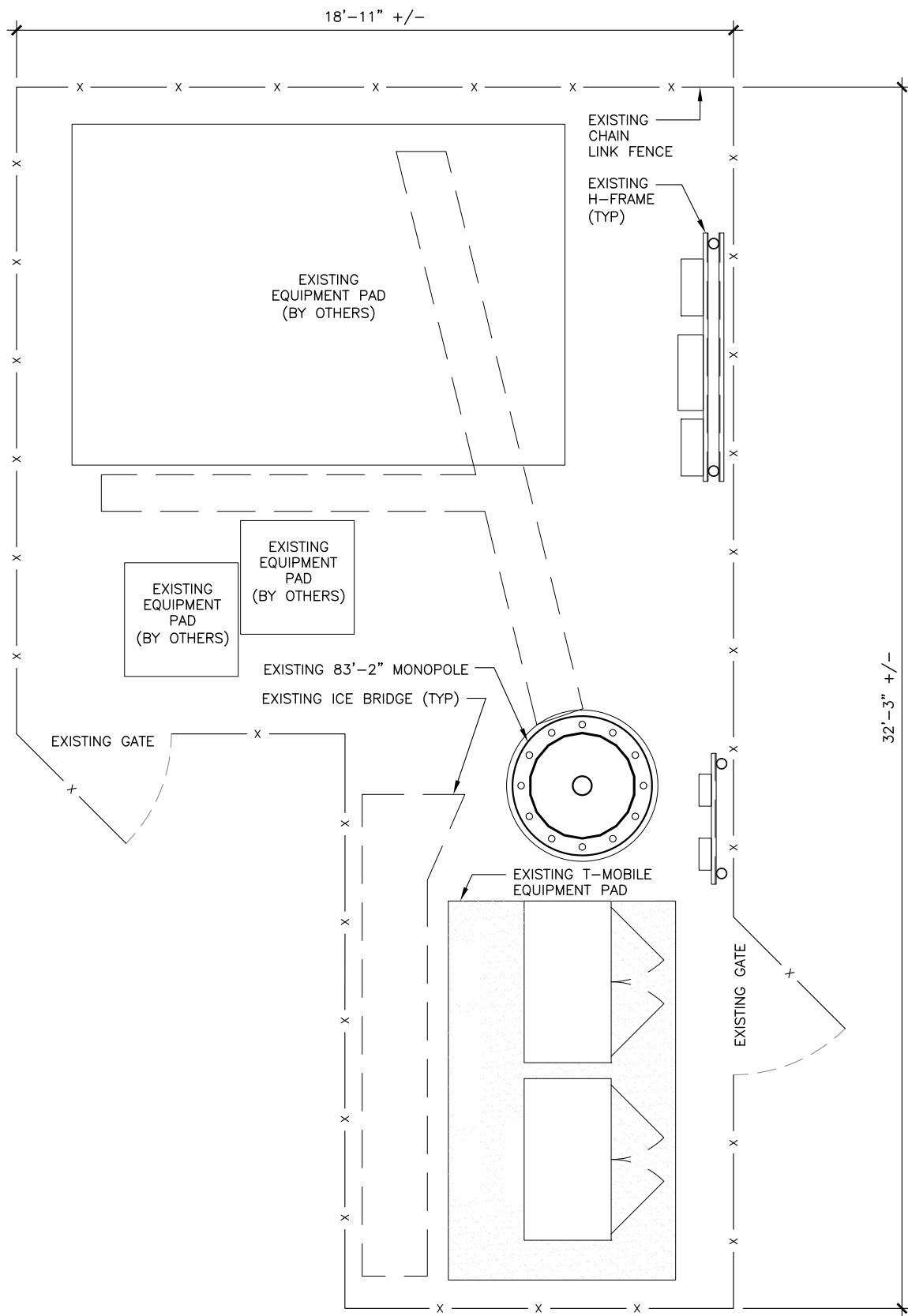
**DO NOT SCALE DRAWINGS**

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.



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





**1** OVERALL SITE PLAN  
 SCALE: 0' 1' 2' 4' 10'



**GENERAL NOTES:**

1. SUBJECT PROPERTY IS SITUATED AT 181 CLAPBOARD RIDGE ROAD, DANBURY, CT 06811.
2. APPLICANT: T-MOBILE  
 A DELAWARE LIMITED LIABILITY COMPANY  
 4 SYLVAN WAY  
 PARSIPPANY, NEW JERSEY 07054  
 (973) 397-4800  
  
 TOWER OWNER: CROWN CASTLE INTERNATIONAL
- THE APPLICANT IS TO UPDATE THEIR NETWORK BY INSTALLING THREE (3) NEW PANEL ANTENNAS MOUNTED ON AN EXISTING MONOPOLE.
3. THIS FACILITY SHALL BE VISITED ON THE AVERAGE OF ONCE A MONTH FOR MAINTENANCE AND SHALL BE MONITORED FROM A REMOTE FACILITY.
4. THE EXISTING SITE IS LOCATED AT LATITUDE OF 41.433709° N± AND LONGITUDE OF 73.492897° W±. THE HORIZONTAL DATUM ARE IN TERMS OF NORTH AMERICAN DATUM OF 1983 (NAD 83).
5. THIS SET OF PLANS HAS BEEN PREPARED FOR THE PURPOSES OF MUNICIPAL AND AGENCY REVIEW AND APPROVAL. THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DOCUMENTS UNTIL ALL CONDITIONS OF APPROVAL HAVE BEEN SATISFIED AND EACH OF THE DRAWINGS HAVE BEEN REVISED TO INDICATED "ISSUED FOR CONSTRUCTION"
6. ALL MATERIALS, WORKMANSHIP, AND CONSTRUCTION FOR THE SITE IMPROVEMENTS SHOWN HEREON SHALL BE IN ACCORDANCE WITH:
  - 6.A. CURRENT PREVAILING MUNICIPAL AND/OR COUNTY SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.
  - 6.B. CURRENT PREVAILING UTILITY COMPANY AUTHORITY SPECIFICATIONS, STANDARDS AND REQUIREMENTS.
7. THE CONTRACTOR SHALL NOTIFY B+T GROUP, P.A. IMMEDIATELY IF ANY FIELD-CONDITIONS ENCOUNTERED DIFFER FROM THOSE REPRESENTED HEREON, AND/OR IF SUCH CONDITIONS WOULD OR COULD RENDER THE DESIGNS SHOWN HEREON INAPPROPRIATE AND/OR INEFFECTIVE.
8. THE CONTRACTOR IS RESPONSIBLE TO PROTECT, REPAIR AND/OR REPLACE ANY DAMAGED STRUCTURES, UTILITIES OR LANDSCAPED AREA WHICH MAY BE DISTURBED DURING THE CONSTRUCTION OF THIS FACILITY.
9. THE CONSTRUCTION CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ALL CONSTRUCTION MEANS AND METHODS. THE CONSTRUCTION CONTRACTOR IS ALSO RESPONSIBLE FOR ALL JOB SITE SAFETY.
10. SITE INFORMATION SHOWN TAKEN FROM CROWN SITE PLANS AND FROM CROWN INSPECTION PHOTOS.



CT11195D  
 BU #: 823630  
  
 DANBURY NORTH/RT37  
 181 CLAPBOARD RIDGE ROAD  
 DANBURY, CT 06811  
 EXISTING 83'-2" MONOPOLE

PROJECT NO: 137212.003.01  
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1	1/19/21	SMM	ISSUE FOR CONSTRUCTION

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



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SHEET NUMBER: **A-1** REVISION: **1**

**LEGEND**

EXISTING/DEMOLITION NOTES	INSTALLATION NOTES
(A) EXISTING RFS APX16DW-16DW-S-E-A20 ANTENNA TO BE REMOVED (TOTAL OF 3)	(1) INSTALL RFS APXVAR18_43-C-NA20 ANTENNAS. (TYP. OF 1 PER SECTOR, TOTAL OF 3)
(B) EXISTING TMAs TO BE REMOVED (TOTAL OF 6)	(2) INSTALL ANDREW ATSBT-BOTTOM-MF SMART BIAS T AT ANTENNA. DAISY CHAIN RETS. (TOTAL OF 3)
(C) EXISTING 7/8" COAX CABLES TO REMAIN (TOTAL OF 12)	(3) INSTALL NEW ANDREW GENERIC TWIN STYLE 3B-PCS+AWS TMAs AT CABINET (TOTAL OF 3)
(D) EXISTING RUS01 B2 & B4 RADIOS TO REMAIN IN CABINET UNUSED	(4) INSTALL NEW COMMSCOPE CBC1923Q-43 DIPLEXERS AT CABINET (TOTAL OF 3)
(E) REMOVE (1) DUS41	(5) INSTALL RADIO 4449 B12/B71 AT CABINET (TOTAL OF 3)
	(6) INSTALL RADIO 4415 B25 AT CABINET (TOTAL OF 3)
	(7) INSTALL RADIO 4415 B66A AT CABINET (TOTAL OF 3)
	(8) INSTALL (2) BB 6630s

**ANTENNA AND CABLE SCHEDULE**

SECTOR	POSITION	EXISTING ANTENNAS	PROPOSED ANTENNA CONFIGURATION		E-TILT	M-TILT	ANTENNA CENTERLINE	TMA/RRU	CABLES	JUMPER TYPE	CABLE LENGTH
60° - ALPHA	A1	RFS-APXVAR18_43-C-NA20	LTE GSM UMTS	B71/B12 B25 B66A	2°	0°	79'-0"	1/3	(4) 1 5/8" COAX	DC/FIBER & 1/2" COAX	129'-0"
180° - BETA	B1	RFS-APXVAR18_43-C-NA20	LTE GSM UMTS	B71/B12 B25 B66A	2°	0°	79'-0"	1/3	(4) 1 5/8" COAX	DC/FIBER & 1/2" COAX	129'-0"
300° - GAMMA	C1	RFS-APXVAR18_43-C-NA20	LTE GSM UMTS	B71/B12 B25 B66A	2°	0°	79'-0"	1/3	(4) 1 5/8" COAX	DC/FIBER & 1/2" COAX	129'-0"



CT11195D  
 BU #: 823630  
 DANBURY NORTH/RT37  
 181 CLAPBOARD RIDGE ROAD  
 DANBURY, CT 06811  
 EXISTING 83'-2" MONOPOLE

PROJECT NO: 137212.003.01  
 CHECKED BY: GEH

**ISSUED FOR:**

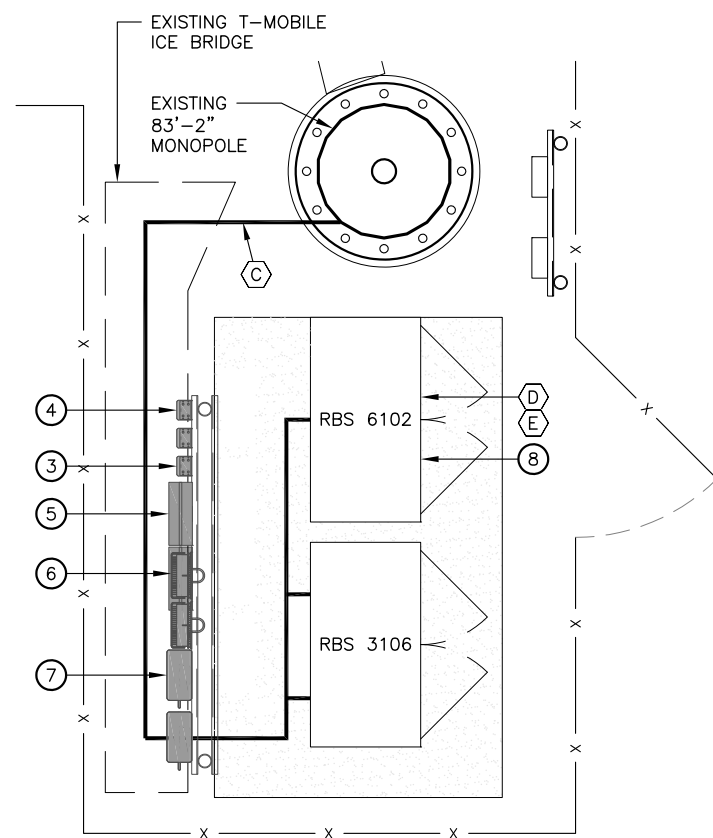
REV	DATE	DRWN	DESCRIPTION
0	8/12/19	RFC	ISSUE FOR CONSTRUCTION
1	1/19/21	SMM	ISSUE FOR CONSTRUCTION

B&T ENGINEERING, INC.  
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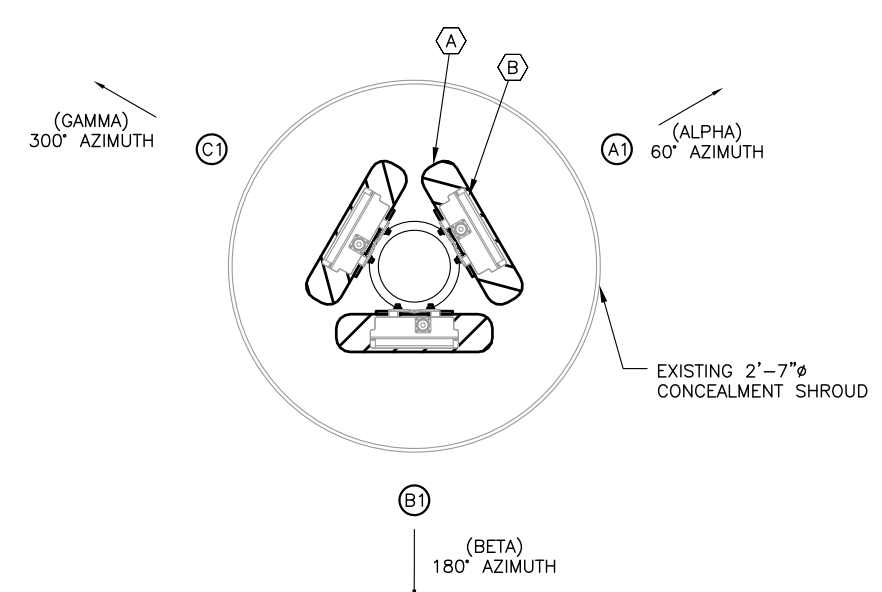


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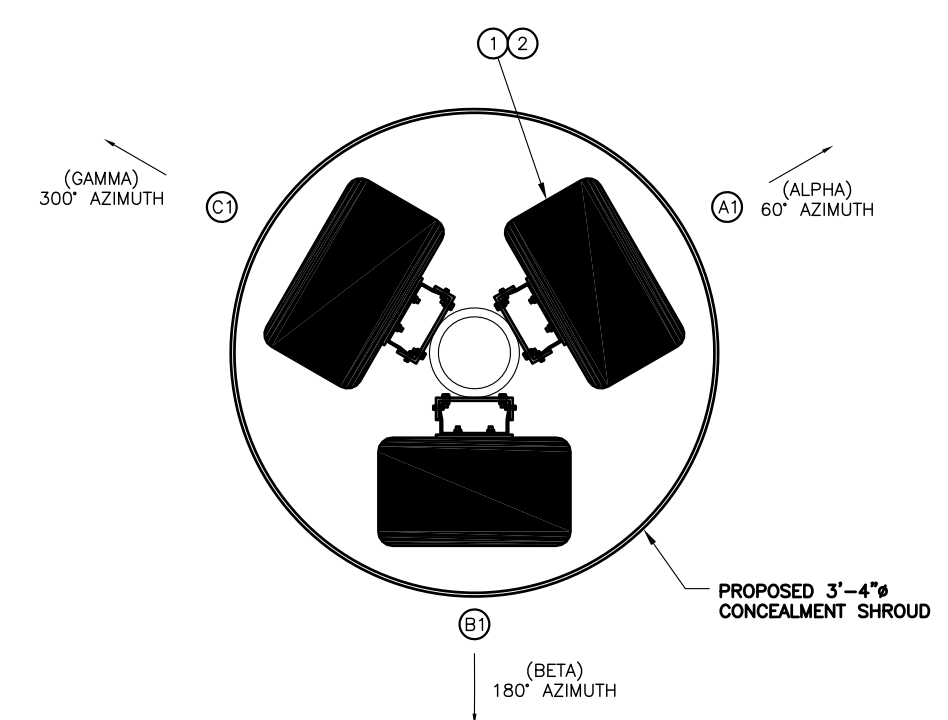
SHEET NUMBER: **A-2** REVISION: **1**



**1 ENLARGED AREA PLAN**  
 SCALE: 0' 1' 2' 4' 10'



**2 EXISTING ANTENNA ORIENTATION**  
 SCALE: 0' 6" 1' 2' 4'



**3 PROPOSED ANTENNA ORIENTATION**  
 SCALE: 0' 6" 1' 2' 4'




137212\_823630\_Danbury North-RT 37.dwg - Sheet-A-2 - User: ghoyes - Jan 19, 2021 - 11:00am

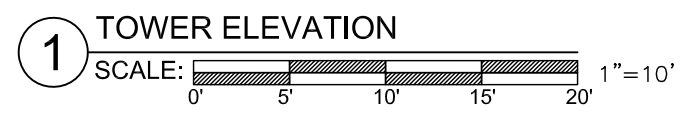
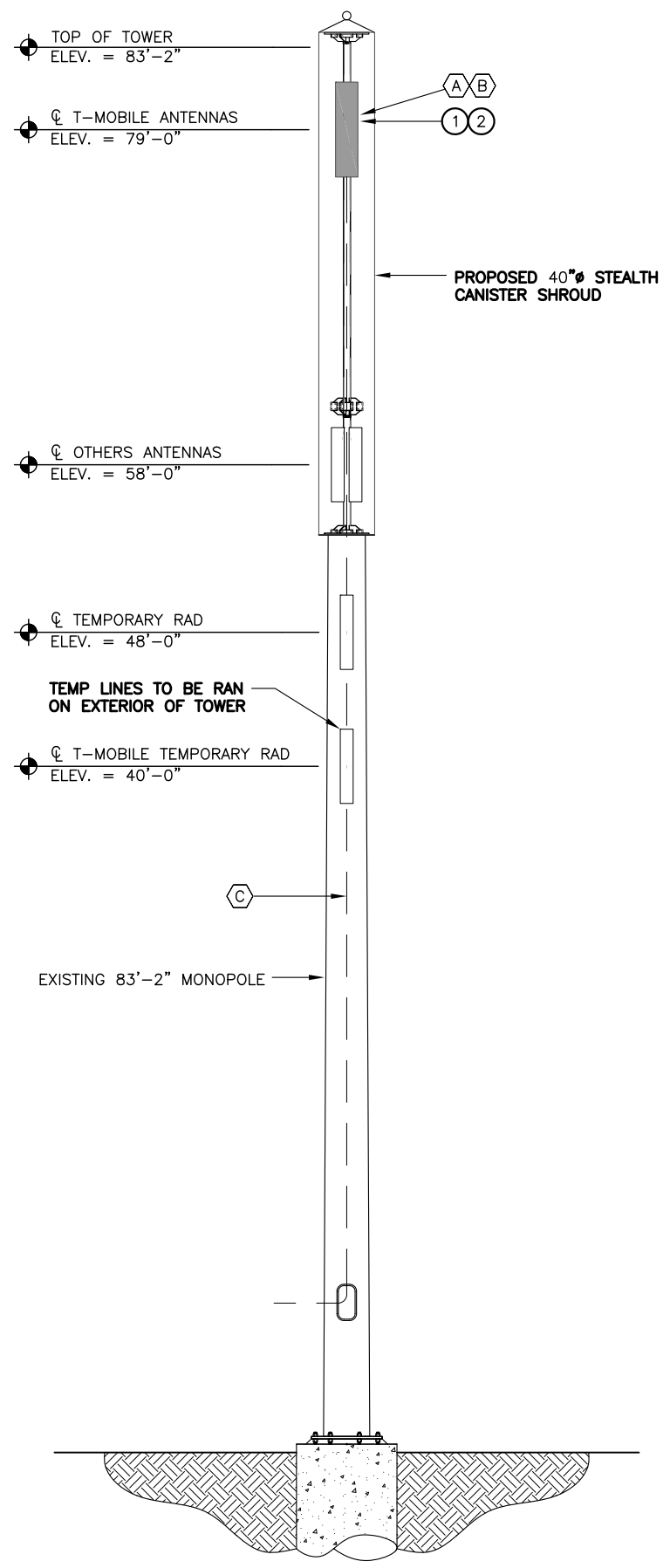


137212\_823630\_Danbury North-Rt. 37.dwg - Sheet-A-3 - User: ghoyes - Jan 19, 2021 - 11:01am

LEGEND	
EXISTING/DEMOLITION NOTES	INSTALLATION NOTES
(A) EXISTING RFS APX16DWV-16DWV-S-E-A20 ANTENNA TO BE REMOVED (TOTAL OF 3)	(1) INSTALL RFS APXVAR18_43-C-NA20 ANTENNAS. (TYP. OF 1 PER SECTOR, TOTAL OF 3)
(B) EXISTING TMAs TO BE REMOVED (TOTAL OF 6)	(2) INSTALL ANDREW ATSBT-BOTTOM-MF SMART BIAS T AT ANTENNA. DAISY CHAIN RETS. (TOTAL OF 3)
(C) EXISTING 7/8" COAX CABLES TO REMAIN (TOTAL OF 12)	
(D) EXISTING RUS01 B2 & B4 RADIOS TO REMAIN IN CABINET UNUSED	

EXISTING TOWER IS SUFFICIENT PER STRUCTURAL ANALYSIS BY PAUL J. FORD & COMPANY DATED 9/20/19.

LEGEND:  
 NEW  
 EXISTING  
 FUTURE



CT11195D  
 BU #: 823630  
 DANBURY NORTH/RT37  
 181 CLAPBOARD RIDGE ROAD  
 DANBURY, CT 06811  
 EXISTING 83'-2" MONOPOLE

PROJECT NO: 137212.003.01  
 CHECKED BY: GEH

ISSUED FOR:			
REV	DATE	DRWN	DESCRIPTION
0	8/12/19	RFC	ISSUE FOR CONSTRUCTION
1	1/19/21	SMM	ISSUE FOR CONSTRUCTION

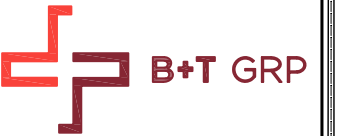
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SHEET NUMBER: **A-3** REVISION: **1**





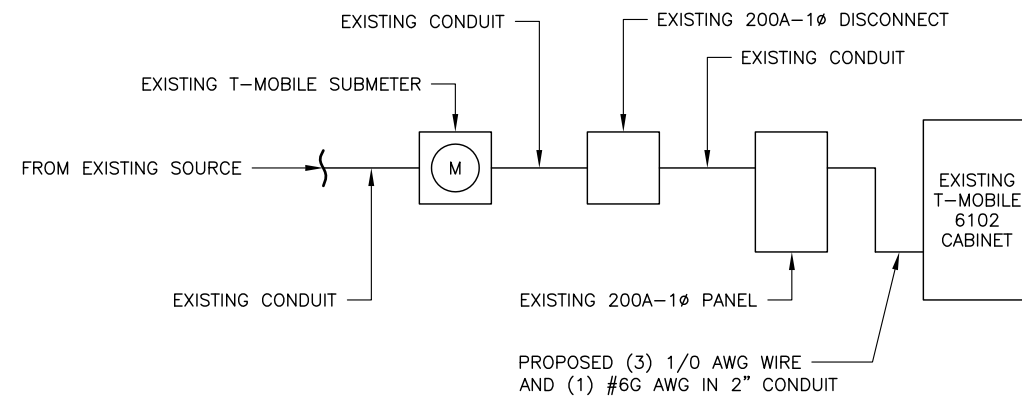
FINAL PANEL SCHEDULE							
LOAD	POLES	AMPS	BUS		AMPS	POLES	LOAD
			L1	L2			
BTS/UMTS	2	50A	1	2			
GFI	1	20A	3	4	15A	1	LED LIGHT
			5	6	125A	2	RBS 6102
			7	8			

RATED VOLTAGE:  120/240  \_\_\_\_\_ 1 PHASE, 3 WIRE  
 BRANCH POLES:  12  24  30  42 APPROVED MF'RS  
 RATED AMPS:  100  200  400  \_\_\_\_\_ CABINET:  SURFACE  FLUSH NEMA  1  3R  4X  
 MAIN LUGS ONLY  MAIN 200 AMPS  BREAKER  FUSED SWITCH  HINGED DOOR  KEYPED DOOR LATCH  
 FUSED  CIRCUIT BREAKER BRANCH DEVICES  \_\_\_\_\_ TO BE GFCI BREAKERS FULL NEUTRAL BUS GROUND BAR  
 ALL BREAKERS MUST BE RATED TO INTERRUPT A SHORT CIRCUIT ISC OF 10,000 AMPS SYMMETRICAL

REPLACE EXISTING BREAKER IN POSITION 6 AND 8 WITH A NEW 2P 125A BREAKER  
 REPLACE EXISTING WIRES FOR EXISTING 6102 CABINET WITH (3) 1/0 AWG THWN (COPPER) AND (1) #6G AWG. MINIMUM CONDUIT SIZE TO BE 2".  
 IF 125A BREAKER WILL NOT PROPERLY FIT IN EXISTING PANEL, REPLACE (E) PANEL WITH SQUARE D PANEL Q012040M200RB (OR APPROVED EQUAL).  
 UPGRADE FEEDER WIRES TO MEET AMPACITY IF NEW PANEL IS REQUIRED.  
 FINAL PANEL DESIGN AND CALCULATIONS FOR WIRE SIZE WERE BASED OFF OF EXISTING PHOTOS

**1** FINAL T-MOBILE PANEL DETAIL

SCALE: N.T.S.



**2** ONE-LINE DIAGRAM

SCALE: N.T.S.

CT11195D  
 BU #: 823630  
 DANBURY NORTH/RT37  
 181 CLAPBOARD RIDGE ROAD  
 DANBURY, CT 06811  
 EXISTING 83'-2" MONOPOLE

PROJECT NO: 137212.003.01

CHECKED BY: GEH

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	8/12/19	RFC	ISSUE FOR CONSTRUCTION
1	1/19/21	SMM	ISSUE FOR CONSTRUCTION

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SHEET NUMBER: REVISION:

E-1 1

# MODIFIED 83'-3" MONOPOLE

## BU #823630; DANBURY NORTH / RT 37

181 CLAPBOARD RIDGE ROAD  
DANBURY, CONNECTICUT 06811  
FAIRFIELD COUNTY

LAT: 41° 25' 59.47"; LONG: -73° 29' 32.76"  
ORDER: 494418 REV. 2; WO: 1772394

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**PJF PAUL J. FORD & COMPANY**  
250 E Broad St., Ste 600· Columbus, OH 43215  
Phone 614.221.6679 www.pauljford.com

**CROWN CASTLE**  
8 PARKMEADOW DR PITTSFORD, NY 14534  
(585) 889-3445

**PROJECT CONTACTS**

STRUCTURE OWNER:  
CROWN CASTLE  
MOD PM: DAN VADNEY AT DAN.VADNEY@CROWNCastle.COM  
PH: (518) 373-3510

ENGINEER OF RECORD:  
PJFMOD@PAULJFORD.COM

WIND DESIGN DATA	
REFERENCE STANDARD	ANSI/TIA-222-H-2017
LOCAL CODE	2018 CONNECTICUT STATE BUILDING CODE
ULTIMATE WIND SPEED (3-SECOND GUST)	120 MPH
CONVERTED NOMINAL WIND SPEED (3-SECOND GUST)	93 MPH
ICE THICKNESS	1.275 IN
ICE WIND SPEED	50 MPH
SERVICE WIND SPEED	60 MPH
STRUCTURE CLASS	II
EXPOSURE CATEGORY	B
Kzt	1.0

SHEET INDEX	
SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
MI-1	MI CHECKLIST
N-1	GENERAL NOTES
S-1	MONOPOLE PROFILE
S-2	CONCEALMENT ELEVATION DETAILS
S-3	CONCEALMENT SECTIONS
S-4	BULKHEAD DETAILS


HOT WORK INCLUDED	
NA	BASE GRINDING ONLY
NA	BASE WELDING (AND GRINDING)
NA	AERIAL GRINDING ONLY
NA	AERIAL WELDING (AND GRINDING)

TOWER MANUFACTURER: STEALTH  
TOWER MANUFACTURER #: VOIC-20499W-02

THE ASSOCIATED FAILING SA WO NUMBER FOR THIS PROJECT IS 1749108

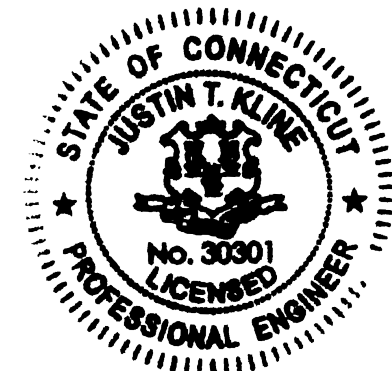
QUALIFIED ENGINEERING SERVICES ARE AVAILABLE FROM PAUL J. FORD & COMPANY TO ASSIST CONTRACTORS IN CLASS IV RIGGING PLAN REVIEWS. FOR REQUESTED QUALIFIED ENGINEERING SERVICES, PLEASE CONTACT PJFMOD@PAULJFORD.COM.

ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT (800) 788-7011.



**SAFETY CLIMB: "LOOK UP"**

THE INTEGRITY OF THE WIRE ROPE SAFETY CLIMB SYSTEM SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION AND INSPECTION. TOWER REINFORCEMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF ANY WIRE ROPE SAFETY CLIMB ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO; PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, OR IMPACT TO THE ANCHORAGE POINTS IN ANY WAY. ANY COMPROMISED SAFETY CLIMB MUST BE REPORTED TO YOUR CROWN POC FOR RESOLUTION, INCLUDING EXISTING CONDITIONS



**BU #823630; DANBURY NORTH / RT 37**  
 DANBURY, CONNECTICUT  
 MODIFIED 83'-3" MONOPOLE

PROJECT No: 37519-2998.001.7700  
DRAWN BY: DC/IM  
DESIGNED BY: GJA  
CHECKED BY: *[Signature]*  
DATE: 09-20-2019

TITLE SHEET

T-1

REV	DATE	DESCRIPTION

V1\_0 37519-2998.001.DWG

MI CHECKLIST			
REQUIRED	REPORT ITEM	APPLICABLE CROWN DOC #	BRIEF DESCRIPTION
<b>PRE-CONSTRUCTION</b>			
X	MI CHECKLIST DRAWING	CED-SOW-10007	THIS CHECKLIST SHALL BE INCLUDED IN THE MI REPORT.
X	EOR APPROVED SHOP DRAWINGS	CED-SOW-10007	ONCE THE PRE-MODIFICATION MAPPING IS COMPLETE AND PRIOR TO FABRICATION, THE CONTRACTOR SHALL PROVIDE DETAILED ASSEMBLY DRAWINGS AND/OR SHOP DRAWINGS. THESE ARE TO INCLUDE, BUT ARE NOT LIMITED TO, A VISUAL LAYOUT OF NEW REINFORCEMENT, EXISTING REINFORCEMENT CONFIGURATION, PORTHOLE, MOUNTS, STEP PEGS, SAFETY CLIMBS AND ANY OTHER MISCELLANEOUS ITEMS WHICH MAY AFFECT SUCCESSFUL INSTALLATION OF MODIFICATIONS ON THE TOWER. THESE DRAWINGS SHALL BE SUBMITTED TO THE EOR FOR APPROVAL. APPROVED ASSEMBLY/SHOP DRAWINGS SHALL BE SUBMITTED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATION INSPECTION	CED-SOW-10007	A LETTER FROM THE FABRICATOR, STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THE CONTRACT DOCUMENTS, SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATOR CERTIFIED WELD INSPECTION	CED-SOW-10007 CED-STD-10069	A CWI SHALL INSPECT ALL WELDING PERFORMED ON STRUCTURAL MEMBERS DURING FABRICATION. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	MATERIAL TEST REPORTS (MTR)	CED-SOW-10007	MATERIAL TEST REPORTS SHALL BE PROVIDED FOR MATERIAL USED AS REQUIRED PER SECTION 9.2.5 OF CED-SOW-10007. MTRS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	FABRICATOR NDE INSPECTION REPORT	CED-SOW-10066 CED-STD-10069	CRITICAL SHOP WELDS THAT REQUIRE TESTING ARE NOTED ON THESE CONTRACT DRAWINGS. A CERTIFIED NDT INSPECTOR SHALL PERFORM NON-DESTRUCTIVE EXAMINATION AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	NDE OF MONOPOLE BASE PLATE	ENG-SOW-10033	A NDE OF THE POLE TO BASE PLATE CONNECTION IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PACKING SLIPS	CED-SOW-10007	THE MATERIAL SHIPPING LIST SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
ADDITIONAL TESTING AND INSPECTIONS:			
<b>CONSTRUCTION</b>			
NA	FOUNDATION INSPECTIONS	CED-SOW-10144	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACING THE CONCRETE. A VISUAL OBSERVATION OF THE REBAR SHALL BE PERFORMED BEFORE PLACING THE EPOXY. A SEALED WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	CONCRETE COMP. STRENGTH AND SLUMP TEST	CED-SOW-10144	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROVIDED AS PART OF THE FOUNDATION REPORT.
NA	EARTHWORK	CED-SOW-10144	FOUNDATION SUB-GRADES SHALL BE INSPECTED AND APPROVED BY AN APPROVED FOUNDATION INSPECTOR AND RESULTS INCLUDED AS PART OF THE FOUNDATION REPORT.
NA	MICROPILE/ROCK ANCHOR	CED-SOW-10144	MICROPILES/ROCK ANCHORS SHALL BE INSPECTED BY THE FOUNDATION INSPECTION VENDOR AND SHALL BE INCLUDED AS PART OF THE FOUNDATION INSPECTION REPORT, ADDITIONAL TESTING AND/OR INSPECTION REQUIREMENTS ARE NOTED IN THESE CONTRACT DOCUMENTS.
NA	POST-INSTALLED ANCHOR ROD VERIFICATION	CED-SOW-10007	POST INSTALLED ANCHOR ROD VERIFICATION SHALL BE PERFORMED IN ACCORDANCE WITH CROWN REQUIREMENTS AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	BASE PLATE GROUT VERIFICATION	ENG-STD-10323	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR THAT CERTIFIES THAT THE GROUT WAS REMOVED AND/OR INSTALLED IN ACCORDANCE WITH CROWN REQUIREMENTS FOR INCLUSION IN THE MI REPORT.
NA	FIELD CERTIFIED WELD INSPECTION	CED-SOW-10066 CED-STD-10069	A CROWN APPROVED CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST FIELD WELDS, FOLLOWING ALL PROCEDURES SPECIFIED IN CROWN STANDARD DOCUMENTS APPLICABLE TO WELD INSPECTIONS. A REPORT SHALL BE PROVIDED. NDE OF FIELD WELDS SHALL BE PERFORMED AS REQUIRED BY CROWN STANDARDS AND CONTRACT DOCUMENTS. THE NDE REPORT SHALL BE INCLUDED IN THE CWI REPORT.
X	ON-SITE COLD GALVANIZING VERIFICATION	ENG-STD-10149 ENG-BUL-10149	THE GENERAL CONTRACTOR SHALL PROVIDE WRITTEN AND PHOTOGRAPHIC DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY ON-SITE COLD GALVANIZING WAS APPLIED PER MANUFACTURER SPECIFICATIONS AND APPLICABLE STANDARDS.
NA	TENSION TWIST AND PLUMB	CED-PRC-10182 CED-STD-10261	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT IN ACCORDANCE WITH APPLICABLE STANDARDS DOCUMENTING TENSION TWIST AND PLUMB.
X	GC AS-BUILT DRAWINGS	CED-SOW-10007	THE GENERAL CONTRACTOR SHALL SUBMIT A LEGIBLE COPY OF THE ORIGINAL DESIGN DRAWINGS EITHER STATING "INSTALLED AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINEER OF RECORD. EOR/RFI FORMS APPROVING ALL CHANGES SHALL BE SUBMITTED WHEN THE EOR IS SPECIFYING ADDITIONAL INSPECTIONS DESCRIPTION AND APPLICABLE STANDARDS SHALL BE APPLIED.
ADDITIONAL TESTING AND INSPECTIONS:			
<b>POST-CONSTRUCTION</b>			
X	CONSTRUCTION COMPLIANCE LETTER	CED-SOW-10007	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THESE CONTRACT DRAWINGS, INCLUDING LISTING ADDITIONAL PARTIES TO THE MODIFICATION PROCESS.
NA	POST-INSTALLED ANCHOR ROD PULL TESTS	CED-PRC-10119	POST-INSTALLED ANCHOR RODS SHALL BE TESTED BY A CROWN APPROVED PULL TEST INSPECTOR AND A REPORT SHALL BE PROVIDED INDICATING TESTING RESULTS.
X	PHOTOGRAPHS	CED-SOW-10007	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI. PHOTOS SHALL DOCUMENT ALL PHASES OF THE CONSTRUCTION. THE PHOTOS SHALL BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
NA	BOLT INSTALLATION VERIFICATION REPORT	CED-SOW-10007	THE MI INSPECTOR SHALL VERIFY THE INSTALLATION AND TIGHTNESS 10% OF ALL NON PRE-TENSIONED BOLTS INSTALLED AS PART OF THE MODIFICATION. THE MI INSPECTOR SHALL LOOSEN THE NUT AND VERIFY THE BOLT HOLE SIZE AND CONDITION. THE MI REPORT SHALL CONTAIN THE COMPLETED BOLT INSTALLATION VERIFICATION REPORT, INCLUDING THE SUPPORTING PHOTOGRAPHS.
X	PUNCHLIST DEVELOPMENT AND CORRECTION DOCUMENTATION	CED-PRC-10283 CED-FRM-10285	FINAL PUNCHLIST INDICATING ALL NONCONFORMANCE(S) IDENTIFIED AND THE FINAL RESOLUTION AND APPROVAL.
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	CED-SOW-10007	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACTOR'S REDLINE DRAWING AND THE ACTUAL COMPLETED INSTALLATION.
ADDITIONAL TESTING AND INSPECTIONS:			
X	FACT TIA INSPECTION	OPS-SOW-10127	PERFORM FACT TIA INSPECTION PER CROWN CASTLE DOC OPS-SOW-10127
X	CONCEALMENT REINFORCING SOLUTION	OPS-SOW-10127 OPS-PRC-10127	INSTALL CONCEALMENT REINFORCING SOLUTION PER CROWN CASTLE DOC OPS-SOW-10127 & OPS-PRC-10127

MODIFICATION INSPECTION NOTES

GENERAL

THE MI IS AN ON-SITE VISUAL AND HANDS-ON INSPECTION OF TOWER MODIFICATIONS INCLUDING A REVIEW OF CONSTRUCTION REPORTS AND ADDITIONAL PERTINENT DOCUMENTATION PROVIDED BY THE GENERAL CONTRACTOR (GC), AS WELL AS ANY INSPECTION DOCUMENTS PROVIDED BY 3RD PARTY INSPECTORS. THE MI IS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS; IN ACCORDANCE WITH APPLICABLE CROWN STANDARDS; AND AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

NO DOCUMENT, CODE OR POLICY CAN ANTICIPATE EVERY SITUATION THAT MAY ARISE. ACCORDINGLY, THIS CHECKLIST IS INTENDED TO SERVE AS A SOURCE OF GUIDING PRINCIPLES IN ESTABLISHING GUIDELINES FOR MODIFICATION INSPECTION.

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, AND THE MI INSPECTOR DOES NOT TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES. THE MI INSPECTOR SHALL INSPECT AND NOTE CONFORMANCE/NONCONFORMANCE AND PROVIDE TO THE CROWN POINT OF CONTACT (CROWN POC) FOR EVALUATION.

ALL MI'S SHALL BE CONDUCTED BY A CROWN APPROVED MI INSPECTOR, WORKING FOR A CROWN APPROVED MI VENDOR. SEE CROWN CED-LST-10173, "APPROVED MI VENDORS".

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PURCHASE ORDER ( PO ) IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN THE GC AND/OR INSPECTOR SHALL CONTACT THE CROWN POINT OF CONTACT (POC).

REFER TO CROWN CED-SOW-10007, "MODIFICATION INSPECTION SOW", FOR FURTHER DETAILS AND REQUIREMENTS.

SERVICE LEVEL COMMITMENT

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING AN MI REPORT:

- THE GC SHALL PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLY 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY MINOR DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

REQUIRED PHOTOS

BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
  - RAW MATERIALS
  - PHOTOS OF ALL CRITICAL DETAILS
  - FOUNDATION MODIFICATIONS
  - WELD PREPARATION
  - BOLT INSTALLATION
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN ONLY FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO CROWN DOCUMENT # CED-SOW-10007.

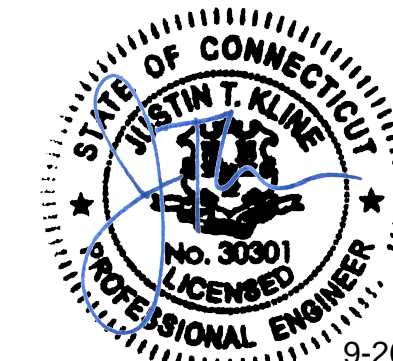
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**PAUL J. FORD & COMPANY**  
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**CROWN CASTLE**  
 8 PARKMEADOW DR PITTSFORD, NY 14534  
 (585) 899-3445

**BU #823630; DANBURY NORTH / RT 37**  
 DANBURY, CONNECTICUT  
 MODIFIED 83'-3" MONOPOLE

PROJECT No:	37519-2998.001.7700
DRAWN BY:	DC/IM
DESIGNED BY:	GJA
CHECKED BY:	<i>[Signature]</i>
DATE:	09-20-2019



MI CHECKLIST

MI-1

REV	DATE	DESCRIPTION

**GENERAL NOTES:**

- The General Contractor (GC) shall reference CED-STD-10159, "Tower Modification Construction Specifications", as a continuation of the following General Notes. The GC shall keep a copy of this document with the Structural Design Drawings (SDD) at all times, and shall ensure that all Contractor Personnel are aware of the information enclosed within the General Notes and CED-STD-10159.
- The Contract Documents are the property of Crown Castle (Crown). They are provided to the GC and its Lower Tier Contractors and material suppliers for the limited purpose of use in completing the Work for this Site, and shall be kept in strict confidence and not disclosed to any third parties. The Contract Documents shall not be used for any other purpose whatsoever without the prior written consent of Crown.
- Detail drawings, including notes and tables, shall govern over general notes and typical details. Contact the Crown Point of Contact (POC) and Engineer of Record (EOR) for clarification as needed.
- Do not scale drawings.
- Any Work performed without a prefabrication mapping is done at the risk of the GC and/or fabricator. All dimensions of existing structural elements are assumed based on the available documentation and are preliminary until field-verified by the GC, unless noted otherwise (UNO). Where discrepancies are found, GC shall contact the Crown POC and EOR through RFI.
- For this analysis and modification, the tower has been assumed to be in good condition without any structural defects, UNO. If the GC discovers any indication of an existing structural defect, contact the Crown POC and EOR immediately.
- All construction means and methods, including but not limited to erection plans, rigging plans, climbing plans, and rescue plans, shall be the responsibility of the GC responsible for the execution of the Work contained herein, and shall meet ANSI/ASSE A10.48 (latest edition); federal, state, and local regulations; and any applicable industry consensus standards related to the construction activities being performed. All rigging plans shall adhere to ANSI/ASSE A10.48 (latest edition) and Crown standard CED-STD-10253, "Rigging Program", including the required involvement of a qualified engineer for class IV construction to certify the supporting structure(s) in accordance with the ANSI/TIA-322 (latest edition).
- The structural integrity of the modification design extends to the complete condition only. The GC must be cognizant that the removal of any structural component of an existing tower has the potential to cause the partial or complete collapse of the structure. All necessary precautions must be taken to ensure structural integrity, including, but not limited to, engineering assessment of construction stresses with installation maximum wind speed and/or temporary bracing and shoring.
- Aerial and underground utilities and facilities may or may not be shown on the drawings. The GC shall take every precaution to preserve and protect these items, which may include aerial or underground power lines, telephone lines, water lines, sewer lines, cable television facilities, pipelines, structures and other public and private improvements within or adjacent to the Work area. The responsibility for determining the actual on-site location of these items shall rest exclusively with the GC.
- All manufacturer's hardware assembly instructions shall be followed, UNO. Conflicting notes shall be brought to the attention of the EOR and the Crown POC.

- The GC shall fabricate all required items per the materials specified below, UNO on the detail drawing sheets. If the GC finds for any component that the materials have not been clearly specified, the GC shall submit an RFI to the EOR to confirm the required material.  
All structural elements shall be new and shall conform to the following requirements, UNO:  
Monopoles:
  - Structural shapes and plates: ASTM A572 Grade 65 (FY = 65 KSI)
  - Welding electrodes, SMAW: E80XX
  - Welding electrodes, FCAW: E8XT-XX
 Self-Support and Guyed Towers:
  - Structural shapes and plates: ASTM A572 Grade 50 (FY = 50 KSI)
  - Welding electrodes, SMAW: E70XX
  - Welding electrodes, FCAW: E7XT-XX
 All tower types:
  - Steel angle: ASTM A572 Grade 50 (FY = 50 KSI)
  - Solid rod: ASTM A36 (FY = 36 KSI)
  - Pipe/tube (round): ASTM A500 Grade C (FY = 46 KSI)
  - Pipe/tube (square): ASTM A500 Grade C (FY = 50 KSI)
  - Bolts: ASTM F3125 Grade A325 Type 1
  - U-bolts: ASTM A307 Grade A, or SAE J429 Grade 2
  - Nuts: ASTM A563 Grade DH
  - Washers: ASTM F436 Type 1
  - Guy Wires: ASTM A475 Grade EHS
  - Bridge Strand: ASTM A586 Grade 1
- After fabrication, hot-dip galvanize all steel items, UNO. Galvanize per ASTM A123, ASTM A153/A153M, or ASTM A653 G90, as applicable. ASTM A490 bolts shall not be hot-dip galvanized, but shall instead be coated with Magni 565 or EOR approved equivalent, per ASTM F2833.
- Contractor Personnel shall not drill holes in any new or existing structural members, other than those drilled holes shown on structural drawings, without the approval of the EOR.
- For a list of Crown-approved cold galvanizing compounds, refer to ENG-STD-10149, "Tower Protective Coatings Guidelines".
- All exposed structural steel as the result of this scope of Work including welds (after final inspection of the weld by the CWI), field drilled holes, and shaft interiors (where accessible), shall be cleaned and two (2) coats cold galvanizing shall be applied by brush in accordance with ENG-STD-10149, "Tower Protective Coatings Guidelines". Photo documentation is required to be submitted to the MI Inspector.
- If removal of existing modifications is required per the modification scope, the GC shall clean and cold galvanize any existing empty bolt holes, UNO. If additional unexpected, oversized, or slotted holes are found, the GC shall contact the EOR and Crown POC for guidance prior to proceeding with the modifications.
- All Work involving base plate grout scope items or resulting in disturbance of base plate grout shall reference ENG-STD-10323, "Base Plate Grout", and shall follow any Base Plate Grout Removal Notes contained herein.

- All tower grounding affected by the Work shall be repaired or replaced in accordance with OPS-STD-10090, "Tower Grounding", and OPS-BUL-10133, "Grounding Repair Recommendation".
- If scope of modification requires removal or covering of tower ID tag, the tag must be replaced.
- Any hardware removed from the existing tower shall be replaced with new hardware of equal size and quality, UNO. No existing fasteners shall be reused.
- All joints using ASTM A325 or A490 bolts, U-bolts, V-bolts, and threaded rods shall be snug tightened, UNO.
- A nut locking device shall be installed on all proposed and/or replaced snug tightened ASTM A325 or A490 bolts, U-bolts, V-bolts, and threaded rods.
- All joints are bearing type connections UNO. If no bolt length is given in the Bill of Materials, the connection may include threads in the shear planes, and the GC is responsible for sizing the length of the bolt.
- Blind bolts shall be installed per the installation specifications on the corresponding Approved Fastener sheets contained in CED-CAT-10300, "Monopole Standard Drawings and Approved Reinforcement Components".
- If ASTM A325 or A490 bolts, and/or threaded rods are specified to be pre-tensioned, these shall be installed and tightened to the pretensioned condition according to the requirements of the RCSC Specification for Structural Joints Using ASTM High Strength Bolts.
- All proposed and/or replaced bolts shall be of sufficient length such that the end of the bolt be at least flush with the face of the nut. It is not permitted for the bolt end to be below the face of the nut after tightening is completed.

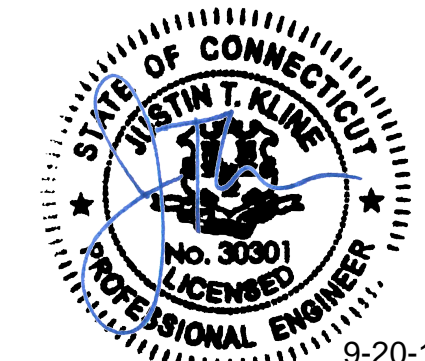
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**BU #823630; DANBURY NORTH / RT 37**  
 DANBURY, CONNECTICUT  
 MODIFIED 83'-3" MONOPOLE

PROJECT No:	37519-2998.001.7700
DRAWN BY:	DC/IM
DESIGNED BY:	GJA
CHECKED BY:	<i>[Signature]</i>
DATE:	09-20-2019



**GENERAL NOTES**

**N-1**

REV	DATE	DESCRIPTION
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V1.D 37519-2998.001.DWG

TOWER MODIFICATION SCHEDULE			
	ELEVATION	TOWER MODIFICATION DESCRIPTION	REFERENCE SHEETS
(A)	54'-2" TO 83'-8"	REMOVE EXISTING CONCEALMENT SHROUDS	S-1
(B)	53'-9" TO 83'-3"	INSTALL NEW CONCEALMENT BULKHEADS AND SHROUDS	S-2 TO S-4
(C)	53'-9" TO 83'-3"	INSTALL CONCEALMENT REINFORCING SOLUTION PER CROWN CASTLE DOC OPS-PRC-10127	S-1
(D)	53'-9" TO 83'-3"	PAINT MODIFICATIONS TO MATCH EXISTING POLE	S-1
(E)	83'-3"	INSTALL NEW BALL TRUCK AND TRUCK ARM	S-2
(F)	53'-9"	REMOVE AND REPLACE EXISTING FLANGE BOLTS	S-3
(G)	83'-3"	FIELD DRILL NEW HOLES FOR INSTALLATION OF NEW BULKHEAD	S-3

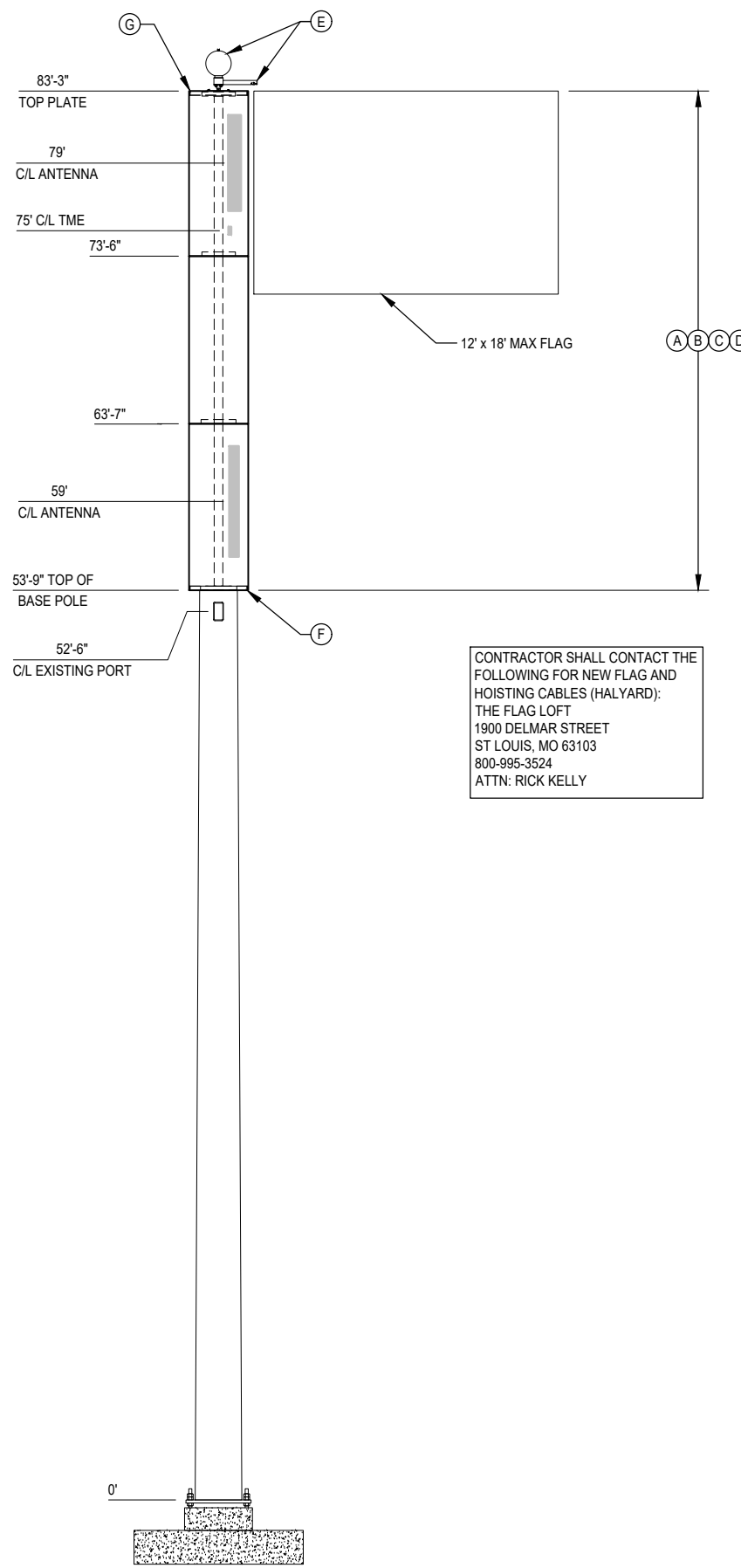
MANUFACTURER POLE SPECIFICATIONS	
TAPER	0.12 IN/FT
BASE PLATE STEEL	ASTM A572 GRADE 50 (50 KSI)
ANCHOR RODS	2 1/4" Ø ASTM 615 GRADE 75
FLANGE PLATE STEEL	NA
FLANGE BOLTS	NA

SHAFT SECTION DATA							
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (FT)	DIAMETER ACROSS FLATS (IN)		POLE GRADE (ksi)	POLE SHAPE
				@ TOP	@ BOTTOM		
1	29.50	0.75000		6.000	6.000	65	ROUND
2	53.75	0.2500		26.625	33.075	65	18-SIDED

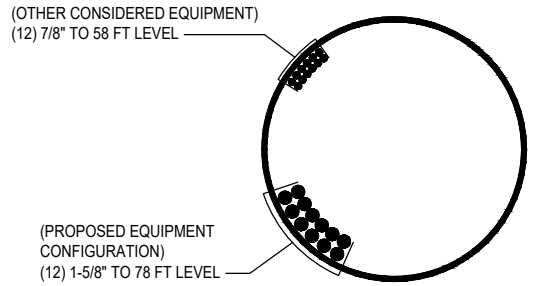
NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

PRIOR TO FABRICATION AND INSTALLATION CONTRACTOR SHALL VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY AND SHALL NOT BE USED FOR FABRICATION.

"FOR PARTS NOT DETAILED WITHIN THE DRAWING AND STARTING WITH "CCI-", SEE CATALOG FOR DETAILS: CED-CAT-10300, MONOPOLE STANDARD DRAWINGS AND APPROVED REINFORCEMENT COMPONENTS

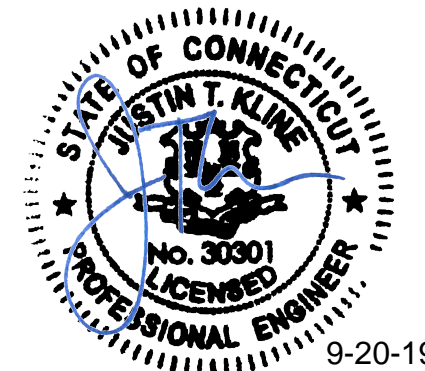


CONTRACTOR SHALL CONTACT THE FOLLOWING FOR NEW FLAG AND HOISTING CABLES (HALYARD):  
 THE FLAG LOFT  
 1900 DELMAR STREET  
 ST LOUIS, MO 63103  
 800-995-3524  
 ATTN: RICK KELLY



COAX LAYOUT 2  
S-1

POLE ELEVATION 1  
S-1



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DATE:	09-20-2019

MONOPOLE PROFILE

S-1

REV	DATE	DESCRIPTION

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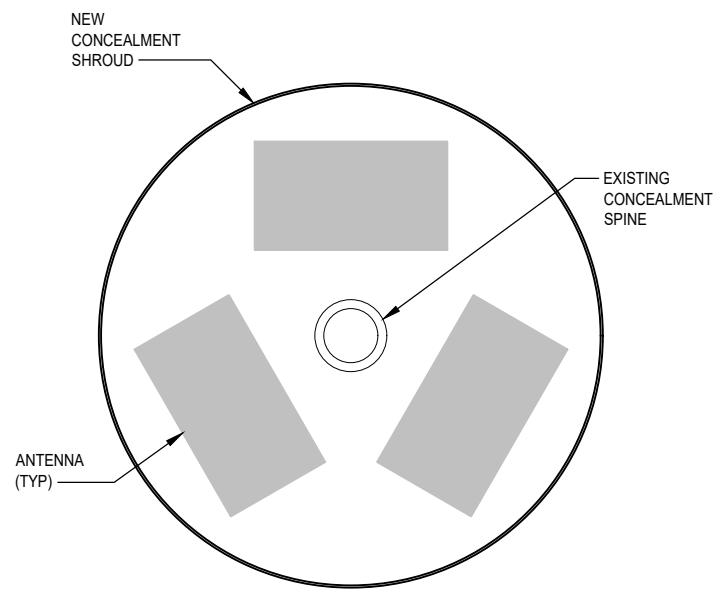
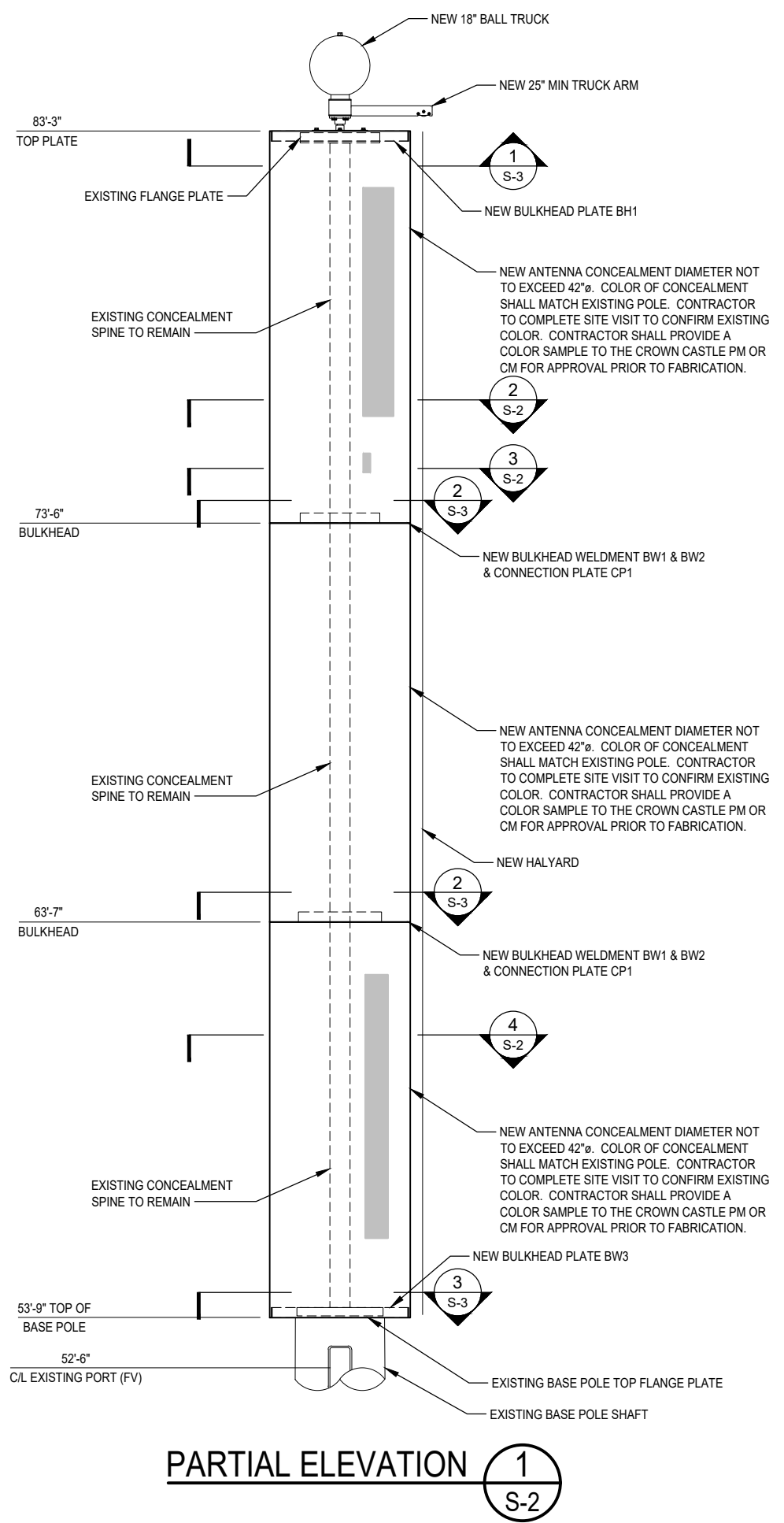
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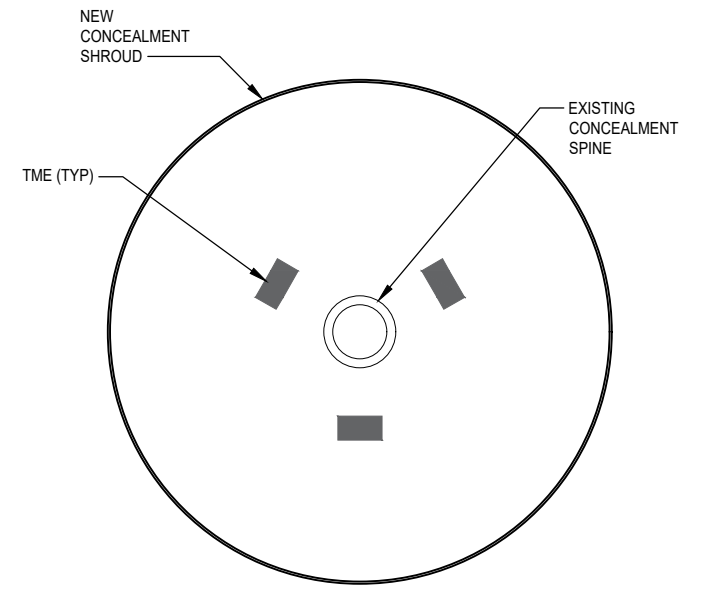
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 DRAWN BY: DC/IM  
 DESIGNED BY: GJA  
 CHECKED BY: *[Signature]*  
 DATE: 09-20-2019

**CONCEALMENT ELEVATION DETAILS**

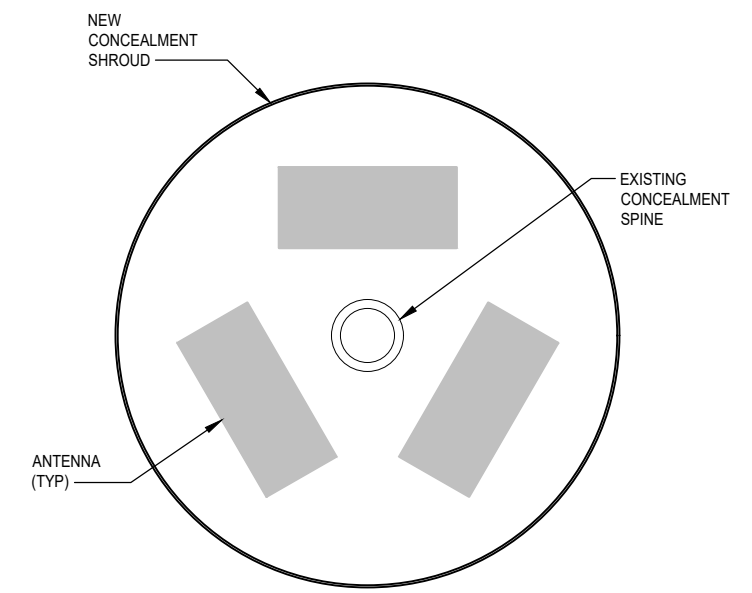
**S-2**



**SECTION 2**  
 (PROPOSED ANTENNA FIT) S-2



**SECTION 3**  
 (PROPOSED ANTENNA FIT) S-2



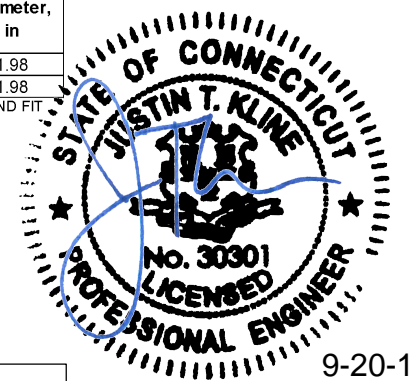
**SECTION 4**  
 (PROPOSED ANTENNA FIT) S-2

Antenna Model	QUANTITY	Antenna Centerline Elevation, ft	Height, in	Depth, in	Width, in
APXVAR18_43-C-NA20	3	79	68	9	16
ATSBT-BOTTOM-MF	3	75	5.63	2	3.7
80010798	3	59	78.5	6.7	14.8
DTMABP7819VG12A	6	55	10.63	3.78	11.02

NOTE: ALL ANTENNA DIMENSIONS HAVE BEEN PROVIDED BY CROWN CASTLE. A 4" SPACING BETWEEN THE SPINE AND ANTENNA HAS BEEN ASSUMED.

Coax Model	QUANTITY	Elevation, ft	Nominal Diameter, in	Actual Diameter, in
LDF7-50A	12	78	1 5/8	1.98
LDF5-50A	12	58	1 5/8	1.98

NOTE: COAX LAYOUT AND FIT IS THEORETICAL. ACTUAL LAYOUT AND FIT MAY VARY PENDING EXISTING CONDITIONS.



REV	DATE	DESCRIPTION

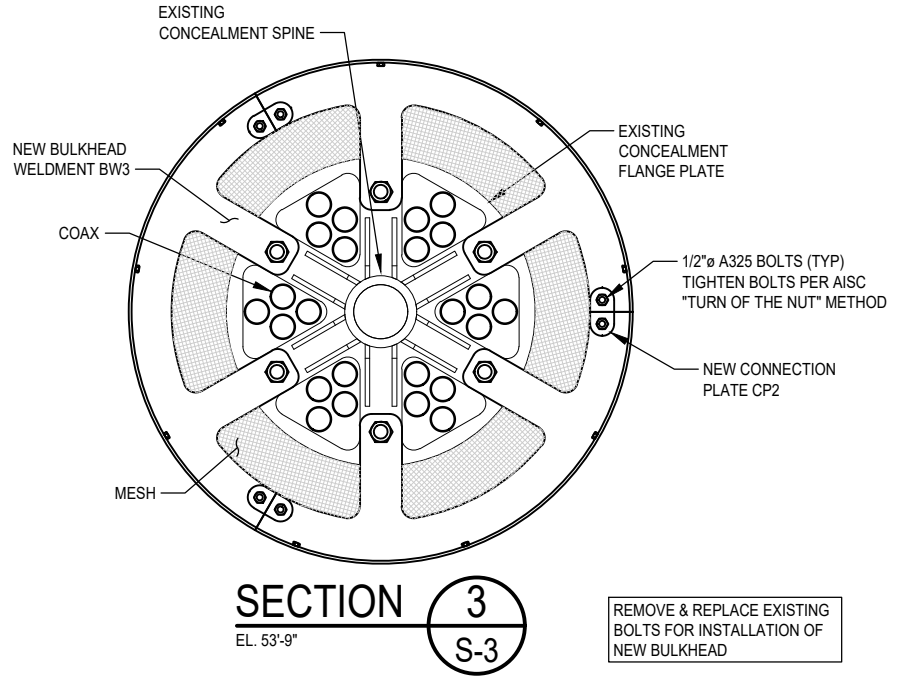
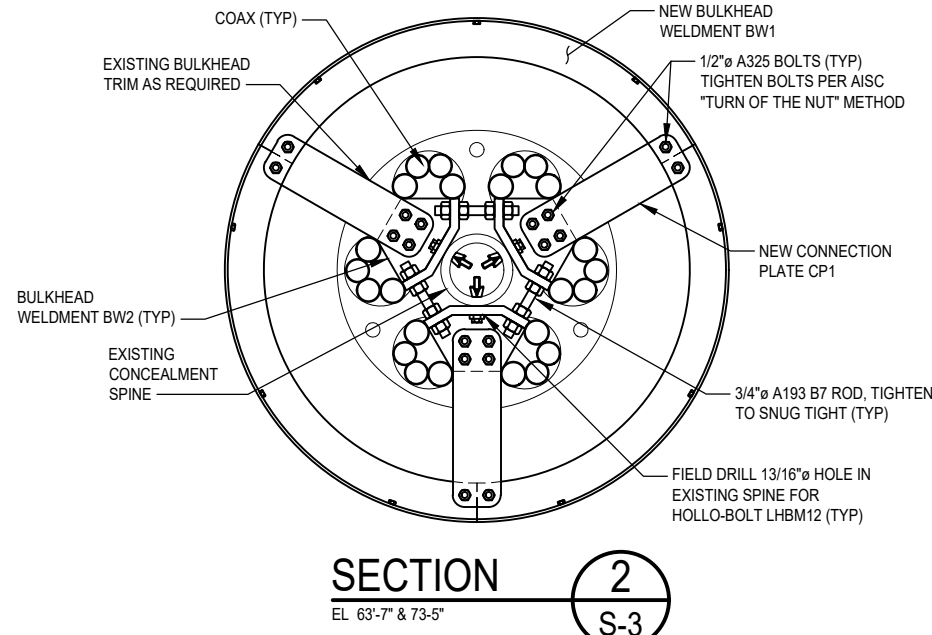
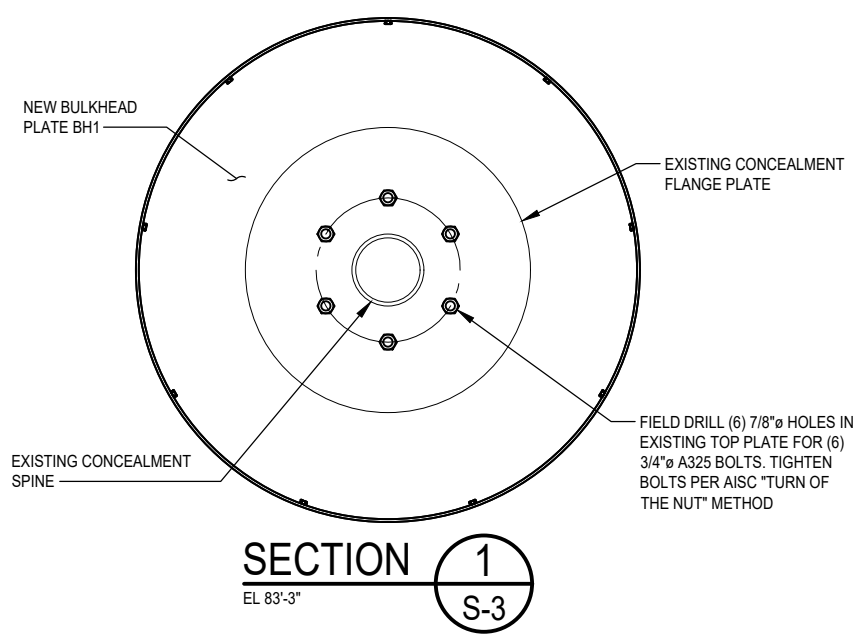
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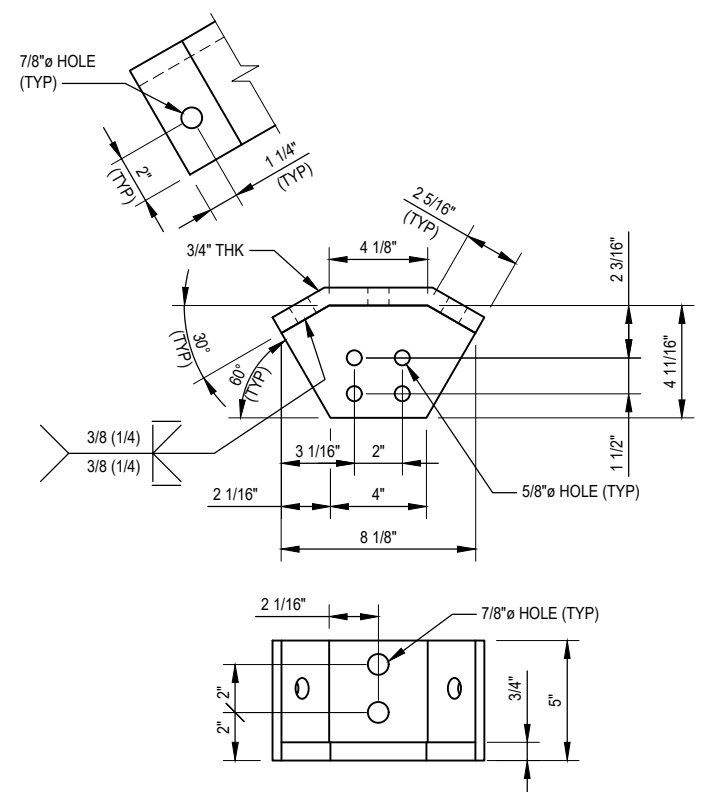
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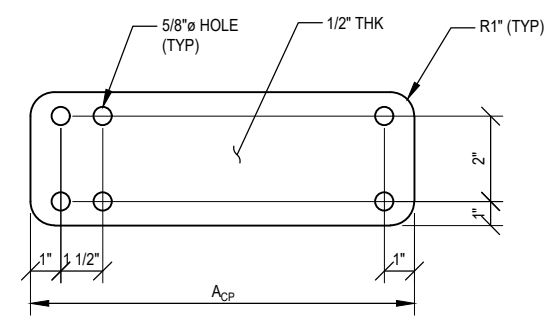
REMOVE & REPLACE EXISTING BOLTS FOR INSTALLATION OF NEW BULKHEAD

INSTALL SHEET METAL CONNECTORS, INC. 1/2" x 1/2" ZINC PLATED ALL STEEL WIRE MESH OR APPROVED EQUIVALENT TO COVER OPENING OUTSIDE OF BASE POLE. FASTEN TO BULKHEAD USING HILTI S-MD 12-24x1 1/4 HWH #5 OR APPROVED EQUIVALENT SELF DRILLING SCREW AND 1" x 1/8" WASHERS WITH 1/4" HOLE.

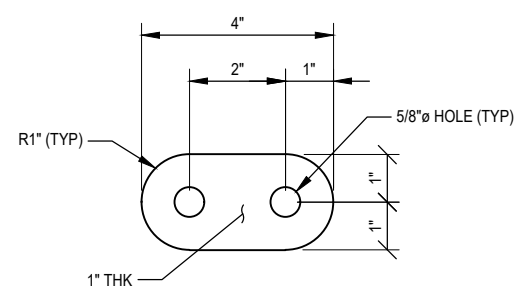
NOTE: CONTRACTOR SHALL COORDINATE WITH CROWN CM AND PM ON BIRD DETERRENT SYSTEM TO BE PLACED ATOP OF THE MESH



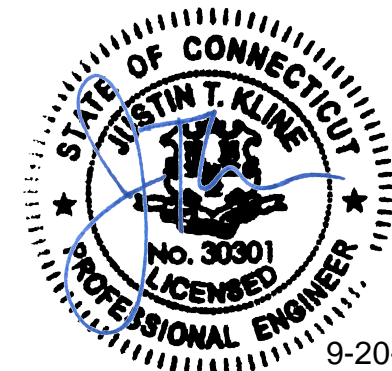
**BULKHEAD WELDMENT MK~BW2**  
 (6 REQUIRED) (ASTM A36)



CONNECTION PLATE			
PART #	GRADE	QTY	A <sub>CP</sub> (IN)
CP1	ASTM A36	6	14 1/2



**CONNECTION PLATE MK~CP1**  
 (3 REQUIRED) (ASTM A36)



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CONCEALMENT SECTIONS

S-3

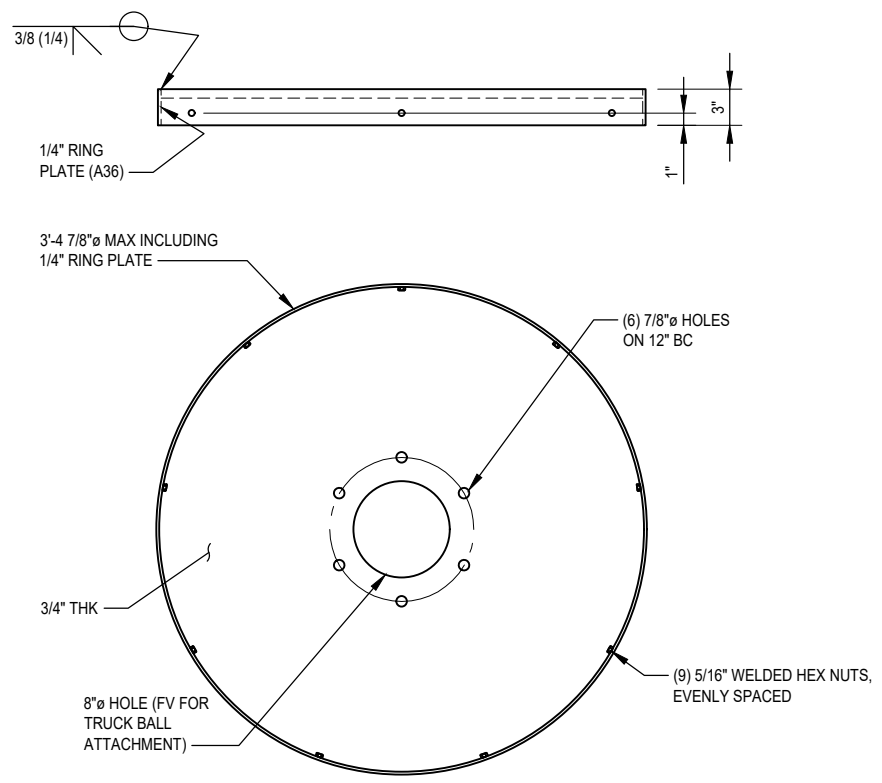
REV	DATE	DESCRIPTION

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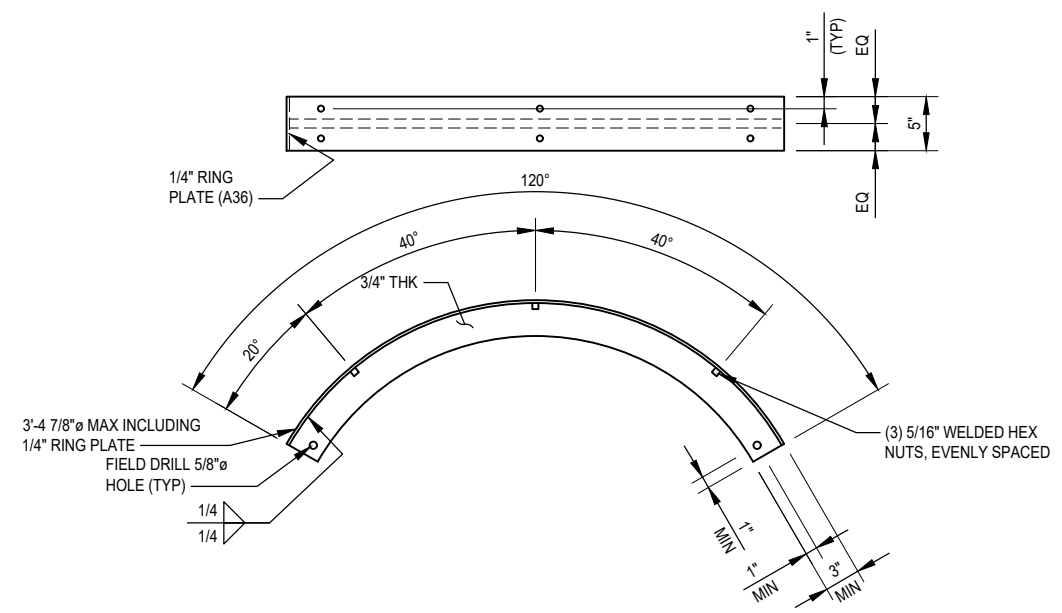
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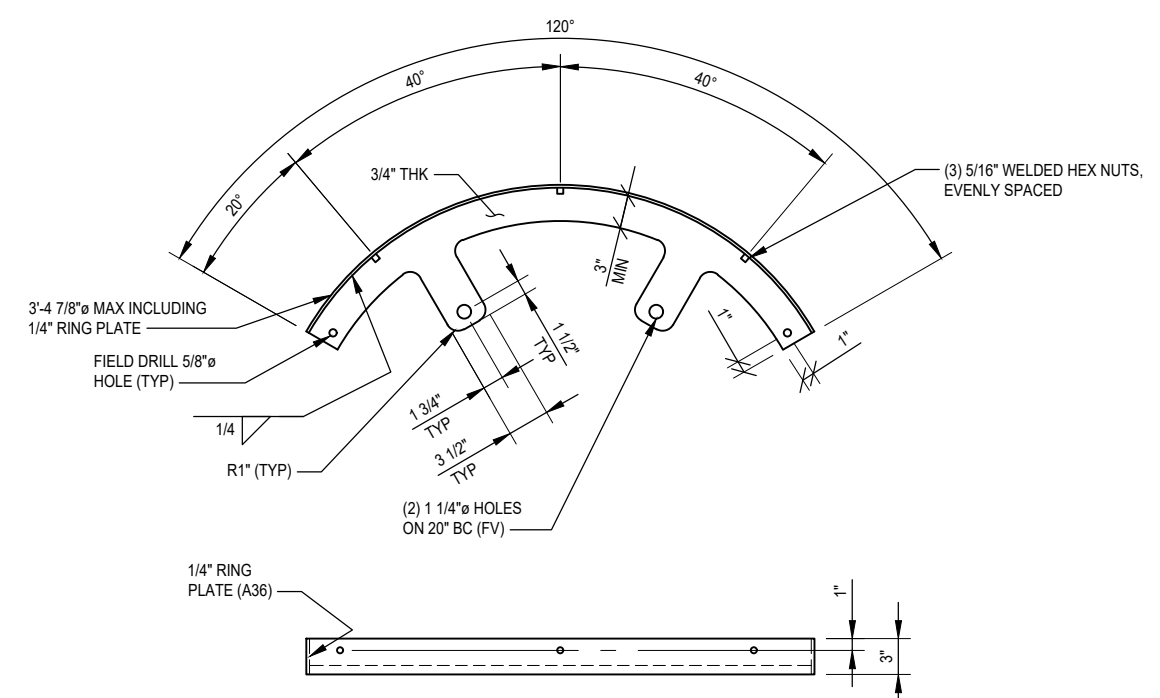
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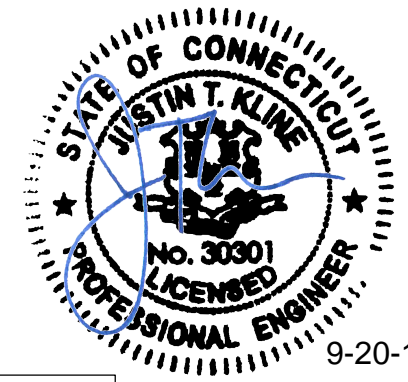
**BULKHEAD PLATE MK~BH1**  
 (1 REQUIRED) (ASTM A36)



**BULKHEAD WELDMENT MK~BW1**  
 (6 REQUIRED) (ASTM A36)



**BULKHEAD WELDMENT MK~BW3**  
 (3 REQUIRED) (ASTM A36)



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 CHECKED BY: *[Signature]*  
 DATE: 09-20-2019

**BULKHEAD DETAILS**

**S-4**

REV	DATE	DESCRIPTION

V1.0 37519-2998.001.DWG

Date: **September 20, 2019**

Steve Tuttle  
Crown Castle  
3 Corporate Dr  
Clifton Park, NY 12065

Paul J. Ford and Company  
250 East Broad St., Suite 600  
Columbus, OH 43215  
(614) 221-6679

**Subject:** Structural Modification Report

**Carrier Designation:** T-Mobile Co-Locate  
**Carrier Site Number:** CT11195D  
**Carrier Site Name:** Danury North /Rt 37

**Crown Castle Designation:** Crown Castle BU Number: 823630  
Crown Castle Site Name: Danbury North / Rt 37  
Crown Castle JDE Job Number: 576543  
Crown Castle Work Order Number: 1772394  
Crown Castle Order Number: 494418 Rev. 2

**Engineering Firm Designation:** Paul J. Ford and Company Project Number: 37519-2998.001.7700

**Site Data:** 181 Clapboard Ridge Road, Danbury, Fairfield County, CT  
Latitude 41° 25' 59.467", Longitude -73° 29' 32.761"  
83.25 Foot - Monopole Tower

Dear Steve Tuttle,

Paul J. Ford and Company is pleased to submit this "Structural Modification 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: Modified Structure w/ Considered + Proposed Equipment Configuration **Sufficient Capacity - 43.3%**

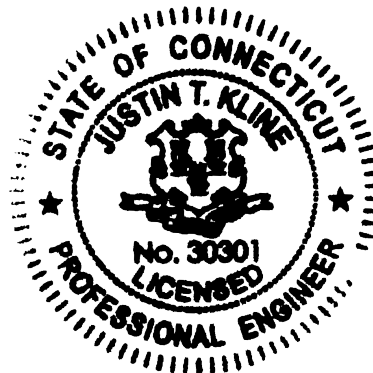
This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut State Building Code and Appendix N. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

Respectfully submitted by:



Grant J. Austin  
Structural Designer  
gaustin@pauljford.com



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tnxTower Output

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### 7) APPENDIX C

Additional Calculations

### 8) APPENDIX D

Modification Drawings

## 1) INTRODUCTION

This tower is a 83.25 ft Monopole tower designed by Stealth Network Technologies Inc. in December of 2002.

The tower has been modified per reinforcement drawings prepared by Stealth Concealment Solutions, in September of 2008. Reinforcement consist of concealment shrouds.

## 2) ANALYSIS CRITERIA

<b>TIA-222 Revision:</b>	TIA-222-H
<b>Risk Category:</b>	II
<b>Wind Speed:</b>	120 mph
<b>Exposure Category:</b>	B
<b>Topographic Factor:</b>	1
<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)
78.4	78.4	1	misc	42"Ø x 9.9' Concealment	--	--
78.0	79.0	3	rfs celwave	APXVAR18_43-C-NA20	12	7/8
	76.0	3	andrew	ATSBT-BOTTOM-MF		
68.6	68.6	1	misc	42"Ø x 9.8' Concealment	--	--
59.0	59.0	1	misc	42"Ø x 9.9' Concealment	--	--

**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)
58.0	59.0	3	kathrein	80010798	12	7/8
		6	cci antennas	DTMABP7819VG12A		

### 3) ANALYSIS PROCEDURE

**Table 3 - Documents Provided**

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	JGI, 00736G, 12/21/2000	3501507	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Stealth, VOIC-20499W-02, 11/13/2002	3501506	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Stealth, VOIC-20499W-02, 12/05/2002	3771879	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Stealth, ATTW-80662W-02R2, 09/10/2008	6523932	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	PJF, 31908-0086, 06/19/2008	3501502	CCISITES

#### 3.1) Analysis Method

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

#### 3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 4) Base plate grout was not installed at the time of the analysis and has not been considered.
- 5) Monopole was modified in conformance with the referenced modification drawings.
- 6) Monopole will be modified in conformance with the attached proposed modification drawings.

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

#### 4) ANALYSIS RESULTS

**Table 4 - Section Capacity (Summary)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	83.25 - 53.75	Pole	TP6x6x0.6975	1	-3.83	768.61	36.1	Pass
L2	53.75 - 0	Pole	TP33.075x26.625x0.25	2	-10.39	1599.92	18.2	Pass
							Summary	
						Pole (L1)	36.1	Pass
						<b>RATING =</b>	<b>36.1</b>	<b>Pass</b>

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

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	26.7	Pass
1	Base Plate	0	29.0	Pass
1	Base Foundation Structural Steel	0	27.4	Pass
1	Base Foundation Soil Interaction	0	43.3	Pass
1	Flange Connection	53.25	Sufficient	Pass

<b>Structure Rating (max from all components) =</b>	<b>43.3%</b>
---	--------------

Notes:

- All structural ratings are per TIA-222-H Section 15.5
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

#### 4.1) Recommendations

Perform the modifications detailed in Appendix D to remedy the deficiencies identified in Crown Castle Work Order No. 1749108.

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

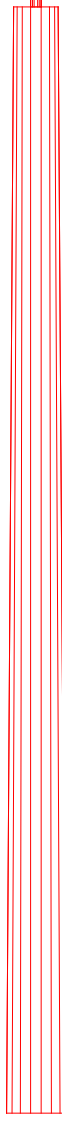
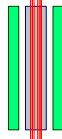


Section	1	2	5.5
Length (ft)	29.50	53.75	
Number of Sides	0	18	
Thickness (in)	0.6975	0.2500	
Top Dia (in)	6.0000	26.6250	
Bot Dia (in)	6.0000	33.0750	
Grade		A572-65	
Weight (K)	1.2	4.3	

83.3 ft



53.8 ft



0.0 ft

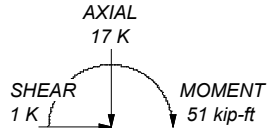
**MATERIAL STRENGTH**

GRADE	Fy	Fu	GRADE	Fy	Fu
ATM A519 C.D.	70 ksi	85 ksi	A572-65	65 ksi	80 ksi

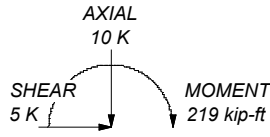
**TOWER DESIGN NOTES**

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.27 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TIA-222-H Annex S
9. TOWER RATING: 36.1%


ALL REACTIONS  
ARE FACTORED



50 mph WIND - 1.275 in ICE



REACTIONS - 120 mph WIND

 <p><b>Paul J. Ford and Company</b> 250 E. Broad St., Ste 600 Columbus, OH 43215 Phone: 614-221-6679 FAX:</p>	<b>Job: 83.25-Ft Monopole / Danbury North / Rt 3</b>		
	<b>Project: PJF 37519-2998.001.7805 / BU# 823630</b>		
	Client: Crown Castle	Drawn by: Grant Austin	App'd:
	Code: TIA-222-H	Date: 09/19/19	Scale: NTS
	Path:		Dwg No. E-1

## Tower Input Data

The tower is a monopole.

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

The following design criteria apply:

- 1) Tower is located in Fairfield County, Connecticut.
- 2) Tower base elevation above sea level: 788.91 ft.
- 3) Basic wind speed of 120 mph.
- 4) Risk Category II.
- 5) Exposure Category B.
- 6) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- 7) Topographic Category: 1.
- 8) Crest Height: 0.00 ft.
- 9) Nominal ice thickness of 1.2750 in.
- 10) Ice thickness is considered to increase with height.
- 11) Ice density of 56 pcf.
- 12) A wind speed of 50 mph is used in combination with ice.
- 13) Temperature drop of 50 °F.
- 14) Deflections calculated using a wind speed of 60 mph.
- 15) TIA-222-H Annex S.
- 16) A non-linear (P-delta) analysis was used.
- 17) Pressures are calculated at each section.
- 18) Stress ratio used in pole design is 1.05.
- 19) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile  Include Bolts In Member Capacity  Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt.  Autocalc Torque Arm Areas  Add IBC .6D+W Combination Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs	Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption  <div style="text-align: center; background-color: #e0e0e0; padding: 2px;"><b>Poles</b></div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known
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## Tapered Pole Section Geometry

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
L1	83.25-53.75	29.50	0.00	Round	6.0000	6.0000	0.6975		ATM A519 C.D. (70 ksi)
L2	53.75-0.00	53.75		18	26.6250	33.0750	0.2500	1.0000	A572-65 (65 ksi)

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	It/Q in <sup>2</sup>	w in	w/t
L1	6.0000	11.6192	41.5429	1.8909	3.0000	13.8476	83.0858	5.8061	0.0000	0
	6.0000	11.6192	41.5429	1.8909	3.0000	13.8476	83.0858	5.8061	0.0000	0
L2	26.9972	20.9286	1839.3390	9.3631	13.5255	135.9905	3681.0983	10.4663	4.2460	16.984
	33.5467	26.0466	3545.6722	11.6529	16.8021	211.0255	7096.0099	13.0258	5.3812	21.525

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A <sub>r</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontal	Double Angle Stitch Bolt Spacing Redundants
ft	ft <sup>2</sup>	in					in	in	in
L1 83.25-53.75				1	0	1			
L2 53.75-0.00				1	1	1			

### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight plf
LDF7-50A(1-5/8)	C	No	No	Inside Pole	78.00 - 0.00	12	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
***									
LDF5-50A(7/8)	C	No	No	Inside Pole	58.00 - 0.00	6	No Ice	0.00	0.33
							1/2" Ice	0.00	0.33
							1" Ice	0.00	0.33
							2" Ice	0.00	0.33
LDF5-50A(7/8)	C	No	No	Inside Pole	58.00 - 0.00	6	No Ice	0.00	0.33
							1/2" Ice	0.00	0.33
							1" Ice	0.00	0.33
							2" Ice	0.00	0.33

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation	Face	A <sub>R</sub>	A <sub>F</sub>	C <sub>A</sub> A <sub>A</sub> In Face	C <sub>A</sub> A <sub>A</sub> Out Face	Weight
n	ft		ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	K
L1	83.25-53.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.26
L2	53.75-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.74

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

Tower Section	Tower Elevation	Face or Leg	Ice Thickness	A <sub>R</sub>	A <sub>F</sub>	C <sub>A</sub> A <sub>A</sub> In Face	C <sub>A</sub> A <sub>A</sub> Out Face	Weight
n	ft		in	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	K
L1	83.25-53.75	A	1.372	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.26
L2	53.75-0.00	A	1.247	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.74

### Feed Line Center of Pressure

Section	Elevation	CP <sub>x</sub>	CP <sub>z</sub>	CP <sub>x</sub> Ice	CP <sub>z</sub> Ice
	ft	in	in	in	in
L1	83.25-53.75	0.0000	0.0000	0.0000	0.0000
L2	53.75-0.00	0.0000	0.0000	0.0000	0.0000

### 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

### User Defined Loads

Description	Elevation	Offset From Centroid	Azimuth Angle	Weight	F <sub>x</sub>	F <sub>z</sub>	Wind Force	C <sub>AA</sub> C	
	ft	ft	°	K	K	K	K	ft <sup>2</sup>	
Flag	83.25	0.00	0.0000	No Ice	0.02	0.00	0.00	0.41	11.71
				Ice	0.59	0.00	0.00	0.07	12.09
				Service	0.02	0.00	0.00	0.10	13.09

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			ft ft ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
APXVAR18_43-C-NA20	A	From Leg	1.00	0.0000	78.00	No Ice	0.00	0.00	0.07
			0.00			1/2"	0.00	0.00	0.13
			1.00			Ice	0.00	0.00	0.20
						1" Ice	0.00	0.00	0.36
						2" Ice			
APXVAR18_43-C-NA20	B	From Leg	1.00	0.0000	78.00	No Ice	0.00	0.00	0.07
			0.00			1/2"	0.00	0.00	0.13
			1.00			Ice	0.00	0.00	0.20
						1" Ice	0.00	0.00	0.36
						2" Ice			
APXVAR18_43-C-NA20	C	From Leg	1.00	0.0000	78.00	No Ice	0.00	0.00	0.07
			0.00			1/2"	0.00	0.00	0.13
			1.00			Ice	0.00	0.00	0.20
						1" Ice	0.00	0.00	0.36
						2" Ice			
ATSBT-BOTTOM-MF	A	From Leg	1.00	0.0000	78.00	No Ice	0.00	0.00	0.00
			0.00			1/2"	0.00	0.00	0.00
			-2.00			Ice	0.00	0.00	0.01
						1" Ice	0.00	0.00	0.01
						2" Ice			
ATSBT-BOTTOM-MF	B	From Leg	1.00	0.0000	78.00	No Ice	0.00	0.00	0.00
			0.00			1/2"	0.00	0.00	0.00
			-2.00			Ice	0.00	0.00	0.01
						1" Ice	0.00	0.00	0.01
						2" Ice			
ATSBT-BOTTOM-MF	C	From Leg	1.00	0.0000	78.00	No Ice	0.00	0.00	0.00
			0.00			1/2"	0.00	0.00	0.00
			-2.00			Ice	0.00	0.00	0.01
						1" Ice	0.00	0.00	0.01
						2" Ice			
***									
80010798	A	From Leg	1.00	0.0000	58.00	No Ice	0.00	0.00	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
			0.00			1/2"	0.00	0.00	0.15
			1.00			Ice	0.00	0.00	0.22
						1" Ice	0.00	0.00	0.37
						2" Ice			
80010798	B	From Leg	1.00	0.0000	58.00	No Ice	0.00	0.00	0.09
			0.00			1/2"	0.00	0.00	0.15
			1.00			Ice	0.00	0.00	0.22
						1" Ice	0.00	0.00	0.37
						2" Ice			
80010798	C	From Leg	1.00	0.0000	58.00	No Ice	0.00	0.00	0.09
			0.00			1/2"	0.00	0.00	0.15
			1.00			Ice	0.00	0.00	0.22
						1" Ice	0.00	0.00	0.37
						2" Ice			
(2) DTMABP7819VG12A	A	From Leg	1.00	0.0000	58.00	No Ice	0.00	0.00	0.02
			0.00			1/2"	0.00	0.00	0.03
			1.00			Ice	0.00	0.00	0.04
						1" Ice	0.00	0.00	0.06
						2" Ice			
(2) DTMABP7819VG12A	B	From Leg	1.00	0.0000	58.00	No Ice	0.00	0.00	0.02
			0.00			1/2"	0.00	0.00	0.03
			1.00			Ice	0.00	0.00	0.04
						1" Ice	0.00	0.00	0.06
						2" Ice			
(2) DTMABP7819VG12A	C	From Leg	1.00	0.0000	58.00	No Ice	0.00	0.00	0.02
			0.00			1/2"	0.00	0.00	0.03
			1.00			Ice	0.00	0.00	0.04
						1" Ice	0.00	0.00	0.06
						2" Ice			
*****									
Canister Load1	C	None		0.0000	83.25	No Ice	7.68	7.68	0.11
						1/2"	7.86	7.86	0.23
						Ice	8.04	8.04	0.36
						1" Ice	8.41	8.41	0.63
						2" Ice			
Canister Load2	C	None		0.0000	73.50	No Ice	15.36	15.36	0.51
						1/2"	15.72	15.72	0.76
						Ice	16.09	16.09	1.02
						1" Ice	16.82	16.82	1.56
						2" Ice			
Canister Load3	C	None		0.0000	63.75	No Ice	15.55	15.55	0.51
						1/2"	15.92	15.92	0.77
						Ice	16.29	16.29	1.03
						1" Ice	17.03	17.03	1.57
						2" Ice			
Canister Load4	C	None		0.0000	53.75	No Ice	7.88	7.88	0.40
						1/2"	8.06	8.06	0.53
						Ice	8.25	8.25	0.67
						1" Ice	8.63	8.63	0.94
						2" Ice			
Truck Ball	C	None		0.0000	84.00	No Ice	0.88	0.88	0.05
						1/2"	1.38	1.38	0.07
						Ice	1.53	1.53	0.09
						1" Ice	1.85	1.85	0.13
						2" Ice			

### Tower Pressures - No Ice

$G_H = 1.100$

Section Elevation ft	z ft	$K_Z$	$q_z$ psf	$A_G$ ft <sup>2</sup>	Face	$A_F$ ft <sup>2</sup>	$A_R$ ft <sup>2</sup>	$A_{leg}$ ft <sup>2</sup>	Leg %	$C_A A_A$ In Face ft <sup>2</sup>	$C_A A_A$ Out Face ft <sup>2</sup>
L1 83.25-53.75	68.50	0.887	30.19	14.750	A	0.000	0.000	0.000	0.00	0.000	0.000
					B	0.000	0.000	0.00	0.000	0.000	
					C	0.000	0.000	0.00	0.000	0.000	
L2 53.75-0.00	26.47	0.7	24.80	135.59 3	A	0.000	135.593	135.593	100.00	0.000	0.000
					B	0.000	135.593	100.00	0.000	0.000	
					C	0.000	135.593	100.00	0.000	0.000	

### Tower Pressure - With Ice

$G_H = 1.100$

Section Elevation ft	z ft	$K_Z$	$q_z$ psf	$t_z$ in	$A_G$ ft <sup>2</sup>	Face	$A_F$ ft <sup>2</sup>	$A_R$ ft <sup>2</sup>	$A_{leg}$ ft <sup>2</sup>	Leg %	$C_A A_A$ In Face ft <sup>2</sup>	$C_A A_A$ Out Face ft <sup>2</sup>
L1 83.25-53.75	68.50	0.887	5.24	1.3716	21.494	A	0.000	0.000	0.000	0.00	0.000	0.000
						B	0.000	0.000	0.00	0.000	0.000	
						C	0.000	0.000	0.00	0.000	0.000	
L2 53.75-0.00	26.47	0.7	4.31	1.2472	146.766	A	0.000	146.766	146.766	100.00	0.000	0.000
						B	0.000	146.766	100.00	0.000	0.000	
						C	0.000	146.766	100.00	0.000	0.000	

### Tower Pressure - Service

$G_H = 1.100$

Section Elevation ft	z ft	$K_Z$	$q_z$ psf	$A_G$ ft <sup>2</sup>	Face	$A_F$ ft <sup>2</sup>	$A_R$ ft <sup>2</sup>	$A_{leg}$ ft <sup>2</sup>	Leg %	$C_A A_A$ In Face ft <sup>2</sup>	$C_A A_A$ Out Face ft <sup>2</sup>
L1 83.25-53.75	68.50	0.887	6.75	14.750	A	0.000	0.000	0.000	0.00	0.000	0.000
					B	0.000	0.000	0.00	0.000	0.000	
					C	0.000	0.000	0.00	0.000	0.000	
L2 53.75-0.00	26.47	0.7	5.55	135.59 3	A	0.000	135.593	135.593	100.00	0.000	0.000
					B	0.000	135.593	100.00	0.000	0.000	
					C	0.000	135.593	100.00	0.000	0.000	

### Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice

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

### Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	83.25 - 53.75	Pole	Max Tension	9	0.00	0.00	0.00
			Max. Compression	26	-7.93	0.00	0.00
			Max. Mx	8	-3.83	-38.73	0.00
			Max. My	2	-3.83	0.00	38.73
			Max. Vy	8	1.87	-22.53	0.00
			Max. Vx	2	-1.87	0.00	22.53
			Max. Torque	4			-0.00
L2	53.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-17.39	0.00	0.00
			Max. Mx	8	-10.39	-218.99	0.00
			Max. My	2	-10.39	0.00	218.99
			Max. Vy	8	4.69	-218.99	0.00
			Max. Vx	2	-4.69	0.00	218.99
			Max. Torque	6			0.00

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	17.39	0.00	0.00
	Max. H <sub>x</sub>	20	10.39	4.68	0.00
	Max. H <sub>z</sub>	2	10.39	0.00	4.68

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. M <sub>x</sub>	2	218.99	0.00	4.68
	Max. M <sub>z</sub>	8	218.99	-4.68	0.00
	Max. Torsion	6	0.00	-4.06	2.34
	Min. Vert	9	7.79	-4.68	0.00
	Min. H <sub>x</sub>	8	10.39	-4.68	0.00
	Min. H <sub>z</sub>	14	10.39	0.00	-4.68
	Min. M <sub>x</sub>	14	-218.99	0.00	-4.68
	Min. M <sub>z</sub>	20	-218.99	4.68	0.00
	Min. Torsion	10	-0.00	-4.06	-2.34

### Tower Mast Reaction Summary

Load Combination	Vertical	Shear <sub>x</sub>	Shear <sub>z</sub>	Overturning Moment, M <sub>x</sub>	Overturning Moment, M <sub>z</sub>	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	8.66	0.00	0.00	0.00	0.00	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	10.39	0.00	-4.68	-218.99	0.00	0.00
0.9 Dead+1.0 Wind 0 deg - No Ice	7.79	0.00	-4.68	-217.77	0.00	0.00
1.2 Dead+1.0 Wind 30 deg - No Ice	10.39	2.34	-4.06	-189.65	-109.50	0.00
0.9 Dead+1.0 Wind 30 deg - No Ice	7.79	2.34	-4.06	-188.61	-108.90	0.00
1.2 Dead+1.0 Wind 60 deg - No Ice	10.39	4.06	-2.34	-109.50	-189.65	-0.00
0.9 Dead+1.0 Wind 60 deg - No Ice	7.79	4.06	-2.34	-108.90	-188.61	-0.00
1.2 Dead+1.0 Wind 90 deg - No Ice	10.39	4.68	0.00	0.00	-218.99	0.00
0.9 Dead+1.0 Wind 90 deg - No Ice	7.79	4.68	0.00	0.00	-217.77	0.00
1.2 Dead+1.0 Wind 120 deg - No Ice	10.39	4.06	2.34	109.50	-189.65	0.00
0.9 Dead+1.0 Wind 120 deg - No Ice	7.79	4.06	2.34	108.90	-188.61	0.00
1.2 Dead+1.0 Wind 150 deg - No Ice	10.39	2.34	4.06	189.65	-109.50	-0.00
0.9 Dead+1.0 Wind 150 deg - No Ice	7.79	2.34	4.06	188.61	-108.90	-0.00
1.2 Dead+1.0 Wind 180 deg - No Ice	10.39	0.00	4.68	218.99	0.00	0.00
0.9 Dead+1.0 Wind 180 deg - No Ice	7.79	0.00	4.68	217.77	0.00	0.00
1.2 Dead+1.0 Wind 210 deg - No Ice	10.39	-2.34	4.06	189.65	109.50	0.00
0.9 Dead+1.0 Wind 210 deg - No Ice	7.79	-2.34	4.06	188.61	108.90	0.00
1.2 Dead+1.0 Wind 240 deg - No Ice	10.39	-4.06	2.34	109.50	189.65	-0.00
0.9 Dead+1.0 Wind 240 deg - No Ice	7.79	-4.06	2.34	108.90	188.61	-0.00
1.2 Dead+1.0 Wind 270 deg - No Ice	10.39	-4.68	0.00	0.00	218.99	0.00
0.9 Dead+1.0 Wind 270 deg - No Ice	7.79	-4.68	0.00	0.00	217.77	0.00
1.2 Dead+1.0 Wind 300 deg - No Ice	10.39	-4.06	-2.34	-109.50	189.65	0.00
0.9 Dead+1.0 Wind 300 deg - No Ice	7.79	-4.06	-2.34	-108.90	188.61	0.00
1.2 Dead+1.0 Wind 330 deg - No Ice	10.39	-2.34	-4.06	-189.65	109.50	-0.00
0.9 Dead+1.0 Wind 330 deg - No Ice	7.79	-2.34	-4.06	-188.61	108.90	-0.00
1.2 Dead+1.0 Ice+1.0 Temp	17.39	0.00	0.00	0.00	0.00	0.00
1.2 Dead+1.0 Wind 0	17.39	0.00	-1.20	-50.78	0.00	0.00



Load Combination	Vertical	Shear <sub>x</sub>	Shear <sub>z</sub>	Overturning Moment, M <sub>x</sub>	Overturning Moment, M <sub>z</sub>	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 30	17.39	0.60	-1.04	-43.98	-25.39	0.00
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 60	17.39	1.04	-0.60	-25.39	-43.98	-0.00
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 90	17.39	1.20	0.00	0.00	-50.78	0.00
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 120	17.39	1.04	0.60	25.39	-43.98	0.00
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 150	17.39	0.60	1.04	43.98	-25.39	-0.00
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 180	17.39	0.00	1.20	50.78	0.00	0.00
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 210	17.39	-0.60	1.04	43.98	25.39	0.00
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 240	17.39	-1.04	0.60	25.39	43.98	-0.00
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 270	17.39	-1.20	0.00	0.00	50.78	0.00
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 300	17.39	-1.04	-0.60	-25.39	43.98	0.00
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 330	17.39	-0.60	-1.04	-43.98	25.39	-0.00
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	8.66	0.00	-1.06	-49.72	0.00	0.00
Dead+Wind 30 deg - Service	8.66	0.53	-0.92	-43.06	-24.86	0.00
Dead+Wind 60 deg - Service	8.66	0.92	-0.53	-24.86	-43.06	-0.00
Dead+Wind 90 deg - Service	8.66	1.06	0.00	0.00	-49.72	0.00
Dead+Wind 120 deg - Service	8.66	0.92	0.53	24.86	-43.06	0.00
Dead+Wind 150 deg - Service	8.66	0.53	0.92	43.06	-24.86	-0.00
Dead+Wind 180 deg - Service	8.66	0.00	1.06	49.72	0.00	0.00
Dead+Wind 210 deg - Service	8.66	-0.53	0.92	43.06	24.86	0.00
Dead+Wind 240 deg - Service	8.66	-0.92	0.53	24.86	43.06	-0.00
Dead+Wind 270 deg - Service	8.66	-1.06	0.00	0.00	49.72	0.00
Dead+Wind 300 deg - Service	8.66	-0.92	-0.53	-24.86	43.06	0.00
Dead+Wind 330 deg - Service	8.66	-0.53	-0.92	-43.06	24.86	-0.00

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-8.66	0.00	0.00	8.66	0.00	0.000%
2	0.00	-10.39	-4.68	0.00	10.39	4.68	0.003%
3	0.00	-7.79	-4.68	0.00	7.79	4.68	0.006%
4	2.34	-10.39	-4.06	-2.34	10.39	4.06	0.003%
5	2.34	-7.79	-4.06	-2.34	7.79	4.06	0.003%
6	4.06	-10.39	-2.34	-4.06	10.39	2.34	0.003%
7	4.06	-7.79	-2.34	-4.06	7.79	2.34	0.003%
8	4.68	-10.39	0.00	-4.68	10.39	0.00	0.003%
9	4.68	-7.79	0.00	-4.68	7.79	0.00	0.006%
10	4.06	-10.39	2.34	-4.06	10.39	-2.34	0.003%
11	4.06	-7.79	2.34	-4.06	7.79	-2.34	0.003%
12	2.34	-10.39	4.06	-2.34	10.39	-4.06	0.003%
13	2.34	-7.79	4.06	-2.34	7.79	-4.06	0.003%
14	0.00	-10.39	4.68	0.00	10.39	-4.68	0.003%
15	0.00	-7.79	4.68	0.00	7.79	-4.68	0.006%
16	-2.34	-10.39	4.06	2.34	10.39	-4.06	0.003%
17	-2.34	-7.79	4.06	2.34	7.79	-4.06	0.003%
18	-4.06	-10.39	2.34	4.06	10.39	-2.34	0.003%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
19	-4.06	-7.79	2.34	4.06	7.79	-2.34	0.003%
20	-4.68	-10.39	0.00	4.68	10.39	0.00	0.003%
21	-4.68	-7.79	0.00	4.68	7.79	0.00	0.006%
22	-4.06	-10.39	-2.34	4.06	10.39	2.34	0.003%
23	-4.06	-7.79	-2.34	4.06	7.79	2.34	0.003%
24	-2.34	-10.39	-4.06	2.34	10.39	4.06	0.003%
25	-2.34	-7.79	-4.06	2.34	7.79	4.06	0.003%
26	0.00	-17.39	0.00	0.00	17.39	0.00	0.000%
27	0.00	-17.39	-1.20	0.00	17.39	1.20	0.001%
28	0.60	-17.39	-1.04	-0.60	17.39	1.04	0.001%
29	1.04	-17.39	-0.60	-1.04	17.39	0.60	0.001%
30	1.20	-17.39	0.00	-1.20	17.39	0.00	0.001%
31	1.04	-17.39	0.60	-1.04	17.39	-0.60	0.001%
32	0.60	-17.39	1.04	-0.60	17.39	-1.04	0.001%
33	0.00	-17.39	1.20	0.00	17.39	-1.20	0.001%
34	-0.60	-17.39	1.04	0.60	17.39	-1.04	0.001%
35	-1.04	-17.39	0.60	1.04	17.39	-0.60	0.001%
36	-1.20	-17.39	0.00	1.20	17.39	0.00	0.001%
37	-1.04	-17.39	-0.60	1.04	17.39	0.60	0.001%
38	-0.60	-17.39	-1.04	0.60	17.39	1.04	0.001%
39	0.00	-8.66	-1.06	0.00	8.66	1.06	0.004%
40	0.53	-8.66	-0.92	-0.53	8.66	0.92	0.004%
41	0.92	-8.66	-0.53	-0.92	8.66	0.53	0.004%
42	1.06	-8.66	0.00	-1.06	8.66	0.00	0.004%
43	0.92	-8.66	0.53	-0.92	8.66	-0.53	0.004%
44	0.53	-8.66	0.92	-0.53	8.66	-0.92	0.004%
45	0.00	-8.66	1.06	0.00	8.66	-1.06	0.004%
46	-0.53	-8.66	0.92	0.53	8.66	-0.92	0.004%
47	-0.92	-8.66	0.53	0.92	8.66	-0.53	0.004%
48	-1.06	-8.66	0.00	1.06	8.66	0.00	0.004%
49	-0.92	-8.66	-0.53	0.92	8.66	0.53	0.004%
50	-0.53	-8.66	-0.92	0.53	8.66	0.92	0.004%

### Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	14	0.00000001	0.00006764
3	Yes	13	0.00000001	0.00013079
4	Yes	14	0.00000001	0.00011729
5	Yes	14	0.00000001	0.00010006
6	Yes	14	0.00000001	0.00011729
7	Yes	14	0.00000001	0.00010006
8	Yes	14	0.00000001	0.00006764
9	Yes	13	0.00000001	0.00013079
10	Yes	14	0.00000001	0.00011729
11	Yes	14	0.00000001	0.00010006
12	Yes	14	0.00000001	0.00011729
13	Yes	14	0.00000001	0.00010006
14	Yes	14	0.00000001	0.00006764
15	Yes	13	0.00000001	0.00013079
16	Yes	14	0.00000001	0.00011729
17	Yes	14	0.00000001	0.00010006
18	Yes	14	0.00000001	0.00011729
19	Yes	14	0.00000001	0.00010006
20	Yes	14	0.00000001	0.00006764
21	Yes	13	0.00000001	0.00013079
22	Yes	14	0.00000001	0.00011729
23	Yes	14	0.00000001	0.00010006
24	Yes	14	0.00000001	0.00011729
25	Yes	14	0.00000001	0.00010006
26	Yes	6	0.00000001	0.00000001
27	Yes	14	0.00000001	0.00001558
28	Yes	14	0.00000001	0.00001544
29	Yes	14	0.00000001	0.00001544
30	Yes	14	0.00000001	0.00001558

31	Yes	14	0.0000001	0.00001544
32	Yes	14	0.0000001	0.00001544
33	Yes	14	0.0000001	0.00001558
34	Yes	14	0.0000001	0.00001544
35	Yes	14	0.0000001	0.00001544
36	Yes	14	0.0000001	0.00001558
37	Yes	14	0.0000001	0.00001544
38	Yes	14	0.0000001	0.00001544
39	Yes	12	0.0000001	0.00007635
40	Yes	12	0.0000001	0.00007461
41	Yes	12	0.0000001	0.00007461
42	Yes	12	0.0000001	0.00007635
43	Yes	12	0.0000001	0.00007461
44	Yes	12	0.0000001	0.00007461
45	Yes	12	0.0000001	0.00007635
46	Yes	12	0.0000001	0.00007461
47	Yes	12	0.0000001	0.00007461
48	Yes	12	0.0000001	0.00007635
49	Yes	12	0.0000001	0.00007461
50	Yes	12	0.0000001	0.00007461

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	83.25 - 53.75	5.099	42	0.8891	0.0000
L2	53.75 - 0	0.962	42	0.1474	0.0000

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
84.00	Truck Ball	42	5.099	0.8891	0.0000	16066
83.25	Canister Load1	42	5.099	0.8891	0.0000	16066
78.00	APXVAR18_43-C-NA20	42	4.252	0.7369	0.0000	15300
73.50	Canister Load2	42	3.543	0.6095	0.0000	8239
63.75	Canister Load3	42	2.126	0.3552	0.0000	4119
58.00	80010798	42	1.412	0.2274	0.0000	3181
53.75	Canister Load4	42	0.962	0.1474	0.0000	2847

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	83.25 - 53.75	22.154	8	3.8435	0.0000
L2	53.75 - 0	4.226	8	0.6462	0.0000

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
84.00	Truck Ball	8	22.154	3.8435	0.0000	3732
83.25	Canister Load1	8	22.154	3.8435	0.0000	3732
78.00	APXVAR18_43-C-NA20	8	18.487	3.1877	0.0000	3554
73.50	Canister Load2	8	15.415	2.6385	0.0000	1913
63.75	Canister Load3	8	9.274	1.5426	0.0000	955
58.00	80010798	8	6.176	0.9916	0.0000	737
53.75	Canister Load4	8	4.226	0.6462	0.0000	659

### 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> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
L1	83.25 - 53.75 (1)	TP6x6x0.6975	29.50	0.00	0.0	11.619 2	-3.83	732.01	0.005
L2	53.75 - 0 (2)	TP33.075x26.625x0.25	53.75	0.00	0.0	26.046 6	-10.39	1523.73	0.007

#### Pole Bending Design Data

Section No.	Elevation ft	Size	M <sub>ux</sub> kip-ft	φM <sub>nx</sub> kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M <sub>uy</sub> kip-ft	φM <sub>ny</sub> kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	83.25 - 53.75 (1)	TP6x6x0.6975	38.73	103.55	0.374	0.00	103.55	0.000
L2	53.75 - 0 (2)	TP33.075x26.625x0.25	218.99	1187.79	0.184	0.00	1187.79	0.000

#### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V <sub>u</sub> K	φV <sub>n</sub> K	Ratio $\frac{V_u}{\phi V_n}$	Actual T <sub>u</sub> kip-ft	φT <sub>n</sub> kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	83.25 - 53.75 (1)	TP6x6x0.6975	1.79	219.60	0.008	0.00	102.38	0.000
L2	53.75 - 0 (2)	TP33.075x26.625x0.25	4.69	457.12	0.010	0.00	1314.06	0.000

#### Pole Interaction Design Data

Section No.	Elevation ft	Ratio P <sub>u</sub> φP <sub>n</sub>	Ratio M <sub>ux</sub> φM <sub>nx</sub>	Ratio M <sub>uy</sub> φM <sub>ny</sub>	Ratio V <sub>u</sub> φV <sub>n</sub>	Ratio T <sub>u</sub> φT <sub>n</sub>	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	83.25 - 53.75 (1)	0.005	0.374	0.000	0.008	0.000	0.379	1.050	4.8.2
L2	53.75 - 0 (2)	0.007	0.184	0.000	0.010	0.000	0.191	1.050	4.8.2

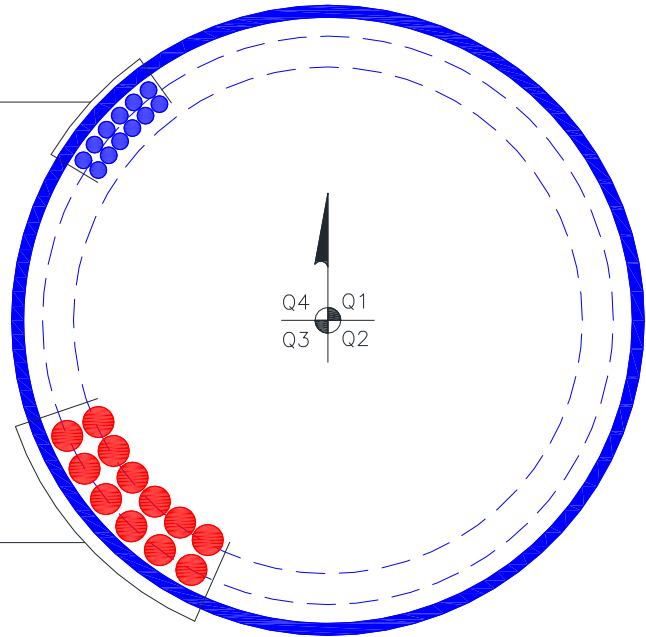
#### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	φP <sub>allow</sub> K	% Capacity	Pass Fail
L1	83.25 - 53.75	Pole	TP6x6x0.6975	1	-3.83	768.61	36.1	Pass
L2	53.75 - 0	Pole	TP33.075x26.625x0.25	2	-10.39	1599.92	18.2	Pass
<b>Summary</b>								
Pole (L1)							36.1	Pass
<b>RATING =</b>							<b>36.1</b>	<b>Pass</b>

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

(OTHER CONSIDERED EQUIPMENT)  
(12) 7/8" TO 58 FT LEVEL

(PROPOSED EQUIPMENT CONFIGURATION)  
(12) 1-5/8" TO 78 FT LEVEL



BUSINESS UNIT: 823630 TOWER ID: C\_BASELEVEL

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

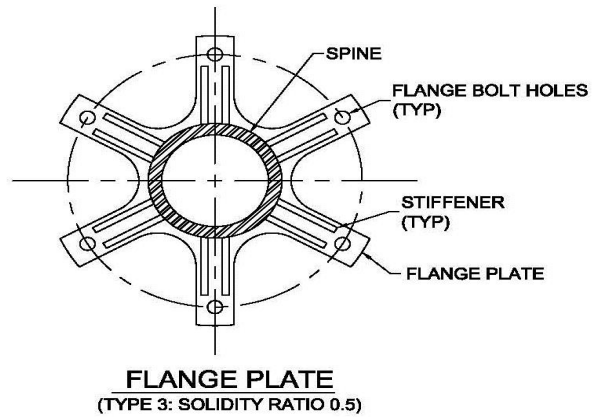
# CCI Flagpole Tool



Site Data	
BU#:	823630
Site Name:	Danbury North / Rt 37
Order #:	

Code	
Code:	TIA-222-H
Ice Thickness:	1.275 in
Windspeed (V):	120 mph
Ice Wind Speed (V):	50 mph
Exposure Category:	B
Topographic Feature:	N/A
Risk Category:	II

Tower Information	
Total Tower Height:	83.25 ft
Base Tower Height:	53.75 ft
Total Canister Length:	29.5 ft
Number of Canister Assembly Sections:	3



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)
1	9.75	42	Round	3	0.75	42	0.5	0.295	0.214
2	9.75	42	Round	3	0.75	42	0.5	0.295	0.214
3	10	42	Round	3	0.75	42	0.5	0.295	0.220

\* 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:	18 ft
Flag Height:	12 ft
Flag Elevation(z):	83.25 ft

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

Geometry : Base Tower + Spine				WO 1772394_BU 823630.eri (last saved 07/23 3:12 pm)					
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	Delete
83.25	29.5	0	0	6	6	0.6975	n/a	ATM A519 C.D.	[x]
53.75	53.75	0	18	26.625	33.075	0.25	1	A572-65	[x]



Discrete Loads: Truck Ball	Apply $C_{aA_A}$ at Elevation(z) (ft)	$C_{aA_A}$ No Ice (ft <sup>2</sup> )	$C_{aA_A}$ 1/2" Ice (ft <sup>2</sup> )	$C_{aA_A}$ 1" Ice (ft <sup>2</sup> )	$C_{aA_A}$ 2" Ice (ft <sup>2</sup> )	$C_{aA_A}$ 4" Ice (ft <sup>2</sup> )	Weight No Ice (Kip)	Weight 1/2" Ice (Kip)
	84	0.884	1.378	1.527	1.848	2.581	0.05	0.067

Discrete Loads : $C_{FAF}$ for Canister Assembly								
Canister Loading	Apply $C_{FAF}$ at Elevation(z) (ft)	$C_{FAF}$ No Ice (ft <sup>2</sup> )	$C_{FAF}$ 1/2" Ice (ft <sup>2</sup> )	$C_{FAF}$ 1" Ice (ft <sup>2</sup> )	$C_{FAF}$ 2" Ice (ft <sup>2</sup> )	$C_{FAF}$ 4" Ice (ft <sup>2</sup> )	Canister Assembly Weight No Ice (Kip)	Canister Assembly Weight 1/2" Ice (Kip)
	Canister Load 1	83.25	7.678	7.861	8.044	8.409	9.141	0.107
Canister Load 2	73.5	15.356	15.722	16.088	16.819	18.281	0.509	0.762
Canister Load 3	63.75	15.553	15.923	16.294	17.034	18.516	0.512	0.768
Canister Load 4	53.75	7.875	8.063	8.250	8.625	9.375	0.405	0.534

User Forces: Flag Force Calculation Per ANSI/NAAMM FP 1001-07	
Wind <sub>FORCE</sub> =	0.411 Kip
Weight=	0.023 Kip
Wind <sub>FORCE, ICE</sub> =	0.074 Kip
Weight <sub>ICE</sub> =	0.587 Kip
W <sub>FORCE, SERVICE WIND</sub> =	0.103 Kip
Weight=	0.023 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:	Yes	<a href="#">Import Deflection Results</a>
3% Spine Deflection Check		
Allowable (3%) Horizontal Spine Deflection (inches)	Actual Deflection ***(inches)	Sufficient/ Insufficient
10.620	4.137	Sufficient

\*\*\* Relative deflection under service level wind speed

**Concealment FEA Results & Discussion**

Analysis Software Information: ANSYS, Inc. Products Release 19.R2

**RESULTS SUMMARY**

**53-9" CONCEALMENT FLANGE CONNECTION**

ELEMENT	MATERIAL	DESIGNATION
Concealment Flange Plate	Gr. 50	Sufficient
Base Pole Flange Plate	Gr. 50	Sufficient
Stiffeners	Gr. 36	Sufficient

**CONNECTIONS**

COMPONENT	SIZING	DESIGNATION
Bolts – Concealment Flange to Base Pole Flange	1-1/8"Ø Bolts	Sufficient

**ANALYSIS APPROACH**

**Finite Element Analysis**

This analysis has been completed by means of computer based finite element analysis (FEA). To establish the basic behavior of the connection, a finite element model (FEM) was developed with elastic material properties. If results of the elastic analysis prove to be unsatisfactory, the connection will be further analyzed with plastic (non-linear) material properties to allow for stress redistribution.

**Loading**

The loading applied to the connection has been done by means of three applied loads: Axial, Shear, and Moment. All loads are calculated through tnxTower. The value of the moment has been adjusted to account for the moment induced by the shear component. The applied loads within the model are a set distance from the interface of the two flange plates. Loading has been applied in a direction that results in the highest stresses in the connection. The applied moment has been increased by a factor of 1.11 to consider a Phi equal to 0.9.

**Loading Direction:**

Two loading directions were considered in this analysis:

- D1) load directly into a stiffener pair, and
- D2) load directly between two stiffener pairs.

**Modeling Notes**

- All welded surfaces have been modeling using bonded contact definitions.
- All non-welded surfaces in contact have been conservatively modeled with frictionless contact definitions.
- The bolts have been modeled using deformable ANSYS one-dimensional beam elements as recommended by the software developers.
- All other structural members are modeled as ANSYS two-dimensional shell elements or three dimensional solid elements.
- The base pole is constrained in all degrees of freedom at its base. The length of the base pole which is modeled is chosen so as not to introduce any false rigidity to the model.
- The load is applied at the top of the spine. The length of the spine modeled is chosen to allow for proper flexural behavior of the connection.



Job Number:	37519-2998.001.7700
Engineer:	RMF
Date:	9/19/2019
Site Name:	DANBURY NORTH / RT 37
Site Number:	823630

**Load Conversions For ANSYS Input**

(Version v1.0 - Effective Date 09/3/2019 )

Number of Levels:

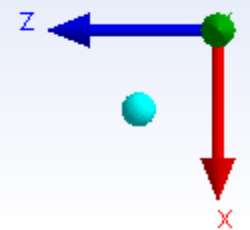
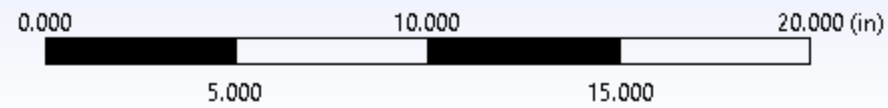
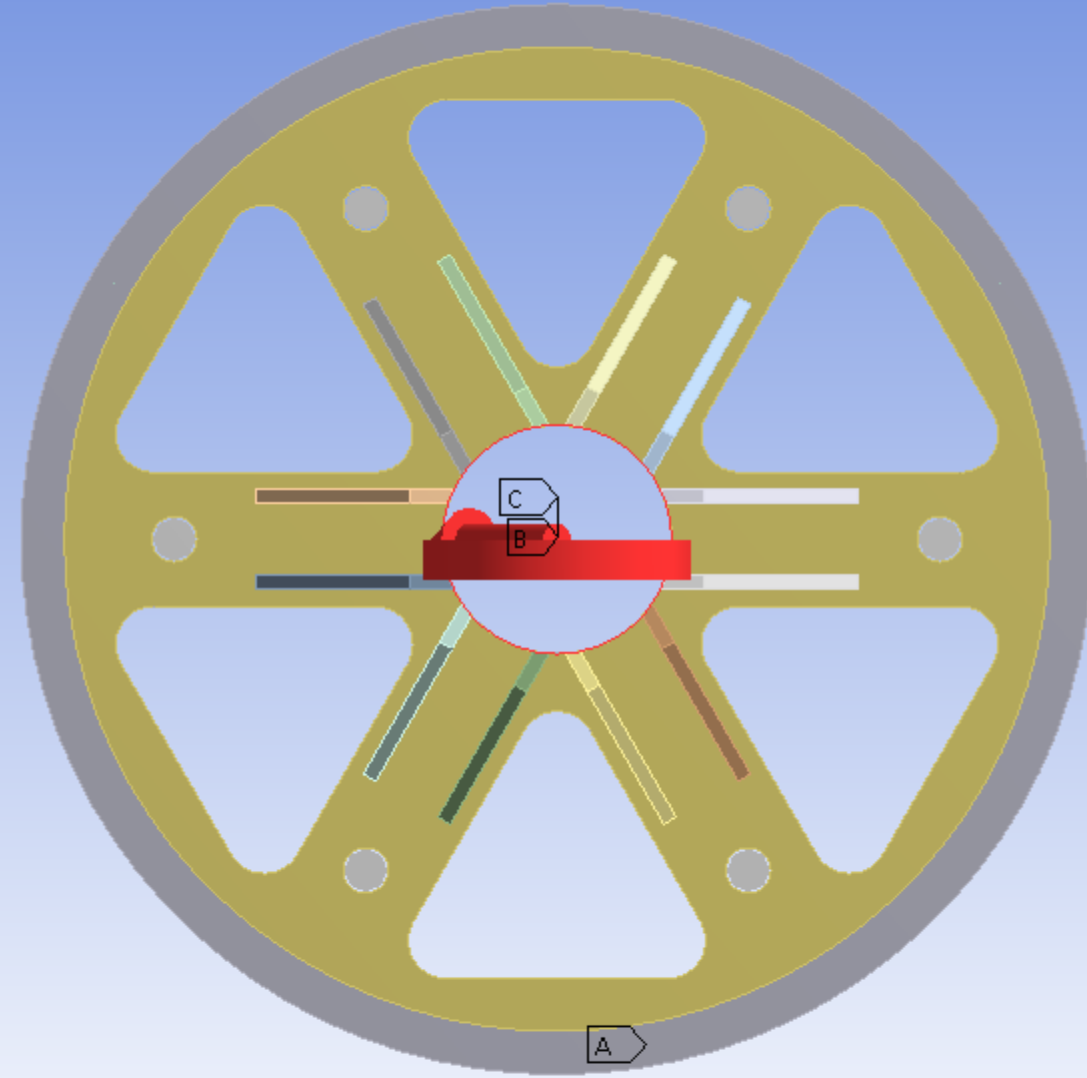
#	Elevation (ft)	Offset (in)	Loading			Displacement / Tilt	
			Load Type	Load From TNX (kip, kip*ft)	Load To ANSYS (lb, lb*in)	Disp. (in)	Tilt (deg)
1	53.75	60.00	Moment <sup>1</sup>	38.73	408813.23		
			Axial	3.83	3834.05		
			Shear	1.79	1794.16		

Axial/Shear Resultant: 4233.08

1. The moment has been adjusted by dividing by 0.9 to account for the capacity phi factor as well as reduced by the inherent moment caused by the shear load offset.

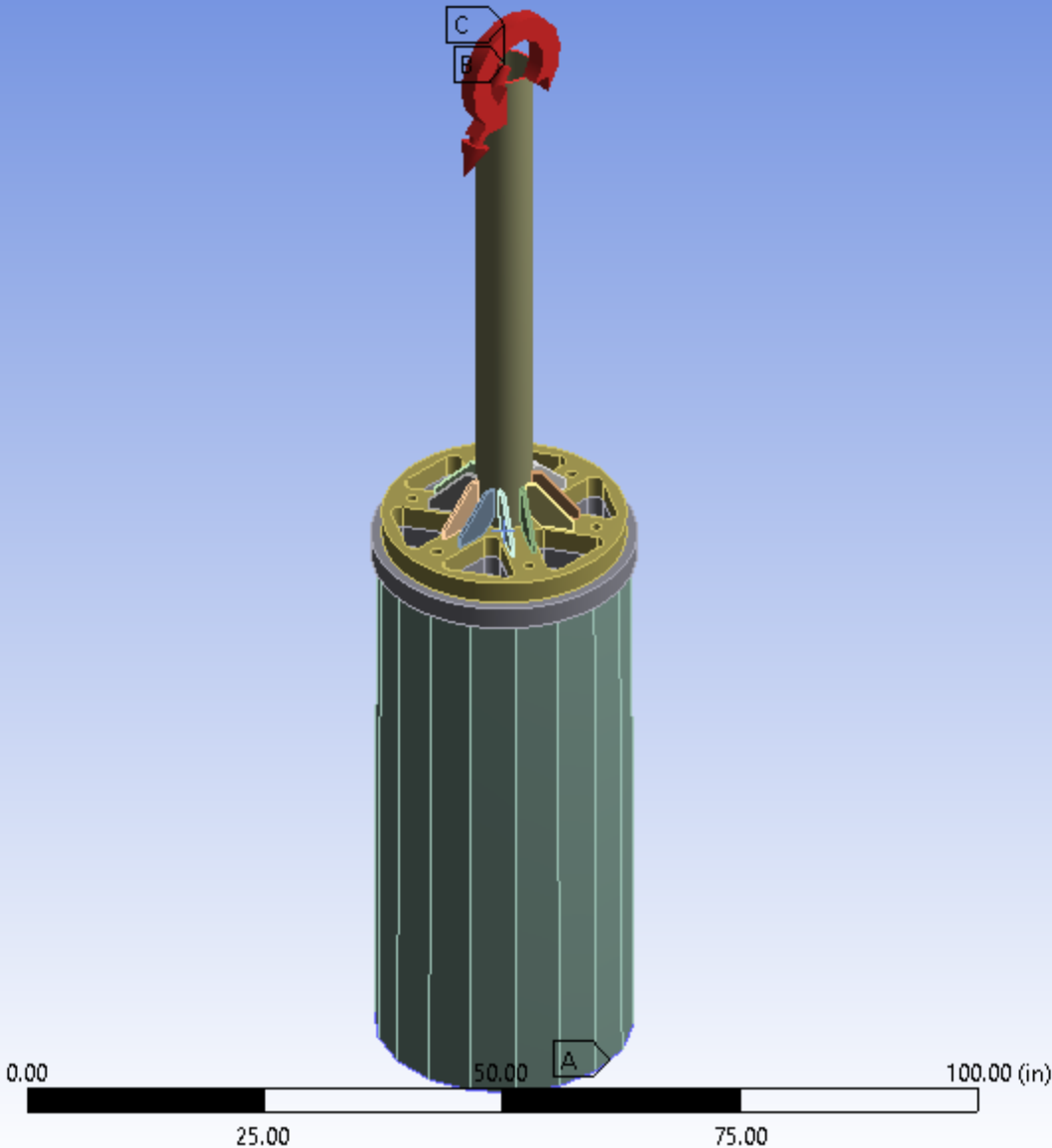
D: D1-P  
D1 - P  
Time: 4.5997e-002 s  
9/19/2019 11:10 AM

- A** Fixed Support
- B** Remote Force: 3808.2 lbf
- C** Moment: 4.0542e+005 lbf-in



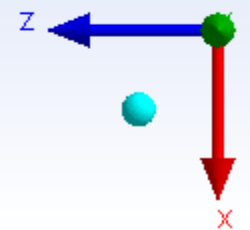
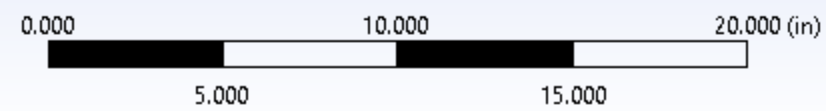
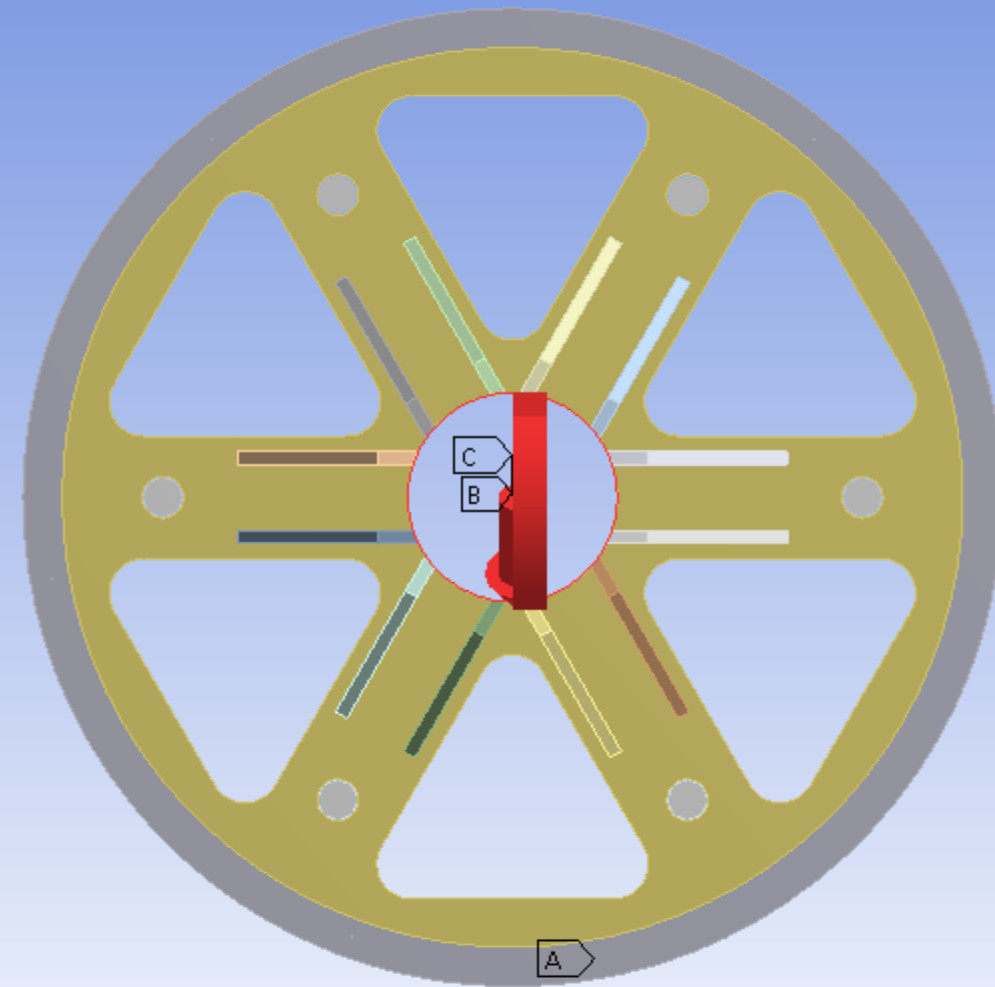
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D1 - P  
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9/19/2019 1:51 PM

- A Fixed Support
- B Remote Force: 3808.2 lbf
- C Moment: 4.0542e+005 lbf-in



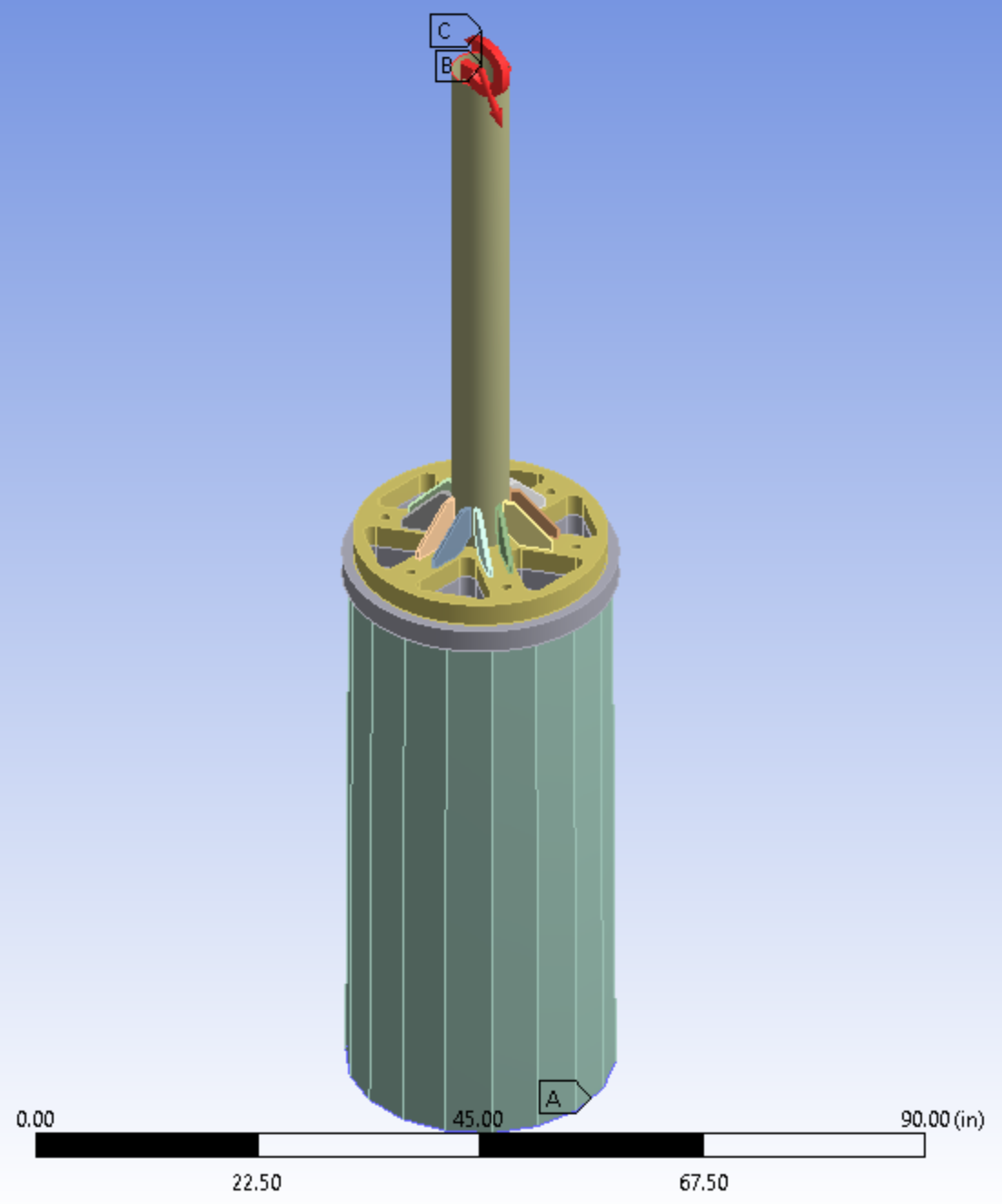
E: D2-P  
D2 - P  
Time: 4.5997e-002 s  
9/19/2019 11:11 AM

- A** Fixed Support
- B** Remote Force: 3808.2 lbf
- C** Moment: 4.0542e+005 lbf-in

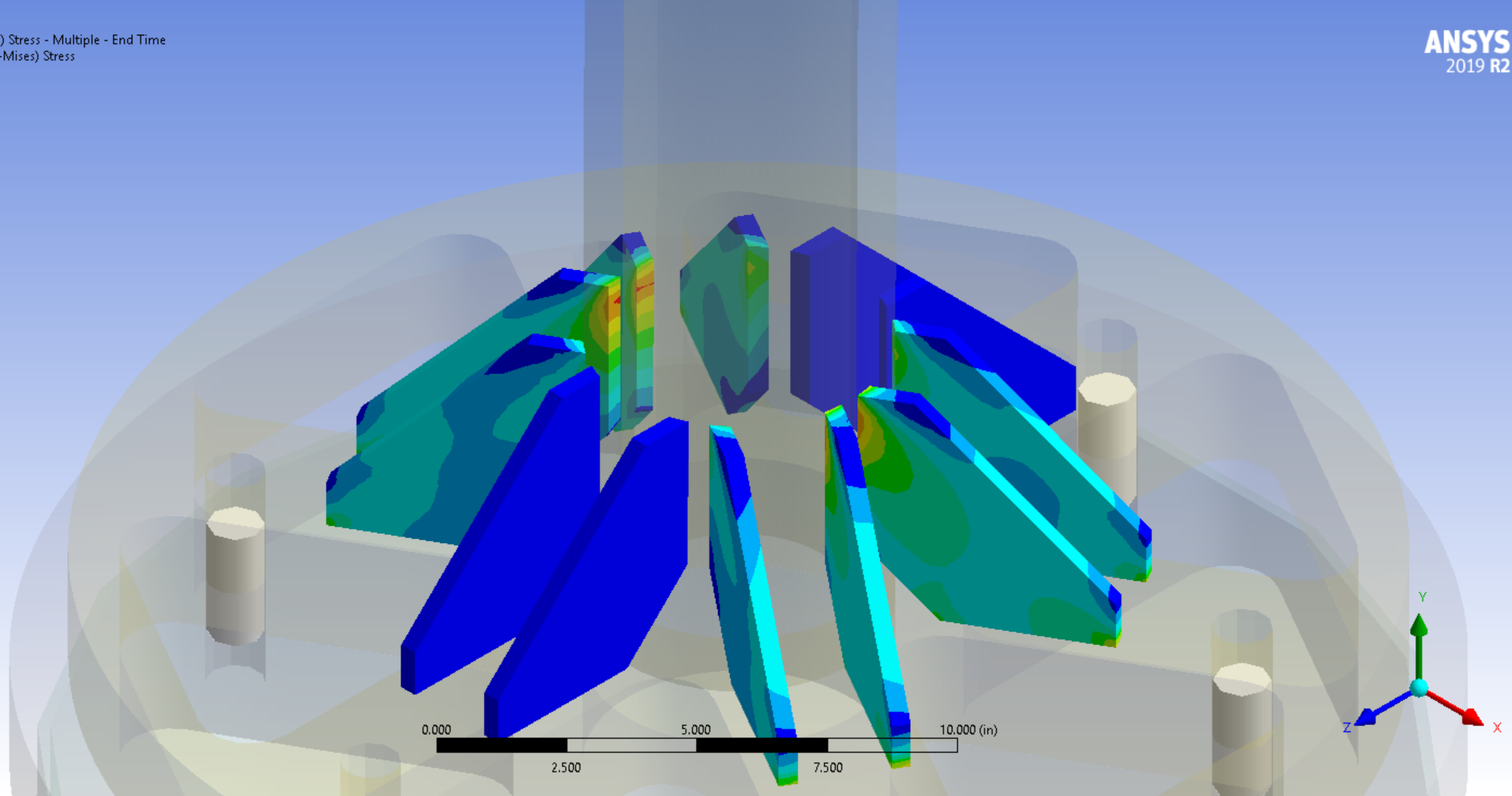
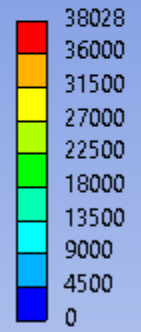


E: D2-P  
D2 - P  
Time: 4.5997e-002 s  
9/19/2019 11:11 AM

- A** Fixed Support
- B** Remote Force: 3808.2 lbf
- C** Moment: 4.0542e+005 lbf-in

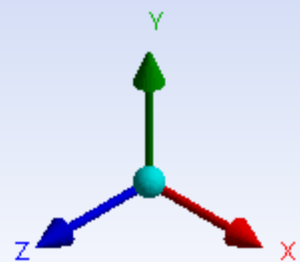
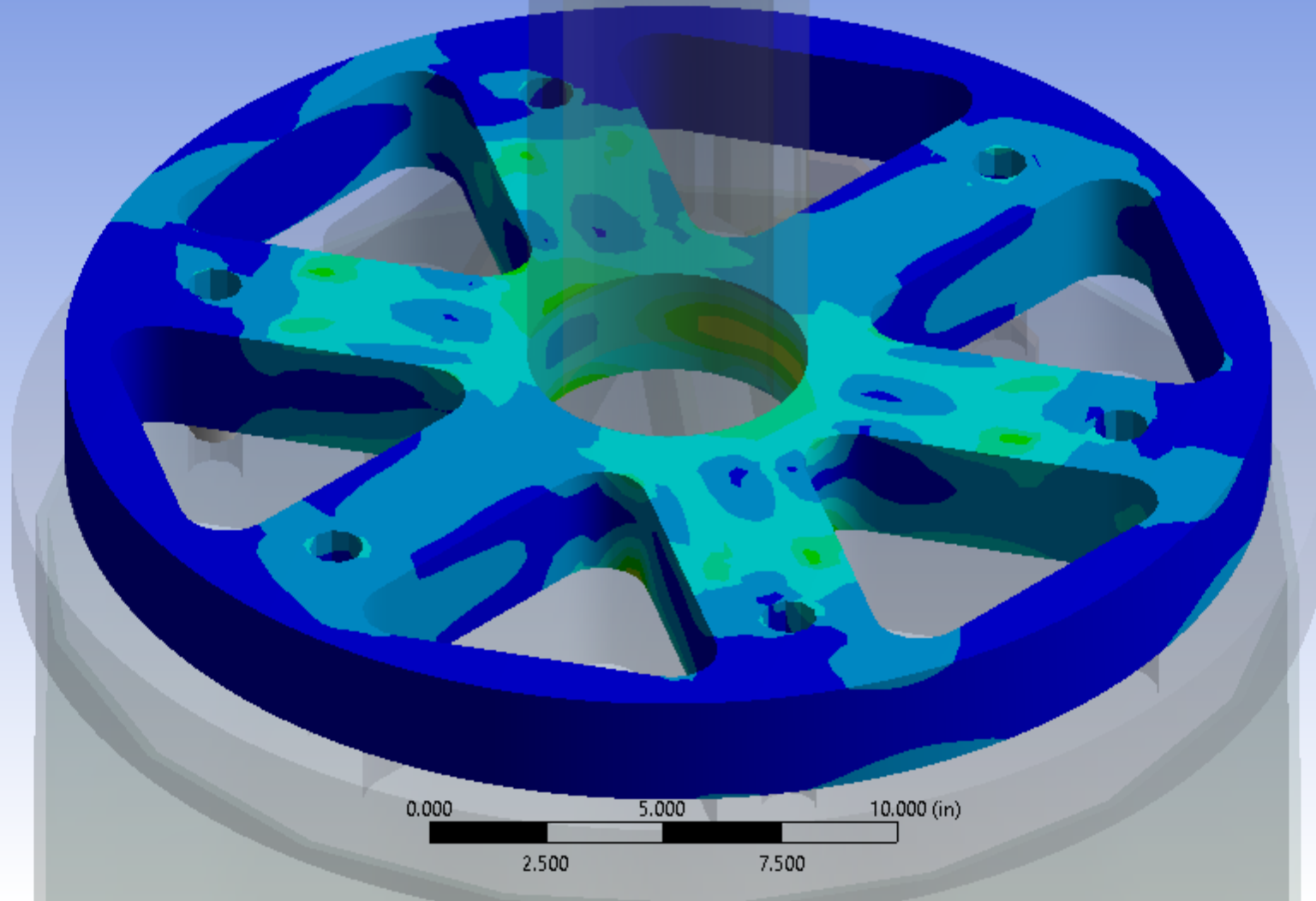
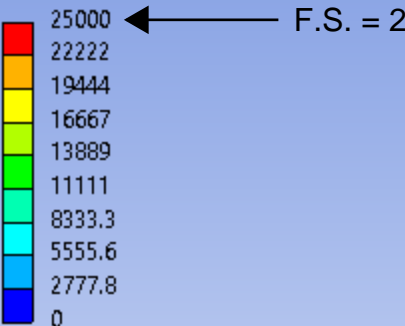


E: D2-P  
Equivalent (von-Mises) Stress - Multiple - End Time  
Type: Equivalent (von-Mises) Stress  
Unit: psi  
Time: 1  
Max: 38028  
Min: 59.187  
9/19/2019 11:07 AM

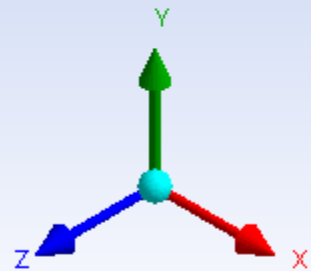
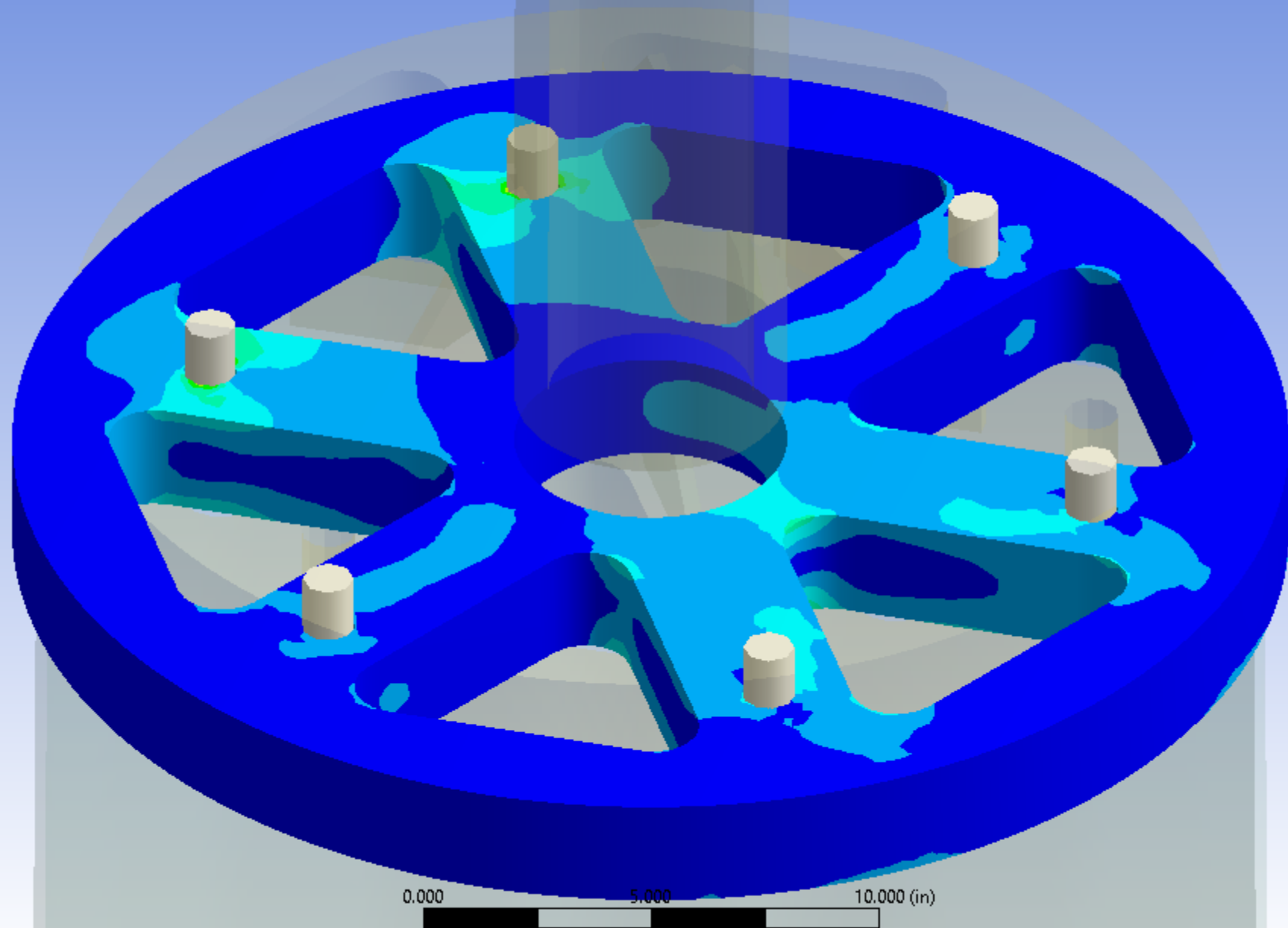
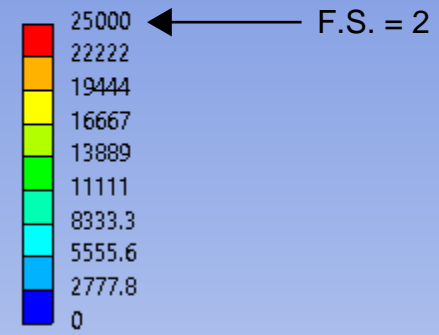




E: D2-P  
Equivalent (von-Mises) Stress - Geom\Top Flange - End Time  
Type: Equivalent (von-Mises) Stress  
Unit: psi  
Time: 1  
Max: 18085  
Min: 37.304  
9/19/2019 1:50 PM



E: D2-P  
Equivalent (von-Mises) Stress - Geom\Bottom Flange - End Time  
Type: Equivalent (von-Mises) Stress  
Unit: psi  
Time: 1  
Max: 15721  
Min: 40.283  
9/19/2019 11:09 AM



# Monopole Base Plate Connection

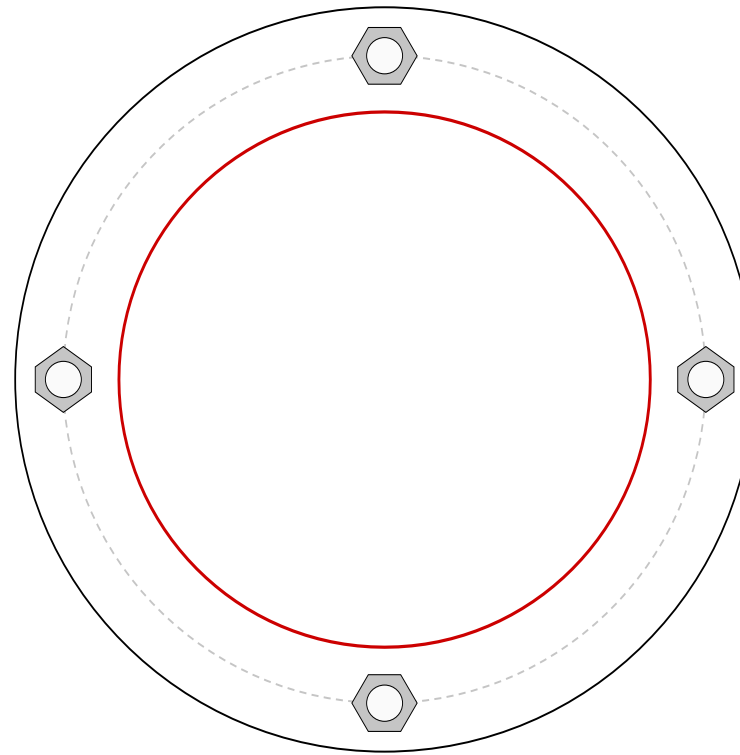


Site Info	
BU #	823630
Site Name	Danbury North / Rt 37
Order #	

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

Applied Loads	
Moment (kip-ft)	218.99
Axial Force (kips)	10.39
Shear Force (kips)	4.69

\*TIA-222-H Section 15.5 Applied



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

Anchor Rod Data
(4) 2-1/4" $\phi$ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 40" BC
Base Plate Data
46" OD x 1.75" Plate (A572-50; $F_y=50$ ksi, $F_u=65$ ksi)
Stiffener Data
N/A
Pole Data
33.075" x 0.25" 18-sided pole (A572-65; $F_y=65$ ksi, $F_u=80$ ksi)

Anchor Rod Summary	(units of kips, kip-in)	
$P_{u\_c} = 68.21$	$\phi P_{n\_c} = 243.75$	<b>Stress Rating</b>
$V_u = 1.17$	$\phi V_n = 73.13$	<b>26.7%</b>
$M_u = n/a$	$\phi M_n = n/a$	<b>Pass</b>
Base Plate Summary		
Max Stress (ksi):	13.71	(Flexural)
Allowable Stress (ksi):	45	
Stress Rating:	<b>29.0%</b>	<b>Pass</b>

# Pier and Pad Foundation



BU #: 823630  
 Site Name:  
 App. Number:

TIA-222 Revision: H  
 Tower Type: Monopole

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

Superstructure Analysis Reactions		
Compression, $P_{comp}$ :	10	kips
Base Shear, $V_{u\_comp}$ :	5	kips
Moment, $M_u$ :	219	ft-kips
Tower Height, $H$ :	83.25	ft
BP Dist. Above Fdn, $bp_{dist}$ :	5	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	101.80	5.00	4.7%	Pass
<i>Bearing Pressure (ksf)</i>	9.00	2.55	27.0%	Pass
<i>Overtuning (kip*ft)</i>	608.54	263.58	43.3%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	840.85	241.50	27.4%	Pass
<i>Pier Compression (kip)</i>	5998.68	20.18	0.3%	Pass
<i>Pad Flexure (kip*ft)</i>	1963.82	64.71	3.1%	Pass
<i>Pad Shear - 1-way (kips)</i>	428.87	0.00	0.0%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.164	0.004	2.2%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	3927.64	144.90	3.5%	Pass

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, $d_{pier}$ :	4	ft
Ext. Above Grade, $E$ :	0	ft
Pier Rebar Size, $S_c$ :	8	
Pier Rebar Quantity, $mc$ :	12	
Pier Tie/Spiral Size, $S_t$ :	3	
Pier Tie/Spiral Quantity, $mt$ :	5	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, $cc_{pier}$ :	3	in

\*Rating per TIA-222-H Section 15.5

Soil Rating*:	43.3%
Structural Rating*:	27.4%

Pad Properties		
Depth, $D$ :	8.5	ft
Pad Width, $W$ :	10	ft
Pad Thickness, $T$ :	4	ft
Pad Rebar Size (Bottom), $S_p$ :	8	
Pad Rebar Quantity (Bottom), $mp$ :	13	
Pad Clear Cover, $cc_{pad}$ :	3	in

Material Properties		
Rebar Grade, $F_y$ :	60	ksi
Concrete Compressive Strength, $F'_c$ :	3	ksi
Dry Concrete Density, $\delta_c$ :	150	pcf

Soil Properties		
Total Soil Unit Weight, $\gamma$ :	120	pcf
Ultimate Gross Bearing, $Q_{ult}$ :	12.000	ksf
Cohesion, $C_u$ :	0.000	ksf
Friction Angle, $\phi$ :	30	degrees
SPT Blow Count, $N_{blows}$ :	1	
Base Friction, $\mu$ :	0.35	
Neglected Depth, $N$ :	4.00	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, $gw$ :	N/A	ft

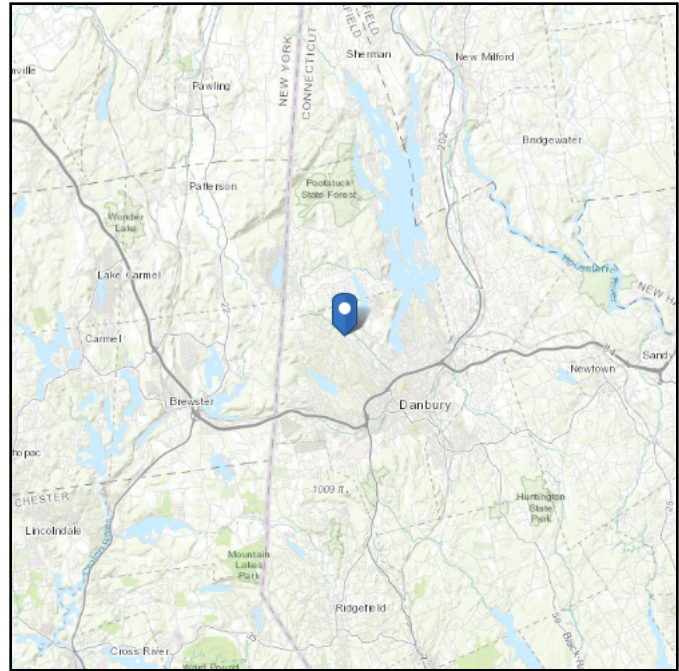
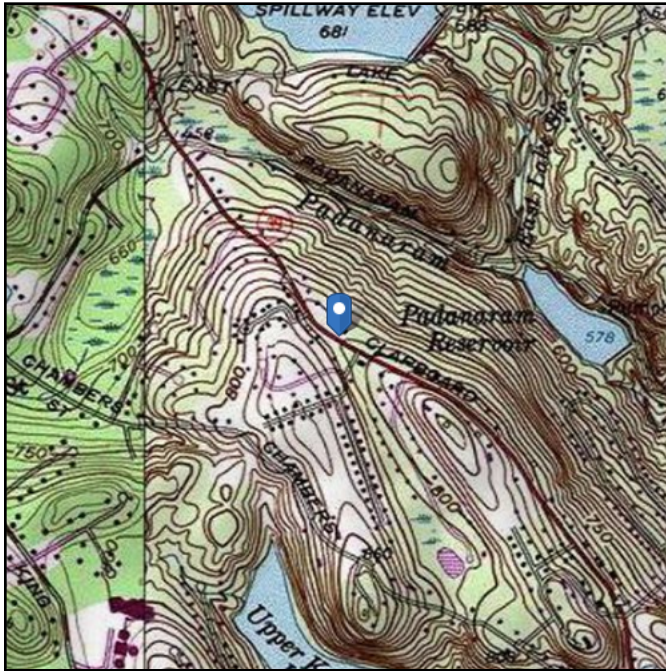
<--Toggle between Gross and Net

# ASCE 7 Hazards Report

**Address:**  
181 Clapboard Ridge Rd  
Danbury, Connecticut  
06811

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

**Elevation:** 788.91 ft (NAVD 88)  
**Latitude:** 41.432384  
**Longitude:** -73.49261



## Wind

### Results:

Wind Speed:	115 Vmph
10-year MRI	76 Vmph
25-year MRI	85 Vmph
50-year MRI	90 Vmph
100-year MRI	96 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 23 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 not in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2.

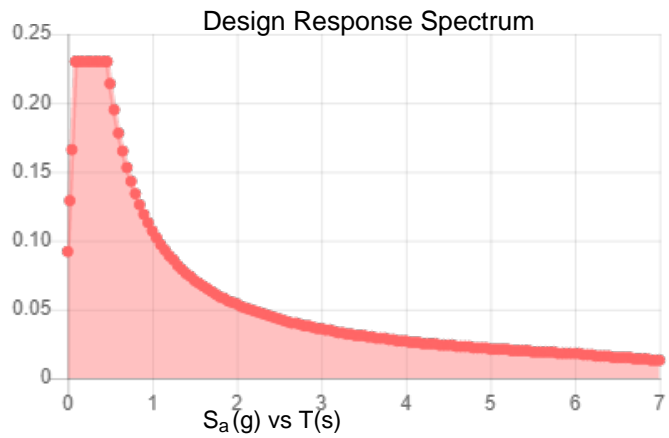
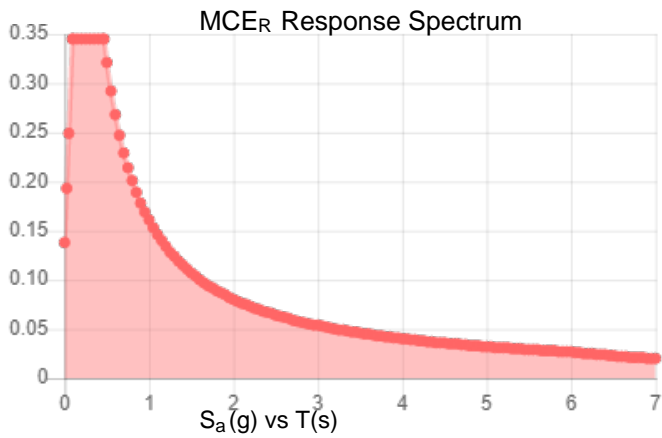
Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

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

**Results:**

$S_s$ :	0.215	$S_{DS}$ :	0.23
$S_1$ :	0.067	$S_{D1}$ :	0.107
$F_a$ :	1.6	$T_L$ :	6
$F_v$ :	2.4	PGA :	0.117
$S_{MS}$ :	0.345	PGA <sub>M</sub> :	0.183
$S_{M1}$ :	0.161	F <sub>PGA</sub> :	1.566
		$I_e$ :	1

**Seismic Design Category** B



**Data Accessed:**

Tue Jul 23 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

---

**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 23 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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**APPENDIX D**  
**MODIFICATION DRAWINGS**



# MODIFIED 83'-3" MONOPOLE

## BU #823630; DANBURY NORTH / RT 37

181 CLAPBOARD RIDGE ROAD  
DANBURY, CONNECTICUT 06811  
FAIRFIELD COUNTY

LAT: 41° 25' 59.47"; LONG: -73° 29' 32.76"  
ORDER: 494418 REV. 2; WO: 1772394

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**PAUL J. FORD & COMPANY**  
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Phone 614.221.6679 www.pauljford.com

**CROWN CASTLE**  
8 PARKMEADOW DR PITTSFORD, NY 14534  
(585) 889-3445

**PROJECT CONTACTS**

STRUCTURE OWNER:  
CROWN CASTLE  
MOD PM: DAN VADNEY AT DAN.VADNEY@CROWNCastle.COM  
PH: (518) 373-3510

ENGINEER OF RECORD:  
PJFMOD@PAULJFORD.COM

WIND DESIGN DATA	
REFERENCE STANDARD	ANSI/TIA-222-H-2017
LOCAL CODE	2018 CONNECTICUT STATE BUILDING CODE
ULTIMATE WIND SPEED (3-SECOND GUST)	120 MPH
CONVERTED NOMINAL WIND SPEED (3-SECOND GUST)	93 MPH
ICE THICKNESS	1.275 IN
ICE WIND SPEED	50 MPH
SERVICE WIND SPEED	60 MPH
STRUCTURE CLASS	II
EXPOSURE CATEGORY	B
Kzt	1.0

SHEET INDEX	
SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
MI-1	MI CHECKLIST
N-1	GENERAL NOTES
S-1	MONOPOLE PROFILE
S-2	CONCEALMENT ELEVATION DETAILS
S-3	CONCEALMENT SECTIONS
S-4	BULKHEAD DETAILS


HOT WORK INCLUDED	
NA	BASE GRINDING ONLY
NA	BASE WELDING (AND GRINDING)
NA	AERIAL GRINDING ONLY
NA	AERIAL WELDING (AND GRINDING)

TOWER MANUFACTURER: STEALTH  
TOWER MANUFACTURER #: VOIC-20499W-02

THE ASSOCIATED FAILING SA WO NUMBER FOR THIS PROJECT IS 1749108

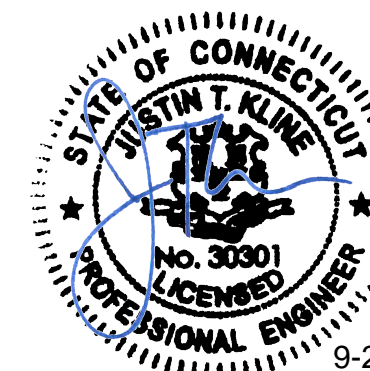
QUALIFIED ENGINEERING SERVICES ARE AVAILABLE FROM PAUL J. FORD & COMPANY TO ASSIST CONTRACTORS IN CLASS IV RIGGING PLAN REVIEWS. FOR REQUESTED QUALIFIED ENGINEERING SERVICES, PLEASE CONTACT PJFMOD@PAULJFORD.COM.

ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT (800) 788-7011.



**SAFETY CLIMB: "LOOK UP"**

THE INTEGRITY OF THE WIRE ROPE SAFETY CLIMB SYSTEM SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION AND INSPECTION. TOWER REINFORCEMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF ANY WIRE ROPE SAFETY CLIMB ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO; PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, OR IMPACT TO THE ANCHORAGE POINTS IN ANY WAY. ANY COMPROMISED SAFETY CLIMB MUST BE REPORTED TO YOUR CROWN POC FOR RESOLUTION, INCLUDING EXISTING CONDITIONS



**BU #823630; DANBURY NORTH / RT 37**  
 DANBURY, CONNECTICUT  
 MODIFIED 83'-3" MONOPOLE

PROJECT No: 37519-2998.001.7700  
DRAWN BY: DC/IM  
DESIGNED BY: GJA  
CHECKED BY: *[Signature]*  
DATE: 09-20-2019

TITLE SHEET

T-1

REV	DATE	DESCRIPTION

V1.0 37519-2998.001.DWG

V1\_0 37519-2998.001.DWG

MI CHECKLIST			
REQUIRED	REPORT ITEM	APPLICABLE CROWN DOC #	BRIEF DESCRIPTION
<b>PRE-CONSTRUCTION</b>			
X	MI CHECKLIST DRAWING	CED-SOW-10007	THIS CHECKLIST SHALL BE INCLUDED IN THE MI REPORT.
X	EOR APPROVED SHOP DRAWINGS	CED-SOW-10007	ONCE THE PRE-MODIFICATION MAPPING IS COMPLETE AND PRIOR TO FABRICATION, THE CONTRACTOR SHALL PROVIDE DETAILED ASSEMBLY DRAWINGS AND/OR SHOP DRAWINGS. THESE ARE TO INCLUDE, BUT ARE NOT LIMITED TO, A VISUAL LAYOUT OF NEW REINFORCEMENT, EXISTING REINFORCEMENT CONFIGURATION, PORTHOLE, MOUNTS, STEP PEGS, SAFETY CLIMBS AND ANY OTHER MISCELLANEOUS ITEMS WHICH MAY AFFECT SUCCESSFUL INSTALLATION OF MODIFICATIONS ON THE TOWER. THESE DRAWINGS SHALL BE SUBMITTED TO THE EOR FOR APPROVAL. APPROVED ASSEMBLY/SHOP DRAWINGS SHALL BE SUBMITTED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATION INSPECTION	CED-SOW-10007	A LETTER FROM THE FABRICATOR, STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THE CONTRACT DOCUMENTS, SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATOR CERTIFIED WELD INSPECTION	CED-SOW-10007 CED-STD-10069	A CWI SHALL INSPECT ALL WELDING PERFORMED ON STRUCTURAL MEMBERS DURING FABRICATION. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	MATERIAL TEST REPORTS (MTR)	CED-SOW-10007	MATERIAL TEST REPORTS SHALL BE PROVIDED FOR MATERIAL USED AS REQUIRED PER SECTION 9.2.5 OF CED-SOW-10007. MTRS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	FABRICATOR NDE INSPECTION REPORT	CED-SOW-10066 CED-STD-10069	CRITICAL SHOP WELDS THAT REQUIRE TESTING ARE NOTED ON THESE CONTRACT DRAWINGS. A CERTIFIED NDT INSPECTOR SHALL PERFORM NON-DESTRUCTIVE EXAMINATION AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	NDE OF MONOPOLE BASE PLATE	ENG-SOW-10033	A NDE OF THE POLE TO BASE PLATE CONNECTION IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PACKING SLIPS	CED-SOW-10007	THE MATERIAL SHIPPING LIST SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
ADDITIONAL TESTING AND INSPECTIONS:			
<b>CONSTRUCTION</b>			
NA	FOUNDATION INSPECTIONS	CED-SOW-10144	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACING THE CONCRETE. A VISUAL OBSERVATION OF THE REBAR SHALL BE PERFORMED BEFORE PLACING THE EPOXY. A SEALED WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	CONCRETE COMP. STRENGTH AND SLUMP TEST	CED-SOW-10144	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROVIDED AS PART OF THE FOUNDATION REPORT.
NA	EARTHWORK	CED-SOW-10144	FOUNDATION SUB-GRADES SHALL BE INSPECTED AND APPROVED BY AN APPROVED FOUNDATION INSPECTOR AND RESULTS INCLUDED AS PART OF THE FOUNDATION REPORT.
NA	MICROPILE/ROCK ANCHOR	CED-SOW-10144	MICROPILES/ROCK ANCHORS SHALL BE INSPECTED BY THE FOUNDATION INSPECTION VENDOR AND SHALL BE INCLUDED AS PART OF THE FOUNDATION INSPECTION REPORT, ADDITIONAL TESTING AND/OR INSPECTION REQUIREMENTS ARE NOTED IN THESE CONTRACT DOCUMENTS.
NA	POST-INSTALLED ANCHOR ROD VERIFICATION	CED-SOW-10007	POST INSTALLED ANCHOR ROD VERIFICATION SHALL BE PERFORMED IN ACCORDANCE WITH CROWN REQUIREMENTS AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	BASE PLATE GROUT VERIFICATION	ENG-STD-10323	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR THAT CERTIFIES THAT THE GROUT WAS REMOVED AND/OR INSTALLED IN ACCORDANCE WITH CROWN REQUIREMENTS FOR INCLUSION IN THE MI REPORT.
NA	FIELD CERTIFIED WELD INSPECTION	CED-SOW-10066 CED-STD-10069	A CROWN APPROVED CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST FIELD WELDS, FOLLOWING ALL PROCEDURES SPECIFIED IN CROWN STANDARD DOCUMENTS APPLICABLE TO WELD INSPECTIONS. A REPORT SHALL BE PROVIDED. NDE OF FIELD WELDS SHALL BE PERFORMED AS REQUIRED BY CROWN STANDARDS AND CONTRACT DOCUMENTS. THE NDE REPORT SHALL BE INCLUDED IN THE CWI REPORT.
X	ON-SITE COLD GALVANIZING VERIFICATION	ENG-STD-10149 ENG-BUL-10149	THE GENERAL CONTRACTOR SHALL PROVIDE WRITTEN AND PHOTOGRAPHIC DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY ON-SITE COLD GALVANIZING WAS APPLIED PER MANUFACTURER SPECIFICATIONS AND APPLICABLE STANDARDS.
NA	TENSION TWIST AND PLUMB	CED-PRC-10182 CED-STD-10261	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT IN ACCORDANCE WITH APPLICABLE STANDARDS DOCUMENTING TENSION TWIST AND PLUMB.
X	GC AS-BUILT DRAWINGS	CED-SOW-10007	THE GENERAL CONTRACTOR SHALL SUBMIT A LEGIBLE COPY OF THE ORIGINAL DESIGN DRAWINGS EITHER STATING "INSTALLED AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINEER OF RECORD. EOR/RFI FORMS APPROVING ALL CHANGES SHALL BE SUBMITTED WHEN THE EOR IS SPECIFYING ADDITIONAL INSPECTIONS DESCRIPTION AND APPLICABLE STANDARDS SHALL BE APPLIED.
ADDITIONAL TESTING AND INSPECTIONS:			
<b>POST-CONSTRUCTION</b>			
X	CONSTRUCTION COMPLIANCE LETTER	CED-SOW-10007	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THESE CONTRACT DRAWINGS, INCLUDING LISTING ADDITIONAL PARTIES TO THE MODIFICATION PROCESS.
NA	POST-INSTALLED ANCHOR ROD PULL TESTS	CED-PRC-10119	POST-INSTALLED ANCHOR RODS SHALL BE TESTED BY A CROWN APPROVED PULL TEST INSPECTOR AND A REPORT SHALL BE PROVIDED INDICATING TESTING RESULTS.
X	PHOTOGRAPHS	CED-SOW-10007	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI. PHOTOS SHALL DOCUMENT ALL PHASES OF THE CONSTRUCTION. THE PHOTOS SHALL BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
NA	BOLT INSTALLATION VERIFICATION REPORT	CED-SOW-10007	THE MI INSPECTOR SHALL VERIFY THE INSTALLATION AND TIGHTNESS 10% OF ALL NON PRE-TENSIONED BOLTS INSTALLED AS PART OF THE MODIFICATION. THE MI INSPECTOR SHALL LOOSEN THE NUT AND VERIFY THE BOLT HOLE SIZE AND CONDITION. THE MI REPORT SHALL CONTAIN THE COMPLETED BOLT INSTALLATION VERIFICATION REPORT, INCLUDING THE SUPPORTING PHOTOGRAPHS.
X	PUNCHLIST DEVELOPMENT AND CORRECTION DOCUMENTATION	CED-PRC-10283 CED-FRM-10285	FINAL PUNCHLIST INDICATING ALL NONCONFORMANCE(S) IDENTIFIED AND THE FINAL RESOLUTION AND APPROVAL.
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	CED-SOW-10007	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACTOR'S REDLINE DRAWING AND THE ACTUAL COMPLETED INSTALLATION.
ADDITIONAL TESTING AND INSPECTIONS:			
X	FACT TIA INSPECTION	OPS-SOW-10127	PERFORM FACT TIA INSPECTION PER CROWN CASTLE DOC OPS-SOW-10127
X	CONCEALMENT REINFORCING SOLUTION	OPS-SOW-10127 OPS-PRC-10127	INSTALL CONCEALMENT REINFORCING SOLUTION PER CROWN CASTLE DOC OPS-SOW-10127 & OPS-PRC-10127

**MODIFICATION INSPECTION NOTES**

GENERAL

THE MI IS AN ON-SITE VISUAL AND HANDS-ON INSPECTION OF TOWER MODIFICATIONS INCLUDING A REVIEW OF CONSTRUCTION REPORTS AND ADDITIONAL PERTINENT DOCUMENTATION PROVIDED BY THE GENERAL CONTRACTOR (GC), AS WELL AS ANY INSPECTION DOCUMENTS PROVIDED BY 3RD PARTY INSPECTORS. THE MI IS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS; IN ACCORDANCE WITH APPLICABLE CROWN STANDARDS; AND AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

NO DOCUMENT, CODE OR POLICY CAN ANTICIPATE EVERY SITUATION THAT MAY ARISE. ACCORDINGLY, THIS CHECKLIST IS INTENDED TO SERVE AS A SOURCE OF GUIDING PRINCIPLES IN ESTABLISHING GUIDELINES FOR MODIFICATION INSPECTION.

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, AND THE MI INSPECTOR DOES NOT TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES. THE MI INSPECTOR SHALL INSPECT AND NOTE CONFORMANCE/NONCONFORMANCE AND PROVIDE TO THE CROWN POINT OF CONTACT (CROWN POC) FOR EVALUATION.

ALL MI'S SHALL BE CONDUCTED BY A CROWN APPROVED MI INSPECTOR, WORKING FOR A CROWN APPROVED MI VENDOR. SEE CROWN CED-LST-10173, "APPROVED MI VENDORS".

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PURCHASE ORDER ( PO ) IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN THE GC AND/OR INSPECTOR SHALL CONTACT THE CROWN POINT OF CONTACT (POC).

REFER TO CROWN CED-SOW-10007, "MODIFICATION INSPECTION SOW", FOR FURTHER DETAILS AND REQUIREMENTS.

SERVICE LEVEL COMMITMENT

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING AN MI REPORT:

- THE GC SHALL PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLY 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY MINOR DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

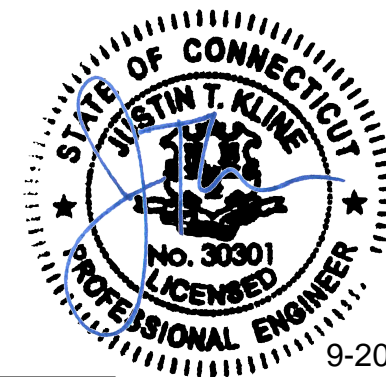
REQUIRED PHOTOS

BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
  - RAW MATERIALS
  - PHOTOS OF ALL CRITICAL DETAILS
  - FOUNDATION MODIFICATIONS
  - WELD PREPARATION
  - BOLT INSTALLATION
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN ONLY FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO CROWN DOCUMENT # CED-SOW-10007.



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**PAUL J. FORD & COMPANY**  
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**CROWN CASTLE**  
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 (585) 899-3445

**BU #823630; DANBURY NORTH / RT 37**  
 DANBURY, CONNECTICUT  
 MODIFIED 83'-3" MONOPOLE

PROJECT No:	37519-2998.001.7700
DRAWN BY:	DC/IM
DESIGNED BY:	GJA
CHECKED BY:	<i>[Signature]</i>
DATE:	09-20-2019

MI CHECKLIST

MI-1

REV	DATE	DESCRIPTION

**GENERAL NOTES:**

1. The General Contractor (GC) shall reference CED-STD-10159, "Tower Modification Construction Specifications", as a continuation of the following General Notes. The GC shall keep a copy of this document with the Structural Design Drawings (SDD) at all times, and shall ensure that all Contractor Personnel are aware of the information enclosed within the General Notes and CED-STD-10159.
2. The Contract Documents are the property of Crown Castle (Crown). They are provided to the GC and its Lower Tier Contractors and material suppliers for the limited purpose of use in completing the Work for this Site, and shall be kept in strict confidence and not disclosed to any third parties. The Contract Documents shall not be used for any other purpose whatsoever without the prior written consent of Crown.
3. Detail drawings, including notes and tables, shall govern over general notes and typical details. Contact the Crown Point of Contact (POC) and Engineer of Record (EOR) for clarification as needed.
4. Do not scale drawings.
5. Any Work performed without a prefabrication mapping is done at the risk of the GC and/or fabricator. All dimensions of existing structural elements are assumed based on the available documentation and are preliminary until field-verified by the GC, unless noted otherwise (UNO). Where discrepancies are found, GC shall contact the Crown POC and EOR through RFI.
6. For this analysis and modification, the tower has been assumed to be in good condition without any structural defects, UNO. If the GC discovers any indication of an existing structural defect, contact the Crown POC and EOR immediately.
7. All construction means and methods, including but not limited to erection plans, rigging plans, climbing plans, and rescue plans, shall be the responsibility of the GC responsible for the execution of the Work contained herein, and shall meet ANSI/ASSE A10.48 (latest edition); federal, state, and local regulations; and any applicable industry consensus standards related to the construction activities being performed. All rigging plans shall adhere to ANSI/ASSE A10.48 (latest edition) and Crown standard CED-STD-10253, "Rigging Program", including the required involvement of a qualified engineer for class IV construction to certify the supporting structure(s) in accordance with the ANSI/TIA-322 (latest edition).
8. The structural integrity of the modification design extends to the complete condition only. The GC must be cognizant that the removal of any structural component of an existing tower has the potential to cause the partial or complete collapse of the structure. All necessary precautions must be taken to ensure structural integrity, including, but not limited to, engineering assessment of construction stresses with installation maximum wind speed and/or temporary bracing and shoring.
9. Aerial and underground utilities and facilities may or may not be shown on the drawings. The GC shall take every precaution to preserve and protect these items, which may include aerial or underground power lines, telephone lines, water lines, sewer lines, cable television facilities, pipelines, structures and other public and private improvements within or adjacent to the Work area. The responsibility for determining the actual on-site location of these items shall rest exclusively with the GC.
10. All manufacturer's hardware assembly instructions shall be followed, UNO. Conflicting notes shall be brought to the attention of the EOR and the Crown POC.

11. The GC shall fabricate all required items per the materials specified below, UNO on the detail drawing sheets. If the GC finds for any component that the materials have not been clearly specified, the GC shall submit an RFI to the EOR to confirm the required material.  
All structural elements shall be new and shall conform to the following requirements, UNO:  
Monopoles:
  - Structural shapes and plates: ASTM A572 Grade 65 (FY = 65 KSI)
  - Welding electrodes, SMAW: E80XX
  - Welding electrodes, FCAW: E8XT-XX
 Self-Support and Guyed Towers:
  - Structural shapes and plates: ASTM A572 Grade 50 (FY = 50 KSI)
  - Welding electrodes, SMAW: E70XX
  - Welding electrodes, FCAW: E7XT-XX
 All tower types:
  - Steel angle: ASTM A572 Grade 50 (FY = 50 KSI)
  - Solid rod: ASTM A36 (FY = 36 KSI)
  - Pipe/tube (round): ASTM A500 Grade C (FY = 46 KSI)
  - Pipe/tube (square): ASTM A500 Grade C (FY = 50 KSI)
  - Bolts: ASTM F3125 Grade A325 Type 1
  - U-bolts: ASTM A307 Grade A, or SAE J429 Grade 2
  - Nuts: ASTM A563 Grade DH
  - Washers: ASTM F436 Type 1
  - Guy Wires: ASTM A475 Grade EHS
  - Bridge Strand: ASTM A586 Grade 1
12. After fabrication, hot-dip galvanize all steel items, UNO. Galvanize per ASTM A123, ASTM A153/A153M, or ASTM A653 G90, as applicable. ASTM A490 bolts shall not be hot-dip galvanized, but shall instead be coated with Magni 565 or EOR approved equivalent, per ASTM F2833.
13. Contractor Personnel shall not drill holes in any new or existing structural members, other than those drilled holes shown on structural drawings, without the approval of the EOR.
14. For a list of Crown-approved cold galvanizing compounds, refer to ENG-STD-10149, "Tower Protective Coatings Guidelines".
15. All exposed structural steel as the result of this scope of Work including welds (after final inspection of the weld by the CWI), field drilled holes, and shaft interiors (where accessible), shall be cleaned and two (2) coats cold galvanizing shall be applied by brush in accordance with ENG-STD-10149, "Tower Protective Coatings Guidelines". Photo documentation is required to be submitted to the MI Inspector.
16. If removal of existing modifications is required per the modification scope, the GC shall clean and cold galvanize any existing empty bolt holes, UNO. If additional unexpected, oversized, or slotted holes are found, the GC shall contact the EOR and Crown POC for guidance prior to proceeding with the modifications.
17. All Work involving base plate grout scope items or resulting in disturbance of base plate grout shall reference ENG-STD-10323, "Base Plate Grout", and shall follow any Base Plate Grout Removal Notes contained herein.

18. All tower grounding affected by the Work shall be repaired or replaced in accordance with OPS-STD-10090, "Tower Grounding", and OPS-BUL-10133, "Grounding Repair Recommendation".
19. If scope of modification requires removal or covering of tower ID tag, the tag must be replaced.
20. Any hardware removed from the existing tower shall be replaced with new hardware of equal size and quality, UNO. No existing fasteners shall be reused.
21. All joints using ASTM A325 or A490 bolts, U-bolts, V-bolts, and threaded rods shall be snug tightened, UNO.
22. A nut locking device shall be installed on all proposed and/or replaced snug tightened ASTM A325 or A490 bolts, U-bolts, V-bolts, and threaded rods.
23. All joints are bearing type connections UNO. If no bolt length is given in the Bill of Materials, the connection may include threads in the shear planes, and the GC is responsible for sizing the length of the bolt.
24. Blind bolts shall be installed per the installation specifications on the corresponding Approved Fastener sheets contained in CED-CAT-10300, "Monopole Standard Drawings and Approved Reinforcement Components".
25. If ASTM A325 or A490 bolts, and/or threaded rods are specified to be pre-tensioned, these shall be installed and tightened to the pretensioned condition according to the requirements of the RCSC Specification for Structural Joints Using ASTM High Strength Bolts.
26. All proposed and/or replaced bolts shall be of sufficient length such that the end of the bolt be at least flush with the face of the nut. It is not permitted for the bolt end to be below the face of the nut after tightening is completed.

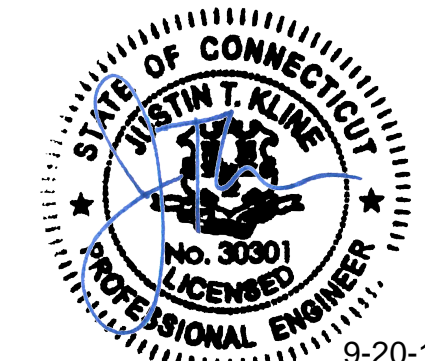
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**BU #823630; DANBURY NORTH / RT 37**  
 DANBURY, CONNECTICUT  
 MODIFIED 83'-3" MONOPOLE

PROJECT No:	37519-2998.001.7700
DRAWN BY:	DC/IM
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CHECKED BY:	<i>[Signature]</i>
DATE:	09-20-2019



**GENERAL NOTES**

**N-1**

REV	DATE	DESCRIPTION
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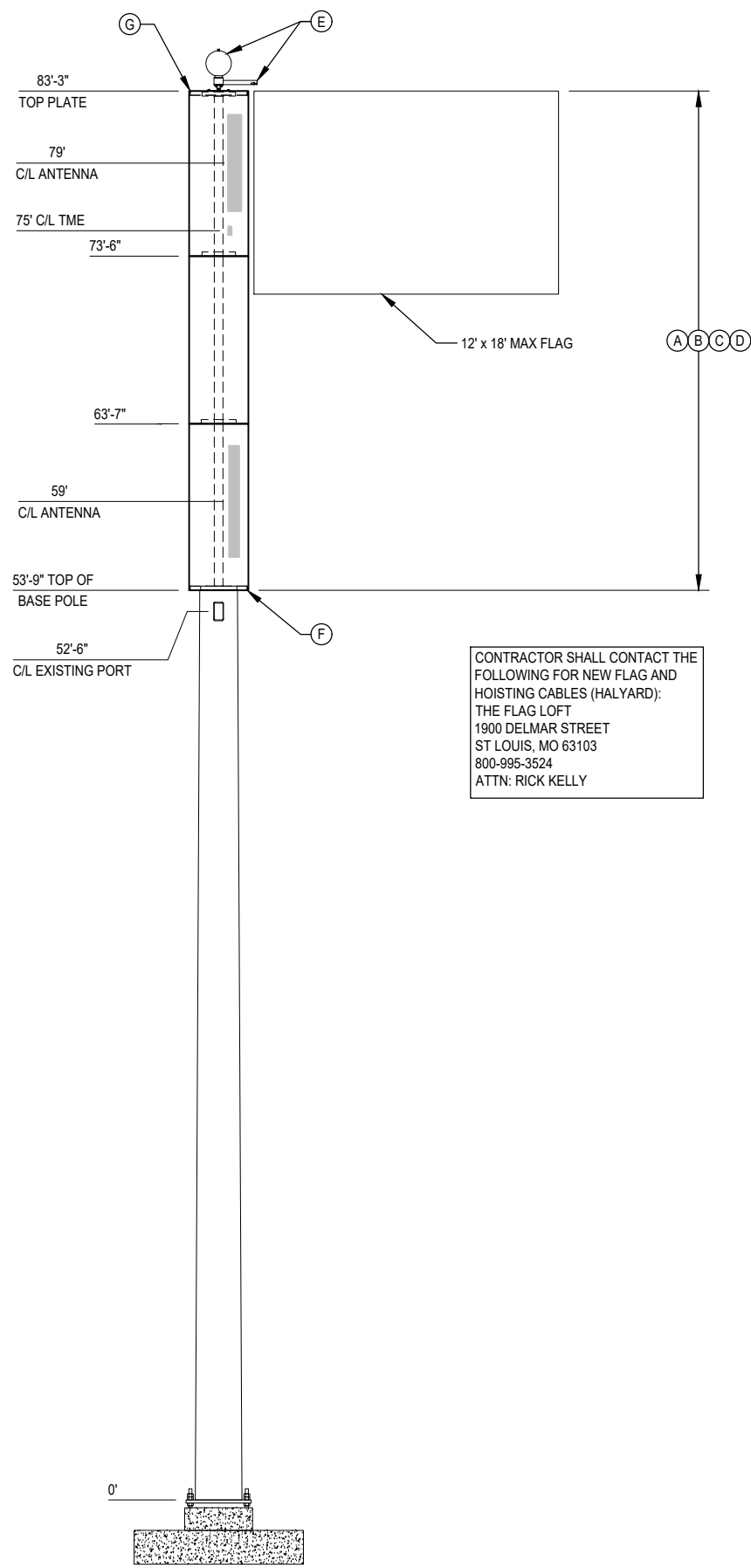
TOWER MODIFICATION SCHEDULE			
	ELEVATION	TOWER MODIFICATION DESCRIPTION	REFERENCE SHEETS
(A)	54'-2" TO 83'-8"	REMOVE EXISTING CONCEALMENT SHROUDS	S-1
(B)	53'-9" TO 83'-3"	INSTALL NEW CONCEALMENT BULKHEADS AND SHROUDS	S-2 TO S-4
(C)	53'-9" TO 83'-3"	INSTALL CONCEALMENT REINFORCING SOLUTION PER CROWN CASTLE DOC OPS-PRC-10127	S-1
(D)	53'-9" TO 83'-3"	PAINT MODIFICATIONS TO MATCH EXISTING POLE	S-1
(E)	83'-3"	INSTALL NEW BALL TRUCK AND TRUCK ARM	S-2
(F)	53'-9"	REMOVE AND REPLACE EXISTING FLANGE BOLTS	S-3
(G)	83'-3"	FIELD DRILL NEW HOLES FOR INSTALLATION OF NEW BULKHEAD	S-3

MANUFACTURER POLE SPECIFICATIONS	
TAPER	0.12 IN/FT
BASE PLATE STEEL	ASTM A572 GRADE 50 (50 KSI)
ANCHOR RODS	2 1/4"Ø ASTM 615 GRADE 75
FLANGE PLATE STEEL	NA
FLANGE BOLTS	NA

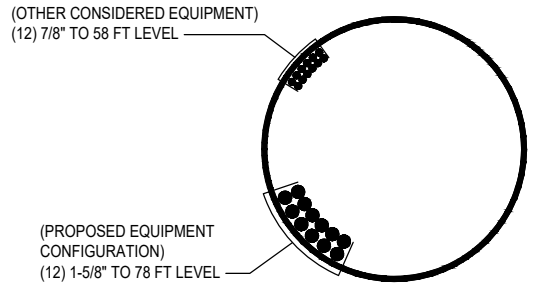
SHAFT SECTION DATA							
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (FT)	DIAMETER ACROSS FLATS (IN)		POLE GRADE (ksi)	POLE SHAPE
				@ TOP	@ BOTTOM		
1	29.50	0.75000		6.000	6.000	65	ROUND
2	53.75	0.2500		26.625	33.075	65	18-SIDED

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

PRIOR TO FABRICATION AND INSTALLATION CONTRACTOR SHALL VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY AND SHALL NOT BE USED FOR FABRICATION.  
 \*FOR PARTS NOT DETAILED WITHIN THE DRAWING AND STARTING WITH "CCI-", SEE CATALOG FOR DETAILS: CED-CAT-10300, MONOPOLE STANDARD DRAWINGS AND APPROVED REINFORCEMENT COMPONENTS

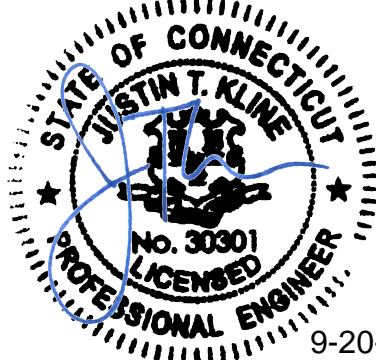


CONTRACTOR SHALL CONTACT THE FOLLOWING FOR NEW FLAG AND HOISTING CABLES (HALYARD):  
 THE FLAG LOFT  
 1900 DELMAR STREET  
 ST LOUIS, MO 63103  
 800-995-3524  
 ATTN: RICK KELLY



COAX LAYOUT 2  
S-1

POLE ELEVATION 1  
S-1



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 MODIFIED 83'-3" MONOPOLE

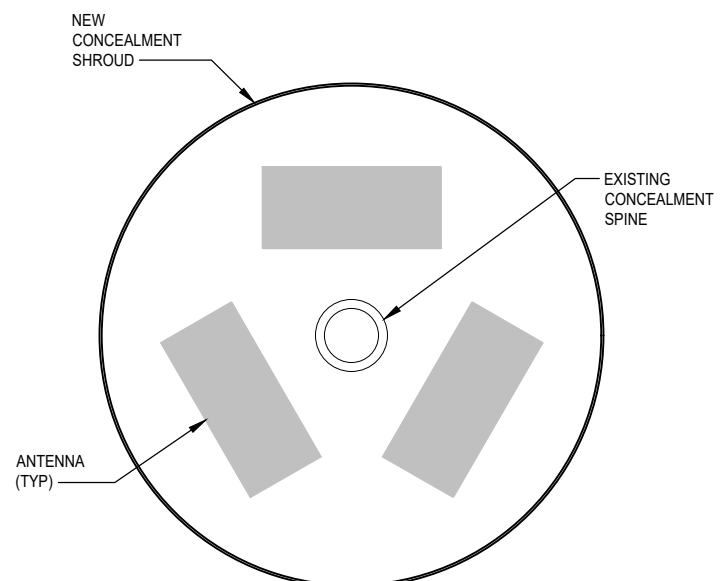
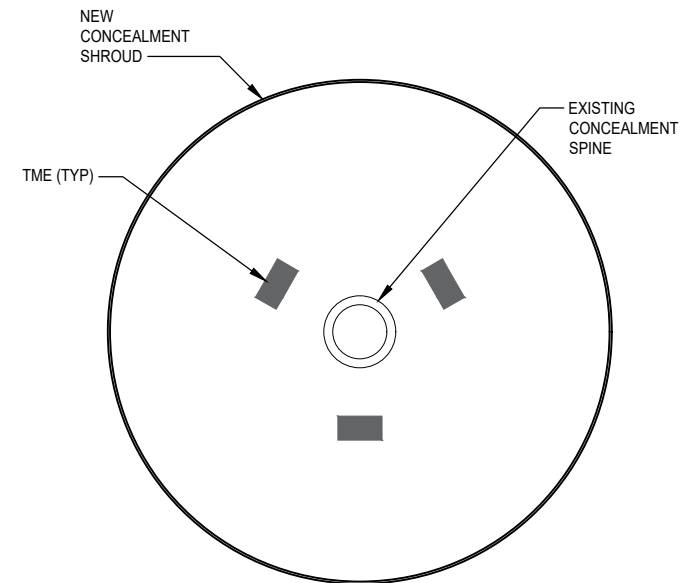
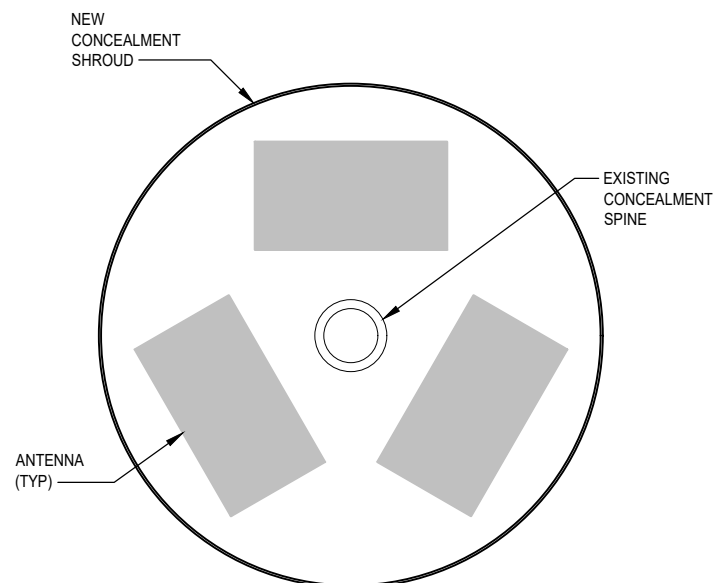
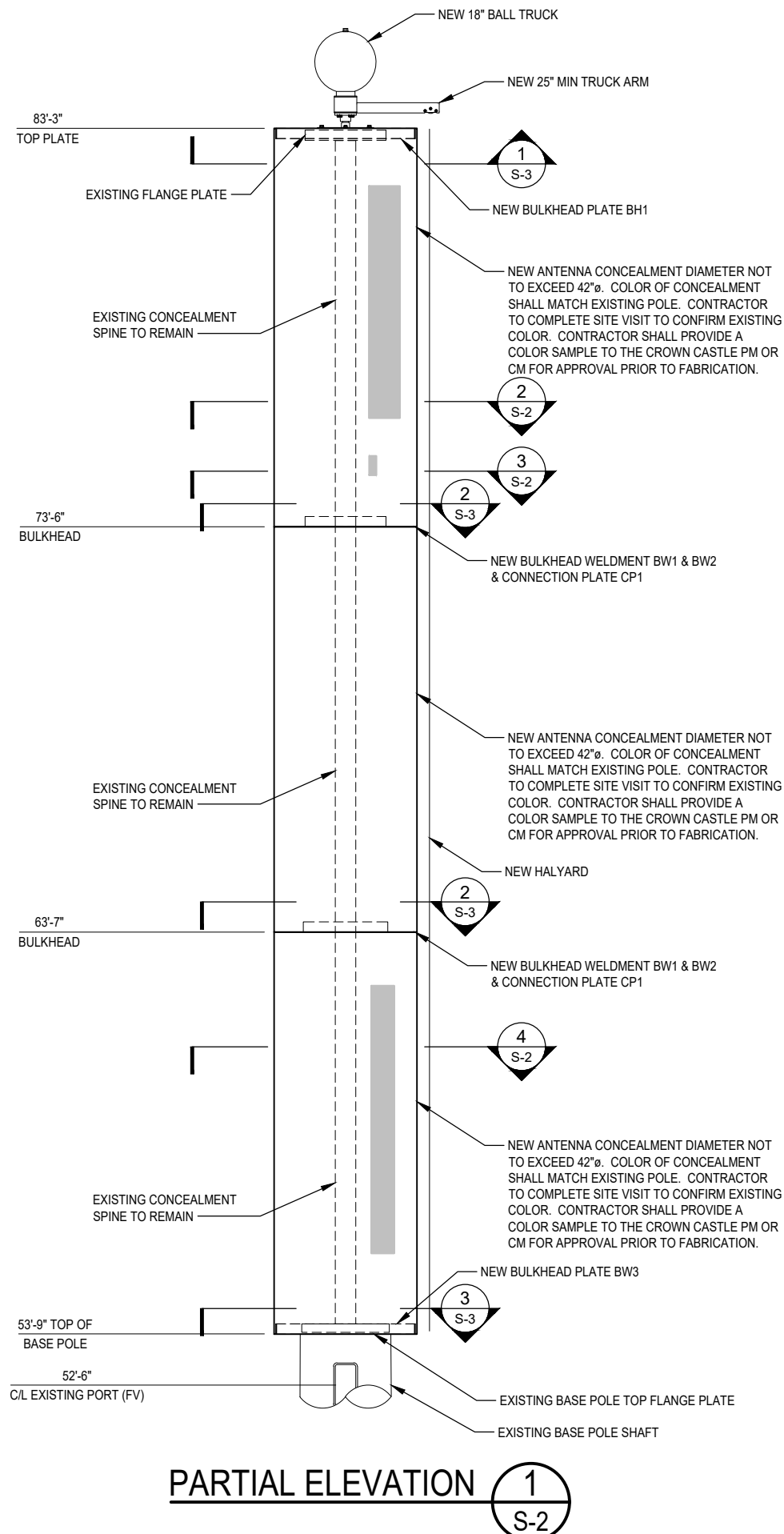
PROJECT No:	37519-2998.001.7700
DRAWN BY:	DC/IM
DESIGNED BY:	GJA
CHECKED BY:	<i>[Signature]</i>
DATE:	09-20-2019

MONOPOLE PROFILE

S-1

REV	DATE	DESCRIPTION

V1.0 37519-2998.001.DWG

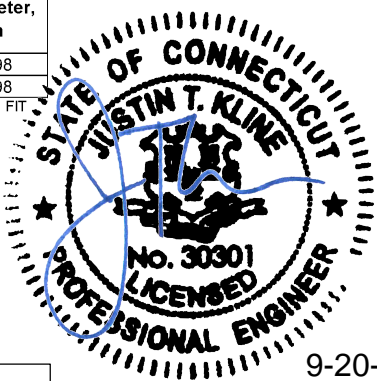


Antenna Model	QUANTITY	Antenna Centerline Elevation, ft	Height, in	Depth, in	Width, in
APXVAR18_43-C-NA20	3	79	68	9	16
ATSBT-BOTTOM-MF	3	75	5.63	2	3.7
80010798	3	59	78.5	6.7	14.8
DTMABP7819VG12A	6	55	10.63	3.78	11.02

Coax Model	QUANTITY	Elevation, ft	Nominal Diameter, in	Actual Diameter, in
LDF7-50A	12	78	1 5/8	1.98
LDF5-50A	12	58	1 5/8	1.98

NOTE: ALL ANTENNA DIMENSIONS HAVE BEEN PROVIDED BY CROWN CASTLE. A 4" SPACING BETWEEN THE SPINE AND ANTENNA HAS BEEN ASSUMED.

NOTE: COAX LAYOUT AND FIT IS THEORETICAL. ACTUAL LAYOUT AND FIT MAY VARY PENDING EXISTING CONDITIONS.



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**PAUL J. FORD & COMPANY**  
 250 E Broad St., Ste 600· Columbus, OH 43215  
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**CROWN CASTLE**  
 8 PARKMEADOW DR PITTSFORD, NY 14534  
 (585) 889-3445

**BU #823630; DANBURY NORTH / RT 37**  
 DANBURY, CONNECTICUT  
 MODIFIED 83'-3" MONOPOLE

PROJECT No: 37519-2998.001.7700  
 DRAWN BY: DC/IM  
 DESIGNED BY: GJA  
 CHECKED BY: *[Signature]*  
 DATE: 09-20-2019

**CONCEALMENT ELEVATION DETAILS**

**S-2**

REV	DATE	DESCRIPTION

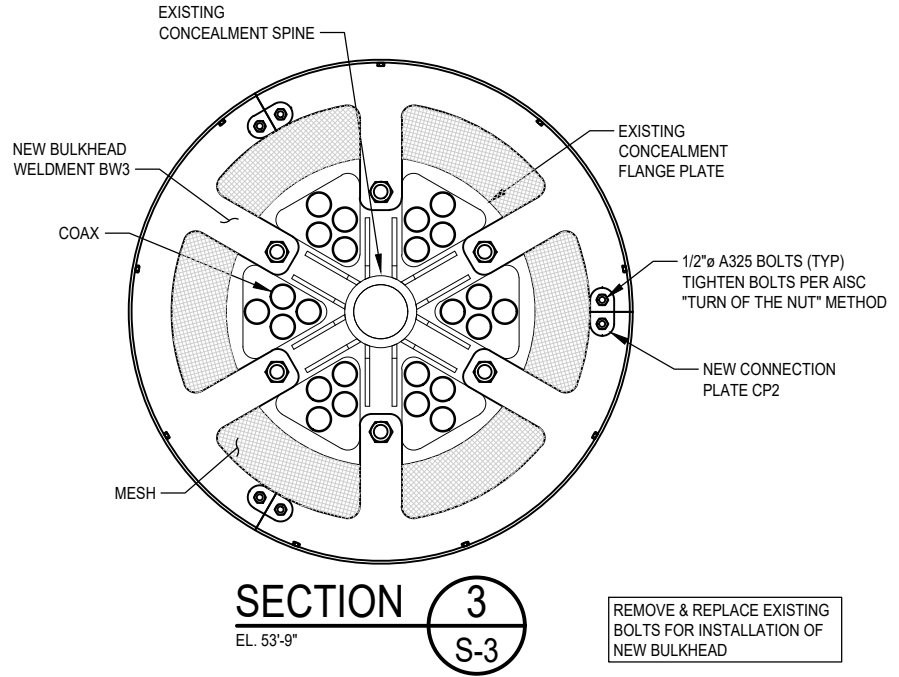
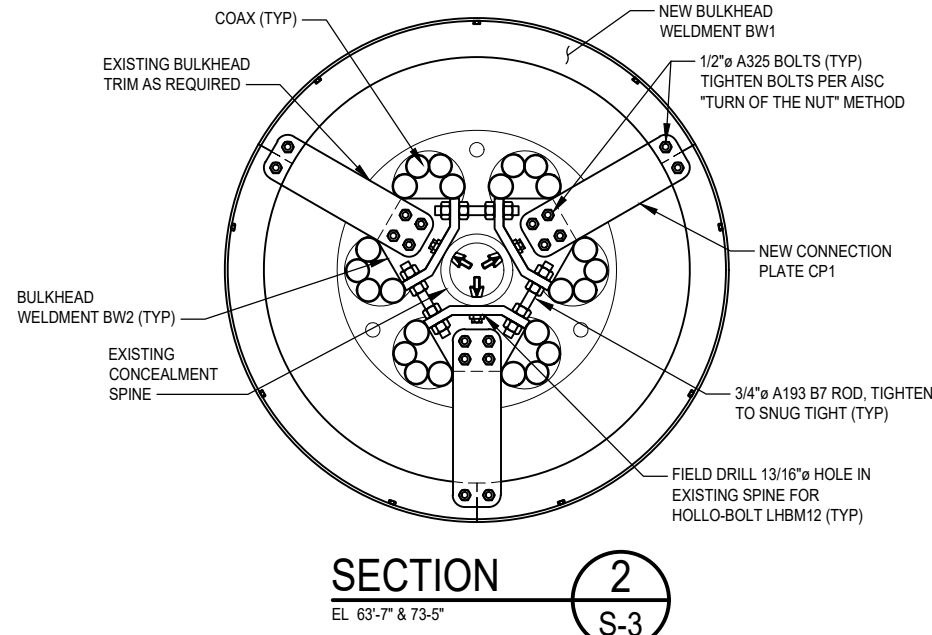
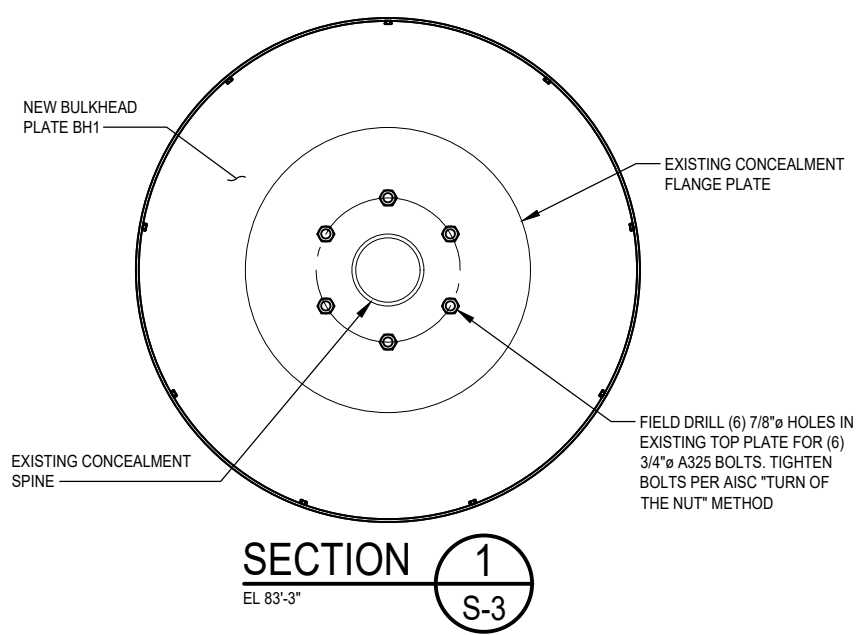
9-20-19

V1.D 37519-2998.001.DWG

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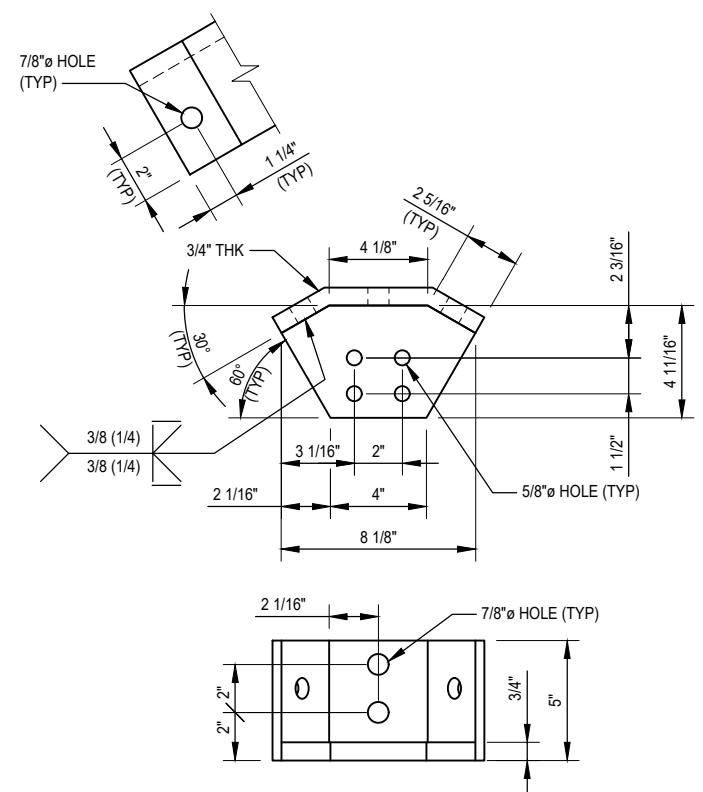
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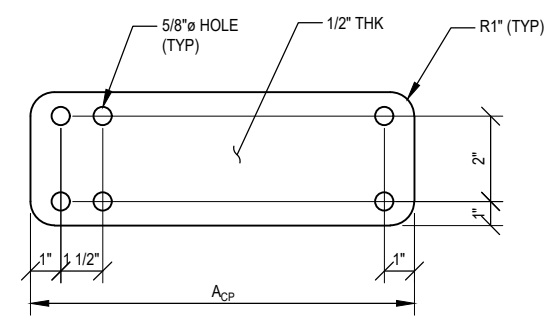
REMOVE & REPLACE EXISTING BOLTS FOR INSTALLATION OF NEW BULKHEAD

INSTALL SHEET METAL CONNECTORS, INC. 1/2" x 1/2" ZINC PLATED ALL STEEL WIRE MESH OR APPROVED EQUIVALENT TO COVER OPENING OUTSIDE OF BASE POLE. FASTEN TO BULKHEAD USING HILTI S-MD 12-24x1 1/4 HWH #5 OR APPROVED EQUIVALENT SELF DRILLING SCREW AND 1" x 1/8" WASHERS WITH 1/4" HOLE.

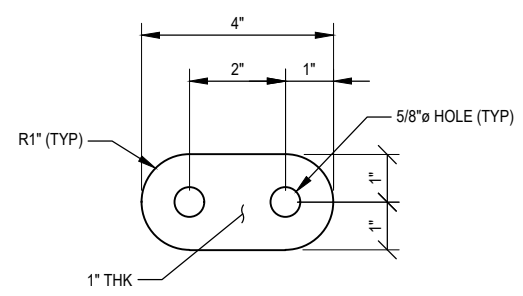
NOTE: CONTRACTOR SHALL COORDINATE WITH CROWN CM AND PM ON BIRD DETERRENT SYSTEM TO BE PLACED ATOP OF THE MESH



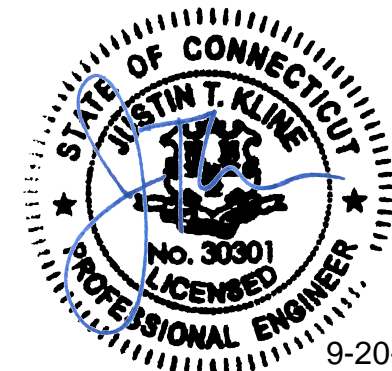
**BULKHEAD WELDMENT MK~BW2**  
 (6 REQUIRED) (ASTM A36)



CONNECTION PLATE			
PART #	GRADE	QTY	A <sub>CP</sub> (IN)
CP1	ASTM A36	6	14 1/2



**CONNECTION PLATE MK~CP1**  
 (3 REQUIRED) (ASTM A36)



**BU #823630; DANBURY NORTH / RT 37**  
 DANBURY, CONNECTICUT  
 MODIFIED 83'-3" MONOPOLE

PROJECT No: 37519-2998.001.7700  
 DRAWN BY: DC/IM  
 DESIGNED BY: GJA  
 CHECKED BY: *[Signature]*  
 DATE: 09-20-2019

CONCEALMENT SECTIONS

S-3

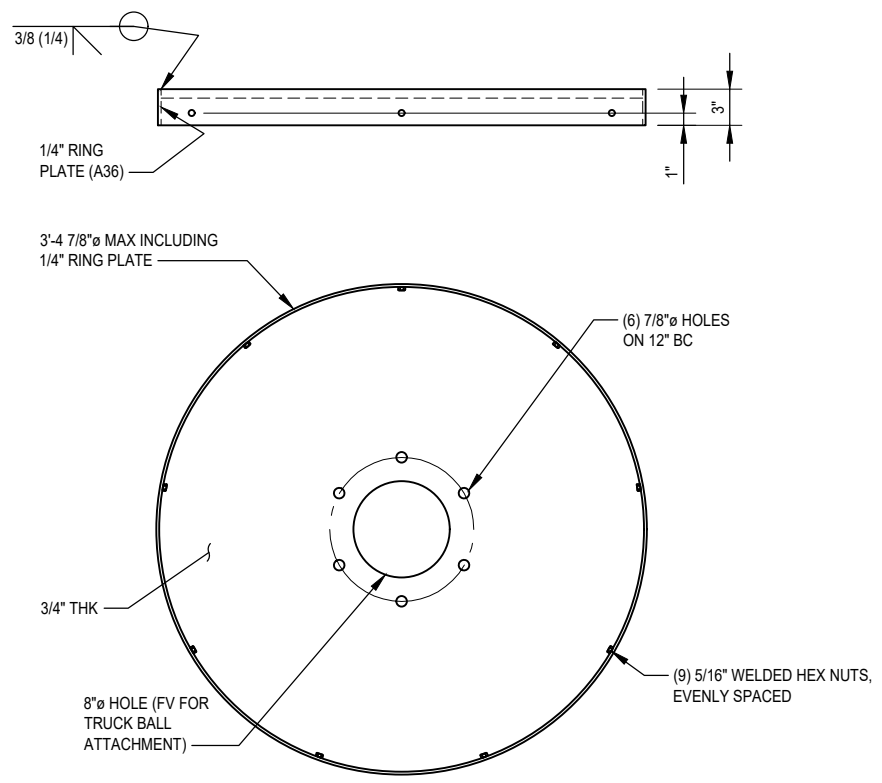
REV	DATE	DESCRIPTION

V1.0 37519-2998.001.DWG

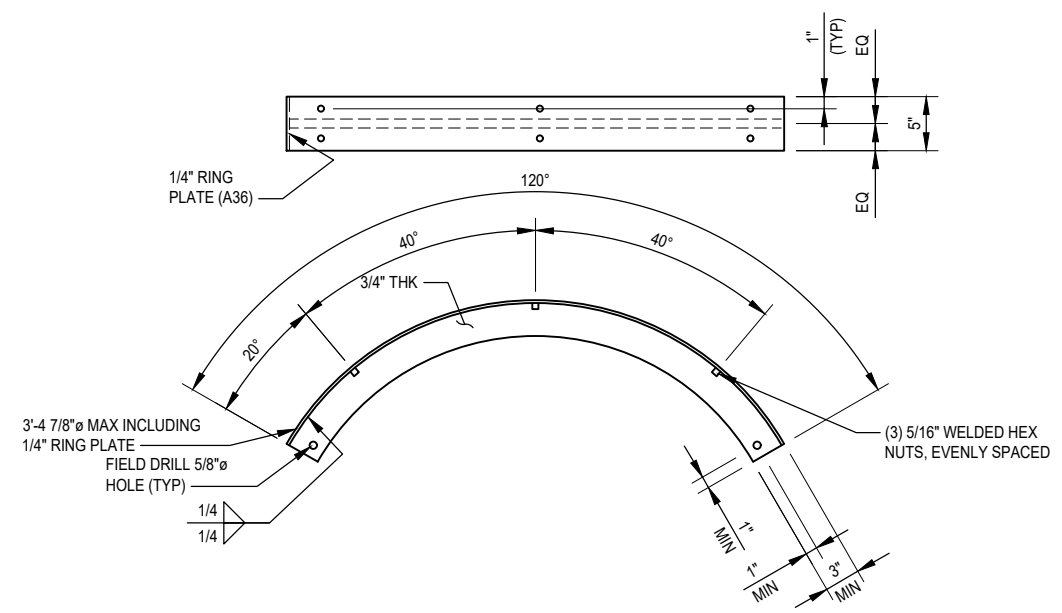
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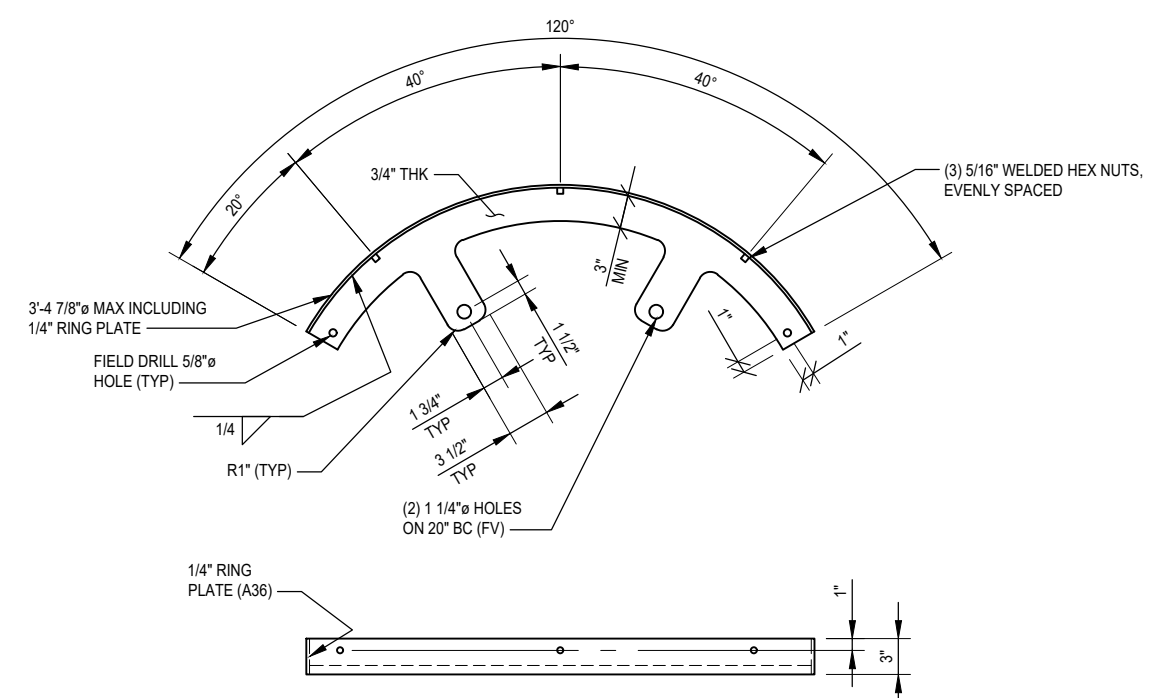
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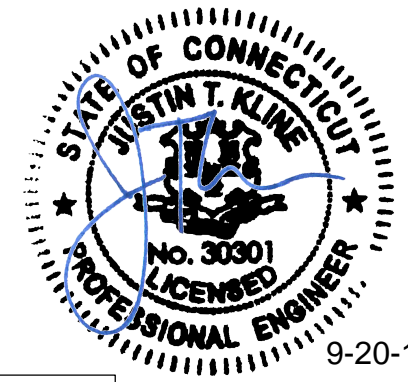
**BULKHEAD PLATE MK~BH1**  
 (1 REQUIRED) (ASTM A36)



**BULKHEAD WELDMENT MK~BW1**  
 (6 REQUIRED) (ASTM A36)



**BULKHEAD WELDMENT MK~BW3**  
 (3 REQUIRED) (ASTM A36)



**BU #823630; DANBURY NORTH / RT 37**  
 DANBURY, CONNECTICUT  
 MODIFIED 83'-3" MONOPOLE

PROJECT No: 37519-2998.001.7700  
 DRAWN BY: DC/IM  
 DESIGNED BY: GJA  
 CHECKED BY: *[Signature]*  
 DATE: 09-20-2019

**BULKHEAD DETAILS**

**S-4**

REV	DATE	DESCRIPTION

V1.0 37519-2998.001.DWG

# Transcom Engineering, Inc.

Wireless Network Design and Deployment

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## Radio Frequency Emissions Analysis Report

**T-MOBILE** Existing Facility

**Site ID: CT11195D**

Danbury North / Rt 37  
181 Clapboard Ridge Road  
Danbury, CT 06811

May 31, 2019

**Transcom Engineering Project Number: 737001-0107**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general population allowable limit:	<b>29.94 %</b>



# Transcom Engineering, Inc.

Wireless Network Design and Deployment

May 31, 2019

T-MOBILE

Attn: Jason Overbey, RF Manager  
35 Griffin Road South  
Bloomfield, CT 6009

## Emissions Analysis for Site: **CT11195D – Danbury North / Rt 37**

Transcom Engineering, Inc (“Transcom”) was directed to analyze the proposed upgrades to the T-MOBILE facility located at **181 Clapboard Ridge Road, Danbury, CT**, for the purpose of determining whether the emissions from the Proposed T-MOBILE Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The number of  $\mu\text{W}/\text{cm}^2$  calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

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

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limits for the 600 & 700 MHz bands are approximately  $400 \mu\text{W}/\text{cm}^2$  and  $467 \mu\text{W}/\text{cm}^2$  respectively. The general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) bands is  $1000 \mu\text{W}/\text{cm}^2$ . Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

# Transcom Engineering, Inc.

Wireless Network Design and Deployment

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

Additional details can be found in FCC OET 65.

# Transcom Engineering, Inc.

Wireless Network Design and Deployment

## CALCULATIONS

Calculations were performed for the proposed upgrades to the T-MOBILE antenna facility located at **181 Clapboard Ridge Road, Danbury, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-MOBILE is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
LTE	1900 MHz (PCS)	4	40
LTE	2100 MHz (AWS)	2	60
GSM	1900 MHz (PCS)	1	15
UMTS	1900 MHz (PCS)	1	40
LTE / 5G NR	600 MHz	2	40
LTE	700 MHz	2	20

*Table 1: Channel Data Table*

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The following antennas listed in *Table 2* were used in the modeling for transmission in the 600, 700 MHz, 1900 MHz (PCS) and 2100 MHz (AWS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	RFS APXVAR18_43-C-NA20	79
B	1	RFS APXVAR18_43-C-NA20	79
C	1	RFS APXVAR18_43-C-NA20	79

*Table 2: Antenna Data*

All calculations were done with respect to uncontrolled / general population threshold limits.

Cable losses were factored in the calculations for this site. Since all radios are ground mounted the following cable loss values were used. For each ground mounted **600 MHz** radio there was **0.64 dB** of cable loss calculated into the system gains / losses for this site. For each ground mounted **700 MHz** radio there was **0.70 dB** of cable loss calculated into the system gains / losses for this site. For each ground mounted **1900 MHz (PCS)** radio there was **1.22 dB** of cable loss calculated into the system gains / losses for this site. For each ground mounted **2100 MHz (AWS)** radio there was **1.29 dB** of cable loss calculated into the system gains / losses for this site. These values were calculated based upon the manufacturers specifications for **100 feet of 1-1/4"** coax.

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## RESULTS

Per the calculations completed for the proposed T-MOBILE configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	RFS APXVAR18_43-C-NA20	1900 MHz (PCS) / 2100 MHz (AWS) / 600 MHz / 700 MHz	15.85 / 17.15 / 12.85 / 13.55	12	455	12,971.13	10.67
Sector A Composite MPE%							<b>10.67</b>
Antenna B1	RFS APXVAR18_43-C-NA20	1900 MHz (PCS) / 2100 MHz (AWS) / 600 MHz / 700 MHz	15.85 / 17.15 / 12.85 / 13.55	12	455	12,971.13	10.67
Sector B Composite MPE%							<b>10.67</b>
Antenna C1	RFS APXVAR18_43-C-NA20	1900 MHz (PCS) / 2100 MHz (AWS) / 600 MHz / 700 MHz	15.85 / 17.15 / 12.85 / 13.55	12	455	12,971.13	10.67
Sector C Composite MPE%							<b>10.67</b>

*Table 3: T-MOBILE Emissions Levels*

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The Following table (*table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum T-MOBILE MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, all three sectors have the same configuration yielding the same results on all three sectors. *Table 5* below shows a summary for each T-MOBILE Sector as well as the composite MPE value for the site.

Site Composite MPE%	
Carrier	MPE%
T-MOBILE – Max Per Sector Value	<b>10.67 %</b>
AT&T	18.80 %
Clearwire	0.47 %
<b>Site Total MPE %:</b>	<b>29.94 %</b>

*Table 4: All Carrier MPE Contributions*

T-MOBILE Sector A Total:	10.67 %
T-MOBILE Sector B Total:	10.67 %
T-MOBILE Sector C Total:	10.67 %
Site Total:	29.94 %

*Table 5: Site MPE Summary*

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FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated T-MOBILE sector(s). For this site, all three sectors have the same configuration yielding the same results on all three sectors.

T-MOBILE _ Frequency Band / Technology Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
T-Mobile 1900 MHz (PCS) LTE	4	1,161.61	79	31.35	1900 MHz (PCS)	1000	3.13%
T-Mobile 2100 MHz (AWS) LTE	2	2,312.87	79	31.21	2100 MHz (AWS)	1000	3.12%
T-Mobile 1900 MHz (PCS) GSM	1	435.60	79	2.94	1900 MHz (PCS)	1000	0.29%
T-Mobile 1900 MHz (PCS) UMTS	1	1,161.61	79	7.84	1900 MHz (PCS)	1000	0.78%
T-Mobile 600 MHz LTE / 5G NR	2	665.37	79	8.98	600 MHz	400	2.24%
T-Mobile 700 MHz LTE	2	385.50	79	5.20	700 MHz	467	1.11%
						<b>Total:</b>	<b>10.67%</b>

*Table 6: T-MOBILE Maximum Sector MPE Power Values*

# Transcom Engineering, Inc.

Wireless Network Design and Deployment

## Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population exposure to RF Emissions.

The anticipated maximum composite contributions from the T-MOBILE facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

T-MOBILE Sector	Power Density Value (%)
Sector A:	10.67 %
Sector B:	10.67 %
Sector C:	10.67 %
T-MOBILE Maximum Total (per sector):	10.67 %
Site Total:	29.94 %
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **29.94 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.



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Sterling, MA 01564