

STATE OF CONNECTICUT  
CONNECTICUT SITING COUNCIL

IN RE: :  
: :  
A SUB-PETITION OF CELLCO : SUB-PETITION NO. 1133  
PARTNERSHIP D/B/A VERIZON WIRELESS : 10 SYLVIA STREET  
FOR THE SHARED USE OF AN EXISTING : BRANFORD, CT  
WIRELESS TELECOMMUNICATIONS :  
FACILITY AT 10 SYLVIA STREET, :  
BRANFORD, CONNECTICUT : FEBRUARY 8, 2016

SUB-PETITION FOR DECLARATORY RULING:  
ELIGIBLE FACILITIES REQUEST FOR MODIFICATIONS  
THAT WILL NOT SUBSTANTIALLY CHANGE THE  
PHYSICAL DIMENSIONS OF AN EXISTING BASE STATION

I. Introduction

Pursuant to Section 6409(a) of the Middle Class Tax Relief and Job Creation Act of 2012, codified at 47 U.S.C. § 1455(a) (“Section 6409(a)”) and the October 21, 2014 Report and Order (FCC-14-533) issued by the Federal Communications Commission (“FCC”) (the “FCC Order”), Cellco Partnership d/b/a Verizon Wireless (“Cellco”) hereby petitions the Connecticut Siting Council (the “Council”) for a declaratory ruling (“Sub-Petition”) that the installation of antennas and related telecommunications equipment at the existing wireless telecommunications base station at 10 Sylvia Street in Branford, Connecticut (the “Property”) constitutes an Eligible Facilities Request (“EFR”) under the FCC Order. Cellco has designated this site as its “Branford 4 Facility”.

II. Factual Background

The Property is a 0.9-acre parcel in Branford’s BL commercial zone. The Property is surrounded by commercial uses along Sylvia Street and East Main Street and Interstate 95 to the north. See Attachment 1 – Site Vicinity Map and Site Schematic (Aerial Photograph). The

existing 125-foot tower was approved by the Branford Planning and Zoning Commission (“PZC”) on November 5, 1998, and was recorded in the Branford Land Records in Volume 662 Page 502. A copy of the PZC’s Notice of Decision is included in Attachment 2. The existing tower is shared by T-Mobile, with antennas at the 122-foot level, AT&T Wireless, with antennas at the 100-foot level, and Clearwire, with antennas at the 90-foot level. Equipment associated with the T-Mobile, AT&T and Clearwire antennas is located within a 39’ x 40’ fenced compound.

Cellco is licensed to provide wireless telecommunications services in the 850 MHz, 1900 MHz, 700 MHz and 2100 MHz frequency ranges in Branford and throughout the State of Connecticut. The proposed Branford 4 Facility described in this filing will provide wireless service in all of Cellco’s licensed frequency ranges and is designed to provide coverage and capacity relief to Cellco’s existing wireless network in Branford.

### III. Proposed Branford 4 Facility

Cellco intends to install twelve (12) antennas and nine (9) remote radio heads (“RRHs”) on a low-profile antenna platform at the 112-foot level on the 125-foot tower. Cellco will also install three (3) equipment cabinets and a 15 kW diesel back-up generator on a 10-foot by 20-foot concrete pad within the limits of the existing fenced compound. Cellco’s equipment pad will be covered by a metal frame canopy structure. Power and telephone service will extend from the existing utility backboard at the Property. Project Plans for the Branford 4 Facility are included in Attachment 3. Specifications for Cellco’s antennas, RRHs and generator are included in Attachment 4. A Structural Modification Report confirming that the tower, with certain modifications, can support Cellco’s antennas and related equipment is included in Attachment 5.

#### IV. Discussion

##### A. The Proposed Modification Will Not Cause a Substantial Change to the Physical Dimensions of the Existing Base Station

Section 6409(a) provides, in relevant part, that “a State or local government may not deny, and shall approve, any eligible facilities request for a modification of an existing wireless tower or base station that does not substantially change the physical dimensions of such tower or base station.” Pursuant to the FCC Order, the proposed modification does not substantially change the physical dimensions of the base station if the following criteria are satisfied.

1. *The proposed modified facility will not increase the height of the tower by more than ten (10) percent of the height.* Cellco does not intend to increase the height of the existing tower. Cellco’s antennas will be located at the 112-foot level on the existing 125-foot tower.

2. *The proposed facility modification will not protrude from the edge of the structure more than six (6) feet.* Cellco’s antennas will not protrude more than six (6) feet from the face of the tower.

3. *The proposed facility does not involve installation of more than the standard number of new equipment cabinets for the technology involved, but not to exceed four cabinets.* Cellco intends to install three (3) equipment cabinets and a small back-up generator on a concrete pad within the fenced compound.

4. *The proposed facility does not entail any excavation or deployment outside the current site of the base station.* Cellco’s proposed modification will remain within the limits of the existing fenced compound at the Property.

5. *The proposed facility does not defeat the existing concealment elements of the base station.* There are no concealment elements incorporated into the existing base station.

6. *The proposed facility complies with conditions associated with the prior approval of construction or modification of the base station.* On November 5, 1998, Omnipoint Communications Inc. (“OCI”) received Branford Planning and Zoning Commission approval to install the existing tower at the Property. The only condition attached to that approval required OCI to construct the tower so that it can easily be extended to accommodate additional carriers. (See Attachment 2). None of the elements of Cellco’s proposed facility modifications conflict with the Town’s original approval, or any of the Council’s previous modification approvals for this tower site.

B. FCC Compliance

Included in Attachment 6 is a cumulative worst case General Power Density table for all existing and Cellco’s proposed antennas confirming that the facility will continue to operate within the FCC safety standards for radio frequency emissions.

C. Notice to the Town, Property Owner and Abutting Landowners

On February 8, 2016, a copy of this Sub-Petition was sent to Branford’s First Selectman James B. Cosgrove, 322 East Main Street LLC and G6 Hospitality Property LLC (the “Property Owners”). Copies of the letters sent to Mr. Cosgrove and the Property Owners are included in Attachment 7. A copy of this Sub-Petition was also sent to the owners of land that abuts the Property. A sample abutter’s cover letter and the list of those abutting landowners who were sent notice and a copy of this filing is included in Attachment 8.

V. Conclusion

Based on the information provided above, Cellco respectfully submits that the proposed modification of the existing base station at the Property constitutes an “eligible facilities request” under Section 6409(a) and the FCC Order.

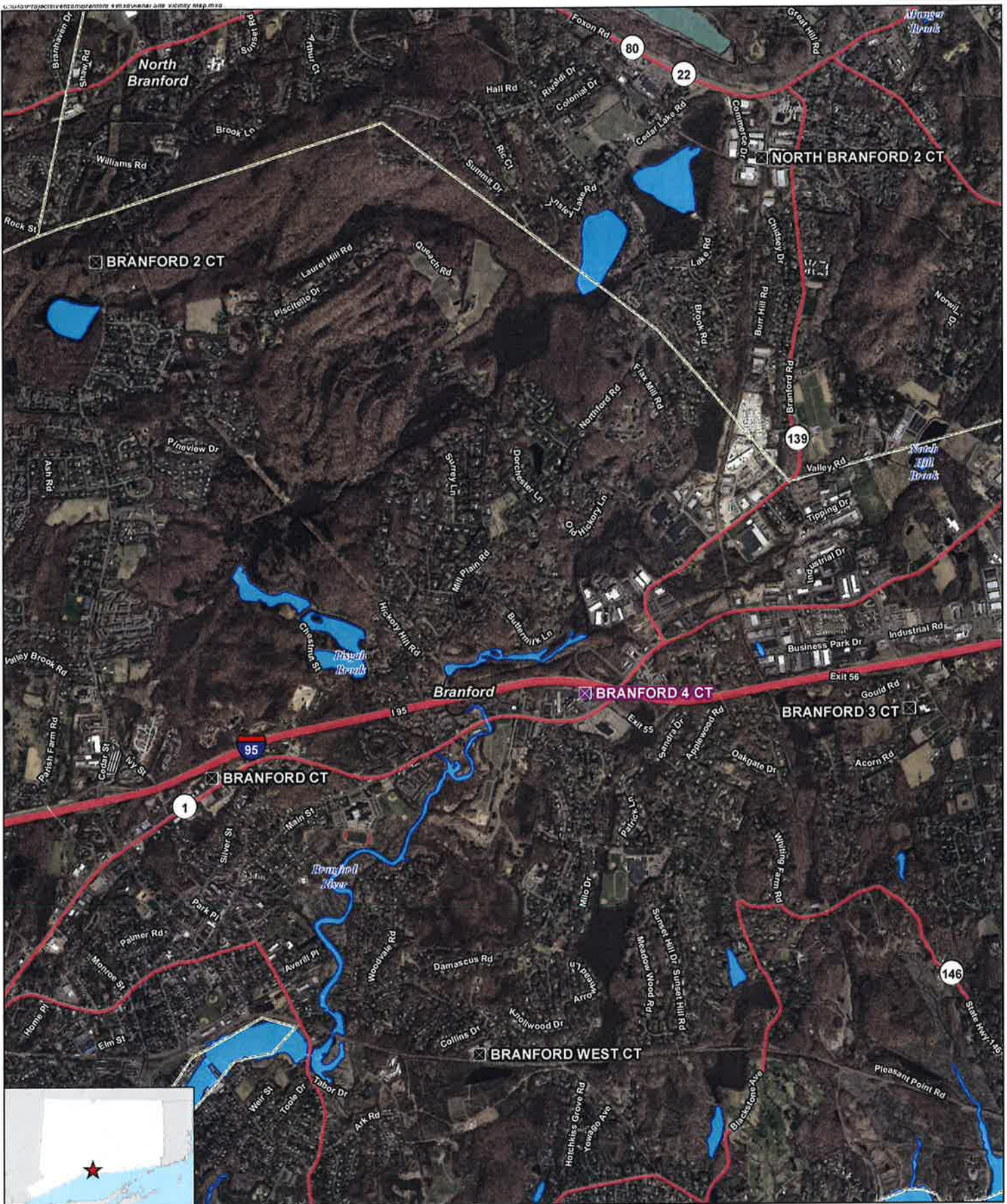
Respectfully submitted,

CELLCO PARTNERSHIP d/b/a VERIZON  
WIRELESS

By  \_\_\_\_\_

Kenneth C. Baldwin, Esq.  
Robinson & Cole LLP  
280 Trumbull Street  
Hartford, CT 06103-3597  
(860) 275-8200  
Its Attorneys

# **ATTACHMENT 1**



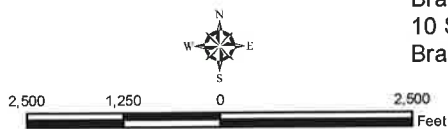
- Legend**
- Proposed Verizon Wireless Facility
  - Surrounding Verizon Wireless Facilities
  - Municipal Boundary
  - Waterbody

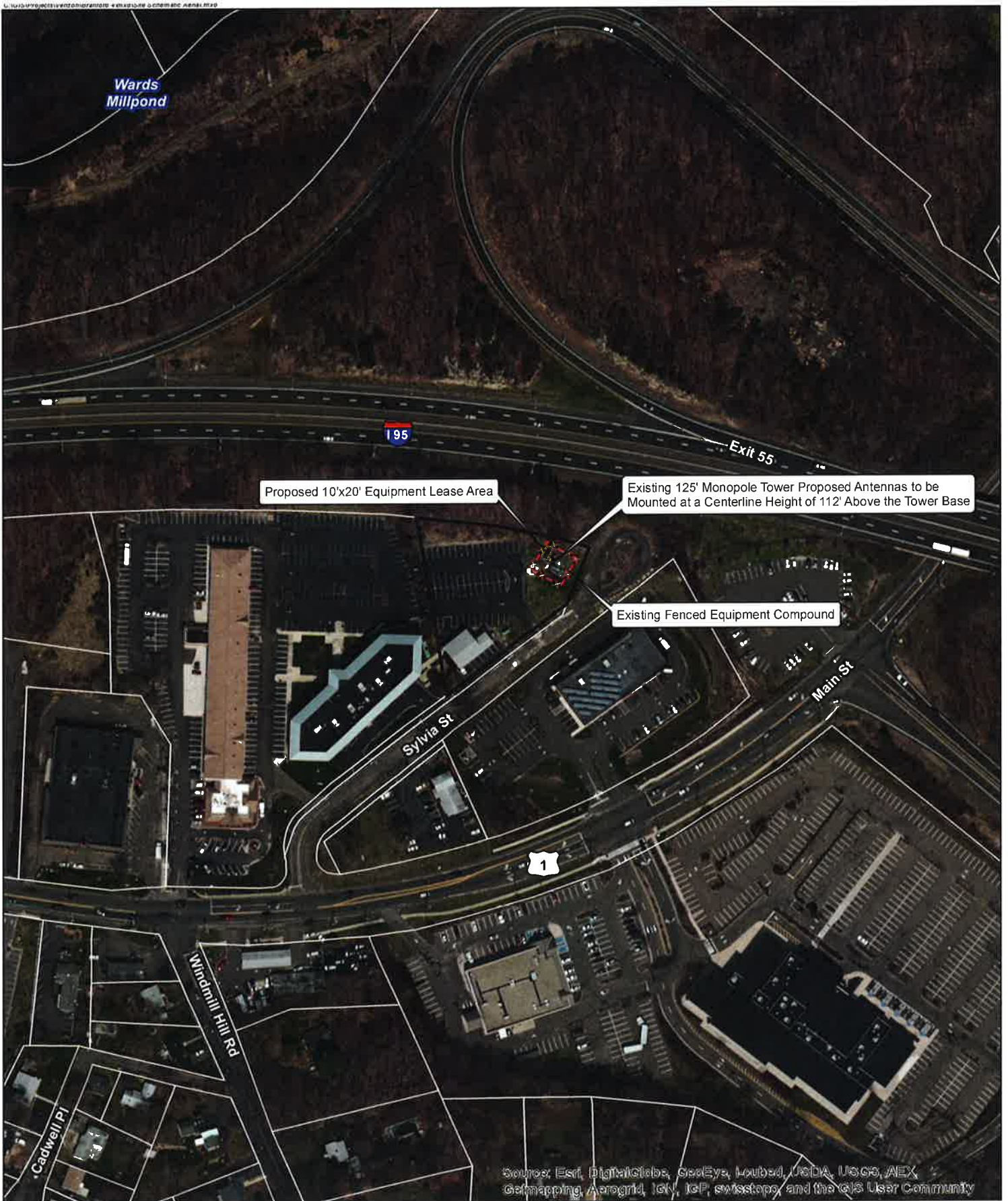
**Site Vicinity Map**

Proposed Wireless Telecommunications Facility  
 Branford 4 CT  
 10 Sylvia Street  
 Branford, Connecticut







Base Map Source: 2012 Aerial Photograph (CTECO)  
 Map Scale: 1 inch = 2,500 feet  
 Map Date: January 2016





Sources: Esri, DigitalGlobe, GeoEye, Ikonos, USDA, USGS, AEX, Getmapping, AerGRID, IGN, IGP, swisstopo, and the GIS User Community

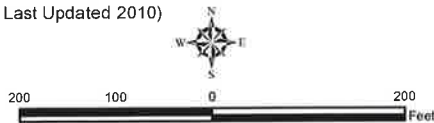
**Legend**

-  Approximate Subject Property
-  Existing Fenced Equipment Compound
-  Proposed 10'x20' Equipment Lease Area
-  Approximate Parcel Boundary (CTDEEP GIS Parcels Last Updated 2010)

**Site Schematic**

Proposed Wireless  
Telecommunications Facility  
Branford 4 CT  
10 Sylvania Street  
Branford, Connecticut

Map Notes:  
Base Map Source: ESRI World Imagery, NAIP 2014  
Map Scale: 1 inch = 200 feet  
Map Date: January 2016





# **ATTACHMENT 2**

6740

VOL. 662 PAGE 502  
PLANNING AND ZONING COMMISSION  
TOWN OF BRANFORD TOWN HALL DRIVE P.O. BOX 150  
Branford, Connecticut 06405 488-1255

**NOTICE OF DECISION**

November 10, 1998

J. Brendan Sharkey, Esq. For Omnipoint Communications, Inc.  
25 VanZant Street #18E  
East Norwalk, Connecticut 06855

SUBJECT: Special Exception

APPLICATION # 98-9.3

LOCATION: 10 Sylvia Street

OWNERS OF RECORD: TKJ SYLVIA ASSOCIATES, LLC

Dear Sir:

At a meeting of the Branford Planning & Zoning Commission held on Thursday, November 5, 1998, the Commission voted to:

Approve your above subject application with the conditions noted below.

Very truly yours,

*Shirley Rasmussen*  
Shirley Rasmussen  
Town Planner

NOTE: This Special Exception shall become effective only after it is filed on the Land Records in the office of the Town Clerk.

- 1. Omnipoint must construct tower so that it can easily be extended to provide spaces for two (2) other carriers for co-location purposes.

NOTE: Special Exception shall become null and void in the event the applicant fails to obtain a building permit within one (1) year of date of approval.  
(Per Section 31.7 of the Branford Zoning Regulations)

RECEIVED FOR RECORD Nov. 19, 1998  
at 3:49 p.m. AND RECORDED BY

GEORGETTE A. LASKE  
BRANFORD TOWN CLERK

# **ATTACHMENT 3**

# Cellco Partnership

d.b.a. **verizon** wireless

## WIRELESS COMMUNICATIONS FACILITY

### BRANFORD 4

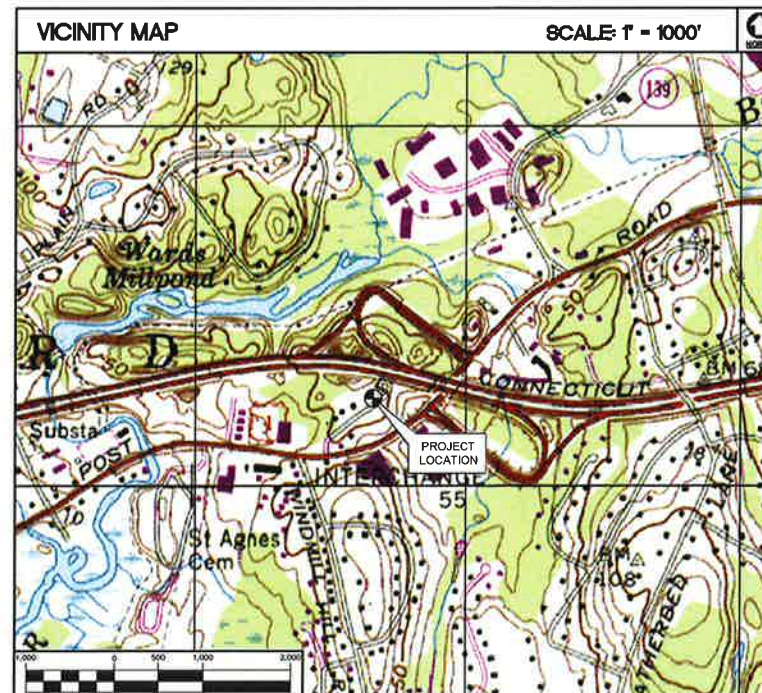
### 10 SYLVIA STREET

### BRANFORD, CONNECTICUT

SITE DIRECTIONS	
FROM:	TO:
99 EAST RIVER DRIVE EAST HARTFORD, CONNECTICUT	10 SYLVIA STREET BRANFORD, CONNECTICUT
1. Head south on E River Dr. toward Pitkin St.	0.9 mi
2. Merge onto US-5 towards I-91 S	1.4 mi
3. Merge onto I-91 S, exit 86	23.4 mi
4. Take exit 14	0.2 mi
5. Turn right onto E Center St.	158 ft
6. Take first left onto S Airline Rd.	0.9 mi
7. Take first left onto CT-150/Woodhouse Ave.	2.0 mi
8. Turn right to stay on Woodhouse Ave.	0.5 mi
9. Turn left to stay on Woodhouse Ave.	0.7 mi
10. Turn right onto Forest Rd.	0.3 mi
11. Turn left Forest Rd/CT-22	4.4 mi
12. Turn left onto Faxon Rd.	1.4 mi
13. Turn right onto Branford Rd.	2.4 mi
14. Turn right onto E Main St.	0.5 mi
15. Turn right onto Sylvia St. Destination is on the left	475 ft

GENERAL NOTES
1. PROPOSED ANTENNA LOCATIONS AND HEIGHTS PROVIDED BY CELCO PARTNERSHIP.

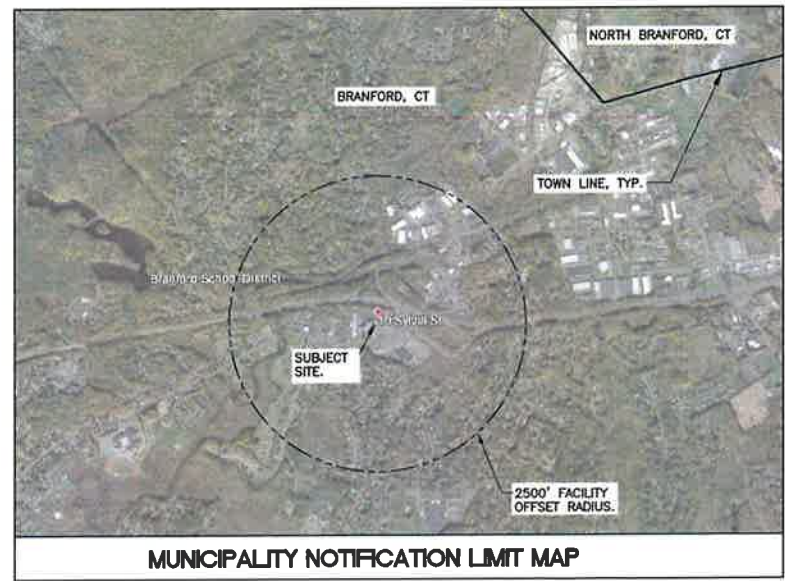
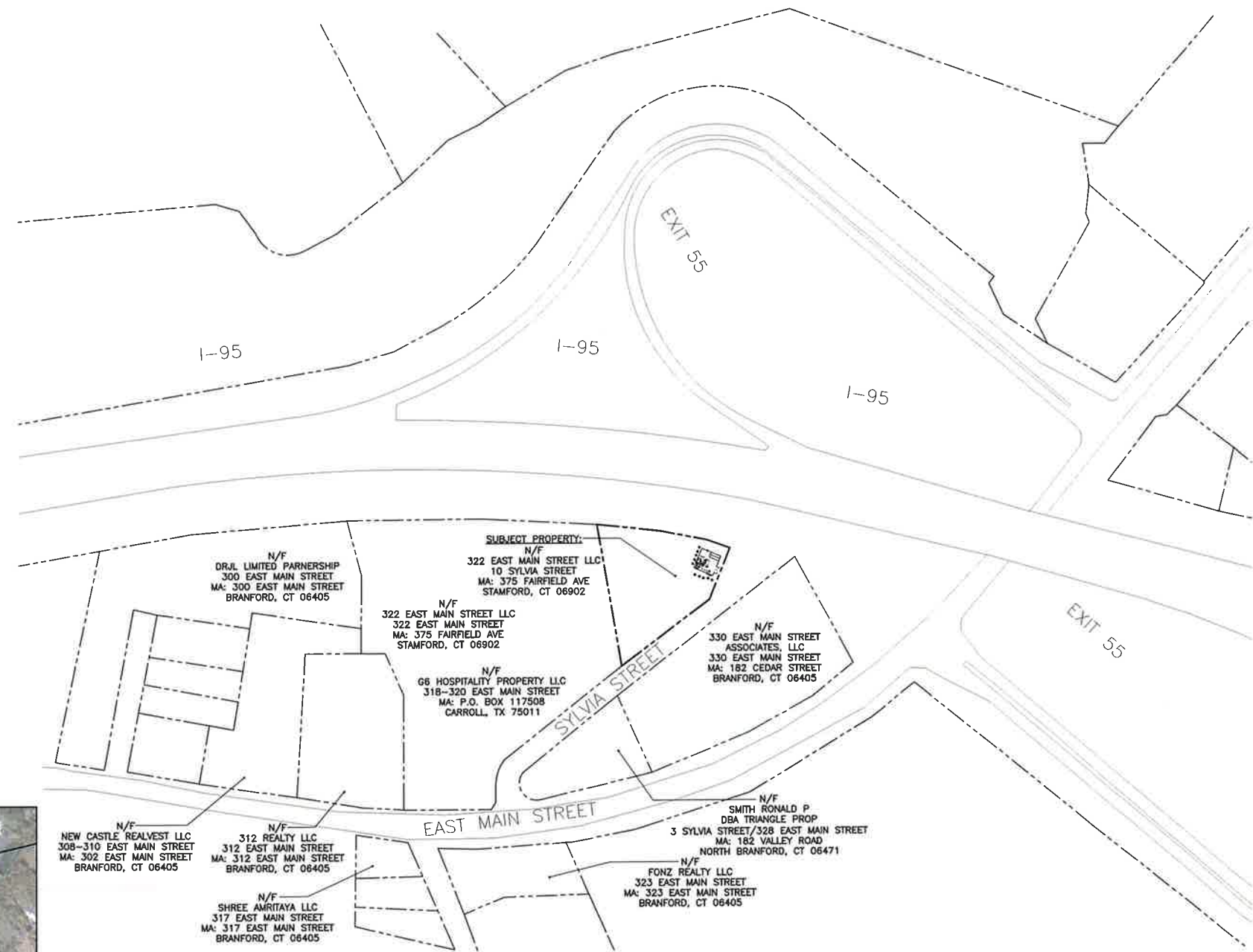
PROJECT SCOPE
1. THE PROPOSED SCOPE OF WORK GENERALLY INCLUDES THE INSTALLATION OF (3) SECTORS WITH (4) ANTENNAS EACH, FOR A TOTAL OF 12 ANTENNAS, ASSOCIATED CABLES AND APPURTENANCES MOUNTED TO EXISTING MONOPOLE TOWER.
2. PAD MOUNTED EQUIPMENT WITH POWER GENERATOR WILL BE INSTALLED WITHIN THE EXISTING FENCED COMPOUND. A STAND-ALONE ROOF IS PROPOSED TO BE INSTALLED OVER THE EQUIPMENT LEASE AREA.
3. POWER AND TELCO UTILITIES DEPICTED HEREIN ARE TENTATIVE. FINAL ROUTING TO BE DETERMINED DURING THE CONSTRUCTION DOCUMENT PHASE OF PROJECT.
4. THE PROPOSED WIRELESS FACILITY INSTALLATION WILL BE DESIGNED IN ACCORDANCE WITH THE 2003 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2009 CONNECTICUT SUPPLEMENT.



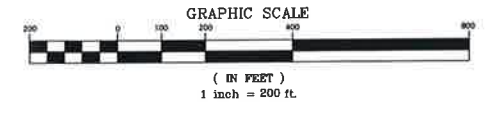
PROJECT SUMMARY	
SITE NAME:	BRANFORD 4
SITE ADDRESS:	10 SYLVIA STREET BRANFORD, CONNECTICUT
LESSEE/TENANT:	CELCO PARTNERSHIP d.b.a. VERIZON WIRELESS 99 EAST RIVER DRIVE EAST HARTFORD, CT 06108
CONTACT PERSON:	DOUG TALMADGE CELCO PARTNERSHIP (860) 549-6116
TOWER COORDINATES:	LATITUDE: 41°-17'-38.2"N LONGITUDE: 72°-47'-08.5"W GROUND ELEVATION: ±54.0' A.M.S.L. COORDINATES REFERENCED CT SITING COUNCIL WEB LOG.

SHEET INDEX		
SHT. NO.	DESCRIPTION	REV. NO.
T-1	TITLE SHEET	1
C-1	ABUTTERS MAP	1
C-2	COMPOUND PLAN, ELEVATION AND ANTENNA CONFIG.	1

PROFESSIONAL ENGINEER SEAL	DATE	09/29/15
	SCALE	AS NOTED
	JOB NO.	15152.000
<b>Cellco Partnership d/b/a Verizon Wireless</b> WIRELESS COMMUNICATIONS FACILITY <b>BRANFORD 4</b> 10 SYLVIA STREET BRANFORD, CT		
<b>T-1</b> Sheet No. 1 of 3		



**1 ABUTTERS MAP**  
C-1 SCALE: 1" = 200'



**MAP REFERENCE NOTE:**  
PROPERTY LINES AND PROPERTY OWNER INFORMATION SHOWN HEREIN ARE REFERENCED FROM THE TOWN OF BRANFORD GIS DATA BASE. SITE FEATURES SHOWN HEREIN ARE REFERENCED FROM AVAILABLE MAPPING ON GOOGLE EARTH PRO.

**Cellco Partnership d/b/a Verizon Wireless**  
WIRELESS COMMUNICATIONS FACILITY  
**BRANFORD 4**  
10 SYLVIA STREET  
BRANFORD, CT

**CENTEK engineering**  
Continued on solutions®  
(203) 486-0880  
(203) 486-8887 Fax  
63-2 North Branford Road  
Branford, CT 06405  
www.CentekEng.com

PROFESSIONAL ENGINEER SEAL

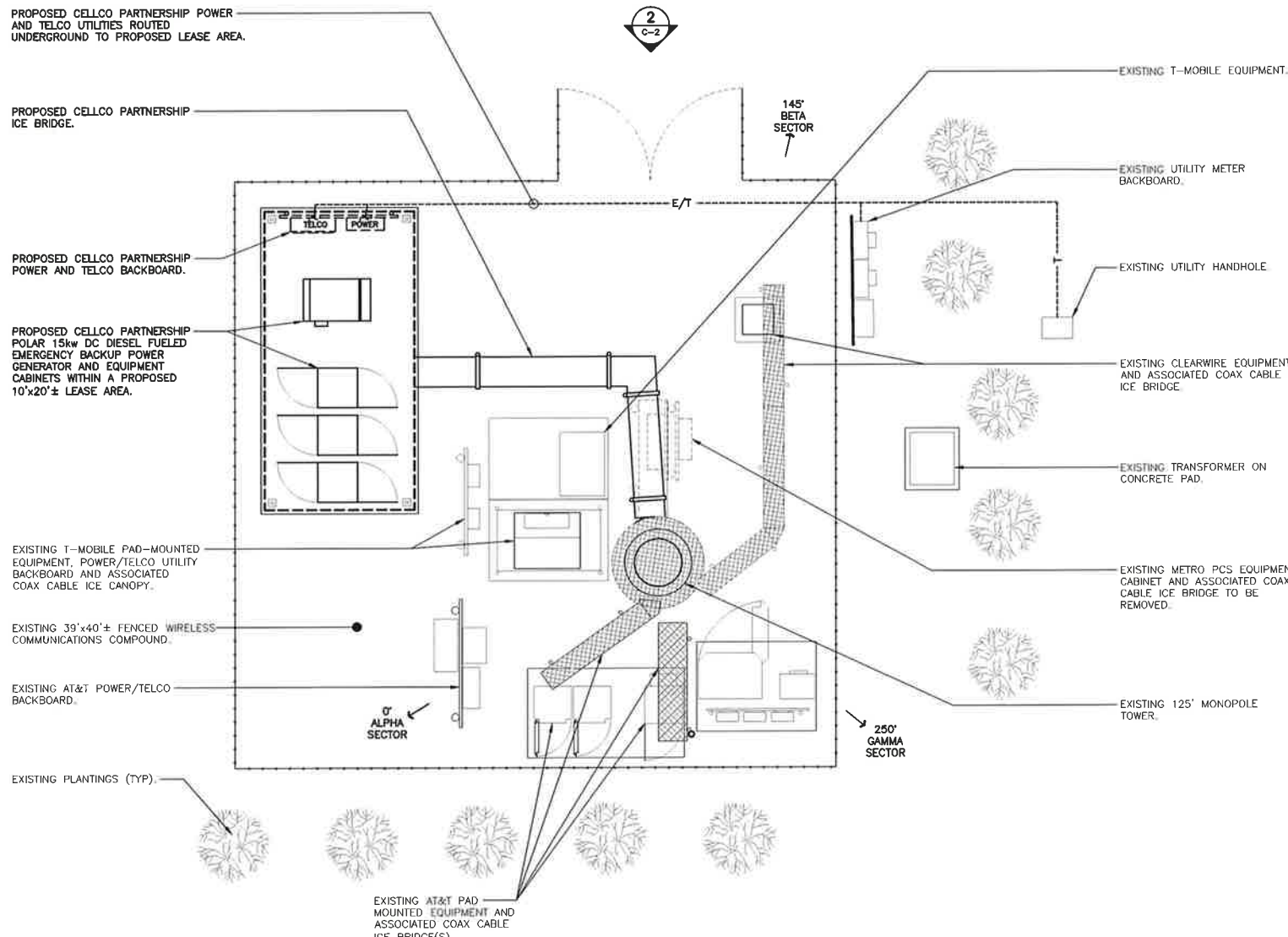
Cellco Partnership  
d.b.a. Verizon Wireless

REV.	DATE	ISSUED FOR	DESCRIPTION
1	02/01/16	BAR	ISSUED FOR CSC
0	07/12/15	DMO	ISSUED FOR CSC-CLIENT REVIEW

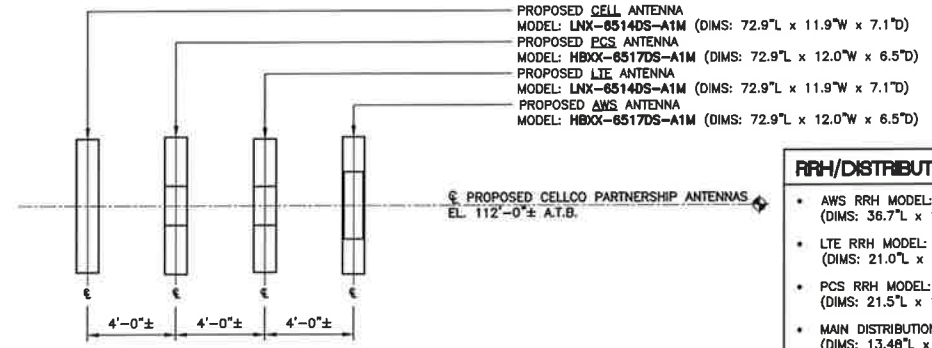
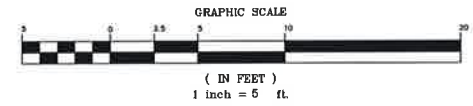
DATE: 09/29/15  
SCALE: AS NOTED  
JOB NO. 15152.000

ABUTTERS MAP

**C-1**  
Sheet No. 2 of 3



**1 COMPOUND PLAN**  
SCALE: 1" = 5'

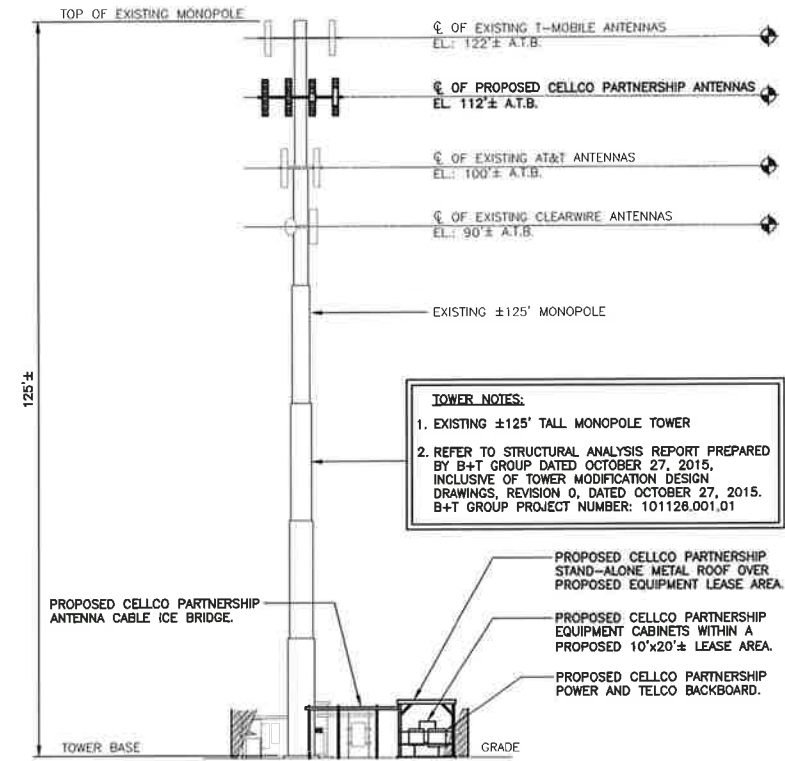


**RRH/DISTRIBUTION BOX MOUNTING NOTE**

- AWS RRH MODEL: ALU RRH2x60-AWS (DIMS: 36.7" L x 10.6" W x 5.8" D) (TYP. OF 1 PER SECTOR)
- LTE RRH MODEL: ALU RRH2x60-700U (DIMS: 21.0" L x 12.0" W x 8.0" D) (TYP. OF 1 PER SECTOR)
- PCS RRH MODEL: ALU RRH2x60-PCS (DIMS: 21.5" L x 12.0" W x 7.4" D) (TYP. OF 1 PER SECTOR)
- MAIN DISTRIBUTION BOX MODEL: R00DC-3315-PF-48 (DIMS: 13.48" L x 10.15" W x 8.14" D) (TYP. OF 2).

ANTENNAS, RRHs AND MAIN DISTRIBUTION BOXES MOUNTED TO LOW PROFILE ANTENNA MOUNTING PLATFORM ASSEMBLY.

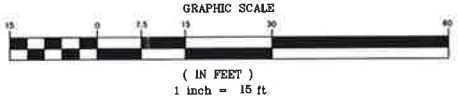
**3 TYP. ANTENNA MOUNTING CONFIGURATION**  
NOT TO SCALE



**TOWER NOTES:**

- EXISTING ±125' TALL MONOPOLE TOWER
- REFER TO STRUCTURAL ANALYSIS REPORT PREPARED BY B+T GROUP DATED OCTOBER 27, 2015, INCLUSIVE OF TOWER MODIFICATION DESIGN DRAWINGS, REVISION 0, DATED OCTOBER 27, 2015. B+T GROUP PROJECT NUMBER: 101128.001.01

**2 SOUTHEAST ELEVATION**  
SCALE: 1" = 15'



REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	02/01/16	BJR	DMD	ISSUED FOR CSC
0	07/12/16	JTD	DMD	ISSUED FOR CSC-CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

Cellco Partnership  
d.b.a. Verizon Wireless

**CENTEK** engineering  
Centered on Solutions™  
(203) 488-0580  
(203) 488-8387 Fax  
43-2 North Branford Road  
Branford, CT 06405  
www.CentekEng.com

Cellco Partnership d/b/a Verizon Wireless  
WIRELESS COMMUNICATIONS FACILITY  
**BRANFORD 4**  
10 SYLVIA STREET  
BRANFORD, CT

DATE: 09/29/15  
SCALE: AS NOTED  
JOB NO. 15152.000

ROOF PLAN,  
ELEVATION &  
ANTENNA CONFIG.

# **ATTACHMENT 4**

# Product Specifications

COMMSCOPE®

LNX-4514DS-VTM

Andrew® Antenna, 698–896 MHz, 45° horizontal beamwidth, RET compatible

POWERED BY



## Electrical Specifications

Frequency Band, MHz	698–806	806–896
Gain, dBi	15.5	16.4
Beamwidth, Horizontal, degrees	47	45
Beamwidth, Vertical, degrees	17.3	15.8
Beam Tilt, degrees	2–18	2–18
USLS, typical, dB	16	15
Front-to-Back Ratio at 180°, dB	32	28
Isolation, dB	30	30
VSWR   Return Loss, dB	1.4   15.6	1.4   15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153
Input Power per Port, maximum, watts	500	500
Polarization	±45°	±45°

## Mechanical Specifications

Color   Radome Material	Light gray   Fiberglass, UV resistant
Connector Interface   Location   Quantity	7-16 DIN Female   Bottom   2
Wind Loading, maximum	586.4 N @ 150 km/h 131.8 lbf @ 150 km/h
Wind Speed, maximum	241.4 km/h   150.0 mph
Antenna Dimensions, L x W x D	1308.0 mm x 389.0 mm x 163.0 mm   51.5 in x 15.3 in x 6.4 in
Net Weight	13.3 kg   29.3 lb
Model with factory installed AISG 2.0 RET LNX-4514DS-A1M	



POWERED BY



## HBXX-6517DS-VTM

**Andrew® Quad Port Antenna, 1710–2180 MHz, 65° horizontal beamwidth, RET compatible**

- Superior azimuth tracking and pattern symmetry with excellent passive intermodulation suppression

### Electrical Specifications

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain, dBi	19.0	19.1	19.2
Beamwidth, Horizontal, degrees	67	66	65
Beamwidth, Vertical, degrees	5.0	4.7	4.4
Beam Tilt, degrees	0–6	0–6	0–6
USLS, dB	18	18	18
Front-to-Back Ratio at 180°, dB	30	30	30
CPR at Boresight, dB	21	22	21
CPR at Sector, dB	10	11	9
Isolation, dB	30	30	30
VSWR   Return Loss, dB	1.4   15.6	1.4   15.6	1.4   15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350
Polarization	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm

### Electrical Specifications, BASTA\*

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain by all Beam Tilts, average, dBi	18.5	18.6	18.8
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3	±0.4
Gain by Beam Tilt, average, dBi	0°   18.4	0°   18.4	0°   18.7
	3°   18.7	3°   18.7	3°   18.9
	6°   18.4	6°   18.5	6°   18.6
Beamwidth, Horizontal Tolerance, degrees	±2.4	±1.7	±2.9
Beamwidth, Vertical Tolerance, degrees	±0.3	±0.3	±0.3
USLS, dB	18	19	19
Front-to-Back Total Power at 180° ± 30°, dB	25	26	26
CPR at Boresight, dB	22	23	22
CPR at Sector, dB	10	10	9

\* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper [Time to Raise the Bar on BSAs](#).

### General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol® quad
Band	Single band
Brand	DualPol®   Teletilt®
Operating Frequency Band	1710 – 2180 MHz

HBXX-6517DS-VTM

POWERED BY



Performance Note

Outdoor usage

## Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Low loss circuit board
Radome Material	PVC, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	4
Wind Loading, maximum	668.0 N @ 150 km/h 150.2 lbf @ 150 km/h
Wind Speed, maximum	241 km/h   150 mph

## Dimensions

Depth	166.0 mm   6.5 in
Length	1903.0 mm   74.9 in
Width	305.0 mm   12.0 in
Net Weight	19.5 kg   43.0 lb

## Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 2.0 Actuator	HBXX-6517DS-A2M
RET System	Teletilt®

## Packed Dimensions

Depth	292.0 mm   11.5 in
Length	2219.0 mm   87.4 in
Width	409.0 mm   16.1 in
Shipping Weight	29.3 kg   64.6 lb

## Regulatory Compliance/Certifications

<b>Agency</b>	<b>Classification</b>
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system



## Included Products

600899A-2 — Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

# Product Specifications

COMMScope®

HBXX-6517DS-VTM

POWERED BY



## \* Footnotes

Performance Note

Severe environmental conditions may degrade optimum performance

# ALCATEL-LUCENT B13 RRH4X30-4R

Alcatel-Lucent B13 Remote Radio Head 4x30-4R is the newest addition of Remote Radio Head to the extended product line of Alcatel-Lucent's distributed Base Station solutions, aimed at facilitating smooth RF site acquisition and related civil engineering.

**Supporting 2Tx/4Tx MIMO and 4-way Rx diversity**, Alcatel-Lucent B13 RRH4x30-4R allows operators to have a compact radio solution to deploy LTE in the 700U band (700 MHz, 3GPP band 13), providing them with the means to achieve high capacity, high quality and high coverage with minimum site requirements.



The Alcatel-Lucent B13 RRH4x30-4R product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x60 W or 4x30 W RF output power. It supports also 4-way Rx diversity and up to 10MHz instantaneous bandwidth.

The Alcatel-Lucent B13 RRH4x30-4R is a near zero-footprint solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

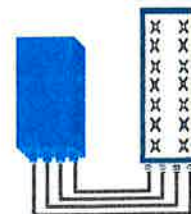
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the RF feeder needs and installation costs.

## FEATURES

- Supporting LTE in 700 MHz band (700U, 3GPP band 13)
- LTE 2Tx or 4Tx MIMO (SW switchable)
- Output power: Up to 2x60W or 4x30W
- 10MHz LTE carrier with 4Rx Diversity
- Convection-cooled (fan-less)
- Supports AISG 2.0 ALD devices (RET, TMA) through RS485 or RF ports

## BENEFITS

- Compact to reduce additional footprint when adding LTE in 700U band
- MIMO scheme operation selection (2Tx or 4Tx) by software only
- Improves downlink spectral efficiency through MIMO4
- Increases LTE coverage thanks to 4Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options: Pole or Wall



4x30W with 4T4R  
or  
2x60W with 2T4R  
Can be switched between modes via SW w/o site visit

# TECHNICAL SPECIFICATIONS

Features & performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R by SW)
Frequency band	U700 (C) (3GPP bands 13): DL: 746 - 756 MHz / UL: 777 - 787 MHz
Instantaneous bandwidth - #carriers	10MHz - 1 LTE carrier (in 10MHz occupied bandwidth)
LTE carrier bandwidth	10 MHz
RF output power	2x60W or 4x30W (by SW)
Noise figure - RX Diversity schema	2 dB typ. (<2.5 dB max) - 2 or 4 way Rx diversity
Sizes (HxWxD) in mm (in.)	550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield)
Volume in L	38 (with solar shield)
Weight in kg (lb) (w/o mounting HW)	26 (57.2) (with solar shield)
DC voltage range	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption
DC power consumption	550W typical @100% RF load ( in 2Tx or 4Tx mode)
Environmental conditions	-40°C (-40°F) / +55°C (+131°F)
Wind load (@150km/h or 93mph)	IP65 Frontal: <200N / Lateral : <150N
Antenna ports	4 ports 7/16 DIN female (50 ohms) VSWR < 1.5
CPRI ports	2 CPRI ports (HW ready for Rate7, 9.8 Gbps) SFP single mode dual fiber
AISG interfaces	1 AISG2.0 output (RS485) Integrated Smart Bias Tees (x2)
Misc. Interfaces	4 external alarms (1 connector) - 4 RF Tx & 4 RF Rx monitor ports - 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27

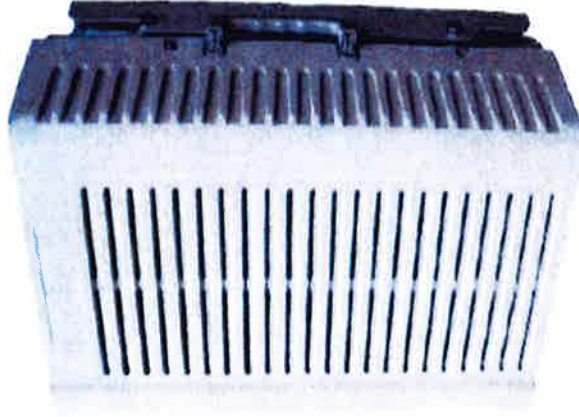
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# PCS RF MODULES

## RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

RRH2x60	
RF Output Power	2x60W
Instantaneous Bandwidth	20MHz
Transmitter	2 TX
Receiver	2 Branch RX – LA6.0.1 4 Branch RX – LR13.3
Features	AISG 2.0 for RET/TMA Internal Smart Bias-T
Power	-48VDC
CPRI Ports	2 CPRI Rate 3 Ports
External Alarms	4 External User Alarms
Monitor Ports	TX
Environmental	GR487 Compliance
RF Connectors	7/16 DIN (top mounted)



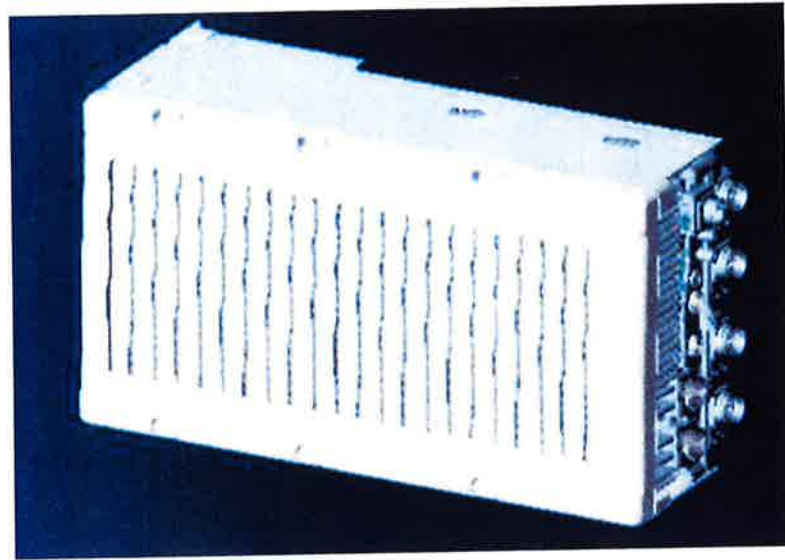
\*\* Not a Verizon Wireless deployed product

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# NEW PCS RF MODULES FOR VZW RRH2X60 - HW CHARACTERISTICS

LR14.3

<b>RRH2x60</b>	
RF Output Power	2x60W (4x30W HW Ready)
Instantaneous Bandwidth	60MHz
Target Reliability (Annual Return Rate)	<2%
Receiver	4 Branch Rx
Features	AISG 2.0 for RET/TMA
Power	-48VDC Internal Smart Bias-T
CPRI Ports	2 CPRI Rate 5 Ports
External Alarms	4 External User Alarms
Monitor Ports	TX, RX
Environmental	GR487 Compliance
RF Connectors	7/16 DIN (downward facing)
Dimensions	22"(h) x 12"(w) x 9.4" (d)**
Weight	55lb**



\*\* - Includes solar shield but not mounting brackets (8 lbs.)



# ALCATEL-LUCENT WIRELESS PRODUCT DATASHEET RRH2X60-AWS FOR BAND 4 APPLICATIONS

The Alcatel-Lucent RRH2x60-AWS is a high power, small form factor Remote Radio Head operating in the AWS frequency band (3GPP Band 4) for LTE technology. It is designed with an eco-efficient approach, providing operators with the means to achieve high quality and high capacity coverage with minimum site requirements and efficient operation.



A distributed Node B expands the deployment options by using two components, a Base Band Unit (BBU) containing the digital assets and a separate RRH containing the radio-frequency (RF) elements. This modular design optimizes available space and allows the main components of a Node B to be installed separately, within the same site or several kilometers apart.

The Alcatel-Lucent RRH2x60-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals

along with operations, administration and maintenance (OA&M) information.

## SUPERIOR RF PERFORMANCE

The Alcatel-Lucent RRH2x60-AWS integrates all the latest technologies. This allows to offer best-in-class characteristics.

It delivers an outstanding 120 watts of total RF power thanks to its two transmit RF paths of 60 W each.

It is ideally suited to support multiple-input multiple-output (MIMO) 2x2 operation.

It includes four RF receivers to natively support 4-way uplink reception diversity. This improves the radio uplink coverage and this can be used to extend the cell radius commensurate with 2x2MIMO 2x60 W for the downlink.

It supports multiple discontinuous LTE carriers within an instantaneous bandwidth of 45 MHz corresponding to the entire AWS B4 spectrum.

The latest generation power amplifiers (PA) used in this product achieve high efficiency (>40%), resulting in improved power consumption figures.

## OPTIMIZED TCO

The Alcatel-Lucent RRH2x60-AWS is designed to make available all the benefits of a distributed Node B, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX).

The Alcatel-Lucent RRH2x60-AWS is a very cost-effective solution to deploy LTE MIMO.

## EASY INSTALLATION

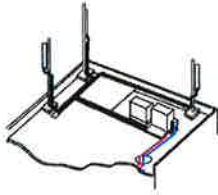
The RRH2x60-AWS includes a reversible mounting bracket which allows for ease of installation behind an antenna, or on a rooftop knee wall while providing easy access to the mid body RF connectors.

The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

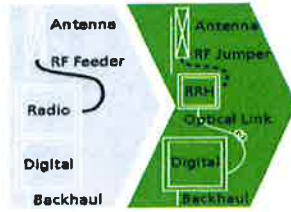
The Alcatel-Lucent RRH2x60-AWS is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.

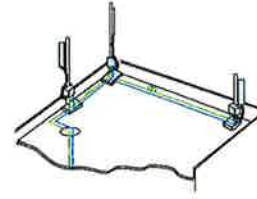




Macro



RRH for space-constrained cell sites



Distributed

## FEATURES

- RRH2x60-AWS integrates two power amplifiers of 60W rating (at each antenna connector)
- Support multiple carriers over the entire 3GPP band 4
- RRH2x60-AWS is optimized for LTE operation
- RRH2x60-AWS is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

## BENEFITS

- MIMO LTE operation with only one single unit per sector
- Improved uplink coverage with built-in 4-way receive diversity capability
- RRH can be mounted close to the antenna, eliminating nearly all losses in RF cables and thus reducing power consumption by 50% compared to conventional solutions
- Distributed configurations provide easily deployable and cost-effective solutions, near zero footprint and

silent solutions, with minimum impact on the neighborhood, which ease the deployment

- RETA and TMA support without additional hardware thanks to the AISG v2.0 port and the integrated Bias-Tees. Bias-Tees support AISG DC supply and signaling.

## TECHNICAL SPECIFICATIONS

Specifications listed are hardware capabilities. Some capabilities depend on support in a specific software release or future release.

### Dimensions and weights

- HxWxD : 510x285x186mm (27 l with solar shield)
- Weight : 20 kg (44 lbs)

### Electrical Data

- Power Supply : -48V DC (-40.5 to -57V)
- Power Consumption (ETSI average traffic load reference) : 250W @2x60W

### RF Characteristics

- Frequency band: 1710-1755, UL / 2110-2155 MHz, DL (3GPP band 4)
- Output power: 2x60W at antenna connectors
- Technology supported: LTE
- Instantaneous bandwidth: 45 MHz
- Rx diversity: 2-way and 4-way uplink reception
- Typical sensitivity without Rx diversity: -105 dBm for LTE

### Connectivity

- Two CPRI optical ports for daisy chaining and up to six RRHs per fiber
- Type of optical fiber: Single-Mode (SM) and Multi-Mode (MM) SFPs
- Optical fiber length: up to 500m using MM fiber, up to 20km using SM fiber
- TMA/RETA : AISG 2.0 (RS485 connector and internal Bias-Tee)
- Six external alarms
- Surge protection for all external ports (DC and RF)

### Environmental specifications

- Operating temperature: -40°C to 55°C including solar load
- Operating relative humidity: 8% to 100%
- Environmental Conditions : ETS 300 019-1-4 class 4.1E
- Ingress Protection : IEC 60529 IP65
- Acoustic Noise : Noiseless (natural convection cooling)

### Safety and Regulatory Data

- EMC : 3GPP 25113, EN 301 489-1, EN 301 489-23, GR 1089, GR 3108, OET-65
- Safety : IEC60950-1, EN 60825-1, UL, ANSI/NFPA 70, CAN/CSA-C22.2
- Regulatory : FCC Part 15 Class B, CE Mark – European Directive : 2002/95/EC (ROHS); 2002/96/EC (WEEE); 1999/5/EC (R&TTE)
- Health : EN 50385

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# 8220Y-3TNV88 GENERATOR SPECIFICATIONS 15kW Diesel Fueled

## ENGINE

Engine.....Yanmar 3TNV88  
 Cylinders.....3 In-line  
 Displacement.....1642 (cc)  
 Aspiration.....Natural  
 Emissions.....EPA and CARB Certified  
 Variable RPM .....1500RPM to 1850RPM  
 Engine Start SuperCapacitor .....14.4V  
 SuperCapacitor DC-DC Charger.....>1A  
 Muffler.....Dual  
 Radiator.....Aluminum with Electric Fan

## FUEL SYSTEM

Type.....Diesel Fuel  
 Tank.....Double Wall – UL 142  
 Capacity.....54 Gallons

## ALTERNATOR

Type.....Permanent Magnet  
 Regulation Type.....RPM Control Output  
 Ripple.....Less than 50 millivolts RMS  
 No. of Poles.....32  
 Overcurrent Protection.....350A  
 Disconnect Means.....Fused Disconnect

## ENGINE CONTROLLER

Engine Controller model.....Supra 250  
 Instrumentation.....Generator output voltage, amperage, kW, Coolant, Temperature, RPM, Hour meter, maintenance intervals, Starting circuit voltage

Automatic Shutdown & Alarm for.....  
 Under/ Over-speed, Low Oil Pressure, High Coolant Temp, Fail to Start

Warning Alarm for..... Low Fuel Level, Fuel Tank Rupture Basin, Low/High Engine Battery Voltage, High Water Temp, and Low Oil Press, Pre-alarm

Glow Plug Delay.....Automatic with temp  
 Engine Start Delay.....Adj. set at 60 seconds  
 Return to Utility Delay.....Adj. set at 60 seconds  
 Engine Cool-Down.....Adj. set at 60 seconds  
 Exerciser.....Programmable/ bi-weekly

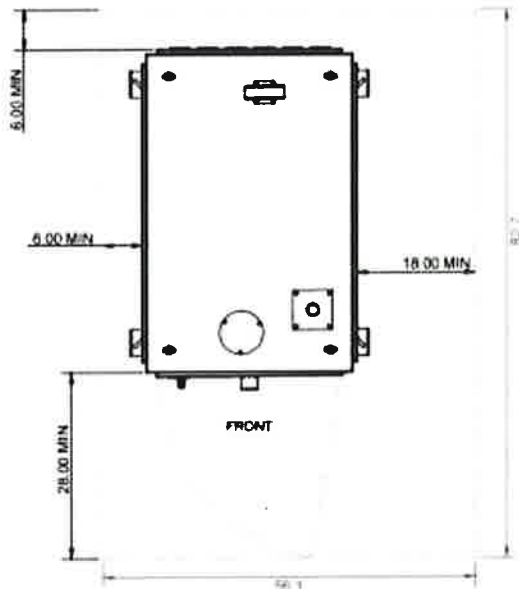
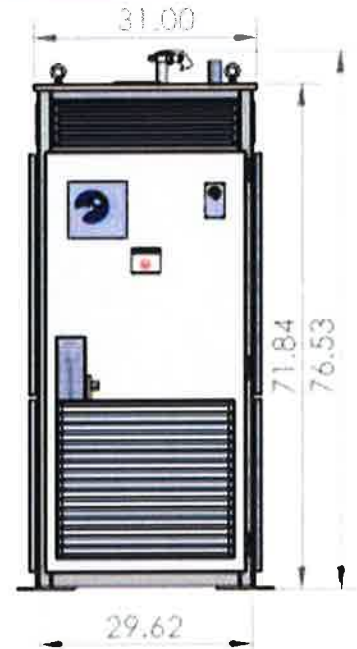
Contact Closure for Remote Indication .....  
 Shutdown Alarm, Warning Alarm, Engine Run, Low Fuel Level, Fuel Leak, E-Stop Depressed

## ENCLOSURE

Model.....88-25-0603  
 Type.....Weather Protective Materials Marine Grade Aluminum

Sound Attenuated.....  
 <65dBA @ 7 Meters Door  
 Hardware Three Point w/ Padlock Hasp and Spring-Latched Removable Side Doors

Mounting.....Secure Mounting Tabs  
 Dimensions.....32" x 50" x 72"  
 Weight (Not Fueled).....1248 lbs.



## Genset UL 2200 LISTED

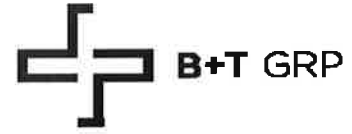
**ETL listed per UL 2200 by Interek Testing Labs.  
 Fuel tank is UL 142 Listed**

For more information contact: [info@polarpowerinc.com](mailto:info@polarpowerinc.com)

# **ATTACHMENT 5**

October 27, 2015

Mr. Timothy Howell  
Crown Castle  
3530 Toringdon Way, Suite 300  
Charlotte, NC 28277  
(980) 209-8242



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

**Subject: Structural Modification Report**

**Carrier Designation:** **Verizon Wireless Co-Locate**  
**Carrier Site Number:** 117639  
**Carrier Site Name:** Branford 4 CT

**Crown Castle Designation:** **Crown Castle BU Number:** 822765  
**Crown Castle Site Name:** Branford/ I-95/ X55/ Dtn1  
**Crown Castle JDE Job Number:** 342870  
**Crown Castle Work Order Number:** 1119032  
**Crown Castle Application Number:** 306331 Rev. 0

**Engineering Firm Designation:** **B+T Group Project Number:** 101126.001.01

**Site Data:** **10 Sylvia St., Branford, CT, New Haven County**  
**Latitude 41° 17' 38.08", Longitude -72° 47' 8.624"**  
**125 Foot - Monopole**

Dear Mr. Howell,

B+T Group is pleased to submit this “**Structural Modification Report**” to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural ‘Statement of Work’ and the terms of Crown Castle Purchase Order Number 824965, in accordance with application 306331, revision 0.

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

LC4.5: TSA specified load case with proposed modifications **Sufficient Capacity**  
Note: See Table 1 and Table 2 for the proposed and existing loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 85 mph fastest mile.

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.

We at B+T Group appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:  
B+T Engineering, Inc.  
PEC.0001564; Exp:02/10/16



Robert M. Frazier, E.I.  
Project Engineer

Chad E. Tuttle, P.E.  
Engineer of Record

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Tower Modification Drawings

## 1) INTRODUCTION

This tower is a 125 ft. monopole designed by Pirod Manufactures Inc. in January of 1999. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

## 2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

**Table 1 - Proposed Antenna and Cable Information**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
112.0	112.0	3	Alcatel Lucent	RRH2X60-AWS	2	1-5/8	--
		3	Alcatel Lucent	RRH2X60-PCS			
		3	Alcatel Lucent	RRH2x60-700			
		6	Andrew	HBXX-6517DS-A2M			
		6	Andrew	LNx-6514DS-A1M			
		2	Raycap	RXXDC-3315-PF-48			
		1	Valmont	RMQP-472 + Handrail Kit			

**Table 2 - Existing Antenna and Cable Information**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
122.0	122.0	3	Commscope	LNx-6515DS-VTM	13	1-5/8	1
		3	Ericsson	ERICSSON AIR 21 B2A B4P			
		3	Ericsson	ERICSSON AIR 21 B4A B2P			
		3	Ericsson	KRY 112 144/1			
		3	Ericsson	RRUS 11 B12			
		1	--	Platform Mount [LP 405-1]			
112.0	112.0	3	Kathrein	742 213	6	1-5/8	2
		1	--	Pipe Mount [PM 601-3]			
100.0	100.0	6	Ericsson	RRUS-11	12	1-1/4 3/8 7/16	1
		3	KMW Com.	AM-X-CD-16-65-00T-RET			
		6	Powerwave	7770.00			
		12	Powerwave	LGP21401			
		1	Raycap	DC6-48-60-18-8F			
		1	--	T-Arm Mount [TA 602-3]			
90.0	90.0	2	Dragonwave	A-ANT-18G-2-C	3	5/8 5/16 1/2 1/4	1
		3	Argus Tech.	LLPX310R			
		3	Dragonwave	AIRPAIR ODU			
		3	Samsung	RRH-C2C			
		1	--	Side Arm Mount [SO 103-3]			

Notes:

- 1) Existing Equipment
- 2) Abandoned Equipment To Be Removed, Not Considered in this Analysis.

**Table 3 - Design Antenna and Cable Information**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
125.0	125.0	3	Generic	S4000 Smart Antennas	24	1/2
		1	Pirod	Low Profile Platform	3	1
		12	Swedcom	ALP9212	12	1-5/8

### 3) ANALYSIS PROCEDURE

**Table 4 - Documents Provided**

Document	Remarks	Reference	Source
Online Application	Verizon Wireless Co-locate, Rev. 0	306331	CCIsites
Tower Manufacturer Drawings	PIROD, Inc. Drawing No. 204417-B	3552248	CCIsites
Foundation Drawing	PIROD, Inc. Drawing No. 204417-B	3910040	CCIsites
Geotech Report	F&P Associates, FPA No. 98A191ER1	3552247	CCIsites
Antenna Configuration	Previous Failing SA by CCI, Project No. 1103436	5849697	CCIsites

#### 3.1) Analysis Method

tnxTower (version 6.1.4.1), 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) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
- 5) Mount areas and weights are assumed based on photographs provided.

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

#### 4) ANALYSIS RESULTS

**Table 5 - Section Capacity (Summary) - LC4.5**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	125 - 100	Pole	P24x3/8	1	-7.970	--	42.3	Pass <sup>1</sup>
L2	100 - 80	Pole	P30x3/8	2	-13.422	--	83.8	Pass <sup>1</sup>
L3	80 - 73	Pole	P36x3/8	3	-14.730	--	76.6	Pass <sup>1</sup>
L4	73 - 60	Pole	P36x3/8 [0.540208]	4	-17.956	--	76.0	Pass <sup>1</sup>
L5	60 - 40	Pole	P42x3/8 [0.513233]	5	-23.416	--	88.9	Pass <sup>1</sup>
L6	40 - 20	Pole	P48x3/8 [0.53833]	6	-29.804	--	90.2	Pass <sup>1</sup>
L7	20 - 0	Pole	P54x3/8 [0.563312]	7	-37.189	--	89.4	Pass <sup>1</sup>
							Summary	
						Pole (L7)	90.2	Pass <sup>1</sup>
						Rating =	90.2	Pass <sup>1</sup>

**Table 6 - Tower Component Stresses vs. Capacity - LC4.5**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Bolts	100	39.0	Pass
1	Flange Plate	100	78.4	Pass
1	Flange Bolts	80	39.4	Pass
1	Flange Plate	80	77.5	Pass
1	Bridge Stiffeners	80	71.4	Pass
1	Flange Bolts	60	50.1	Pass
1	Flange Plate	60	94.9	Pass
1	Bridge Stiffeners	60	88.7	Pass
1	Flange Bolts	40	51.5	Pass
1	Flange Plate	40	98.4	Pass
1	Bridge Stiffeners	40	83.0	Pass
1	Flange Bolts	20	50.3	Pass
1	Flange Plate	20	96.5	Pass
1	Bridge Stiffeners	20	80.5	Pass
1	Anchor Rods	Base	54.1	Pass
1	Base Plate	Base	94.4	Pass
1	Base Foundation (Soil)	Base	95.8	Pass
1	Base Foundation (Steel)	Base	84.9	Pass

<b>Structure Rating (max from all components) =</b>	<b>98.4%</b>
-----------------------------------------------------	--------------

Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

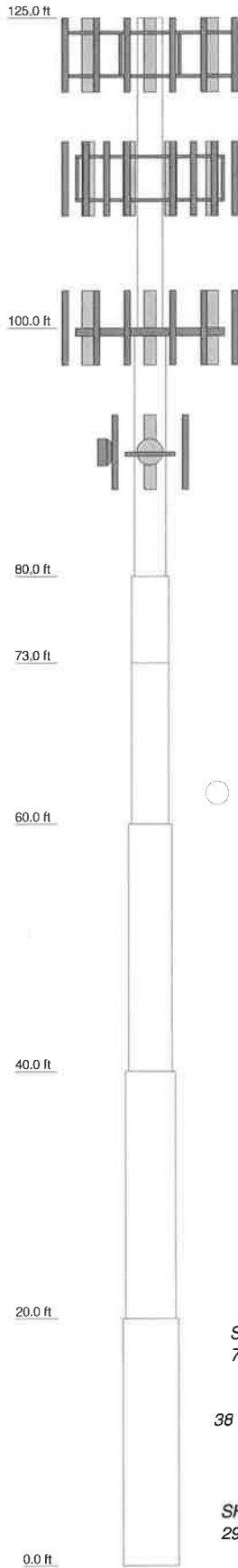
#### 4.1) Recommendations

- 1) All modifications proposed in this report shall be installed in accordance with the attached drawings (Appendix D) for the determined available structural capacity to be effective.



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

Section	1	2	3	4	5	6	7
Size	P24x3/8	P30x3/8	P36x3/8	P36x3/8 [0.540208]	P42x3/8 [0.513233]	P46x3/8 [0.53833]	P54x3/8 [0.563312]
Length (ft)	25,000	20,000	7,000	13,000	20,000	20,000	20,000
Grade	A53-B-42	A53-B-42	49.519093ksi	49.519093ksi	40.32547ksi	37.010171ksi	35.455792ksi
Weight (K)	2.4	2.4	1.0	2.7	4.6	5.5	6.5



### DESIGNED APPURTENANCE LOADING

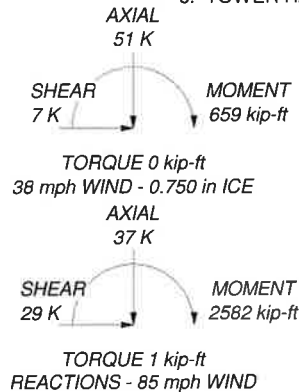
TYPE	ELEVATION	TYPE	ELEVATION
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (E)	122	RRH2X60-AWS (P)	112
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (E)	122	RRH2X60-PCS (P)	112
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (E)	122	RRH2X60-PCS (P)	112
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (E)	122	RRH2X60-PCS (P)	112
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (E)	122	RXXDC-3315-PF-48 (P)	112
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (E)	122	RXXDC-3315-PF-48 (P)	112
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (E)	122	RMQP-472 + Handrail Ki (P)	112
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (E)	122	AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	100
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (E)	122	AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	100
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (E)	122	AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	100
LNX-6515DS-VTM w/ Mount Pipe (E)	122	AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	100
LNX-6515DS-VTM w/ Mount Pipe (E)	122	(2) 7770.00 w/ Mount Pipe (E)	100
LNX-6515DS-VTM w/ Mount Pipe (E)	122	(2) 7770.00 w/ Mount Pipe (E)	100
LNX-6515DS-VTM w/ Mount Pipe (E)	122	(2) 7770.00 w/ Mount Pipe (E)	100
LNX-6515DS-VTM w/ Mount Pipe (E)	122	(2) 7770.00 w/ Mount Pipe (E)	100
KRY 112 144/1 (E)	122	(2) RRUS-11 (E)	100
KRY 112 144/1 (E)	122	(2) RRUS-11 (E)	100
KRY 112 144/1 (E)	122	(4) LGP21401 (E)	100
RRUS 11 B12 (E)	122	(4) LGP21401 (E)	100
RRUS 11 B12 (E)	122	(4) LGP21401 (E)	100
RRUS 11 B12 (E)	122	(4) LGP21401 (E)	100
RRUS 11 B12 (E)	122	DC6-48-60-18-8F (E)	100
Platform Mount [LP 405-1] (E)	122	4' x 2" Pipe Mount (E)	100
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	112	4' x 2" Pipe Mount (E)	100
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	112	4' x 2" Pipe Mount (E)	100
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	112	T-Arm Mount [TA 602-3] (E)	100
(2) LNX-6514DS-A1M w/ Mount Pipe (P)	112	LLPX310R w/ Mount Pipe (E)	90
(2) LNX-6514DS-A1M w/ Mount Pipe (P)	112	LLPX310R w/ Mount Pipe (E)	90
(2) LNX-6514DS-A1M w/ Mount Pipe (P)	112	LLPX310R w/ Mount Pipe (E)	90
(2) LNX-6514DS-A1M w/ Mount Pipe (P)	112	RRH-C2C (E)	90
(2) LNX-6514DS-A1M w/ Mount Pipe (P)	112	RRH-C2C (E)	90
(2) LNX-6514DS-A1M w/ Mount Pipe (P)	112	RRH-C2C (E)	90
RRH2x60-700 (P)	112	AIRPAIR ODU (E)	90
RRH2x60-700 (P)	112	AIRPAIR ODU (E)	90
RRH2x60-700 (P)	112	AIRPAIR ODU (E)	90
RRH2x60-AWS (P)	112	6' x 2" Mount Pipe (E)	90
RRH2x60-AWS (P)	112	6' x 2" Mount Pipe (E)	90
RRH2x60-AWS (P)	112	6' x 2" Mount Pipe (E)	90
RRH2x60-AWS (P)	112	Side Arm Mount [SO 103-3] (E)	90
		A-ANT-18G-2-C (E)	90
		A-ANT-18G-2-C (E)	90

### MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi	37.010171ksi	37 ksi	52 ksi
49.519093ksi	50 ksi	65 ksi	35.455792ksi	35 ksi	50 ksi
40.32547ksi	40 ksi	55 ksi			

### TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 90.2%

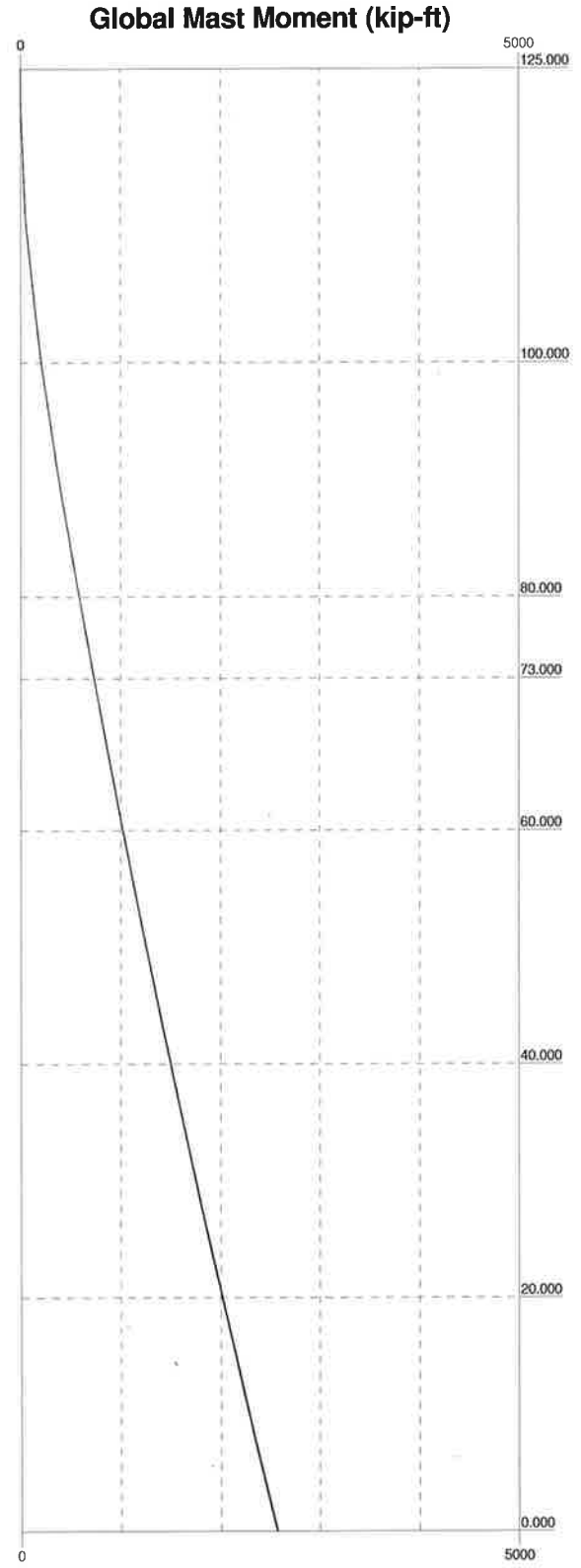
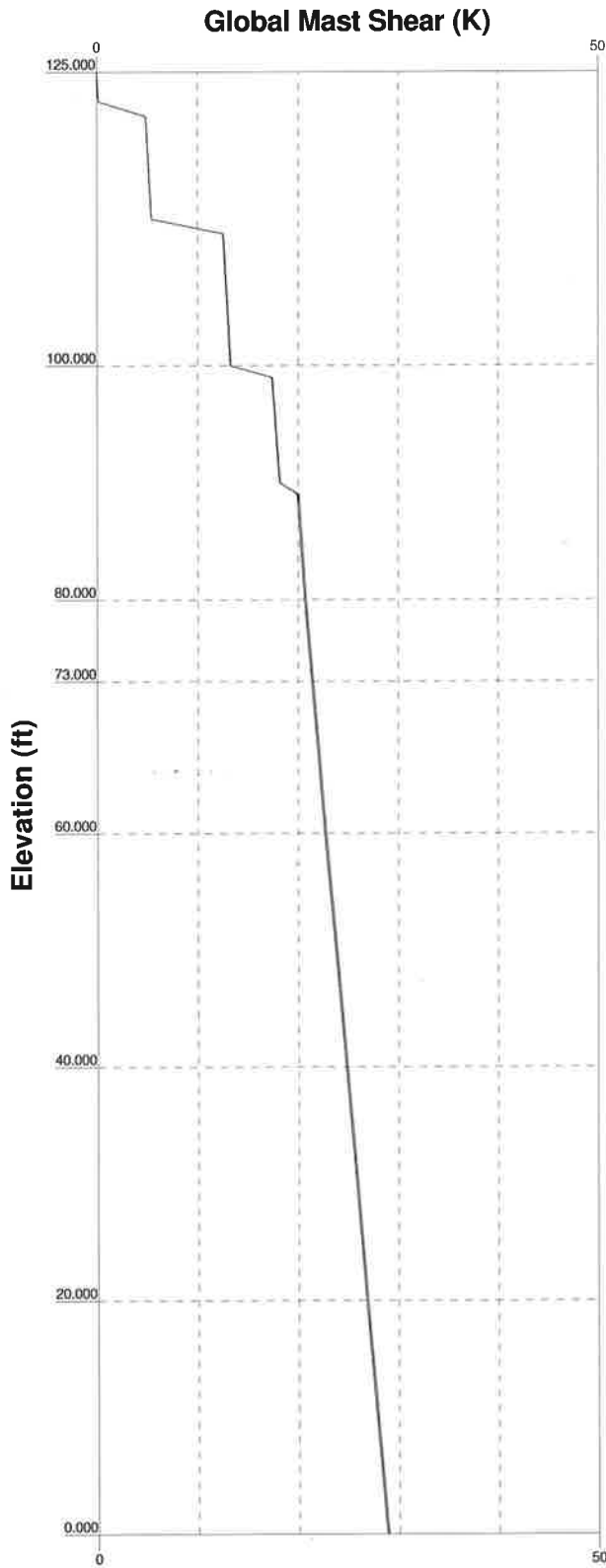


**B+T Group**  
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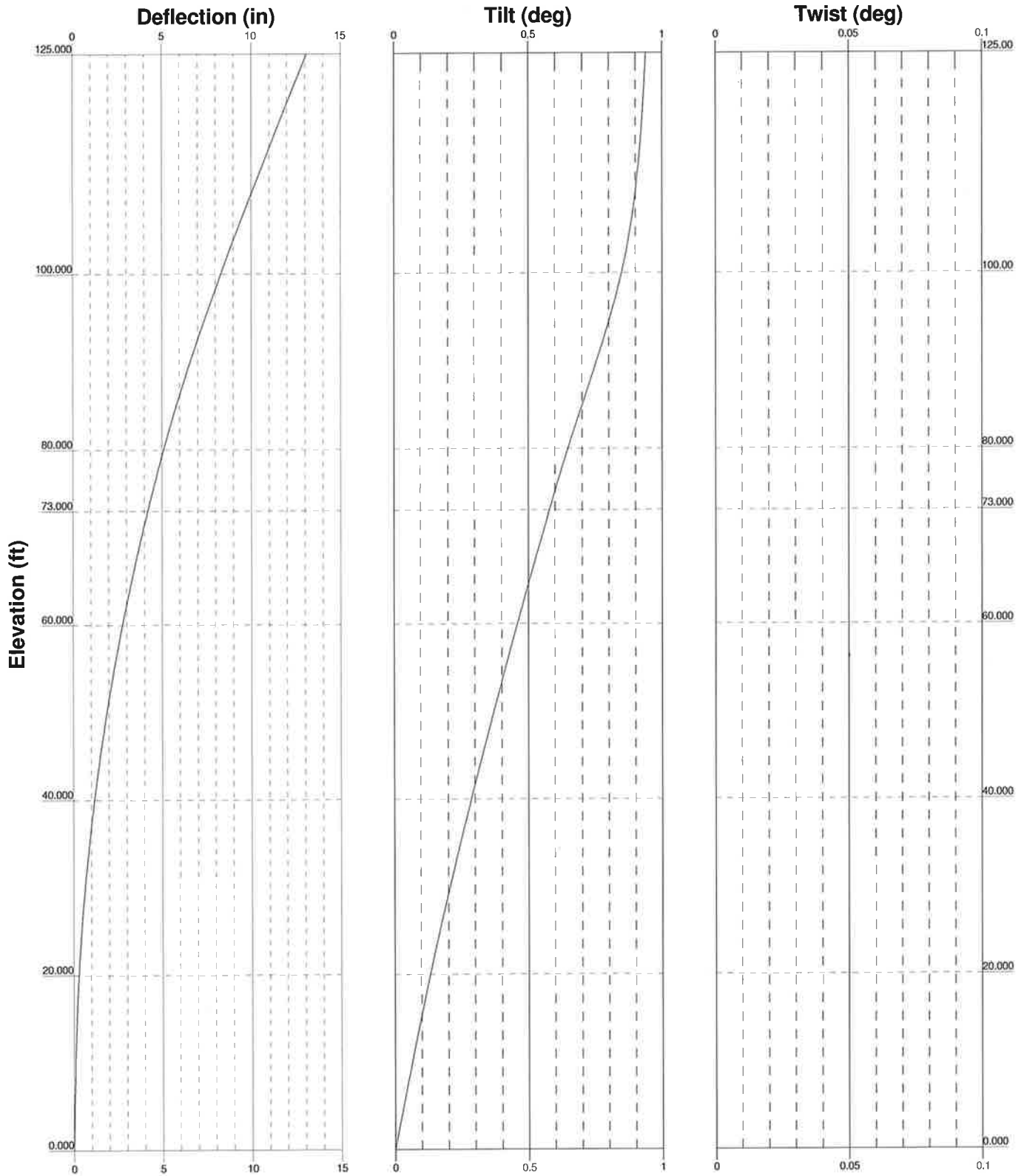
Job: **101126.001.01 - Branford/ I-95/ X55/ Dtn1, CT (BU# 8227)**  
 Project: \_\_\_\_\_  
 Client: Crown Castle  
 Drawn by: Nagabharana Nayak  
 App'd: \_\_\_\_\_  
 Code: TIA/EIA-222-F  
 Date: 10/20/15  
 Scale: NTS  
 Path: \_\_\_\_\_  
 Dwg No. E-1

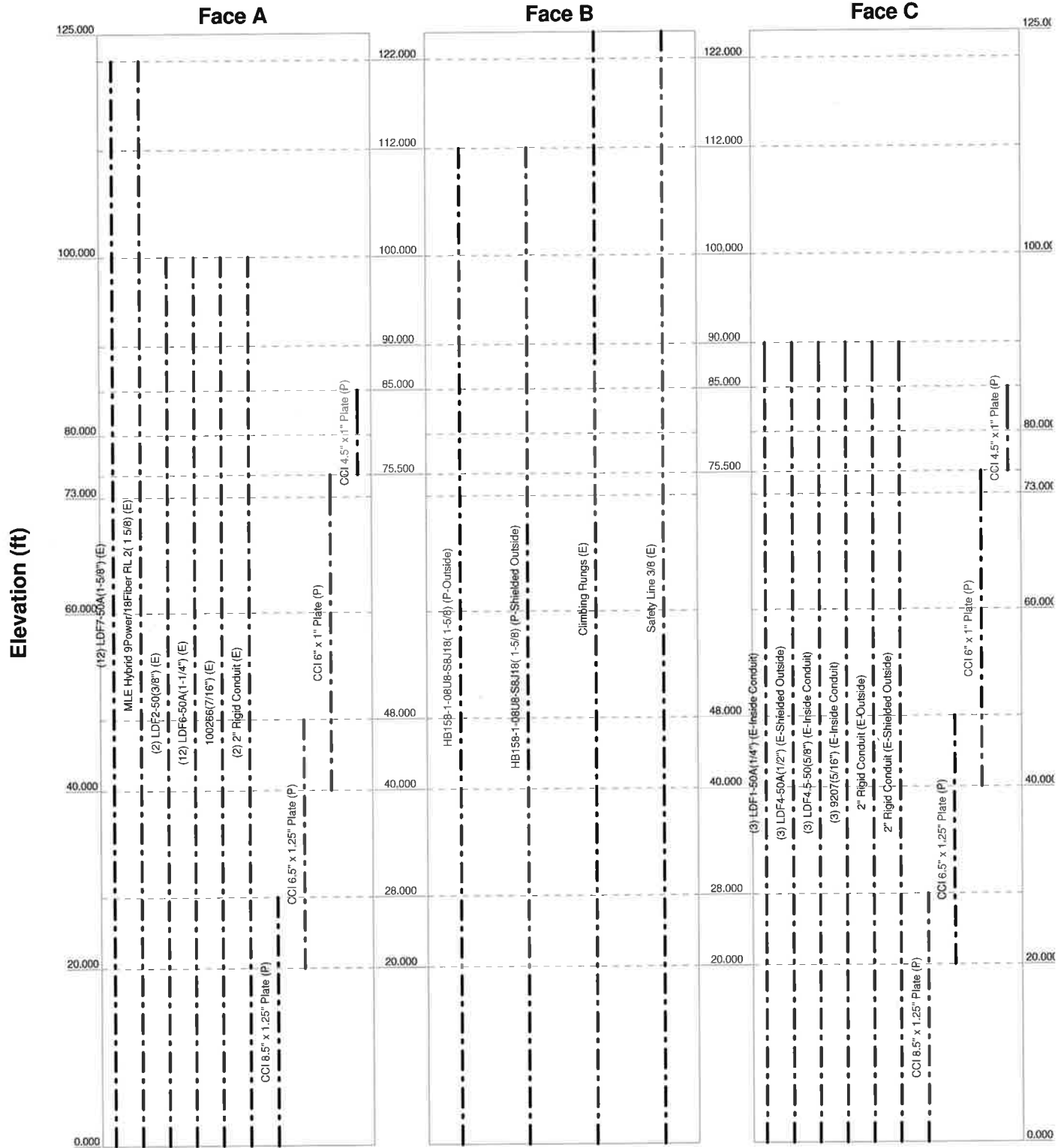
—— Vx      - - - - Vz


—— Mx      - - - - Mz



 <b>B+T GRP</b> Consulting Engineers	<b>B+T Group</b>	Job: <b>101126.001.01 - Branford/ I-95/ X55/ Dtn1, CT (BU# 8227)</b>			
	1717 S. Boulder, Suite 300		Project:		
	Tulsa, OK 74119		Client: Crown Castle	Drawn by: Nagabharana Nayak	App'd:
	Phone: (918) 587-4630		Code: TIA/EIA-222-F	Date: 10/20/15	Scale: NTS
	FAX: (918) 295-0265		Path:		Dwg No. E-4





 <b>B+T GRP</b> Consulting Engineers	<b>B+T Group</b> 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job: <b>101126.001.01 - Branford/ I-95/ X55/ Dtn1, CT (BU# 8227)</b>		
	Project:	Client: <b>Crown Castle</b>	Drawn by: <b>Nagabharana Nayak</b>	App'd:
	Code: <b>TIA/EIA-222-F</b>	Date: <b>10/20/15</b>	Scale: <b>NTS</b>	Dwg No. <b>E-7</b>
	Path:	Date:	Scale:	Dwg No.
	Path:	Date:	Scale:	Dwg No.

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	<b>Client</b> Crown Castle	<b>Designed by</b> Nagabharana Nayak

## Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Tower is located in New Haven County, Connecticut.

Basic wind speed of 85 mph.

Nominal ice thickness of 0.750 in.

Ice thickness is considered to increase with height.

Ice density of 56.000 pcf.

A wind speed of 38 mph is used in combination with ice.

Temperature drop of 50.000 °F.

Deflections calculated using a wind speed of 50 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

<ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Horizontals</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Magnification</li> <li>√ Use Code Stress Ratios</li> <li>√ Use Code Safety Factors - Guys</li> <li>√ Escalate Ice</li> <li>Always Use Max Kz</li> <li>Use Special Wind Profile</li> <li>Include Bolts In Member Capacity</li> <li>Leg Bolts Are At Top Of Section</li> <li>Secondary Horizontal Braces Leg</li> <li>Use Diamond Inner Bracing (4 Sided)</li> <li>Add IBC .6D+W Combination</li> </ul>	<ul style="list-style-type: none"> <li>Distribute Leg Loads As Uniform</li> <li>Assume Legs Pinned</li> <li>√ Assume Rigid Index Plate</li> <li>√ Use Clear Spans For Wind Area</li> <li>Use Clear Spans For KL/r</li> <li>Retension Guys To Initial Tension</li> <li>√ Bypass Mast Stability Checks</li> <li>√ Use Azimuth Dish Coefficients</li> <li>√ Project Wind Area of Appurt.</li> <li>Autocalc Torque Arm Areas</li> <li>SR Members Have Cut Ends</li> <li>Sort Capacity Reports By Component</li> <li>Triangulate Diamond Inner Bracing</li> <li>Use TIA-222-G Tension Splice Capacity</li> <li>Exemption</li> </ul>	<ul style="list-style-type: none"> <li>Treat Feedline Bundles As Cylinder</li> <li>Use ASCE 10 X-Brace Ly Rules</li> <li>Calculate Redundant Bracing Forces</li> <li>Ignore Redundant Members in FEA</li> <li>SR Leg Bolts Resist Compression</li> <li>All Leg Panels Have Same Allowable</li> <li>Offset Girt At Foundation</li> <li>√ Consider Feedline Torque</li> <li>Include Angle Block Shear Check</li> <li style="text-align: center;">Poles</li> <li>√ Include Shear-Torsion Interaction</li> <li>Always Use Sub-Critical Flow</li> <li>Use Top Mounted Sockets</li> </ul>
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## Pole Section Geometry

Section	Elevation <i>ft</i>	Section Length <i>ft</i>	Pole Size	Pole Grade	Socket Length <i>ft</i>
L1	125.000-100.000	25.000	P24x3/8	A53-B-42 (42 ksi)	
L2	100.000-80.000	20.000	P30x3/8	A53-B-42 (42 ksi)	
L3	80.000-73.000	7.000	P36x3/8	A53-B-42 (42 ksi)	
L4	73.000-60.000	13.000	P36x3/8 [0.540208]	49.519093ksi (50 ksi)	

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Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L5	60.000-40.000	20.000	P42x3/8 [0.513233]	40.32547ksi (40 ksi)	
L6	40.000-20.000	20.000	P48x3/8 [0.53833]	37.010171ksi (37 ksi)	
L7	20.000-0.000	20.000	P54x3/8 [0.563312]	35.455792ksi (35 ksi)	

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 125.000-100.000				1	1	1		
L2 100.000-80.000				1	1	1		
L3 80.000-73.000				1	1	1		
L4 73.000-60.000				1	1	0.997023		
L5 60.000-40.000				1	1	1.00269		
L6 40.000-20.000				1	1	1.00318		
L7 20.000-0.000				1	1	1.00563		

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

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight klf
LDF7-50A(1-5/8") (E)	A	No	Inside Pole	122.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
MLE Hybrid 9Power/18Fiber RL 2( 1 5/8) (E)	A	No	Inside Pole	122.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
*A* HB158-1-08U8-S8J18( 1-5/8) (P-Outside)	B	No	CaAa (Out Of Face)	112.000 - 0.000	1	No Ice	0.198	0.001
						1/2" Ice	0.298	0.003
						1" Ice	0.398	0.005
						2" Ice	0.598	0.011
						4" Ice	0.998	0.031
HB158-1-08U8-S8J18( 1-5/8) (P-Shielded Outside)	B	No	CaAa (Out Of Face)	112.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.003
						1" Ice	0.000	0.005
						2" Ice	0.000	0.011
						4" Ice	0.000	0.031

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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight klf
*A*								
LDF2-50(3/8") (E)	A	No	Inside Pole	100.000 - 0.000	2	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000 0.000
LDF6-50A(1-1/4") (E)	A	No	Inside Pole	100.000 - 0.000	12	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001 0.001
100266(7/16") (E)	A	No	Inside Pole	100.000 - 0.000	1	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000 0.000
2" Rigid Conduit (E)	A	No	Inside Pole	100.000 - 0.000	2	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.000 0.000 0.000	0.003 0.003 0.003 0.003 0.003
*A*								
LDF1-50A(1/4") (E-Inside Conduit)	C	No	Inside Pole	90.000 - 0.000	3	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000 0.000
LDF4-50A(1/2") (E-Shielded Outside)	C	No	CaAa (Out Of Face)	90.000 - 0.000	3	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.000 0.000 0.000	0.000 0.001 0.002 0.007 0.023
LDF4.5-50(5/8") (E-Inside Conduit)	C	No	Inside Pole	90.000 - 0.000	3	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000 0.000
9207(5/16") (E-Inside Conduit)	C	No	Inside Pole	90.000 - 0.000	3	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001 0.001
2" Rigid Conduit (E-Outside)	C	No	CaAa (Out Of Face)	90.000 - 0.000	1	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.200 0.300 0.400 0.600 1.000	0.003 0.004 0.006 0.013 0.032
2" Rigid Conduit (E-Shielded Outside)	C	No	CaAa (Out Of Face)	90.000 - 0.000	1	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.000 0.000 0.000	0.003 0.004 0.006 0.013 0.032
*A*								
Climbing Rungs (E)	B	No	CaAa (Out Of Face)	125.000 - 0.000	1	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.088 0.188 0.287 0.487 0.887	0.001 0.001 0.003 0.008 0.024
Safety Line 3/8 (E)	B	No	CaAa (Out Of Face)	125.000 - 0.000	1	No Ice 1/2" Ice 1" Ice	0.037 0.137 0.238	0.000 0.001 0.001



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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C <sub>AA</sub>		Weight klf
						ft <sup>2</sup> /ft	klf	
						2" Ice	0.437	0.002
						4" Ice	0.838	0.004
*/*								
CCI 8.5" x 1.25" Plate (P)	C	No	CaAa (Out Of Face)	28.000 - 0.000	1	No Ice	0.208	0.000
						1/2" Ice	0.292	0.000
						1" Ice	0.375	0.000
						2" Ice	0.542	0.000
						4" Ice	0.875	0.000
CCI 8.5" x 1.25" Plate (P)	A	No	CaAa (Out Of Face)	28.000 - 0.000	1	No Ice	0.208	0.000
						1/2" Ice	0.292	0.000
						1" Ice	0.375	0.000
						2" Ice	0.542	0.000
						4" Ice	0.875	0.000
CCI 6.5" x 1.25" Plate (P)	C	No	CaAa (Out Of Face)	48.000 - 20.000	1	No Ice	0.208	0.000
						1/2" Ice	0.292	0.000
						1" Ice	0.375	0.000
						2" Ice	0.542	0.000
						4" Ice	0.875	0.000
CCI 6.5" x 1.25" Plate (P)	A	No	CaAa (Out Of Face)	48.000 - 20.000	1	No Ice	0.208	0.000
						1/2" Ice	0.292	0.000
						1" Ice	0.375	0.000
						2" Ice	0.542	0.000
						4" Ice	0.875	0.000
CCI 6" x 1" Plate (P)	C	No	CaAa (Out Of Face)	75.500 - 40.000	1	No Ice	0.167	0.000
						1/2" Ice	0.250	0.000
						1" Ice	0.333	0.000
						2" Ice	0.500	0.000
						4" Ice	0.833	0.000
CCI 6" x 1" Plate (P)	A	No	CaAa (Out Of Face)	75.500 - 40.000	1	No Ice	0.167	0.000
						1/2" Ice	0.250	0.000
						1" Ice	0.333	0.000
						2" Ice	0.500	0.000
						4" Ice	0.833	0.000
CCI 4.5" x 1" Plate (P)	C	No	CaAa (Out Of Face)	85.000 - 75.500	1	No Ice	0.167	0.000
						1/2" Ice	0.250	0.000
						1" Ice	0.333	0.000
						2" Ice	0.500	0.000
						4" Ice	0.833	0.000
CCI 4.5" x 1" Plate (P)	A	No	CaAa (Out Of Face)	85.000 - 75.500	1	No Ice	0.167	0.000
						1/2" Ice	0.250	0.000
						1" Ice	0.333	0.000
						2" Ice	0.500	0.000
						4" Ice	0.833	0.000

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A <sub>R</sub>	A <sub>F</sub>	C <sub>AA</sub> In Face	C <sub>AA</sub> Out Face	Weight K
			ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	
L1	125.000-100.000	A	0.000	0.000	0.000	0.000	0.240
		B	0.000	0.000	0.000	5.501	0.050
		C	0.000	0.000	0.000	0.000	0.000
L2	100.000-80.000	A	0.000	0.000	0.000	0.833	0.493
		B	0.000	0.000	0.000	6.460	0.067
		C	0.000	0.000	0.000	2.833	0.085
L3	80.000-73.000	A	0.000	0.000	0.000	1.167	0.173
		B	0.000	0.000	0.000	2.261	0.024
		C	0.000	0.000	0.000	2.567	0.059

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Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L4	73.000-60.000	A	0.000	0.000	0.000	2.167	0.321
		B	0.000	0.000	0.000	4.199	0.044
		C	0.000	0.000	0.000	4.767	0.110
L5	60.000-40.000	A	0.000	0.000	0.000	5.000	0.493
		B	0.000	0.000	0.000	6.460	0.067
		C	0.000	0.000	0.000	9.000	0.170
L6	40.000-20.000	A	0.000	0.000	0.000	5.833	0.493
		B	0.000	0.000	0.000	6.460	0.067
		C	0.000	0.000	0.000	9.833	0.170
L7	20.000-0.000	A	0.000	0.000	0.000	4.167	0.493
		B	0.000	0.000	0.000	6.460	0.067
		C	0.000	0.000	0.000	8.167	0.170

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

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L1	125.000-100.000	A	0.869	0.000	0.000	0.000	0.000	0.240
		B		0.000	0.000	0.000	16.276	0.195
		C		0.000	0.000	0.000	0.000	0.000
L2	100.000-80.000	A	0.846	0.000	0.000	0.000	1.538	0.493
		B		0.000	0.000	0.000	16.611	0.241
		C		0.000	0.000	0.000	5.230	0.193
L3	80.000-73.000	A	0.830	0.000	0.000	0.000	2.135	0.173
		B		0.000	0.000	0.000	5.745	0.083
		C		0.000	0.000	0.000	4.696	0.133
L4	73.000-60.000	A	0.816	0.000	0.000	0.000	3.934	0.321
		B		0.000	0.000	0.000	10.562	0.152
		C		0.000	0.000	0.000	8.655	0.244
L5	60.000-40.000	A	0.788	0.000	0.000	0.000	8.679	0.493
		B		0.000	0.000	0.000	15.920	0.227
		C		0.000	0.000	0.000	15.832	0.366
L6	40.000-20.000	A	0.750	0.000	0.000	0.000	9.333	0.493
		B		0.000	0.000	0.000	15.460	0.218
		C		0.000	0.000	0.000	16.333	0.354
L7	20.000-0.000	A	0.750	0.000	0.000	0.000	6.667	0.493
		B		0.000	0.000	0.000	15.460	0.218
		C		0.000	0.000	0.000	13.667	0.354

### Feed Line Center of Pressure

Section	Elevation ft	CP <sub>X</sub> in	CP <sub>Z</sub> in	CP <sub>X</sub> Ice in	CP <sub>Z</sub> Ice in
L1	125.000-100.000	0.258	0.149	0.605	0.349
L2	100.000-80.000	0.196	0.238	0.485	0.462
L3	80.000-73.000	-0.044	0.208	0.118	0.402
L4	73.000-60.000	-0.044	0.208	0.116	0.399
L5	60.000-40.000	-0.128	0.158	0.004	0.334
L6	40.000-20.000	-0.172	0.136	-0.037	0.319
L7	20.000-0.000	-0.092	0.195	0.082	0.415

<b>tnxTower</b>  <b>B+T Group</b> 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	<b>Job</b> 101126.001.01 - Branford/ I-95/ X55/ Dtn1, CT (BU# 822765)	<b>Page</b> 6 of 14
	<b>Project</b>	<b>Date</b> 13:38:21 10/20/15
	<b>Client</b> Crown Castle	<b>Designed by</b> Nagabharana Nayak

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K	
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	122.000	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	122.000	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	122.000	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	122.000	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	122.000	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	122.000	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
LNX-6515DS-VTM w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	122.000	No Ice	11.683	9.842	0.083
						1/2" Ice	12.404	11.366	0.173
						1" Ice	13.135	12.914	0.273
						2" Ice	14.601	15.267	0.506
						4" Ice	17.875	20.139	1.151
LNX-6515DS-VTM w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	122.000	No Ice	11.683	9.842	0.083
						1/2" Ice	12.404	11.366	0.173
						1" Ice	13.135	12.914	0.273
						2" Ice	14.601	15.267	0.506
						4" Ice	17.875	20.139	1.151
LNX-6515DS-VTM w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	122.000	No Ice	11.683	9.842	0.083
						1/2" Ice	12.404	11.366	0.173
						1" Ice	13.135	12.914	0.273
						2" Ice	14.601	15.267	0.506
						4" Ice	17.875	20.139	1.151
KRY 112 144/1 (E)	A	From Leg	4.000 0.000 0.000	0.000	122.000	No Ice	0.408	0.204	0.011
						1/2" Ice	0.497	0.273	0.014
						1" Ice	0.594	0.351	0.019
						2" Ice	0.815	0.533	0.032
						4" Ice	1.359	0.999	0.082
KRY 112 144/1	B	From Leg	4.000	0.000	122.000	No Ice	0.408	0.204	0.011

# tnxTower

**B+T Group**  
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**Job**  
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**Project**

**Date**  
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**Client**  
 Crown Castle

**Designed by**  
 Nagabharana  
 Nayak

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement  ft	C <sub>AA</sub> Front  ft <sup>2</sup>	C <sub>AA</sub> Side  ft <sup>2</sup>	Weight  K
			Horz Lateral ft ft ft	Vert ft					
(E)			0.000						0.014
			0.000						0.019
									0.032
									0.082
KRY 112 144/1	C	From Leg	4.000	0.000	122.000	No Ice	0.408	0.204	0.011
(E)			0.000			1/2" Ice	0.497	0.273	0.014
			0.000			1" Ice	0.594	0.351	0.019
						2" Ice	0.815	0.533	0.032
						4" Ice	1.359	0.999	0.082
RRUS 11 B12	A	From Leg	4.000	0.000	122.000	No Ice	3.306	1.361	0.051
(E)			0.000			1/2" Ice	3.550	1.540	0.072
			0.000			1" Ice	3.802	1.728	0.095
						2" Ice	4.334	2.130	0.153
						4" Ice	5.501	3.038	0.314
RRUS 11 B12	B	From Leg	4.000	0.000	122.000	No Ice	3.306	1.361	0.051
(E)			0.000			1/2" Ice	3.550	1.540	0.072
			0.000			1" Ice	3.802	1.728	0.095
						2" Ice	4.334	2.130	0.153
						4" Ice	5.501	3.038	0.314
RRUS 11 B12	C	From Leg	4.000	0.000	122.000	No Ice	3.306	1.361	0.051
(E)			0.000			1/2" Ice	3.550	1.540	0.072
			0.000			1" Ice	3.802	1.728	0.095
						2" Ice	4.334	2.130	0.153
						4" Ice	5.501	3.038	0.314
Platform Mount [LP 405-1]	C	None		0.000	122.000	No Ice	20.800	20.800	1.800
(E)						1/2" Ice	28.100	28.100	2.066
						1" Ice	35.400	35.400	2.332
						2" Ice	50.000	50.000	2.864
						4" Ice	79.200	79.200	3.928
*A*									
*A*									
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	A	From Leg	4.000	0.000	112.000	No Ice	8.976	6.963	0.067
			0.000			1/2" Ice	9.647	8.182	0.137
			0.000			1" Ice	10.291	9.144	0.215
						2" Ice	11.595	11.022	0.398
						4" Ice	14.321	15.027	0.914
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	B	From Leg	4.000	0.000	112.000	No Ice	8.976	6.963	0.067
			0.000			1/2" Ice	9.647	8.182	0.137
			0.000			1" Ice	10.291	9.144	0.215
						2" Ice	11.595	11.022	0.398
						4" Ice	14.321	15.027	0.914
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	C	From Leg	4.000	0.000	112.000	No Ice	8.976	6.963	0.067
			0.000			1/2" Ice	9.647	8.182	0.137
			0.000			1" Ice	10.291	9.144	0.215
						2" Ice	11.595	11.022	0.398
						4" Ice	14.321	15.027	0.914
(2) LNX-6514DS-A1M w/ Mount Pipe (P)	A	From Leg	4.000	0.000	112.000	No Ice	8.648	7.082	0.065
			0.000			1/2" Ice	9.305	8.273	0.134
			0.000			1" Ice	9.930	9.185	0.211
						2" Ice	11.204	11.023	0.393
						4" Ice	13.872	15.063	0.902
(2) LNX-6514DS-A1M w/ Mount Pipe (P)	B	From Leg	4.000	0.000	112.000	No Ice	8.648	7.082	0.065
			0.000			1/2" Ice	9.305	8.273	0.134
			0.000			1" Ice	9.930	9.185	0.211
						2" Ice	11.204	11.023	0.393
						4" Ice	13.872	15.063	0.902
(2) LNX-6514DS-A1M w/	C	From Leg	4.000	0.000	112.000	No Ice	8.648	7.082	0.065

# tnxTower

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**Job**  
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**Project**

**Date**  
 13:38:21 10/20/15

**Client**  
 Crown Castle

**Designed by**  
 Nagabharana  
 Nayak

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
Mount Pipe (P)			0.000 0.000			1/2" Ice 9.305 1" Ice 9.930 2" Ice 11.204 4" Ice 13.872	8.273 9.185 11.023 15.063	0.134 0.211 0.393 0.902
RRH2x60-700 (P)	A	From Leg	4.000 0.000 0.000	0.000	112.000	No Ice 3.957 1/2" Ice 4.272 1" Ice 4.596 2" Ice 5.271 4" Ice 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2x60-700 (P)	B	From Leg	4.000 0.000 0.000	0.000	112.000	No Ice 3.957 1/2" Ice 4.272 1" Ice 4.596 2" Ice 5.271 4" Ice 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2x60-700 (P)	C	From Leg	4.000 0.000 0.000	0.000	112.000	No Ice 3.957 1/2" Ice 4.272 1" Ice 4.596 2" Ice 5.271 4" Ice 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2X60-AWS (P)	A	From Leg	4.000 0.000 0.000	0.000	112.000	No Ice 3.957 1/2" Ice 4.272 1" Ice 4.596 2" Ice 5.271 4" Ice 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2X60-AWS (P)	B	From Leg	4.000 0.000 0.000	0.000	112.000	No Ice 3.957 1/2" Ice 4.272 1" Ice 4.596 2" Ice 5.271 4" Ice 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2X60-AWS (P)	C	From Leg	4.000 0.000 0.000	0.000	112.000	No Ice 3.957 1/2" Ice 4.272 1" Ice 4.596 2" Ice 5.271 4" Ice 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2X60-PCS (P)	A	From Leg	4.000 0.000 0.000	0.000	112.000	No Ice 2.567 1/2" Ice 2.791 1" Ice 3.025 2" Ice 3.517 4" Ice 4.606	1.551 1.745 1.947 2.378 3.344	0.055 0.073 0.094 0.145 0.289
RRH2X60-PCS (P)	B	From Leg	4.000 0.000 0.000	0.000	112.000	No Ice 2.567 1/2" Ice 2.791 1" Ice 3.025 2" Ice 3.517 4" Ice 4.606	1.551 1.745 1.947 2.378 3.344	0.055 0.073 0.094 0.145 0.289
RRH2X60-PCS (P)	C	From Leg	4.000 0.000 0.000	0.000	112.000	No Ice 2.567 1/2" Ice 2.791 1" Ice 3.025 2" Ice 3.517 4" Ice 4.606	1.551 1.745 1.947 2.378 3.344	0.055 0.073 0.094 0.145 0.289
RXXDC-3315-PF-48 (P)	A	From Leg	4.000 0.000 0.000	0.000	112.000	No Ice 4.326 1/2" Ice 4.609 1" Ice 4.901 2" Ice 5.510 4" Ice 6.832	2.557 2.794 3.040 3.557 4.696	0.032 0.062 0.097 0.176 0.389
RXXDC-3315-PF-48 (P)	B	From Leg	4.000 0.000 0.000	0.000	112.000	No Ice 4.326 1/2" Ice 4.609 1" Ice 4.901	2.557 2.794 3.040	0.032 0.062 0.097

<b>tnxTower</b>  <b>B+T Group</b> 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	<b>Job</b> 101126.001.01 - Branford/ I-95/ X55/ Dtn1, CT (BU# 822765)	<b>Page</b> 9 of 14
	<b>Project</b>	<b>Date</b> 13:38:21 10/20/15
	<b>Client</b> Crown Castle	<b>Designed by</b> Nagabharana Nayak

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
RMQP-472 + Handrail Ki (P)	C	None		0.000	112.000	2" Ice	5.510	3.557	0.176
						4" Ice	6.832	4.696	0.389
						No Ice	30.100	30.100	1.589
						1/2" Ice	40.800	40.800	2.029
						1" Ice	51.500	51.500	2.470
						2" Ice	72.900	72.900	3.351
						4" Ice	115.700	115.700	5.114
*A*									
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice	8.498	6.304	0.074
						1/2" Ice	9.149	7.479	0.139
						1" Ice	9.767	8.368	0.212
						2" Ice	11.031	10.179	0.385
						4" Ice	13.679	14.024	0.874
						No Ice	8.498	6.304	0.074
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	100.000	1/2" Ice	9.149	7.479	0.139
						1" Ice	9.767	8.368	0.212
						2" Ice	11.031	10.179	0.385
						4" Ice	13.679	14.024	0.874
						No Ice	8.498	6.304	0.074
						1/2" Ice	9.149	7.479	0.139
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	100.000	1" Ice	9.767	8.368	0.212
						2" Ice	11.031	10.179	0.385
						4" Ice	13.679	14.024	0.874
						No Ice	8.498	6.304	0.074
						1/2" Ice	9.149	7.479	0.139
						1" Ice	9.767	8.368	0.212
(2) 7770.00 w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	100.000	2" Ice	11.031	10.179	0.385
						4" Ice	13.679	14.024	0.874
						No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.103
						1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
(2) 7770.00 w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	100.000	4" Ice	10.360	10.412	0.665
						No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.103
						1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
(2) 7770.00 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.103
						1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
						No Ice	6.119	4.254	0.055
(2) RRUS-11 (E)	A	From Leg	4.000 0.000 0.000	0.000	100.000	1/2" Ice	3.491	1.551	0.068
						1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
						No Ice	3.249	1.373	0.048
						1/2" Ice	3.491	1.551	0.068
(2) RRUS-11 (E)	B	From Leg	4.000 0.000 0.000	0.000	100.000	1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
						No Ice	3.249	1.373	0.048
						1/2" Ice	3.491	1.551	0.068
						1" Ice	3.741	1.738	0.092
(2) RRUS-11 (E)	C	From Leg	4.000 0.000 0.000	0.000	100.000	2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
						No Ice	3.249	1.373	0.048
						1/2" Ice	3.491	1.551	0.068
						1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
(4) LGP21401 (E)	A	From Leg	4.000 0.000 0.000	0.000	100.000	4" Ice	5.426	3.042	0.310
						No Ice	1.288	0.233	0.014
						1/2" Ice	1.445	0.313	0.021
						1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						No Ice	1.288	0.233	0.014

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	<b>Project</b>	<b>Date</b> 13:38:21 10/20/15
	<b>Client</b> Crown Castle	<b>Designed by</b> Nagabharana Nayak

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>A</sub> A <sub>A</sub>			Weight K
						Front ft <sup>2</sup>	Side ft <sup>2</sup>		
(4) LGP21401 (E)	B	From Leg	4.000 0.000 0.000	0.000	100.000	4" Ice	2.788	1.121	0.135
						No Ice	1.288	0.233	0.014
						1/2" Ice	1.445	0.313	0.021
						1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
(4) LGP21401 (E)	C	From Leg	4.000 0.000 0.000	0.000	100.000	4" Ice	2.788	1.121	0.135
						No Ice	1.288	0.233	0.014
						1/2" Ice	1.445	0.313	0.021
						1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
DC6-48-60-18-8F (E)	A	From Leg	4.000 0.000 0.000	0.000	100.000	4" Ice	2.788	1.121	0.135
						No Ice	2.567	2.567	0.019
						1/2" Ice	2.798	2.798	0.041
						1" Ice	3.038	3.038	0.067
						2" Ice	3.543	3.543	0.129
4' x 2" Pipe Mount (E)	A	From Leg	4.000 0.000 0.000	0.000	100.000	4" Ice	4.658	4.658	0.299
						No Ice	0.785	0.785	0.029
						1/2" Ice	1.028	1.028	0.035
						1" Ice	1.281	1.281	0.044
						2" Ice	1.814	1.814	0.072
4' x 2" Pipe Mount (E)	B	From Leg	4.000 0.000 0.000	0.000	100.000	4" Ice	3.111	3.111	0.167
						No Ice	0.785	0.785	0.029
						1/2" Ice	1.028	1.028	0.035
						1" Ice	1.281	1.281	0.044
						2" Ice	1.814	1.814	0.072
4' x 2" Pipe Mount (E)	C	From Leg	4.000 0.000 0.000	0.000	100.000	4" Ice	3.111	3.111	0.167
						No Ice	0.785	0.785	0.029
						1/2" Ice	1.028	1.028	0.035
						1" Ice	1.281	1.281	0.044
						2" Ice	1.814	1.814	0.072
T-Arm Mount [TA 602-3] (E)	C	None	0.000	0.000	100.000	4" Ice	3.111	3.111	0.167
						No Ice	11.590	11.590	0.774
						1/2" Ice	15.440	15.440	0.990
						1" Ice	19.290	19.290	1.206
						2" Ice	26.990	26.990	1.639
*A* LLPX310R w/ Mount Pipe (E)	A	From Leg	2.000 0.000 0.000	0.000	90.000	4" Ice	42.390	42.390	2.503
						No Ice	5.065	2.985	0.045
						1/2" Ice	5.480	3.528	0.083
						1" Ice	5.905	4.087	0.126
						2" Ice	6.788	5.314	0.232
LLPX310R w/ Mount Pipe (E)	B	From Leg	2.000 0.000 0.000	0.000	90.000	4" Ice	8.705	8.133	0.544
						No Ice	5.065	2.985	0.045
						1/2" Ice	5.480	3.528	0.083
						1" Ice	5.905	4.087	0.126
						2" Ice	6.788	5.314	0.232
LLPX310R w/ Mount Pipe (E)	C	From Leg	2.000 0.000 0.000	0.000	90.000	4" Ice	8.705	8.133	0.544
						No Ice	5.065	2.985	0.045
						1/2" Ice	5.480	3.528	0.083
						1" Ice	5.905	4.087	0.126
						2" Ice	6.788	5.314	0.232
RRH-C2C (E)	A	From Leg	2.000 0.000 0.000	0.000	90.000	4" Ice	8.705	8.133	0.544
						No Ice	1.263	2.946	0.046
						1/2" Ice	1.436	3.177	0.065
						1" Ice	1.618	3.417	0.087
						2" Ice	2.007	3.922	0.140
						4" Ice	2.889	5.037	0.289

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	<b>Project</b>	<b>Date</b> 13:38:21 10/20/15
	<b>Client</b> Crown Castle	<b>Designed by</b> Nagabharana Nayak

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Lateral					
RRH-C2C (E)	B	From Leg	2.000	0.000	90.000	No Ice	1.263	2.946	0.046
			0.000	0.000		1/2" Ice	1.436	3.177	0.065
			0.000	0.000		1" Ice	1.618	3.417	0.087
						2" Ice	2.007	3.922	0.140
						4" Ice	2.889	5.037	0.289
RRH-C2C (E)	C	From Leg	2.000	0.000	90.000	No Ice	1.263	2.946	0.046
			0.000	0.000		1/2" Ice	1.436	3.177	0.065
			0.000	0.000		1" Ice	1.618	3.417	0.087
						2" Ice	2.007	3.922	0.140
						4" Ice	2.889	5.037	0.289
AIRPAIR ODU (E)	A	From Leg	2.000	0.000	90.000	No Ice	1.175	0.488	0.012
			0.000	0.000		1/2" Ice	1.331	0.615	0.019
			0.000	0.000		1" Ice	1.496	0.751	0.028
						2" Ice	1.851	1.048	0.053
						4" Ice	2.665	1.745	0.135
AIRPAIR ODU (E)	B	From Leg	2.000	0.000	90.000	No Ice	1.175	0.488	0.012
			0.000	0.000		1/2" Ice	1.331	0.615	0.019
			0.000	0.000		1" Ice	1.496	0.751	0.028
						2" Ice	1.851	1.048	0.053
						4" Ice	2.665	1.745	0.135
AIRPAIR ODU (E)	C	From Leg	2.000	0.000	90.000	No Ice	1.175	0.488	0.012
			0.000	0.000		1/2" Ice	1.331	0.615	0.019
			0.000	0.000		1" Ice	1.496	0.751	0.028
						2" Ice	1.851	1.048	0.053
						4" Ice	2.665	1.745	0.135
6' x 2" Mount Pipe (E)	A	From Leg	2.000	0.000	90.000	No Ice	1.425	1.425	0.022
			0.000	0.000		1/2" Ice	1.925	1.925	0.033
			0.000	0.000		1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe (E)	B	From Leg	2.000	0.000	90.000	No Ice	1.425	1.425	0.022
			0.000	0.000		1/2" Ice	1.925	1.925	0.033
			0.000	0.000		1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe (E)	C	From Leg	2.000	0.000	90.000	No Ice	1.425	1.425	0.022
			0.000	0.000		1/2" Ice	1.925	1.925	0.033
			0.000	0.000		1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
Side Arm Mount [SO 103-3] (E)	C	None		0.000	90.000	No Ice	9.500	9.500	0.224
						1/2" Ice	11.800	11.800	0.317
						1" Ice	14.100	14.100	0.410
						2" Ice	18.700	18.700	0.596
						4" Ice	27.900	27.900	0.968

\*A\*



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	<b>Client</b> Crown Castle	<b>Designed by</b> Nagabharana Nayak

## Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets:		Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight	
				Horz Lateral Vert ft	°							°
A-ANT-18G-2-C (E)	A	Paraboloid w/Shroud (HP)	From Leg	2.000	-90.000			90.000	2.175	No Ice	3.720	0.030
										1/2" Ice	4.010	0.030
										1" Ice	4.300	0.360
										2" Ice	4.880	0.070
										4" Ice	6.040	0.190
A-ANT-18G-2-C (E)	C	Paraboloid w/Shroud (HP)	From Leg	2.000	30.000			90.000	2.175	No Ice	3.720	0.030
										1/2" Ice	4.010	0.030
										1" Ice	4.300	0.360
										2" Ice	4.880	0.070
										4" Ice	6.040	0.190

\*\*\*

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## Compression Checks

## Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P K	Allow. P <sub>a</sub> K	Ratio P P <sub>a</sub>
L1	125 - 100 (1)	P24x3/8	25.000	0.000	0.0	25.200	27.833	-7.970	701.380	0.011
L2	100 - 80 (2)	P30x3/8	20.000	0.000	0.0	25.075	34.901	-13.422	875.146	0.015
L3	80 - 73 (3)	P36x3/8	7.000	0.000	0.0	23.696	41.970	-14.730	994.507	0.015
L4	73 - 60 (4)	P36x3/8 [0.540208]	13.000	0.000	0.0	29.712	60.179	-17.956	1788.010	0.010
L5	60 - 40 (5)	P42x3/8 [0.513233]	20.000	0.000	0.0	24.195	66.892	-23.416	1618.470	0.014
L6	40 - 20 (6)	P48x3/8 [0.53833]	20.000	0.000	0.0	22.206	80.268	-29.804	1782.440	0.017
L7	20 - 0 (7)	P54x3/8 [0.563312]	20.000	0.000	0.0	21.088	94.567	-37.189	1994.230	0.019

## Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M <sub>x</sub> kip-ft	Actual f <sub>bx</sub> ksi	Allow. F <sub>bx</sub> ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M <sub>y</sub> kip-ft	Actual f <sub>by</sub> ksi	Allow. F <sub>by</sub> ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	125 - 100 (1)	P24x3/8	206.787	15.331	27.720	0.553	0.000	0.000	27.720	0.000
L2	100 - 80 (2)	P30x3/8	588.513	27.663	25.075	1.103	0.000	0.000	25.075	0.000
L3	80 - 73 (3)	P36x3/8	736.785	23.900	23.696	1.009	0.000	0.000	23.696	0.000
L4	73 - 60 (4)	P36x3/8 [0.540208]	1025.25 0	23.407	29.712	0.788	0.000	0.000	29.712	0.000
L5	60 - 40 (5)	P42x3/8 [0.513233]	1503.00 8	26.314	24.195	1.088	0.000	0.000	24.195	0.000
L6	40 - 20 (6)	P48x3/8 [0.53833]	2021.95 8	25.762	24.427	1.055	0.000	0.000	24.427	0.000
L7	20 - 0 (7)	P54x3/8 [0.563312]	2581.63 3	24.778	21.088	1.175	0.000	0.000	21.088	0.000

## Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f <sub>v</sub> ksi	Allow. F <sub>v</sub> ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f <sub>vt</sub> ksi	Allow. F <sub>vt</sub> ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	125 - 100 (1)	P24x3/8	13.308	0.956	16.800	0.057	0.582	0.022	16.800	0.001
L2	100 - 80 (2)	P30x3/8	20.825	1.193	16.800	0.071	1.190	0.028	15.644	0.002
L3	80 - 73 (3)	P36x3/8	21.544	1.027	16.800	0.061	1.179	0.019	12.270	0.002
L4	73 - 60 (4)	P36x3/8 [0.540208]	22.832	0.759	19.808	0.038	1.156	0.013	19.808	0.001
L5	60 - 40 (5)	P42x3/8 [0.513233]	24.926	0.745	16.130	0.046	1.120	0.010	16.130	0.001
L6	40 - 20 (6)	P48x3/8 [0.53833]	26.954	0.672	14.804	0.045	1.083	0.007	14.804	0.000
L7	20 - 0 (7)	P54x3/8 [0.563312]	29.000	0.613	14.182	0.043	1.042	0.005	14.182	0.000

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	<b>Client</b> Crown Castle	<b>Designed by</b> Nagabharana Nayak

### Pole Interaction Design Data

Section No.	Elevation ft	Ratio P	Ratio $f_{bx}$	Ratio $f_{by}$	Ratio $f_v$	Ratio $f_{tx}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		$P_u$	$F_{bx}$	$F_{by}$	$F_v$	$F_{tx}$			
L1	125 - 100 (1)	0.011	0.553	0.000	0.057	0.001	0.568	1.333	H1-3+VT ✓
L2	100 - 80 (2)	0.015	1.103	0.000	0.071	0.002	1.124	1.333	H1-3+VT ✓
L3	80 - 73 (3)	0.015	1.009	0.000	0.061	0.002	1.027	1.333	H1-3+VT ✓
L4	73 - 60 (4)	0.010	0.788	0.000	0.038	0.001	0.799	1.333	H1-3+VT ✓
L5	60 - 40 (5)	0.014	1.088	0.000	0.046	0.001	1.104	1.333	H1-3+VT ✓
L6	40 - 20 (6)	0.017	1.055	0.000	0.045	0.000	1.073	1.333	H1-3+VT ✓
L7	20 - 0 (7)	0.019	1.175	0.000	0.043	0.000	1.196	1.333	H1-3+VT ✓

### Section Capacity Table

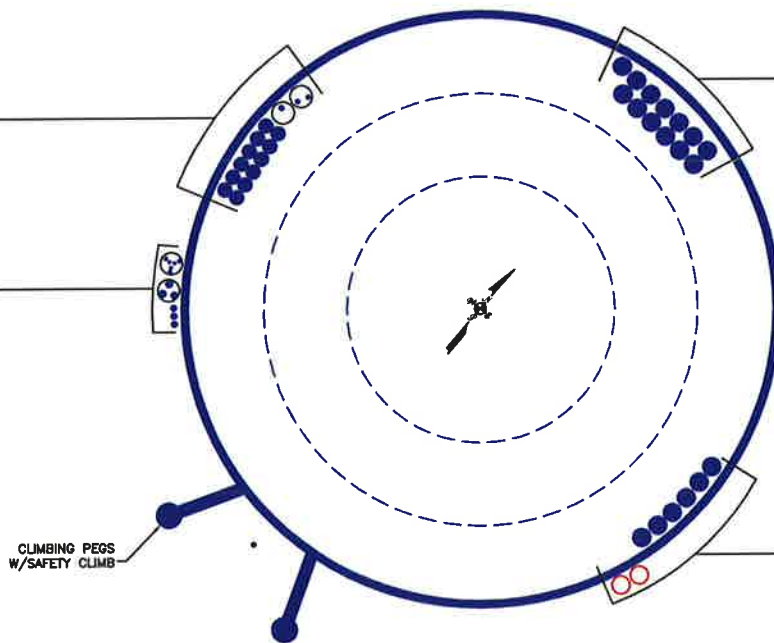
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF* $P_{allow}$ K	% Capacity	Pass Fail	
L1	125 - 100	Pole	P24x3/8	1	-7.970	934.940	42.3	Pass**	
L2	100 - 80	Pole	P30x3/8	2	-13.422	1166.570	83.8	Pass**	
L3	80 - 73	Pole	P36x3/8	3	-14.730	1325.678	76.6	Pass**	
L4	73 - 60	Pole	P36x3/8 [0.540208]	4	-17.956	2383.417	76.0	Pass**	
L5	60 - 40	Pole	P42x3/8 [0.513233]	5	-23.416	2157.420	88.9	Pass**	
L6	40 - 20	Pole	P48x3/8 [0.53833]	6	-29.804	2375.992	90.2	Pass**	
L7	20 - 0	Pole	P54x3/8 [0.563312]	7	-37.189	2658.308	89.4	Pass**	
							Summary		
							Pole (L7)	90.2	Pass**
							<b>RATING =</b>	<b>90.2</b>	<b>Pass**</b>

\*\* See "Appendix-C" for Calculations.

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

(INSTALLED—IN (2) 2" CONDUIT)  
 (2) 3/8" TO 100 FT LEVEL  
 (1) 7/16" TO 100 FT LEVEL  
 (INSTALLED)  
 (12) 1-1/4" TO 100 FT LEVEL

(INSTALLED—IN (2) 2" CONDUIT)  
 (3) 1/4" TO 90 FT LEVEL  
 (3) 5/16" TO 90 FT LEVEL  
 (INSTALLED)  
 (3) 1/2" TO 90 FT LEVEL  
 (INSTALLED—IN CONDUIT)  
 (3) 5/8" TO 90 FT LEVEL



(INSTALLED)  
 (13) 1-5/8" TO 122 FT LEVEL

(PROPOSED)  
 (2) 1-5/8" TO 112 FT LEVEL  
 (ABANDONED—TO BE REMOVED)  
 (6) 1-5/8" TO 112 FT LEVEL

CLIMBING PEGS  
 W/SAFETY CLIMB

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

Section	Section Properties		Torsion Shear	Material Properties		Modulus of Elasticity	Effective Thickness		Effective Thickness	Reinforcement Properties		Reinforcement Area		Reinforcement Ratio		Concrete Modulus	Concrete Strength	Concrete Strength	Concrete Strength	Concrete Strength
	Area	Moment of Inertia		Modulus of Elasticity	Yield Strength		Ultimate Strength	Yield Strength		Ultimate Strength	Yield Strength	Ultimate Strength	Yield Strength	Ultimate Strength	Yield Strength					
1	100	4000000	150000	40000	60000	15000000	12	12	12	12	12	12	12	12	12	4000	4000	4000	4000	4000
2	100	4000000	150000	40000	60000	15000000	12	12	12	12	12	12	12	12	4000	4000	4000	4000	4000	4000
3	100	4000000	150000	40000	60000	15000000	12	12	12	12	12	12	12	12	4000	4000	4000	4000	4000	4000
4	100	4000000	150000	40000	60000	15000000	12	12	12	12	12	12	12	12	4000	4000	4000	4000	4000	4000
5	100	4000000	150000	40000	60000	15000000	12	12	12	12	12	12	12	12	4000	4000	4000	4000	4000	4000

# Reinforcement Capacity

Dimensions and Properties										Compression			ASD-9		LRFD						
Model	Weight (lb/ft)	Area (in <sup>2</sup> )	Moment of Inertia (in <sup>4</sup> )	Centroid from Mating Edge (in)	Centroid from Bolt Hole Center (in)	Web Thickness (in)	Width (in)	Flange Width (in)	Flange Thickness (in)	Hole Diameter (in)	Yield Stress (ksi)	Ultimate Stress (ksi)	Slender Ratio Coefficient	Unbraced Length (in)	Slender Ratio Coefficient	Unbraced Length (in)	Allowable Axial (kip)	Allowable Axial w/ Increase (kip)	Governing Axial (kip)	Design Axial Strength (kip)	Governing Axial
CC-XP-04S100	15.3	4.50	0.38	7.99	0.5	1	4.5	0	0	1.1875	65	80	0.80	20	1.00	20	125.7	172.4	Compress.	185.0	Rupture
CC-XP-060100	20.4	6.00	0.50	18.00	0.5	1	6	0	0	1.1875	65	80	0.80	16	1.00	16	155.1	252.3	Compress.	285.0	Rupture
CC-XP-065125	27.6	8.13	1.06	28.61	0.625	1.25	6.5	0	0	1.1875	65	80	0.80	19	1.00	19	240.4	347.2	Compress.	393.8	Rupture
CC-XP-085125	36.2	10.63	1.38	63.97	0.625	1.25	8.5	0	0	1.1875	65	80	0.80	17	1.00	17	350.9	467.9	Compress.	543.1	Compress.
FP-2(6.5"x1.25")	27.6	8.13	1.38	63.97	0.625	1.25	8.5	0	0	1.1875	65	80	0.80	24	1.00	24	312.7	416.3	Compress.	474.9	Compress.
FP-2(6.5"x1.25")	20.4	6.00	0.50	28.61	0.625	1.25	6.5	0	0	1.1875	65	80	0.80	24	1.00	24	238.7	318.3	Compress.	363.2	Compress.
FP-2(4.5"x1")	15.3	4.50	0.38	18.00	0.5	1	4.5	0	0	1.1875	65	80	0.80	24	1.00	24	154.7	206.3	Compress.	230.5	Compress.
FP-2(4.5"x1")	15.3	4.50	0.38	7.59	0.5	1	4.5	0	0	1.1875	65	80	0.80	24	1.00	24	116.0	154.7	Compress.	172.9	Compress.



# Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

## Site Data

BU#: 822765  
 Site Name: Branford- I-95- X55- Dtn1  
 App #: 306331 Revision # 0

Reactions		
Moment:	206.787	ft-kips
Axial:	7.97	kips
Shear:	13.308	kips
Elevation:	100	feet

Pole Manufacturer:	Other
--------------------	-------

If No stiffeners, Criteria: **AISC ASD** <-Only Applicable to Unstiffened Cases

Bolt Data		
Qty:	20	
Diameter (in.):	1	Bolt Fu: 120
Bolt Material:	A325	Bolt Fy: 92
N/A:		Bolt Fty: 44.00
N/A:		<-- Disregard
Circle (in.):	27	<-- Disregard

## Flange Bolt Results

Bolt Tension Capacity, **B**: 46.07 kips  
 Max Bolt directly applied T: 17.98 Kips  
 Min. PL "tc" for **B cap. w/o Pry**: 1.427 in  
 Min PL "treq" for actual **T w/ Pry**: 0.680 in  
 Min PL "t1" for actual **T w/o Pry**: 0.892 in  
 T allowable with Prying: 38.25 kips  $0 \leq \alpha \leq 1$  case  
 Prying Force, Q: 0.00 kips  
 Total Bolt Tension=T+Q: 17.98 kips  
 Prying Bolt Stress Ratio=(T+Q)/(B): 39.0% **Pass**

Rigid
Service, ASD
Fty*ASIF

Plate Data		
Diam:	30	in
Thick, t:	1	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.77	in

## Exterior Flange Plate Results

Flexural Check  
 Compression Side Plate Stress: 28.2 ksi  
 Allowable Plate Stress: 36.0 ksi  
 Compression Plate Stress Ratio: 78.4% **Pass**  
**No Prying**  
 Tension Side Stress Ratio, (treq/t)^2: 46.3% **Pass**

Rigid
Service ASD
0.75*Fy*ASIF
Comp. Y.L. Length: 12.37

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

## Stiffener Results

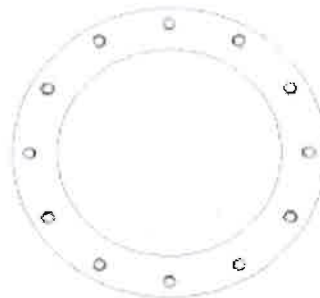
Horizontal Weld : n/a  
 Vertical Weld: n/a  
 Plate Flex+Shear, fb/Fb+(fv/Fv)^2: n/a  
 Plate Tension+Shear, ft/Ft+(fv/Fv)^2: n/a  
 Plate Comp. (AISC Bracket): n/a

## Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Diam:	24	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor	
ASIF:	1.333



\* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

\*\* Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

# Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev F

## Site Data

BU#: 822765  
 Site Name: Branford- I-95- X55- Dtn1  
 App #: 306331 Revision # 0

Manufacturer: Other

Bolt Data	
Qty:	20
Diam:	1
Bolt Material:	A325
N/A:	<-- Disregard
N/A:	<-- Disregard
Circle:	27 in

Bolt Fu:	120
Bolt Fy:	92
Bolt Fty:	44.00

## Interior Flange Bolt Results

Maximum Bolt Tension: 18.0 Kips, Ext. T=Interior T  
 Allowable Tension: 46.1 Kips  
 Bolt Stress Ratio: 39.0% **Pass**

Plate Data	
Plate Outer Diam:	29.25 in
Plate Inner Diam:	24 in (Hole @ Ctr)
Thick:	1 in
Grade:	36 ksi
Effective Width:	4.59 in

## Interior Flange Plate Results

Controlling Bolt Axial Force: 18.8 Kips, Ext. C= Interior C  
 Plate Stress: 27.6 ksi  
 Allowable Plate Stress: 36.0 ksi  
 Plate Stress Ratio: 76.7% **Pass**

## Flexural Check

Stiffener Data (Welding at Both Sides)	
Config:	0 *
Weld Type:	
Groove Depth:	in **
Groove Angle:	degrees
Fillet H. Weld:	<-- Disregard
Fillet V. Weld:	in
Width:	in
Height:	in
Thick:	in
Notch:	in
Grade:	ksi
Weld str.:	ksi

n/a

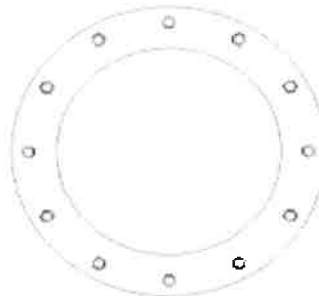
## Stiffener Results

Horizontal Weld : n/a  
 Vertical Weld: n/a  
 Plate Flex+Shear, fb/Fb+(fv/Fv)^2: n/a  
 Plate Tension+Shear, ft/Ft+(fv/Fv)^2: n/a  
 Plate Comp. (AISC Bracket): n/a

## Pole Results

Pole Punching Shear Check: n/a

Pole Data	
Pole OuterDiam:	30 in
Thick:	0.375 in
Pole Inner Diam:	29.25 in
Grade:	42 ksi
# of Sides:	0 "0" IF Round
Fu:	63 ksi



Stress Increase Factor	
ASIF:	1.333

\* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

\*\* Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

PROJECT	<b>101126.001.01 - BU#822765_Branford, CT - CCI</b>		
SUBJECT	<b>Sabre - Bridge Stiffeners @ 80 ft</b>		
DATE	<b>10-20-15</b>	PAGE	1 OF 1



Inj

**Global Section Properties:**

Step Width	3.00 in
Pole Thickness	0.38 in
Pole Grade	42.00 ksi
BS Material Grade	65.00 ksi
BS Ultimate Stress	80.00 ksi
BS Width	4.50 in
BS Thickness	1.00 in
BS Height	78.00 in
Gap	6.00 in
I	4889.21 in <sup>4</sup>
Moment	588.51 k-ft
Ybar	19.00 in
S	257.33 in <sup>3</sup>
fb	27.44 ksi
Area	4.50 in <sup>2</sup>
P	123.50 k

Axial Load	13.42 k
Number of BS	3
Bolt Circle	33
Number of Bolts	24
Bolt Size	1

Distance Between BS Welded Sections  
 Global MOI, Taken from AutoCAD  
 Moment at Flange Under Consideration  
 Dist. CL Pole to CL BS  
 Global Section Modulus; I/Ybar  
 M/S  
 BS Cross Sectional Area Below Flange  
 Load to BS

**Check Bridge Stiffener Span:**

Lu	16.00 in
ly	0.38 in <sup>4</sup>
A	4.50 in <sup>2</sup>
ry	0.2887 in
Cc	93.84414701
kl/r	55.42562584
Fa	28.81 ksi
Fa w/ 1/3 Increase	38.42 ksi

**71.43%**

**Plate Tension Analysis:**

Hole Size	1.25 in
Ag	4.50 in <sup>2</sup>
An	3.25 in <sup>2</sup>
U	1
Ae	3.25 in <sup>2</sup>
Ta (Yielding)	234.00 k
Ta (Rupture)	173.33 k
Ft (Equiv)	38.52 ksi

**71.25%**

**Moment to Existing Bolt Group:**

S <sub>BG</sub> =	296.32 in <sup>3</sup>
ft =	23.83 ksi
Ab =	.785 in <sup>2</sup>
T =	112.31 k
Arm =	33.00 in
M <sub>EQ</sub> =	308.9 k-ft

# Bolts Acting      6

<-----Insert into Crown Spreadsheet

# Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA R

## Site Data

BU#: 822765  
 Site Name: Branford- I-95- X55- Dtn1  
 App #: 306331 Revision # 0

Pole Manufacturer: Other

## Bolt Data

Qty:	24	Bolt Fu:	120
Diameter (in.):	1	Bolt Fy:	92
Bolt Material:	A325	Bolt Fty:	44.00
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle (in.):	33		

## Plate Data

Diam:	36	in
Thick, t:	1	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.93	in

## Stiffener Data (Welding at Both Sides)

Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

## Pole Data

Diam:	30	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu:	63	ksi
Reinf. Fillet Weld:	0	"0" if None

## Stress Increase Factor

ASIF:	1.333
-------	-------

Reactions		
Moment:	308.9	ft-kips
Axial:	13.422	kips
Shear:	20.825	kips
Elevation:	80	feet

If No stiffeners, Criteria: AISC ASD <-Only Applicable to Unstiff

## Flange Bolt Results

Bolt Tension Capacity, B:	46.07 kips
Max Bolt <u>directly</u> applied T:	18.16 Kips
Min. PL "tc" for B cap. w/o Pry:	1.398 in
Min PL "treq" for actual T w/ Pry:	0.668 in
Min PL "t1" for actual T w/o Pry:	0.878 in
T allowable with Prying:	38.56 kips
Prying Force, Q:	0.00 kips
Total Bolt Tension=T+Q:	18.16 kips
Prying Bolt Stress Ratio=(T+Q)/(B):	39.4% <b>Pass</b>

## Exterior Flange Plate Results

Flexural Check	
Compression Side Plate Stress:	27.9 ksi
Allowable Plate Stress:	36.0 ksi
Compression Plate Stress Ratio:	77.5% <b>Pass</b>

## No Prying

Tension Side Stress Ratio, (treq/t)^2:	44.6% <b>Pass</b>
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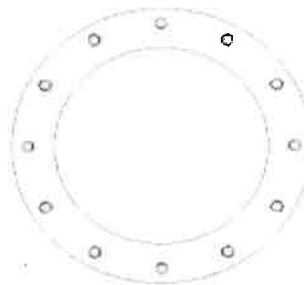
n/a

## Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

## Pole Results

Pole Punching Shear Check:	n/a
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\* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

\*\* Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

# Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev F

## Site Data

BU#: 822765  
 Site Name: Branford- I-95- X55- Dtn1  
 App #: 306331 Revision # 0

## Reactions

Moment:	308.9	ft-kips
Axial:	13.422	kips
Shear:	20.825	kips
Exterior Flange Run, T+Q:	18.16	kips

Elevation: 80 feet

Manufacturer: Other

## Bolt Data

Qty:	24	
Diam:	1	Bolt Fu: 120
Bolt Material:	A325	Bolt Fy: 92
N/A:		Bolt Fty: 44.00
N/A:		
Circle:	33	in

## Interior Flange Bolt Results

Maximum Bolt Tension: 18.2 Kips, Ext. T=Interior T  
 Allowable Tension: 46.1 Kips  
 Bolt Stress Ratio: 39.4% **Pass**

## Plate Data

Plate Outer Diam:	35.25	in
Plate Inner Diam:	30	in (Hole @ Ctr)
Thick:	1	in
Grade:	36	ksi
Effective Width:	4.61	in

## Interior Flange Plate Results

Controlling Bolt Axial Force: 19.3 Kips, Ext. C= Interior C  
 Plate Stress: 28.2 ksi  
 Allowable Plate Stress: 36.0 ksi  
 Plate Stress Ratio: 78.4% **Pass**

## Flexural Check

## Stiffener Data (Welding at Both Sides)

Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

## Stiffener Results

Horizontal Weld : n/a  
 Vertical Weld: n/a  
 Plate Flex+Shear, fb/Fb+(fv/Fv)^2: n/a  
 Plate Tension+Shear, ft/Ft+(fv/Fv)^2: n/a  
 Plate Comp. (AISC Bracket): n/a

## Pole Results

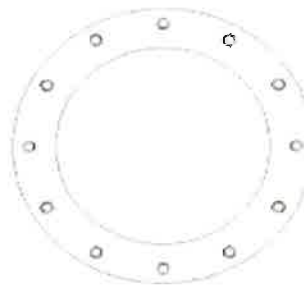
Pole Punching Shear Check: n/a

## Pole Data

Pole OuterDiam:	36	in
Thick:	0.375	in
Pole Inner Diam:	35.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

## Stress Increase Factor

ASIF: 1.333



\* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

\*\* Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

PROJECT	101126.001.01 - BU#822765_Branford, CT - CCI		
SUBJECT	Sabre - Bridge Stiffeners @ 60 ft		
DATE	10-20-15	PAGE	1 OF 1



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**Global Section Properties:**

Step Width	3.00 in
Pole Thickness	0.38 in
Pole Grade	42.00 ksi
BS Material Grade	65.00 ksi
BS Ultimate Stress	80.00 ksi
BS Width	6.00 in
BS Thickness	1.00 in
BS Height	120.00 in
Gap	6.00 in
I	7951.71 in <sup>4</sup>
Moment	1026.00 k-ft
Ybar	22.00 in
S	361.44 in <sup>3</sup>
fb	34.06 ksi
Area	6.00 in <sup>2</sup>
P	204.38 k

Axial Load	17.96 k
Number of BS	3
Bolt Circle	39
Number of Bolts	28
Bolt Size	1

Distance Between BS Welded Sections  
 Global MOI, Taken from AutoCAD  
 Moment at Flange Under Consideration  
 Dist. CL Pole to CL BS  
 Global Section Modulus; I/Ybar  
 M/S  
 BS Cross Sectional Area Below Flange  
 Load to BS

**Check Bridge Stiffener Span:**

Lu	16.00 in
ly	0.50 in <sup>4</sup>
A	6.00 in <sup>2</sup>
ry	0.2887 in
Cc	93.84414701
kl/r	55.42562584
Fa	28.81 ksi
Fa w/ 1/3 Increase	38.42 ksi

**88.66%**

**Plate Tension Analysis:**

Hole Size	1.25 in
Ag	6.00 in <sup>2</sup>
An	4.75 in <sup>2</sup>
U	1
Ae	4.75 in <sup>2</sup>
Ta (Yielding)	312.00 k
Ta (Rupture)	253.33 k
Ft (Equiv)	42.22 ksi

**80.68%**

**Moment to Existing Bolt Group:**

S <sub>BG</sub> =	407.78 in <sup>3</sup>
ft =	30.19 ksi
Ab =	.785 in <sup>2</sup>
T =	165.99 k
Arm =	39.00 in
M <sub>EQ</sub> =	539.5 k-ft

# Bolts Acting 7

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# Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA R

## Site Data

BU#: 822765  
 Site Name: Branford- I-95- X55- Dtn1  
 App #: 306331 Revision # 0

Reactions		
Moment:	539.5	ft-kips
Axial:	17.956	kips
Shear:	22.832	kips
Elevation:	60	feet

Pole Manufacturer: Other

If No stiffeners, Criteria: AISC ASD <-Only Applicable to Unstiff

## Bolt Data

Qty:	28		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		Bolt Fty:	44.00
N/A:			
Circle (in.):	39		

## Flange Bolt Results

Bolt Tension Capacity, B:	46.07 kips
Max Bolt directly applied T:	23.07 Kips
Min. PL "tc" for B cap. w/o Pry:	1.379 in
Min PL "treq" for actual T w/ Pry:	0.740 in
Min PL "t1" for actual T w/o Pry:	0.976 in
T allowable with Prying:	38.79 kips
Prying Force, Q:	0.00 kips
Total Bolt Tension=T+Q:	23.07 kips
Prying Bolt Stress Ratio=(T+Q)/(B):	50.1% <b>Pass</b>

## Plate Data

Diam:	42	in
Thick, t:	1	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.04	in

## Exterior Flange Plate Results

Flexural Check	
Compression Side Plate Stress:	34.1 ksi
Allowable Plate Stress:	36.0 ksi
Compression Plate Stress Ratio:	94.9% <b>Pass</b>

## No Prying

Tension Side Stress Ratio, (treq/t)^2: 54.8% **Pass**

## Stiffener Data (Welding at Both Sides)

Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

## Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

## Pole Results

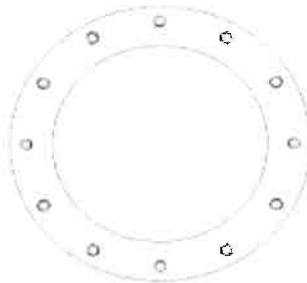
Pole Punching Shear Check: n/a

## Pole Data

Diam:	36	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

## Stress Increase Factor

ASIF:	1.333
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\* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

\*\* Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

# Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev F

## Site Data

BU#: 822765  
 Site Name: Branford- I-95- X55- Dtn1  
 App #: 306331 Revision # 0

Manufacturer: Other

Bolt Data	
Qty:	28
Diam:	1
Bolt Material:	A325
N/A:	<-- Disregard
N/A:	<-- Disregard
Circle:	39 in

Bolt Fu:	120
Bolt Fy:	92
Bolt Fty:	44.00

## Interior Flange Bolt Results

Maximum Bolt Tension: 23.1 Kips, Ext. T=Interior T  
 Allowable Tension: 46.1 Kips  
 Bolt Stress Ratio: 50.1% **Pass**

Plate Data	
Plate Outer Diam:	41.25 in
Plate Inner Diam:	36 in (Hole @ Ctr)
Thick:	1.25 in
Grade:	36 ksi
Effective Width:	4.63 in

## Interior Flange Plate Results

Controlling Bolt Axial Force: 24.4 Kips, Ext. C= Interior C  
 Plate Stress: 22.7 ksi  
 Allowable Plate Stress: 36.0 ksi  
 Plate Stress Ratio: 63.2% **Pass**

## Flexural Check

Stiffener Data (Welding at Both Sides)	
Config:	0 *
Weld Type:	
Groove Depth:	in **
Groove Angle:	degrees
Fillet H. Weld:	<-- Disregard
Fillet V. Weld:	in
Width:	in
Height:	in
Thick:	in
Notch:	in
Grade:	ksi
Weld str.:	ksi

n/a

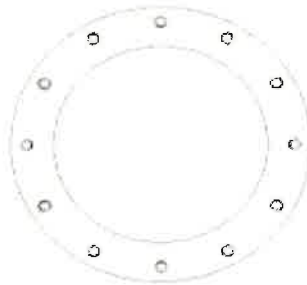
## Stiffener Results

Horizontal Weld : n/a  
 Vertical Weld: n/a  
 Plate Flex+Shear,  $f_b/F_b + (f_v/F_v)^2$ : n/a  
 Plate Tension+Shear,  $f_t/F_t + (f_v/F_v)^2$ : n/a  
 Plate Comp. (AISC Bracket): n/a

## Pole Results

Pole Punching Shear Check: n/a

Pole Data	
Pole OuterDiam:	42 in
Thick:	0.375 in
Pole Inner Diam:	41.25 in
Grade:	42 ksi
# of Sides:	0 "0" IF Round
Fu	63 ksi



Stress Increase Factor	
ASIF:	1.333

\* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

\*\* Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes



PROJECT	<b>101126.001.01 - BU#822765_Branford, CT - CCI</b>		
SUBJECT	<b>Sabre - Bridge Stiffeners @ 40 ft</b>		
DATE	<b>10-20-15</b>	PAGE	1 OF 1



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**Global Section Properties:**

Step Width	3.00 in
Pole Thickness	0.38 in
Pole Grade	42.00 ksi
BS Material Grade	65.00 ksi
BS Ultimate Stress	80.00 ksi
BS Width	6.50 in
BS Thickness	1.25 in
BS Height	150.00 in
Gap	6.00 in
I	13053.27 in <sup>4</sup>
Moment	1504.00 k-ft
Ybar	25.25 in
S	516.96 in <sup>3</sup>
fb	34.91 ksi
Area	8.13 in <sup>2</sup>
P	283.66 k

Axial Load	23.42 k
Number of BS	3
Bolt Circle	45
Number of Bolts	32
Bolt Size	1

Distance Between BS Welded Sections  
 Global MOI, Taken from AutoCAD  
 Moment at Flange Under Consideration  
 Dist. CL Pole to CL BS  
 Global Section Modulus; I/Ybar  
 M/S  
 BS Cross Sectional Area Below Flange  
 Load to BS

**Check Bridge Stiffener Span:**

Lu	16.00 in	
ly	1.06 in <sup>4</sup>	
A	8.13 in <sup>2</sup>	
ry	0.3608 in	
Cc	93.84414701	
kl/r	44.34050067	
Fa	31.54 ksi	
Fa w/ 1/3 Increase	42.06 ksi	<b>83.01%</b>

**Plate Tension Analysis:**

Hole Size	1.25 in	
Ag	8.13 in <sup>2</sup>	
An	6.56 in <sup>2</sup>	
U	1	
Ae	6.56 in <sup>2</sup>	
Ta (Yielding)	422.50 k	
Ta (Rupture)	350.00 k	
Ft (Equiv)	43.08 ksi	<b>81.05%</b>

**Moment to Existing Bolt Group:**

S <sub>BG</sub> =	580.15 in <sup>3</sup>	# Bolts Acting	8
ft =	31.11 ksi		
Ab =	.785 in <sup>2</sup>		
T =	195.47 k		
Arm =	45.00 in		
M <sub>EQ</sub> =	733.0 k-ft		

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# Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Re

## Site Data

BU#: 822765  
 Site Name: Branford- I-95- X55- Dtn1  
 App #: 306331 Revision # 0

Reactions		
Moment:	733	ft-kips
Axial:	23.416	kips
Shear:	24.926	kips
Elevation:	40	feet

Pole Manufacturer: Other

If No stiffeners, Criteria: AISC ASD <-Only Applicable to Unstiff

## Bolt Data

Qty:	32		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		Bolt Fty:	44.00
N/A:			
Circle (in.):	45		

## Flange Bolt Results

Bolt Tension Capacity, B:	46.07 kips
Max Bolt directly applied T:	23.70 Kips
Min. PL "tc" for B cap. w/o Pry:	1.365 in
Min PL "treq" for actual T w/ Pry:	0.742 in
Min PL "t1" for actual T w/o Pry:	0.979 in
T allowable with Prying:	38.95 kips
Prying Force, Q:	0.00 kips
Total Bolt Tension=T+Q:	23.70 kips
Prying Bolt Stress Ratio=(T+Q)/(B):	51.5% <b>Pass</b>

## Plate Data

Diam:	48	in
Thick, t:	1	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.12	in

## Exterior Flange Plate Results

Flexural Check	
Compression Side Plate Stress:	35.4 ksi
Allowable Plate Stress:	36.0 ksi
Compression Plate Stress Ratio:	98.4% <b>Pass</b>

## No Prying

Tension Side Stress Ratio, (treq/t)^2: 55.0% **Pass**

## Stiffener Data (Welding at Both Sides)

Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

## Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

## Pole Results

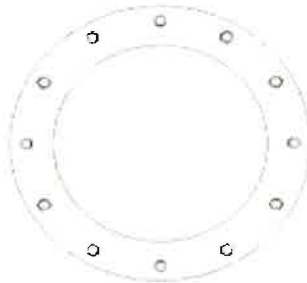
Pole Punching Shear Check: n/a

## Pole Data

Diam:	42	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

## Stress Increase Factor

ASIF:	1.333
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\* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

\*\* Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

# Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev F

## Site Data

BU#: 822765  
 Site Name: Branford- I-95- X55- Dtn1  
 App #: 306331 Revision # 0

Manufacturer: **Other**

Bolt Data	
Qty:	32
Diam:	1
Bolt Material:	A325
N/A:	<-- Disregard
N/A:	<-- Disregard
Circle:	45 in

Bolt Fu:	120
Bolt Fy:	92
Bolt Fty:	44.00

## Interior Flange Bolt Results

Maximum Bolt Tension: 23.7 Kips, Ext. T=Interior T  
 Allowable Tension: 46.1 Kips  
 Bolt Stress Ratio: 51.5% **Pass**

Plate Data	
Plate Outer Diam:	47.25 in
Plate Inner Diam:	42 in (Hole @ Ctr)
Thick:	1.25 in
Grade:	36 ksi
<b>Effective Width:</b>	4.64 in

## Interior Flange Plate Results

Controlling Bolt Axial Force: 25.2 Kips, Ext. C= Interior C  
 Plate Stress: 23.4 ksi  
 Allowable Plate Stress: 36.0 ksi  
 Plate Stress Ratio: 65.1% **Pass**

## Flexural Check

Stiffener Data (Welding at Both Sides)	
Config:	0 *
Weld Type:	
Groove Depth:	in **
Groove Angle:	degrees
Fillet H. Weld:	<-- Disregard
Fillet V. Weld:	in
Width:	in
Height:	in
Thick:	in
Notch:	in
Grade:	ksi
Weld str.:	ksi

n/a

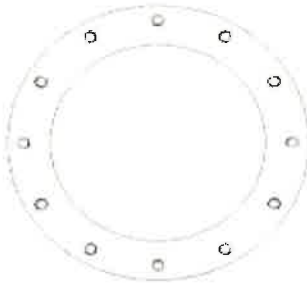
## Stiffener Results

Horizontal Weld : n/a  
 Vertical Weld: n/a  
 Plate Flex+Shear, fb/Fb+(fv/Fv)^2: n/a  
 Plate Tension+Shear, ft/Ft+(fv/Fv)^2: n/a  
 Plate Comp. (AISC Bracket): n/a

## Pole Results

Pole Punching Shear Check: n/a

Pole Data	
Pole OuterDiam:	48 in
Thick:	0.375 in
Pole Inner Diam:	47.25 in
Grade:	42 ksi
# of Sides:	0 "0" IF Round
Fu	63 ksi



Stress Increase Factor	
ASIF:	1.333

\* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

\*\* Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

PROJECT	<b>101126.001.01 - BU#822765_Branford, CT - CCI</b>		
SUBJECT	<b>Sabre - Bridge Stiffeners @ 20 ft</b>		
DATE	<b>10-20-15</b>	PAGE	1 OF 1



Inj

**Global Section Properties:**

Step Width	3.00 in
Pole Thickness	0.38 in
Pole Grade	42.00 ksi
BS Material Grade	65.00 ksi
BS Ultimate Stress	80.00 ksi
BS Width	8.50 in
BS Thickness	1.25 in
BS Height	186.00 in
Gap	6.00 in
I	20230.93 in <sup>4</sup>
Moment	2022.00 k-ft
Ybar	28.25 in
S	716.14 in <sup>3</sup>
fb	33.88 ksi
Area	10.63 in <sup>2</sup>
P	359.99 k

Axial Load	29.80 k
Number of BS	3
Bolt Circle	51
Number of Bolts	36
Bolt Size	1

Distance Between BS Welded Sections  
 Global MOI, Taken from AutoCAD  
 Moment at Flange Under Consideration  
 Dist. CL Pole to CL BS  
 Global Section Modulus; I/Ybar  
 M/S  
 BS Cross Sectional Area Below Flange  
 Load to BS

**Check Bridge Stiffener Span:**

Lu	16.00 in
ly	1.38 in <sup>4</sup>
A	10.63 in <sup>2</sup>
ry	0.3608 in
Cc	93.84414701
kl/r	44.34050067
Fa	31.54 ksi
Fa w/ 1/3 Increase	42.06 ksi

**80.56%**

**Plate Tension Analysis:**

Hole Size	1.19 in
Ag	10.63 in <sup>2</sup>
An	9.14 in <sup>2</sup>
U	1
Ae	9.14 in <sup>2</sup>
Ta (Yielding)	552.50 k
Ta (Rupture)	487.50 k
Ft (Equiv)	45.88 ksi

**73.84%**

**Moment to Existing Bolt Group:**

S <sub>BG</sub> =	793.37 in <sup>3</sup>	# Bolts Acting	9
ft =	30.58 ksi		
Ab =	.785 in <sup>2</sup>		
T =	216.18 k		
Arm =	51.00 in		
M <sub>EQ</sub> =	918.8 k-ft		

<-----Insert into Crown Spreadsheet

# Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Re

## Site Data

BU#: 822765  
 Site Name: Branford- I-95- X55- Dtn1  
 App #: 306331 Revision # 0

Reactions		
Moment:	918.8	ft-kips
Axial:	29.8	kips
Shear:	26.954	kips
Elevation:	20	feet

Pole Manufacturer: Other

If No stiffeners, Criteria: AISC ASD <-Only Applicable to Unstiff

## Bolt Data

Qty:	36		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		Bolt Fty:	44.00
N/A:			
Circle (in.):	51		

## Flange Bolt Results

Bolt Tension Capacity, B:	46.07 kips
Max Bolt directly applied T:	23.19 Kips
Min. PL "tc" for B cap. w/o Pry:	1.354 in
Min PL "treq" for actual T w/ Pry:	0.727 in
Min PL "t1" for actual T w/o Pry:	0.961 in
T allowable with Prying:	39.09 kips
Prying Force, Q:	0.00 kips
Total Bolt Tension=T+Q:	23.19 kips
Prying Bolt Stress Ratio=(T+Q)/(B):	50.3% <b>Pass</b>

## Plate Data

Diam:	54	in
Thick, t:	1	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.19	in

## Exterior Flange Plate Results

Flexural Check	
Compression Side Plate Stress:	34.7 ksi
Allowable Plate Stress:	36.0 ksi
Compression Plate Stress Ratio:	96.5% <b>Pass</b>

## Stiffener Data (Welding at Both Sides)

Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

## No Prying

Tension Side Stress Ratio, (treq/t)^2: 52.9% **Pass**

n/a

## Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

## Pole Results

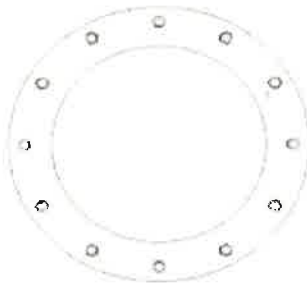
Pole Punching Shear Check: n/a

## Pole Data

Diam:	48	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

## Stress Increase Factor

ASIF:	1.333
-------	-------



\* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

\*\* Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

# Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev F

## Site Data

BU#: 822765  
 Site Name: Branford- I-95- X55- Dtn1  
 App #: 306331 Revision # 0

Manufacturer: Other

Bolt Data	
Qty:	36
Diam:	1
Bolt Material:	A325
N/A:	<-- Disregard
N/A:	<-- Disregard
Circle:	51 in

Bolt Fu:	120
Bolt Fy:	92
Bolt Fty:	44.00

Reactions	
Moment:	918.8 ft-kips
Axial:	29.8 kips
Shear:	26.954 kips
Exterior Flange Run, T+Q:	23.19 kips

Elevation: 20 feet

## Interior Flange Bolt Results

Maximum Bolt Tension: 23.2 Kips, Ext. T=Interior T  
 Allowable Tension: 46.1 Kips  
 Bolt Stress Ratio: 50.3% **Pass**

Plate Data	
Plate Outer Diam:	53.25 in
Plate Inner Diam:	48 in (Hole @ Ctr)
Thick:	1.25 in
Grade:	36 ksi
Effective Width:	4.65 in

## Interior Flange Plate Results

Controlling Bolt Axial Force: 24.8 Kips, Ext. C= Interior C  
 Plate Stress: 23.1 ksi  
 Allowable Plate Stress: 36.0 ksi  
 Plate Stress Ratio: 64.2% **Pass**

## Flexural Check

Stiffener Data (Welding at Both Sides)	
Config:	0 *
Weld Type:	
Groove Depth:	in **
Groove Angle:	degrees
Fillet H. Weld:	<-- Disregard
Fillet V. Weld:	in
Width:	in
Height:	in
Thick:	in
Notch:	in
Grade:	ksi
Weld str.:	ksi

n/a

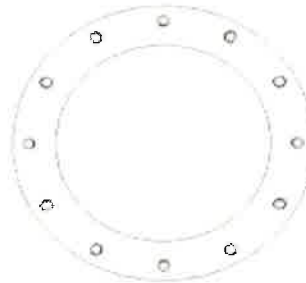
## Stiffener Results

Horizontal Weld : n/a  
 Vertical Weld: n/a  
 Plate Flex+Shear, fb/Fb+(fv/Fv)^2: n/a  
 Plate Tension+Shear, ft/Ft+(fv/Fv)^2: n/a  
 Plate Comp. (AISC Bracket): n/a

## Pole Results

Pole Punching Shear Check: n/a

Pole Data	
Pole OuterDiam:	54 in
Thick:	0.375 in
Pole Inner Diam:	53.25 in
Grade:	42 ksi
# of Sides:	0 "0" IF Round
Fu:	63 ksi



Stress Increase Factor	
ASIF:	1.333

\* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

\*\* Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

# Anchor Rod Information for TIA/EIA-222-F and TIA-222-G-2



Site Information	
ID:	822765
Name:	Branford- I-95- X55- Dtm1
App. #:	306331 Revision # 0

Base Reactions	
Moment:	2577 ft-kip
Axial:	37 kip
Shear:	29 kip
Base Plate Type:	Circular

Design Information	
TIA Code:	F
ASIF:	1.333
Failure:	99%
eta Factor:	0.50

Original Anchor Rod Data	
Quantity:	48
Diameter:	1.00 in
Material:	A687
Bolt Circle:	57.0 in
Bolt Spacing:	37.70 in
Bolt Group Area:	15311 in <sup>2</sup>
Bolt Group MOIx:	in <sup>4</sup>

Reactions Seen by Original AR Group

Moment:	1641.0 kip-ft
Axial:	37.2 kip
Shear:	29.0 kip

Original AR Capacity Check

Tension Load:	28.0 kip
Allowable load:	50.9 kip
AR Capacity:	55.0% <b>Pass</b>

First Added Anchor Rod Data	
Quantity:	8
Diameter:	1.75 in
Material:	A193 B7
Bolt Circle:	60.3 in
Bolt Group Area:	19.24 in <sup>2</sup>
Bolt Group MOIx:	8731 in <sup>4</sup>

Reactions Seen by First Added AR Group

Moment:	935.8 kip-ft
Axial:	0.0 kip
Shear:	0.0 kip

First Added AR Capacity Check

Tension Load:	93.2 kip
Allowable load:	132.3 kip
AR Capacity:	70.5% <b>Pass</b>

Second Added Anchor Rod Data	
Quantity:	
Diameter:	in
Material:	
Bolt Circle:	in
Bolt Group Area:	0.00 in <sup>2</sup>
Bolt Group MOIx:	0 in <sup>4</sup>

Reactions Seen by Second Added AR Group

Moment:	0.0 kip-ft
Axial:	0.0 kip
Shear:	0.0 kip

Second Added AR Capacity Check

Tension Load:	0.0 kip
Allowable load:	0.0 kip
AR Capacity:	0.0%

Third Added Anchor Rod Data	
Quantity:	
Diameter:	in
Material:	
Bolt Circle:	in
Bolt Group Area:	0.00 in <sup>2</sup>
Bolt Group MOIx:	0 in <sup>4</sup>

Reactions Seen by Second Added AR Group

Moment:	0.0 kip-ft
Axial:	0.0 kip
Shear:	0.0 kip

Second Added AR Capacity Check

Tension Load:	0.0 kip
Allowable load:	0.0 kip
AR Capacity:	0.0%

# Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

## TIA Rev F

### Site Data

BU#:	822765
Site Name:	Branford- I-95- X55- Dtn1
App #:	306331 Revision # 0
Pole Manufacturer:	Other

Reactions		
Moment:	1641.0077	ft-kips
Axial:	37.1886	kips
Shear:	28.952411	kips

### Anchor Rod Data

Qty:	48	
Diam:	1	in
Rod Material:	Other	
Strength (Fu):	150	ksi
Yield (Fy):	105	ksi
Bolt Circle:	57	in

If No stiffeners, Criteria: **AISC ASD** <-Only Applicable to Unstiffened Cases

### Anchor Rod Results

Maximum Rod Tension:	28.0 Kips
Allowable Tension:	51.8 Kips
Anchor Rod Stress Ratio:	54.1% <b>Pass</b>

Stiffened
Service, ASD
Fty*ASIF

### Plate Data

Diam:	60.125	in
Thick:	1	in
Grade:	36	ksi
Single-Rod B-eff:	3.53	in

### Base Plate Results

Base Plate Stress:	34.0 ksi	Flexural Check
Allowable Plate Stress:	36.0 ksi	
Base Plate Stress Ratio:	94.4% <b>Pass</b>	

Stiffened
Service, ASD
0.75*Fy*ASIF
Y.L. Length:
N/A, Roark

### Stiffener Data (Welding at both sides)

Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.375	in
Width:	3	in
Height:	5	in
Thick:	0.625	in
Notch:	0	in
Grade:	36	ksi
Weld str.:	70	ksi

### Stiffener Results

Horizontal Weld :	44.8% <b>Pass</b>
Vertical Weld:	33.0% <b>Pass</b>
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	27.4% <b>Pass</b>
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	38.9% <b>Pass</b>
Plate Comp. (AISC Bracket):	71.2% <b>Pass</b>

### Pole Results

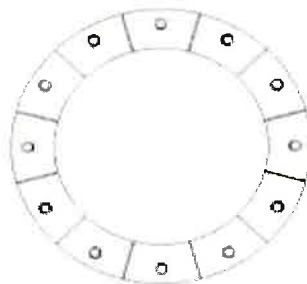
Pole Punching Shear Check:	19.5% <b>Pass</b>
----------------------------	-------------------

### Pole Data

Diam:	54	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

### Stress Increase Factor

ASIF:	1.333
-------	-------



\* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

\*\* Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes





Site Number	822765
Site Name	Branford- I-95- X55- Dtn1

# Caisson Analysis

Pier Properties		Analysis Properties	
Moment	2577 kip-ft	TIA Code	F
Shear	29 kip	Soil Safety Factor	2.00
Pier Diameter	6.0 ft	Water Table Depth	99.0 ft
Height Above Grade	0.50 ft	Ignored Soil Depth	3.3 ft
Depth Below Grade	21.00 ft	Cohesion Based on	PLS Caisson
Donut Diameter	ft	Max Soil Capacity	105%
Donut Depth	ft		

Soil Properties						
Layer	Top of Soil Layer (ft)	Layer Thickness (ft)	Bottom of Soil Layer (ft)	Soil Unit Weight (pcf)	Cohesion (psf)	Friction Angle (degrees)
<i>Soil.Layer</i>	<i>Soil.Top</i>	<i>Soil.Thick</i>	<i>Soil.Bottom</i>	<i>Soil.Weight</i>	<i>Soil.Cohesion</i>	<i>Soil.Phi</i>
1	0.00	3.33	3.33	120	1000	
2	3.33	7.67	11.00	120		34
3	11.00	10	21.00	130		33
4						
5						
6						
7						
8						
9						
10						

Critical Depths Below Grade		Results	
Rotation Axis	15.32 ft	Soil Capacity	95.8% <b>OK</b>
Zero Shear	5.19 ft	Max Pier Moment	2717 kip-ft

Moment At User Defined Depths Below Grade	
Moment @ 11.7'	2146 kip-ft
	kip-ft
	kip-ft

## Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

**Note:** Shaft assumed to have ties, not spiral, transverse reinforcing

### Site Data

BU#: 822765  
 Site Name: Branford- I-95- X55- Dtn1  
 App #: 306331 Revision # 0

Enter Load Factors Below:

For M (WL)	1.3	<---- Enter Factor
For P (DL)	1.3	<---- Enter Factor

### Pier Properties

#### Concrete:

Pier Diameter = 6.0 ft  
 Concrete Area = 4071.5 in<sup>2</sup>

#### Reinforcement:

Clear Cover to Tie = 3.00 in  
 Horiz. Tie Bar Size = 5  
 Vert. Cage Diameter = Multiple ft  
 Vert. Cage Diameter = Multiple in  
**Vertical** Bar Size = Multiple  
 Bar Diameter = Multiple in  
 Bar Area = Multiple in<sup>2</sup>  
 Number of Bars = 27  
 As Total = 30.75 in<sup>2</sup>  
 A s/ Aconc, Rho: 0.0076 0.76%

ACI 10.5 , ACI 21.10.4, and IBC 1810.

Min As for Flexural, Tension Controlled, Shafts:

$(3) * (\text{sqrt}(f'c) / F_y) = 0.0032$   
 $200 / F_y = 0.0033$

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.76%	<b>OK</b>

Ref. Shaft Max Axial Capacities, $\phi$ Max(Pn or Tn):		
Max Pu = ( $\phi=0.65$ ) Pn		
Pn per ACI 318 (10-2)	8103.45	kips
at Mu=( $\phi=0.65$ )Mn=	4152.38	ft-kips
Max Tu, ( $\phi=0.9$ ) Tn =	1660.5	kips
at Mu= $\phi=(0.90)$ Mn=	0.00	ft-kips

### Maximum Shaft Superimposed Forces

TIA Revision:	F	
Max. Service Shaft M:	2716.569	ft-kips (* Note)
Max. Service Shaft P:	37.1886	kips
Max Axial Force Type:	Comp.	

(\* Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

### Load Factor Shaft Factored Loads

Load Factor	Mu:	3531.539	ft-kips
1.30	Pu:	48.34518	kips
1.30			

### Material Properties

Concrete Comp. strength, f'c =	4000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	

### ACI 318 Code

Select Analysis ACI Code = 2002

### Seismic Properties

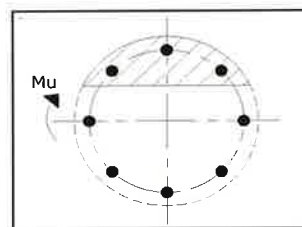
Seismic Design Category = B  
 Seismic Risk = Low

Solve  
(Run)

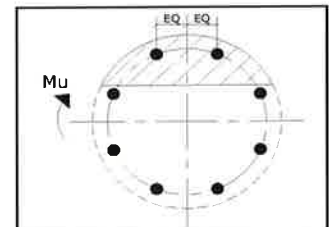
<-- Press Upon Completing All Input

### Results:

Governing Orientation Case: 2



Case 1



Case 2

Dist. From Edge to Neutral Axis: 12.50 in

Extreme Steel Strain,  $\epsilon_t$ : 0.0132

$\epsilon_t > 0.0050$ , Tension Controlled

Reduction Factor,  $\phi$ : 0.900

Output Note: Negative Pu=Tension

For Axial Compression,  $\phi$  Pn = Pu: 48.35 kips  
 Drilled Shaft Moment Capacity,  $\phi$ Mn: 4157.62 ft-kips  
 Drilled Shaft Superimposed Mu: 3531.54 ft-kips

(Mu/ $\phi$ Mn, Drilled Shaft Flexure CSR): 84.9%

# Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

**Note:** Shaft assumed to have ties, not spiral, transverse reinforcing

## Site Data

BU#: 822765  
 Site Name: Branford- I-95- X55- Dtn1  
 App #: 306331 Revision # 0

Enter Load Factors Below:		
For M (WL)	1.3	<---- Enter Factor
For P (DL)	1.3	<---- Enter Factor

Pier Properties	
<b>Concrete:</b>	
Pier Diameter =	6.0 ft
Concrete Area =	4071.5 in <sup>2</sup>
<b>Reinforcement:</b>	
Clear Cover to Tie=	3.00 in
Horiz. Tie Bar Size=	5
Vert. Cage Diameter =	5.30 ft
Vert. Cage Diameter =	63.62 in
Vertical Bar Size =	9
Bar Diameter =	1.13 in
Bar Area =	1 in <sup>2</sup>
Number of Bars =	24
As Total=	24 in <sup>2</sup>
A s/ Aconc, Rho:	0.0059 0.59%

Maximum Shaft Superimposed Forces		
TIA Revision:	F	
Max. Service Shaft M:	2145.551	ft-kips (* Note)
Max. Service Shaft P:	37.1886	kips
Max Axial Force Type:	Comp.	

(\* Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Load Factor	Shaft Factored Loads	
1.30	Mu:	2789.217 ft-kips
1.30	Pu:	48.34518 kips

Material Properties		
Concrete Comp. strength, f'c =	4000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	
ACI 318 Code		
Select Analysis ACI Code=	2002	
Seismic Properties		
Seismic Design Category =	B	
Seismic Risk =	Low	

Solve (Run) <-- Press Upon Completing All Input

ACI 10.5 , ACI 21.10.4, and IBC 1810.  
 Min As for Flexural, Tension Controlled, Shafts:

$$(3) * (\text{sqrt}(f'c) / Fy) = 0.0032$$

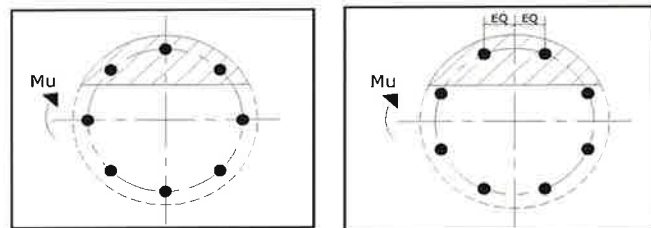
$$200 / Fy = 0.0033$$

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.59%	<b>OK</b>

## Results:

Governing Orientation Case: 1



Case 1

Case 2

Dist. From Edge to Neutral Axis: 10.40 in

Extreme Steel Strain, et: 0.0166

**et > 0.0050, Tension Controlled**

Reduction Factor, φ: 0.900

Ref. Shaft Max Axial Capacities, φ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn		
Pn per ACI 318 (10-2)	7904.79	kips
at Mu=(φ=0.65)Mn=	4129.80	ft-kips
Max Tu, (φ=0.9) Tn =	1296	kips
at Mu=φ=(0.90)Mn=	0.00	ft-kips

Output Note: Negative Pu=Tension  
 For Axial Compression, φ Pn = Pu: 48.35 kips  
 Drilled Shaft Moment Capacity, φMn: 3375.21 ft-kips  
 Drilled Shaft Superimposed Mu: 2789.22 ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR): 82.6%

**APPENDIX D**  
**TOWER MODIFICATION DRAWINGS**

# TOWER MODIFICATION DRAWINGS PREPARED FOR: CROWN CASTLE

## PROJECT CONTACTS:

### 1. CROWN PROJECT MANAGER

DAN VADNEY  
(518) 373-3510  
DAN.VADNEY@CROWNCASTLE.COM

### 2. CROWN CONSTRUCTION MANAGER

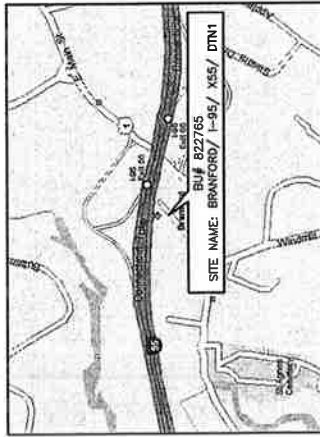
JASON D'AMICO  
(860) 209-0104  
JASON.D'AMICO.VENDOR@CROWNCASTLE.COM

### 3. B+T GROUP RFI CONTACT

ROBBIE FRAZIER  
(918) 587-4630  
RFRAZIER@BTGRP.COM  
MODDWGS@BTGRP.COM  
1717 S BOULDER AVENUE, SUITE 300  
TULSA, OK 74119

SITE NAME: BRANFORD/ I-95/ X55/ DTN1  
BU NUMBER: 822765

SITE ADDRESS:  
10 SYLVIA ST.  
BRANFORD, CT 06405  
NEW HAVEN COUNTY, USA



## MAP

## DIRECTIONS

I-95 N TO EXIT 55 TOWARD N BRANFORD, TURN LEFT ONTO U.S. 1 S/E MAIN ST., TURN RIGHT ONTO SYLVIA ST (SITE WILL BE ON THE LEFT).

## TOWER INFORMATION

TOWER MANUFACTURER / DWG #: PIROD / 204417 B  
TOWER HEIGHT / TYPE: 125' MONOPOLE  
TOWER LOCATION: LAT. 41° 17' 38.08"  
LONG. -72° 47' 8.624"  
ELEV. 54 FT AMSL  
STRUCTURAL DESIGN DRAWING REPORT: B+T GROUP / WO. # 1119032  
STRUCTURAL ANALYSIS REPORT: CROWN CASTLE / WO. # 1103436  
APPLICATION ID / REVISION #: 306331 / 0  
C/SITES DOCUMENT ID: 5849697

## CODE COMPLIANCE

THIS REINFORCEMENT DESIGN IS PERFORMED IN ACCORDANCE WITH THE TIA/IEA-222-F STANDARD AND 2005 CT STATE BUILDING CODE WITH 2009 AMENDMENT BASED UPON A WIND SPEED OF 65 MPH FASTEST MILE.

## DRAWINGS INCLUDED

SHEET NUMBER	DESCRIPTION
S1	TITLE SHEET
S2	MODIFICATION INSPECTION NOTES AND CHECKLIST
S3	GENERAL NOTES, NG2 BOLT NOTES AND DETAILS
S4	FORGBOLT NOTES AND DETAILS
S5	TOWER ELEV., SCHEDULES & TX LINE DIST. DIAG.
S6	TOWER SECTION (0'-28.5') AND TRANSITION STIFFENER DETAIL
S7	FLAT PLATE REINFORCEMENT SCHEDULE AND TOWER SECTION (20.5'-46.5')
S8	FLAT PLATE REINFORCEMENT SCHEDULE AND TOWER SECTIONS (40.5'-65.5' AND 60.5'-75.5')
S9	FLAT PLATE BRIDGE STIFFENER DETAIL, SCHEDULE AND TOWER SECTION AT 80'
D1	DETAILS
D2	PART DETAILS
D3	PART DETAILS
D4	PART DETAILS



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

**CROWN  
CASTLE**

REV	DATE	DESCRIPTION
0	10/27/15	ISSUED FOR CONSTRUCTION

PROJECT NO: 101726.001.01  
PROJECT ENG: ROBBIE FRAZIER  
DRAWN BY: RA  
CHECKED BY: NGN

B+T ENGINEERING, INC.  
PEC 0001564  
Expires 02/10/18



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE APPROVED BY THE BOARD OF C.E.A. TO SIGN OR SEAL THIS DOCUMENT AFTER THE DOCUMENT.

BRANFORD/ I-95/ X55/ DTN1  
822765

10 SYLVIA ST.  
BRANFORD, CT  
EXISTING 125' MONOPOLE

SHEET TITLE  
TITLE SHEET

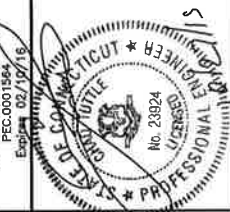
SHEET NUMBER: **S1**  
REVISION: **0**

**B+B GRP**  
1717 S BOLLINGER AVE  
SUITE 300  
LITTLE ROCK, AR 72103  
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**CROWN CASTLE**

REV	DATE	DESCRIPTION
0	10/27/19	ISSUED FOR CONSTRUCTION

PROJECT NO: 19126.001.01  
PROJECT ENG: ROBBIE FRAUHER  
DRAWN BY: RA  
CHECKED BY: NSN



B+B ENGINEERING, INC.  
PEC-0001564  
Expire 02/19/21

IF A VALIDATION OF JMW FOR ANY REVISIONS OF A LICENSED PROFESSIONAL ENGINEER TO SIGN THIS DOCUMENT.

BRANFORDY I-957 X557 DTM1  
822765  
10 SIVA ST  
BRANFORD, CT  
EXISTING 125' MONOPOLE

SHEET TITLE  
MODIFICATION INSPECTION NOTES AND CHECKLIST

SHEET NUMBER  
S2  
REVISIONS  
0

**MI INSPECTOR**  
THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS

THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN.

**GENERAL CONTRACTOR**  
THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION ON TURNKEY PROJECT TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE MI INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND ENG-SOW-10007.

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

- IT IS SUGGESTED THAT THE GC 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 SHOULD 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.
- IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS AND MI INSPECTION(S) TO COMMENCE WITH FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
- IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY 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.

**CANCELLATION OR DELAYS IN SCHEDULED MI**  
IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

**CORRECTION OF INSTALLING MI'S**  
IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI (FAILED MI), THE GC SHALL WORK WITH CROWN TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

- CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS. CORRECTIVE ACTION ELEMENTS SHALL BE SUBMITTED WITH THE COR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION.

**MI VERIFICATION INSPECTIONS**  
CROWN RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.

VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEW/AESV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING MI" OR "PASS AS NOTED MI" REPORT FOR THE ORIGINAL PROJECT.

**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
- BOLT INSTALLATION AND TORQUE
- FINAL INSTALLED CONDITION
- SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
- FINAL INFELD CONDITION

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

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG-SOW-10007.

**MI CHECKLIST**

REQUIRED	REPORT ITEM	BRIEF DESCRIPTION
		<b>PRE-CONSTRUCTION</b>
X	MI CHECKLIST DRAWING	THIS CHECKLIST SHALL BE INCLUDED IN THE MI REPORT. ONCE THE PRE-MODIFICATION MAPPING IS COMPLETE AND PRIOR TO FABRICATION, THE CONTRACTOR SHALL PROVIDE DETAILED ASSEMBLY DRAWINGS AND/OR SHOP DRAWINGS AS NECESSARY FOR NON-STANDARD PARTS. THESE ARE TO INCLUDE, BUT ARE NOT LIMITED TO, A VISUAL LAYOUT OF NEW REINFORCEMENT, EXISTING REINFORCEMENT CONFIGURATION, PORTHOLES, 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 GC FOR APPROVAL. APPROVED ASSEMBLY/SHOP DRAWINGS SHALL BE SUBMITTED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATION INSPECTION	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	A VISUAL OBSERVATION BY A CWI OF A PORTION OF THE PROPOSED STRUCTURAL MEMBERS IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	MATERIAL TEST REPORT (MTR)	MILL CERTIFICATION SHALL BE PROVIDED FOR ALL STEEL AS SPECIFIED IN THE MODIFICATION DRAWINGS AND THIS DOCUMENTATION SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FABRICATOR NDE INSPECTION	CRITICAL SHOP WELDS THAT REQUIRE TESTING (PER ENG-STD-10069) ARE NOTED ON THESE CONTRACT DRAWINGS. A CERTIFIED WELD INSPECTOR SHALL PERFORM NON-DESTRUCTIVE EXAMINATION AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	NDE REPORT OF MONOPOLE BASE PLATE	A NDE (PER ENG-SOW-10033) 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	THE MATERIAL SHIPPING LIST SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
		<b>CONSTRUCTION (PERFORMED BY CONTRACTOR)</b>
X	CONSTRUCTION INSPECTIONS	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THESE CONTRACT DRAWINGS.
N/A	FOUNDATION INSPECTIONS	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACING THE CONCRETE. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	CONCRETE COMP. STRENGTH AND SLUMP TESTS	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	POST INSTALLED ANCHOR ROD VERIFICATION	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.
N/A	BASE PLATE GROUT VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR THAT CERTIFIES THAT THE GROUT WAS INSTALLED IN ACCORDANCE WITH CROWN ENG-PRC-10012 FOR INCLUSION IN THE MI REPORT.
X	CONTRACTOR'S CERTIFIED WELD INSPECTION	A CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST AS NECESSARY ALL FIELD WELDS. CWI SHALL FOLLOW ALL THE PROCEDURES SPECIFIED IN CROWN STANDARD DOCUMENTS ENG-SOW-10066, ENG-STD-10069 AND SRV-STD-10159. A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT. FULL PENETRATION WELDS IN THE VICINITY OF BASE OF THE TOWER ARE REQUIRED TO BE 100% NDE INSPECTED. BUT IN ACCORDANCE WITH AEW/AESV CONTRACT DOCUMENTS, ALL WELDS IN THE VICINITY OF BASE OF THE TOWER ARE REQUIRED TO BE 50% NDE INSPECTED BY MP IN ACCORDANCE WITH AWS D1.1.
N/A	EARTHWORK: LIFT AND DENSITY	FOUNDATION SUB-GRADES SHALL BE INSPECTED AND APPROVED BY A GEOTECHNICAL ENGINEER AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	ON SITE COLD GALVANIZING VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY ON-SITE COLD GALVANIZING WAS APPLIED IN ACCORDANCE WITH ENG-BUL-10149.
N/A	GUY WIRE TENSION REPORT	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT TO THE MI INSPECTOR INDICATING THE TEMPERATURE AND TENSION IN EVERY GUY CABLE AS PART OF PLUMB AND TENSION PROCEDURE FOR INCLUSION IN THE MI REPORT.
X	GC AS-BUILT DOCUMENTS	THE GENERAL CONTRACTOR SHALL SUBMIT A COPY OF THE CONTRACT DRAWINGS EITHER STATING "INSTALLED AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINEER OF RECORD.
		<b>POST-CONSTRUCTION</b>
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACTORS REDLINE DRAWING AND THE ACTUAL COMPLETED INSTALLATION.
X	POST INSTALLED ANCHOR ROD PULL-OUT TESTING	POST-INSTALLED ANCHOR RODS SHALL BE TESTED IN ACCORDANCE WITH ENG-PRC-10119 AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PHOTOGRAPHS	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI WHICH DOCUMENT ALL PHASES OF THE CONSTRUCTION. THE PHOTOS SHALL BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
		ADDITIONAL TESTING AND INSPECTIONS:

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE MI REPORT AND N/A DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT

**MODIFICATION INSPECTION NOTES:**

**GENERAL**  
THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE ENGINEER OF RECORD (EOR). THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY, AND IS NOT A REVIEW OF THE MODIFICATION DESIGN (ITSELF NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES. ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-BUL-10173 LIST OF 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 EARLY AS POSSIBLE. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN POINT OF CONTACT (POC).

REFER TO ENG-SOW-10007 : MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.



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SUITE 300  
TULSA, OK 74119  
918.465.0650  
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**CROWN  
CASTLE**

REV	DATE	DESCRIPTION
0	10/27/15	ISSUED FOR CONSTRUCTION

PROJECT NO: 101128.091.01  
PROJECT ENG: ROBBIE FRAZER  
DRAWN BY: RA  
CHECKED BY: NEN



IF IT IS A VIOLATION OF LAW FOR ANY REASON,  
THIS SEAL IS NOT VALID FOR ANY PURPOSE,  
UNLESS IT IS USED IN ACCORDANCE WITH THE  
STATE BOARD OF PROFESSIONAL ENGINEERS.  
ALSO SEE 500.000000

BRANFORD/1-957 X567 DTM1  
B22765  
19 S.W. 10A ST.  
BRANFORD, CT  
EXISTING 125 MONOPOLE

SHEET TITLE  
GENERAL NOTES, NG2 BOLT  
NOTES AND DETAILS

SHEET NUMBER: **S3**  
REVISION: **0**

**GENERAL NOTES**

- 1.1 ALL WORK SHALL COMPLY WITH THE TIA/EIA-222-F STANDARD AS WELL AS ALL OTHER APPLICABLE STANDARDS.
- 1.2 FIELD WORK WILL BE DONE AROUND EXISTING COAXIAL CABLE AND EQUIPMENT. ALL WORK SHALL BE DONE IN A MANNER SUCH THAT NO DAMAGE OCCURS TO THE EXISTING EQUIPMENT OR THE STRUCTURE.
- 1.3 ALL EXISTING AND NEW COATS OF ZINCA COLD GALVANIZING COMPOUND (OR APPROVED EQUIVALENT) SHALL BE APPLIED TO ANY FIELD CUTS OR FIELD DRILLED HOLES.
- 1.4 THE USE OF A GAS TORCH OR WELDER WILL NOT BE PERMITTED ON THE TOWER WITHOUT THE CONSENT OF THE OWNER.
- 1.5 ALL WORK SHALL BE PERFORMED BY AN ENGINEER LICENSED IN THE STATE THE TOWER IS LOCATED. THE ANALYSIS SHALL USE A MINIMUM WIND SPEED OF 45 mph (3-SEC) PER TIA-1019.
- 1.6 ALL CONSTRUCTION MEANS AND METHODS, INCLUDING BUT NOT LIMITED TO THE USE OF CRANES, SHALL BE APPROVED BY THE GENERAL CONTRACTOR. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE GENERAL CONTRACTOR FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/TIA-1019 (LATEST EDITION), OSHA AND GENERAL INDUSTRY STANDARDS. ALL RIGGING PLANS SHALL ADHERE TO ANSI/TIA-1019 (LATEST EDITION) INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION.

**FABRICATION**

- 2.1 ALL WORK SHALL BE DONE IN ACCORDANCE WITH A.I.S.C. SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS.
- 2.2 STRUCTURAL STEEL SHALL MEET THE FOLLOWING SPECIFICATIONS:

YIELD: **ASTM SPECS**  
A. STEEL SHAPES AND PLATES, U.N.O. 65ksi A572  
B. STEEL PIPE 50ksi

- 2.3 ALL NEW MATERIAL INCLUDING STRUCTURAL STEEL AND FASTENERS SHALL BE PROVIDED BY THE CONTRACTOR FOR FABRICATION IN ACCORDANCE WITH ASTM A133 AND A153.
- 2.4 WELDING SHALL MEET ANSI/AWS D1.1 STRUCTURAL WELDING CODE (LATEST REVISION). ELECTRODES SHALL BE E80 SERIES.
- 2.5 CONTRACTOR SHALL PROVIDE SHOP FABRICATION DRAWINGS TO B+T GROUP 5 DAYS PRIOR TO FABRICATION.

**KEY NOTES**

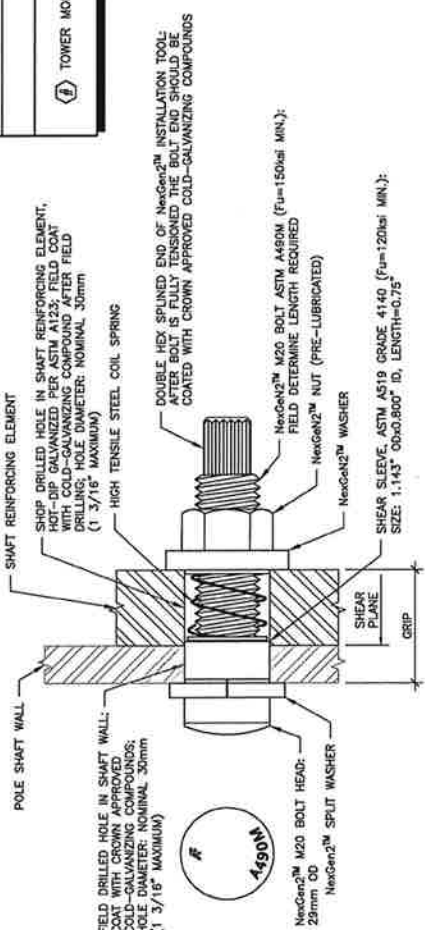
1. TOWER MODIFICATION I.D.

PART NUMBER	BOLT LENGTH	SLEEVE LENGTH	MIN. GRIP RANGE	MAX. GRIP RANGE
M20x35	M20x95	11/16"	15/16"	1 7/16"
M20x48	M20x85	1 7/8"	1 7/16"	1 7/8"
M20x57	M20x85	1 5/8"	1 7/16"	2 1/4"
M20x68	M20x135	2"	2 1/4"	2 11/16"
M20x86	M20x135	2 7/16"	2 11/16"	3 3/4"
M20x127	M20x165	3"	3 3/4"	5"
M20x212	M20x250	4"	5"	8 5/16"

INTERIOR OF POLE SHAFT      EXTERIOR OF POLE SHAFT



**NEXGENZ**  
BLIND BOLT ASSEMBLY  
- PATENT PENDING -



**TYPICAL NG2 BOLT DETAIL**

1 TYPICAL NG2 BOLT DETAIL  
SCALE: N.T.S.

**NOTES:**

1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRE-TENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2005.
2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2005.
3. ALL SHOP AND FIELD DRILLED HOLES SHALL BE NOMINAL 30mm DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1 3/16".
4. NEXGENZ™ COMPLETE ASSEMBLY SHALL BE MAGN 565 CONEDED PER ASTM F2333 AS APPROPRIATE.
5. INSTALL PER MANUFACTURER'S INSTRUCTIONS.

**MANUFACTURERS:**  
ALLFASTENERS  
1540 CONVERSE PARK DRIVE  
BROOKPARK, OH 44142  
PHONE: 440-232-6060  
WEBSITE: WWW.ALLFASTENERS.COM



# CROWN CASTLE

REV	DATE	DESCRIPTION
0	10/27/15	ISSUED FOR CONSTRUCTION

PROJECT NO: 101126.001.01  
 PROJECT ENG: ROBBIE FRAZIER  
 DRAWN BY: RA  
 CHECKED BY: NGR



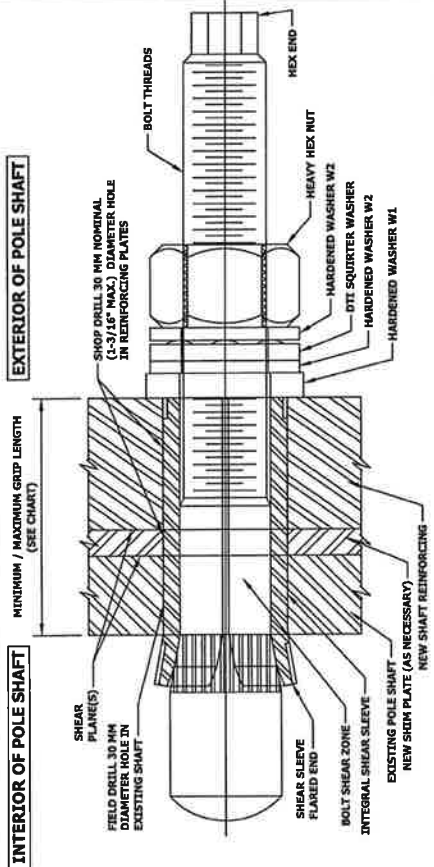
BHT ENGINEERING, INC.  
 PEC0001564  
 Expires 02/19/19

BRANFORD/1-947 X559/DTN1  
 822765  
 10 SYDNEY ST  
 BRANFORD, CT  
 EXISTING 125' MONOPILE

SHEET TITLE  
 FORGEBOLT NOTES  
 AND DETAILS

SHEET NUMBER  
**S4**  
 REVISION  
**0**

FORGEBOLT™ NOTE SHEET: A325/PC8.8 LANDSCAPE VERSION DATE 01/29/2015; Rev. 1.0 04/23/2015  
**NOTES:** 1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.  
 2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

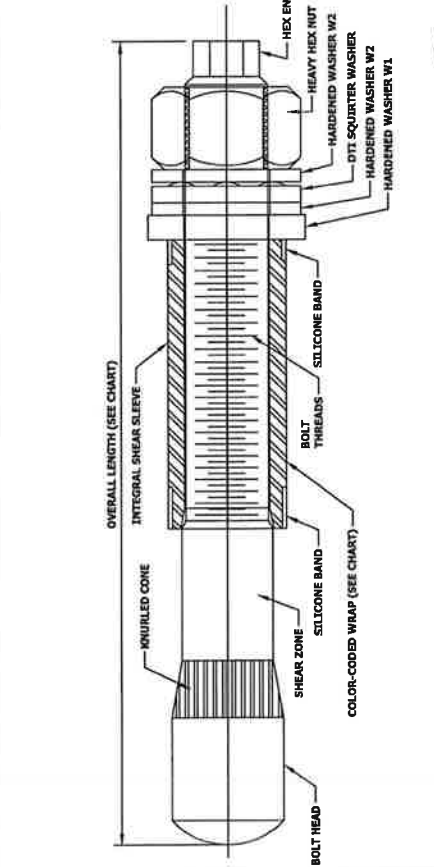


## PRE-INSTALLED FORGEBOLT™ ASSEMBLY DETAIL 1

**BOLT HOLE NOTES:**  
 1. ALL SHOP-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM SHOP-DRILLED HOLE DIAMETER PERMITTED IS 1-3/16".  
 2. ALL FIELD-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM FIELD-DRILLED HOLE DIAMETER PERMITTED IS 30 MM.

FORGEBOLT™		AISC Group A Material: ASTM A325 and PC8.8 (Tensile Stress, Fu = 120 ksi minimum)				
GROUP	FORGEBOLT™ Size (mm)	Overall Length (inches)	Estimated Weight Each (lbs)	Grip Range (inch)	Comment	Color Code
A	135	5.31	1.3	3/8" to 1"	--	RED
	160	6.30	1.6	3/4" to 1-1/2"	--	GREEN
	195	7.68	1.9	1-1/4" to 2-1/4"	--	BLUE
	260	10.24	2.6	2" to 3-1/2"	Splice Bolt	YELLOW
A325 - PC8.8	365	14.37	3.6	3-1/2" to 5-1/2"	Flange Jump Bolt	ORANGE
	440	17.32	4.3	5-1/2" to 8-1/2"	Flange Jump Bolt	BLACK

Each Group A (A325/PC8.8) FORGEBOLT™ assembly shall have a 'Squitter' DTT that is compatible with a M20-PC8.8 bolt.



## INSTALLED FORGEBOLT™ ASSEMBLY DETAIL 2

**DISTRIBUTOR CONTACT:**  
 PRECISION TOWER PRODUCTS  
 PHONE: 888-926-4857  
 EMAIL: info@precisiontowerproducts.com  
 WEB: www.precisiontowerproducts.com  
 CONTAINS PROPRIETARY INFORMATION PATENT PENDING  
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**FORGEBOLT™ Installation**  
 Follow all Manufacturer/Distributor Recommendations for Installation, Tightening, and Inspection.  
 1. FIELD DRILL HOLES TO 30 MM DIAMETER.  
 2. SELECT CORRECT BOLT SIZE FOR INSTALLATION GRIP (REFER TO PLANS).  
 3. INSERT BOLT ASSEMBLY THROUGH HOLES IN SHAFT REINFORCING PLATES AND SEAT THE HARDENED WASHER W1 FLUSH AGAINST OUTSIDE OF PLATE.  
 4. HAND TIGHTEN NUT TO FINGER TIGHT.  
 5. TIGHTEN NUT TO PRETENSIONED CONDITION AND UNTIL DTT SHOWS PROPER INDICATION.  
 6. PROPERLY DOCUMENT AND INSPECT BOLT TIGHTENING PER PLAN REQUIREMENTS.





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PH: (303) 537-4180  
www.btrgp.com

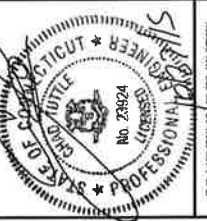
**CROWN  
CASTLE**

ISSUED FOR:

REV	DATE	DESCRIPTION
0	10/27/19	ISSUED FOR CONSTRUCTION

PROJECT NO: 101126.001.01  
PROJECT ENG: ROBBIE FRAISER  
DRAWN BY: RA  
CHECKED BY: NEN

B+T ENGINEERING, INC.  
PECC001564  
Expires 02/10/26



U.S. A MEMBER OF THE BURNS & MCDONNELL GROUP  
A DIVISION OF THE BURNS & MCDONNELL GROUP  
FOR THE PROJECT:

BRANFORD/1492 X358 DTM1  
822765

10 SYLVIA ST.  
BRANFORD, CT  
EXISTING 122' MONOPOLE

SHEET TITLE  
TOWER ELEV., SCHEDULES,  
AND TX LINE DIST. DIAGRAM

SHEET NUMBER  
**S5**

REVISION  
**0**

**CCI: FLAT PLATE-BILL OF MATERIALS (6SKS)**

BOTTOM ELEVATION	TOP ELEVATION	FLAT PLATE DESIGNATION	FLAT PLATE LENGTH	FLAT PLATE QUANTITY	AZIMUTHS	BOLTS PER PLATE	TOTAL BOLT QTY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	TOTAL STEEL WEIGHT
0'-6"	28'-6"	CCI-CPP-08512528**	28'-0"	3	0°, 121° & 232°	53	159	15	30	24"	3035 LBS.
20'-6"	46'-6"	CCI-CPP-08512528**	26'-0"	3	0°, 121° & 232°	61	183	22	22	16"	2155 LBS.
40'-6"	65'-6"	CCI-CPP-08010028**	25'-0"	3	0°, 121° & 232°	49	147	22	16	16"	1530 LBS.
60'-6"	75'-6"	CCI-CPP-08010015**	15'-0"	3	0°, 121° & 232°	28	84	16	8	24"	918 LBS.
											7638 LBS.

\*\* UNIQUE PART. SEE PART DETAIL SHEET D2, D3 AND D4.  
ALL BOLTS SHALL BE PRE-APPROVED BLIND M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A519 WITH MIN. Fu=120 KSI), CONTACT SUPPLIER FOR MATERIAL (PLATE AND BOLTS) AND INSTALLATION PROCEDURES.

**ANCHOR ROD SCHEDULE**

QTY	PART NUMBER	DIAMETER	LENGTH	MATERIALS	EMBEDMENT	AZIMUTHS
5	CC-AR-0175	1 3/4"	10'-0"	A193-B7	5'-0"	64°, 154°, 199°, 289° & 334°
3	---	1 3/4"	18'-8"	F1554-105	15'-0"	19°, 109° & 244°

**EXISTING MEMBER SCHEDULE**

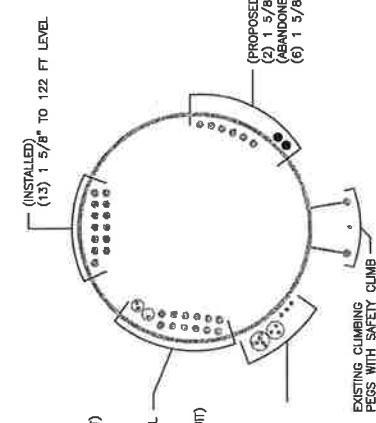
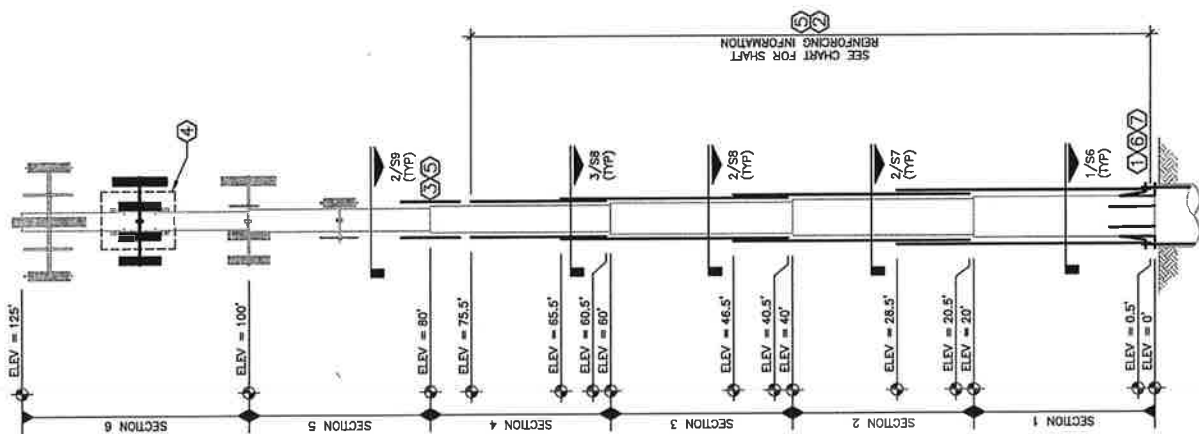
SECTION	DIAMETER
1	P54"x3/8" PIPE
2	P46"x3/8" PIPE
3	P42"x3/8" PIPE
4	P36"x3/8" PIPE
5	P30"x3/8" PIPE
6	P24"x3/8" PIPE

**NOTES:**

- ALL THE PARTS STARTING WITH "CCI-" DESIGNATION - REFER TO "CROWN CASTLE APPROVED REINFORCEMENT COMPONENTS CATALOGUE EDITION 1" FOR PART DETAILS.
- ANCHOR RODS SHALL BE HOT-DIP GALVANIZED AFTER FABRICATOR IN ACCORDANCE WITH ASTM A153. ALTERNATIVELY, ALL ALL STEEL SHALL BE HOT-DIP GALVANIZED.
- NEW STIFFENER PLATE STEEL REINFORING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND, FILM THICKNESS: 1-800-831-3275 FOR PRODUCT INFORMATION.
- SHIMS SHALL BE ASTM A36.
- HOLE BOLTS AND SHEAR SLEEVES ARE 30MPa UNLESS NOTED OTHERWISE.
- SHOP WELDS ARE ASSUMED EBOXX OR GREATER, PER STANDARD SPALICE DETAIL.
- IF SCOPE OF MODIFICATION REQUIRES REMOVAL OF TOWER ID TAG, IT MUST BE REPLACED.
- THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPERED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE DESIGNER. RECORD OR PHOTOGRAPH THE EXISTING MEMBER IN PLACE BEFORE ANY MODIFICATION TO THE TOWER IS MADE. IF AN OBSTRUCTION CAUSES A LATERAL OFFSET OF 2'-0" OR MORE CLIMBING ANCHORS SHALL BE PROVIDED AT EACH CHANGE IN ALIGNMENT. IF NEW REINFORCEMENT REQUIRES STEP BOLT BRACKETS, INSTALL PRIOR TO GALVANIZATION OF STEEL.
- CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER FITTING OF REINFORCEMENT ON MONOPOLES. SHIMS FOR MONOPOLE AT FASTENER LOCATIONS. FOR INTERMEDIATE CONNECTIONS, THE MINIMUM SHIM LENGTH AND WIDTH SHALL BE THE WIDTH OF THE FASTENER. FOR EQUIVALENT INDIVIDUAL SHIM PLATES THE WIDTH OF THE REINFORCING MEMBER MAY BE USED. SHIM THICKNESSES SHALL BE NO LESS THAN 1/16". STACKING OF SHIMS IS PERMITTED.

**TOWER MODIFICATIONS:**

- INSTALL NEW ANCHOR RODS, ANCHOR ROD BRACKETS AND FOOT PADS  
RE: SHEET S6.
  - INSTALL NEW REINFORCING ELEMENTS  
RE: SHEET S6, S7 AND S8.
  - INSTALL NEW BRIDGE STIFFENERS  
RE: SHEET S6.
  - REMOVE ABANDONED ANTENNAS, MOUNTS AND FEEDLINES AT 112' LEVEL.
  - PAIN REINFORCEMENT TO MATCH TOWER
  - REMOVE EXISTING BASE PLATE STIFFENERS AS INDICATED  
RE: SHEET S6.
  - INSTALL NEW TRANSITION STIFFENERS  
RE: SHEET S6.
- \* CONTRACTOR SHALL BUDGET A SITE VISIT TO CHECK CRITICAL DIMENSIONS AND VERIFY UNKNOWN CONDITIONS PRIOR TO STEEL FABRICATION.
- \*\* DIMENSIONS AND SPACING OF TRANSITION LINES MUST BE DISTRIBUTED AS SHOWN IN THE TX LINE DIST. DIAGRAM RE: DETAIL 2/55.
- \*\*\* CONTRACTOR SHALL PROVIDE TEMPORARY BRACING FOR ALL REMOVE AND REPLACE PROCEDURES.
- \*\*\*\* MODIFICATIONS SHALL BE COMPLETED PRIOR TO ADDING THE PROPOSED APPURTENANCES.



2 TX LINE DISTRIBUTION DIAGRAM  
SCALE: N.T.S.

1 TOWER ELEVATION  
SCALE: N.T.S.



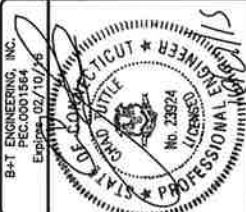


**B+T GRP**  
 1717 S. BOULDER AVE  
 SUITE 300  
 TULSA, OK 74119  
 PH: 918-466-4650  
 WWW.B+TGRP.COM

# CROWN CASTLE

ISSUED FOR:	
REV	DATE / DESCRIPTION
0	10/27/19 ISSUED FOR CONSTRUCTION

PROJECT NO: 101126.001.01  
 PROJECT ENG: ROBBIE FRAZIER  
 DRAWN BY: RA  
 CHECKED BY: NOSH



B+T ENGINEERING, INC.  
 PEC 0001564  
 Expires: 02/10/25

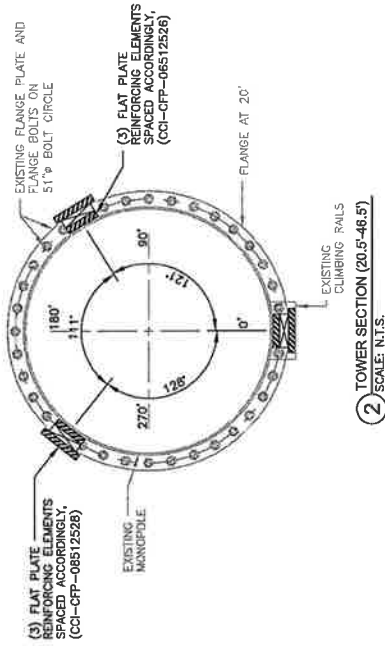
BRANFORD/1-95/ X55/ D/TN1  
 822765  
 10 SKYLINE ST.  
 BRANFORD, CT

SHEET TITLE  
 FLAT PLATE REINFORCEMENT  
 SCHEDULE AND TOWER SECTION  
 (20.5'-46.5')

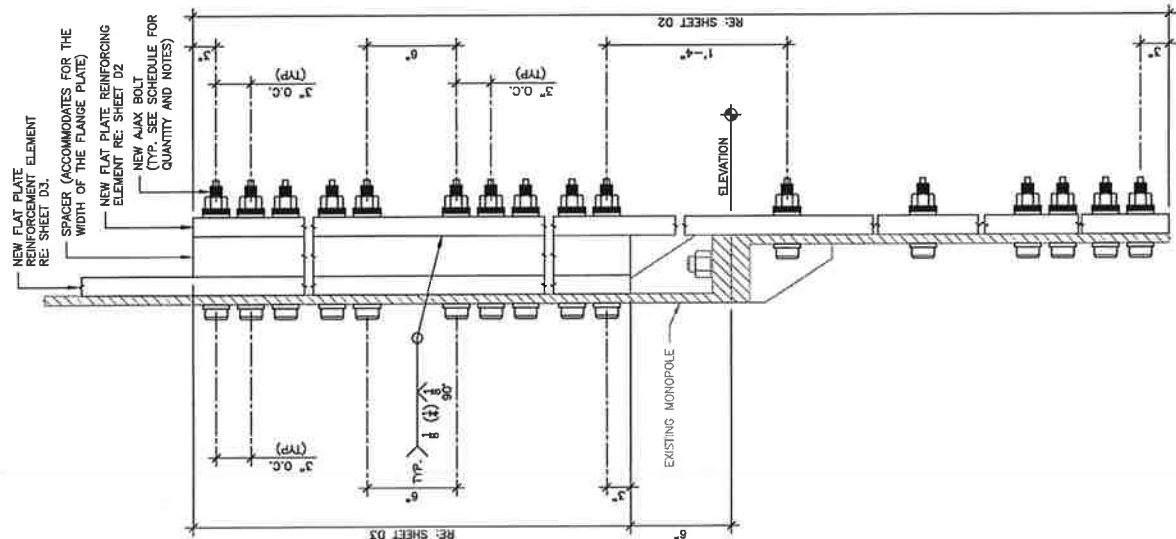
SHEET NUMBER  
**S7**

REVISION  
**0**

CONTRACTOR TO INCLUDE PROVISION FOR RELOCATION / REPLACEMENT OF EXISTING CLIMBING RAILS AS REQUIRED



2 TOWER SECTION (20.5'-46.5')  
 SCALE: N.T.S.



1 FLAT PLATE BRIDGE STIFFENER DETAIL  
 SCALE: N.T.S.



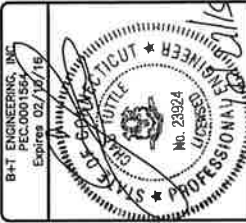


**B+T GRP**  
 1717 S. SHOULDER AVE  
 SUITE 300  
 TULSA, OK 74118  
 (918) 439-8600  
 www.btgrp.com

**CROWN  
 CASTLE**

REV	DATE	DESCRIPTION
0	10/27/15	ISSUED FOR CONSTRUCTION

PROJECT NO: 101126.001.01  
 PROJECT ENG: ROBBIE FROZIER  
 DRAWN BY: RA  
 CHECKED BY: NDN



IT IS A VIOLATION OF LAW FOR ANY PERSON, FIRM OR CORPORATION TO REPRODUCE OR TRANSMIT THIS DRAWING OR ANY PART THEREOF WITHOUT THE WRITTEN PERMISSION OF A LICENSED PROFESSIONAL ENGINEER TO ALTER THIS DOCUMENT.

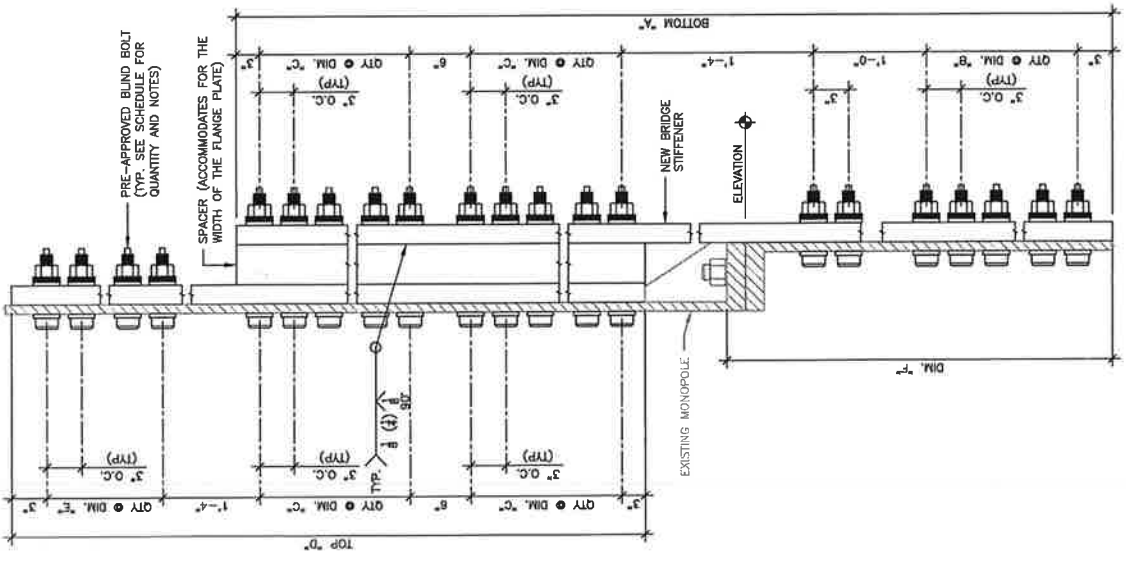
BRANFORD/1-801 X551 DTM1  
 822765  
 10 S.W. 1st ST  
 BRANFORD, CT  
 EXISTING 125' MONOPOLE

SHEET TITLE  
 FLAT PLATE BRIDGE STIFFENER  
 DETAIL, SCHEDULE AND TOWER  
 SECTION AT 80'

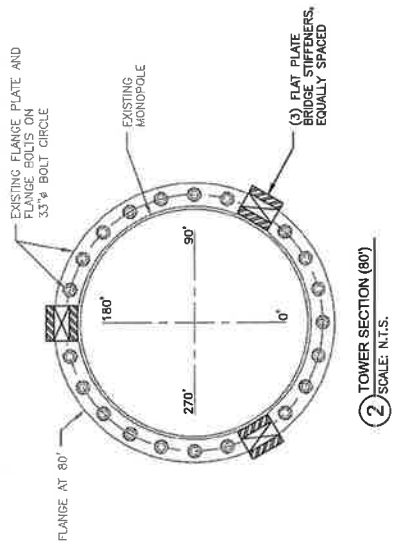
SHEET NUMBER  
**S9**  
 REVISION:  
**0**

FLAT PLATE BRIDGE STIFFENER-SCHEDULE (65KSI)

ELEVATION	NO. OF BRIDGE STIFFENERS	FLAT PLATE SIZE	BOTTOM "A"	QTY @ DIM. "B"	QTY @ DIM. "C"	TOP "D"	QTY @ DIM. "E"	DIM. "F"	BOLT QTY PER STIFFENER	TOTAL BOLT QTY
80'	3	1"x4 1/2"	6'-6"	6 HOLES @ 1'-3"	5 HOLES @ 1'-0"	5'-6"	6 HOLES @ 1'-3"	3'-3"	24	72



1 FLAT PLATE BRIDGE STIFFENER DETAIL  
 SCALE: N.T.S.



2 TOWER SECTION (90')  
 SCALE: N.T.S.



**B+T GRP**  
 1717 S. BOULDER AVE  
 SUITE 300  
 BOULDER, CO 80502  
 PH: (303) 442-4820  
 www.btgpr.com

# CROWN CASTLE

REV	DATE	DESCRIPTION
0	10/23/19	ISSUED FOR CONSTRUCTION

PROJECT NO: 101126.001.01  
 PROJECT ENG: ROBBIE FRAZER  
 DRAWN BY: RFA  
 CHECKED BY: NWN

B+T ENGINEERING, INC.  
 P.E.C. 000189  
 Expires 02/20/26



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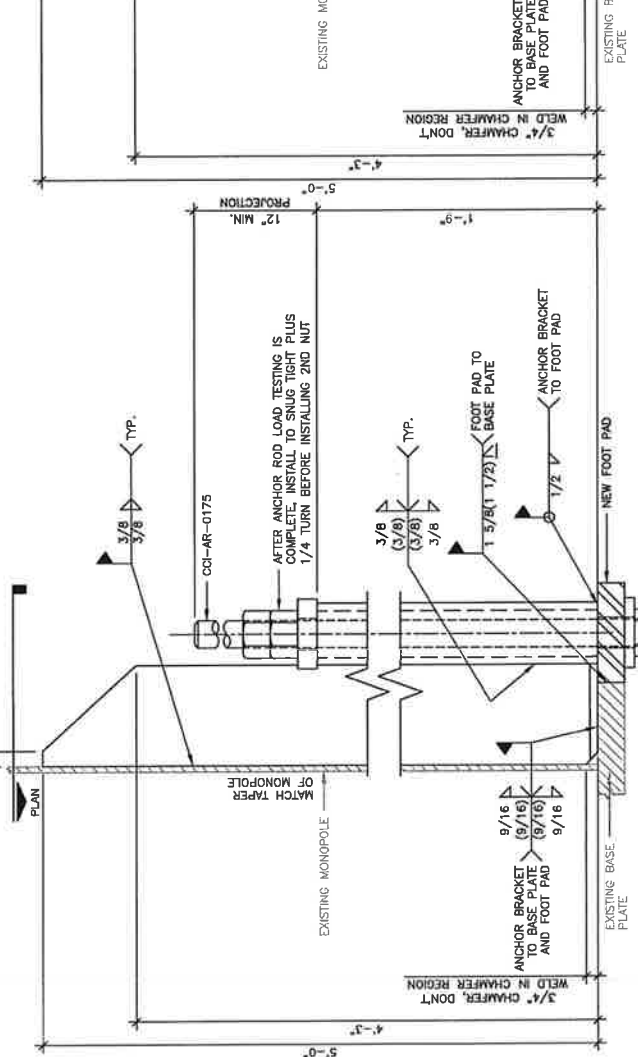
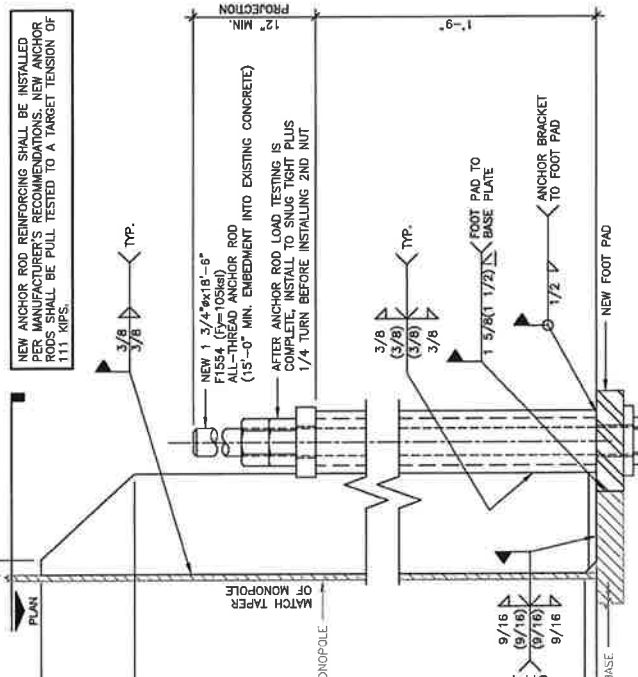
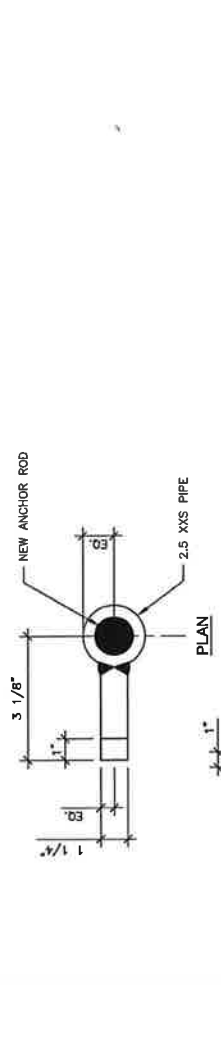
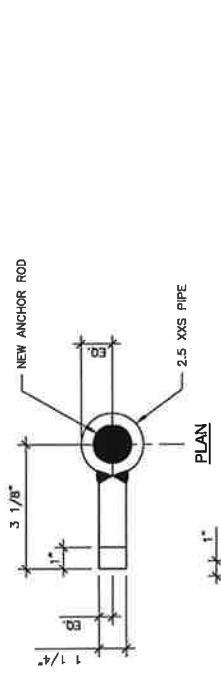
BRANFORD/1-951/X55/DTN1  
 822765

10 SVALIST  
 BRANFORD, CT  
 EXISTING 125 MONOPOLE

SHEET TITLE  
 DETAILS

SHEET NUMBER  
**D1**

REVISION  
**0**



NEW ANCHOR ROD REINFORCING SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. NEW ANCHOR RODS SHALL BE PULL TESTED TO A TARGET TENSION OF 111.1 KIPS.

NEW 1 3/4" x 18" F1554 (F=105KSI) ALL-THREAD ANCHOR ROD (15" MIN. EMBEDMENT INTO EXISTING CONCRETE)  
 AFTER ANCHOR ROD LOAD TESTING IS COMPLETE, INSTALL TO SNUG TIGHT PLUS 1/4 TURN BEFORE INSTALLING 2ND NUT

TAKE ALL MEASURES NECESSARY TO AVOID DAMAGING EXISTING REINFORCING BARS DURING DRILLING OPERATIONS. NOTIFY B+T GROUP IMMEDIATELY IF ANY REINFORCING BARS ARE ENCOUNTERED AND INTERFERE WITH PLACEMENT OF NEW ANCHORS. MINOR ADJUSTMENT TO PROPOSED LOCATION OF NEW ANCHORS MAY BE REQUIRED.

TAKE ALL MEASURES NECESSARY TO AVOID DAMAGING EXISTING REINFORCING BARS DURING DRILLING OPERATIONS. NOTIFY B+T GROUP IMMEDIATELY IF ANY REINFORCING BARS ARE ENCOUNTERED AND INTERFERE WITH PLACEMENT OF NEW ANCHORS. MINOR ADJUSTMENT TO PROPOSED LOCATION OF NEW ANCHORS MAY BE REQUIRED.

① ANCHOR ROD BRACKET  
 SCALE: N.T.S.

② ANCHOR ROD BRACKET  
 SCALE: N.T.S.

**B+T GRP**  
 1777 S BOULDER AVE  
 SUITE 300  
 TULSA, OK 74119  
 (918) 466-6600  
 www.b+trp.com

# CROWN CASTLE

REV.	DATE	DESCRIPTION
0	10/27/15	ISSUED FOR CONSTRUCTION

PROJECT NO: 101126.001.01  
 PROJECT ENG: ROBBIE FRAZIER  
 DRAWN BY: RA  
 CHECKED BY: NGR

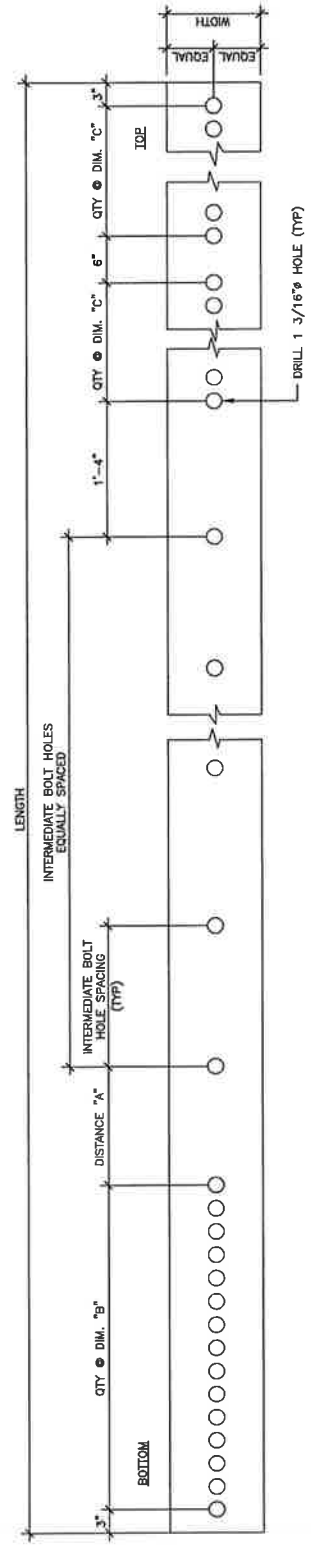
B+T ENGINEERING, INC.  
 PEC.0001564  
 Expires 02/10/16

IT IS A VIOLATION OF LAW FOR ANY PERSON, OTHER THAN THE REGISTERED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

BRANFORD I-95 X55/DTN1  
 822765  
 10 SYLVIA ST.  
 BRANFORD, CT  
 EXISTING 125' MONOPOLE

SHEET TITLE  
**PART DETAILS**

SHEET NUMBER: **D2**  
 REVISION: **0**



1 PART DETAIL  
 SCALE: N.T.S.

PART NUMBER	BLACK WEIGHT (LBS)	WIDTH	THICKNESS	LENGTH	QTY @ DIM. "B"	QTY @ DIM. "C"	TOTAL QTY OF 1 3/16" Ø BOLT HOLES	DISTANCE "A"	INTERMEDIATE BOLT HOLE SPACING
CC-GFP-08512528	1012	6 1/2"	1 1/4"	26'-0"	15 HOLES @ 3'-6"	15 HOLES @ 3'-6"	53	1'-2"	2'-0"

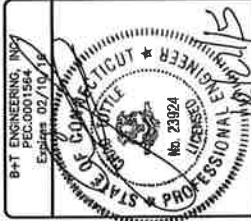


**B+T GRP**  
 1717 S. BOULDER AVE  
 SUITE 300  
 DENVER, CO 80202  
 PH: (303) 574-4800  
 WWW.BTGRP.COM

# CROWN CASTLE

REV	DATE	DESCRIPTION
0	10/27/13	ISSUED FOR CONSTRUCTION

PROJECT NO: 101126.001.01  
 PROJECT ENG: ROBBIE FRAZIER  
 DRAWN BY: RA  
 CHECKED BY: NSN



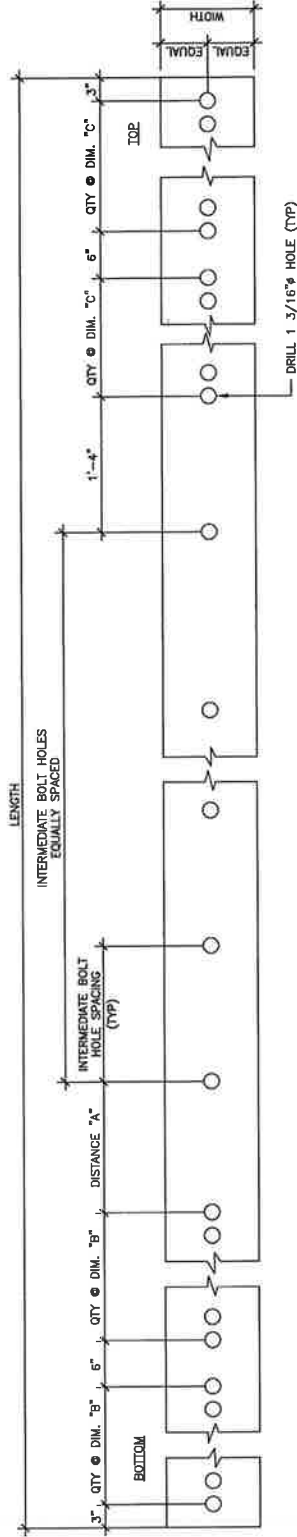
B+T ENGINEERING, INC.  
 P.E.C. 0001564  
 Expires 02/10/16

BRANFORD/1-957 X55/ DTM1  
 822765

16 SKYLARK ST  
 BRANFORD, CT  
 EXISTING 12" MONOPOLE

SHEET TITLE  
 PART DETAILS

SHEET NUMBER: **D3**  
 REVISION: **0**



1 PART DETAIL  
 SCALE: N.T.S.

PART NUMBER	BLACK WEIGHT (LBS)	WIDTH	THICKNESS	LENGTH	QTY @ DIM. 'B'	TOTAL QTY OF 1 3/16" BOLT HOLES	QTY @ DIM. 'C'	DISTANCE, 'A'	INTERMEDIATE BOLT HOLE SPACING
CC-CFP-08512526	718	6 1/2"	1 1/4"	26'-0"	15 HOLES @ 3'-6"	61	11 HOLES @ 2'-6"	6"	1'-4"
CC-CFP-08010025	510	6"	1"	25'-0"	11 HOLES @ 2'-6"	49	8 HOLES @ 1'-9"	4"	1'-4"



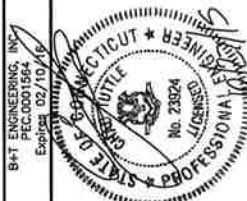
**B+T GRP**  
 177 S. SCULDER AVE.  
 SUITE 300  
 TULSA, OK 74118  
 PH: (918) 587-4600  
 www.btgpr.com

# CROWN CASTLE

ISSUED FOR:	
REV	DATE DESCRIPTION
0	10/27/15 ISSUED FOR CONSTRUCTION

PROJECT NO: 10126.001.01  
 PROJECT ENG: ROBBIE FRAZIER  
 DRAWN BY: RA  
 CHECKED BY: NGM

B+T ENGINEERING, INC.  
 PEC.0001964  
 Expired 02/10/19



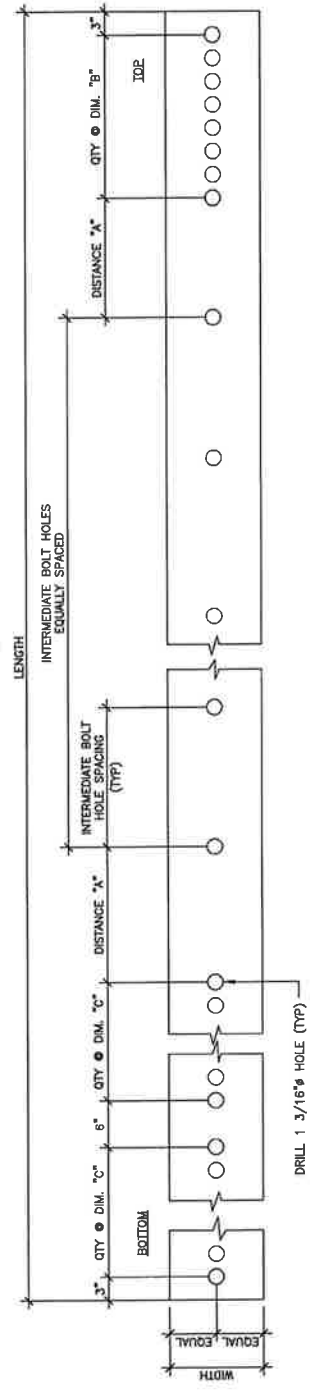
IF IS A VIOLATION OF LAW FOR ANY PERSON, UNDER ANY STATE OR FEDERAL STATUTE, TO REPRODUCE OR TRANSMIT THIS DOCUMENT, IN WHOLE OR IN PART, WITHOUT THE WRITTEN PERMISSION OF B+T ENGINEERING, INC.

BRANFORD/ I-95/ X55/ DTM1  
 822765  
 18 SYLVIA ST.  
 BRANFORD, CT  
 EXISTING 125 MONROPOLE

SHEET TITLE  
 PART DETAILS

SHEET NUMBER  
**D4**

REVISION  
**0**



1 PART DETAIL  
 SCALE: N.T.S.

PART NUMBER	BLACK WEIGHT (LBS)	WIDTH	THICKNESS	LENGTH	QTY @ DIM. "B"	QTY @ DIM. "C"	TOTAL QTY OF 1 3/16" BOLT HOLES	DISTANCE "A"	INTERMEDIATE BOLT HOLE SPACING
CR-CFP-06010015	306	6"	1"	15'-0"	8 HOLES @ 1'-9"	8 HOLES @ 1'-9"	28	1'-4 1/2"	2'-0"

# **ATTACHMENT 6**



# **ATTACHMENT 7**

February 8, 2016

*Via Certificate of Mailing*

James B. Cosgrove, First Selectman  
Town of Branford  
Town Hall  
1019 Main Street  
Branford, CT 06405

Re: **Proposed Telecommunications Facility at 10 Sylvia Street in Branford, Connecticut**

Dear Mr. Cosgrove:

This firm represents Cellco Partnership d/b/a Verizon Wireless (“Cellco”). Today, Cellco filed a Sub-Petition for Declaratory Ruling (“Sub-Petition”) with the Connecticut Siting Council (“Council”) seeking approval to install antennas and related equipment on the existing 125-foot tower at 10 Sylvia Street in Branford (the “Property”). Cellco intends to install twelve (12) antennas and nine (9) remote radio heads at the 112-foot level on the tower. Three (3) equipment cabinets and an emergency back-up generator will be installed on a concrete pad near the base of the tower, within the existing fenced compound. The equipment pad will be located beneath a steel canopy structure.

As presented in the Sub-Petition, the proposed facility modifications constitute an eligible facility request pursuant to Section 6409(a) of the Federal Middle Class Tax Relief and Job Creation act of 2012 (47 U.S.C. § 1455(a)) and the October 21, 2014 Order of the Federal Communications Commission (FCC-14-533). A copy of the full Sub-Petition is attached for your review. Landowners whose property abuts the Property were also sent notice of this filing along with a copy of the Sub-Petition.

14436535-v1

# Robinson+Cole

James B. Cosgrove  
February 8, 2016  
Page 2

**Pursuant to its decision in Petition No. 1133, comments or concerns regarding this proposal should be submitted to the Council within thirty (30) days of the date of the attached Sub-Petition.**

Please contact me if you have any questions regarding this proposal.

Sincerely,



Kenneth C. Baldwin

Attachment

February 8, 2016

*Via Certificate of Mailing*

322 East Main Street LLC  
375 Fairfield Avenue, Building 1  
Stamford, CT 06902

Re: **Proposed Telecommunications Facility at 10 Sylvia Street in Branford, Connecticut**

Dear Sir or Madam:

This firm represents Cellco Partnership d/b/a Verizon Wireless (“Cellco”). Today, Cellco filed a Sub-Petition for Declaratory Ruling (“Sub-Petition”) with the Connecticut Siting Council (“Council”) seeking approval to install antennas and related equipment on the existing 125-foot tower at 10 Sylvia Street in Branford (the “Property”). Cellco intends to install twelve (12) antennas and nine (9) remote radio heads at the 112-foot level on the tower. Three (3) equipment cabinets and an emergency back-up generator will be installed on a concrete pad near the base of the tower, within the existing fenced compound. The equipment pad will be located beneath a steel canopy structure.

As presented in the Sub-Petition, the proposed facility modifications constitute an eligible facility request pursuant to Section 6409(a) of the Federal Middle Class Tax Relief and Job Creation act of 2012 (47 U.S.C. § 1455(a)) and the October 21, 2014 Order of the Federal Communications Commission (FCC-14-533). A copy of the full Sub-Petition is attached for your review. Landowners whose property abuts the Property were also sent notice of this filing along with a copy of the Sub-Petition.

14436555-v1

# Robinson + Cole

322 East Main Street LLC

February 8, 2016

Page 2

**Pursuant to its decision in Petition No. 1133, comments or concerns regarding this proposal should be submitted to the Council within thirty (30) days of the date of the attached Sub-Petition.**

Please contact me if you have any questions regarding this proposal.

Sincerely,



Kenneth C. Baldwin

Attachment



February 8, 2016

*Via Certificate of Mailing*

G6 Hospitality Property LLC  
P.O. Box 117508  
Carroll, TX 75011

Re: **Proposed Telecommunications Facility at 10 Sylvia Street in Branford, Connecticut**

Dear Sir or Madam:

This firm represents Cellco Partnership d/b/a Verizon Wireless (“Cellco”). Today, Cellco filed a Sub-Petition for Declaratory Ruling (“Sub-Petition”) with the Connecticut Siting Council (“Council”) seeking approval to install antennas and related equipment on the existing 125-foot tower at 10 Sylvia Street in Branford (the “Property”). Cellco intends to install twelve (12) antennas and nine (9) remote radio heads at the 112-foot level on the tower. Three (3) equipment cabinets and an emergency back-up generator will be installed on a concrete pad near the base of the tower, within the existing fenced compound. The equipment pad will be located beneath a steel canopy structure.

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14496093-v1

# Robinson + Cole

G6 Hospitality Property LLC  
February 8, 2016  
Page 2

**Pursuant to its decision in Petition No. 1133, comments or concerns regarding this proposal should be submitted to the Council within thirty (30) days of the date of the attached Sub-Petition.**

Please contact me if you have any questions regarding this proposal.

Sincerely,



Kenneth C. Baldwin

Attachment

# **ATTACHMENT 8**

KENNETH C. BALDWIN

280 Trumbull Street  
Hartford, CT 06103-3597  
Main (860) 275-8200  
Fax (860) 275-8299  
kbaldwin@rc.com  
Direct (860) 275-8345

Also admitted in Massachusetts

February 8, 2016

*Via Certificate of Mailing*

«Name\_and\_Address»

**Re: Proposed Telecommunications Facility at 10 Sylvia Street, Branford, Connecticut**

Dear «Salutation»:

This firm represents Cellco Partnership d/b/a Verizon Wireless (“Cellco”). Today, Cellco filed a Sub-Petition for Declaratory Ruling (“Sub-Petition”) with the Connecticut Siting Council (“Council”) seeking approval to install antennas and related equipment on the existing 125-foot tower at 10 Sylvia Street in Branford (the “Property”). Cellco intends to install twelve (12) antennas and nine (9) remote radio heads at the 112-foot level on the tower. Three (3) equipment cabinets and an emergency back-up generator will be installed on a concrete pad near the base of the tower, within the existing fenced compound. The equipment pad will be located beneath a steel canopy structure.

As presented in the Sub-Petition, the proposed facility improvements at the Property constitute an eligible facility request pursuant to Section 6409(a) of the Federal Middle Class Tax Relief and Job Creation act of 2012 (47 U.S.C. § 1455(a)) and the October 21, 2014 Order of the Federal Communications Commission (FCC-14-533). A copy of the full Sub-Petition is attached for your review.

**Pursuant to its decision in Petition No. 1133, comments or concerns regarding this proposal should be submitted to the Council within thirty (30) days of the date of the Sub-Petition.**

February 8, 2016  
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This notice is being sent to you because you are listed as an owner of land that abuts the Property. If you have any questions regarding the Sub-Petition, the Council's process for reviewing the Sub-Petition or the details of the filing itself, please feel free to contact me at the number listed above. You may also contact the Council directly at 860-827-2935.

Sincerely,

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

Kenneth C. Baldwin

Attachment

**CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS**

**ABUTTING PROPERTY OWNERS**

**10 SYLVIA STREET, BRANFORD, CONNECTICUT**

	<b>Property Address</b>	<b>Owner and Mailing Address</b>
1.	330 East Main Street	330 Main Street Associates LLC 182 Cedar Street Branford, CT 06405
2.	3 Sylvia Street/328 East Main Street	Ronald P. Smith d/b/a Triangle Property 152 Valley Road North Branford, CT 06471
3.	323 East Main Street	Fonz Realty LLC 323 East Main Street Branford, CT 06405
4.	317 East Main Street	Shree Amritaya LLC 317 East Main Street Branford, CT 06405
5.	312 East Main Street	312 Realty LLC 312 East Main Street Branford, CT 06405
6.	308-310 East Main Street	New Castle Realvest LLC Attn: Dimitries Kirtopoulos 302 East Main Street Branford, CT 06405
7.	300 East Main Street	DRJL Limited Partnership 300 East Main Street Branford, CT 06405
8.	318-320 East Main Street	66 Hospitality Property LLC P.O. Box 117508 Carroll, TX 75011
9.	322 East Main Street	322 East Main Street LLC 322 East Main Street Branford, CT 06405