



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

August 7, 2018

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

RE: Notice of Exempt Modification for Sprint DO Macro: 876366
Sprint Site ID: CT33XC010
101 Pierce Road, Preston, CT 06365
Latitude: 41° 32' 17.46"/ Longitude: -71° 57 6.0"

Dear Ms. Bachman:

Sprint currently maintains Six (6) antennas at the 150-foot level of the existing 155-foot monopole tower at 101 Pierce Road, Preston CT. The tower is owned by Crown Castle. The property is owned by Panus Farm LLC. Sprint now intends to replace six (6) antennas with six (6) new antennas. These antennas would be installed at the 150-foot level of the tower. Sprint also intends to install twelve (12) RRH's, four (4) Hybrid cables and remove six (6) coax cables.

The facility was approved on August 3, 1999 by the Town of Preston, CT, site plan#2-99 and Special Exception 4-99 for the installation of a monopole.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to The Honorable Robert Congdon, First-Selectman, Town of Preston, Board of Selectman, as well as the property owner, and Crown Castle is the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.

Melanie A. Bachman

August 7, 2018

Page 2

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

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

Sincerely,



Jeffrey Barbadora
Real Estate Specialist

12 Gill Street, Suite 5800, Woburn, MA 01801

781-729-0053

Jeff.Barbadora@crowncastle.com

Attachments:

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes

Tab 2: Exhibit-2: Structural Modification Report

Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc: The Honorable Robert Congdon, First-Selectman
Town of Preston
389 Route 2
Preston, CT 06365
(860) 887-5581 ext.105

Panus Farm LLC
60 Pierce Road
Preston, CT 06365



TOWN OF PRESTON
TOWN OFFICES
589 ROUTE 2
PRESTON, CONNECTICUT 06365-8830

*To Dan
for signature
9/1/99*

FILE COPY

Date: August 10, 1999

Certified Mail

Sprint Spectrum, L.P.
One International Blvd
Suite 800 Mahwah New, Jersey 07495

Dear Attorney Regan:

At the regular meeting of the Preston Planning and Zoning Commission held on August 3, 1999, the Commission reviewed application **Site Plan # 2-99 and Special Exception 4-99** for the installation of a monopole and other associated work at 101 Peirce Road. The Commission voted unanimously to approve the subject application with the following modifications:

1. Note sight distance for the driveway on the plan.
2. Gravel drive shall have 6" of gravel rather than 4". The driveway shall have a paved apron. A driveway permit is required for its installation.
3. An As-built plan must be provided for the project after the construction is completed. The as-built must be provided prior to the release of the bond.
4. A bond for the site work in the amount of \$28,000.00 must be submitted on forms as provided by the town with the final format to be approved by the town attorney.
5. A bond in the amount \$29,500.00 must be posted for the tower dismantling. This bond is to be renewed every two years and must be renewed by August 3, 2001. In the event the bond is not renewed it will be a violation of this permit.
6. The Commission requested that a company representative contact the First Selectmen to afford the town due consideration to address the town's emergency communication needs.

Please provide one mylar copy of the plan revised in accordance with the above noted and produced or reproduced in compliance with section 7-31 of the Connecticut General Statutes regarding requirements for the filing of a map. In addition, provide two (2) paper copies. After endorsement of the plan by the Chairman, the mylar copy of the plan must be filed with the Town Clerk's office.

BONDING: Prior to the endorsement of the plan the two bonds in the amount of \$28,000 and 29,500 must be filed with the Commission using the format as approved by the Commission (see attached forms). The Town will hold the bonds until such time the Commission approves their reduction or

release. Any plan filed without the appropriate bond will be considered to be in violation with the approved plan and zoning regulations. In order for the Commission to consider a bond release or reduction, a letter requesting a release or reduction must be submitted to the Planning and Zoning Office two (2) weeks prior to the regularly scheduled meeting. This will allow adequate time to conduct a site inspection of the completed work. Unauthorized work could result in delays with the bond release or reduction by the Commission.

OTHER PERMITS REQUIRED: Prior to the commencement of any work, a zoning permit and other subsequent town and state permits must be obtained.

SITE INSPECTIONS: During the construction of the project, inspections will be conducted of the progress by the town staff. A forty-eight hour notice is required for the inspections. In the event that there is concern with the location of the structure, parking etc, the Zoning Enforcement Officer may require that a land surveyor licensed in the State of Connecticut locate the structure prior to construction. Failure to provide notice to the town of the work and failure to construct the project as shown on the plan without prior approval of the changes could result in problems with the issuance of Certificate of Occupancy and the release or reduction of the bond. Please contact the Planning and Zoning Office at 889-2529 to schedule an appointment to inspect the project at the following times:

1. After the installation of the erosion and sediment control.
2. After the structure has been staked out and the footings are to be placed.
3. After the parking and sidewalks have been staked out.
4. Completion of the project.

If there are any questions regarding this application or if the staff can be of any assistance at any time during the project construction, please do not hesitate to contact the office.

Congratulations on the success completion of the application.

Very truly yours,



Daniel Kulesza
Town Planner

cc: ZEO
First Selectman
Inland Wetland Officer
Building Inspector
Walter and Ruth Panus



Town of Preston, CT

Property Listing Report

Map Block Lot

8-0-PIE1-101

Account

00059300

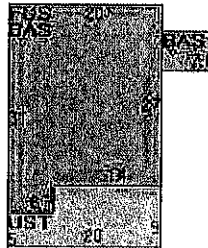
Property Information

Property Location	101 PIERCE RD
Owner	PANUS FARM LLC
Co-Owner	
Mailing Address	60 PIERCE RD PRESTON CT 06365
Land Use	1010 Single Fam MDL-01
Land Class	R
Zoning Code	R-80
Census Tract	7001
Sub Lot	
Neighborhood	0050
Acreage	198.43
Utilities	Well,Septic
Lot Setting/Desc	Rural Low
Survey Map	
Foundation	8-0-PIE1-101

Photo



Sketch



Primary Construction Details

Year Built	1950
Stories	2
Building Style	Conventional
Building Use	Residential
Building Condition	Below Average
Floors	Carpet
Total Rooms	6

Bedrooms	4 Bedrooms
Full Bathrooms	1
Half Bathrooms	1
Bath Style	Average
Kitchen Style	Average
Roof Style	Gable/Hip
Roof Cover	Asph/F Gls/Cmp

Exterior Walls	Wood Shingle
Interior Walls	Plastered
Heating Type	Hot Water
Heating Fuel	Gas
AC Type	None
Gross Bldg Area	1326
Total Living Area	1170



Town of Preston, CT

Property Listing Report

Map Block Lot

8-0-PIE1-101

Account

00059300

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

Item	Appraised	Assessed
Buildings	58000	40600
Extras	0	0
Outbuildings	34400	24100
Land	955000	97600
Total	1047400	162300

Outbuilding and Extra Items

Type	Description
GARAGE-AVE	2088.00 S.F.
SILO-WD OR CNC	3432.00 DIAxHT
1 STORY W/LOFT	1744.00 S.F.
POLE BARN	5124.00 S.F.
SHED FRAME	270.00 S.F.
LEAN-TO	930.00 S.F.
W/LIGHTS ETC	4090.00 S.F.
GARAGE-AVE	492.00 S.F.

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
First Floor	606	606
Upper Story, Finished	564	564
Utility, Storage, Unfinished	156	0
Total Area	1326	1170

Sales History

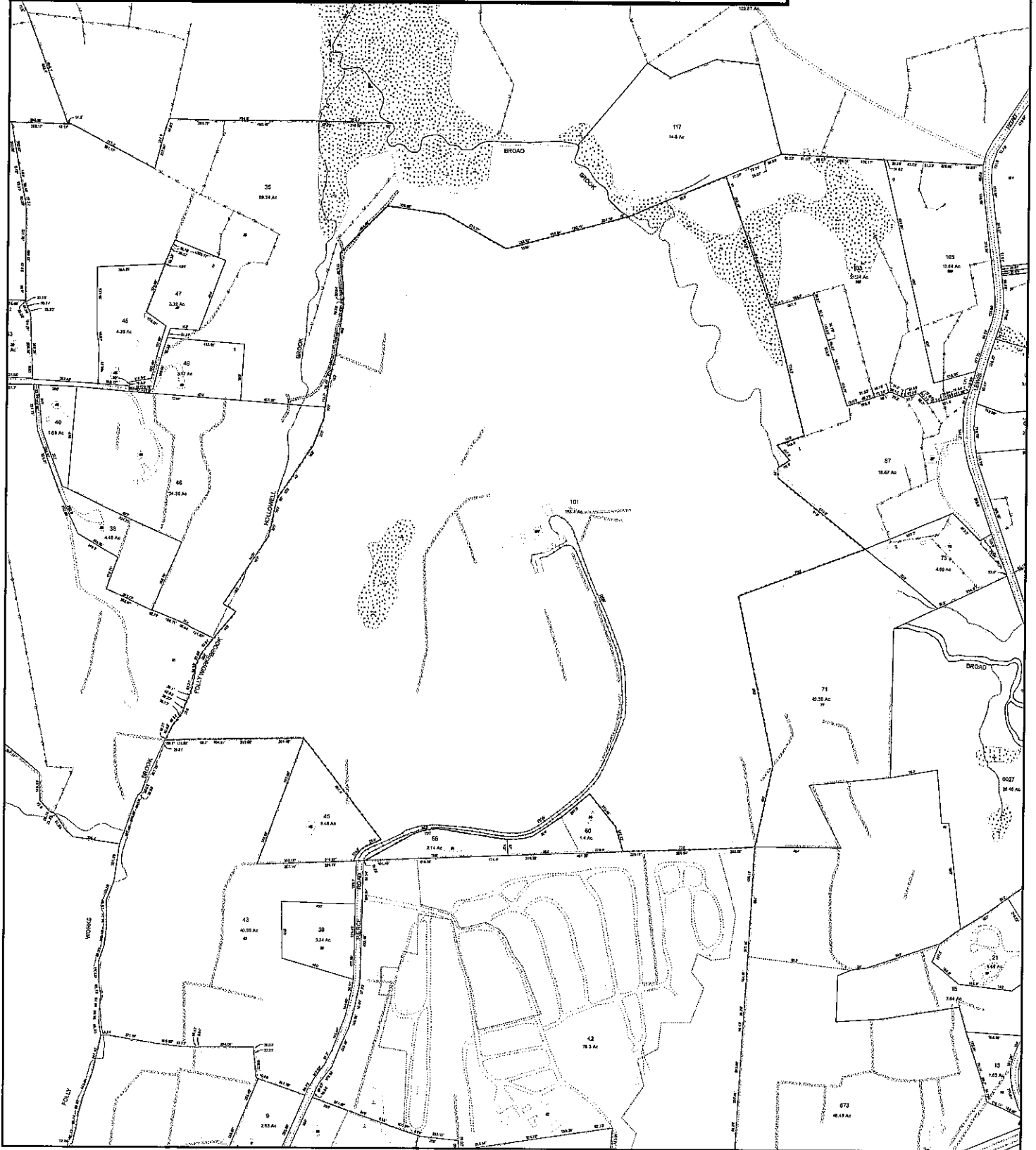
Owner of Record	Book/ Page	Sale Date	Sale Price
PANUS FARM LLC	196/ 38	12/3/2015	
SHEA JOAN	193/ 185	11/19/2014	
SHEA JOAN - TRUSTEE	193/ 180	11/19/2014	
PANUS RUTH L ESTATE OF	190/ 842	11/26/2013	
PANUS RUTH L TRUSTEE	188/ 206	3/26/2013	
PANUS RUTH L	153/ 96	12/16/2004	
PANUS WALTER C SR + RUTH L	0055/0353	3/9/1973	0



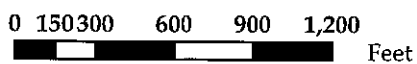
Town of Preston, Connecticut - Assessment Parcel Map

Parcel: 8-0-PIE1-101

Address 101 PIERCE RD

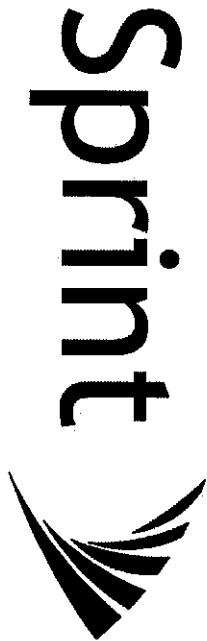


Approximate Scale: **1:8,400**



Map Produced:
June 2018

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

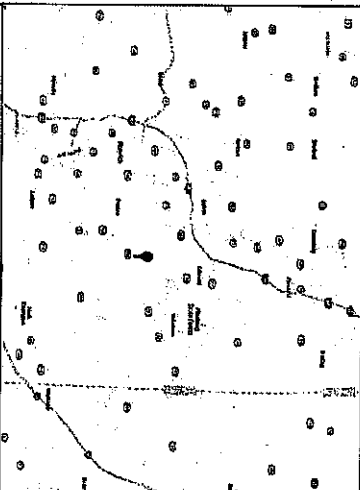


PROJECT: DO MACRO UPGRADE
SITE NAME: WAPPINGERS FALLS / PRESTON CITY
SITE CASCADE: CT33XC010
SITE NUMBER: 876366
SITE ADDRESS: 101 PIERCE ROAD
 PRESTON, CT 06365
SITE TYPE: MONOPOLE TOWER
MARKET: NORTHERN CONNECTICUT

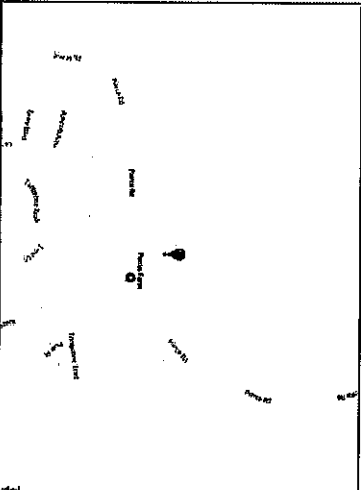
SITE INFORMATION

TOWER OWNER:
 CROWN CASTLE COMPANY LLC
 2000 WASHINGTON BLVD
 CHANDLER, AZ 85224
 (704) 408-8585
LATITUDE (NAD83):
 41° 32' 17.46" N
 41.538183
LONGITUDE (NAD83):
 -71° 57' 5.07" W
 -71.951887
COUNTY:
 NEW LONDON

AREA MAP



LOCATION MAP



PROJECT DESCRIPTION

SPRINT PROPOSES TO INSTALL AN EXISTING UNARMED TELECOMMUNICATIONS FACILITY.
 INSTALL 2.5 EQUIPMENT RISES EXISTING N.X. MASS CABINET
 REMOVE (6) PANEL ANTENNAS
 INSTALL (6) PANEL ANTENNAS (3 800/1500, 3 2500)
 INSTALL (12) RISES ON TOWER (6 800, 3 1500, 3 2500)
 REMOVE (6) COAX CABLES
 INSTALL (4) HYBRID CABLES

THESE PLANS HAVE BEEN DEVELOPED FOR THE MODIFICATION OF AN EXISTING UNARMED TELECOMMUNICATIONS FACILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL GOVERNING AUTHORITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL GOVERNING AUTHORITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL GOVERNING AUTHORITIES.

APPLICABLE CODES

1. INTERNATIONAL BUILDING CODE (2015 IBC)
2. IRC-2006 OR LATEST EDITION
3. NFPA 700 - LIGHTING PROTECTION CODE
4. 2011 NATIONAL ELECTRICAL CODE OR LATEST EDITION
5. MOST RECENT EDITION OF LOCAL APPLICABLE CODES.
6. LOCAL BUILDING CODE
7. CITY/COUNTY ORDINANCES



DRAWING INDEX

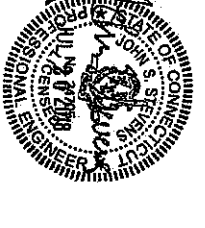
SHEET NO.	SHEET TITLE	REV
T-1	TITLE SHEET & PROJECT DATA	2
B-1	SPRINT SPECIFICATIONS	2
B-2	SPRINT SPECIFICATIONS	2
B-3	SPRINT SPECIFICATIONS	2
A-1	TOWER ELEVATION & COAXE PLAN	2
A-2	ANTENNA ELEVATION & MOUNTING DETAILS	2
A-3	EQUIPMENT & MOUNTING DETAILS	2
A-4	CAN. DETAILS	2
A-5	PLUMBING DIAGRAM	2
E-1	ELECTRICAL & CORDONING DETAILS	2
E-2	ELECTRICAL & CORDONING DETAILS	2

1:4800 PROPOSED FOR



6500 South Parkway
Overland Park, Kansas 66201

DESIGN PROVIDED BY:
INFINIGY
 FROM ZERO TO INFINIGY
 the solutions are endless
 1000 Washington Blvd., Suite 1000, Westborough, MA 01581
 Phone: 508-853-8277 Fax: 508-853-8278
 www.infinigy.com
 © 2011 INFINIGY, INC.



DESIGNED BY: JOHN S. STEBBINS
DATE: 07/20/18
REVISIONS:
 NO. 1
 DATE 07/20/18
 BY J.S.
 NO. 2
 DATE 07/20/18
 BY J.S.
 NO. 3
 DATE 07/20/18
 BY J.S.

WAPPINGERS FALLS / PRESTON CITY
CT33XC010
101 PIERCE ROAD PRESTON, CT 06365

TITLE SHEET & PROJECT DATA
T-1



689 Sprint Parkway
Crested Peak, Kansas 66515

PLAN NUMBER:
INFINIGYO
FROM ZERO TO INFINIGYO

has solutions that end users
1133 Southfield Tower #1, Liberty, MO 64068
Phone: 816-439-9991 | Fax: 816-439-9992
www.infinygo.com



ENGINEERED BY:



DESIGNED BY: WAPPINGERS FALLS / PRESTON CITY

DATE: 02/01/11 BY: JRS

DATE: 02/01/11 BY: JRS

DATE: 02/01/11 BY: JRS

DATE: 02/01/11 BY: JRS

DATE: 02/01/11 BY: JRS

DATE: 02/01/11 BY: JRS

DATE: 02/01/11 BY: JRS

DATE: 02/01/11 BY: JRS

DATE: 02/01/11 BY: JRS

DATE: 02/01/11 BY: JRS

DATE: 02/01/11 BY: JRS

DATE: 02/01/11 BY: JRS

DATE: 02/01/11 BY: JRS

DATE: 02/01/11 BY: JRS

DATE: 02/01/11 BY: JRS

DATE: 02/01/11 BY: JRS

DATE: 02/01/11 BY: JRS

DATE: 02/01/11 BY: JRS

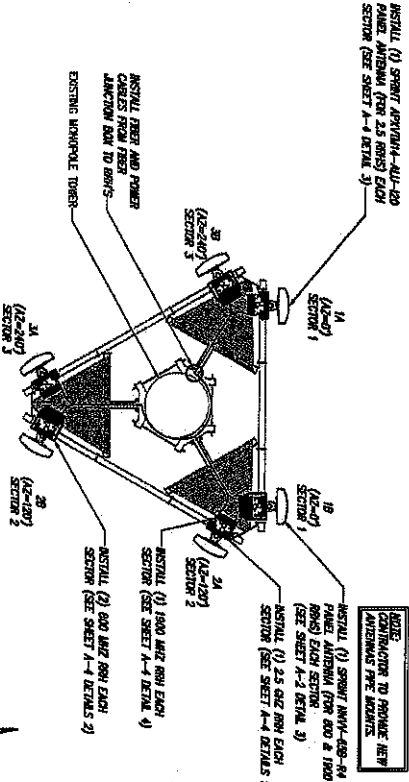
DATE: 02/01/11 BY: JRS

DATE: 02/01/11 BY: JRS

DATE: 02/01/11 BY: JRS

NOTE: THESE PANELS ARE TO BE 2.5' HIGHER FROM THE 2.5' ANTENNA CENTER EXCEEDED 25 FEET

NOTE: CONTRACTOR TO PROVIDE NEW WINDMILL PRE-MOUNTED ANTENNAS



THE CONNECTION PLANS ARE BASED ON THE ASSUMPTION THAT THE CONTRACTOR WILL PROVIDE ALL NECESSARY CONNECTIONS FROM THE EXISTING FIELD TO THE ANTENNAS.

FINAL ANTENNA & RAIL LAYOUT

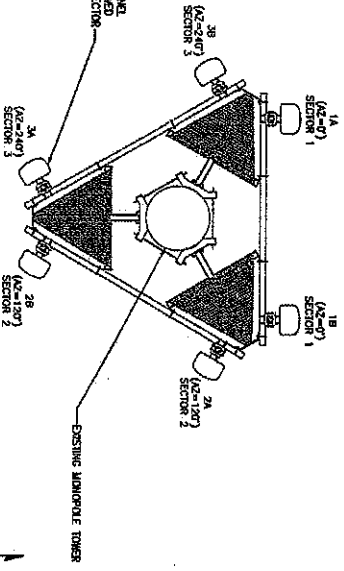
NO SCALE

1

NO SCALE

1

EXISTING ANTENNA LAYOUT



NO SCALE

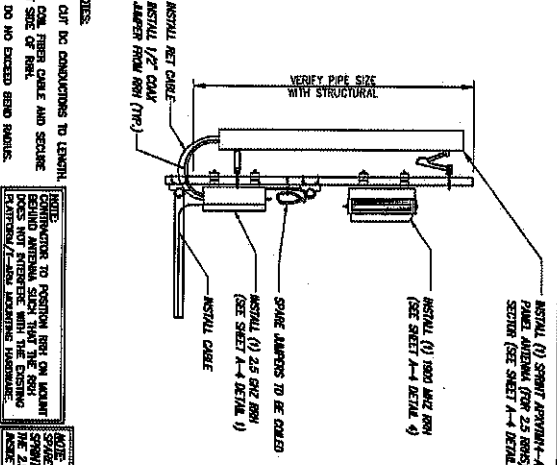
1

- 1. ALL ANTENNA HEIGHTS ARE TO CENTER OF HORIZONTAL ANTENNA.
- 2. VERIFY AZIMUTH AND CL HEIGHT WITH AS-BUILT DRAWINGS IF AVAILABLE.
- 3. NO OBJECT IS TO BE WITHIN 45 DEGREES OF BOSS-9087 OF 2.5G OR ANY OTHER TOWER ANTENNA. IF NECESSARY, 2.5G ANTENNA CAN BE PLACED AT THE EDGE OF HORIZONTAL ANTENNA MOUNT HUBS FOR CLEAR LINE OF SIGHT OR EVEN ON ANOTHER SECTOR FOR CLEAR LINE OF SIGHT.
- 4. 2.5G ANTENNA MUST BE AT LEAST 6' FROM TOWER ANTENNA, 30' FROM DOMINANT ANTENNA AND 30' FROM DUAL BAND TOWER ANTENNA AND GROUND ANTENNA.
- 5. IF ANTENNAS ARE MOUNTED ON A FACE SURFACE SUCH AS A BUILDING WALL, BRACKET WALL, OR WINDY TOWER WALL, THIS AREA MUST BE ACCOMPANIED BY A SKETCH PROVIDED BY THE OBSERVING ENGINEER CALLING OUT THE EXACT LOCATION OF WHERE ANTENNA IS TO BE LOCATED. CONTACT WITH THE ENGINEER IF THIS SECTION IS MISSING.
- 6. GENERAL CONTRACTOR TO FIELD VERIFY AZIMUTH AND CL HEIGHT AND MECHANICAL CONNECTIONS. IF ANY DISCREPANCIES ARE FOUND, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING NECESSARY PERMISSIONS FROM THE ENGINEER FOR ANY DEVIATIONS FROM THE AS-BUILT DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING NECESSARY PERMISSIONS FROM THE ENGINEER FOR ANY DEVIATIONS FROM THE AS-BUILT DRAWINGS.
- 7. ASSET TESTS TO VERIFY OPERATION IS TO BE PERFORMED AFTER FINAL INSTALLATION OF ANTENNAS AND ALL CABLES HAVE BEEN CONNECTED. VERIFY OPERATION OF ALL EXISTING EQUIPMENT AND EQUIPMENT INCLUDING ROUTER, LOGS, AND 2.5G TEST INCLUDE COMPLETE AZIMUTH AND CL HEIGHT TESTS. VERIFY OPERATION OF ALL EXISTING EQUIPMENT AND EQUIPMENT INCLUDING ROUTER, LOGS, AND 2.5G TEST INCLUDE COMPLETE AZIMUTH AND CL HEIGHT TESTS.
- 8. GENERAL CONTRACTOR MUST INSURE THAT NO OBJECT IS LOCATED IN FRONT OF ANTENNA THIS MEANS NO OBJECT IS TO BE LOCATED 45 DEGREES LEFT AND RIGHT OF FRONT OF ANTENNA OR 120 DEGREES LEFT AND RIGHT OF FRONT OF ANTENNA. IF THIS IS NOT POSSIBLE, CONTACT THE ENGINEER IMMEDIATELY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING NECESSARY PERMISSIONS FROM THE ENGINEER FOR ANY DEVIATIONS FROM THE AS-BUILT DRAWINGS.
- 9. GENERAL CONTRACTOR IS REQUIRED TO USE A DOPPLER ANEMOMETER TOOL TO SET AZIMUTH, ROLL AND TILT TO BE WITHIN 0.1 DEGREES. IF FOR SOME REASON THIS ANEMOMETER CANNOT BE USED, CONTACT THE ENGINEER IMMEDIATELY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING NECESSARY PERMISSIONS FROM THE ENGINEER FOR ANY DEVIATIONS FROM THE AS-BUILT DRAWINGS.

NOTES

NO SCALE

3



TYPICAL ANTENNA & RAIL MOUNTING DETAILS

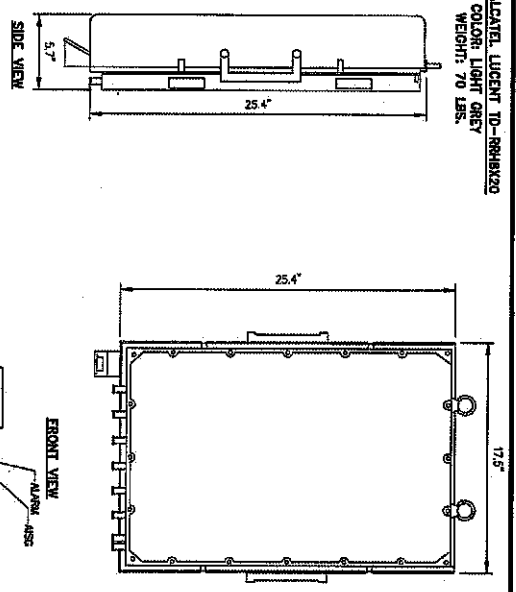
NO SCALE

4

A-3

RRH: ALCATEL LUCENT TD-RHNR100

COLOR: LIGHT GREY
WEIGHT: 70 LBS.



NOTES
CONSULT WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRH'S RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING. DO NOT OPEN RRH PACKAGES IN THE FIELD.

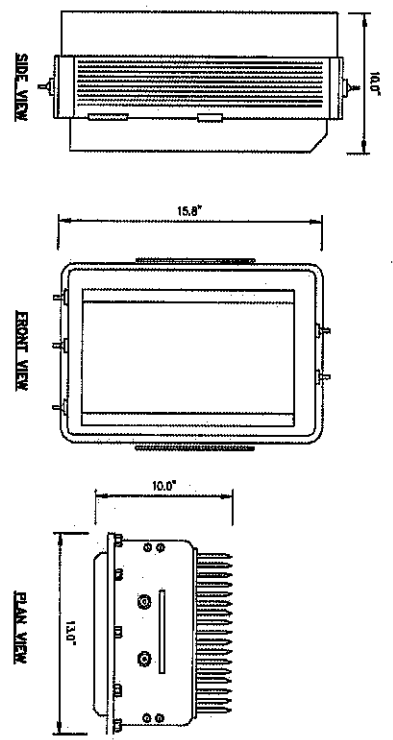
2.5 RRH'S

NO SCALE

1

RRH: ALCATEL LUCENT RRH 800 MHz 2-650W

COLOR: LIGHT GREY
WEIGHT: 55 LBS.



NOTES
CONSULT WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRH'S RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING. DO NOT OPEN RRH PACKAGES IN THE FIELD.

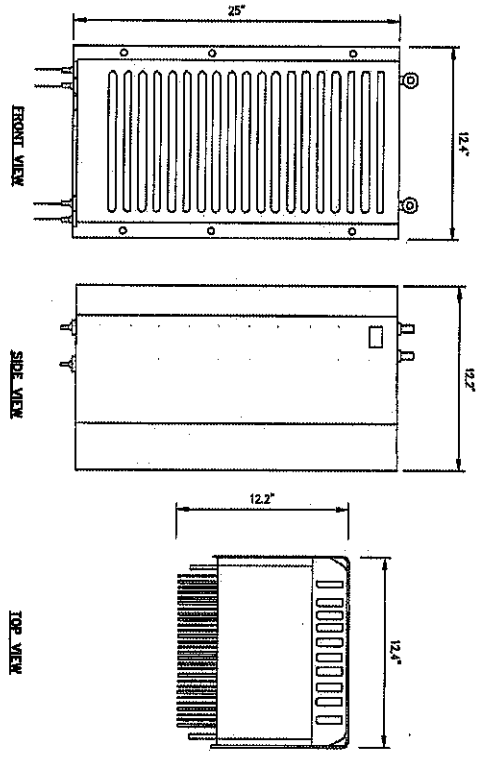
800 MHz RRH

NO SCALE

2

RRH: ALCATEL LUCENT 1800 MHz

COLOR: LIGHT GREY
WEIGHT: 70 LBS.
(INCLUDING OPTIONAL SOLAR SHIELD)



1800 MHz RRH

NO SCALE

4

DRAWING NOTES:
THESE DOCUMENTS ARE CONFIDENTIAL AND ARE THE SOLE PROPERTY OF SPRINT AND MAY NOT BE REPRODUCED, DISSEMINATED OR OTHERWISE USED WITHOUT THE EXPRESS WRITTEN CONSENT OF SPRINT.



PLANS PROVIDED BY:
INFINIGY
FROM ZERO TO INFINIGY
How solutions are endless
1000 Waterfront Plaza #4, Albany, NY 12201
Phone: 518-438-9270 | Fax: 518-438-9273
WWW.INFINIGY.COM

PLANS PROVIDED FOR:
Sprint
6590 South Parkway
Overland Park, Kansas 66251

REVISION	DESCRIPTION	DATE	BY	REV
1	ISSUED FOR CONSTRUCTION	09/24/12	EB	1
2	ISSUED FOR CONSTRUCTION	09/24/12	EB	2
3	ISSUED FOR CONSTRUCTION	09/24/12	EB	3
4	ISSUED FOR CONSTRUCTION	09/24/12	EB	4

ENGINEER:
WAPPINGERS FALLS / PRESTON CITY

DRAWING NO.:
CT33XC010

SITE ADDRESS:
**101 PERCE ROAD
PRESTON, CT 06365**

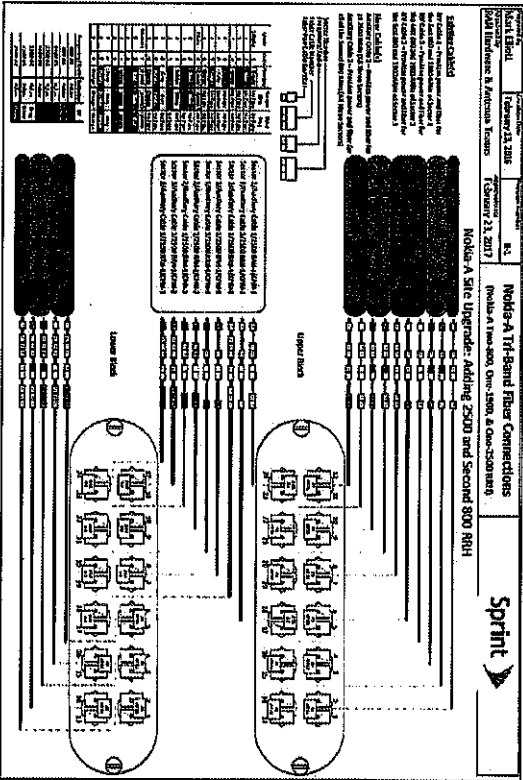
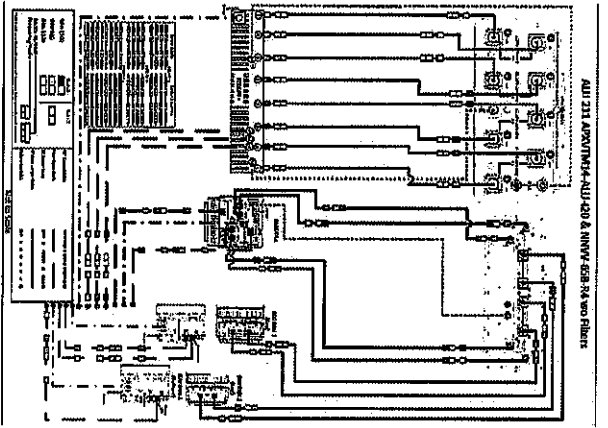
SHEET NUMBER:
EQUIPMENT & MOUNTING DETAILS

PROJECT NUMBER:
A-4

2.5 ANTENNA

NO SCALE

3



PLUMBING DIAGRAM

NO SCALE

1

Sprint
 650 Sprint Parkway
 Overland Park, Kansas 66201

INFINIGYO
 FROM ZERO TO INFINIGYO
 The solutions we analyze
 002 Sutterfield Street, 11th Floor, New York, NY 10003
 Phone: 917-442-9776 | Fax: 917-442-9777
 www.infinigyo.com

CROWN CASTLE

PROFESSIONAL ENGINEER
 STATE OF CONNECTICUT
 License No. 10000
 10/1/2010 - 10/1/2015

THESE DOCUMENTS ARE CONFIDENTIAL AND ARE THE SOLE PROPERTY OF SPRINT AND MAY NOT BE REPRODUCED, ASSASSINATED OR REMOVED FROM SPRINT WITHOUT THE WRITTEN CONSENT OF SPRINT.

REVISION	DATE	BY	REASON
ISSUED FOR CONSTRUCTION	10/1/15	RE: 1	
ISSUED FOR CONSTRUCTION	07/07/15	RE: 1	
ISSUED FOR CONSTRUCTION	11/16/13	RE: 1	
ISSUED FOR CONSTRUCTION	11/16/13	RE: 1	

WAPPINGERS FALLS / PRESTON CITY
 SITE CHAIRMAN
 CT33XC010

101 PIERCE ROAD PRESTON, CT 06365
 PLUMBING DIAGRAM

A-6



650 South Palmer
Oxford Park, Vermont 05451



PLANS PROVIDED BY:
INFINIGY
FROM ZERO TO INFINIGY
1033 Westfield Street, 2nd Floor, New York, NY 10018
Phone: 516-455-0261 | Fax: 516-455-0270
www.infinity.com
© 2010



CONTRACT NO. 10001
DATE: 01/11/10
BY: WJW
DESCRIPTION: WAPPINGERS FALLS / PRESTON CITY

WAPPINGERS FALLS / PRESTON CITY
SITE ADDRESS:
101 PIERCE ROAD
PRESTON, CT 06365

PROJECT NUMBER:
E-1

PROJECT NAME:
ELECTRICAL & GROUNDING DETAILS

FINAL EQUIPMENT CONFIGURATION

SECTION	ANTENNA MANUFACTURER	ANTENNA MODEL	ROD CENTER	ASB/HV	ROTOR/CABLE ATTACHMENT
1	RFS	AVT10M44100	157"	0"	(1) 1/4" THERMOPLASTIC OVERSHEATH (2) 1/4" BONDING 250,000
2	RFS	AVT10M44100	157"	120"	(1) 1/4" THERMOPLASTIC OVERSHEATH (2) 1/4" BONDING 250,000
3	RFS	AVT10M44100	157"	240"	(1) 1/4" THERMOPLASTIC OVERSHEATH (2) 1/4" BONDING 250,000

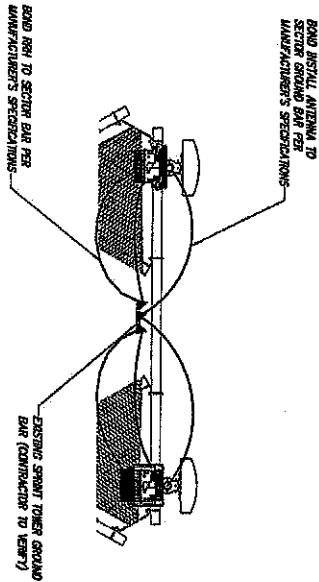
NOTE: REFER TO WPPINGERS FALLS PRESTON CITY AT THE MOST CURRENT DATE AT TIME OF CONSTRUCTION. REFER TO WAPPINGERS FALLS PRESTON CITY AT THE MOST CURRENT DATE AT TIME OF CONSTRUCTION. REFER TO WAPPINGERS FALLS PRESTON CITY AT THE MOST CURRENT DATE AT TIME OF CONSTRUCTION.

ANTENNA/CABLE SCHEDULE

LEGEND:
EXISTING
NEW

MANUFACTURER	MODEL	LENGTH	UNIT
RFS	AVT10M44100	200'	(1)
RFS	AVT10M44100	200'	(1)

- g — EXISTING GROUND RING
- CROWNED CONNECTION (EXPOSING WELD)
- ▲ MECHANICAL CONNECTION
- ⊙ GROUND ROD
- CABLE GROUND KIT



TYPICAL ANTENNA GROUNDING PLAN

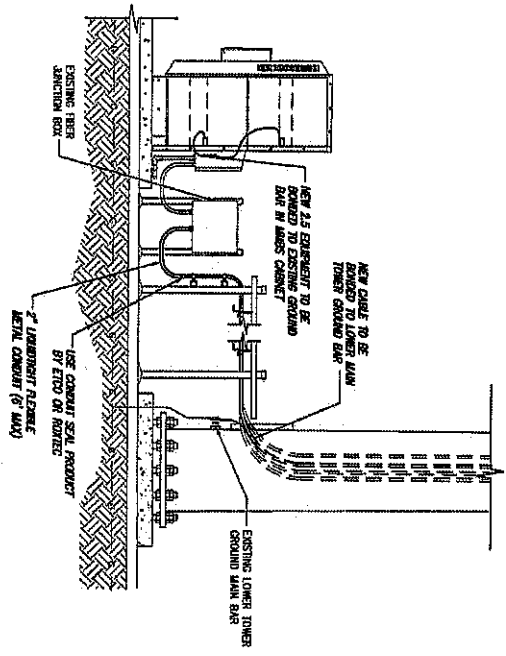
NO SCALE

2

TYPICAL EQUIPMENT GROUNDING PLAN (ELEVATION)

NO SCALE

3

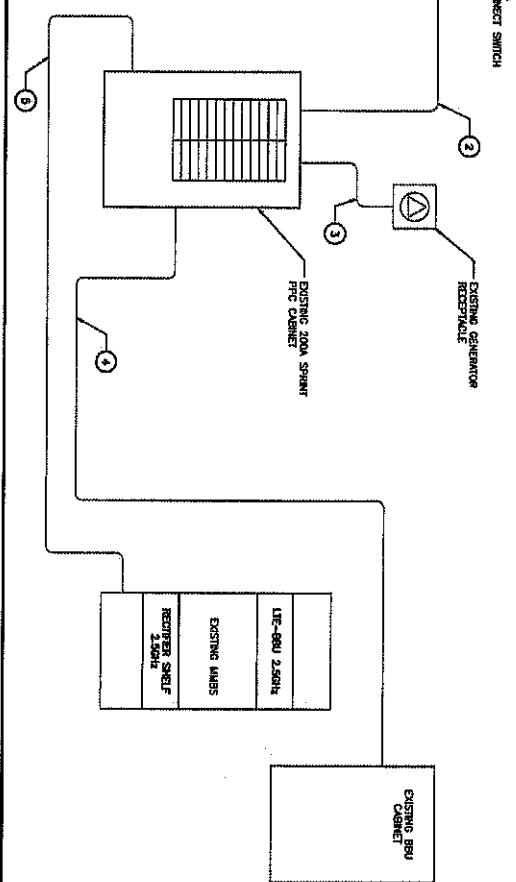


NO SCALE

1

NOTES
 1. SHALL REFERENCE ALL SPECS FOR CONCERNING THE POWER SUPPLY OF THE NEW INSTALLATION DOCUMENTS FOR ALL CONNECTIONS SPECIFICALLY.

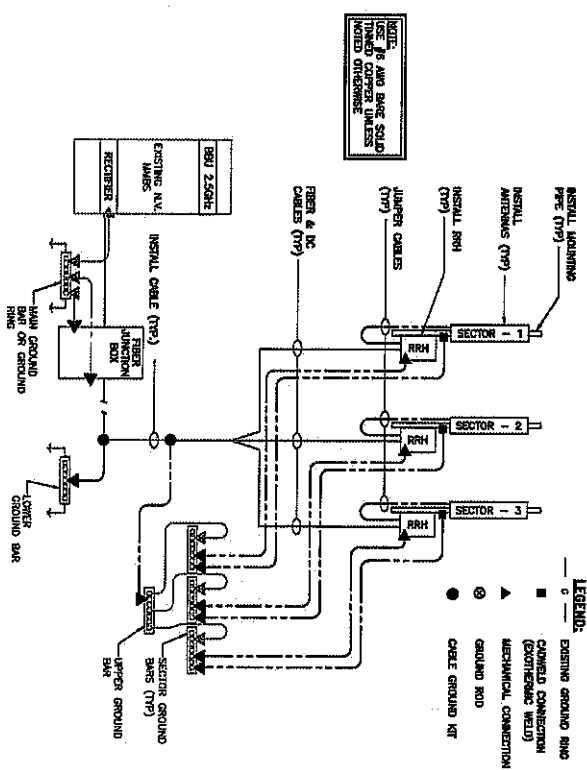
NO.	FROM	TO	COMPLETION
1	UTILITY SOURCE	METER/DISCONNECT	EXISTING
2	METER/DISCONNECT	TRANSFER & LOAD CENTER	EXISTING
3	TRANSFER & LOAD CENTER	GENERATOR RECEPTACLE	EXISTING
4	TRANSFER & LOAD CENTER	EXISTING SPRINT BRU CABINET	EXISTING
5	TRANSFER & LOAD CENTER	EXISTING SPRINT LAMBS	EXISTING



NO.	FROM	TO	COMPLETION
1	UTILITY SOURCE	METER/DISCONNECT	EXISTING
2	METER/DISCONNECT	TRANSFER & LOAD CENTER	EXISTING
3	TRANSFER & LOAD CENTER	GENERATOR RECEPTACLE	EXISTING
4	TRANSFER & LOAD CENTER	EXISTING SPRINT BRU CABINET	EXISTING
5	TRANSFER & LOAD CENTER	EXISTING SPRINT LAMBS	EXISTING

PANEL SCHEDULE

NO SCALE 2



PLAN PREPARED FOR:
Sprint
 6500 Saddle Parkway
 Overland Park, Kansas 66251

PLAN PREPARED BY:
INFINIGY
 FROM ZERO TO INFINIGY
 No solutions are unattainable.
 1033 Westfield Parkway, Suite 110
 Phoenix, AZ 85029 | Fax: 480-326-2222
 www.infinigy.com

PLAN PARTNER:
CROWN CASTLE

DESIGNED BY:
JOHN S. STEWART
 PROFESSIONAL ENGINEER
 No. 24705

THESE DOCUMENTS ARE CONFIDENTIAL AND ARE THE SOLE PROPERTY OF SPRINT AND MAY NOT BE REPRODUCED, DISSEMINATED OR DISTRIBUTED WITHOUT THE EXPRESS WRITTEN CONSENT OF SPRINT.

REVISIONS:

NO.	DESCRIPTION	DATE	BY	REV
1	ISSUED FOR GROUNDING	02/27/13	ES	1
2	ISSUED FOR CONSTRUCTION	02/27/13	ES	1
3	ISSUED FOR CONSTRUCTION	02/27/13	ES	1

DATE: 02/27/13
 DRAWN BY: ES
 CHECKED BY: ES
 DATE: 02/27/13
 DRAWN BY: ES
 CHECKED BY: ES

PROJECT NAME:
WAPPINGERS FALLS / PRESTON CITY

PROJECT ADDRESS:
 101 PIERCE ROAD
 PRESTON, CT 06365

PROJECT NUMBER:
E-2

Date: June 27, 2018

Timothy Howell
Crown Castle
3530 Toringdon Way, Suite 300
Clifton Park, NY 12065



Aero Solutions
5555 Central Ave., Suite 100
Boulder, CO 80301
(720) 304-6882

Subject: Structural Analysis Report

Carrier Designation:

Sprint PCS Co-Locate
Carrier Site Number:
Carrier Site Name:

CT33XC010
CT33XC010

Crown Castle Designation:

Crown Castle BU Number:
Crown Castle Site Name:
Crown Castle JDE Job Number:
Crown Castle Work Order Number:
Crown Castle Application Number:

876366
Wappingers Falls / Preston Cit
505915
1593865
441415 Rev. 0

Engineering Firm Designation:

Aero Solutions Project Number:

003-18-0094

Site Data:

101 Pierce Road, Preston, New London County, CT 06365
Latitude 41° 32' 17.46", Longitude -71° 57' 6"
155 Foot - Monopole Tower

Dear Denice Nicholson,

Aero Solutions is pleased to submit this "Structural Analysis 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 1209078, in accordance with application 441415, 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:

LC5: Existing + Reserved + Proposed Equipment

Sufficient Capacity

Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 135 mph converted to a nominal 3-second gust wind speed of 105 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B Risk Category II was/were used in this analysis.

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 Aero Solutions 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.

Structural analysis prepared by: Josh Rozina, P.E.

Respectfully submitted by:

Ryan Spalding, P.E.
Structural Engineer
PE#: 30849
Expires: 10/31/2019

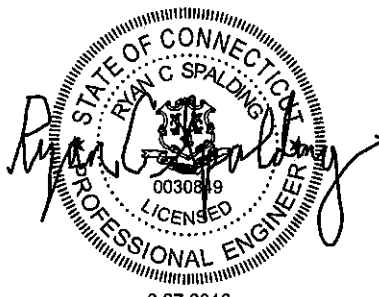


TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA

Table 1 - Proposed Antenna and Cable Information

Table 2 - Existing and Reserved Antenna and Cable Information

Table 3 - Design Antenna and Cable Information

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Table 6 - Tower Components vs. Capacity

4.1) Recommendations

5) APPENDIX A

tnxTower Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 155 ft Monopole tower designed by Engineered Endeavors, Inc. and mapped by TEP in December of 2007. The tower was originally designed for a wind speed of 89 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-H Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 105 mph with no ice, 50 mph with 0.75 inch ice thickness and 60 mph under service loads, exposure category B with topographic category 1 and crest height of 0 feet.

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
155.0	150.0	3	Alcatel Lucent	PCS 1900MHz 4x45W-65MHz	4	1-1/4	-
		6	Alcatel Lucent	RRH2X50-800			
		3	Alcatel Lucent	TD-RRH8x20-25			
		3	Commscope	NNVV-65B-R4 w/ Mount Pipe			
		3	RFS Celwave	APXVTM14-ALU-I20 w/ Mount Pipe			

Notes:

- 1) See Appendix B for proposed coax configuration

Table 2 - Existing and Reserved 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
155.0	157.0	6	Decibel	DB980H90E-M w/ Mount Pipe	6	7/8	3
	155.0	1	Tower Mounts	Platform Mount [LP 712-1]	-	-	1
142.0	142.0	3	Ericsson	RRUS 11	-	-	1
		1	Tower Mounts	Side Arm Mount [SO 102-3]			
140.0	140.0	6	Powerwave Technologies	7770.00 w/ Mount Pipe	12 2	1-1/4 3/8	1
		3	CCI Antennas	HPA-65R-BUU-H8 w/ Mount Pipe	4	7/16	2
		3	Ericsson	RRUS 32 B2			
		3	Ericsson	RRUS 4478 B14			
		3	Kathrein	80010966 w/ Mount Pipe			
		6	Powerwave Technologies	LGP21401			
		6	Powerwave Technologies	LGP21901			
		2	Raycap	DC6-48-60-18-8F			
1	Tower Mounts	Platform Mount [LP 303-1]	-	-			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
128.0	134.0	3	Alcatel Lucent	B66A RRH4X45-4R	2	1-5/8	2
		3	Alcatel Lucent	RRH2x60-700			
		3	Nokia	B5 4T4R RRH4X40 AIRSCALE			
		1	Raycap	RVZDC-6627-PF-48			
	131.0	6	Commscope	JAHH-65B-R3B w/ Mount Pipe	12	1-5/8	1
		6	Antel	LPA-80063/6CF w/ Mount Pipe			
128.0	1	Tower Mounts	T-Arm Mount [TA 602-3]				
74.0	74.0	1	Lucent	KS24019-L112A	1	1/2	1
		1	Tower Mounts	Side Arm Mount [SO 701-1]			

- Notes:
 1) Existing equipment
 2) Reserved equipment
 3) Existing 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)
150.0	150.0	12	Decibel	DB980H90E-M	-	-
140.0	140.0	12	Antel	ALP9212	-	-
130.0	130.0	12	Antel	ALP9212	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Geotechnical Reports	Dr. Clarence Welti	5568	-
Tower Foundation Drawing	Engineered Endeavors	5568	-
Tower Manufacture Drawing	Engineered Endeavors	5568	-
Post-Modification Inspection	PSG Engineering, Ltd.	2391519	CCISites
Post-Modification Inspection	Sinnott Gering and Schmitt Towers, Inc.	6133027	CCISites
Tower Reinforcement Design	PSG Engineering, Ltd.	2271037	CCISites
Tower Reinforcement Design	Black & Veatch Corp.	5971889	CCISites

3.1) Analysis Method

tnxTower (version 8.0.2.1), 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.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)¹

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
155 - 150	Pole	TP19.036x18x0.1875	Pole	6.7%	Pass
150 - 145	Pole	TP20.073x19.036x0.1875	Pole	15.3%	Pass
145 - 140	Pole	TP21.109x20.073x0.1875	Pole	23.1%	Pass
140 - 135	Pole	TP22.146x21.109x0.1875	Pole	38.3%	Pass
135 - 130	Pole	TP23.182x22.146x0.1875	Pole	51.4%	Pass
130 - 126.79	Pole	TP24.59x23.182x0.1875	Pole	64.6%	Pass
126.79 - 121.79	Pole	TP24.671x23.473x0.25	Pole	57.3%	Pass
121.79 - 116.79	Pole	TP25.87x24.671x0.25	Pole	66.0%	Pass
116.79 - 111.79	Pole	TP27.068x25.87x0.25	Pole	73.8%	Pass
111.79 - 106.79	Pole	TP28.267x27.068x0.25	Pole	80.6%	Pass
106.79 - 101.79	Pole	TP29.465x28.267x0.25	Pole	86.5%	Pass
101.79 - 97.5	Pole	TP30.494x29.465x0.25	Pole	90.9%	Pass
97.5 - 97.25	Pole	TP30.554x30.494x0.25	Pole	91.2%	Pass
97.25 - 92.25	Pole	TP31.752x30.554x0.25	Pole	95.8%	Pass
92.25 - 87.41	Pole	TP34.07x31.752x0.25	Pole	99.8%	Pass
87.41 - 81.58	Pole	TP33.825x32.412x0.3125	Pole	79.9%	Pass
81.58 - 76.58	Pole	TP35.037x33.825x0.3125	Pole	82.0%	Pass
76.58 - 71.58	Pole	TP36.249x35.037x0.3125	Pole	84.0%	Pass
71.58 - 68	Pole	TP37.117x36.249x0.3125	Pole	85.3%	Pass
68 - 67.75	Pole + Reinf.	TP37.178x37.117x0.4875	Reinf. 1 Tension Rupture	84.3%	Pass
67.75 - 62.75	Pole + Reinf.	TP38.39x37.178x0.475	Reinf. 1 Tension Rupture	86.0%	Pass
62.75 - 57.75	Pole + Reinf.	TP39.602x38.39x0.475	Reinf. 1 Tension Rupture	87.6%	Pass
57.75 - 52.75	Pole + Reinf.	TP40.814x39.602x0.4625	Reinf. 1 Tension Rupture	89.0%	Pass
52.75 - 48.96	Pole + Reinf.	TP43.17x40.814x0.4625	Reinf. 1 Tension Rupture	90.0%	Pass
48.96 - 42.03	Pole	TP42.791x41.108x0.375	Pole	75.0%	Pass
42.03 - 37.03	Pole	TP44.005x42.791x0.375	Pole	75.7%	Pass
37.03 - 32.03	Pole	TP45.22x44.005x0.375	Pole	76.4%	Pass
32.03 - 27.03	Pole	TP46.434x45.22x0.375	Pole	77.0%	Pass
27.03 - 22.03	Pole	TP47.649x46.434x0.375	Pole	77.6%	Pass
22.03 - 17.03	Pole	TP48.863x47.649x0.375	Pole	78.1%	Pass
17.03 - 12.03	Pole	TP50.078x48.863x0.375	Pole	78.6%	Pass
12.03 - 7.03	Pole	TP51.292x50.078x0.375	Pole	79.1%	Pass
7.03 - 2.03	Pole	TP52.507x51.292x0.375	Pole	79.6%	Pass

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
2.03 - 0	Pole	TP53x52.507x0.375	Pole	79.8%	Pass
				Summary	
			Pole	99.8%	Pass
			Reinforcement	90.0%	Pass
			Overall	99.8%	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	93.5	Pass
1	Base Plate	0	68.4	Pass
1	Base Foundation	0	92.8	Pass
1	Base Foundation Soil Interaction	0	82.5	Pass

Structure Rating (max from all components) =	99.8%
---	--------------

Notes:

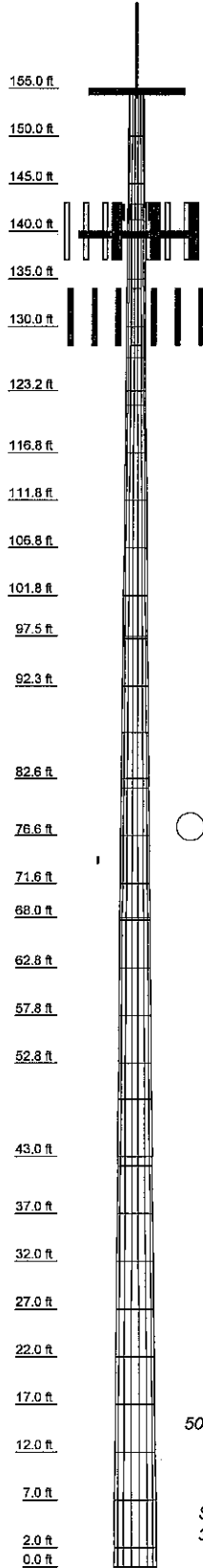
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity listed.

4.1) Recommendations

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

APPENDIX A
TNXTOWER OUTPUT

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	
Length (ft)	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	
Number of Sides	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Thickness (in)	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	
Socket Length (ft)	3.58																																		
Top Dia (in)	30.5506																																		
Bot Dia (in)	31.7901																																		
Grade	A572-65																																		
Weight (K)	21.204																																		



DESIGNED APPURTENANCE LOADING

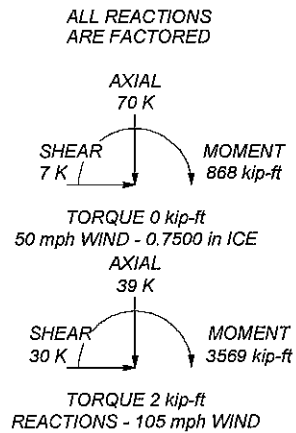
TYPE	ELEVATION	TYPE	ELEVATION
NNVV-65B-R4 w/ Mount Pipe	155	RRUS 32 B2	140
NNVV-65B-R4 w/ Mount Pipe	155	RRUS 32 B2	140
NNVV-65B-R4 w/ Mount Pipe	155	RRUS 32 B2	140
APXVTM14-ALU-120 w/ Mount Pipe	155	RRUS 4478 B14	140
APXVTM14-ALU-120 w/ Mount Pipe	155	RRUS 4478 B14	140
APXVTM14-ALU-120 w/ Mount Pipe	155	RRUS 4478 B14	140
TD-RRH8x20-25	155	(2) LGP21401	140
TD-RRH8x20-25	155	(2) LGP21401	140
TD-RRH8x20-25	155	(2) LGP21401	140
(2) RRH2X50-800	155	(2) LGP21901	140
(2) RRH2X50-800	155	(2) LGP21901	140
(2) RRH2X50-800	155	(2) LGP21901	140
PCS 1900MHz 4x45W-65MHz	155	DC6-48-60-18-8F	140
PCS 1900MHz 4x45W-65MHz	155	DC6-48-60-18-8F	140
PCS 1900MHz 4x45W-65MHz	155	LPA-80063/6CF w/ Mount Pipe	128
(2) 6' x 2" Mount Pipe	155	LPA-80063/6CF w/ Mount Pipe	128
(2) 6' x 2" Mount Pipe	155	(2) LPA-80063/6CF w/ Mount Pipe	128
(2) 6' x 2" Mount Pipe	155	(2) LPA-80063/6CF w/ Mount Pipe	128
Platform Mount [LP 712-1]	155	JAHH-65B-R3B w/ Mount Pipe	128
Transition Ladder	155	JAHH-65B-R3B w/ Mount Pipe	128
8' x 3" Mount Pipe	155	JAHH-65B-R3B w/ Mount Pipe	128
RRUS 11	142	JAHH-65B-R3B w/ Mount Pipe	128
RRUS 11	142	JAHH-65B-R3B w/ Mount Pipe	128
RRUS 11	142	JAHH-65B-R3B w/ Mount Pipe	128
Side Arm Mount [SO 102-3]	142	RRH2x60-700	128
Platform Mount [LP 303-1]	140	RRH2x60-700	128
(2) 7770.00 w/ Mount Pipe	140	RRH2x60-700	128
(2) 7770.00 w/ Mount Pipe	140	B66A RRH4X45-4R	128
(2) 7770.00 w/ Mount Pipe	140	(2) B66A RRH4X45-4R	128
HPA-65R-BUU-H8 w/ Mount Pipe	140	B5 4T4R RRH4X40 AIRSCALE	128
HPA-65R-BUU-H8 w/ Mount Pipe	140	(2) B5 4T4R RRH4X40 AIRSCALE	128
HPA-65R-BUU-H8 w/ Mount Pipe	140	RVZDC-6627-PF-48	128
80010966 w/ Mount Pipe	140	T-Arm Mount [TA 602-3]	128
80010966 w/ Mount Pipe	140	KS24019-L112A	74
80010966 w/ Mount Pipe	140	Side Arm Mount [SO 701-1]	74

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 105 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft



Aero Wireless Group
5555 Central Ave., Suite 100
Boulder, CO 80301
Phone: (720) 304-6882
FAX: (720) 304-6883

Job: **BU# 876366) WAPPINGERS FALLS / PRESTON C**
Project: **Existing 155-ft Monopole**

Client: Crown Castle	Drawn by: JRozina	App'd:
Code: TIA-222-G	Date: 06/26/18	Scale: NTS
Path:		Dwg No. E-1

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 1 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Tower Input Data

The tower is a monopole.

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

The following design criteria apply:

Tower is located in New London County, Connecticut.

Basic wind speed of 105 mph.

Structure Class II.

Exposure Category B.

Topographic Category 1.

Crest Height 0.00 ft.

Nominal ice thickness of 0.7500 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 50 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

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

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

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

Options

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

Tapered Pole Section Geometry

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
L1	155.00-150.00	5.00	0.00	18	18.0000	19.0365	0.1875	0.7500	A572-65

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 2 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L2	150.00-145.00	5.00	0.00	18	19.0365	20.0730	0.1875	0.7500	(65 ksi) A572-65
L3	145.00-140.00	5.00	0.00	18	20.0730	21.1095	0.1875	0.7500	(65 ksi) A572-65
L4	140.00-135.00	5.00	0.00	18	21.1095	22.1460	0.1875	0.7500	(65 ksi) A572-65
L5	135.00-130.00	5.00	0.00	18	22.1460	23.1824	0.1875	0.7500	(65 ksi) A572-65
L6	130.00-123.21	6.79	3.58	18	23.1824	24.5900	0.1875	0.7500	(65 ksi) A572-65
L7	123.21-121.79	5.00	0.00	18	23.4729	24.6714	0.2500	1.0000	(65 ksi) A572-65
L8	121.79-116.79	5.00	0.00	18	24.6714	25.8699	0.2500	1.0000	(65 ksi) A572-65
L9	116.79-111.79	5.00	0.00	18	25.8699	27.0684	0.2500	1.0000	(65 ksi) A572-65
L10	111.79-106.79	5.00	0.00	18	27.0684	28.2669	0.2500	1.0000	(65 ksi) A572-65
L11	106.79-101.79	5.00	0.00	18	28.2669	29.4654	0.2500	1.0000	(65 ksi) A572-65
L12	101.79-97.50	4.29	0.00	18	29.4654	30.4937	0.2500	1.0000	(65 ksi) A572-65
L13	97.50-97.25	0.25	0.00	18	30.4937	30.5536	0.2500	1.0000	(65 ksi) A572-65
L14	97.25-92.25	5.00	0.00	18	30.5536	31.7521	0.2500	1.0000	(65 ksi) A572-65
L15	92.25-82.58	9.67	4.83	18	31.7521	34.0700	0.2500	1.0000	(65 ksi) A572-65
L16	82.58-81.58	5.83	0.00	18	32.4123	33.8254	0.3125	1.2500	(65 ksi) A572-65
L17	81.58-76.58	5.00	0.00	18	33.8254	35.0375	0.3125	1.2500	(65 ksi) A572-65
L18	76.58-71.58	5.00	0.00	18	35.0375	36.2495	0.3125	1.2500	(65 ksi) A572-65
L19	71.58-68.00	3.58	0.00	18	36.2495	37.1173	0.3125	1.2500	(65 ksi) A572-65
L20	68.00-67.75	0.25	0.00	18	37.1173	37.1779	0.4875	1.9500	(65 ksi) A572-65
L21	67.75-62.75	5.00	0.00	18	37.1779	38.3899	0.4750	1.9000	(65 ksi) A572-65
L22	62.75-57.75	5.00	0.00	18	38.3899	39.6019	0.4750	1.9000	(65 ksi) A572-65
L23	57.75-52.75	5.00	0.00	18	39.6019	40.8139	0.4625	1.8500	(65 ksi) A572-65
L24	52.75-43.03	9.72	5.93	18	40.8139	43.1700	0.4625	1.8500	(65 ksi) A572-65
L25	43.03-42.03	6.93	0.00	18	41.1076	42.7909	0.3750	1.5000	(65 ksi) A572-65
L26	42.03-37.03	5.00	0.00	18	42.7909	44.0054	0.3750	1.5000	(65 ksi) A572-65
L27	37.03-32.03	5.00	0.00	18	44.0054	45.2199	0.3750	1.5000	(65 ksi) A572-65
L28	32.03-27.03	5.00	0.00	18	45.2199	46.4344	0.3750	1.5000	(65 ksi) A572-65
L29	27.03-22.03	5.00	0.00	18	46.4344	47.6489	0.3750	1.5000	(65 ksi) A572-65
L30	22.03-17.03	5.00	0.00	18	47.6489	48.8634	0.3750	1.5000	(65 ksi) A572-65
L31	17.03-12.03	5.00	0.00	18	48.8634	50.0779	0.3750	1.5000	(65 ksi) A572-65

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 3 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L32	12.03-7.03	5.00	0.00	18	50.0779	51.2924	0.3750	1.5000	A572-65 (65 ksi)
L33	7.03-2.03	5.00	0.00	18	51.2924	52.5069	0.3750	1.5000	A572-65 (65 ksi)
L34	2.03-0.00	2.03		18	52.5069	53.0000	0.3750	1.5000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L1	18.2488	10.6007	424.9328	6.3234	9.1440	46.4712	850.4248	5.3013	2.8380	15.136
19.3012	11.2175	503.5120	6.6914	9.6705	52.0666	1007.6866	5.6098	3.0204	16.109	
L2	19.3012	11.2175	503.5120	6.6914	9.6705	52.0666	1007.6866	5.6098	3.0204	16.109
20.3537	11.8343	591.2264	7.0593	10.1971	57.9800	1183.2307	5.9183	3.2028	17.082	
L3	20.3537	11.8343	591.2264	7.0593	10.1971	57.9800	1183.2307	5.9183	3.2028	17.082
21.4062	12.4512	688.5782	7.4273	10.7236	64.2114	1378.0624	6.2268	3.3853	18.055	
L4	21.4062	12.4512	688.5782	7.4273	10.7236	64.2114	1378.0624	6.2268	3.3853	18.055
22.4587	13.0680	796.0698	7.7953	11.2501	70.7608	1593.1871	6.5353	3.5677	19.028	
L5	22.4587	13.0680	796.0698	7.7953	11.2501	70.7608	1593.1871	6.5353	3.5677	19.028
23.5111	13.6849	914.2035	8.1632	11.7767	77.6283	1829.6100	6.8437	3.7501	20.001	
L6	23.5111	13.6849	914.2035	8.1632	11.7767	77.6283	1829.6100	6.8437	3.7501	20.001
24.9404	14.5225	1092.5683	8.6629	12.4917	87.4634	2186.5743	7.2626	3.9978	21.322	
L7	24.6678	18.4274	1255.5449	8.2441	11.9242	105.2937	2512.7419	9.2154	3.6912	14.765
25.0134	19.3784	1460.1403	8.6696	12.5331	116.5031	2922.2018	9.6910	3.9022	15.609	
L8	25.0134	19.3784	1460.1403	8.6696	12.5331	116.5031	2922.2018	9.6910	3.9022	15.609
26.2304	20.3294	1685.8355	9.0951	13.1419	128.2795	3373.8893	10.1666	4.1131	16.452	
L9	26.2304	20.3294	1685.8355	9.0951	13.1419	128.2795	3373.8893	10.1666	4.1131	16.452
27.4474	21.2804	1933.6662	9.5205	13.7507	140.6228	3869.8768	10.6422	4.3240	17.296	
L10	27.4474	21.2804	1933.6662	9.5205	13.7507	140.6228	3869.8768	10.6422	4.3240	17.296
28.6644	22.2314	2204.6679	9.9460	14.3596	153.5330	4412.2367	11.1178	4.5350	18.14	
L11	28.6644	22.2314	2204.6679	9.9460	14.3596	153.5330	4412.2367	11.1178	4.5350	18.14
29.8814	23.1824	2499.8759	10.3715	14.9684	167.0102	5003.0412	11.5934	4.7459	18.984	
L12	29.8814	23.1824	2499.8759	10.3715	14.9684	167.0102	5003.0412	11.5934	4.7459	18.984
30.9255	23.9984	2773.2452	10.7365	15.4908	179.0254	5550.1394	12.0015	4.9269	19.708	
L13	30.9255	23.9984	2773.2452	10.7365	15.4908	179.0254	5550.1394	12.0015	4.9269	19.708
30.9864	24.0459	2789.7626	10.7578	15.5212	179.7385	5583.1961	12.0252	4.9374	19.75	
L14	30.9864	24.0459	2789.7626	10.7578	15.5212	179.7385	5583.1961	12.0252	4.9374	19.75
32.2034	24.9969	3134.0292	11.1832	16.1301	194.2973	6272.1822	12.5008	5.1484	20.593	
L15	32.2034	24.9969	3134.0292	11.1832	16.1301	194.2973	6272.1822	12.5008	5.1484	20.593
34.5570	26.8362	3877.9767	12.0061	17.3076	224.0626	7761.0561	13.4206	5.5563	22.225	
L16	34.0529	31.8389	4144.7596	11.3954	16.4654	251.7251	8294.9731	15.9225	5.1546	16.495
34.2991	33.2407	4716.6349	11.8971	17.1833	274.4890	9439.4760	16.6235	5.4033	17.29	
L17	34.2991	33.2407	4716.6349	11.8971	17.1833	274.4890	9439.4760	16.6235	5.4033	17.29
35.5298	34.4428	5247.0999	12.3274	17.7990	294.7970	10501.1041	17.2247	5.6166	17.973	
L18	35.5298	34.4428	5247.0999	12.3274	17.7990	294.7970	10501.1041	17.2247	5.6166	17.973
36.7605	35.6450	5815.9176	12.7576	18.4147	315.8298	11639.4879	17.8259	5.8299	18.656	
L19	36.7605	35.6450	5815.9176	12.7576	18.4147	315.8298	11639.4879	17.8259	5.8299	18.656
37.6416	36.5057	6247.4967	13.0657	18.8556	331.3344	12503.2140	18.2563	5.9826	19.144	
L20	37.6416	36.5057	6247.4967	13.0657	18.8556	331.3344	12503.2140	18.2563	5.9826	19.144
37.6762	56.6781	9607.7320	13.0036	18.8556	509.5436	19228.1062	28.3444	5.6746	11.64	
L21	37.6762	56.6781	9607.7320	13.0036	18.8556	509.5436	19228.1062	28.3444	5.6746	11.64
37.6781	55.3351	9417.5380	13.0295	18.8863	511.2421	19323.6970	28.3913	5.6853	11.662	
L22	37.6781	55.3351	9417.5380	13.0295	18.8863	511.2421	19323.6970	28.3913	5.6853	11.662
38.9088	57.1623	10381.6453	13.4598	19.5020	532.3362	20776.9510	28.5866	5.9206	12.464	
L22	38.9088	57.1623	10381.6453	13.4598	19.5020	532.3362	20776.9510	28.5866	5.9206	12.464
40.1395	58.9896	11409.4039	13.8900	20.1177	567.1314	22833.8205	29.5004	6.1339	12.914	
L23	40.1395	58.9896	11409.4039	13.8900	20.1177	567.1314	22833.8205	29.5004	6.1339	12.914
40.1414	57.4556	11119.8070	13.8945	20.1177	552.7363	22254.2458	28.7333	6.1559	13.31	

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 5 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft ²	in					in	in	in
L17				1	1	1			
81.58-76.58									
L18				1	1	1			
76.58-71.58									
L19				1	1	1			
71.58-68.00									
L20				1	1	0.961153			
68.00-67.75									
L21				1	1	0.975618			
67.75-62.75									
L22				1	1	0.965777			
62.75-57.75									
L23				1	1	0.982074			
57.75-52.75									
L24				1	1	0.975253			
52.75-43.03									
L25				1	1	1			
43.03-42.03									
L26				1	1	1			
42.03-37.03									
L27				1	1	1			
37.03-32.03									
L28				1	1	1			
32.03-27.03									
L29				1	1	1			
27.03-22.03									
L30				1	1	1			
22.03-17.03									
L31				1	1	1			
17.03-12.03									
L32 12.03-7.03				1	1	1			
L33 7.03-2.03				1	1	1			
L34 2.03-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement	Total Number	Number Per Row	Start/End Position	Width or Diameter	Perimeter	Weight
			ft				in	in	plf
Safety Line 3/8	B	Surface Ar (CaAa)	155.00 - 10.00	1	1	0.490 0.500	0.3750		0.22
5/8" Step Pegs	C	Surface Ar (CaAa)	155.00 - 0.00	1	1	0.000 0.000	0.3500		0.49

SFP-060100 (No Weight)	A	Surface Ar (CaAa)	70.00 - 45.00	1	1	0.000 0.000	6.0000		0.00
SFP-060100 (No Weight)	B	Surface Ar (CaAa)	70.00 - 45.00	1	1	0.000 0.000	6.0000		0.00
SFP-060100 (No Weight)	C	Surface Ar (CaAa)	70.00 - 45.00	1	1	0.000 0.000	6.0000		0.00
SFP-045100 (No Weight)	A	Surface Ar (CaAa)	99.00 - 84.00	1	1	0.000 0.000	4.5000		0.00
SFP-045100 (No Weight)	B	Surface Ar (CaAa)	99.00 - 84.00	1	1	0.000 0.000	4.5000		0.00
SFP-045100 (No Weight)	C	Surface Ar	99.00 - 84.00	1	1	0.000	4.5000		0.00

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 6 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
**		(CaAa)						0.000	

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C _{AA} ft ² /ft	Weight plf
*								
HB114-1-0813U4-M5J(1-1/4)	A	No	Inside Pole	155.00 - 8.00	3	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.20 1.20 1.20
HB114-13U3M12-XXX F(1-1/4)	A	No	Inside Pole	155.00 - 8.00	1	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.99 0.99 0.99

LDF6-50A(1-1/4)	B	No	Inside Pole	140.00 - 2.00	12	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.60 0.60 0.60
FB-L98B-002-75000(3/8)	B	No	Inside Pole	140.00 - 2.00	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.06 0.06 0.06
WR-VG122ST-BRDA(7/16)	B	No	Inside Pole	140.00 - 2.00	4	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.14 0.14 0.14
2" Flex Conduit	B	No	Inside Pole	140.00 - 2.00	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.32 0.32 0.32

AVA7-50(1-5/8)	B	No	Inside Pole	128.00 - 9.00	12	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.70 0.70 0.70
HB158-1-08U8-S8J18(1-5/8)	B	No	Inside Pole	128.00 - 9.00	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.30 1.30 1.30

LDF4-50A(1/2)	A	No	Inside Pole	74.00 - 8.00	1	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.15 0.15 0.15
**								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	155.00-150.00	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.188	0.000	0.00
		C	0.000	0.000	0.175	0.000	0.00
L2	150.00-145.00	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.188	0.000	0.00
		C	0.000	0.000	0.175	0.000	0.00
L3	145.00-140.00	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.188	0.000	0.00
		C	0.000	0.000	0.175	0.000	0.00

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 7 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L4	140.00-135.00	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.188	0.000	0.04
		C	0.000	0.000	0.175	0.000	0.00
L5	135.00-130.00	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.188	0.000	0.04
		C	0.000	0.000	0.175	0.000	0.00
L6	130.00-123.21	A	0.000	0.000	0.000	0.000	0.03
		B	0.000	0.000	0.255	0.000	0.11
		C	0.000	0.000	0.238	0.000	0.00
L7	123.21-121.79	A	0.000	0.000	0.000	0.000	0.01
		B	0.000	0.000	0.053	0.000	0.03
		C	0.000	0.000	0.050	0.000	0.00
L8	121.79-116.79	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.188	0.000	0.10
		C	0.000	0.000	0.175	0.000	0.00
L9	116.79-111.79	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.188	0.000	0.10
		C	0.000	0.000	0.175	0.000	0.00
L10	111.79-106.79	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.188	0.000	0.10
		C	0.000	0.000	0.175	0.000	0.00
L11	106.79-101.79	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.188	0.000	0.10
		C	0.000	0.000	0.175	0.000	0.00
L12	101.79-97.50	A	0.000	0.000	0.553	0.000	0.02
		B	0.000	0.000	0.714	0.000	0.08
		C	0.000	0.000	0.703	0.000	0.00
L13	97.50-97.25	A	0.000	0.000	0.092	0.000	0.00
		B	0.000	0.000	0.102	0.000	0.00
		C	0.000	0.000	0.101	0.000	0.00
L14	97.25-92.25	A	0.000	0.000	1.854	0.000	0.02
		B	0.000	0.000	2.041	0.000	0.10
		C	0.000	0.000	2.029	0.000	0.00
L15	92.25-82.58	A	0.000	0.000	3.090	0.000	0.04
		B	0.000	0.000	3.453	0.000	0.19
		C	0.000	0.000	3.429	0.000	0.00
L16	82.58-81.58	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.037	0.000	0.02
		C	0.000	0.000	0.035	0.000	0.00
L17	81.58-76.58	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.188	0.000	0.10
		C	0.000	0.000	0.175	0.000	0.00
L18	76.58-71.58	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.188	0.000	0.10
		C	0.000	0.000	0.175	0.000	0.00
L19	71.58-68.00	A	0.000	0.000	0.776	0.000	0.02
		B	0.000	0.000	0.910	0.000	0.07
		C	0.000	0.000	0.901	0.000	0.00
L20	68.00-67.75	A	0.000	0.000	0.097	0.000	0.00
		B	0.000	0.000	0.107	0.000	0.00
		C	0.000	0.000	0.106	0.000	0.00
L21	67.75-62.75	A	0.000	0.000	1.955	0.000	0.02
		B	0.000	0.000	2.143	0.000	0.10
		C	0.000	0.000	2.130	0.000	0.00
L22	62.75-57.75	A	0.000	0.000	1.978	0.000	0.02
		B	0.000	0.000	2.165	0.000	0.10
		C	0.000	0.000	2.153	0.000	0.00
L23	57.75-52.75	A	0.000	0.000	2.002	0.000	0.02
		B	0.000	0.000	2.190	0.000	0.10
		C	0.000	0.000	2.177	0.000	0.00
L24	52.75-43.03	A	0.000	0.000	3.158	0.000	0.05

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 8 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Tower Section	Tower Elevation ft	Face	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight K
L25	43.03-42.03	B	0.000	0.000	3.523	0.000	0.19
		C	0.000	0.000	3.498	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
L26	42.03-37.03	B	0.000	0.000	0.037	0.000	0.02
		C	0.000	0.000	0.035	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.02
L27	37.03-32.03	B	0.000	0.000	0.188	0.000	0.10
		C	0.000	0.000	0.175	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.02
L28	32.03-27.03	B	0.000	0.000	0.188	0.000	0.10
		C	0.000	0.000	0.175	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.02
L29	27.03-22.03	B	0.000	0.000	0.188	0.000	0.10
		C	0.000	0.000	0.175	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.02
L30	22.03-17.03	B	0.000	0.000	0.188	0.000	0.10
		C	0.000	0.000	0.175	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.02
L31	17.03-12.03	B	0.000	0.000	0.188	0.000	0.10
		C	0.000	0.000	0.175	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.02
L32	12.03-7.03	B	0.000	0.000	0.188	0.000	0.10
		C	0.000	0.000	0.175	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.02
L33	7.03-2.03	B	0.000	0.000	0.076	0.000	0.08
		C	0.000	0.000	0.175	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
L34	2.03-0.00	B	0.000	0.000	0.000	0.000	0.04
		C	0.000	0.000	0.175	0.000	0.00
		A	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.071	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight K
L1	155.00-150.00	A	1.748	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	1.936	0.000	0.02
		C		0.000	0.000	1.923	0.000	0.02
L2	150.00-145.00	A	1.742	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	1.930	0.000	0.02
		C		0.000	0.000	1.917	0.000	0.02
L3	145.00-140.00	A	1.736	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	1.924	0.000	0.02
		C		0.000	0.000	1.911	0.000	0.02
L4	140.00-135.00	A	1.730	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	1.918	0.000	0.07
		C		0.000	0.000	1.905	0.000	0.02
L5	135.00-130.00	A	1.724	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	1.911	0.000	0.07
		C		0.000	0.000	1.899	0.000	0.02
L6	130.00-123.21	A	1.716	0.000	0.000	0.000	0.000	0.03
		B		0.000	0.000	2.585	0.000	0.14
		C		0.000	0.000	2.568	0.000	0.03
L7	123.21-121.79	A	1.710	0.000	0.000	0.000	0.000	0.01
		B		0.000	0.000	0.541	0.000	0.03

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 9 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight K
L8	121.79-116.79	C		0.000	0.000	0.537	0.000	0.01
		A	1.706	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	1.893	0.000	0.12
		C		0.000	0.000	1.881	0.000	0.02
L9	116.79-111.79	A	1.698	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	1.886	0.000	0.12
		C		0.000	0.000	1.873	0.000	0.02
L10	111.79-106.79	A	1.691	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	1.878	0.000	0.12
		C		0.000	0.000	1.866	0.000	0.02
L11	106.79-101.79	A	1.683	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	1.870	0.000	0.12
		C		0.000	0.000	1.858	0.000	0.02
L12	101.79-97.50	A	1.675	0.000	0.000	1.142	0.000	0.04
		B		0.000	0.000	2.740	0.000	0.12
		C		0.000	0.000	2.729	0.000	0.04
L13	97.50-97.25	A	1.671	0.000	0.000	0.190	0.000	0.00
		B		0.000	0.000	0.283	0.000	0.01
		C		0.000	0.000	0.282	0.000	0.00
L14	97.25-92.25	A	1.667	0.000	0.000	3.801	0.000	0.09
		B		0.000	0.000	5.655	0.000	0.18
		C		0.000	0.000	5.643	0.000	0.09
L15	92.25-82.58	A	1.653	0.000	0.000	6.259	0.000	0.15
		B		0.000	0.000	9.820	0.000	0.33
		C		0.000	0.000	9.795	0.000	0.15
L16	82.58-81.58	A	1.643	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.368	0.000	0.02
		C		0.000	0.000	0.366	0.000	0.00
L17	81.58-76.58	A	1.637	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	1.824	0.000	0.12
		C		0.000	0.000	1.812	0.000	0.02
L18	76.58-71.58	A	1.626	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	1.814	0.000	0.12
		C		0.000	0.000	1.801	0.000	0.02
L19	71.58-68.00	A	1.617	0.000	0.000	1.847	0.000	0.05
		B		0.000	0.000	3.138	0.000	0.11
		C		0.000	0.000	3.129	0.000	0.05
L20	68.00-67.75	A	1.612	0.000	0.000	0.231	0.000	0.00
		B		0.000	0.000	0.321	0.000	0.01
		C		0.000	0.000	0.320	0.000	0.00
L21	67.75-62.75	A	1.606	0.000	0.000	4.606	0.000	0.10
		B		0.000	0.000	6.399	0.000	0.19
		C		0.000	0.000	6.387	0.000	0.10
L22	62.75-57.75	A	1.593	0.000	0.000	4.593	0.000	0.10
		B		0.000	0.000	6.374	0.000	0.19
		C		0.000	0.000	6.361	0.000	0.10
L23	57.75-52.75	A	1.579	0.000	0.000	4.579	0.000	0.10
		B		0.000	0.000	6.346	0.000	0.19
		C		0.000	0.000	6.334	0.000	0.09
L24	52.75-43.03	A	1.557	0.000	0.000	7.063	0.000	0.16
		B		0.000	0.000	10.454	0.000	0.34
		C		0.000	0.000	10.430	0.000	0.15
L25	43.03-42.03	A	1.539	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.349	0.000	0.02
		C		0.000	0.000	0.346	0.000	0.00
L26	42.03-37.03	A	1.527	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	1.715	0.000	0.12
		C		0.000	0.000	1.702	0.000	0.02
L27	37.03-32.03	A	1.507	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	1.694	0.000	0.12
		C		0.000	0.000	1.682	0.000	0.02

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 10 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight K
L28	32.03-27.03	A	1.483	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	1.671	0.000	0.12
		C		0.000	0.000	1.658	0.000	0.02
L29	27.03-22.03	A	1.456	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	1.644	0.000	0.12
		C		0.000	0.000	1.631	0.000	0.02
L30	22.03-17.03	A	1.423	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	1.611	0.000	0.11
		C		0.000	0.000	1.598	0.000	0.02
L31	17.03-12.03	A	1.382	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	1.569	0.000	0.11
		C		0.000	0.000	1.557	0.000	0.02
L32	12.03-7.03	A	1.325	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	0.614	0.000	0.08
		C		0.000	0.000	1.500	0.000	0.02
L33	7.03-2.03	A	1.230	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.04
		C		0.000	0.000	1.405	0.000	0.01
L34	2.03-0.00	A	1.059	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.501	0.000	0.00

Feed Line Center of Pressure

Section	Elevation ft	CP_x in	CP_z in	CP_x Ice in	CP_z Ice in
L1	155.00-150.00	0.2833	0.4627	1.0624	1.8086
L2	150.00-145.00	0.2840	0.4638	1.0806	1.8397
L3	145.00-140.00	0.2846	0.4649	1.0973	1.8682
L4	140.00-135.00	0.2851	0.4658	1.1126	1.8942
L5	135.00-130.00	0.2857	0.4666	1.1265	1.9180
L6	130.00-123.21	0.2862	0.4676	1.1414	1.9434
L7	123.21-121.79	0.2866	0.4682	1.1503	1.9585
L8	121.79-116.79	0.2869	0.4687	1.1563	1.9687
L9	116.79-111.79	0.2873	0.4694	1.1682	1.9890
L10	111.79-106.79	0.2877	0.4701	1.1789	2.0072
L11	106.79-101.79	0.2881	0.4707	1.1884	2.0234
L12	101.79-97.50	0.2354	0.3847	1.0020	1.7060
L13	97.50-97.25	0.1725	0.2819	0.7755	1.3203
L14	97.25-92.25	0.1743	0.2849	0.7821	1.3316
L15	92.25-82.58	0.1915	0.3129	0.8414	1.4327
L16	82.58-81.58	0.2894	0.4729	1.2194	2.0763
L17	81.58-76.58	0.2895	0.4731	1.2170	2.0720
L18	76.58-71.58	0.2898	0.4735	1.2207	2.0783
L19	71.58-68.00	0.2211	0.3613	0.9231	1.5716
L20	68.00-67.75	0.1755	0.2869	0.7770	1.3229
L21	67.75-62.75	0.1769	0.2891	0.7815	1.3305
L22	62.75-57.75	0.1795	0.2933	0.7894	1.3440
L23	57.75-52.75	0.1819	0.2973	0.7964	1.3559
L24	52.75-43.03	0.2064	0.3373	0.8650	1.4725
L25	43.03-42.03	0.2910	0.4755	1.2264	2.0879
L26	42.03-37.03	0.2911	0.4757	1.2133	2.0654
L27	37.03-32.03	0.2913	0.4760	1.2072	2.0548
L28	32.03-27.03	0.2914	0.4762	1.1988	2.0405
L29	27.03-22.03	0.2915	0.4764	1.1876	2.0213
L30	22.03-17.03	0.2917	0.4767	1.1725	1.9953

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 11 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Section	Elevation	CP _x	CP _z	CP _x Ice	CP _z Ice
	ft	in	in	in	in
L31	17.03-12.03	0.2918	0.4769	1.1513	1.9590
L32	12.03-7.03	0.1186	0.3819	0.4653	1.5753
L33	7.03-2.03	0.0000	0.3168	0.0000	1.2673
L34	2.03-0.00	0.0000	0.3168	0.0000	1.1278

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L1	1	Safety Line 3/8	150.00 - 155.00	1.0000	1.0000
L1	2	5/8" Step Pegs	150.00 - 155.00	1.0000	1.0000
L2	1	Safety Line 3/8	145.00 - 150.00	1.0000	1.0000
L2	2	5/8" Step Pegs	145.00 - 150.00	1.0000	1.0000
L3	1	Safety Line 3/8	140.00 - 145.00	1.0000	1.0000
L3	2	5/8" Step Pegs	140.00 - 145.00	1.0000	1.0000
L4	1	Safety Line 3/8	135.00 - 140.00	1.0000	1.0000
L4	2	5/8" Step Pegs	135.00 - 140.00	1.0000	1.0000
L5	1	Safety Line 3/8	130.00 - 135.00	1.0000	1.0000
L5	2	5/8" Step Pegs	130.00 - 135.00	1.0000	1.0000
L6	1	Safety Line 3/8	123.21 - 130.00	1.0000	1.0000
L6	2	5/8" Step Pegs	123.21 - 130.00	1.0000	1.0000
L8	1	Safety Line 3/8	116.79 - 121.79	1.0000	1.0000
L8	2	5/8" Step Pegs	116.79 - 121.79	1.0000	1.0000
L9	1	Safety Line 3/8	111.79 - 116.79	1.0000	1.0000
L9	2	5/8" Step Pegs	111.79 - 116.79	1.0000	1.0000
L10	1	Safety Line 3/8	106.79 - 111.79	1.0000	1.0000
L10	2	5/8" Step Pegs	106.79 - 111.79	1.0000	1.0000
L11	1	Safety Line 3/8	101.79 - 106.79	1.0000	1.0000
L11	2	5/8" Step Pegs	101.79 - 106.79	1.0000	1.0000
L12	1	Safety Line 3/8	97.50 - 101.79	1.0000	1.0000
L12	2	5/8" Step Pegs	97.50 - 101.79	1.0000	1.0000
L12	22	SFP-045100 (No Weight)	97.50 - 99.00	1.0000	1.0000

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 12 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _o Ice
L12	23	SFP-045100 (No Weight)	97.50 - 99.00	1.0000	1.0000
L12	24	SFP-045100 (No Weight)	97.50 - 99.00	1.0000	1.0000
L13	1	Safety Line 3/8	97.25 - 97.50	1.0000	1.0000
L13	2	5/8" Step Pegs	97.25 - 97.50	1.0000	1.0000
L13	22	SFP-045100 (No Weight)	97.25 - 97.50	1.0000	1.0000
L13	23	SFP-045100 (No Weight)	97.25 - 97.50	1.0000	1.0000
L13	24	SFP-045100 (No Weight)	97.25 - 97.50	1.0000	1.0000
L14	1	Safety Line 3/8	92.25 - 97.25	1.0000	1.0000
L14	2	5/8" Step Pegs	92.25 - 97.25	1.0000	1.0000
L14	22	SFP-045100 (No Weight)	92.25 - 97.25	1.0000	1.0000
L14	23	SFP-045100 (No Weight)	92.25 - 97.25	1.0000	1.0000
L14	24	SFP-045100 (No Weight)	92.25 - 97.25	1.0000	1.0000
L15	1	Safety Line 3/8	82.58 - 92.25	1.0000	1.0000
L15	2	5/8" Step Pegs	82.58 - 92.25	1.0000	1.0000
L15	22	SFP-045100 (No Weight)	84.00 - 92.25	1.0000	1.0000
L15	23	SFP-045100 (No Weight)	84.00 - 92.25	1.0000	1.0000
L15	24	SFP-045100 (No Weight)	84.00 - 92.25	1.0000	1.0000
L17	1	Safety Line 3/8	76.58 - 81.58	1.0000	1.0000
L17	2	5/8" Step Pegs	76.58 - 81.58	1.0000	1.0000
L18	1	Safety Line 3/8	71.58 - 76.58	1.0000	1.0000
L18	2	5/8" Step Pegs	71.58 - 76.58	1.0000	1.0000
L19	1	Safety Line 3/8	68.00 - 71.58	1.0000	1.0000
L19	2	5/8" Step Pegs	68.00 - 71.58	1.0000	1.0000
L19	19	SFP-060100 (No Weight)	68.00 - 70.00	1.0000	1.0000
L19	20	SFP-060100 (No Weight)	68.00 - 70.00	1.0000	1.0000
L19	21	SFP-060100 (No Weight)	68.00 - 70.00	1.0000	1.0000
L20	1	Safety Line 3/8	67.75 - 68.00	1.0000	1.0000
L20	2	5/8" Step Pegs	67.75 - 68.00	1.0000	1.0000
L20	19	SFP-060100 (No Weight)	67.75 - 68.00	1.0000	1.0000
L20	20	SFP-060100 (No Weight)	67.75 - 68.00	1.0000	1.0000
L20	21	SFP-060100 (No Weight)	67.75 - 68.00	1.0000	1.0000
L21	1	Safety Line 3/8	62.75 - 67.75	1.0000	1.0000
L21	2	5/8" Step Pegs	62.75 - 67.75	1.0000	1.0000
L21	19	SFP-060100 (No Weight)	62.75 - 67.75	1.0000	1.0000
L21	20	SFP-060100 (No Weight)	62.75 - 67.75	1.0000	1.0000
L21	21	SFP-060100 (No Weight)	62.75 - 67.75	1.0000	1.0000
L22	1	Safety Line 3/8	57.75 - 62.75	1.0000	1.0000
L22	2	5/8" Step Pegs	57.75 - 62.75	1.0000	1.0000
L22	19	SFP-060100 (No Weight)	57.75 - 62.75	1.0000	1.0000
L22	20	SFP-060100 (No Weight)	57.75 - 62.75	1.0000	1.0000
L22	21	SFP-060100 (No Weight)	57.75 - 62.75	1.0000	1.0000
L23	1	Safety Line 3/8	52.75 - 57.75	1.0000	1.0000
L23	2	5/8" Step Pegs	52.75 - 57.75	1.0000	1.0000
L23	19	SFP-060100 (No Weight)	52.75 - 57.75	1.0000	1.0000
L23	20	SFP-060100 (No Weight)	52.75 - 57.75	1.0000	1.0000
L23	21	SFP-060100 (No Weight)	52.75 - 57.75	1.0000	1.0000
L24	1	Safety Line 3/8	43.03 - 52.75	1.0000	1.0000
L24	2	5/8" Step Pegs	43.03 - 52.75	1.0000	1.0000
L24	19	SFP-060100 (No Weight)	45.00 - 52.75	1.0000	1.0000
L24	20	SFP-060100 (No Weight)	45.00 - 52.75	1.0000	1.0000
L24	21	SFP-060100 (No Weight)	45.00 - 52.75	1.0000	1.0000
L26	1	Safety Line 3/8	37.03 - 42.03	1.0000	1.0000
L26	2	5/8" Step Pegs	37.03 - 42.03	1.0000	1.0000
L27	1	Safety Line 3/8	32.03 - 37.03	1.0000	1.0000
L27	2	5/8" Step Pegs	32.03 - 37.03	1.0000	1.0000
L28	1	Safety Line 3/8	27.03 - 32.03	1.0000	1.0000
L28	2	5/8" Step Pegs	27.03 - 32.03	1.0000	1.0000
L29	1	Safety Line 3/8	22.03 - 27.03	1.0000	1.0000
L29	2	5/8" Step Pegs	22.03 - 27.03	1.0000	1.0000
L30	1	Safety Line 3/8	17.03 - 22.03	1.0000	1.0000
L30	2	5/8" Step Pegs	17.03 - 22.03	1.0000	1.0000
L31	1	Safety Line 3/8	12.03 - 17.03	1.0000	1.0000

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job		Page
	BU# 876366) WAPPINGERS FALLS / PRESTON CIT		14 of 31
	Project		Date
Existing 155-ft Monopole		14:44:25 06/26/18	
Client		Designed by	
Crown Castle		JRozina	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Lateral					
			ft	ft	°	ft	ft ²	ft ²	K
4x45W-65MHz			0.00			1/2" Ice	2.53	2.44	0.08
			0.00			1" Ice	2.74	2.65	0.11
PCS 1900MHz	C	From Leg	4.00		0.0000	No Ice	2.32	2.24	0.06
4x45W-65MHz			0.00			1/2" Ice	2.53	2.44	0.08
			0.00			1" Ice	2.74	2.65	0.11
(2) 6' x 2" Mount Pipe	A	From Leg	4.00		0.0000	No Ice	1.43	1.43	0.02
			0.00			1/2" Ice	1.92	1.92	0.03
			0.00			1" Ice	2.29	2.29	0.05
(2) 6' x 2" Mount Pipe	B	From Leg	4.00		0.0000	No Ice	1.43	1.43	0.02
			0.00			1/2" Ice	1.92	1.92	0.03
			0.00			1" Ice	2.29	2.29	0.05
(2) 6' x 2" Mount Pipe	C	From Leg	4.00		0.0000	No Ice	1.43	1.43	0.02
			0.00			1/2" Ice	1.92	1.92	0.03
			0.00			1" Ice	2.29	2.29	0.05
Platform Mount [LP 712-1]	C	None			0.0000	No Ice	24.53	24.53	1.34
						1/2" Ice	29.94	29.94	1.65
						1" Ice	35.35	35.35	1.96
Transition Ladder	C	From Leg	2.00		0.0000	No Ice	6.00	6.00	0.16
			0.00			1/2" Ice	8.00	8.00	0.24
			-2.00			1" Ice	10.00	10.00	0.32
8' x 3" Mount Pipe	C	From Face	4.00		0.0000	No Ice	2.40	2.40	0.04
			0.00			1/2" Ice	3.19	3.19	0.06
			4.00			1" Ice	3.67	3.67	0.08

RRUS 11	A	From Leg	1.00		25.0000	No Ice	2.78	1.19	0.05
			0.00			1/2" Ice	2.99	1.33	0.07
			0.00			1" Ice	3.21	1.49	0.10
RRUS 11	B	From Leg	1.00		15.0000	No Ice	2.78	1.19	0.05
			0.00			1/2" Ice	2.99	1.33	0.07
			0.00			1" Ice	3.21	1.49	0.10
RRUS 11	C	From Leg	1.00		25.0000	No Ice	2.78	1.19	0.05
			0.00			1/2" Ice	2.99	1.33	0.07
			0.00			1" Ice	3.21	1.49	0.10
Side Arm Mount [SO 102-3]	C	None			0.0000	No Ice	3.00	3.00	0.08
						1/2" Ice	3.48	3.48	0.11
						1" Ice	3.96	3.96	0.14

Platform Mount [LP 303-1]	C	None			0.0000	No Ice	14.66	14.66	1.25
						1/2" Ice	18.87	18.87	1.48
						1" Ice	23.08	23.08	1.71
(2) 7770.00 w/ Mount Pipe	A	From Face	4.00		30.0000	No Ice	5.75	4.25	0.06
			2.00			1/2" Ice	6.18	5.01	0.10
			0.00			1" Ice	6.61	5.71	0.16
(2) 7770.00 w/ Mount Pipe	B	From Face	4.00		-25.0000	No Ice	5.75	4.25	0.06
			2.00			1/2" Ice	6.18	5.01	0.10
			0.00			1" Ice	6.61	5.71	0.16
(2) 7770.00 w/ Mount Pipe	C	From Face	4.00		65.0000	No Ice	5.75	4.25	0.06
			2.00			1/2" Ice	6.18	5.01	0.10
			0.00			1" Ice	6.61	5.71	0.16
HPA-65R-BUU-H8 w/ Mount Pipe	A	From Face	4.00		-35.0000	No Ice	13.21	9.58	0.10
			-6.00			1/2" Ice	13.90	11.05	0.20
			0.00			1" Ice	14.59	12.50	0.30
HPA-65R-BUU-H8 w/ Mount Pipe	B	From Face	4.00		-35.0000	No Ice	13.21	9.58	0.10
			-6.00			1/2" Ice	13.90	11.05	0.20
			0.00			1" Ice	14.59	12.50	0.30
HPA-65R-BUU-H8 w/ Mount Pipe	C	From Face	4.00		-45.0000	No Ice	13.21	9.58	0.10
			-6.00			1/2" Ice	13.90	11.05	0.20

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 15 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft ²	ft ²	K	
80010966 w/ Mount Pipe	A	From Face	0.00				1" Ice	14.59	12.50	0.30
			4.00		-35.0000	140.00	No Ice	17.60	9.64	0.15
			-2.00				1/2" Ice	18.33	11.15	0.26
			0.00				1" Ice	19.07	12.70	0.39
80010966 w/ Mount Pipe	B	From Face	4.00		-35.0000	140.00	No Ice	17.60	9.64	0.15
			-2.00				1/2" Ice	18.33	11.15	0.26
			0.00				1" Ice	19.07	12.70	0.39
			4.00		-45.0000	140.00	No Ice	17.60	9.64	0.15
80010966 w/ Mount Pipe	C	From Face	-2.00				1/2" Ice	18.33	11.15	0.26
			0.00				1" Ice	19.07	12.70	0.39
			4.00		-35.0000	140.00	No Ice	2.73	1.67	0.05
			0.00				1/2" Ice	2.95	1.86	0.07
RRUS 32 B2	A	From Face	0.00				1" Ice	3.18	2.05	0.10
			4.00		-35.0000	140.00	No Ice	2.73	1.67	0.05
			0.00				1/2" Ice	2.95	1.86	0.07
			0.00				1" Ice	3.18	2.05	0.10
RRUS 32 B2	B	From Face	4.00		-35.0000	140.00	No Ice	2.73	1.67	0.05
			0.00				1/2" Ice	2.95	1.86	0.07
			0.00				1" Ice	3.18	2.05	0.10
			4.00		-45.0000	140.00	No Ice	2.73	1.67	0.05
RRUS 32 B2	C	From Face	0.00				1/2" Ice	2.95	1.86	0.07
			0.00				1" Ice	3.18	2.05	0.10
			4.00		-35.0000	140.00	No Ice	1.84	1.06	0.06
			0.00				1/2" Ice	2.01	1.20	0.08
RRUS 4478 B14	A	From Face	0.00				1" Ice	2.19	1.34	0.09
			4.00		-35.0000	140.00	No Ice	1.84	1.06	0.06
			0.00				1/2" Ice	2.01	1.20	0.08
			0.00				1" Ice	2.19	1.34	0.09
RRUS 4478 B14	B	From Face	4.00		-35.0000	140.00	No Ice	1.84	1.06	0.06
			0.00				1/2" Ice	2.01	1.20	0.08
			0.00				1" Ice	2.19	1.34	0.09
			4.00		-45.0000	140.00	No Ice	1.84	1.06	0.06
RRUS 4478 B14	C	From Face	0.00				1/2" Ice	2.01	1.20	0.08
			0.00				1" Ice	2.19	1.34	0.09
			4.00		30.0000	140.00	No Ice	1.10	0.21	0.01
			0.00				1/2" Ice	1.24	0.27	0.02
(2) LGP21401	A	From Face	0.00				1" Ice	1.38	0.35	0.03
			4.00		-25.0000	140.00	No Ice	1.10	0.21	0.01
			0.00				1/2" Ice	1.24	0.27	0.02
			0.00				1" Ice	1.38	0.35	0.03
(2) LGP21401	B	From Face	4.00		65.0000	140.00	No Ice	1.10	0.21	0.01
			0.00				1/2" Ice	1.24	0.27	0.02
			0.00				1" Ice	1.38	0.35	0.03
			4.00		30.0000	140.00	No Ice	0.23	0.16	0.01
(2) LGP21901	A	From Face	0.00				1/2" Ice	0.29	0.21	0.01
			0.00				1" Ice	0.36	0.28	0.01
			4.00		-25.0000	140.00	No Ice	0.23	0.16	0.01
			0.00				1/2" Ice	0.29	0.21	0.01
(2) LGP21901	B	From Face	0.00				1" Ice	0.36	0.28	0.01
			4.00		65.0000	140.00	No Ice	0.23	0.16	0.01
			0.00				1/2" Ice	0.29	0.21	0.01
			0.00				1" Ice	0.36	0.28	0.01
DC6-48-60-18-8F	B	From Face	1.00		-35.0000	140.00	No Ice	2.20	2.20	0.02
			0.00				1/2" Ice	2.40	2.40	0.04
			0.00				1" Ice	2.60	2.60	0.07
			1.00		-45.0000	140.00	No Ice	2.20	2.20	0.02
DC6-48-60-18-8F	C	From Face	0.00				1/2" Ice	2.40	2.40	0.04
			0.00				1" Ice	2.60	2.60	0.07
			0.00				1" Ice	2.60	2.60	0.07

LPA-80063/6CF w/ Mount Pipe	A	From Leg	4.00		-20.0000	128.00	No Ice	9.59	9.98	0.05
			0.00				1/2" Ice	10.06	10.94	0.14
			3.00				1" Ice	10.54	11.77	0.24
LPA-80063/6CF w/ Mount	A	From Leg	4.00		0.0000	128.00	No Ice	9.59	9.98	0.05

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 16 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft ²	ft ²	K	
Pipe			0.00			1/2" Ice	10.06	10.94	0.14	
			3.00			1" Ice	10.54	11.77	0.24	
(2) LPA-80063/6CF w/ Mount Pipe	B	From Leg	4.00		-20.0000	128.00	No Ice	9.59	9.98	0.05
			0.00				1/2" Ice	10.06	10.94	0.14
			3.00				1" Ice	10.54	11.77	0.24
(2) LPA-80063/6CF w/ Mount Pipe	C	From Leg	4.00		-10.0000	128.00	No Ice	9.59	9.98	0.05
			0.00				1/2" Ice	10.06	10.94	0.14
			3.00				1" Ice	10.54	11.77	0.24
JAHH-65B-R3B w/ Mount Pipe	A	From Leg	4.00		40.0000	128.00	No Ice	9.35	7.65	0.09
			0.00				1/2" Ice	9.92	8.83	0.17
			3.00				1" Ice	10.46	9.73	0.25
JAHH-65B-R3B w/ Mount Pipe	A	From Leg	4.00		40.0000	128.00	No Ice	9.35	7.65	0.09
			0.00				1/2" Ice	9.92	8.83	0.17
			3.00				1" Ice	10.46	9.73	0.25
JAHH-65B-R3B w/ Mount Pipe	B	From Leg	4.00		20.0000	128.00	No Ice	9.35	7.65	0.09
			0.00				1/2" Ice	9.92	8.83	0.17
			3.00				1" Ice	10.46	9.73	0.25
JAHH-65B-R3B w/ Mount Pipe	B	From Leg	4.00		20.0000	128.00	No Ice	9.35	7.65	0.09
			0.00				1/2" Ice	9.92	8.83	0.17
			3.00				1" Ice	10.46	9.73	0.25
JAHH-65B-R3B w/ Mount Pipe	C	From Leg	4.00		20.0000	128.00	No Ice	9.35	7.65	0.09
			0.00				1/2" Ice	9.92	8.83	0.17
			3.00				1" Ice	10.46	9.73	0.25
JAHH-65B-R3B w/ Mount Pipe	C	From Leg	4.00		20.0000	128.00	No Ice	9.35	7.65	0.09
			0.00				1/2" Ice	9.92	8.83	0.17
			3.00				1" Ice	10.46	9.73	0.25
RRH2x60-700	A	From Leg	4.00		40.0000	128.00	No Ice	3.50	1.82	0.06
			0.00				1/2" Ice	3.76	2.05	0.08
			6.00				1" Ice	4.03	2.29	0.11
RRH2x60-700	B	From Leg	4.00		20.0000	128.00	No Ice	3.50	1.82	0.06
			0.00				1/2" Ice	3.76	2.05	0.08
			6.00				1" Ice	4.03	2.29	0.11
RRH2x60-700	C	From Leg	4.00		20.0000	128.00	No Ice	3.50	1.82	0.06
			0.00				1/2" Ice	3.76	2.05	0.08
			6.00				1" Ice	4.03	2.29	0.11
B66A RRH4X45-4R	A	From Leg	4.00		40.0000	128.00	No Ice	2.54	1.61	0.06
			0.00				1/2" Ice	2.75	1.79	0.08
			6.00				1" Ice	2.97	1.98	0.10
(2) B66A RRH4X45-4R	B	From Leg	4.00		20.0000	128.00	No Ice	2.54	1.61	0.06
			0.00				1/2" Ice	2.75	1.79	0.08
			6.00				1" Ice	2.97	1.98	0.10
B5 4T4R RRH4X40 AIRSCALE	A	From Leg	4.00		40.0000	128.00	No Ice	1.32	0.75	0.05
			0.00				1/2" Ice	1.47	0.86	0.06
			6.00				1" Ice	1.62	0.98	0.07
(2) B5 4T4R RRH4X40 AIRSCALE	C	From Leg	4.00		20.0000	128.00	No Ice	1.32	0.75	0.05
			0.00				1/2" Ice	1.47	0.86	0.06
			6.00				1" Ice	1.62	0.98	0.07
RVZDC-6627-PF-48	A	From Leg	4.00		40.0000	128.00	No Ice	3.79	2.51	0.03
			0.00				1/2" Ice	4.04	2.73	0.06
			6.00				1" Ice	4.30	2.95	0.10
T-Arm Mount [TA 602-3]	C	None			0.0000	128.00	No Ice	11.59	11.59	0.77
							1/2" Ice	15.44	15.44	0.99
							1" Ice	19.29	19.29	1.21

KS24019-L112A	C	From Leg	3.00		-15.0000	74.00	No Ice	0.14	0.14	0.01
			0.00				1/2" Ice	0.20	0.20	0.01
			0.00				1" Ice	0.26	0.26	0.01

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 17 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
Side Arm Mount [SO 701-1]	C	From Leg	0.00	0.0000	74.00	No Ice 0.85	1.67	0.07
			0.00			1/2" Ice 1.14	2.34	0.08
			0.00			1" Ice 1.43	3.01	0.09

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 18 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Comb. No.	Description
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	155 - 150	Pole	Max Tension	26	0.00	-0.00	0.00
			Max. Compression	26	-8.63	1.12	-1.34
			Max. Mx	20	-2.74	20.11	-0.35
			Max. My	14	-2.76	0.36	-20.12
			Max. Vy	20	-6.32	20.11	-0.35
			Max. Vx	14	6.31	0.36	-20.12
			Max. Torque	22			1.31
L2	150 - 145	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-9.17	1.11	-1.39
			Max. Mx	20	-2.97	52.49	-0.39
			Max. My	14	-2.99	0.38	-52.47
			Max. Vy	20	-6.63	52.49	-0.39
			Max. Vx	14	6.63	0.38	-52.47
			Max. Torque	22			1.31
L3	145 - 140	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-10.38	1.10	-1.44
			Max. Mx	20	-3.43	87.36	-0.42
			Max. My	14	-3.45	0.39	-87.27
			Max. Vy	20	-7.41	87.36	-0.42
			Max. Vx	14	7.38	0.39	-87.27
			Max. Torque	22			1.32
L4	140 - 135	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-19.84	0.90	-1.61
			Max. Mx	20	-6.19	157.35	-0.57
			Max. My	14	-6.25	0.78	-156.42
			Max. Vy	20	-14.17	157.35	-0.57
			Max. Vx	14	13.99	0.78	-156.42
			Max. Torque	20			2.78
L5	135 - 130	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-20.50	0.89	-1.66
			Max. Mx	20	-6.58	229.02	-0.96
			Max. My	14	-6.63	1.15	-227.17
			Max. Vy	20	-14.50	229.02	-0.96
			Max. Vx	14	14.32	1.15	-227.17
			Max. Torque	20			2.78
L6	130 - 123.21	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-29.01	0.51	-0.88
			Max. Mx	20	-8.59	301.68	-1.54
			Max. My	14	-8.68	1.63	-298.50
			Max. Vy	20	-20.92	301.68	-1.54
			Max. Vx	14	20.61	1.63	-298.50
			Max. Torque	20			2.78
L7	123.21 - 121.79	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-30.26	0.50	-0.94

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 19 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L8	121.79 - 116.79	Pole	Max. Mx	20	-9.36	407.25	-2.22
			Max. My	14	-9.44	2.29	-402.51
			Max. Vy	20	-21.31	407.25	-2.22
			Max. Vx	14	21.00	2.29	-402.51
			Max. Torque	20			1.72
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-31.14	0.48	-1.00
			Max. Mx	20	-10.02	514.60	-2.90
			Max. My	14	-10.10	2.95	-508.30
			Max. Vy	20	-21.65	514.60	-2.90
L9	116.79 - 111.79	Pole	Max. Vx	14	21.34	2.95	-508.30
			Max. Torque	20			1.72
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-32.05	0.47	-1.06
			Max. Mx	20	-10.72	623.66	-3.57
			Max. My	14	-10.79	3.60	-615.79
			Max. Vy	20	-21.99	623.66	-3.57
			Max. Vx	14	21.68	3.60	-615.79
			Max. Torque	20			1.72
			Max Tension	1	0.00	0.00	0.00
L10	111.79 - 106.79	Pole	Max. Compression	26	-32.99	0.45	-1.12
			Max. Mx	20	-11.44	734.42	-4.25
			Max. My	14	-11.51	4.26	-724.99
			Max. Vy	20	-22.33	734.42	-4.25
			Max. Vx	14	22.02	4.26	-724.99
			Max. Torque	20			1.71
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-33.96	0.43	-1.18
			Max. Mx	20	-12.20	846.88	-4.92
			Max. My	14	-12.27	4.91	-835.88
L11	106.79 - 101.79	Pole	Max. Vy	20	-22.67	846.88	-4.92
			Max. Vx	14	22.36	4.91	-835.88
			Max. Torque	20			1.71
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-34.88	0.41	-1.22
			Max. Mx	20	-12.87	944.73	-5.49
			Max. My	14	-12.93	5.47	-932.38
			Max. Vy	20	-22.97	944.73	-5.49
			Max. Vx	14	22.65	5.47	-932.38
			Max. Torque	20			1.71
L12	101.79 - 97.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-34.94	0.41	-1.22
			Max. Mx	20	-12.92	950.47	-5.52
			Max. My	14	-12.98	5.51	-938.05
			Max. Vy	8	22.98	-949.82	4.86
			Max. Vx	14	22.66	5.51	-938.05
			Max. Torque	20			1.71
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.15	0.38	-1.27
			Max. Mx	20	-13.71	1066.34	-6.19
L13	97.5 - 92.25	Pole	Max. My	14	-13.77	6.16	-1052.22
			Max. Vy	20	-23.39	1066.34	-6.19
			Max. Vx	14	23.02	6.16	-1052.22
			Max. Torque	20			1.71
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-37.34	0.36	-1.31
			Max. Mx	20	-14.50	1180.34	-6.83
			Max. My	14	-13.77	6.16	-1052.22
			Max. Vy	20	-23.39	1066.34	-6.19
			Max. Vx	14	23.02	6.16	-1052.22
L14	92.25 - 82.58	Pole	Max. Torque	20			1.71
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-37.34	0.36	-1.31
			Max. Mx	20	-14.50	1180.34	-6.83
			Max. My	14	-13.77	6.16	-1052.22
			Max. Vy	20	-23.39	1066.34	-6.19
			Max. Vx	14	23.02	6.16	-1052.22
			Max. Torque	20			1.71
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-37.34	0.36	-1.31
Max. Mx	20	-14.50	1180.34	-6.83			

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 20 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L16	82.58 - 81.58	Pole	Max. My	14	-14.56	6.79	-1164.38
			Max. Vy	20	-23.75	1180.34	-6.83
			Max. Vx	14	23.35	6.79	-1164.38
			Max. Torque	20			1.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-39.76	0.32	-1.37
			Max. Mx	20	-16.06	1320.35	-7.60
			Max. My	14	-16.12	7.54	-1301.98
			Max. Vy	20	-24.29	1320.35	-7.60
			Max. Vx	14	23.86	7.54	-1301.98
L17	81.58 - 76.58	Pole	Max. Torque	20			1.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.01	0.30	-1.42
			Max. Mx	20	-17.03	1442.64	-8.25
			Max. My	14	-17.09	8.19	-1422.14
			Max. Vy	20	-24.65	1442.64	-8.25
			Max. Vx	14	24.22	8.19	-1422.14
			Max. Torque	20			1.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.43	0.49	-1.59
L18	76.58 - 71.58	Pole	Max. Mx	20	-18.12	1566.97	-8.94
			Max. My	14	-18.17	8.92	-1544.33
			Max. Vy	20	-25.06	1566.97	-8.94
			Max. Vx	14	24.65	8.92	-1544.33
			Max. Torque	22			1.78
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-43.45	0.47	-1.63
			Max. Mx	20	-18.85	1657.10	-9.35
			Max. My	14	-18.89	9.32	-1633.01
			Max. Vy	20	-25.32	1657.10	-9.35
L19	71.58 - 68	Pole	Max. Vx	14	24.91	9.32	-1633.01
			Max. Torque	22			1.78
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-43.55	0.47	-1.63
			Max. Mx	20	-18.93	1663.43	-9.38
			Max. My	14	-18.98	9.35	-1639.23
			Max. Vy	8	25.33	-1662.55	8.44
			Max. Vx	14	24.92	9.35	-1639.23
			Max. Torque	22			1.78
			Max Tension	1	0.00	0.00	0.00
L20	68 - 67.75	Pole	Max. Compression	26	-45.47	0.44	-1.68
			Max. Mx	20	-20.27	1791.31	-9.96
			Max. My	14	-20.32	9.92	-1764.96
			Max. Vy	20	-25.83	1791.31	-9.96
			Max. Vx	14	25.38	9.92	-1764.96
			Max. Torque	22			1.78
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-47.42	0.41	-1.73
			Max. Mx	20	-21.65	1921.66	-10.54
			Max. My	14	-21.70	10.48	-1892.94
L21	67.75 - 62.75	Pole	Max. Vy	20	-26.32	1921.66	-10.54
			Max. Vx	14	25.83	10.48	-1892.94
			Max. Torque	22			1.77
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-49.41	0.38	-1.79
			Max. Mx	20	-23.06	2054.41	-11.11
			Max. My	14	-23.10	11.05	-2023.12
			Max. Vy	20	-26.80	2054.41	-11.11
			Max. Vx	14	26.26	11.05	-2023.12
			Max. Torque	22			1.77
L22	62.75 - 57.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-49.41	0.38	-1.79
			Max. Mx	20	-23.06	2054.41	-11.11
L23	57.75 - 52.75	Pole	Max. My	14	-23.10	11.05	-2023.12
			Max. Vy	20	-26.80	2054.41	-11.11
			Max. Vx	14	26.26	11.05	-2023.12
L24	52.75 - 43.03	Pole	Max. Torque	22			1.77
			Max Tension	1	0.00	0.00	0.00

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 21 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L25	43.03 - 42.03	Pole	Max. Compression	26	-50.90	0.36	-1.83
			Max. Mx	20	-24.14	2156.52	-11.55
			Max. My	14	-24.18	11.48	-2123.18
			Max. Vy	20	-27.11	2156.52	-11.55
			Max. Vx	14	26.56	11.48	-2123.18
			Max. Torque	22			1.77
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.30	0.32	-1.90
			Max. Mx	20	-27.28	2346.75	-12.34
			Max. My	14	-27.32	12.26	-2309.44
L26	42.03 - 37.03	Pole	Max. Vy	20	-27.78	2346.75	-12.34
			Max. Vx	14	27.19	12.26	-2309.44
			Max. Torque	22			1.77
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-56.95	0.29	-1.96
			Max. Mx	20	-28.60	2486.41	-12.91
			Max. My	14	-28.63	12.82	-2446.18
			Max. Vy	20	-28.11	2486.41	-12.91
			Max. Vx	14	27.52	12.82	-2446.18
			Max. Torque	22			1.77
L27	37.03 - 32.03	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-58.64	0.25	-2.01
			Max. Mx	20	-29.95	2627.69	-13.48
			Max. My	14	-29.98	13.38	-2584.53
			Max. Vy	20	-28.43	2627.69	-13.48
			Max. Vx	14	27.84	13.38	-2584.53
			Max. Torque	22			1.77
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-60.36	0.22	-2.07
			Max. Mx	20	-31.33	2770.51	-14.05
L28	32.03 - 27.03	Pole	Max. My	14	-31.35	13.93	-2724.44
			Max. Vy	20	-28.73	2770.51	-14.05
			Max. Vx	14	28.15	13.93	-2724.44
			Max. Torque	22			1.77
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-62.11	0.19	-2.12
			Max. Mx	20	-32.73	2914.85	-14.61
			Max. My	14	-32.76	14.49	-2865.88
			Max. Vy	20	-29.04	2914.85	-14.61
			Max. Vx	14	28.46	14.49	-2865.88
L29	27.03 - 22.03	Pole	Max. Torque	22			1.77
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-63.89	0.16	-2.18
			Max. Mx	20	-34.17	3060.73	-15.17
			Max. My	14	-34.19	15.04	-3008.87
			Max. Vy	20	-29.35	3060.73	-15.17
			Max. Vx	14	28.77	15.04	-3008.87
			Max. Torque	22			1.77
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-65.70	0.13	-2.23
L30	22.03 - 17.03	Pole	Max. Mx	20	-35.64	3208.17	-15.72
			Max. My	14	-35.65	15.58	-3153.42
			Max. Vy	20	-29.66	3208.17	-15.72
			Max. Vx	14	29.08	15.58	-3153.42
			Max. Torque	22			1.77
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-67.48	0.12	-2.27
			Max. Mx	20	-37.10	3357.18	-16.27
			Max. My	14	-37.11	16.13	-3299.56
			Max. Vy	20	-29.98	3357.18	-16.27
L32	12.03 - 7.03	Pole	Max. Vx	14	29.40	16.13	-3299.56

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 22 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L33	7.03 - 2.03	Pole	Max. Torque	22			1.77
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-69.21	0.12	-2.30
			Max. M _x	20	-38.53	3507.77	-16.82
			Max. M _y	14	-38.53	16.67	-3447.29
			Max. V _y	20	-30.29	3507.77	-16.82
			Max. V _x	14	29.72	16.67	-3447.29
L34	2.03 - 0	Pole	Max. Torque	22			1.77
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-69.87	0.12	-2.31
			Max. M _x	20	-39.10	3569.37	-17.04
			Max. M _y	14	-39.10	16.89	-3507.73
			Max. V _y	20	-30.43	3569.37	-17.04
			Max. V _x	14	29.85	16.89	-3507.73
		Max. Torque	22			1.77	

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	36	69.87	7.25	-0.00
	Max. H _x	21	29.33	30.41	-0.11
	Max. H _z	2	39.11	-0.11	29.84
	Max. M _x	2	3506.51	-0.11	29.84
	Max. M _z	8	3568.52	-30.41	0.11
	Max. Torsion	22	1.77	26.03	14.83
	Min. Vert	7	29.33	-26.14	15.01
	Min. H _x	8	39.11	-30.41	0.11
	Min. H _z	14	39.11	0.11	-29.84
	Min. M _x	14	-3507.73	0.11	-29.84
	Min. M _z	20	-3569.37	30.41	-0.11
	Min. Torsion	10	-1.72	-26.03	-14.83

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	32.59	0.00	0.00	0.48	0.33	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	39.11	0.11	-29.84	-3506.51	-16.04	-0.46
0.9 Dead+1.6 Wind 0 deg - No Ice	29.33	0.11	-29.84	-3464.12	-15.93	-0.45
1.2 Dead+1.6 Wind 30 deg - No Ice	39.11	15.30	-26.15	-3063.23	-1798.60	0.48
0.9 Dead+1.6 Wind 30 deg - No Ice	29.33	15.30	-26.15	-3026.31	-1776.92	0.48
1.2 Dead+1.6 Wind 60 deg - No Ice	39.11	26.14	-15.01	-1767.07	-3080.50	1.27
0.9 Dead+1.6 Wind 60 deg - No Ice	29.33	26.14	-15.01	-1745.77	-3043.21	1.26
1.2 Dead+1.6 Wind 90 deg - No Ice	39.11	30.41	-0.11	-15.88	-3568.52	1.72

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 23 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Load Combination	Vertical K	Shear _x K	Shear _y K	Overturning Moment, M _x kip-ft	Overturning Moment, M _y kip-ft	Torque kip-ft
Ice						
0.9 Dead+1.6 Wind 90 deg - No Ice	29.33	30.41	-0.11	-15.82	-3525.43	1.70
1.2 Dead+1.6 Wind 120 deg - No Ice	39.11	26.03	14.83	1739.84	-3064.24	1.72
0.9 Dead+1.6 Wind 120 deg - No Ice	29.33	26.03	14.83	1718.59	-3027.15	1.70
1.2 Dead+1.6 Wind 150 deg - No Ice	39.11	15.06	25.96	3041.90	-1766.61	1.28
0.9 Dead+1.6 Wind 150 deg - No Ice	29.33	15.06	25.96	3004.92	-1745.31	1.26
1.2 Dead+1.6 Wind 180 deg - No Ice	39.11	-0.11	29.84	3507.73	16.88	0.50
0.9 Dead+1.6 Wind 180 deg - No Ice	29.33	-0.11	29.84	3465.02	16.55	0.48
1.2 Dead+1.6 Wind 210 deg - No Ice	39.11	-15.30	26.15	3064.44	1799.47	-0.43
0.9 Dead+1.6 Wind 210 deg - No Ice	29.33	-15.30	26.15	3027.20	1777.55	-0.43
1.2 Dead+1.6 Wind 240 deg - No Ice	39.11	-26.14	15.01	1768.24	3081.37	-1.26
0.9 Dead+1.6 Wind 240 deg - No Ice	29.33	-26.14	15.01	1746.63	3043.85	-1.25
1.2 Dead+1.6 Wind 270 deg - No Ice	39.11	-30.41	0.11	17.04	3569.37	-1.75
0.9 Dead+1.6 Wind 270 deg - No Ice	29.33	-30.41	0.11	16.67	3526.05	-1.74
1.2 Dead+1.6 Wind 300 deg - No Ice	39.11	-26.03	-14.83	-1738.66	3065.06	-1.77
0.9 Dead+1.6 Wind 300 deg - No Ice	29.33	-26.03	-14.83	-1717.73	3027.75	-1.75
1.2 Dead+1.6 Wind 330 deg - No Ice	39.11	-15.06	-25.96	-3040.70	1767.43	-1.29
0.9 Dead+1.6 Wind 330 deg - No Ice	29.33	-15.06	-25.96	-3004.03	1745.91	-1.27
1.2 Dead+1.0 Ice+1.0 Temp	69.87	-0.00	0.00	2.31	0.12	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	69.87	0.00	-7.09	-851.12	-0.94	-0.22
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	69.87	3.63	-6.26	-746.15	-434.25	-0.01
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	69.87	6.16	-3.55	-425.26	-742.32	0.21
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	69.87	7.25	-0.00	1.40	-866.75	0.37
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	69.87	6.15	3.54	428.36	-741.24	0.43
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	69.87	3.55	6.14	741.20	-427.27	0.37
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	69.87	-0.00	7.09	856.11	1.23	0.22
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	69.87	-3.63	6.26	751.14	434.56	0.01
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	69.87	-6.16	3.55	430.24	742.63	-0.21
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	69.87	-7.25	0.00	3.58	867.05	-0.37
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	69.87	-6.15	-3.54	-423.38	741.54	-0.43
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	69.87	-3.55	-6.14	-736.22	427.56	-0.37
Dead+Wind 0 deg - Service	32.59	0.02	-5.45	-636.63	-2.64	-0.09

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 24 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Load Combination	Vertical K	Shear _x K	Shear _y K	Overturning Moment, M _x kip-ft	Overturning Moment, M _y kip-ft	Torque kip-ft
Dead+Wind 30 deg - Service	32.59	2.79	-4.78	-556.14	-326.50	0.09
Dead+Wind 60 deg - Service	32.59	4.77	-2.74	-320.65	-559.41	0.24
Dead+Wind 90 deg - Service	32.59	5.55	-0.02	-2.48	-648.08	0.32
Dead+Wind 120 deg - Service	32.59	4.75	2.71	316.49	-556.42	0.33
Dead+Wind 150 deg - Service	32.59	2.75	4.74	553.03	-320.66	0.24
Dead+Wind 180 deg - Service	32.59	-0.02	5.45	637.65	3.34	0.09
Dead+Wind 210 deg - Service	32.59	-2.79	4.78	557.16	327.21	-0.09
Dead+Wind 240 deg - Service	32.59	-4.77	2.74	321.67	560.12	-0.24
Dead+Wind 270 deg - Service	32.59	-5.55	0.02	3.50	648.79	-0.33
Dead+Wind 300 deg - Service	32.59	-4.75	-2.71	-315.47	557.13	-0.33
Dead+Wind 330 deg - Service	32.59	-2.75	-4.74	-552.01	321.37	-0.24

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-32.59	0.00	0.00	32.59	0.00	0.000%
2	0.11	-39.11	-29.84	-0.11	39.11	29.84	0.000%
3	0.11	-29.33	-29.84	-0.11	29.33	29.84	0.000%
4	15.30	-39.11	-26.15	-15.30	39.11	26.15	0.000%
5	15.30	-29.33	-26.15	-15.30	29.33	26.15	0.000%
6	26.14	-39.11	-15.01	-26.14	39.11	15.01	0.000%
7	26.14	-29.33	-15.01	-26.14	29.33	15.01	0.000%
8	30.41	-39.11	-0.11	-30.41	39.11	0.11	0.000%
9	30.41	-29.33	-0.11	-30.41	29.33	0.11	0.000%
10	26.03	-39.11	14.83	-26.03	39.11	-14.83	0.000%
11	26.03	-29.33	14.83	-26.03	29.33	-14.83	0.000%
12	15.06	-39.11	25.96	-15.06	39.11	-25.96	0.000%
13	15.06	-29.33	25.96	-15.06	29.33	-25.96	0.000%
14	-0.11	-39.11	29.84	0.11	39.11	-29.84	0.000%
15	-0.11	-29.33	29.84	0.11	29.33	-29.84	0.000%
16	-15.30	-39.11	26.15	15.30	39.11	-26.15	0.000%
17	-15.30	-29.33	26.15	15.30	29.33	-26.15	0.000%
18	-26.14	-39.11	15.01	26.14	39.11	-15.01	0.000%
19	-26.14	-29.33	15.01	26.14	29.33	-15.01	0.000%
20	-30.41	-39.11	0.11	30.41	39.11	-0.11	0.000%
21	-30.41	-29.33	0.11	30.41	29.33	-0.11	0.000%
22	-26.03	-39.11	-14.83	26.03	39.11	14.83	0.000%
23	-26.03	-29.33	-14.83	26.03	29.33	14.83	0.000%
24	-15.06	-39.11	-25.96	15.06	39.11	25.96	0.000%
25	-15.06	-29.33	-25.96	15.06	29.33	25.96	0.000%
26	0.00	-69.87	0.00	0.00	69.87	-0.00	0.000%
27	0.00	-69.87	-7.09	-0.00	69.87	7.09	0.000%
28	3.63	-69.87	-6.26	-3.63	69.87	6.26	0.000%
29	6.16	-69.87	-3.55	-6.16	69.87	3.55	0.000%
30	7.25	-69.87	-0.00	-7.25	69.87	0.00	0.000%
31	6.15	-69.87	3.54	-6.15	69.87	-3.54	0.000%
32	3.55	-69.87	6.14	-3.55	69.87	-6.14	0.000%
33	-0.00	-69.87	7.09	0.00	69.87	-7.09	0.000%
34	-3.63	-69.87	6.26	3.63	69.87	-6.26	0.000%
35	-6.16	-69.87	3.55	6.16	69.87	-3.55	0.000%
36	-7.25	-69.87	0.00	7.25	69.87	-0.00	0.000%
37	-6.15	-69.87	-3.54	6.15	69.87	3.54	0.000%
38	-3.55	-69.87	-6.14	3.55	69.87	6.14	0.000%
39	0.02	-32.59	-5.45	-0.02	32.59	5.45	0.000%
40	2.79	-32.59	-4.78	-2.79	32.59	4.78	0.000%
41	4.77	-32.59	-2.74	-4.77	32.59	2.74	0.000%

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 25 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
42	5.55	-32.59	-0.02	-5.55	32.59	0.02	0.000%
43	4.75	-32.59	2.71	-4.75	32.59	-2.71	0.000%
44	2.75	-32.59	4.74	-2.75	32.59	-4.74	0.000%
45	-0.02	-32.59	5.45	0.02	32.59	-5.45	0.000%
46	-2.79	-32.59	4.78	2.79	32.59	-4.78	0.000%
47	-4.77	-32.59	2.74	4.77	32.59	-2.74	0.000%
48	-5.55	-32.59	0.02	5.55	32.59	-0.02	0.000%
49	-4.75	-32.59	-2.71	4.75	32.59	2.71	0.000%
50	-2.75	-32.59	-4.74	2.75	32.59	4.74	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.0000001	0.0000001
2	Yes	5	0.0000001	0.00016172
3	Yes	5	0.0000001	0.00005576
4	Yes	7	0.0000001	0.00005312
5	Yes	6	0.0000001	0.00028016
6	Yes	7	0.0000001	0.00005122
7	Yes	6	0.0000001	0.00026948
8	Yes	5	0.0000001	0.00056009
9	Yes	5	0.0000001	0.00023030
10	Yes	7	0.0000001	0.00005422
11	Yes	6	0.0000001	0.00028681
12	Yes	7	0.0000001	0.00005124
13	Yes	6	0.0000001	0.00027030
14	Yes	5	0.0000001	0.00052195
15	Yes	5	0.0000001	0.00020886
16	Yes	7	0.0000001	0.00005218
17	Yes	6	0.0000001	0.00027468
18	Yes	7	0.0000001	0.00005394
19	Yes	6	0.0000001	0.00028463
20	Yes	6	0.0000001	0.00006006
21	Yes	5	0.0000001	0.00045929
22	Yes	7	0.0000001	0.00005064
23	Yes	6	0.0000001	0.00026689
24	Yes	7	0.0000001	0.00005375
25	Yes	6	0.0000001	0.00028424
26	Yes	4	0.0000001	0.00025938
27	Yes	7	0.0000001	0.00021491
28	Yes	7	0.0000001	0.00029027
29	Yes	7	0.0000001	0.00028723
30	Yes	7	0.0000001	0.00021784
31	Yes	7	0.0000001	0.00029189
32	Yes	7	0.0000001	0.00028786
33	Yes	7	0.0000001	0.00021714
34	Yes	7	0.0000001	0.00029417
35	Yes	7	0.0000001	0.00029322
36	Yes	7	0.0000001	0.00021863
37	Yes	7	0.0000001	0.00028588
38	Yes	7	0.0000001	0.00028896
39	Yes	4	0.0000001	0.00060253
40	Yes	5	0.0000001	0.00024315
41	Yes	5	0.0000001	0.00022564
42	Yes	4	0.0000001	0.00092016

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 26 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

43	Yes	5	0.00000001	0.00025204
44	Yes	5	0.00000001	0.00022087
45	Yes	4	0.00000001	0.00063203
46	Yes	5	0.00000001	0.00023593
47	Yes	5	0.00000001	0.00025466
48	Yes	4	0.00000001	0.00099458
49	Yes	5	0.00000001	0.00021637
50	Yes	5	0.00000001	0.00024523

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	155 - 150	26.673	48	1.6767	0.0078
L2	150 - 145	24.920	48	1.6730	0.0070
L3	145 - 140	23.178	48	1.6549	0.0064
L4	140 - 135	21.461	48	1.6259	0.0059
L5	135 - 130	19.781	48	1.5826	0.0046
L6	130 - 123.21	18.154	48	1.5236	0.0035
L7	126.79 - 121.79	17.144	48	1.4779	0.0030
L8	121.79 - 116.79	15.618	48	1.4310	0.0027
L9	116.79 - 111.79	14.158	48	1.3550	0.0023
L10	111.79 - 106.79	12.782	48	1.2735	0.0020
L11	106.79 - 101.79	11.493	48	1.1885	0.0018
L12	101.79 - 97.5	10.293	48	1.1015	0.0015
L13	97.5 - 97.25	9.338	48	1.0260	0.0013
L14	97.25 - 92.25	9.284	48	1.0216	0.0013
L15	92.25 - 82.58	8.260	48	0.9335	0.0011
L16	87.41 - 81.58	7.357	48	0.8486	0.0010
L17	81.58 - 76.58	6.350	48	0.7957	0.0009
L18	76.58 - 71.58	5.554	48	0.7240	0.0007
L19	71.58 - 68	4.833	48	0.6536	0.0006
L20	68 - 67.75	4.362	48	0.6041	0.0006
L21	67.75 - 62.75	4.330	48	0.6019	0.0006
L22	62.75 - 57.75	3.723	48	0.5568	0.0005
L23	57.75 - 52.75	3.164	48	0.5127	0.0004
L24	52.75 - 43.03	2.650	48	0.4686	0.0004
L25	48.96 - 42.03	2.291	48	0.4359	0.0004
L26	42.03 - 37.03	1.682	48	0.3973	0.0003
L27	37.03 - 32.03	1.294	48	0.3451	0.0003
L28	32.03 - 27.03	0.959	48	0.2944	0.0002
L29	27.03 - 22.03	0.677	48	0.2450	0.0002
L30	22.03 - 17.03	0.445	48	0.1969	0.0001
L31	17.03 - 12.03	0.264	48	0.1502	0.0001
L32	12.03 - 7.03	0.130	48	0.1046	0.0001
L33	7.03 - 2.03	0.044	48	0.0603	0.0000
L34	2.03 - 0	0.004	48	0.0172	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
155.00	NNVV-65B-R4 w/ Mount Pipe	48	26.673	1.6767	0.0079	25458
142.00	RRUS 11	48	22.144	1.6389	0.0062	9384

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 27 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Elevation	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
140.00	Platform Mount [LP 303-1]	48	21.461	1.6259	0.0059	8101
128.00	LPA-80063/6CF w/ Mount Pipe	48	17.522	1.4940	0.0032	4993
74.00	KS24019-L112A	48	5.173	0.6879	0.0007	4014

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	155 - 150	146.356	20	9.1902	0.0417
L2	150 - 145	136.772	20	9.1774	0.0374
L3	145 - 140	127.245	20	9.0841	0.0341
L4	140 - 135	117.847	20	8.9300	0.0313
L5	135 - 130	108.645	20	8.6968	0.0246
L6	130 - 123.21	99.732	20	8.3761	0.0189
L7	126.79 - 121.79	94.201	20	8.1271	0.0160
L8	121.79 - 116.79	85.830	20	7.8706	0.0145
L9	116.79 - 111.79	77.827	20	7.4539	0.0126
L10	111.79 - 106.79	70.273	20	7.0064	0.0109
L11	106.79 - 101.79	63.196	20	6.5394	0.0094
L12	101.79 - 97.5	56.611	20	6.0611	0.0081
L13	97.5 - 97.25	51.360	20	5.6462	0.0071
L14	97.25 - 92.25	51.066	20	5.6220	0.0070
L15	92.25 - 82.58	45.440	20	5.1374	0.0060
L16	87.41 - 81.58	40.475	20	4.6704	0.0051
L17	81.58 - 76.58	34.936	20	4.3797	0.0046
L18	76.58 - 71.58	30.561	20	3.9849	0.0040
L19	71.58 - 68	26.594	20	3.5977	0.0034
L20	68 - 67.75	24.000	20	3.3254	0.0030
L21	67.75 - 62.75	23.827	20	3.3132	0.0030
L22	62.75 - 57.75	20.489	20	3.0648	0.0027
L23	57.75 - 52.75	17.409	20	2.8223	0.0024
L24	52.75 - 43.03	14.582	20	2.5795	0.0021
L25	48.96 - 42.03	12.607	20	2.3994	0.0019
L26	42.03 - 37.03	9.258	20	2.1867	0.0017
L27	37.03 - 32.03	7.119	20	1.8997	0.0014
L28	32.03 - 27.03	5.277	20	1.6203	0.0012
L29	27.03 - 22.03	3.724	20	1.3484	0.0010
L30	22.03 - 17.03	2.451	20	1.0838	0.0008
L31	17.03 - 12.03	1.451	20	0.8264	0.0006
L32	12.03 - 7.03	0.718	20	0.5758	0.0004
L33	7.03 - 2.03	0.243	20	0.3319	0.0002
L34	2.03 - 0	0.020	20	0.0946	0.0001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
155.00	NNVV-65B-R4 w/ Mount Pipe	20	146.356	9.1902	0.0437	5477
142.00	RRUS 11	20	121.586	8.9999	0.0336	1845
140.00	Platform Mount [LP 303-1]	20	117.847	8.9300	0.0320	1583

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 28 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
128.00	LPA-80063/6CF w/ Mount Pipe	20	96.270	8.2149	0.0171	953
74.00	KS24019-L112A	20	28.462	3.7863	0.0037	736

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L _u	Kl/r	A	P _u	φP _n	Ratio P _u / φP _n
	ft		ft	ft		in ²	K	K	
L1	155 - 150 (1)	TP19.0365x18x0.1875	5.00	0.00	0.0	11.2175	-2.75	832.43	0.003
L2	150 - 145 (2)	TP20.073x19.0365x0.1875	5.00	0.00	0.0	11.8343	-2.97	866.02	0.003
L3	145 - 140 (3)	TP21.1095x20.073x0.1875	5.00	0.00	0.0	12.4512	-3.43	898.33	0.004
L4	140 - 135 (4)	TP22.146x21.1095x0.1875	5.00	0.00	0.0	13.0680	-6.19	929.38	0.007
L5	135 - 130 (5)	TP23.1824x22.146x0.1875	5.00	0.00	0.0	13.6849	-6.58	959.15	0.007
L6	130 - 123.21 (6)	TP24.59x23.1824x0.1875	6.79	0.00	0.0	14.0809	-8.59	977.60	0.009
L7	123.21 - 121.79 (7)	TP24.6714x23.4729x0.25	5.00	0.00	0.0	19.3784	-9.36	1439.72	0.006
L8	121.79 - 116.79 (8)	TP25.8699x24.6714x0.25	5.00	0.00	0.0	20.3294	-10.02	1501.21	0.007
L9	116.79 - 111.79 (9)	TP27.0684x25.8699x0.25	5.00	0.00	0.0	21.2804	-10.72	1552.44	0.007
L10	111.79 - 106.79 (10)	TP28.2669x27.0684x0.25	5.00	0.00	0.0	22.2314	-11.44	1601.96	0.007
L11	106.79 - 101.79 (11)	TP29.4654x28.2669x0.25	5.00	0.00	0.0	23.1824	-12.20	1649.78	0.007
L12	101.79 - 97.5 (12)	TP30.4937x29.4654x0.25	4.29	0.00	0.0	23.9984	-12.87	1689.46	0.008
L13	97.5 - 97.25 (13)	TP30.5536x30.4937x0.25	0.25	0.00	0.0	24.0459	-12.92	1691.73	0.008
L14	97.25 - 92.25 (14)	TP31.7521x30.5536x0.25	5.00	0.00	0.0	24.9969	-13.71	1736.31	0.008
L15	92.25 - 82.58 (15)	TP34.07x31.7521x0.25	9.67	0.00	0.0	25.9175	-14.51	1777.85	0.008
L16	82.58 - 81.58 (16)	TP33.8254x32.4123x0.3125	5.83	0.00	0.0	33.2407	-16.07	2425.15	0.007
L17	81.58 - 76.58 (17)	TP35.0375x33.8254x0.3125	5.00	0.00	0.0	34.4428	-17.04	2487.97	0.007
L18	76.58 - 71.58 (18)	TP36.2495x35.0375x0.3125	5.00	0.00	0.0	35.6450	-18.12	2549.06	0.007
L19	71.58 - 68 (19)	TP37.1173x36.2495x0.3125	3.58	0.00	0.0	36.5057	-18.85	2591.72	0.007
L20	68 - 67.75 (20)	TP37.1779x37.1173x0.4875	0.25	0.00	0.0	56.7719	-18.93	4217.87	0.004
L21	67.75 - 62.75 (21)	TP38.3899x37.1779x0.475	5.00	0.00	0.0	57.1623	-20.27	4246.88	0.005
L22	62.75 - 57.75 (22)	TP39.6019x38.3899x0.475	5.00	0.00	0.0	58.9896	-21.65	4382.63	0.005
L23	57.75 - 52.75 (23)	TP40.8139x39.6019x0.4625	5.00	0.00	0.0	59.2348	-23.06	4400.85	0.005
L24	52.75 - 43.03 (24)	TP43.17x40.8139x0.4625	9.72	0.00	0.0	60.5834	-24.14	4501.05	0.005
L25	43.03 - 42.03 (25)	TP42.7909x41.1076x0.375	6.93	0.00	0.0	50.4855	-27.28	3628.11	0.008
L26	42.03 - 37.03	TP44.0054x42.7909x0.375	5.00	0.00	0.0	51.9311	-28.60	3700.66	0.008

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 29 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio P _u φP _n
L27	(26) 37.03 - 32.03	TP45.2199x44.0054x0.375	5.00	0.00	0.0	53.3766	-29.95	3771.46	0.008
L28	(27) 32.03 - 27.03	TP46.4344x45.2199x0.375	5.00	0.00	0.0	54.8222	-31.33	3840.52	0.008
L29	(28) 27.03 - 22.03	TP47.6489x46.4344x0.375	5.00	0.00	0.0	56.2677	-32.73	3907.84	0.008
L30	(29) 22.03 - 17.03	TP48.8634x47.6489x0.375	5.00	0.00	0.0	57.7133	-34.17	3973.41	0.009
L31	(30) 17.03 - 12.03	TP50.0779x48.8634x0.375	5.00	0.00	0.0	59.1589	-35.64	4037.24	0.009
L32	(31) 12.03 - 7.03	TP51.2924x50.0779x0.375	5.00	0.00	0.0	60.6044	-37.10	4099.33	0.009
L33	(32) 7.03 - 2.03 (33)	TP52.5069x51.2924x0.375	5.00	0.00	0.0	62.0500	-38.53	4159.67	0.009
L34	2.03 - 0 (34)	TP53x52.5069x0.375	2.03	0.00	0.0	62.6369	-39.10	4183.67	0.009

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{ux} kip-ft	φM _{ux} kip-ft	Ratio M _{ux} φM _{ux}	M _{uy} kip-ft	φM _{uy} kip-ft	Ratio M _{uy} φM _{uy}
L1	155 - 150 (1)	TP19.0365x18x0.1875	20.30	321.98	0.063	0.00	321.98	0.000
L2	150 - 145 (2)	TP20.073x19.0365x0.1875	52.68	353.57	0.149	0.00	353.57	0.000
L3	145 - 140 (3)	TP21.1095x20.073x0.1875	87.53	386.06	0.227	0.00	386.06	0.000
L4	140 - 135 (4)	TP22.146x21.1095x0.1875	157.61	419.37	0.376	0.00	419.37	0.000
L5	135 - 130 (5)	TP23.1824x22.146x0.1875	229.35	453.41	0.506	0.00	453.41	0.000
L6	130 - 123.21 (6)	TP24.59x23.1824x0.1875	302.12	475.61	0.635	0.00	475.61	0.000
L7	123.21 - 121.79 (7)	TP24.6714x23.4729x0.25	407.84	721.30	0.565	0.00	721.30	0.000
L8	121.79 - 116.79 (8)	TP25.8699x24.6714x0.25	515.36	789.40	0.653	0.00	789.40	0.000
L9	116.79 - 111.79 (9)	TP27.0684x25.8699x0.25	624.57	854.88	0.731	0.00	854.88	0.000
L10	111.79 - 106.79 (10)	TP28.2669x27.0684x0.25	735.49	921.94	0.798	0.00	921.94	0.000
L11	106.79 - 101.79 (11)	TP29.4654x28.2669x0.25	848.11	990.44	0.856	0.00	990.44	0.000
L12	101.79 - 97.5 (12)	TP30.4937x29.4654x0.25	946.09	1050.27	0.901	0.00	1050.27	0.000
L13	97.5 - 97.25 (13)	TP30.5536x30.4937x0.25	951.83	1053.78	0.903	0.00	1053.78	0.000
L14	97.25 - 92.25 (14)	TP31.7521x30.5536x0.25	1067.73	1124.68	0.949	0.00	1124.68	0.000
L15	92.25 - 82.58 (15)	TP34.07x31.7521x0.25	1181.56	1194.33	0.989	0.00	1194.33	0.000
L16	82.58 - 81.58 (16)	TP33.8254x32.4123x0.3125	1321.17	1668.83	0.792	0.00	1668.83	0.000
L17	81.58 - 76.58 (17)	TP35.0375x33.8254x0.3125	1443.04	1774.55	0.813	0.00	1774.55	0.000
L18	76.58 - 71.58 (18)	TP36.2495x35.0375x0.3125	1567.00	1882.14	0.833	0.00	1882.14	0.000
L19	71.58 - 68 (19)	TP37.1173x36.2495x0.3125	1657.13	1960.26	0.845	0.00	1960.26	0.000
L20	68 - 67.75 (20)	TP37.1779x37.1173x0.4875	1663.46	3165.22	0.526	0.00	3165.22	0.000
L21	67.75 - 62.75 (21)	TP38.3899x37.1779x0.475	1791.34	3295.82	0.544	0.00	3295.82	0.000

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 30 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{ux} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M_{uy} kip-ft	ϕM_{uy} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
L22	62.75 - 57.75 (22)	TP39.6019x38.3899x0.475	1921.68	3511.25	0.547	0.00	3511.25	0.000
L23	57.75 - 52.75 (23)	TP40.8139x39.6019x0.4625	2054.43	3638.63	0.565	0.00	3638.63	0.000
L24	52.75 - 43.03 (24)	TP43.17x40.8139x0.4625	2156.56	3807.16	0.566	0.00	3807.16	0.000
L25	43.03 - 42.03 (25)	TP42.7909x41.1076x0.375	2346.78	3161.39	0.742	0.00	3161.39	0.000
L26	42.03 - 37.03 (26)	TP44.0054x42.7909x0.375	2486.45	3317.75	0.749	0.00	3317.75	0.000
L27	37.03 - 32.03 (27)	TP45.2199x44.0054x0.375	2627.72	3476.15	0.756	0.00	3476.15	0.000
L28	32.03 - 27.03 (28)	TP46.4344x45.2199x0.375	2770.54	3636.47	0.762	0.00	3636.47	0.000
L29	27.03 - 22.03 (29)	TP47.6489x46.4344x0.375	2914.89	3798.57	0.767	0.00	3798.57	0.000
L30	22.03 - 17.03 (30)	TP48.8634x47.6489x0.375	3060.77	3962.31	0.772	0.00	3962.31	0.000
L31	17.03 - 12.03 (31)	TP50.0779x48.8634x0.375	3208.21	4127.57	0.777	0.00	4127.57	0.000
L32	12.03 - 7.03 (32)	TP51.2924x50.0779x0.375	3357.22	4294.23	0.782	0.00	4294.23	0.000
L33	7.03 - 2.03 (33)	TP52.5069x51.2924x0.375	3507.82	4462.13	0.786	0.00	4462.13	0.000
L34	2.03 - 0 (34)	TP53x52.5069x0.375	3569.41	4530.63	0.788	0.00	4530.63	0.000

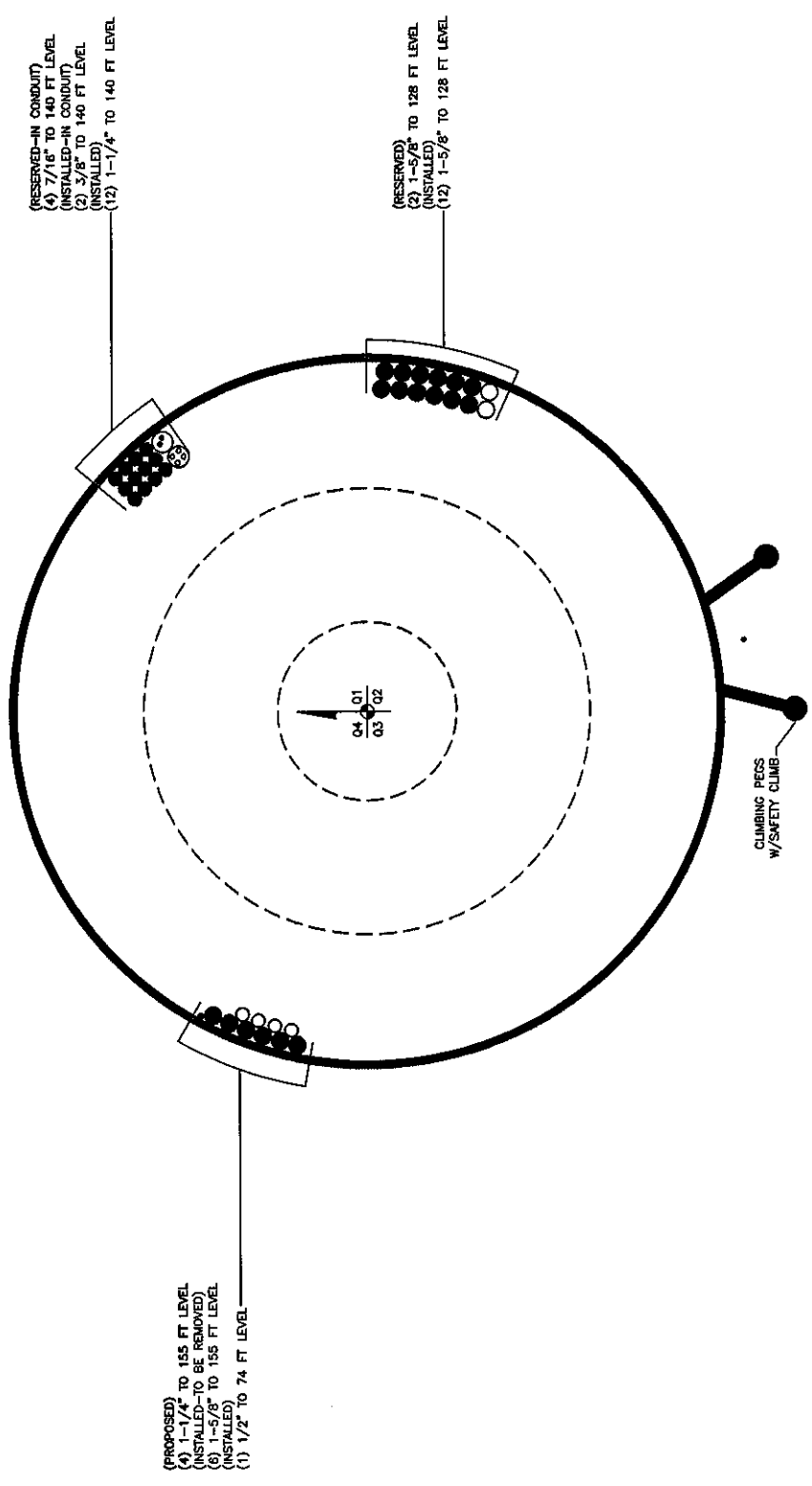
Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_u K	Ratio $\frac{V_u}{\phi V_u}$	Actual T_u kip-ft	ϕT_u kip-ft	Ratio $\frac{T_u}{\phi T_u}$
L1	155 - 150 (1)	TP19.0365x18x0.1875	6.32	416.21	0.015	0.12	645.72	0.000
L2	150 - 145 (2)	TP20.073x19.0365x0.1875	6.63	433.01	0.015	0.55	709.02	0.001
L3	145 - 140 (3)	TP21.1095x20.073x0.1875	7.40	449.17	0.016	0.54	774.12	0.001
L4	140 - 135 (4)	TP22.146x21.1095x0.1875	14.19	464.69	0.031	2.23	840.84	0.003
L5	135 - 130 (5)	TP23.1824x22.146x0.1875	14.52	479.58	0.030	2.22	909.03	0.002
L6	130 - 123.21 (6)	TP24.59x23.1824x0.1875	20.95	488.80	0.043	1.28	953.52	0.001
L7	123.21 - 121.79 (7)	TP24.6714x23.4729x0.25	21.34	719.86	0.030	1.28	1446.59	0.001
L8	121.79 - 116.79 (8)	TP25.8699x24.6714x0.25	21.68	750.61	0.029	1.28	1583.05	0.001
L9	116.79 - 111.79 (9)	TP27.0684x25.8699x0.25	22.02	776.22	0.028	1.28	1714.27	0.001
L10	111.79 - 106.79 (10)	TP28.2669x27.0684x0.25	22.36	800.98	0.028	1.27	1848.63	0.001
L11	106.79 - 101.79 (11)	TP29.4654x28.2669x0.25	22.70	824.89	0.028	1.27	1985.87	0.001
L12	101.79 - 97.5 (12)	TP30.4937x29.4654x0.25	23.00	844.73	0.027	1.27	2105.72	0.001
L13	97.5 - 97.25 (13)	TP30.5536x30.4937x0.25	23.01	845.87	0.027	1.27	2112.77	0.001
L14	97.25 - 92.25 (14)	TP31.7521x30.5536x0.25	23.37	868.16	0.027	1.27	2254.80	0.001
L15	92.25 - 82.58 (15)	TP34.07x31.7521x0.25	23.69	888.93	0.027	1.27	2394.33	0.001
L16	82.58 - 81.58	TP33.8254x32.4123x0.3125	24.21	1212.58	0.020	1.27	3346.45	0.000

tnxTower Aero Wireless Group 5555 Central Ave., Suite 100 Boulder, CO 80301 Phone: (720) 304-6882 FAX: (720) 304-6883	Job BU# 876366) WAPPINGERS FALLS / PRESTON CIT	Page 31 of 31
	Project Existing 155-ft Monopole	Date 14:44:25 06/26/18
	Client Crown Castle	Designed by JRozina

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L17	(16) 81.58 - 76.58	TP35.0375x33.8254x0.3125	24.57	1243.99	0.020	1.27	3558.27	0.000
L18	(17) 76.58 - 71.58	TP36.2495x35.0375x0.3125	25.06	1274.53	0.020	1.76	3773.83	0.000
L19	(18) 71.58 - 68 (19)	TP37.1173x36.2495x0.3125	25.32	1295.86	0.020	1.76	3930.33	0.000
L20	68 - 67.75 (20)	TP37.1779x37.1173x0.4875	25.33	2108.93	0.012	1.76	6350.85	0.000
L21	(21) 67.75 - 62.75	TP38.3899x37.1779x0.475	25.84	2123.44	0.012	1.76	6612.14	0.000
L22	(22) 62.75 - 57.75	TP39.6019x38.3899x0.475	26.32	2191.32	0.012	1.76	7043.92	0.000
L23	(23) 57.75 - 52.75	TP40.8139x39.6019x0.4625	26.80	2200.42	0.012	1.76	7298.72	0.000
L24	(24) 52.75 - 43.03	TP43.17x40.8139x0.4625	27.11	2250.52	0.012	1.76	7636.49	0.000
L25	(25) 43.03 - 42.03	TP42.7909x41.1076x0.375	27.78	1814.05	0.015	1.76	6338.95	0.000
L26	(26) 42.03 - 37.03	TP44.0054x42.7909x0.375	28.11	1850.33	0.015	1.76	6652.22	0.000
L27	(27) 37.03 - 32.03	TP45.2199x44.0054x0.375	28.43	1885.73	0.015	1.76	6969.58	0.000
L28	(28) 32.03 - 27.03	TP46.4344x45.2199x0.375	28.73	1920.26	0.015	1.76	7290.77	0.000
L29	(29) 27.03 - 22.03	TP47.6489x46.4344x0.375	29.04	1953.92	0.015	1.76	7615.52	0.000
L30	(30) 22.03 - 17.03	TP48.8634x47.6489x0.375	29.35	1986.71	0.015	1.76	7943.57	0.000
L31	(31) 17.03 - 12.03	TP50.0779x48.8634x0.375	29.66	2018.62	0.015	1.76	8274.66	0.000
L32	(32) 12.03 - 7.03	TP51.2924x50.0779x0.375	29.98	2049.66	0.015	1.76	8608.50	0.000
L33	(33) 7.03 - 2.03	TP52.5069x51.2924x0.375	30.30	2079.83	0.015	1.75	8944.83	0.000
L34	(34) 2.03 - 0	TP53x52.5069x0.375	30.43	2091.83	0.015	1.75	9082.08	0.000

APPENDIX B
BASE LEVEL DRAWING



(RESERVED-IN CONDUIT)
(4) 7/16" TO 140 FT LEVEL
(INSTALLED-IN CONDUIT)
(2) 3/8" TO 140 FT LEVEL
(INSTALLED)
(12) 1-1/4" TO 140 FT LEVEL

(RESERVED)
(2) 1-5/8" TO 128 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 128 FT LEVEL

(PROPOSED)
(4) 1-1/4" TO 155 FT LEVEL
(INSTALLED--TO BE REMOVED)
(6) 1-5/8" TO 155 FT LEVEL
(INSTALLED)
(1) 1/2" TO 74 FT LEVEL

CLIMBING PEGS
W/SAFETY CLIMB

APPENDIX C
ADDITIONAL CALCULATIONS



Site BU: 876366

Work Order: 1593865



Copyright © 2018 Crown Castle

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	155	31.79	3.58	18	18	24.59	0.1875	0.75	A572-65
2	126.79	44.21	4.83	18	23.47	34.07	0.25	1	A572-65
3	87.41	44.38	5.93	18	32.41	43.17	0.3125	1.25	A572-65
4	48.96	48.96	0	18	41.11	53	0.375	1.5	A572-65

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1	47	68	plate	CCI-SFP-060100	3	x																		
2	85.5	97.5	plate	CCI-SFP-045100	3	x																		
3																								
4																								
5																								
6																								
7																								
8																								
9																								
10																								

Reinforcement Details

	B (in)	H (in)	Gross Area (in ²)	Pole Face to Centroid (in)	Bottom Termination Length (in)	Top Termination Length (in)	L _w (in)	Net Area (in ²)	Bolt Hole Size (in)	Reinforcement Material
1	6	1	6	0.5	24,000	24,000	16,000	4,750	1.1875	A572-65
2	4.5	1	4.5	0.5	18,000	18,000	20,000	3,250	1.1875	A572-65

TNX Geometry Input

Increment (ft):

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	155 - 150	5		18	18.000	19.036	0.1875	A572-65	1.000
2	150 - 145	5		18	19.036	20.073	0.1875	A572-65	1.000
3	145 - 140	5		18	20.073	21.109	0.1875	A572-65	1.000
4	140 - 135	5		18	21.109	22.146	0.1875	A572-65	1.000
5	135 - 130	5		18	22.146	23.182	0.1875	A572-65	1.000
6	130 - 126.79	6.79	3.58	18	23.182	24.590	0.1875	A572-65	1.000
7	126.79 - 121.79	5		18	23.473	24.671	0.25	A572-65	1.000
8	121.79 - 116.79	5		18	24.671	25.870	0.25	A572-65	1.000
9	116.79 - 111.79	5		18	25.870	27.068	0.25	A572-65	1.000
10	111.79 - 106.79	5		18	27.068	28.267	0.25	A572-65	1.000
11	106.79 - 101.79	5		18	28.267	29.465	0.25	A572-65	1.000
12	101.79 - 97.5	4.29		18	29.465	30.494	0.25	A572-65	1.000
13	97.5 - 92.25	0.25		18	30.494	30.554	0.25	A572-65	1.000
14	97.25 - 92.25	5		18	30.554	31.752	0.25	A572-65	1.000
15	92.25 - 87.41	9.67	4.83	18	31.752	34.070	0.25	A572-65	1.000
16	87.41 - 81.58	5.83		18	32.412	33.825	0.3125	A572-65	1.000
17	81.58 - 76.58	5		18	33.825	35.037	0.3125	A572-65	1.000
18	76.58 - 71.58	5		18	35.037	36.249	0.3125	A572-65	1.000
19	71.58 - 68	3.58		18	36.249	37.117	0.3125	A572-65	1.000
20	68 - 67.75	0.25		18	37.117	37.178	0.4875	A572-65	0.961
21	67.75 - 62.75	5		18	37.178	38.390	0.475	A572-65	0.976
22	62.75 - 57.75	5		18	38.390	39.602	0.475	A572-65	0.966
23	57.75 - 52.75	5		18	39.602	40.814	0.4625	A572-65	0.982
24	52.75 - 48.96	9.72	5.93	18	40.814	43.170	0.4625	A572-65	0.975
25	48.96 - 42.03	6.93		18	41.108	42.791	0.375	A572-65	1.000
26	42.03 - 37.03	5		18	42.791	44.005	0.375	A572-65	1.000
27	37.03 - 32.03	5		18	44.005	45.220	0.375	A572-65	1.000
28	32.03 - 27.03	5		18	45.220	46.434	0.375	A572-65	1.000
29	27.03 - 22.03	5		18	46.434	47.649	0.375	A572-65	1.000
30	22.03 - 17.03	5		18	47.649	48.863	0.375	A572-65	1.000
31	17.03 - 12.03	5		18	48.863	50.078	0.375	A572-65	1.000
32	12.03 - 7.03	5		18	50.078	51.292	0.375	A572-65	1.000
33	7.03 - 2.03	5		18	51.292	52.507	0.375	A572-65	1.000
34	2.03 - 0	2.03		18	52.507	53.000	0.375	A572-65	1.000

TNX Section Forces

Increment (ft):		TNX Output		
	5	P _u	M _{ux} (kip-ft)	V _u
	Section Height (ft)	(K)		(K)
1	155 - 150	2.75	20.30	6.32
2	150 - 145	2.97	52.68	6.63
3	145 - 140	3.43	87.54	7.40
4	140 - 135	6.19	157.61	14.19
5	135 - 130	6.58	229.35	14.52
6	130 - 126.79	8.59	302.12	20.95
7	126.79 - 121.79	9.36	407.84	21.34
8	121.79 - 116.79	10.02	515.36	21.68
9	116.79 - 111.79	10.72	624.57	22.02
10	111.79 - 106.79	11.44	735.49	22.36
11	106.79 - 101.79	12.20	848.11	22.70
12	101.79 - 97.5	12.87	946.09	23.00
13	97.5 - 97.25	12.92	951.84	23.01
14	97.25 - 92.25	13.71	1067.73	23.37
15	92.25 - 87.41	14.51	1181.56	23.69
16	87.41 - 81.58	16.07	1321.17	24.21
17	81.58 - 76.58	17.04	1443.04	24.57
18	76.58 - 71.58	18.12	1567.00	25.06
19	71.58 - 68	18.85	1657.13	25.32
20	68 - 67.75	18.93	1663.46	25.33
21	67.75 - 62.75	20.27	1791.34	25.84
22	62.75 - 57.75	21.65	1921.69	26.32
23	57.75 - 52.75	23.06	2054.44	26.80
24	52.75 - 48.96	24.14	2156.55	27.11
25	48.96 - 42.03	27.28	2346.78	27.78
26	42.03 - 37.03	28.60	2486.45	28.11
27	37.03 - 32.03	29.95	2627.72	28.43
28	32.03 - 27.03	31.33	2770.54	28.73
29	27.03 - 22.03	32.73	2914.89	29.04
30	22.03 - 17.03	34.17	3060.77	29.35
31	17.03 - 12.03	35.64	3208.21	29.66
32	12.03 - 7.03	37.10	3357.22	29.98
33	7.03 - 2.03	38.53	3507.81	30.30
34	2.03 - 0	39.10	3569.41	30.43

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
155 - 150	Pole	TP19.036x18x0.1875	Pole	6.7%	Pass
150 - 145	Pole	TP20.073x19.036x0.1875	Pole	15.3%	Pass
145 - 140	Pole	TP21.109x20.073x0.1875	Pole	23.1%	Pass
140 - 135	Pole	TP22.146x21.109x0.1875	Pole	38.3%	Pass
135 - 130	Pole	TP23.182x22.146x0.1875	Pole	51.4%	Pass
130 - 126.79	Pole	TP24.59x23.182x0.1875	Pole	64.6%	Pass
126.79 - 121.79	Pole	TP24.671x23.473x0.25	Pole	57.3%	Pass
121.79 - 116.79	Pole	TP25.87x24.671x0.25	Pole	66.0%	Pass
116.79 - 111.79	Pole	TP27.068x25.87x0.25	Pole	73.8%	Pass
111.79 - 106.79	Pole	TP28.267x27.068x0.25	Pole	80.6%	Pass
106.79 - 101.79	Pole	TP29.465x28.267x0.25	Pole	86.5%	Pass
101.79 - 97.5	Pole	TP30.494x29.465x0.25	Pole	90.9%	Pass
97.5 - 97.25	Pole	TP30.554x30.494x0.25	Pole	91.2%	Pass
97.25 - 92.25	Pole	TP31.752x30.554x0.25	Pole	95.8%	Pass
92.25 - 87.41	Pole	TP34.07x31.752x0.25	Pole	99.8%	Pass
87.41 - 81.58	Pole	TP33.825x32.412x0.3125	Pole	79.9%	Pass
81.58 - 76.58	Pole	TP35.037x33.825x0.3125	Pole	82.0%	Pass
76.58 - 71.58	Pole	TP36.249x35.037x0.3125	Pole	84.0%	Pass
71.58 - 68	Pole	TP37.117x36.249x0.3125	Pole	85.3%	Pass
68 - 67.75	Pole + Reinf.	TP37.178x37.117x0.4875	Reinf. 1 Tension Rupture	84.3%	Pass
67.75 - 62.75	Pole + Reinf.	TP38.39x37.178x0.475	Reinf. 1 Tension Rupture	86.0%	Pass
62.75 - 57.75	Pole + Reinf.	TP39.602x38.39x0.475	Reinf. 1 Tension Rupture	87.6%	Pass
57.75 - 52.75	Pole + Reinf.	TP40.814x39.602x0.4625	Reinf. 1 Tension Rupture	89.0%	Pass
52.75 - 48.96	Pole + Reinf.	TP43.17x40.814x0.4625	Reinf. 1 Tension Rupture	90.0%	Pass
48.96 - 42.03	Pole	TP42.791x41.108x0.375	Pole	75.0%	Pass
42.03 - 37.03	Pole	TP44.005x42.791x0.375	Pole	75.7%	Pass
37.03 - 32.03	Pole	TP45.22x44.005x0.375	Pole	76.4%	Pass
32.03 - 27.03	Pole	TP46.434x45.22x0.375	Pole	77.0%	Pass
27.03 - 22.03	Pole	TP47.649x46.434x0.375	Pole	77.6%	Pass
22.03 - 17.03	Pole	TP48.863x47.649x0.375	Pole	78.1%	Pass
17.03 - 12.03	Pole	TP50.078x48.863x0.375	Pole	78.6%	Pass
12.03 - 7.03	Pole	TP51.292x50.078x0.375	Pole	79.1%	Pass
7.03 - 2.03	Pole	TP52.507x51.292x0.375	Pole	79.6%	Pass
2.03 - 0	Pole	TP53x52.507x0.375	Pole	79.8%	Pass
				Summary	
			Pole	99.8%	Pass
			Reinforcement	90.0%	Pass
			Overall	99.8%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in ⁴)			Area (in ²)			% Capacity		
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2
155 - 150	503	n/a	503	11.22	n/a	11.22	6.7%		
150 - 145	591	n/a	591	11.83	n/a	11.83	15.3%		
145 - 140	688	n/a	688	12.45	n/a	12.45	23.1%		
140 - 135	796	n/a	796	13.07	n/a	13.07	38.3%		
135 - 130	914	n/a	914	13.68	n/a	13.68	51.4%		
130 - 126.79	996	n/a	996	14.08	n/a	14.08	64.6%		
126.79 - 121.79	1460	n/a	1460	19.38	n/a	19.38	57.3%		
121.79 - 116.79	1685	n/a	1685	20.33	n/a	20.33	66.0%		
116.79 - 111.79	1933	n/a	1933	21.28	n/a	21.28	73.8%		
111.79 - 106.79	2204	n/a	2204	22.23	n/a	22.23	80.6%		
106.79 - 101.79	2499	n/a	2499	23.18	n/a	23.18	86.4%		
101.79 - 97.5	2772	n/a	2772	24.00	n/a	24.00	90.9%		
97.5 - 97.25	2789	n/a	2789	24.05	n/a	24.05	91.2%		
97.25 - 92.25	3133	n/a	3133	25.00	n/a	25.00	95.8%		
92.25 - 87.41	3492	n/a	3492	25.92	n/a	25.92	99.8%		
87.41 - 81.58	4715	n/a	4715	33.24	n/a	33.24	79.9%		
81.58 - 76.58	5245	n/a	5245	34.44	n/a	34.44	82.0%		
76.58 - 71.58	5814	n/a	5814	35.64	n/a	35.64	84.0%		
71.58 - 68	6245	n/a	6245	36.50	n/a	36.50	85.3%		
68 - 67.75	6276	3307	9583	36.56	18.00	54.56	55.2%	84.3%	
67.75 - 62.75	6916	3519	10435	37.77	18.00	55.77	56.9%	86.0%	
62.75 - 57.75	7597	3737	11334	38.97	18.00	56.97	58.6%	87.6%	
57.75 - 52.75	8322	3962	12284	40.17	18.00	58.17	60.2%	89.0%	
52.75 - 48.96	8902	4136	13038	41.08	18.00	59.08	61.4%	90.0%	
48.96 - 42.03	11471	n/a	11471	50.48	n/a	50.48	75.0%		
42.03 - 37.03	12485	n/a	12485	51.93	n/a	51.93	75.7%		
37.03 - 32.03	13557	n/a	13557	53.37	n/a	53.37	76.4%		
32.03 - 27.03	14688	n/a	14688	54.82	n/a	54.82	77.0%		
27.03 - 22.03	15881	n/a	15881	56.27	n/a	56.27	77.6%		
22.03 - 17.03	17137	n/a	17137	57.71	n/a	57.71	78.1%		
17.03 - 12.03	18457	n/a	18457	59.16	n/a	59.16	78.6%		
12.03 - 7.03	19843	n/a	19843	60.60	n/a	60.60	79.1%		
7.03 - 2.03	21298	n/a	21298	62.05	n/a	62.05	79.6%		
2.03 - 0	21908	n/a	21908	62.63	n/a	62.63	79.8%		

Note: Section capacity checked in 5 degree increments.

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

Site Information	
ID:	876366
Name:	WAPPINGERS FALLS - PRESTON CIT
App. #:	441414 RO

Base Reactions	
Moment:	3569 ft-kip
Axial:	39 kip
Shear:	30 kip
Base Plate Type:	Circular

Design Information	
TIA Code:	G
ASIF:	1.000
Failure:	105%
eta Factor:	0.50



Original Anchor Rod Data	
Quantity:	12
Diameter:	2.25 in
Material:	A615 GR 75
Bolt Circle:	62.0 in
Bolt Spacing:	47.71 in
Bolt Group Area:	22926 in ²
Bolt Group MOIx:	in ⁴
Reactions Seen by Original AR Group	
Moment:	2977.4 kip-ft
Axial:	39.1 kip
Shear:	30.4 kip
Original AR Capacity Check	
Combined Load:	200.4 kip
Allowable load:	259.8 kip
AR Capacity:	77.1% Pass

First Added Anchor Rod Data	
Quantity:	3
Diameter:	1.75 in
Material:	A193 B7
Bolt Circle:	71.1 in
Bolt Group Area:	7.22 in ²
Bolt Group MOIx:	4558 in ⁴
Reactions Seen by First Added AR Group	
Moment:	592.0 kip-ft
Axial:	0.0 kip
Shear:	0.0 kip
First Added AR Capacity Check	
Combined Load:	128.7 kip
Allowable load:	189.9 kip
AR Capacity:	67.8% Pass

Second Added Anchor Rod Data	
Quantity:	
Diameter:	in
Material:	in
Bolt Circle:	in
Bolt Group Area:	0.00 in ²
Bolt Group MOIx:	0 in ⁴
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	
Combined load:	0.0 kip
Allowable load:	0.0 kip
AR Capacity:	0.0%

Third Added Anchor Rod Data	
Quantity:	
Diameter:	in
Material:	in
Bolt Circle:	in
Bolt Group Area:	0.00 in ²
Bolt Group MOIx:	0 in ⁴
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	
Combined Load:	0.0 kip
Allowable load:	0.0 kip
AR Capacity:	0.0%

Anchor Rod Embedment (v1.2)

Analysis Standard

TIA Code: *TIACode*
Allowable Stress Increase: *ASIF*

Dimensions and Properties

Pier Diameter: *PierDia* in
Concrete Strength: *Fc* psi
Clear Cover, Side: *cc.side* in
Clear Cover, Top: *cc.top* in

Rebar Yield Strength: *BarFy* ksi

Rebar Tie Size: *TieSize*
Rebar Tie Diameter: *TieDia* in

Vertical Bar Quantity: *BarQty*
Vertical Bar Size: *BarSize*
Vertical Bar Diameter: *BarDia* in
Vertical Bar Area: *BarArea* in
Vertical Bar Circle Diameter: *BarBC* in
Vertical Bar Spacing: *BarSp* in
Vertical Bar Radial Angle Between: *BarAngle* deg

Anchor Rod Type: *RodType*
Anchor Rod Diameter: *RodDia* in
Anchor Rod Threads per Inch: *RodThreads*
Anchor Rod Net Area Through Threads: *RodArea* sq in
Anchor Rod Circle Diameter: *RodBC* in
Anchor Rod Material: *RodMatl*
Anchor Rod Yield Strength: *RodFy* ksi
Anchor Rod Ultimate Strength: *RodFu* ksi

Anchor Rod Loading

Anchor Rod Tensile Requirement: *RodP* kip
Anchor Rod Design Criteria: *DesCrit*

Development Length of Vertical Rebar

Reinforcement Location Factor⁽¹⁾: *Alpha* ACI 12.2.4
Coating Factor⁽¹⁾: *Beta* ACI 12.2.4
Lightweight Aggregate Concrete Factor⁽¹⁾: *Lambda* ACI 12.2.4
Reinforcement Size Factor⁽¹⁾: *Gamma* ACI 12.2.4
Transverse Reinforcement Ratio⁽²⁾: *Ktr* in ACI 12.2.4
Maximum Spacing or Cover Dimension: *Cover* in ACI 12.2.4
Development Length: *Ld* in ACI 12.2.3
Reinforcement Stress Ratio⁽³⁾: *SR*
Reduced Development Length: *Ld.red* in ACI 12.2.5 Used only if DesCrit = "Analysis"

Force Transfer Length

Angle to Vertical Bar: *Angle* deg
Distance to Farthest Bar: *BarDist* in

Epoxy Bond

Epoxy Ultimate Bond Stress: *EpoxyBond* psi
Strength Resistance Factor: *EpoxyPhi*
Bond Length Required: *EpoxyL* in

Embedment Length

Total Required Embedment Length: *EmbedIn* in
EmbedFt ft
Actual Embedment length: *ActEmbed* ft
Embedment Capacity: *EmbedCap*

Rebar Length Controls

Notes:

- (1) These factors are typically 1.0 for most tower foundations.
- (2) This factor is typically 0 inches for most tower foundations.
- (3) Stress ratio of reinforcement can be entered to reduce required development length. Only to be used in already installed desperate situations.
- (4) This is consistent with on CCI Foundations Criteria Item AC-1, dated 06/01/2010.

Stiffened or Unstiffened, UngROUTed, Circular Base Plate - Any Rod Materi

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(F

Site Data

BU#:	876366
Site Name:	WAPPINGERS FALLS - PF
App #:	441414 R0
Pole Manufacturer:	Other

Anchor Rod Data

Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	62	in

Plate Data

Diam:	68	in
Thick:	1.75	in
Grade:	60	ksi
Single-Rod B-eff:	13.36	in

Stiffener Data (Welding at both sides)

Config:	1	*
Weld Type:	Groove	
Groove Depth:	0.3125	in **
Groove Angle:	45	degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:	0.25	in
Width:	7.5	in
Height:	23	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	50	ksi
Weld str.:	80	ksi

Pole Data

Diam:	50.52	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Reactions		
Mu:	2977.4099	ft-kips
Axial, Pu:	39.0996	kips
Shear, Vu:	30.425991	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

If No stiffeners, Criteria: **AISC LRFD** <-Only Applicable to Unstiffene

Base Plate Results

Base Plate Stress:	36.9 ksi
Allowable Plate Stress:	54.0 ksi
Base Plate Stress Ratio:	68.4% Pass

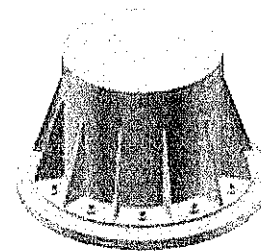
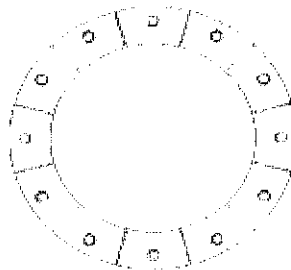
Flexural Check

Stiffener Results

Horizontal Weld :	60.1% Pass
Vertical Weld:	43.8% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	17.6% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	62.8% Pass
Plate Comp. (AISC Bracket):	66.2% Pass

Pole Results

Pole Punching Shear Check:	9.6% Pass
----------------------------	-----------



* 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

Pier and Pad Foundation



BU #: 876366
 Site Name: WAPPINGERS FA
 App. Number: 441415 R0

TIA-222 Revision: G
 Tower Type: Monopole

Block Foundation?: F

Superstructure Analysis Reactions		
Compression, P_{comp} :	39	kips
Base Shear, V_{u_comp} :	30	kips
Moment, M_u :	3569	ft-kips
Tower Height, H :	155	ft
BP Dist. Above Fdn, bp_{dist} :	3	in

Foundation Analysis Checks				
	Capacity	Demand	Rating	Check
Lateral (Sliding) (kips)	296.74	30.00	10.1%	Pass
Bearing Pressure (ksf)	5.06	3.19	62.9%	Pass
Overturing (kip*ft)	4589.66	3786.50	82.5%	Pass
Pier Flexure (Comp.) (kip*ft)	3989.23	3704.00	92.8%	Pass
Pier Compression (kip)	31187.52	78.69	0.3%	Pass
Pad Flexure (kip*ft)	3732.05	1755.36	47.0%	Pass
Pad Shear - 1-way (kips)	667.68	300.35	45.0%	Pass
Pad Shear - 2-way (ksi)	0.19	0.00	0.0%	Pass

Pier Properties		
Pier Shape:	Square	
Pier Diameter, $dpier$:	7.0	ft
Ext. Above Grade, E :	1.00	ft
Pier Rebar Size, Sc :	8	
Pier Rebar Quantity, mc :	30	
Pier Tie/Spiral Size, St :	4	
Pier Tie/Spiral Quantity, mt :	5	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier} :	3	in

Soil Rating: 82.5%
 Structural Rating: 92.8%

Pad Properties		
Depth, D :	6.0	ft
Pad Width, W :	23.0	ft
Pad Thickness, T :	2.5	ft
Pad Rebar Size, Sp :	8	
Pad Rebar Quantity, mp :	43	
Pad Clear Cover, cc_{pad} :	3	in

Material Properties		
Rebar Grade, F_y :	60000	psi
Concrete Compressive Strength, F'_c :	4000	psi
Dry Concrete Density, δ_c :	150	pcf

Soil Properties		
Total Soil Unit Weight, γ :	125	pcf
Ultimate Net Bearing, Q_{net} :	6.000	ksf
Cohesion, C_u :		ksf
Friction Angle, ϕ :	34	degrees
SPT Blow Count, N_{blows} :		
Base Friction, μ :	0.6	
Neglected Depth, N :		ft
Foundation Bearing on Rock?	No	
Groundwater Depth, gw :	6	ft

<--Toggle between Gross and Net



EBI Consulting

environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

SPRINT Existing Facility

Site ID: CT33XC010

Wappingers Falls / Preston City
101 Pierce Road
Preston, CT 06365

July 31, 2018

EBI Project Number: 6218005229

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	12.37 %



July 31, 2018

SPRINT

Attn: RF Engineering Manager
1 International Boulevard, Suite 800
Mahwah, NJ 07495

Emissions Analysis for Site: **CT33XC010 – Wappingers Falls / Preston City**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **101 Pierce Road, Preston, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT Antenna Installation located on this property are within specified federal limits.

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

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

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

General population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limits for the 850 MHz Band is approximately $567 \mu\text{W}/\text{cm}^2$. The general population exposure limit for the 1900 MHz (PCS) and 2500 MHz (BRS) bands is $1000 \mu\text{W}/\text{cm}^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.



EBI Consulting

environmental | engineering | due diligence

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed SPRINT Wireless antenna facility located at **101 Pierce Road, Preston, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since SPRINT is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

- 1) 1 CDMA channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.
- 2) 2 LTE channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 50 Watts per Channel.
- 3) 5 CDMA channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 16 Watts per Channel.
- 4) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 5) 8 LTE channels (2500 MHz (BRS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.



EBI Consulting

environmental | engineering | due diligence

- 6) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 7) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 8) The antennas used in this modeling are the **KMW ETCR-654L12H6** for transmission in the 850 MHz, 1900 MHz (PCS) and 2500 MHz (BRS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 9) The antenna mounting height centerlines of the proposed antennas are **150 feet** above ground level (AGL) for **Sector A**, **150 feet** above ground level (AGL) for **Sector B** and **150 feet** above ground level (AGL) for Sector C.
- 10) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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



SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	KMW ETCR-654L12H6	Make / Model:	KMW ETCR-654L12H6	Make / Model:	KMW ETCR-654L12H6
Gain:	13.35 / 15.25 / 15.05 dBd	Gain:	13.35 / 15.25 / 15.05 dBd	Gain:	13.35 / 15.25 / 15.05 dBd
Height (AGL):	150 feet	Height (AGL):	150 feet	Height (AGL):	150 feet
Frequency Bands:	850 MHz / 1900 MHz (PCS) / 2500 MHz (BRS)	Frequency Bands:	850 MHz / 1900 MHz (PCS) / 2500 MHz (BRS)	Frequency Bands:	850 MHz / 1900 MHz (PCS) / 2500 MHz (BRS)
Channel Count:	18	Channel Count:	18	Channel Count:	18
Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts
ERP (W):	13,072.94	ERP (W):	13,072.94	ERP (W):	13,072.94
Antenna A1 MPE%:	2.61 %	Antenna B1 MPE%:	2.61 %	Antenna C1 MPE%:	2.61 %

Site Composite MPE%	
Carrier	MPE%
SPRINT – Max per sector	2.61 %
AT&T	3.54 %
Verizon Wireless	6.22 %
Site Total MPE %:	12.37 %

SPRINT Sector A Total:	2.61 %
SPRINT Sector B Total:	2.61 %
SPRINT Sector C Total:	2.61 %
Site Total:	12.37 %

SPRINT Frequency Band / Technology (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
Sprint 850 MHz CDMA	1	432.54	150	0.75	850 MHz	567	0.14%
Sprint 850 MHz LTE	2	1,081.36	150	3.75	850 MHz	567	0.66%
Sprint 1900 MHz (PCS) CDMA	5	535.94	150	4.65	1900 MHz (PCS)	1000	0.46%
Sprint 1900 MHz (PCS) LTE	2	1,339.86	150	4.65	1900 MHz (PCS)	1000	0.46%
Sprint 2500 MHz (BRS) LTE	8	639.78	150	8.87	2500 MHz (BRS)	1000	0.89%
						Total:	2.61%



EBI Consulting

environmental | engineering | due diligence

Summary

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

The anticipated maximum composite contributions from the SPRINT facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

SPRINT Sector	Power Density Value (%)
Sector A:	2.61 %
Sector B:	2.61 %
Sector C:	2.61 %
SPRINT Maximum MPE % (per sector):	2.61 %
Site Total:	12.37 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **12.37 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

ORIGIN ID:BEDA (781) 970-0053
JEFF BARBADORA
CROWN CASTLE
12 GILL STREET
SUITE 5800
WOBURN, MA 01801
UNITED STATES US

SHIP DATE: 07AUG18
ACTWGT: 0.50 LB
CAD: 104924191/INET4040
BILL SENDER

TO PANUS FARM
PANUS FARM LLC
60 PIERCE ROAD

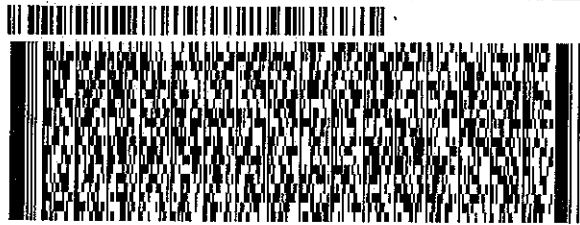
PRESTON CT 06365

(860) 334-3581

REF: 1766.6680

INV:
PO:

DEPT:



FedEx
Express



552.116309IDCA5

41820100720100

WED - 08 AUG 12:00P

PRIORITY OVERNIGHT

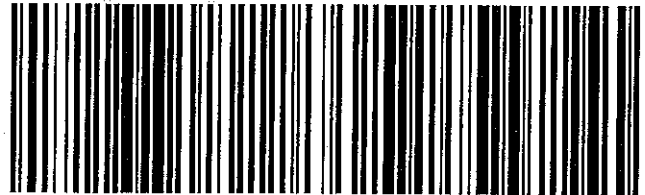
TRK#
0201

7729 1177 9702

EB GONA

06365

CT-US BDL



Barbadora, Jeff

From: TrackingUpdates@fedex.com
Sent: Wednesday, August 8, 2018 11:13 AM
To: Barbadora, Jeff
Subject: FedEx Shipment 772911779702 Delivered

Your package has been delivered

Tracking # 772911779702

Ship date:
Tue, 8/7/2018

Jeff Barbadora

Crown Castle
WOBURN, MA 01801
US

Delivery date:
**Wed, 8/8/2018 11:09
am**

Panus Farm
Panus Farm LLC
60 Pierce Road
PRESTON, CT 06365
US



Shipment Facts

Our records indicate that the following package has been delivered.

Tracking number: 772911779702

Status: Delivered: 08/08/2018 11:09 AM
Signed for By: Signature not required

Reference: 1766.6680

Signed for by: Signature not required

Delivery location: PRESTON, CT

Delivered to: Residence

Service type: FedEx Priority Overnight®


Packaging type: FedEx® Envelope

Number of pieces: 1

Weight: 2.00 lb.

Special handling/Services: Deliver Weekday
Residential Delivery

Standard transit: 8/8/2018 by 12:00 pm

 Please do not respond to this message. This email was sent from an unattended mailbox. This report was generated at approximately 10:13 AM CDT on 08/08/2018.

ORIGIN ID:BEDA (781) 970-0053
JEFF BARBADORA
CROWN CASTLE
12 GILL STREET
SUITE 5800
WOBURN, MA 01801
UNITED STATES US

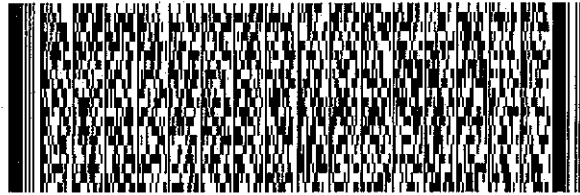
SHIP DATE: 07AUG18
ACTWGT: 0.50 LB
CAD: 104924191/INET4040
BILL SENDER

TO FIRST SELECTMAN-ROBERT CONGDON
TOWN F PRESTON
389 ROUTE 2

PRESTON CT 06365

(860) 887-5581 X 105 REF: 1766.6680
INV: PO: DEPT:

552.11/3309/0CA5



WED - 08 AUG 12:00P
PRIORITY OVERNIGHT

TRK# 7729 1176 8039
0201

EB GONA

06365
CT-US BDL



Barbadora, Jeff

From: TrackingUpdates@fedex.com
Sent: Wednesday, August 8, 2018 10:11 AM
To: Barbadora, Jeff
Subject: FedEx Shipment 772911768039 Delivered

Your package has been delivered

Tracking # 772911768039

Ship date:
Tue, 8/7/2018

Jeff Barbadora
Crown Castle
WOBURN, MA 01801
US

Delivery date:
Wed, 8/8/2018 10:09
am


First Selectman-Robert
Congdon
Town f Preston
389 Route 2
PRESTON, CT 06365
US



Shipment Facts

Our records indicate that the following package has been delivered.

Tracking number: 772911768039
Status: Delivered: 08/08/2018 10:09 AM
Signed for By: M.NANCY
Reference: 1766.6680
Signed for by: M.NANCY
Delivery location: PRESTON, CT
Delivered to: Receptionist/Front Desk
Service type: FedEx Priority Overnight®
Packaging type: FedEx® Envelope
Number of pieces: 1
Weight: 2.00 lb.
Special handling/Services: Deliver Weekday
Standard transit: 8/8/2018 by 12:00 pm

 Please do not respond to this message. This email was sent from an unattended mailbox. This report was generated at approximately 9:11 AM CDT on 08/08/2018.

All weights are estimated.