

June 11, 2018

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

Re: **Notice of Exempt Modification – Facility Modification
24 Dinglebrook Road, Newtown, Connecticut**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) antennas at the 140-foot level of an existing 149-foot tower at 24 Dinglebrook Road in Newtown, Connecticut (the “Property”). The tower is owned by Crown Castle (“Crown”). The Council approved Cellco’s use of this tower in 2009 (Docket No. 376). Cellco now intends to replace six (6) of its existing antennas with six (6) new antennas (three (3) model JAHH-65B-R3B, 700/2100 MHz antennas and three (3) model JAHH-65B-R3B, 850 MHz antennas) all at the same level on the tower. Cellco also intends to install nine (9) remote radio heads (“RRHs”) and two (2) HYBRIFLEX™ fiber optic antenna cables. Included in Attachment 1 are specifications for Cellco’s replacement antennas, RRHs and HYBRIFLEX™ cables.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Daniel Rosenthal, Newtown’s First Selectman; George Benson, Newtown’s Director of Planning; the Estate of Paul Lundgren, the owner of the Property; and Crown, the tower owner.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco’s new antennas and RRHs will be attached to its existing antenna platform at the 140-foot level of the tower.

Robinson+Cole

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2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.

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

4. The installation of Cellco's replacement antennas and new RRHs will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table for Cellco's modified facility is included in Attachment 2.

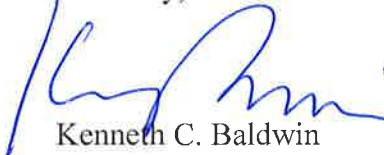
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The tower and its foundation can support Cellco's proposed modifications. (See Structural Analysis Report included in Attachment 3).

A copy of the parcel map and property owner information is included in Attachment 4. A Certificate of Mailing verifying that this filing was sent to municipal officials and the owner of the Property is included in Attachment 5.

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,



Kenneth C. Baldwin

Enclosures

Copy to:

Daniel Rosenthal, First Selectman
George Benson, Director of Planning
Estate of Paul Lundgren
Crown Castle
Tim Parks

ATTACHMENT 1



JAHH-65B-R3B

8-port sector antenna, 2x 698–787, 2x 824–894 and 4x 1695–2360 MHz, 65° HPBW, 3x RET and low bands have diplexers. Internal SBT's on first LB (Port 1) and first HB (Port 5).

- Internal SBT on low and high band allow remote RET control from the radio over the RF jumper cable
- One RET for 700MHz, one RET for 850MHz, and one RET for both high bands to ensure same tilt level for 4x Rx or 4x MIMO
- Internal filter on low band and interleaved dipole technology providing for attractive, low wind load mechanical package
- Separate RS-485 RET input/output for low and high band

Electrical Specifications

Frequency Band, MHz	698–787	824–894	1695–1880	1850–1990	1920–2200	2300–2360
Gain, dBi	14.5	15.8	18.0	18.4	18.5	18.8
Beamwidth, Horizontal, degrees	67	65	63	63	65	68
Beamwidth, Vertical, degrees	12.4	10.5	5.7	5.2	4.9	4.4
Beam Tilt, degrees	2–14	2–14	0–10	0–10	0–10	0–10
USLS (First Lobe), dB	18	18	20	20	21	23
Front-to-Back Ratio at 180°, dB	32	34	31	35	36	38
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR Return Loss, dB	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port at 50°C, maximum, watts	200	200	300	300	300	250
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

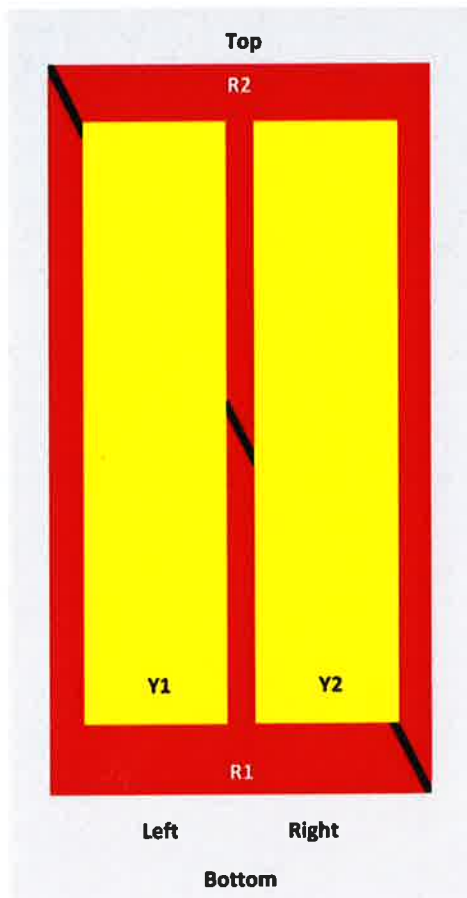
Frequency Band, MHz	698–787	824–894	1695–1880	1850–1990	1920–2200	2300–2360
Gain by all Beam Tilts, average, dBi	14.3	14.9	17.6	18.1	18.2	18.5
Gain by all Beam Tilts Tolerance, dB	±0.3	±0.5	±0.6	±0.4	±0.5	±0.6
Gain by Beam Tilt, average, dBi	2° 14.3	2° 15.0	0° 17.2	0° 17.6	0° 17.7	0° 17.9
	8° 14.3	8° 14.9	5° 17.6	5° 18.2	5° 18.3	5° 18.7
	14° 14.3	14° 15.4	10° 17.6	10° 18.2	10° 18.3	10° 18.7
Beamwidth, Horizontal Tolerance, degrees	±1.2	±1.4	±4	±2.4	±2.9	±2.7
Beamwidth, Vertical Tolerance, degrees	±0.9	±0.5	±0.3	±0.2	±0.3	±0.1
USLS, beampeak to 20° above beampeak, dB	18	17	17	18	19	18
Front-to-Back Total Power at 180° ± 30°, dB	25	24	26	29	27	29
CPR at Boresight, dB	22	23	20	21	21	24
CPR at Sector, dB	11	12	11	11	11	8

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

JAHH-65B-R3B

Array Layout

JAHH-65A-R3B JAHH-65B-R3B JAHH-65C-R3B



Array	Freq (MHz)	Conns	RET (SRET)	AISG RET UID
R1	698-798	1-2	1	ANXXXXXXXXXXXXX1
R2	824-894	3-4	2	ANXXXXXXXXXXXXX2
Y1	1695-2360	5-6	3	ANXXXXXXXXXXXXX3
Y2	1695-2360	7-8		

View from the front of the antenna

(Sizes of colored boxes are not true depictions of array sizes)

General Specifications

Operating Frequency Band	1695 – 2360 MHz 698 – 787 MHz 824 – 894 MHz
Antenna Type	Sector
Band	Multiband
Performance Note	Outdoor usage

Mechanical Specifications

RF Connector Quantity, total	8
RF Connector Quantity, low band	4
RF Connector Quantity, high band	4
RF Connector Interface	4.3-10 Female

JAHH-65BR3B

Color	Light gray
Grounding Type	RF connector body grounded to reflector and mounting bracket
Radiator Material	Aluminum Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Location	Bottom
Wind Loading, frontal	301.0 N @ 150 km/h 67.7 lbf @ 150 km/h
Wind Loading, lateral	254.0 N @ 150 km/h 57.1 lbf @ 150 km/h
Wind Loading, maximum	638.0 N @ 150 km/h 143.4 lbf @ 150 km/h
Wind Speed, maximum	241 km/h 150 mph

Dimensions

Length	1828.0 mm 72.0 in
Width	350.0 mm 13.8 in
Depth	208.0 mm 8.2 in
Net Weight, without mounting kit	28.7 kg 63.3 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Internal Bias Tee	Port 1 Port 5
Internal RET	High band (1) Low band (2)
Power Consumption, idle state, maximum	2 W
Power Consumption, normal conditions, maximum	13 W
Protocol	3GPP/AISG 2.0 (Single RET)
RET Interface	8-pin DIN Female 8-pin DIN Male
RET Interface, quantity	2 female 2 male

Packed Dimensions

Length	1975.0 mm 77.8 in
Width	456.0 mm 18.0 in
Depth	357.0 mm 14.1 in
Shipping Weight	42.0 kg 92.6 lb

Regulatory Compliance/Certifications

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



JAHH-65BR3B

Included Products

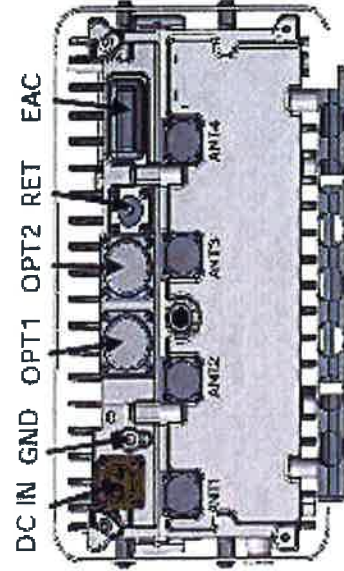
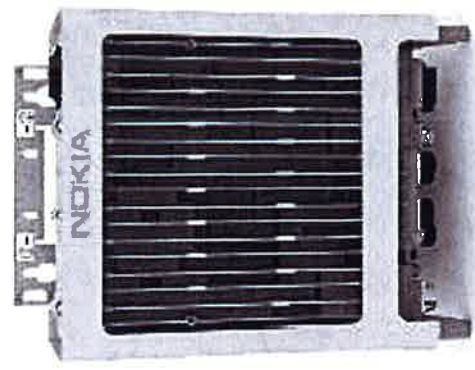
BSAMNT-1 — Wide Profile Antenna Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

* Footnotes

Performance Note Severe environmental conditions may degrade optimum performance

AHCA AirScale RRH 4T4R B5 160W

Supported Frequency bands	3GPP band 5
Frequencies	DL 869-894MHz, UL 824-849MHz
Number of TX/RX paths/pipes	4TX/4RX
Instantaneous Bandwidth IBW	25MHz (Full Band)
Occupied Bandwidth OBW	25MHz (Full Band)
Output Power	4T4R @ 40W / 2T4R @ 60W
RF Sharing	LTE, WCDMA, LTE + NB-IoT supported
256 QAM Back Off	No backoff at 40W and 0.8dB at 60W.
Supply Voltage / Voltage Range	DC -48V / -36V to -60V
Typical Power Consumption	365W [50% ETSI Busy Hour Load at 4TX @ 40W]
	529W [100% RF Load at 4 TX @ 40W]
	574W [100% RF Load at 4 TX @ 40W with SBT and 2ISG ON]
Antenna Ports	4 Ports, 4.3-10+
Optical Ports	2x CPRI 9.8 Gbps
ALD Control Interfaces	AI563.0 from ANT 1, 2, 3, 4 and RET (Power supply ANT1 and ANT3)
Other Interfaces	External Alarm MDR-26 Serial connector (4 inputs, 1 Output) DC Circular Power Connector



Operational Temperature Range	-40°C to 55°C (with solar cover)
Dimensions (mm)	337 x 295 x 165 (radio only)
Height x width x depth	13.3" x 11.7" x 6.5" 428 x 324 x 208 (with bracket and enclosure) 16.9" x 12.8" x 8.2"
Volume (liters)	16.5
Weight (kg)	16 / 35.3 lb - w/o bracket
Ingress protection class	IP65
Installation options	Pole or Wall, Vertical or Horizontal Book Mount
Surge protection	Class II 5kA



B66a RRH4x45W

Datasheet

Radio Technology

FDD-LTE

Feature description:

- Remote Radio Head 4x45W or 2x90W Switchable via SW

Power Output

4 x 45 W or 2x90W (SW Switchable)
w/o fans

IBW

70MHz

OBW

60 MHz

RF Sharing

LTE

Mass/Volume

25.8kg/56.9 lb Weight
655H x 299W x 182D mm
25.8"x11.8"x7.2"
29.7L / 35.5L

Antenna Conf.

4Tx/4Rx

Temperature

-40 to 55 °C

IP class

IP65

Input Power

DC 48 V

Cooling

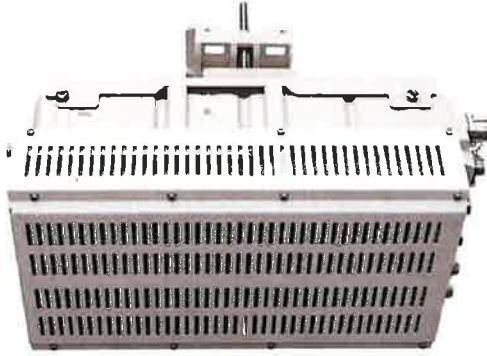
Natural Convection

Mounting

Wall, Pole mount

BBU connection

2x 9.8Gbps SFP(Rate 7 HW ready)



B66a RRH 4x45 – Interfaces

Power:

- Max power: 816W (add 58W for AISG)
- Breaker size: 25A
- Max distance with 6ga power feed and 5.5V drop: 284 feet

RF Interfaces:

- 4.3/10 Connectors
- No monitoring ports(Spectrum analyzer SW takes place of monitoring ports)

AISG:

- Two Smart Bias-T
- One AISG port

B66 Details

- Max power for a single carrier is:
 - 2x60W for 10,15,20 MHz carrier
 - 2x40W for 5 MHz carrier
- Multi- Carrier Support with AWS-1 carriers: 15.1
- Multi- Carrier Support with AWS-3 carriers: 16.2

Carrier power: Multi-carrier

- Assuming 2 Tx power can be assigned per carrier subject to 40W max for 5Mhz, 60W for larger in 2T, cut that power in half for 4T
- Example:B4 (20Mhz) and AWS3 (10MHz)
 - Power can be varied between those two carriers, can go 60W for 20 MHz carrier, 30W for 10 MHz carrier to use the 90W in 2T.
 - It could be 45/45 for 20Mhz/10Mhz if desired.



HYBRIFLEX™ RRH Hybrid Feeder Cabling Solution, 1-5/8", Single-Mode Fiber

Product Description

RFS' HYBRIFLEX Remote Radio Head (RRH) hybrid feeder cabling solution combines optical fiber and DC power for RRHs in a single lightweight aluminum corrugated cable, making it the world's most innovative solution for RRH deployments.

It was developed to reduce installation complexity and costs at Cellular sites. HYBRIFLEX allows mobile operators deploying an RRH architecture to standardize the RRH installation process and eliminate the need for and cost of cable grounding. HYBRIFLEX combines optical fiber (multi-mode or single-mode) and power in a single corrugated cable. It eliminates the need for junction boxes and can connect multiple RRHs with a single feeder. Standard RFS CELLFLEX® accessories can be used with HYBRIFLEX cable. Both pre-connectorized and on-site options are available.

Features/Benefits

- Aluminum corrugated armor with outstanding bending characteristics - minimizes installation time and enables mechanical protection and shielding
- Same accessories as 1 5/8" coaxial cable
- Outer conductor grounding - Eliminates typical grounding requirements and saves on installation costs
- Lightweight solution and compact design - Decreases tower loading
- Robust cabling - Eliminates need for expensive cable trays and ducts
- Installation of tight bundled fiber optic cable pairs directly to the RRH - Reduces CAPEX and wind load by eliminating need for interconnection
- Optical fiber and power cables housed in single corrugated cable - Saves CAPEX by standardizing RRH cable installation and reducing installation requirements
- Outdoor polyethylene jacket - Ensures long-lasting cable protection



Figure 1: HYBRIFLEX Series

Technical Specifications

Structure			
Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Mechanical Properties			
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
Electrical Properties			
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	068 (0.205)
DC-Resistance Power Cable, 8.4mm ² (8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Physical Properties			
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[μm]	50/125
Primary Coating (Acrylate)		[μm]	245
Buffer Diameter, Nominal		[μm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0, UL1666 RoHS Compliant
DC Power Cable Properties			
Size (Power)		[mm (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Environment			
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to 149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to 149)

* This data is provisional and subject to change

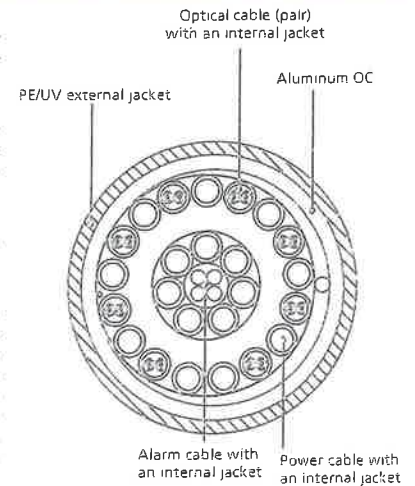


Figure 2: Construction Detail

All information contained in the present datasheet is subject to confirmation at time of ordering.

ATTACHMENT 2

Site Name: Newtown N Tower Height: 150Ft		General		Power		Density							
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total					
*AT&T	2	578	150	880	0.0200	0.5867	0.34%						
*AT&T	2	855	150	1900	0.0297	1.0000	0.30%						
*AT&T	1	298	150	880	0.0052	0.5867	0.09%						
*AT&T	4	513	150	1900	0.0356	1.0000	0.36%						
*AT&T	1	1313	150	734	0.0228	0.4893	0.47%						
VZW PCS	0	5062	140	0.0000	1970	1.0000	0.00%						
VZW Cellular	3	369	140	0.0203	869	0.5793	3.51%						
VZW Cellular	1	3709	140	0.0680	880	0.5866	11.60%						
VZW AWS	1	7770	140	0.1425	2145	1.0000	14.25%						
VZW 700	1	2062	140	0.0378	746	0.4973	7.61%						38.51%
* Source: Siting Council													

ATTACHMENT 3

Date: **February 14, 2018**

Cheryl Schultz
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704) 405-6632



GPD Engineering and Architecture
Professional Corporation
520 South Main Street, Suite 2531
Akron, OH 44311
(216) 927-8663
dpalkovic@gpdgroup.com

Subject: **Structural Analysis Report**

Carrier Designation: **Verizon Wireless Co-Locate**
Carrier Site Name: Newtown North CT

Crown Castle Designation: **Crown Castle BU Number:** 857525
Crown Castle Site Name: NEWTOWN DINGLEBROOK
Crown Castle JDE Job Number: 455568
Crown Castle Work Order Number: 1523381
Crown Castle Application Number: 403072 Rev. 1

Engineering Firm Designation: **GPD Project Number:** 2018777.857525.04

Site Data: **24 Dinglebrook Lane, Newtown, CT 06470, Fairfield County**
Latitude 41° 28' 1.01", Longitude -73° 20' 2.05"
149 Foot – Modified Sabre Monopole Tower

Dear Cheryl Schultz,

We are 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 1138825, in accordance with application 403072, revision 1.

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 + Proposed

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 120 mph converted to a nominal 3-second gust wind speed of 93 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 C with a maximum topographic factor, Kzt, of 1.000 and Risk Category II was/were used in this analysis.

We 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 modification prepared by: Tyler Beltz

Respectfully submitted by:

A handwritten signature in black ink, appearing to read "Chris Scheks", written over a circular professional engineer seal. The seal contains the text "STATE OF CONNECTICUT", "CHRISTOPHER J. SCHEKS", "No. 30026", and "LICENSED ENGINEER".

Christopher J. Scheks P.E.
Connecticut #: 0030026

2/14/2018

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tnxTower Output

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Additional Calculations

1) INTRODUCTION

The existing 149' monopole has an 18-sided cross section and is evenly tapered from 40.9" (flat-flat) at the base to 16" (flat-flat) at the top. It has three major sections connected with slip joints. The structure is galvanized and has no tower lighting.

This tower is a 149 ft Monopole tower designed by Sabre Communications in June of 2010. The tower was originally designed for a wind speed of 100 mph per TIA-222-G.

Modifications designed by GPD (Project #: 2013723.99800.01, dated 3/11/2013) consisted of reinforcing the tower shaft from 0'-120' and adding additional anchor rods to the tower base. These modifications have been considered in this analysis.

Modifications designed by GPD (Project #: 2014777.857525.01 Rev 1, dated 12/30/2014) consist of reinforcing the tower shaft from 25'-45', 50'-75', 88'-98', and 116'-126', adding additional anchor rods to the tower base, adding additional steel reinforcement to the foundation pier, adding a collar to the base of the pier, and adding an extension to two sides of the foundation mat. These modifications have been considered in this analysis.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 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 C with a maximum topographic factor, Kzt, of 1.000 and Risk Category II was/were used in this analysis.

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
140.0	140.0	6	Commscope	JAHH-65B-R3B	2	1-5/8	1
		3	Nokia	AIRSCALE RRH 4T4R B5 160W			
		3	Alcatel Lucent	B13 RRH 4X30			
		3	Alcatel Lucent	B66A RRH4X45			
		1	RFS Celwave	DB-C1-12C-24AB-0Z			
		3		BSAMNT-SBS-2-2			

Notes:

- 1) See Appendix B for the proposed coax layout.

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
148.0	150.0	3	KMW	AM-X-CD-16-65-00T-RET	12 2 1	1-5/8 3/4 1/2	1
		6	Powerwave	P90-14-XLH-RR			
		3	Ericsson	RRUS-11			
		6	Powerwave	TT19-08BP111-001			
		1	Raycap	DC6-48-60-18-8F			
	1		Platform Mount [LP 602-1]				
140.0	140.0	3	Antel	BXA-70063/6CF	6	1-5/8	2
		3	RFS Celwave	APX18-206516L-CT0			
		6	RFS Celwave	FD9R6004/2C-3L			
		6	Andrew	DB846F65ZAXY			
		1		T-Arm Mount [TA 602-3]	6	1-5/8	1

- Notes:
 1) Existing equipment.
 2) Equipment to be removed and was not considered in the 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)
147	149	9		7770		
		6		TT08-19DB111-01		
	1		12' LP Platform w/ Handrail			
139	139	9		7770		
		6		TMA		
		1		12' LP Platform		
129	129	9		7770		
		6		TMA		
		1		12' LP Platform		
119	119	9		7770		
		6		TMA		
		1		12' LP Platform		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Tower Drawings	Sabre Job #: 11-05139, dated 6/1/2010	4570932	CCISites
Foundation Drawings	Sabre Job #: 11-05139, dated 6/1/2010	4895572	CCISites
Geotechnical Reports	Clarence Welti Assoc., Inc., dated 7/28/2009	4308150	CCISites
Modification Design	GPD Project #: 2013723.99800.01, dated 3/11/2013	4860017	CCISites
Post-Mod Inspection	Centek Project #: 13014.006, dated 11/2/2013	4871327	CCISites
Modification Design	GPD Project #: 2014777.857525.01, Rev 1, dated 9/3/2014	5461906	CCISites
Post-Mod Inspection	TEP Project #: 58006, dated 4/24/2015	5652840	CCISites

3.1) Analysis Method

tnxTower (version 7.0.5.1), 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.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
L1	149 - 144	Pole	TP16.865x16x0.1875	Pole	10.9%	Pass
L2	144 - 139	Pole	TP17.73x16.865x0.1875	Pole	21.5%	Pass
L3	139 - 134	Pole	TP18.595x17.73x0.1875	Pole	36.4%	Pass
L4	134 - 129	Pole	TP19.459x18.595x0.1875	Pole	49.3%	Pass
L5	129 - 124.5	Pole	TP20.238x19.459x0.1875	Pole	59.7%	Pass
L6	124.5 - 124.25	Pole + Reinf.	TP20.281x20.238x0.35	Reinf. 6 Tension Rupture	59.3%	Pass
L7	124.25 - 119.25	Pole + Reinf.	TP21.146x20.281x0.3438	Reinf. 6 Tension Rupture	70.0%	Pass
L8	119.25 - 118.5	Pole + Reinf.	TP21.276x21.146x0.3438	Reinf. 6 Tension Rupture	71.5%	Pass
L9	118.5 - 118.25	Pole + Reinf.	TP21.319x21.276x0.625	Reinf. 5 Bolt-Shaft Bearing	47.9%	Pass
L10	118.25 - 117.5	Pole + Reinf.	TP21.449x21.319x0.625	Reinf. 5 Tension Rupture	42.7%	Pass
L11	117.5 - 117.25	Pole + Reinf.	TP21.492x21.449x0.4625	Reinf. 5 Tension Rupture	57.1%	Pass
L12	117.25 - 112.25	Pole + Reinf.	TP22.357x21.492x0.4438	Reinf. 5 Tension Rupture	64.8%	Pass
L13	112.25 - 107.25	Pole + Reinf.	TP23.222x22.357x0.4313	Reinf. 5 Tension Rupture	72.0%	Pass
L14	107.25 - 102.25	Pole + Reinf.	TP24.086x23.222x0.425	Reinf. 5 Tension Rupture	78.6%	Pass
L15	102.25 - 102	Pole + Reinf.	TP24.735x24.086x0.425	Reinf. 5 Tension Rupture	78.9%	Pass
L16	102 - 97	Pole + Reinf.	TP24.62x23.755x0.4813	Reinf. 5 Tension Rupture	75.5%	Pass
L17	97 - 96.75	Pole + Reinf.	TP24.663x24.62x0.625	Reinf. 5 Tension Rupture	59.8%	Pass
L18	96.75 - 91.75	Pole + Reinf.	TP25.528x24.663x0.6	Reinf. 5 Tension Rupture	63.8%	Pass
L19	91.75 - 90.25	Pole + Reinf.	TP25.788x25.528x0.6	Reinf. 5 Tension Rupture	65.0%	Pass
L20	90.25 - 90	Pole + Reinf.	TP25.831x25.788x0.6875	Reinf. 7 Tension Rupture	56.3%	Pass
L21	90 - 89	Pole + Reinf.	TP26.004x25.831x0.6875	Reinf. 7 Tension Rupture	56.9%	Pass
L22	89 - 88.75	Pole + Reinf.	TP26.047x26.004x0.55	Reinf. 4 Tension Rupture	63.3%	Pass
L23	88.75 - 83.75	Pole + Reinf.	TP26.913x26.047x0.5375	Reinf. 4 Tension Rupture	66.7%	Pass
L24	83.75 - 78.75	Pole + Reinf.	TP27.778x26.913x0.525	Reinf. 4 Tension Rupture	69.9%	Pass
L25	78.75 - 73.75	Pole + Reinf.	TP28.643x27.778x0.5188	Reinf. 4 Tension Rupture	72.9%	Pass
L26	73.75 - 73.5	Pole + Reinf.	TP28.686x28.643x0.5188	Reinf. 4 Tension Rupture	73.1%	Pass
L27	73.5 - 73.25	Pole + Reinf.	TP28.73x28.686x0.7	Reinf. 8 Tension Rupture	58.7%	Pass
L28	73.25 - 68.25	Pole + Reinf.	TP29.595x28.73x0.675	Reinf. 8 Tension Rupture	61.2%	Pass
L29	68.25 - 63.25	Pole + Reinf.	TP30.46x29.595x0.6625	Reinf. 8 Tension Rupture	63.6%	Pass
L30	63.25 - 63	Pole + Reinf.	TP30.503x30.46x0.6625	Reinf. 8 Tension Rupture	63.8%	Pass
L31	63 - 62.75	Pole + Reinf.	TP30.547x30.503x0.6625	Reinf. 8 Tension Rupture	63.9%	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
L32	62.75 - 57.75	Pole + Reinf.	TP31.412x30.547x0.65	Reinf. 8 Tension Rupture	66.1%	Pass
L33	57.75 - 53.25	Pole + Reinf.	TP33.013x31.412x0.6375	Reinf. 8 Tension Rupture	68.1%	Pass
L34	53.25 - 47.5	Pole + Reinf.	TP32.682x31.691x0.55	Reinf. 3 Tension Rupture	78.0%	Pass
L35	47.5 - 45.75	Pole + Reinf.	TP32.984x32.682x0.5375	Reinf. 3 Tension Rupture	78.6%	Pass
L36	45.75 - 45.5	Pole + Reinf.	TP33.027x32.984x0.5375	Reinf. 2 Tension Rupture	78.7%	Pass
L37	45.5 - 43.5	Pole + Reinf.	TP33.372x33.027x0.5375	Reinf. 2 Tension Rupture	79.4%	Pass
L38	43.5 - 43.25	Pole + Reinf.	TP33.415x33.372x0.6875	Reinf. 9 Tension Rupture	66.9%	Pass
L39	43.25 - 38.25	Pole + Reinf.	TP34.278x33.415x0.675	Reinf. 9 Tension Rupture	68.6%	Pass
L40	38.25 - 33.25	Pole + Reinf.	TP35.14x34.278x0.6625	Reinf. 9 Tension Rupture	70.1%	Pass
L41	33.25 - 28.25	Pole + Reinf.	TP36.002x35.14x0.6625	Reinf. 9 Tension Rupture	71.6%	Pass
L42	28.25 - 28	Pole + Reinf.	TP36.046x36.002x0.6625	Reinf. 9 Tension Rupture	71.6%	Pass
L43	28 - 27.75	Pole + Reinf.	TP36.089x36.046x0.7	Reinf. 9 Tension Rupture	67.5%	Pass
L44	27.75 - 26.5	Pole + Reinf.	TP36.304x36.089x0.6875	Reinf. 9 Tension Rupture	67.9%	Pass
L45	26.5 - 26.25	Pole + Reinf.	TP36.347x36.304x0.575	Reinf. 1 Tension Rupture	75.0%	Pass
L46	26.25 - 21.25	Pole + Reinf.	TP37.21x36.347x0.575	Reinf. 1 Tension Rupture	76.3%	Pass
L47	21.25 - 16.25	Pole + Reinf.	TP38.072x37.21x0.5625	Reinf. 1 Tension Rupture	77.5%	Pass
L48	16.25 - 11.25	Pole + Reinf.	TP38.935x38.072x0.5625	Reinf. 1 Tension Rupture	78.6%	Pass
L49	11.25 - 6.25	Pole + Reinf.	TP39.797x38.935x0.55	Reinf. 1 Tension Rupture	79.7%	Pass
L50	6.25 - 1.25	Pole + Reinf.	TP40.659x39.797x0.55	Reinf. 1 Tension Rupture	80.6%	Pass
L51	1.25 - 0	Pole + Reinf.	TP40.875x40.659x0.5438	Reinf. 1 Tension Rupture	80.9%	Pass
					Summary	
				Pole	59.7%	Pass
				Reinforcement	80.9%	Pass
				Overall	80.9%	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	48.3	Pass
1	Base Plate	0	63.2	Pass
1	Base Foundation (Reinforcement)	0	61.1	Pass
1	Base Foundation (Soil Interaction)	0	59.0	Pass

Structure Rating (max from all components) =	80.9%
---	--------------

Notes:

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

4.1) Recommendations

The tower has sufficient capacity to carry the proposed load configuration. Modifications will not be required to bring the tower into compliance with the TIA-222-G standard for the proposed load configuration.

5) DISCLAIMER OF WARRANTIES

GPD has not performed a site visit to the tower to verify the member sizes or antenna/coax loading. If the existing conditions are not as represented on the tower elevation contained in this report, we should be contacted immediately to evaluate the significance of the discrepancy. This is not a condition assessment of the tower or foundation. This report does not replace a full tower inspection. The tower and foundations are assumed to have been properly fabricated, erected, maintained, in good condition, twist free, and plumb.

The engineering services rendered by GPD in connection with this Structural Analysis are limited to a computer analysis of the tower structure and theoretical capacity of its main structural members. No allowance was made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds.

This analysis is limited to the designated maximum wind and seismic conditions per the governing tower standards and code. Wind forces resulting in tower vibrations near the structure's resonant frequencies were not considered in this analysis and are outside the scope of this analysis. Lateral loading from any dynamic response was not evaluated under a time-domain based fatigue analysis.

GPD does not analyze the fabrication of the structure (including welding). It is not possible to have all the very detailed information needed to perform a thorough analysis of every structural sub-component and connection of an existing tower. GPD provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the capability of adding appurtenances usually accompanied by transmission lines to the structure.

It is the owner's responsibility to determine the amount of ice accumulation in excess of the code specified amount, if any, that should be considered in the structural analysis.

The attached sketches are a schematic representation of the analyzed tower. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from GPD, but are beyond the scope of this report.

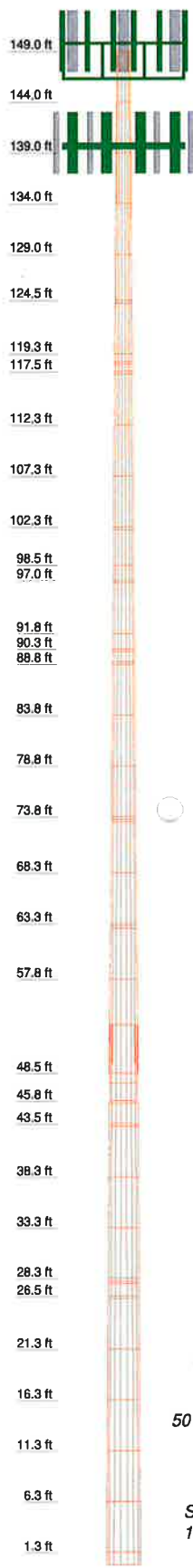
Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

Towers are designed to carry gravity, wind, and ice loads. All members, legs, diagonals, struts, and redundant members provide structural stability to the tower with little redundancy. Absence or removal of a member can trigger catastrophic failure unless a substitute is provided before any removal. Legs carry axial loads and derive their strength from shorter unbraced lengths by the presence of redundant members and their connection to the diagonals with bolts or welds. If the bolts or welds are removed without providing any substitute to the frame, the leg is subjected to a higher unbraced length that immediately reduces its load carrying capacity. If a diagonal is also removed in addition to the connection, the unbraced length of the leg is greatly increased, jeopardizing its load carrying capacity. Failure of one leg can result in a tower collapse because there is no redundancy. Redundant members and diagonals are critical to the stability of the tower.

GPD makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of GPD pursuant to this report will be limited to the total fee received for preparation of this report.

APPENDIX A
TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
2	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
3	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
4	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
5	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
6	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
7	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
8	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
9	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
10	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
11	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
12	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
13	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
14	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
15	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
16	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
17	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
18	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
19	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
20	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
21	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
22	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
23	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
24	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
25	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
26	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
27	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
28	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
29	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
30	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
31	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
32	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
33	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
34	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
35	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
36	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
37	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
38	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
39	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
40	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
41	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
42	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
43	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
44	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
45	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
46	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
47	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
48	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
49	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
50	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2
51	5.00	18	0.1875	3.50	40.6594	40.8740	A572-65	0.2



DESIGNED APPURTENANCE LOADING

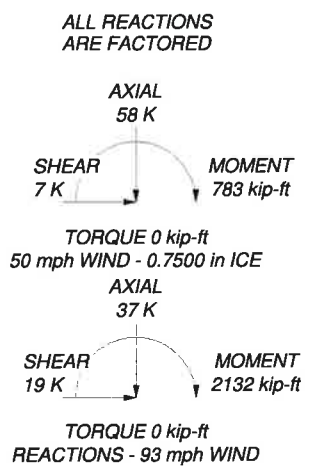
TYPE	ELEVATION	TYPE	ELEVATION
4' Lightning Rod	152	BSAMNT-SBS-2-2	140
Platform Mount [LP 602-1]	148	BSAMNT-SBS-2-2	140
(2) P90-14-XLH-RR w/ Mount Pipe	148	(2) DB846F65ZAXY w/ Mount Pipe	140
(2) P90-14-XLH-RR w/ Mount Pipe	148	(2) DB846F65ZAXY w/ Mount Pipe	140
(2) P90-14-XLH-RR w/ Mount Pipe	148	(2) DB846F65ZAXY w/ Mount Pipe	140
AM-X-CD-16-65-00T-RET w/ Mount Pipe	148	JAHH-65B-R3B w/ Mount Pipe	140
AM-X-CD-16-65-00T-RET w/ Mount Pipe	148	JAHH-65B-R3B w/ Mount Pipe	140
AM-X-CD-16-65-00T-RET w/ Mount Pipe	148	JAHH-65B-R3B w/ Mount Pipe	140
RRUS-11	148	B13 RRH 4X30	140
RRUS-11	148	B13 RRH 4X30	140
RRUS-11	148	B13 RRH 4X30	140
(2) TT19-08BP111-001	148	B66A RRH4X45	140
(2) TT19-08BP111-001	148	B66A RRH4X45	140
(2) TT19-08BP111-001	148	B66A RRH4X45	140
DC6-48-60-18-8F Surge Suppression Unit	148	DB-C1-12C-24AB-0Z	140
T-Arm Mount [TA 602-3]	140	Pipe Mount 5'x2.375"	140
BSAMNT-SBS-2-2	140	Pipe Mount 5'x2.375"	140
		Pipe Mount 5'x2.375"	140

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 93 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



GPD
520 South Main Street Suite 2531
Akron, Ohio 44311
Phone: (330) 572-2100
FAX: (330) 572-2101

Job: **NEWTOWN DINGLEBROOK - BU #: 8575**
Project: **2018777.857525.04**
Client: Crown Castle USA, Inc. Drawn by: tbelz App'd:
Code: TIA-222-G Date: 02/14/18 Scale: NTS
Path: \\AKRN05.gpdco.com\TELECOM\Crown\857525\04\hvx857525.en Dwg No. E-

0' - 149'

Round

Flat

App In Face

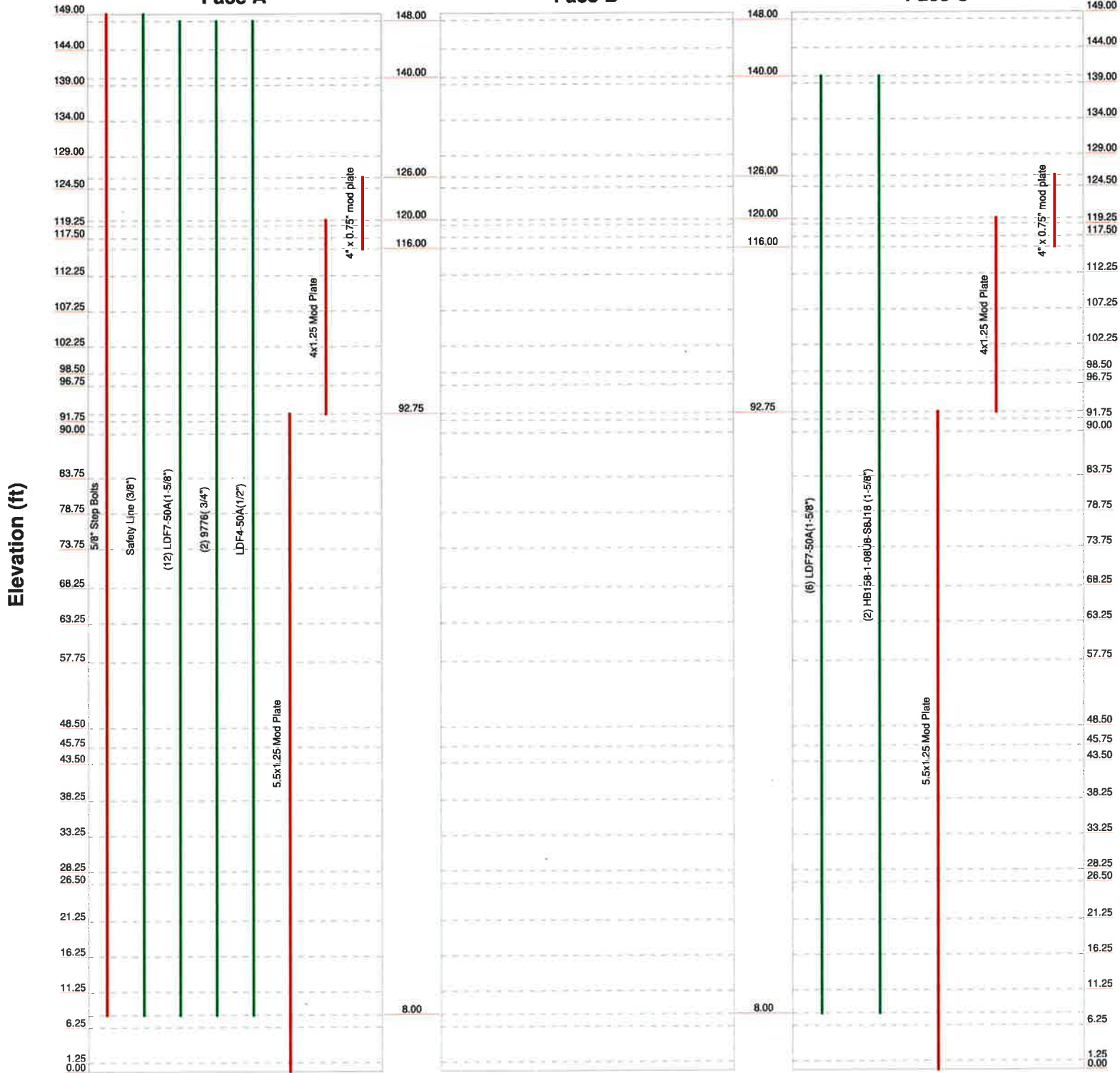
App Out Face


Truss Leg

Face A

Face B

Face C



 <p>GPD 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (330) 572-2100 FAX: (330) 572-2101</p>	<p>Job: NEWTOWN DINGLEBROOK - BU #: 8575</p>		
	<p>Project: 2018777.857525.04</p>		
	<p>Client: Crown Castle USA, Inc.</p>	<p>Drawn by: tbeltz</p>	<p>App'd:</p>
	<p>Code: TIA-222-G</p>	<p>Date: 02/14/18</p>	<p>Scale: NTS</p>
	<p>Path: \\AKRN05.gpdco.com\TELECOM\Crown\857525\04\tx\857525.dwg</p>		

tnxTower GPD 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (330) 572-2100 FAX: (330) 572-2101	Job NEWTOWN DINGLEBROOK - BU #: 857525	Page 1 of 14
	Project 2018777.857525.04	Date 13:00:44 02/14/18
	Client Crown Castle USA, Inc.	Designed by tbeltz

Tower Input Data

There is a pole section.

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

The following design criteria apply:

Tower is located in Fairfield County, Connecticut.

ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).

Basic wind speed of 93 mph.

Structure Class II.

Exposure Category C.

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 <li style="text-align: center;">Poles √ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets |
|--|--|---|

Tapered Pole Section Geometry

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
L1	149.00-144.00	5.00	0.00	18	16.0000	16.8649	0.1875	0.7500	A572-65 (65 ksi)
L2	144.00-139.00	5.00	0.00	18	16.8649	17.7297	0.1875	0.7500	A572-65 (65 ksi)
L3	139.00-134.00	5.00	0.00	18	17.7297	18.5946	0.1875	0.7500	A572-65 (65 ksi)
L4	134.00-129.00	5.00	0.00	18	18.5946	19.4594	0.1875	0.7500	A572-65 (65 ksi)
L5	129.00-124.50	4.50	0.00	18	19.4594	20.2378	0.1875	0.7500	A572-65

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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
L6	124.50-124.25	0.25	0.00	18	20.2378	20.2810	0.3500	1.4000	(65 ksi) A572-65
L7	124.25-119.25	5.00	0.00	18	20.2810	21.1459	0.3438	1.3750	(65 ksi) A572-65
L8	119.25-118.50	0.75	0.00	18	21.1459	21.2756	0.3438	1.3750	(65 ksi) A572-65
L9	118.50-118.25	0.25	0.00	18	21.2756	21.3188	0.6250	2.5000	(65 ksi) A572-65
L10	118.25-117.50	0.75	0.00	18	21.3188	21.4486	0.6250	2.5000	(65 ksi) A572-65
L11	117.50-117.25	0.25	0.00	18	21.4486	21.4918	0.4625	1.8500	(65 ksi) A572-65
L12	117.25-112.25	5.00	0.00	18	21.4918	22.3567	0.4437	1.7750	(65 ksi) A572-65
L13	112.25-107.25	5.00	0.00	18	22.3567	23.2215	0.4313	1.7250	(65 ksi) A572-65
L14	107.25-102.25	5.00	0.00	18	23.2215	24.0864	0.4250	1.7000	(65 ksi) A572-65
L15	102.25-98.50	3.75	3.50	18	24.0864	24.7350	0.4250	1.7000	(65 ksi) A572-65
L16	98.50-97.00	5.00	0.00	18	23.7546	24.6198	0.4813	1.9250	(65 ksi) A572-65
L17	97.00-96.75	0.25	0.00	18	24.6198	24.6631	0.6250	2.5000	(65 ksi) A572-65
L18	96.75-91.75	5.00	0.00	18	24.6631	25.5283	0.6000	2.4000	(65 ksi) A572-65
L19	91.75-90.25	1.50	0.00	18	25.5283	25.7879	0.6000	2.4000	(65 ksi) A572-65
L20	90.25-90.00	0.25	0.00	18	25.7879	25.8311	0.6875	2.7500	(65 ksi) A572-65
L21	90.00-89.00	1.00	0.00	18	25.8311	26.0042	0.6875	2.7500	(65 ksi) A572-65
L22	89.00-88.75	0.25	0.00	18	26.0042	26.0474	0.5500	2.2000	(65 ksi) A572-65
L23	88.75-83.75	5.00	0.00	18	26.0474	26.9127	0.5375	2.1500	(65 ksi) A572-65
L24	83.75-78.75	5.00	0.00	18	26.9127	27.7779	0.5250	2.1000	(65 ksi) A572-65
L25	78.75-73.75	5.00	0.00	18	27.7779	28.6431	0.5188	2.0750	(65 ksi) A572-65
L26	73.75-73.50	0.25	0.00	18	28.6431	28.6864	0.5188	2.0750	(65 ksi) A572-65
L27	73.50-73.25	0.25	0.00	18	28.6864	28.7296	0.7000	2.8000	(65 ksi) A572-65
L28	73.25-68.25	5.00	0.00	18	28.7296	29.5949	0.6750	2.7000	(65 ksi) A572-65
L29	68.25-63.25	5.00	0.00	18	29.5949	30.4601	0.6625	2.6500	(65 ksi) A572-65
L30	63.25-63.00	0.25	0.00	18	30.4601	30.5034	0.6625	2.6500	(65 ksi) A572-65
L31	63.00-62.75	0.25	0.00	18	30.5034	30.5466	0.6625	2.6500	(65 ksi) A572-65
L32	62.75-57.75	5.00	0.00	18	30.5466	31.4118	0.6500	2.6000	(65 ksi) A572-65
L33	57.75-48.50	9.25	4.75	18	31.4118	33.0125	0.6375	2.5500	(65 ksi) A572-65
L34	48.50-47.50	5.75	0.00	18	31.6905	32.6823	0.5500	2.2000	(65 ksi) A572-65
L35	47.50-45.75	1.75	0.00	18	32.6823	32.9841	0.5375	2.1500	(65 ksi) A572-65

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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
L36	45.75-45.50	0.25	0.00	18	32.9841	33.0272	0.5375	2.1500	A572-65 (65 ksi)
L37	45.50-43.50	2.00	0.00	18	33.0272	33.3722	0.5375	2.1500	A572-65 (65 ksi)
L38	43.50-43.25	0.25	0.00	18	33.3722	33.4153	0.6875	2.7500	A572-65 (65 ksi)
L39	43.25-38.25	5.00	0.00	18	33.4153	34.2777	0.6750	2.7000	A572-65 (65 ksi)
L40	38.25-33.25	5.00	0.00	18	34.2777	35.1401	0.6625	2.6500	A572-65 (65 ksi)
L41	33.25-28.25	5.00	0.00	18	35.1401	36.0025	0.6625	2.6500	A572-65 (65 ksi)
L42	28.25-28.00	0.25	0.00	18	36.0025	36.0456	0.6625	2.6500	A572-65 (65 ksi)
L43	28.00-27.75	0.25	0.00	18	36.0456	36.0887	0.7000	2.8000	A572-65 (65 ksi)
L44	27.75-26.50	1.25	0.00	18	36.0887	36.3043	0.6875	2.7500	A572-65 (65 ksi)
L45	26.50-26.25	0.25	0.00	18	36.3043	36.3474	0.5750	2.3000	A572-65 (65 ksi)
L46	26.25-21.25	5.00	0.00	18	36.3474	37.2098	0.5750	2.3000	A572-65 (65 ksi)
L47	21.25-16.25	5.00	0.00	18	37.2098	38.0722	0.5625	2.2500	A572-65 (65 ksi)
L48	16.25-11.25	5.00	0.00	18	38.0722	38.9346	0.5625	2.2500	A572-65 (65 ksi)
L49	11.25-6.25	5.00	0.00	18	38.9346	39.7970	0.5500	2.2000	A572-65 (65 ksi)
L50	6.25-1.25	5.00	0.00	18	39.7970	40.6594	0.5500	2.2000	A572-65 (65 ksi)
L51	1.25-0.00	1.25		18	40.6594	40.8750	0.5437	2.1750	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	16.2468	9.4104	297.2674	5.6134	8.1280	36.5733	594.9259	4.7061	2.4860	13.259
	17.1250	9.9251	348.7601	5.9205	8.5673	40.7081	697.9792	4.9635	2.6382	14.07
L2	17.1250	9.9251	348.7601	5.9205	8.5673	40.7081	697.9792	4.9635	2.6382	14.07
	18.0032	10.4398	405.8804	6.2275	9.0067	45.0643	812.2948	5.2209	2.7904	14.882
L3	18.0032	10.4398	405.8804	6.2275	9.0067	45.0643	812.2948	5.2209	2.7904	14.882
	18.8814	10.9545	468.9197	6.5345	9.4460	49.6420	938.4565	5.4783	2.9426	15.694
L4	18.8814	10.9545	468.9197	6.5345	9.4460	49.6420	938.4565	5.4783	2.9426	15.694
	19.7596	11.4692	538.1702	6.8415	9.8854	54.4410	1077.0486	5.7357	3.0949	16.506
L5	19.7596	11.4692	538.1702	6.8415	9.8854	54.4410	1077.0486	5.7357	3.0949	16.506
	20.5500	11.9324	606.0472	7.1178	10.2808	58.9495	1212.8919	5.9673	3.2318	17.237
L6	20.5500	11.9324	606.0472	7.1178	10.2808	58.9495	1212.8919	5.9673	3.2318	17.237
	20.5939	22.1414	1111.2216	7.0755	10.3028	107.8567	2223.9053	11.0728	2.9535	8.438
L7	20.5939	21.7528	1092.4054	7.0777	10.3028	106.0304	2186.2481	10.8785	2.9645	8.624
	21.4721	22.6964	1240.8224	7.3848	10.7421	115.5102	2483.2775	11.3504	3.1167	9.067
L8	21.4721	22.6964	1240.8224	7.3848	10.7421	115.5102	2483.2775	11.3504	3.1167	9.067
	21.6038	22.8380	1264.1818	7.4308	10.8080	116.9672	2530.0271	11.4211	3.1395	9.133
L9	21.6038	40.9656	2207.1001	7.3310	10.8080	204.2098	4417.1044	20.4867	2.6445	4.231
	21.6477	41.0514	2220.9944	7.3463	10.8300	205.0786	4444.9112	20.5296	2.6521	4.243
L10	21.6477	41.0514	2220.9944	7.3463	10.8300	205.0786	4444.9112	20.5296	2.6521	4.243
	21.7794	41.3087	2263.0262	7.3924	10.8959	207.6958	4529.0301	20.6583	2.6749	4.28
L11	21.7794	30.8070	1714.1510	7.4501	10.8959	157.3212	3430.5576	15.4064	2.9609	6.402
	21.8234	30.8705	1724.7692	7.4654	10.9178	157.9772	3451.8079	15.4382	2.9686	6.419

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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
L43	36.6017	78.5309	12395.0674	12.5477	18.3112	676.9129	24806.4446	39.2729	5.1120	7.303
	36.6455	78.6267	12440.4870	12.5630	18.3331	678.5816	24897.3435	39.3208	5.1196	7.314
L44	36.6455	77.2499	12231.2873	12.5674	18.3331	667.1705	24478.6688	38.6323	5.1416	7.479
	36.8644	77.7204	12456.1202	12.6440	18.4426	675.3994	24928.6306	38.8676	5.1796	7.534
L45	36.8644	65.2078	10516.8762	12.6839	18.4426	570.2492	21047.5908	32.6101	5.3776	9.352
	36.9082	65.2865	10554.9991	12.6992	18.4645	571.6373	21123.8867	32.6495	5.3852	9.365
L46	36.9082	65.2865	10554.9991	12.6992	18.4645	571.6373	21123.8867	32.6495	5.3852	9.365
	37.7839	66.8604	11336.9199	13.0054	18.9026	599.7546	22688.7573	33.4366	5.5369	9.629
L47	37.7839	65.4292	11101.8214	13.0098	18.9026	587.3172	22218.2508	32.7208	5.5589	9.883
	38.6596	66.9689	11904.1589	13.3160	19.3407	615.4981	23823.9815	33.4908	5.7107	10.152
L48	38.6596	66.9689	11904.1589	13.3160	19.3407	615.4981	23823.9815	33.4908	5.7107	10.152
	39.5353	68.5086	12744.2510	13.6221	19.7788	644.3393	25505.2711	34.2608	5.8625	10.422
L49	39.5353	67.0080	12473.2272	13.6265	19.7788	630.6366	24962.8670	33.5104	5.8845	10.699
	40.4109	68.5135	13332.9676	13.9327	20.2169	659.4967	26683.4790	34.2633	6.0363	10.975
L50	40.4109	68.5135	13332.9676	13.9327	20.2169	659.4967	26683.4790	34.2633	6.0363	10.975
	41.2866	70.0190	14231.3344	14.2388	20.6550	689.0027	28481.3947	35.0161	6.1881	11.251
L51	41.2866	69.2341	14076.1928	14.2411	20.6550	681.4916	28170.9075	34.6236	6.1991	11.401
	41.5056	69.6062	14304.3685	14.3176	20.7645	688.8858	28627.5591	34.8097	6.2370	11.47

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
L1 149.00-144.00				1	1	1			
L2 144.00-139.00				1	1	1			
L3 139.00-134.00				1	1	1			
L4 134.00-129.00				1	1	1			
L5 129.00-124.50				1	1	1			
L6 124.50-124.25				1	1	0.946576			
L7 124.25-119.25				1	1	0.946104			
L8 119.25-118.50				1	1	0.943621			
L9 118.50-118.25				1	1	0.890996			
L10 118.25-117.50				1	1	0.887315			
L11 117.50-117.25				1	1	0.896625			
L12 117.25-112.25				1	1	0.913505			
L13 112.25-107.25				1	1	0.920296			
L14 107.25-102.25				1	1	0.915576			
L15 102.25-98.50				1	1	0.914711			
L16 98.50-97.00				1	1	0.931291			
L17 97.00-96.75				1	1	0.909555			
L18 96.75-91.75				1	1	0.92808			
L19 91.75-90.25				1	1	0.92281			
L20 90.25-90.00				1	1	0.909929			
L21 90.00-89.00				1	1	0.906195			
L22 89.00-88.75				1	1	0.92328			
L23 88.75-83.75				1	1	0.92857			
L24 83.75-78.75				1	1	0.935178			
L25 78.75-73.75				1	1	0.931945			
L26 73.75-73.50				1	1	0.931254			
L27 73.50-73.25				1	1	0.910858			
L28 73.25-68.25				1	1	0.926597			
L29 68.25-63.25				1	1	0.927228			
L30 63.25-63.00				1	1	0.926431			
L31 63.00-62.75				1	1	0.925636			
L32 62.75-57.75				1	1	0.927336			
L33 57.75-48.50				1	1	0.931488			
L34 48.50-47.50				1	1	0.940085			
L35 47.50-45.75				1	1	0.958037			
L36 45.75-45.50				1	1	0.957537			
L37 45.50-43.50				1	1	0.953586			
L38 43.50-43.25				1	1	0.937604			

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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
L39 43.25-38.25				1	1	0.941985			
L40 38.25-33.25				1	1	0.947202			
L41 33.25-28.25				1	1	0.935598			
L42 28.25-28.00				1	1	0.935033			
L43 28.00-27.75				1	1	0.972787			
L44 27.75-26.50				1	1	0.986882			
L45 26.50-26.25				1	1	0.968702			
L46 26.25-21.25				1	1	0.958692			
L47 21.25-16.25				1	1	0.969911			
L48 16.25-11.25				1	1	0.960599			
L49 11.25-6.25				1	1	0.973015			
L50 6.25-1.25				1	1	0.964311			
L51 1.25-0.00				1	1	0.973102			

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
5/8" Step Bolts	A	Surface Ar (CaAa)	149.00 - 8.00	1	1	0.000 0.000	0.4167		1.00
5.5x1.25 Mod Plate	A	Surface Af (CaAa)	92.75 - 0.00	1	1	0.000 0.000	5.5000	13.5000	0.00
5.5x1.25 Mod Plate	C	Surface Af (CaAa)	92.75 - 0.00	1	1	-0.500 -0.500	5.5000	13.5000	0.00
4x1.25 Mod Plate	A	Surface Af (CaAa)	120.00 - 92.75	1	1	0.000 0.000	4.0000	10.5000	0.00
4x1.25 Mod Plate	C	Surface Af (CaAa)	120.00 - 92.75	1	1	-0.500 -0.050	4.0000	10.5000	0.00
4" x 0.75" mod plate	A	Surface Af (CaAa)	126.00 - 116.00	1	1	0.000 0.000	4.0000	9.5000	0.00
4" x 0.75" mod plate	C	Surface Af (CaAa)	126.00 - 116.00	1	1	-0.500 -0.500	4.0000	9.5000	0.00

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number		C _A A _A	Weight
				ft			ft ² /ft	plf
Safety Line (3/8")	A	No	CaAa (Out Of Face)	149.00 - 8.00	1	No Ice 1/2" Ice 1" Ice	0.04 0.14 0.24	0.22 0.75 1.28
LDF7-50A(1-5/8")	A	No	Inside Pole	148.00 - 8.00	12	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.82 0.82 0.82
9776(3/4")	A	No	Inside Pole	148.00 - 8.00	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.31 0.31 0.31
LDF4-50A(1/2")	A	No	Inside Pole	148.00 - 8.00	1	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.15 0.15 0.15
LDF7-50A(1-5/8")	C	No	Inside Pole	140.00 - 8.00	6	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.82 0.82 0.82
HB158-1-08U8-S8J18 (1-5/8")	C	No	Inside Pole	140.00 - 8.00	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.30 1.30 1.30

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Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA}		Weight	
			Horz	Lateral			Front	Side		
			ft	ft	°	ft	ft ²	ft ²	K	
4' Lightning Rod	C	None			0.0000	152.00	No Ice	0.10	0.10	0.01
							1/2" Ice	0.51	0.51	0.01
							1" Ice	0.89	0.89	0.02
Platform Mount [LP 602-1]	C	None			0.0000	148.00	No Ice	32.03	32.03	1.34
							1/2" Ice	38.71	38.71	1.80
							1" Ice	45.39	45.39	2.26
(2) P90-14-XLH-RR w/ Mount Pipe	A	From Centroid-Leg	4.00	0.0000	148.00	No Ice	5.30	4.05	0.05	
			0.00			1/2" Ice	5.69	4.67	0.09	
			2.00			1" Ice	6.09	5.29	0.15	
(2) P90-14-XLH-RR w/ Mount Pipe	B	From Centroid-Leg	4.00	0.0000	148.00	No Ice	5.30	4.05	0.05	
			0.00			1/2" Ice	5.69	4.67	0.09	
			2.00			1" Ice	6.09	5.29	0.15	
(2) P90-14-XLH-RR w/ Mount Pipe	C	From Centroid-Leg	4.00	0.0000	148.00	No Ice	5.30	4.05	0.05	
			0.00			1/2" Ice	5.69	4.67	0.09	
			2.00			1" Ice	6.09	5.29	0.15	
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Centroid-Leg	4.00	0.0000	148.00	No Ice	8.26	6.30	0.07	
			0.00			1/2" Ice	8.82	7.48	0.14	
			2.00			1" Ice	9.35	8.37	0.21	
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Centroid-Leg	4.00	0.0000	148.00	No Ice	8.26	6.30	0.07	
			0.00			1/2" Ice	8.82	7.48	0.14	
			2.00			1" Ice	9.35	8.37	0.21	
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Centroid-Leg	4.00	0.0000	148.00	No Ice	8.26	6.30	0.07	
			0.00			1/2" Ice	8.82	7.48	0.14	
			2.00			1" Ice	9.35	8.37	0.21	
RRUS-11	A	From Centroid-Leg	4.00	0.0000	148.00	No Ice	2.78	1.19	0.05	
			0.00			1/2" Ice	2.99	1.33	0.07	
			2.00			1" Ice	3.21	1.49	0.09	
RRUS-11	B	From Centroid-Leg	4.00	0.0000	148.00	No Ice	2.78	1.19	0.05	
			0.00			1/2" Ice	2.99	1.33	0.07	
			2.00			1" Ice	3.21	1.49	0.09	
RRUS-11	C	From Centroid-Leg	4.00	0.0000	148.00	No Ice	2.78	1.19	0.05	
			0.00			1/2" Ice	2.99	1.33	0.07	
			2.00			1" Ice	3.21	1.49	0.09	
(2) TT19-08BP111-001	A	From Centroid-Leg	4.00	0.0000	148.00	No Ice	0.55	0.44	0.02	
			0.00			1/2" Ice	0.64	0.53	0.02	
			2.00			1" Ice	0.74	0.63	0.03	
(2) TT19-08BP111-001	B	From Centroid-Leg	4.00	0.0000	148.00	No Ice	0.55	0.44	0.02	
			0.00			1/2" Ice	0.64	0.53	0.02	
			2.00			1" Ice	0.74	0.63	0.03	
(2) TT19-08BP111-001	C	From Centroid-Leg	4.00	0.0000	148.00	No Ice	0.55	0.44	0.02	
			0.00			1/2" Ice	0.64	0.53	0.02	
			2.00			1" Ice	0.74	0.63	0.03	
DC6-48-60-18-8F Surge Suppression Unit	A	From Centroid-Leg	4.00	0.0000	148.00	No Ice	0.92	0.92	0.02	
			0.00			1/2" Ice	1.46	1.46	0.04	
			2.00			1" Ice	1.64	1.64	0.06	
T-Arm Mount [TA 602-3]	C	None			0.0000	140.00	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
BSAMNT-SBS-2-2	A	From Face	4.00	0.0000	140.00	No Ice	1.27	0.97	0.07	
			0.00			1/2" Ice	1.47	1.13	0.10	
			0.00			1" Ice	1.67	1.30	0.14	
BSAMNT-SBS-2-2	B	From Face	4.00	0.0000	140.00	No Ice	1.27	0.97	0.07	
			0.00			1/2" Ice	1.47	1.13	0.10	
			0.00			1" Ice	1.67	1.30	0.14	

tnxTower

GPD
 520 South Main Street Suite 2531
 Akron, Ohio 44311
 Phone: (330) 572-2100
 FAX: (330) 572-2101

Job	NEWTOWN DINGLEBROOK - BU #: 857525	Page	8 of 14
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Client	Crown Castle USA, Inc.	Designed by	tbeltz

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA}		Weight
			Horz	Vert			Front	Side	
			ft	ft	°	ft	ft ²	ft ²	K
BSAMNT-SBS-2-2	C	From Face	4.00	0.0000	140.00	No Ice	1.27	0.97	0.07
			0.00			1/2" Ice	1.47	1.13	0.10
			0.00			1" Ice	1.67	1.30	0.14
(2) DB846F65ZAXY w/ Mount Pipe	A	From Face	4.00	0.0000	140.00	No Ice	7.03	7.58	0.04
			0.00			1/2" Ice	7.49	8.54	0.11
			0.00			1" Ice	7.94	9.38	0.18
(2) DB846F65ZAXY w/ Mount Pipe	B	From Face	4.00	0.0000	140.00	No Ice	7.03	7.58	0.04
			0.00			1/2" Ice	7.49	8.54	0.11
			0.00			1" Ice	7.94	9.38	0.18
(2) DB846F65ZAXY w/ Mount Pipe	C	From Face	4.00	0.0000	140.00	No Ice	7.03	7.58	0.04
			0.00			1/2" Ice	7.49	8.54	0.11
			0.00			1" Ice	7.94	9.38	0.18
JAHH-65B-R3B w/ Mount Pipe	A	From Face	4.00	0.0000	140.00	No Ice	9.35	7.65	0.09
			0.00			1/2" Ice	9.92	8.83	0.16
			0.00			1" Ice	10.46	9.73	0.25
JAHH-65B-R3B w/ Mount Pipe	B	From Face	4.00	0.0000	140.00	No Ice	9.35	7.65	0.09
			0.00			1/2" Ice	9.92	8.83	0.16
			0.00			1" Ice	10.46	9.73	0.25
JAHH-65B-R3B w/ Mount Pipe	C	From Face	4.00	0.0000	140.00	No Ice	9.35	7.65	0.09
			0.00			1/2" Ice	9.92	8.83	0.16
			0.00			1" Ice	10.46	9.73	0.25
AIRSCALE RRH 4T4R B5 160W	A	From Face	4.00	0.0000	140.00	No Ice	1.29	0.72	0.04
			0.00			1/2" Ice	1.43	0.83	0.05
			0.00			1" Ice	1.58	0.96	0.06
AIRSCALE RRH 4T4R B5 160W	B	From Face	4.00	0.0000	140.00	No Ice	1.29	0.72	0.04
			0.00			1/2" Ice	1.43	0.83	0.05
			0.00			1" Ice	1.58	0.96	0.06
AIRSCALE RRH 4T4R B5 160W	C	From Face	4.00	0.0000	140.00	No Ice	1.29	0.72	0.04
			0.00			1/2" Ice	1.43	0.83	0.05
			0.00			1" Ice	1.58	0.96	0.06
B13 RRH 4X30	A	From Face	4.00	0.0000	140.00	No Ice	2.06	1.32	0.06
			0.00			1/2" Ice	2.24	1.48	0.07
			0.00			1" Ice	2.43	1.64	0.09
B13 RRH 4X30	B	From Face	4.00	0.0000	140.00	No Ice	2.06	1.32	0.06
			0.00			1/2" Ice	2.24	1.48	0.07
			0.00			1" Ice	2.43	1.64	0.09
B13 RRH 4X30	C	From Face	4.00	0.0000	140.00	No Ice	2.06	1.32	0.06
			0.00			1/2" Ice	2.24	1.48	0.07
			0.00			1" Ice	2.43	1.64	0.09
B66A RRH4X45	A	From Face	4.00	0.0000	140.00	No Ice	2.54	1.61	0.06
			0.00			1/2" Ice	2.75	1.79	0.08
			0.00			1" Ice	2.97	1.98	0.10
B66A RRH4X45	B	From Face	4.00	0.0000	140.00	No Ice	2.54	1.61	0.06
			0.00			1/2" Ice	2.75	1.79	0.08
			0.00			1" Ice	2.97	1.98	0.10
B66A RRH4X45	C	From Face	4.00	0.0000	140.00	No Ice	2.54	1.61	0.06
			0.00			1/2" Ice	2.75	1.79	0.08
			0.00			1" Ice	2.97	1.98	0.10
DB-C1-12C-24AB-0Z	C	From Face	4.00	0.0000	140.00	No Ice	4.06	3.10	0.03
			0.00			1/2" Ice	4.32	3.34	0.07
			0.00			1" Ice	4.58	3.58	0.11
Pipe Mount 5'x2.375"	A	From Face	4.00	0.0000	140.00	No Ice	1.19	1.19	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
Pipe Mount 5'x2.375"	B	From Face	4.00	0.0000	140.00	No Ice	1.19	1.19	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04

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	Client Crown Castle USA, Inc.	Designed by tbeltz

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
Pipe Mount 5'x2.375"	C	From Face	4.00 0.00 0.00	0.0000	140.00	No Ice 1.19 1/2" Ice 1.50 1" Ice 1.81	1.19 1.50 1.81	0.02 0.03 0.04

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 144	23.831	46	1.6023	0.0017
L2	144 - 139	22.158	46	1.5895	0.0019
L3	139 - 134	20.510	46	1.5546	0.0020
L4	134 - 129	18.913	46	1.4915	0.0016
L5	129 - 124.5	17.396	46	1.4025	0.0013
L6	124.5 - 124.25	16.119	46	1.3055	0.0010
L7	124.25 - 119.25	16.050	46	1.3024	0.0010
L8	119.25 - 118.5	14.722	46	1.2340	0.0008
L9	118.5 - 118.25	14.529	46	1.2233	0.0008
L10	118.25 - 117.5	14.465	46	1.2212	0.0008
L11	117.5 - 117.25	14.274	46	1.2150	0.0008
L12	117.25 - 112.25	14.210	46	1.2122	0.0008
L13	112.25 - 107.25	12.972	46	1.1521	0.0007
L14	107.25 - 102.25	11.799	46	1.0871	0.0006
L15	102.25 - 98.5	10.697	46	1.0188	0.0005
L16	102 - 97	10.643	46	1.0153	0.0005
L17	97 - 96.75	9.599	46	0.9721	0.0005
L18	96.75 - 91.75	9.548	46	0.9695	0.0005
L19	91.75 - 90.25	8.561	46	0.9157	0.0004
L20	90.25 - 90	8.276	46	0.8998	0.0004
L21	90 - 89	8.229	46	0.8974	0.0004
L22	89 - 88.75	8.042	46	0.8880	0.0004
L23	88.75 - 83.75	7.996	46	0.8850	0.0004
L24	83.75 - 78.75	7.100	46	0.8250	0.0004
L25	78.75 - 73.75	6.269	46	0.7637	0.0003
L26	73.75 - 73.5	5.501	46	0.7021	0.0003
L27	73.5 - 73.25	5.464	46	0.6990	0.0003
L28	73.25 - 68.25	5.428	46	0.6967	0.0003
L29	68.25 - 63.25	4.723	46	0.6489	0.0002
L30	63.25 - 63	4.069	46	0.6008	0.0002
L31	63 - 62.75	4.038	46	0.5984	0.0002
L32	62.75 - 57.75	4.007	46	0.5960	0.0002
L33	57.75 - 48.5	3.408	46	0.5476	0.0002
L34	53.25 - 47.5	2.912	46	0.5038	0.0002
L35	47.5 - 45.75	2.324	46	0.4674	0.0002
L36	45.75 - 45.5	2.157	46	0.4472	0.0001
L37	45.5 - 43.5	2.133	46	0.4443	0.0001
L38	43.5 - 43.25	1.952	46	0.4211	0.0001
L39	43.25 - 38.25	1.930	46	0.4188	0.0001
L40	38.25 - 33.25	1.516	46	0.3726	0.0001
L41	33.25 - 28.25	1.150	46	0.3263	0.0001
L42	28.25 - 28	0.832	46	0.2808	0.0001
L43	28 - 27.75	0.817	46	0.2786	0.0001
L44	27.75 - 26.5	0.803	46	0.2765	0.0001
L45	26.5 - 26.25	0.732	46	0.2657	0.0001
L46	26.25 - 21.25	0.718	46	0.2632	0.0001

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L47	21.25 - 16.25	0.469	46	0.2124	0.0001
L48	16.25 - 11.25	0.273	46	0.1615	0.0000
L49	11.25 - 6.25	0.131	46	0.1115	0.0000
L50	6.25 - 1.25	0.040	46	0.0614	0.0000
L51	1.25 - 0	0.002	46	0.0122	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.00	4' Lightning Rod	46	23.831	1.6023	0.0017	11491
148.00	Platform Mount [LP 602-1]	46	23.495	1.6005	0.0018	11491
140.00	T-Arm Mount [TA 602-3]	46	20.836	1.5639	0.0020	6648

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 144	102.854	16	6.9258	0.0060
L2	144 - 139	95.651	16	6.8700	0.0069
L3	139 - 134	88.557	16	6.7188	0.0073
L4	134 - 129	81.679	16	6.4472	0.0057
L5	129 - 124.5	75.143	16	6.0633	0.0043
L6	124.5 - 124.25	69.637	16	5.6451	0.0032
L7	124.25 - 119.25	69.343	16	5.6314	0.0032
L8	119.25 - 118.5	63.612	16	5.3364	0.0026
L9	118.5 - 118.25	62.780	16	5.2901	0.0025
L10	118.25 - 117.5	62.504	16	5.2812	0.0025
L11	117.5 - 117.25	61.678	16	5.2542	0.0025
L12	117.25 - 112.25	61.404	16	5.2422	0.0024
L13	112.25 - 107.25	56.061	16	4.9827	0.0021
L14	107.25 - 102.25	51.000	16	4.7020	0.0017
L15	102.25 - 98.5	46.238	16	4.4070	0.0014
L16	102 - 97	46.008	16	4.3921	0.0014
L17	97 - 96.75	41.499	16	4.2052	0.0013
L18	96.75 - 91.75	41.279	16	4.1941	0.0013
L19	91.75 - 90.25	37.015	16	3.9616	0.0011
L20	90.25 - 90	35.783	16	3.8926	0.0011
L21	90 - 89	35.579	16	3.8823	0.0011
L22	89 - 88.75	34.772	16	3.8415	0.0010
L23	88.75 - 83.75	34.571	16	3.8288	0.0010
L24	83.75 - 78.75	30.702	16	3.5693	0.0009
L25	78.75 - 73.75	27.107	16	3.3043	0.0008
L26	73.75 - 73.5	23.789	16	3.0376	0.0007
L27	73.5 - 73.25	23.631	16	3.0243	0.0007
L28	73.25 - 68.25	23.473	16	3.0143	0.0007
L29	68.25 - 63.25	20.427	16	2.8075	0.0007
L30	63.25 - 63	17.598	16	2.5993	0.0006
L31	63 - 62.75	17.462	16	2.5889	0.0006
L32	62.75 - 57.75	17.327	16	2.5786	0.0006
L33	57.75 - 48.5	14.738	16	2.3693	0.0006
L34	53.25 - 47.5	12.595	16	2.1797	0.0005
L35	47.5 - 45.75	10.052	16	2.0221	0.0005
L36	45.75 - 45.5	9.327	16	1.9349	0.0005

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L37	45.5 - 43.5	9.226	16	1.9223	0.0005
L38	43.5 - 43.25	8.442	16	1.8218	0.0004
L39	43.25 - 38.25	8.347	16	1.8119	0.0004
L40	38.25 - 33.25	6.555	16	1.6118	0.0004
L41	33.25 - 28.25	4.973	16	1.4116	0.0003
L42	28.25 - 28	3.598	16	1.2148	0.0003
L43	28 - 27.75	3.535	16	1.2050	0.0003
L44	27.75 - 26.5	3.472	16	1.1958	0.0003
L45	26.5 - 26.25	3.165	16	1.1493	0.0003
L46	26.25 - 21.25	3.105	16	1.1383	0.0003
L47	21.25 - 16.25	2.029	16	0.9187	0.0002
L48	16.25 - 11.25	1.182	16	0.6985	0.0002
L49	11.25 - 6.25	0.564	16	0.4823	0.0001
L50	6.25 - 1.25	0.173	16	0.2655	0.0001
L51	1.25 - 0	0.007	16	0.0527	0.0000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.00	4' Lightning Rod	16	102.854	6.9258	0.0060	2762
148.00	Platform Mount [LP 602-1]	16	101.410	6.9181	0.0062	2762
140.00	T-Arm Mount [TA 602-3]	16	89.962	6.7591	0.0074	1582

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio P _u / φP _n
L1	149 - 144 (1)	TP16.8649x16x0.1875	5.00	0.00	0.0	9.9251	-2.23		0.003
L2	144 - 139 (2)	TP17.7297x16.8649x0.1875	5.00	0.00	0.0	10.4398	-4.44		0.006
L3	139 - 134 (3)	TP18.5946x17.7297x0.1875	5.00	0.00	0.0	10.9545	-4.80		0.006
L4	134 - 129 (4)	TP19.4594x18.5946x0.1875	5.00	0.00	0.0	11.4692	-5.18		0.006
L5	129 - 124.5 (5)	TP20.2378x19.4594x0.1875	4.50	0.00	0.0	11.9324	-5.55		0.006
L6	124.5 - 124.25 (6)	TP20.281x20.2378x0.35	0.25	0.00	0.0	22.1414	-5.59		0.003
L7	124.25 - 119.25 (7)	TP21.1459x20.281x0.3438	5.00	0.00	0.0	22.6964	-6.16		0.004
L8	119.25 - 118.5 (8)	TP21.2756x21.1459x0.3438	0.75	0.00	0.0	22.8379	-6.25		0.004
L9	118.5 - 118.25 (9)	TP21.3188x21.2756x0.625	0.25	0.00	0.0	41.0514	-6.29		0.002
L10	118.25 - 117.5 (10)	TP21.4486x21.3188x0.625	0.75	0.00	0.0	41.3087	-6.40		0.002
L11	117.5 - 117.25 (11)	TP21.4918x21.4486x0.4625	0.25	0.00	0.0	30.8705	-6.43		0.003
L12	117.25 - 112.25 (12)	TP22.3567x21.4918x0.4438	5.00	0.00	0.0	30.8635	-7.13		0.003
L13	112.25 - 107.25 (13)	TP23.2215x22.3567x0.4313	5.00	0.00	0.0	31.1950	-7.85		0.003
L14	107.25 - 102.25 (14)	TP24.0864x23.2215x0.425	5.00	0.00	0.0	31.9180	-8.59		0.004
L15	102.25 - 98.5 (15)	TP24.735x24.0864x0.425	3.75	0.00	0.0	31.9763	-8.63		0.004
L16	98.5 - 97 (16)	TP24.6198x23.7546x0.4813	5.00	0.00	0.0	36.8714	-9.86		0.004
L17	97 - 96.75 (17)	TP24.6631x24.6198x0.625	0.25	0.00	0.0	47.6856	-9.92		0.003
L18	96.75 - 91.75 (18)	TP25.5283x24.6631x0.6	5.00	0.00	0.0	47.4735	-10.94		0.003
L19	91.75 - 90.25 (19)	TP25.7879x25.5283x0.6	1.50	0.00	0.0	47.9678	-11.25		0.003
L20	90.25 - 90 (20)	TP25.8311x25.7879x0.6875	0.25	0.00	0.0	54.8666	-11.32		0.003
L21	90 - 89 (21)	TP26.0042x25.8311x0.6875	1.00	0.00	0.0	55.2442	-11.55		0.003
L22	89 - 88.75 (22)	TP26.0474x26.0042x0.55	0.25	0.00	0.0	44.5109	-11.60		0.004
L23	88.75 - 83.75 (23)	TP26.9127x26.0474x0.5375	5.00	0.00	0.0	44.9967	-12.59		0.004

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	Client Crown Castle USA, Inc.	Designed by tbeltz

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
L24	83.75 - 78.75 (24)	TP27.7779x26.9127x0.525	5.00	0.00	0.0	45.4129	-13.60		0.004
L25	78.75 - 73.75 (25)	TP28.6431x27.7779x0.5188	5.00	0.00	0.0	46.3071	-14.63		0.004
L26	73.75 - 73.5 (26)	TP28.6864x28.6431x0.5188	0.25	0.00	0.0	46.3784	-14.69		0.004
L27	73.5 - 73.25 (27)	TP28.7296x28.6864x0.7	0.25	0.00	0.0	62.2763	-14.75		0.003
L28	73.25 - 68.25 (28)	TP29.5949x28.7296x0.675	5.00	0.00	0.0	61.9594	-16.05		0.003
L29	68.25 - 63.25 (29)	TP30.4601x29.5949x0.6625	5.00	0.00	0.0	62.6576	-17.38		0.004
L30	63.25 - 63 (30)	TP30.5034x30.4601x0.6625	0.25	0.00	0.0	62.7486	-17.45		0.004
L31	63 - 62.75 (31)	TP30.5466x30.5034x0.6625	0.25	0.00	0.0	62.8396	-17.52		0.004
L32	62.75 - 57.75 (32)	TP31.4118x30.5466x0.65	5.00	0.00	0.0	63.4647	-18.85		0.004
L33	57.75 - 48.5 (33)	TP33.0125x31.4118x0.6375	9.25	0.00	0.0	63.8452	-20.07		0.004
L34	48.5 - 47.5 (34)	TP32.6823x31.6905x0.55	5.75	0.00	0.0	56.0933	-22.62		0.005
L35	47.5 - 45.75 (35)	TP32.9841x32.6823x0.5375	1.75	0.00	0.0	55.3548	-23.05		0.006
L36	45.75 - 45.5 (36)	TP33.0272x32.9841x0.5375	0.25	0.00	0.0	55.4283	-23.13		0.006
L37	45.5 - 43.5 (37)	TP33.3722x33.0272x0.5375	2.00	0.00	0.0	56.0168	-23.63		0.006
L38	43.5 - 43.25 (38)	TP33.4153x33.3722x0.6875	0.25	0.00	0.0	71.4162	-23.71		0.004
L39	43.25 - 38.25 (39)	TP34.2777x33.4153x0.675	5.00	0.00	0.0	71.9921	-25.24		0.005
L40	38.25 - 33.25 (40)	TP35.1401x34.2777x0.6625	5.00	0.00	0.0	72.4986	-26.79		0.005
L41	33.25 - 28.25 (41)	TP36.0025x35.1401x0.6625	5.00	0.00	0.0	74.3120	-28.36		0.005
L42	28.25 - 28 (42)	TP36.0456x36.0025x0.6625	0.25	0.00	0.0	74.4027	-28.44		0.005
L43	28 - 27.75 (43)	TP36.0887x36.0456x0.7	0.25	0.00	0.0	78.6267	-28.53		0.005
L44	27.75 - 26.5 (44)	TP36.3043x36.0887x0.6875	1.25	0.00	0.0	77.7204	-28.95		0.005
L45	26.5 - 26.25 (45)	TP36.3474x36.3043x0.575	0.25	0.00	0.0	65.2865	-29.03		0.006
L46	26.25 - 21.25 (46)	TP37.2098x36.3474x0.575	5.00	0.00	0.0	66.8604	-30.50		0.006
L47	21.25 - 16.25 (47)	TP38.0722x37.2098x0.5625	5.00	0.00	0.0	66.9689	-31.99		0.006
L48	16.25 - 11.25 (48)	TP38.9346x38.0722x0.5625	5.00	0.00	0.0	68.5086	-33.50		0.007
L49	11.25 - 6.25 (49)	TP39.797x38.9346x0.55	5.00	0.00	0.0	68.5135	-34.99		0.007
L50	6.25 - 1.25 (50)	TP40.6594x39.797x0.55	5.00	0.00	0.0	70.0190	-36.43		0.007
L51	1.25 - 0 (51)	TP40.875x40.6594x0.5438	1.25	0.00	0.0	69.6062	-36.79		0.007

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	149 - 144 (1)	TP16.8649x16x0.1875	26.72		0.106	0.00		0.000
L2	144 - 139 (2)	TP17.7297x16.8649x0.1875	58.19		0.209	0.00		0.000
L3	139 - 134 (3)	TP18.5946x17.7297x0.1875	109.79		0.357	0.00		0.000
L4	134 - 129 (4)	TP19.4594x18.5946x0.1875	162.75		0.486	0.00		0.000
L5	129 - 124.5 (5)	TP20.2378x19.4594x0.1875	211.57		0.590	0.00		0.000
L6	124.5 - 124.25 (6)	TP20.281x20.2378x0.35	214.31		0.321	0.00		0.000
L7	124.25 - 119.25 (7)	TP21.1459x20.281x0.3438	270.01		0.378	0.00		0.000
L8	119.25 - 118.5 (8)	TP21.2756x21.1459x0.3438	278.49		0.385	0.00		0.000
L9	118.5 - 118.25 (9)	TP21.3188x21.2756x0.625	281.33		0.222	0.00		0.000
L10	118.25 - 117.5 (10)	TP21.4486x21.3188x0.625	289.93		0.225	0.00		0.000
L11	117.5 - 117.25 (11)	TP21.4918x21.4486x0.4625	292.82		0.299	0.00		0.000
L12	117.25 - 112.25 (12)	TP22.3567x21.4918x0.4438	351.61		0.344	0.00		0.000
L13	112.25 - 107.25 (13)	TP23.2215x22.3567x0.4313	412.19		0.384	0.00		0.000
L14	107.25 - 102.25 (14)	TP24.0864x23.2215x0.425	474.52		0.415	0.00		0.000
L15	102.25 - 98.5 (15)	TP24.735x24.0864x0.425	477.68		0.417	0.00		0.000
L16	98.5 - 97 (16)	TP24.6198x23.7546x0.4813	542.00		0.403	0.00		0.000
L17	97 - 96.75 (17)	TP24.6631x24.6198x0.625	545.27		0.317	0.00		0.000
L18	96.75 - 91.75 (18)	TP25.5283x24.6631x0.6	611.56		0.344	0.00		0.000
L19	91.75 - 90.25 (19)	TP25.7879x25.5283x0.6	631.81		0.348	0.00		0.000
L20	90.25 - 90 (20)	TP25.8311x25.7879x0.6875	635.20		0.307	0.00		0.000
L21	90 - 89 (21)	TP26.0042x25.8311x0.6875	648.81		0.309	0.00		0.000
L22	89 - 88.75 (22)	TP26.0474x26.0042x0.55	652.22		0.381	0.00		0.000
L23	88.75 - 83.75 (23)	TP26.9127x26.0474x0.5375	721.43		0.403	0.00		0.000
L24	83.75 - 78.75 (24)	TP27.7779x26.9127x0.525	792.38		0.424	0.00		0.000

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	Client Crown Castle USA, Inc.	Designed by tbeltz

Section No.	Elevation ft	Size	M_{ux}	ϕM_{ux}	Ratio	M_{uy}	ϕM_{uy}	Ratio
			kip-ft	kip-ft	$\frac{M_{ux}}{\phi M_{ux}}$	kip-ft	kip-ft	$\frac{M_{uy}}{\phi M_{uy}}$
L25	78.75 - 73.75 (25)	TP28.6431x27.7779x0.5188	865.06		0.439	0.00		0.000
L26	73.75 - 73.5 (26)	TP28.6864x28.6431x0.5188	868.73		0.440	0.00		0.000
L27	73.5 - 73.25 (27)	TP28.7296x28.6864x0.7	872.42		0.333	0.00		0.000
L28	73.25 - 68.25 (28)	TP29.5949x28.7296x0.675	947.02		0.351	0.00		0.000
L29	68.25 - 63.25 (29)	TP30.4601x29.5949x0.6625	1023.46		0.364	0.00		0.000
L30	63.25 - 63 (30)	TP30.5034x30.4601x0.6625	1027.33		0.364	0.00		0.000
L31	63 - 62.75 (31)	TP30.5466x30.5034x0.6625	1031.20		0.365	0.00		0.000
L32	62.75 - 57.75 (32)	TP31.4118x30.5466x0.65	1109.61		0.377	0.00		0.000
L33	57.75 - 48.5 (33)	TP33.0125x31.4118x0.6375	1181.68		0.389	0.00		0.000
L34	48.5 - 47.5 (34)	TP32.6823x31.6905x0.55	1276.04		0.468	0.00		0.000
L35	47.5 - 45.75 (35)	TP32.9841x32.6823x0.5375	1305.25		0.480	0.00		0.000
L36	45.75 - 45.5 (36)	TP33.0272x32.9841x0.5375	1309.44		0.480	0.00		0.000
L37	45.5 - 43.5 (37)	TP33.3722x33.0272x0.5375	1343.08		0.482	0.00		0.000
L38	43.5 - 43.25 (38)	TP33.4153x33.3722x0.6875	1347.30		0.382	0.00		0.000
L39	43.25 - 38.25 (39)	TP34.2777x33.4153x0.675	1432.60		0.392	0.00		0.000
L40	38.25 - 33.25 (40)	TP35.1401x34.2777x0.6625	1519.51		0.402	0.00		0.000
L41	33.25 - 28.25 (41)	TP36.0025x35.1401x0.6625	1607.97		0.405	0.00		0.000
L42	28.25 - 28 (42)	TP36.0456x36.0025x0.6625	1612.43		0.405	0.00		0.000
L43	28 - 27.75 (43)	TP36.0887x36.0456x0.7	1616.89		0.385	0.00		0.000
L44	27.75 - 26.5 (44)	TP36.3043x36.0887x0.6875	1639.28		0.392	0.00		0.000
L45	26.5 - 26.25 (45)	TP36.3474x36.3043x0.575	1643.78		0.464	0.00		0.000
L46	26.25 - 21.25 (46)	TP37.2098x36.3474x0.575	1734.26		0.467	0.00		0.000
L47	21.25 - 16.25 (47)	TP38.0722x37.2098x0.5625	1826.03		0.479	0.00		0.000
L48	16.25 - 11.25 (48)	TP38.9346x38.0722x0.5625	1919.00		0.481	0.00		0.000
L49	11.25 - 6.25 (49)	TP39.797x38.9346x0.55	2013.11		0.493	0.00		0.000
L50	6.25 - 1.25 (50)	TP40.6594x39.797x0.55	2108.32		0.494	0.00		0.000
L51	1.25 - 0 (51)	TP40.875x40.6594x0.5438	2132.29		0.500	0.00		0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual	ϕV_n	Ratio	Actual	ϕT_n	Ratio
			V_u K	K	$\frac{V_u}{\phi V_n}$	T_u kip-ft	kip-ft	$\frac{T_u}{\phi T_n}$
L1	149 - 144 (1)	TP16.8649x16x0.1875	5.23		0.014	0.00	504.68	0.000
L2	144 - 139 (2)	TP17.7297x16.8649x0.1875	10.18		0.026	0.20	558.69	0.000
L3	139 - 134 (3)	TP18.5946x17.7297x0.1875	10.46		0.026	0.00	615.44	0.000
L4	134 - 129 (4)	TP19.4594x18.5946x0.1875	10.73		0.025	0.00	670.33	0.000
L5	129 - 124.5 (5)	TP20.2378x19.4594x0.1875	10.98		0.025	0.00	718.24	0.000
L6	124.5 - 124.25 (6)	TP20.281x20.2378x0.35	10.99		0.013	0.00	1337.17	0.000
L7	124.25 - 119.25 (7)	TP21.1459x20.281x0.3438	11.30		0.013	0.00	1432.06	0.000
L8	119.25 - 118.5 (8)	TP21.2756x21.1459x0.3438	11.34		0.013	0.00	1450.12	0.000
L9	118.5 - 118.25 (9)	TP21.3188x21.2756x0.625	11.36		0.007	0.00	2542.49	0.000
L10	118.25 - 117.5 (10)	TP21.4486x21.3188x0.625	11.54		0.008	0.18	2574.94	0.000
L11	117.5 - 117.25 (11)	TP21.4918x21.4486x0.4625	11.57		0.010	0.18	1958.54	0.000
L12	117.25 - 112.25 (12)	TP22.3567x21.4918x0.4438	11.95		0.010	0.18	2043.86	0.000
L13	112.25 - 107.25 (13)	TP23.2215x22.3567x0.4313	12.30		0.011	0.17	2151.32	0.000
L14	107.25 - 102.25 (14)	TP24.0864x23.2215x0.425	12.64		0.011	0.17	2287.47	0.000
L15	102.25 - 98.5 (15)	TP24.735x24.0864x0.425	12.66		0.011	0.17	2295.92	0.000
L16	98.5 - 97 (16)	TP24.6198x23.7546x0.4813	13.06		0.010	0.16	2690.55	0.000
L17	97 - 96.75 (17)	TP24.6631x24.6198x0.625	13.08		0.007	0.16	3444.71	0.000
L18	96.75 - 91.75 (18)	TP25.5283x24.6631x0.6	13.45		0.008	0.16	3563.10	0.000
L19	91.75 - 90.25 (19)	TP25.7879x25.5283x0.6	13.56		0.008	0.16	3638.57	0.000
L20	90.25 - 90 (20)	TP25.8311x25.7879x0.6875	13.57		0.007	0.16	4140.32	0.000
L21	90 - 89 (21)	TP26.0042x25.8311x0.6875	13.65		0.007	0.16	4198.27	0.000
L22	89 - 88.75 (22)	TP26.0474x26.0042x0.55	13.67		0.008	0.16	3425.37	0.000
L23	88.75 - 83.75 (23)	TP26.9127x26.0474x0.5375	14.02		0.008	0.15	3586.14	0.000
L24	83.75 - 78.75 (24)	TP27.7779x26.9127x0.525	14.37		0.009	0.15	3743.84	0.000
L25	78.75 - 73.75 (25)	TP28.6431x27.7779x0.5188	14.71		0.009	0.14	3942.81	0.000

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	Client Crown Castle USA, Inc.	Designed by tbeltz

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio V_u ϕV_n	Actual T_u kip-ft	ϕT_n kip-ft	Ratio T_u ϕT_n
L26	73.75 - 73.5 (26)	TP28.6864x28.6431x0.5188	14.72		0.009	0.14	3955.06	0.000
L27	73.5 - 73.25 (27)	TP28.7296x28.6864x0.7	14.74		0.006	0.14	5250.98	0.000
L28	73.25 - 68.25 (28)	TP29.5949x28.7296x0.675	15.11		0.007	0.14	5398.78	0.000
L29	68.25 - 63.25 (29)	TP30.4601x29.5949x0.6625	15.47		0.007	0.13	5631.42	0.000
L30	63.25 - 63 (30)	TP30.5034x30.4601x0.6625	15.49		0.007	0.13	5647.96	0.000
L31	63 - 62.75 (31)	TP30.5466x30.5034x0.6625	15.51		0.007	0.13	5664.52	0.000
L32	62.75 - 57.75 (32)	TP31.4118x30.5466x0.65	15.87		0.007	0.13	5894.90	0.000
L33	57.75 - 48.5 (33)	TP33.0125x31.4118x0.6375	16.18		0.007	0.12	6088.29	0.000
L34	48.5 - 47.5 (34)	TP32.6823x31.6905x0.55	16.64		0.008	0.11	5463.80	0.000
L35	47.5 - 45.75 (35)	TP32.9841x32.6823x0.5375	16.76		0.008	0.11	5447.56	0.000
L36	45.75 - 45.5 (36)	TP33.0272x32.9841x0.5375	16.76		0.008	0.11	5462.17	0.000
L37	45.5 - 43.5 (37)	TP33.3722x33.0272x0.5375	16.89		0.008	0.11	5579.73	0.000
L38	43.5 - 43.25 (38)	TP33.4153x33.3722x0.6875	16.90		0.006	0.11	7058.27	0.000
L39	43.25 - 38.25 (39)	TP34.2777x33.4153x0.675	17.23		0.006	0.11	7311.97	0.000
L40	38.25 - 33.25 (40)	TP35.1401x34.2777x0.6625	17.55		0.007	0.10	7561.60	0.000
L41	33.25 - 28.25 (41)	TP36.0025x35.1401x0.6625	17.85		0.006	0.10	7948.27	0.000
L42	28.25 - 28 (42)	TP36.0456x36.0025x0.6625	17.86		0.006	0.09	7967.85	0.000
L43	28 - 27.75 (43)	TP36.0887x36.0456x0.7	17.88		0.006	0.09	8412.83	0.000
L44	27.75 - 26.5 (44)	TP36.3043x36.0887x0.6875	17.96		0.006	0.09	8373.33	0.000
L45	26.5 - 26.25 (45)	TP36.3474x36.3043x0.575	17.97		0.007	0.09	7086.96	0.000
L46	26.25 - 21.25 (46)	TP37.2098x36.3474x0.575	18.24		0.007	0.09	7435.54	0.000
L47	21.25 - 16.25 (47)	TP38.0722x37.2098x0.5625	18.49		0.007	0.08	7630.72	0.000
L48	16.25 - 11.25 (48)	TP38.9346x38.0722x0.5625	18.72		0.007	0.08	7988.29	0.000
L49	11.25 - 6.25 (49)	TP39.797x38.9346x0.55	18.95		0.007	0.08	8176.21	0.000
L50	6.25 - 1.25 (50)	TP40.6594x39.797x0.55	19.17		0.007	0.07	8542.00	0.000
L51	1.25 - 0 (51)	TP40.875x40.6594x0.5438	19.22		0.007	0.07	8540.58	0.000

APPENDIX B
BASE LEVEL DRAWING

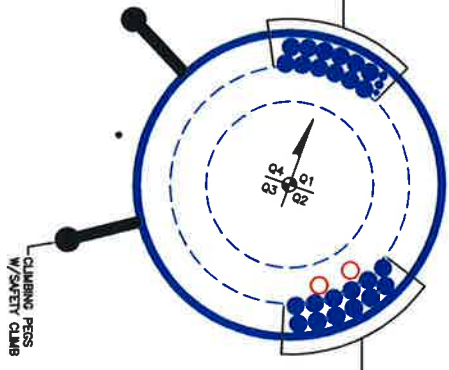


CROWN REGION ADDRESS

USA

(INSTALL) (1) 1/2" TO 148 FT LEVEL
 (2) 3/4" TO 148 FT LEVEL
 (12) 1-5/8" TO 148 FT LEVEL

(PROPOSED) (2) 1-5/8" TO 140 FT LEVEL
 (INSTALL-TO BE REMOVED) (6) 1-5/8" TO 140 FT LEVEL
 (INSTALL) (5) 1-5/8" TO 140 FT LEVEL



BUSINESS UNIT: 857325 TOWER ID: C.ASSELVEL

BASE LEVEL DRAWING

1'-1'-0" 1

A1-0

DRAWN BY: NJH
 CHECKED BY:
 DRAWING DATE: 4/14/14

- 11/14/14 NEW BUILT PER PER WORK ORDER # 740023
- 14/04/14 AS-BUILT INFORMATION ADDED PER WORK ORDER # 740023
- 14/04/14 UPDATED PER PER WORK ORDER # 713081
- 18/06/14 UPDATED PER PER WORK ORDER # 1003862
- 01/09/14 UPDATED PER PER WORK ORDER 1033377

SITE NUMBER: _____
 SITE NAME: _____
 SITE NAME: _____
 NEWTOWN DINGEBROOK
 BUSINESS UNIT NUMBER: 857325
 SITE ADDRESS: 24 DINGEBROOK LANE
 NEWTOWN, CT 06470
 FAIRFIELD COUNTY
 USA
 SHEET TITLE: BASE LEVEL
 SHEET NUMBER: _____

APPENDIX C
ADDITIONAL CALCULATIONS

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	149	50.5	3.5	18	16	24.735	0.1875	0.75	A572-65
2	102	53.5	4.75	18	23.75	33.0125	0.25	1	A572-65
3	53.25	53.25	0	18	31.69	40.875	0.3125	1.25	A572-65

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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	0	28	plate	PL1.25x5.5	4		X									X								
2	28	45.75	plate	PL1.25x5.5	3			X																
3	45.75	63	plate	PL1.25x5.5	3			X																
4	63	90.25	plate	PL1.25x5.5	3				X															
5	90.25	118.5	plate	PL1.25x4	3				X															
6	117.5	124.5	plate	CCI-AFP-040075	3					X														
7	89	97	plate	CCI-SFP-040075	3		X																	
8	51.5	73.5	plate	CCI-SFP-045100	3		X																	
9	26.5	43.5	plate	CCI-SFP-045100	3						X													
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	5.5	1.25	6.875	0.625	30.000	30.000	18.000	5.313	1.1875	A572-65
2	5.5	1.25	6.875	0.625	30.000	30.000	18.000	5.313	1.1875	A572-65
3	5.5	1.25	6.875	0.625	30.000	30.000	18.000	5.313	1.1875	A572-65
4	5.5	1.25	6.875	0.625	30.000	30.000	18.000	5.313	1.1875	A572-65
5	4	1.25	5	0.625	18.000	18.000	18.000	3.438	1.1875	A572-65
6	4	0.75	3	0.375	18.000	18.000	16.000	2.063	1.1875	A572-65
7	4	0.75	3	0.375	12.000	12.000	16.000	2.063	1.1875	A572-65
8	4.5	1	4.5	0.5	18.000	18.000	20.000	3.250	1.1875	A572-65
9	4.5	1	4.5	0.5	18.000	18.000	20.000	3.250	1.1875	A572-65

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fall
149 - 144	Pole	TP16.865x16x0.1875	Pole	10.9%	Pass
144 - 139	Pole	TP17.73x16.865x0.1875	Pole	21.5%	Pass
139 - 134	Pole	TP18.595x17.73x0.1875	Pole	36.4%	Pass
134 - 129	Pole	TP19.459x18.595x0.1875	Pole	49.3%	Pass
129 - 124.5	Pole	TP20.238x19.459x0.1875	Pole	59.7%	Pass
124.5 - 124.25	Pole + Reinf.	TP20.281x20.238x0.35	Reinf. 6 Tension Rupture	59.3%	Pass
124.25 - 119.25	Pole + Reinf.	TP21.146x20.281x0.3438	Reinf. 6 Tension Rupture	70.0%	Pass
119.25 - 118.5	Pole + Reinf.	TP21.276x21.146x0.3438	Reinf. 6 Tension Rupture	71.5%	Pass
118.5 - 118.25	Pole + Reinf.	TP21.319x21.276x0.625	Reinf. 5 Bolt-Shaft Bearing	47.9%	Pass
118.25 - 117.5	Pole + Reinf.	TP21.449x21.319x0.625	Reinf. 5 Tension Rupture	42.7%	Pass
117.5 - 117.25	Pole + Reinf.	TP21.492x21.449x0.4625	Reinf. 5 Tension Rupture	57.1%	Pass
117.25 - 112.25	Pole + Reinf.	TP22.357x21.492x0.4438	Reinf. 5 Tension Rupture	64.8%	Pass
112.25 - 107.25	Pole + Reinf.	TP23.222x22.357x0.4313	Reinf. 5 Tension Rupture	72.0%	Pass
107.25 - 102.25	Pole + Reinf.	TP24.086x23.222x0.425	Reinf. 5 Tension Rupture	78.6%	Pass
102.25 - 102	Pole + Reinf.	TP24.735x24.086x0.425	Reinf. 5 Tension Rupture	78.9%	Pass
102 - 97	Pole + Reinf.	TP24.62x23.755x0.4813	Reinf. 5 Tension Rupture	75.5%	Pass
97 - 96.75	Pole + Reinf.	TP24.663x24.62x0.625	Reinf. 5 Tension Rupture	59.8%	Pass
96.75 - 91.75	Pole + Reinf.	TP25.528x24.663x0.6	Reinf. 5 Tension Rupture	63.8%	Pass
91.75 - 90.25	Pole + Reinf.	TP25.788x25.528x0.6	Reinf. 5 Tension Rupture	65.0%	Pass
90.25 - 90	Pole + Reinf.	TP25.831x25.788x0.6875	Reinf. 7 Tension Rupture	56.3%	Pass
90 - 89	Pole + Reinf.	TP26.004x25.831x0.6875	Reinf. 7 Tension Rupture	56.9%	Pass
89 - 88.75	Pole + Reinf.	TP26.047x26.004x0.55	Reinf. 4 Tension Rupture	63.3%	Pass
88.75 - 83.75	Pole + Reinf.	TP26.913x26.047x0.5375	Reinf. 4 Tension Rupture	66.7%	Pass
83.75 - 78.75	Pole + Reinf.	TP27.778x26.913x0.525	Reinf. 4 Tension Rupture	69.9%	Pass
78.75 - 73.75	Pole + Reinf.	TP28.643x27.778x0.5188	Reinf. 4 Tension Rupture	72.9%	Pass
73.75 - 73.5	Pole + Reinf.	TP28.686x28.643x0.5188	Reinf. 4 Tension Rupture	73.1%	Pass
73.5 - 73.25	Pole + Reinf.	TP28.73x28.686x0.7	Reinf. 8 Tension Rupture	58.7%	Pass
73.25 - 68.25	Pole + Reinf.	TP29.595x28.73x0.675	Reinf. 8 Tension Rupture	61.2%	Pass
68.25 - 63.25	Pole + Reinf.	TP30.46x29.595x0.6625	Reinf. 8 Tension Rupture	63.6%	Pass
63.25 - 63	Pole + Reinf.	TP30.503x30.46x0.6625	Reinf. 8 Tension Rupture	63.8%	Pass
63 - 62.75	Pole + Reinf.	TP30.547x30.503x0.6625	Reinf. 8 Tension Rupture	63.9%	Pass
62.75 - 57.75	Pole + Reinf.	TP31.412x30.547x0.65	Reinf. 8 Tension Rupture	66.1%	Pass
57.75 - 53.25	Pole + Reinf.	TP33.013x31.412x0.6375	Reinf. 8 Tension Rupture	68.1%	Pass
53.25 - 47.5	Pole + Reinf.	TP32.682x31.691x0.55	Reinf. 3 Tension Rupture	78.0%	Pass
47.5 - 45.75	Pole + Reinf.	TP32.984x32.682x0.5375	Reinf. 3 Tension Rupture	78.6%	Pass
45.75 - 45.5	Pole + Reinf.	TP33.027x32.984x0.5375	Reinf. 2 Tension Rupture	78.7%	Pass
45.5 - 43.5	Pole + Reinf.	TP33.372x33.027x0.5375	Reinf. 2 Tension Rupture	79.4%	Pass
43.5 - 43.25	Pole + Reinf.	TP33.415x33.372x0.6875	Reinf. 9 Tension Rupture	66.9%	Pass
43.25 - 38.25	Pole + Reinf.	TP34.278x33.415x0.675	Reinf. 9 Tension Rupture	68.6%	Pass
38.25 - 33.25	Pole + Reinf.	TP35.14x34.278x0.6625	Reinf. 9 Tension Rupture	70.1%	Pass
33.25 - 28.25	Pole + Reinf.	TP36.002x35.14x0.6625	Reinf. 9 Tension Rupture	71.6%	Pass
28.25 - 28	Pole + Reinf.	TP36.046x36.002x0.6625	Reinf. 9 Tension Rupture	71.6%	Pass
28 - 27.75	Pole + Reinf.	TP36.089x36.046x0.7	Reinf. 9 Tension Rupture	67.5%	Pass
27.75 - 26.5	Pole + Reinf.	TP36.304x36.089x0.6875	Reinf. 9 Tension Rupture	67.9%	Pass
26.5 - 26.25	Pole + Reinf.	TP36.347x36.304x0.575	Reinf. 1 Tension Rupture	75.0%	Pass
26.25 - 21.25	Pole + Reinf.	TP37.21x36.347x0.575	Reinf. 1 Tension Rupture	76.3%	Pass
21.25 - 16.25	Pole + Reinf.	TP38.072x37.21x0.5625	Reinf. 1 Tension Rupture	77.5%	Pass
16.25 - 11.25	Pole + Reinf.	TP38.935x38.072x0.5625	Reinf. 1 Tension Rupture	78.6%	Pass
11.25 - 6.25	Pole + Reinf.	TP39.797x38.935x0.55	Reinf. 1 Tension Rupture	79.7%	Pass
6.25 - 1.25	Pole + Reinf.	TP40.659x39.797x0.55	Reinf. 1 Tension Rupture	80.6%	Pass
1.25 - 0	Pole + Reinf.	TP40.875x40.659x0.5438	Reinf. 1 Tension Rupture	80.9%	Pass
				Summary	
			Pole	59.7%	Pass
			Reinforcement	80.9%	Pass
			Overall	80.9%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in ⁴)			Area (in ²)			% Capacity									
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5	R6	R7	R8	R9
149 - 144	349	n/a	349	9.92	n/a	9.92	10.9%									
144 - 139	406	n/a	406	10.44	n/a	10.44	21.5%									
139 - 134	469	n/a	469	10.95	n/a	10.95	36.4%									
134 - 129	538	n/a	538	11.47	n/a	11.47	49.3%									
129 - 124.5	606	n/a	606	11.93	n/a	11.93	59.7%									
124.5 - 124.25	610	504	1114	11.96	9.00	20.96	32.6%						59.3%			
124.25 - 119.25	692	546	1238	12.47	9.00	21.47	38.9%						70.0%			
119.25 - 118.5	705	552	1257	12.55	9.00	21.55	39.8%						71.5%			
118.5 - 118.25	709	1520	2229	12.58	24.00	36.58	22.8%					47.9%	40.8%			
118.25 - 117.5	722	1538	2260	12.65	24.00	36.65	23.3%					42.7%	41.7%			
117.5 - 117.25	727	981	1707	12.68	15.00	27.68	31.2%					57.1%				
117.25 - 112.25	819	1056	1875	13.19	15.00	28.19	35.9%					64.8%				
112.25 - 107.25	919	1134	2052	13.71	15.00	28.71	40.4%					72.0%				
107.25 - 102.25	1026	1215	2241	14.22	15.00	29.22	44.8%					78.6%				
102.25 - 102	1032	1219	2250	14.25	15.00	29.25	45.0%					78.9%				
102 - 97	1450	1266	2716	19.34	15.00	34.34	40.1%					75.5%				
97 - 96.75	1458	2003	3461	19.37	24.00	43.37	31.8%					59.8%		58.6%		
96.75 - 91.75	1619	2139	3757	20.06	24.00	44.06	34.1%					63.8%		62.6%		
91.75 - 90.25	1669	2180	3849	20.26	24.00	44.26	34.8%					65.0%		63.8%		
90.25 - 90	1678	2719	4397	20.30	29.63	49.92	30.7%				51.0%			56.3%		
90 - 89	1712	2754	4466	20.44	29.63	50.06	31.2%				51.6%			56.9%		
89 - 88.75	1721	1948	3669	20.47	20.63	41.09	38.2%				63.3%					
88.75 - 83.75	1900	2072	3972	21.16	20.63	41.78	40.7%				66.7%					
83.75 - 78.75	2090	2200	4290	21.84	20.63	42.47	43.1%				69.9%					
78.75 - 73.75	2294	2331	4625	22.53	20.63	43.15	45.4%				72.9%					
73.75 - 73.5	2304	2338	4642	22.56	20.63	43.19	45.5%				73.1%					
73.5 - 73.25	2315	3848	6163	22.60	34.13	56.72	34.5%				55.4%				58.7%	
73.25 - 68.25	2532	4072	6604	23.28	34.13	57.41	36.3%				57.7%				61.2%	
68.25 - 63.25	2763	4302	7065	23.97	34.13	58.10	38.1%				60.0%				63.6%	
63.25 - 63	2775	4314	7088	24.01	34.13	58.13	38.2%				60.1%				63.8%	
63 - 62.75	2787	4325	7112	24.04	34.13	58.16	38.3%				60.2%				63.9%	
62.75 - 57.75	3032	4562	7595	24.73	34.13	58.85	40.1%				62.3%				66.1%	
57.75 - 53.25	3266	4781	8047	25.34	34.13	59.47	41.7%				64.2%				68.1%	
53.25 - 47.5	4249	2996	7245	32.11	20.63	52.73	47.6%				78.0%					
47.5 - 45.75	4369	3049	7418	32.40	20.63	53.03	48.1%				78.6%					
45.75 - 45.5	4386	3056	7442	32.45	20.63	53.07	48.2%				78.7%					
45.5 - 43.5	4526	3118	7644	32.79	20.63	53.41	48.8%				79.4%					
43.5 - 43.25	4544	5136	9680	32.83	34.13	66.96	39.7%				63.0%					66.9%
43.25 - 38.25	4908	5394	10302	33.69	34.13	67.81	40.0%				64.6%					68.6%
38.25 - 33.25	5292	5657	10949	34.54	34.13	68.67	41.2%				66.0%					70.1%
33.25 - 28.25	5695	5928	11622	35.40	34.13	69.52	42.4%				67.4%					71.6%
28.25 - 28	5715	5941	11657	35.44	34.13	69.57	42.5%				67.5%					71.6%
28 - 27.75	5736	6631	12367	35.48	41.00	76.48	40.6%	61.0%								67.5%
27.75 - 26.5	5841	6707	12548	35.70	41.00	76.70	40.9%	61.3%								67.9%
26.5 - 26.25	5862	4750	10612	35.74	27.50	63.24	48.8%	75.0%								
26.25 - 21.25	6293	4969	11261	36.60	27.50	64.10	62.9%	76.3%								
21.25 - 16.25	6744	5192	11936	37.45	27.50	64.95	61.2%	77.5%								
16.25 - 11.25	7217	5421	12638	38.31	27.50	65.81	52.4%	78.6%								
11.25 - 6.25	7711	5655	13366	39.16	27.50	66.66	39.1%	79.7%								
6.25 - 1.25	8228	5893	14121	40.02	27.50	67.52	54.6%	80.6%								
1.25 - 0	8360	5953	14314	40.23	27.50	67.73	54.9%	80.9%								

Note: Section capacity checked in 5 degree increments.



Anchor Rod Interaction, TIA-222-G

tnx Reactions	
Overturning Moment=	2132.00 k*ft
Axial Force =	37.00 k
Shear Force =	19.00 k

Existing Anchor Rods	
Number of Rods =	12
Rod Circle =	46.875 in
Rod Diameter =	2.25 in
Est. Dist. b/w ea. Rod =	6 in
Plate Type =	Square
Plate Width =	46.5 in

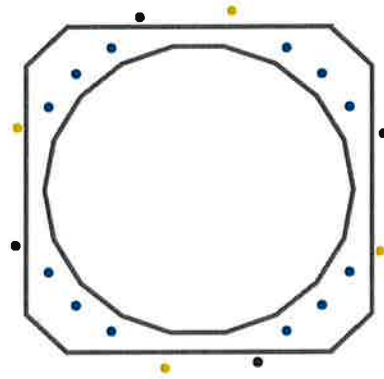
Pole	
Pole Diameter =	40.9 in
Number of Sides =	18
Thickness =	0.3125 in

First Added Anchor Rods	
Number of Rods =	4
Rod Circle =	51.88 in
Rod Diameter =	2.00 in
Anchor Rod Grade =	F1554 GR 105

Rod Number	Initial Angle
1	72
2	162
3	252
4	342

First Added Anchor Rods	
Max Rod Compression =	103.88 k
ϕR_{nt} =	250.00 k
Anchor Rod Capacity =	41.55% OK

Reactions in Existing Rods	
Overturning Moment=	1396.88 k*ft
Axial Force =	37.00 k
Shear Force =	19.00 k
Centroid Offset =	0.00 in



- Existing Anchor Rods
- First Added Anchor Rods
- Second Added Anchor Rods

Second Added Anchor Rods	
Number of Rods =	4
Rod Circle =	51.88 in
Rod Diameter =	1.75 in
Anchor Rod Grade =	A193 B7

Rod Number	Initial Angle
1	10
2	110
3	190
4	290

Second Added Anchor Rods	
Max Rod Compression =	77.29 k
ϕR_{nt} =	190.00 k
Anchor Rod Capacity =	40.68% OK

ANCHOR ROD BRACKET CALCULATIONS

First Added

Anchor Rod Properties		
F_u =	125	ksi
F_y =	105	ksi
Diameter =	2	in
ϕP_n =	250.0	kips

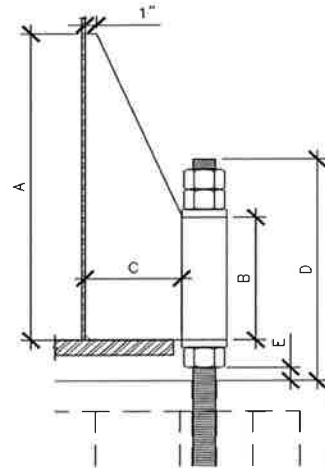
Bracket Plate Properties		
A =	36	in
B =	14	in
C =	3.5	in
E (max) =	2	in
Thickness =	1.25	in
t_y =	65	ksi
ARB connected to flat plate?	No	

Pipe Yielding		
Pipe Size =	P3.5 XX-STR	
Outer Diameter =	4	in
Inner Diameter =	3.364	in
Area =	6.72	in ²
Yield Stress, F_y =	42	ksi
ϕP_n =	254.07	kips
Capacity =	98.4%	OK

Flexure and Combined Shear (Pipe-to-Bracket)		
Plastic Modulus, Z =	61.25	in ³
Elastic Modulus, S =	40.83	in ³
F_{cr} =	60.1	ksi
ϕ =	0.9	
$\phi M_{n, \text{combined shear}}$ =	3313.4	kip-in
$\phi M_{n, \text{yield, LTB}}$ =	3583.1	kip-in
M_u =	500.0	kip-in
Capacity =	15.1%	OK

Flexure and Combined Shear (Bracket-to-Tower)		
Plastic Modulus, Z =	405.00	in ³
Elastic Modulus, S =	270.00	in ³
F_{cr} =	64.28	ksi
ϕ =	0.9	
$\phi M_{n, \text{combined shear}}$ =	23431.4	kip-in
$\phi M_{n, \text{yield, LTB}}$ =	23226.2	kip-in
M_u =	1375.0	kip-in
Capacity =	5.9%	OK

Weld Check (Bracket-to-Tower)		
Weld Length =	36	in
Fillet Weld Size =	0.3125	in
Weld Strength =	70	ksi
e =	5.5	in
a =	0.153	
D =	5	
C1 =	1	
C =	3.66	
ϕ =	0.75	
ϕR_n =	494.25	k
Capacity =	50.6%	OK



Shear Yielding (Pipe-to-Bracket)		
A_w =	17.5	in ²
F_y =	65	ksi
ϕ =	0.9	
ϕV_n =	614.3	kip
V_u =	250.0	kip
Capacity =	40.7%	OK

Rupture Strength at Welds (Bracket-to-Pole)		
Pole Thickness =	0.3125	in
Pole F_y =	65	ksi
Pole F_u =	80	ksi
Rupture Strength of Welds =	4.69	k/in
Rupture Strength of Pole =	15	k/in
Capacity =	31.3%	OK

Shear Yielding (Bracket-to-Tower)		
A_w =	45	in ²
F_y =	65	ksi
ϕ =	0.9	
ϕV_n =	1579.5	kip
V_u =	250.0	kip
Capacity =	15.8%	OK

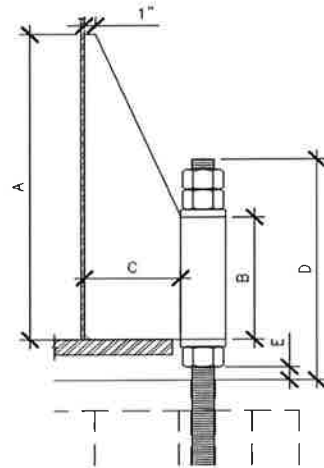
Pole Punching Shear (max per unit length)		
Eccentricity, e =	5.5	in
Induced Moment, M =	1375	k-in
Elastic Modulus, S =	270	in ³
Shear Force, f_v =	6.37	kip
ϕ_v =	0.9	
ϕF_v =	21.94	kip
Capacity =	29.0%	OK

ANCHOR ROD BRACKET CALCULATIONS

Second Added

Anchor Rod Properties		
F_u =	125	ksi
F_y =	105	ksi
Diameter =	1.75	in
ϕP_n =	190.0	kips

Bracket Plate Properties		
A =	18	in
B =	12	in
C =	3.75	in
E (max) =	1.75	in
Thickness =	1	in
F_y =	50	ksi
ARB connected to flat plate?	No	



Pipe Yielding		
Pipe Size =	P 3 XX-STR	
Outer Diameter =	3.5	in
Inner Diameter =	2.3	in
Area =	5.47	in ²
Yield Stress, F_y =	42	ksi
ϕP_n =	206.63	kips
Capacity =	92.0%	OK

Flexure and Combined Shear (Pipe-to-Bracket)		
Plastic Modulus, Z =	36.00	in ³
Elastic Modulus, S =	24.00	in ³
F_{cr} =	41.8	ksi
ϕ =	0.9	
$\phi M_{n, combined\ shear}$ =	1354.6	kip-in
$\phi M_{n, yield, LTB}$ =	1620.0	kip-in
M_u =	332.5	kip-in
Capacity =	24.5%	OK

Shear Yielding (Pipe-to-Bracket)		
A_w =	12	in ²
F_y =	50	ksi
ϕ =	0.9	
ϕV_n =	324.0	kip
V_u =	190.0	kip
Capacity =	58.6%	OK

Rupture Strength at Welds (Bracket-to-Pole)		
Pole Thickness =	0.3125	in
Pole F_y =	65	ksi
Pole F_u =	80	ksi
Rupture Strength of Welds =	9.45	k/in
Rupture Strength of Pole =	15	k/in
Capacity =	63.0%	OK

Flexure and Combined Shear (Bracket-to-Tower)		
Plastic Modulus, Z =	81.00	in ³
Elastic Modulus, S =	54.00	in ³
F_{cr} =	46.54	ksi
ϕ =	0.9	
$\phi M_{n, combined\ shear}$ =	3392.6	kip-in
$\phi M_{n, yield, LTB}$ =	3616.1	kip-in
M_u =	1045.0	kip-in
Capacity =	30.8%	OK

Shear Yielding (Bracket-to-Tower)		
A_w =	18	in ²
F_y =	50	ksi
ϕ =	0.9	
ϕV_n =	486.0	kip
V_u =	190.0	kip
Capacity =	39.1%	OK

Pole Punching Shear (max per unit length)		
Eccentricity, e =	5.5	in
Induced Moment, M =	1045	k-in
Elastic Modulus, S =	54	in ³
Shear Force, f_v =	19.35	kip
ϕ_v =	0.9	
ϕF_v =	21.94	kip
Capacity =	88.2%	OK

Weld Check (Pipe-to-Bracket)					
Weld Length =	12	in	D =	6	
Fillet Weld Size =	0.375	in	C1 =	1.03	
Weld Strength =	80	ksi	C =	3.67	
e =	1.75	in	ϕ =	0.75	
a =	0.146		ϕR_n =	204.36	k
			Capacity =	93.0%	OK

Weld Check (Bracket-to-Tower)					
Weld Length =	18	in	D =	5	
Fillet Weld Size =	0.3125	in	C1 =	1.03	
Weld Strength =	80	ksi	C =	3.07	
e =	5.5	in	ϕ =	0.75	
a =	0.306		ϕR_n =	213.17	k
			Capacity =	89.1%	OK

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /G

- Assumptions:**
- 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
 - 2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
 - 3) Clear space between bottom of leveling nut and top of concrete **not** exceeding $(1) \times (\text{Rod Diameter})$

Site Data

BU#: 857525
 Site Name: NEWTOWN DINGLEBRO
 App #: 403072 Rev 1

Anchor Rod Data

Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	46.875	in
Anchor Spacing:	6	in

Plate Data

W=Side:	46.5	in
Thick:	2.25	in
Grade:	50	ksi
Clip Distance:	7	in

Stiffener Data (Welding at both sides)

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

Pole Data

Diam:	40.875	in
Thick:	0.3125	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Base Reactions

TIA Revision:	G	
Factored Moment, Mu:	1396.88	ft-kips
Factored Axial, Pu:	37	kips
Factored Shear, Vu:	19	kips

Anchor Rod Results

TIA G --> Max Rod ($C_u + V_u/\eta$): 125.5 Kips
 Axial Design Strength, $\Phi * F_u * A_{net}$: 260.0 Kips
 Anchor Rod Stress Ratio: 48.3% **Pass**

Base Plate Results

Base Plate Stress: 28.4 ksi
 PL Design Bending Strength, $\Phi * F_y$: 45.0 ksi
 Base Plate Stress Ratio: 63.2% **Pass**

Flexural Check

PL Ref. Data
Yield Line (in):
24.89
Max PL Length:
24.89

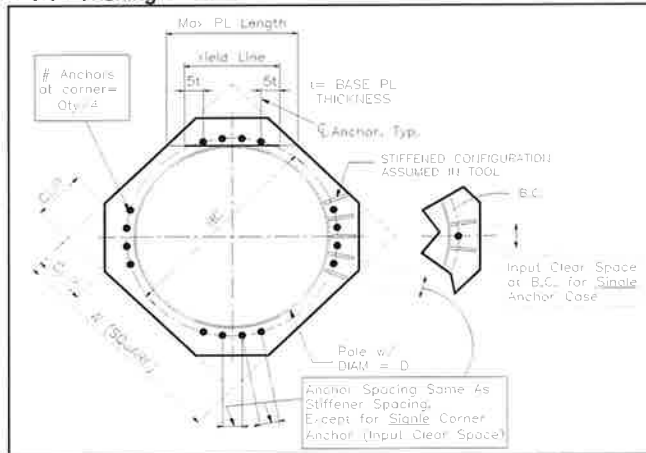
N/A - Unstiffened

Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A



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



Mat Foundation Analysis

General Info	
Foundation Criteria	Crown Castle
TIA Code	TIA-222-G
Soil Code	AASHTO 2012
Concrete Code	ACI 318-11
Seismic Design Category	B
Tower Height	149 ft
Bearing On	Rock
Foundation Type	Monopole Pad
Pier Type	Square
Reinforcing Known	Yes

Tower Reactions	
Moment, M	2132 k-ft
Axial, P	37 k
Shear, V	19 k

Pad & Pier Geometry	
Pier Width, ϕ	10.5 ft
Pad Length, L [y]	22 ft
Pad Width, W [x]	22 ft
Pad Thickness, t	1.5 ft
Depth, D	5.5 ft
Height Above Grade, HG	1 ft
Tower Centroid, X	12 ft
Tower Centroid, Y	10 ft
Tower Eccentricity	1.4142 ft

Pad & Pier Reinforcing	
Rebar Fy	60 ksi
Concrete F'c	4 ksi
Pier Reinforcing Clear Cover	33 in
Shear Rebar Type	T10
Shear Rebar Size	# 4
Pad Reinforcing Clear Cover	3 in
Reinforced Top & Bottom?	Yes
Pad Reinforcing Size	# 8
Pad Quantity Per Layer	27
Pier Rebar Size	# 7
Pier Quantity of Rebar	30

Soil Properties	
Soil Type	Granular
Soil Unit Weight	110 pcf
Angle of Friction, ϕ	30
Base Friction Coeff. Provided In Geo?	No
Bearing Type	Gross
Ultimate Bearing	12 ksi
Water Table Depth	99 ft
Frost Depth	3.333 ft

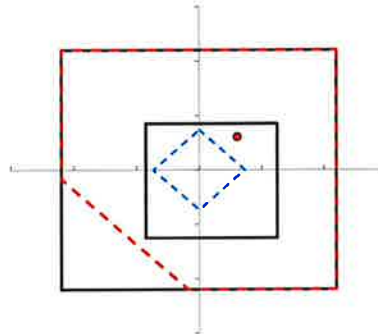
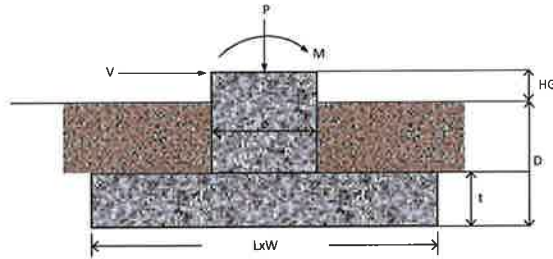
GFD Mat Foundation Analysis - V3.2

Bearing Summary					
Case	Demand/Limits	Capacity/Availability	Check	Eccentricity	Load Case
Q _{xmax}	2.09 ksf	9.00 ksf	OK, <= 110%	L/5.2	1.2D+1.6W
Q _{ymax}	2.09 ksf	9.00 ksf	OK, <= 110%	W/5.2	1.2D+1.6W
Q _{max @ 45°}	2.66 ksf	9.00 ksf	OK, <= 110%	W/7.2	1.2D+1.6W
Controlling Capacity		29.5%	Pass		

Overturning Summary					
Case	Demand/Limits	Capacity/Availability	Check	Load Case	
O _{vtx}	1905.9 k-ft	3830.0 k-ft	49.8% OK	0.9D+1.6W	
O _{vty}	1905.9 k-ft	3830.0 k-ft	49.8% OK	0.9D+1.6W	
O _{vtxy}	1338.8 k-ft	3830.0 k-ft	35.0% OK	0.9D+1.6W	
Controlling Capacity		49.8%	Pass		

Sliding Summary					
Case	Demand/Limits	Capacity/Availability	Check	Load Case	
Sliding _x	19.0 k	140.2 k	13.6% OK	0.9D+1.6W	
Sliding _y	19.0 k	140.2 k	13.6% OK	0.9D+1.6W	
Controlling Capacity		13.6%	Pass		

Reinforcement Summary					
Component	Demand/Limits	Capacity/Availability	Check	Load Case	
Pad Flexural Bending	30.9 k-ft	55.8 k-ft	55.3% OK	0.9D+1.6W	
One-Way Shear in Pad	155.6 k	338.1 k	46.0% OK	0.9D+1.6W	
Two-Way Shear in Pad	348.0 k	1060.4 k	32.8% OK	0.9D+1.6W	
Compression on Pier	136.2 k	50893.9 k	0.3% OK	1.2D+1.6W	
Moment on Pier	2224.9 k-ft	3769.1 k-ft	59.0% OK	1.2D+1.6W	
As Min Pad Met?	1.94 sq. in.	0.50 sq. in.	Yes		
As Min Pier Met?	18.00 sq. in.	79.38 sq. in.	No		
Controlling Capacity		59.0%	Pass		



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

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

Maximum Shaft Superimposed Forces	
TIA Revision:	G
Max. Factored Shaft Mu:	2227 ft-kips (* Note)
Max. Factored Shaft Pu:	37 kips
Max Axial Force Type:	Comp.

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

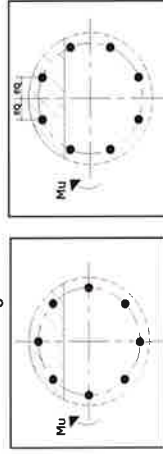
Shaft Factored Loads	
Mu:	2227 ft-kips
Pu:	37 kips

Material Properties	
Concrete Comp. strength, f_c =	4000 psi
Reinforcement yield strength, F_y =	60 ksi
Reinforcing Modulus of Elasticity, E =	29000 ksi
Reinforcement yield strain =	0.00207
Limiting compressive strain =	0.003
ACI 318 Code	
Select Analysis ACI Code=	2008
Seismic Properties	
Seismic Design Category =	B
Seismic Risk =	Low

Solve (Run) ← Press Upon Completing All Input

Results:

Governing Orientation Case: 1



Case 1
Dist. From Edge to Neutral Axis: 9.35 in
Extreme Steel Strain, ϵ_t : 0.1077

et > 0.0050, Tension Controlled
Reduction Factor, ϕ : 0.900

Output Note: Negative Pu=Tension
For Axial Compression, ϕP_n = Pu: 37.00 kips
Drilled Shaft Moment Capacity, ϕM_n : 3643.20 ft-kips
Drilled Shaft Superimposed Mu: 2227.00 ft-kips

(Mu/phi Mn, Drilled Shaft Flexure CSR): 61.1%

Site Data

BU#: 857525
Site Name: NEWTOWN DINGLEBROOK
App #: 403072 Rev 1

Loads Already Factored	←----Disregard
For M (WL)	←----Disregard
For P (DL)	←----Disregard

Pier Properties	
Pier Diameter =	5.5 ft
Concrete Area =	3421.2 in ²
Reinforcement:	
Clear Cover to Tie=	3.00 in
Horiz. Tie Bar Size=	4
Vert. Cage Diameter =	Multiple ft
Vert. Cage Diameter =	Multiple in
Vertical Bar Size =	Multiple
Bar Diameter =	Multiple in
Bar Area =	Multiple in ²
Number of Bars =	34
As Total=	19.76 in ²
A s/ Aconc, Rho:	0.0058 0.58%

ACI 10.5, ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:
(3)*(Sqrt(fc)/Fy): 0.0032
200 / Fy: 0.0033

Minimum Rho Check:
Actual Req'd Min. Rho: 0.33% Flexural
Provided Rho: 0.58% OK

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):	
Max Pu = ($\phi=0.65$) Pn:	6630.25 kips
Pn per ACI 318 (10-2)	3969.98 ft-kips
at Mu=($\phi=0.65$) Mn=	1067.04 kips
Max Tu, ($\phi=0.9$) Tn =	0.00 ft-kips
at Mu= $\phi=(0.90)$ Mn=	0.00 ft-kips

Rebar 2	
Reinforcement:	
Vert. Cage Diameter =	52.00 ft
Vert. Cage Diameter =	624.00 in
Vertical Bar Size =	6
Bar Diameter =	0.75 in
Bar Area =	0.44 in ²
Number of Bars =	4
As Total=	1.76 in ²
A s/ Aconc, Rho:	0.0005 0.05%

Rebar 1	
Reinforcement:	
Vert. Cage Diameter =	4.84 ft
Vert. Cage Diameter =	58.13 in
Vertical Bar Size =	7
Bar Diameter =	0.88 in
Bar Area =	0.6 in ²
Number of Bars =	30
As Total=	18 in ²
A s/ Aconc, Rho:	0.0053 0.53%

Rebar Reduction Factor= 1.00

Allowable Structural Capacity	100%
Unfactored Allowable Mome	3643 ft-kips

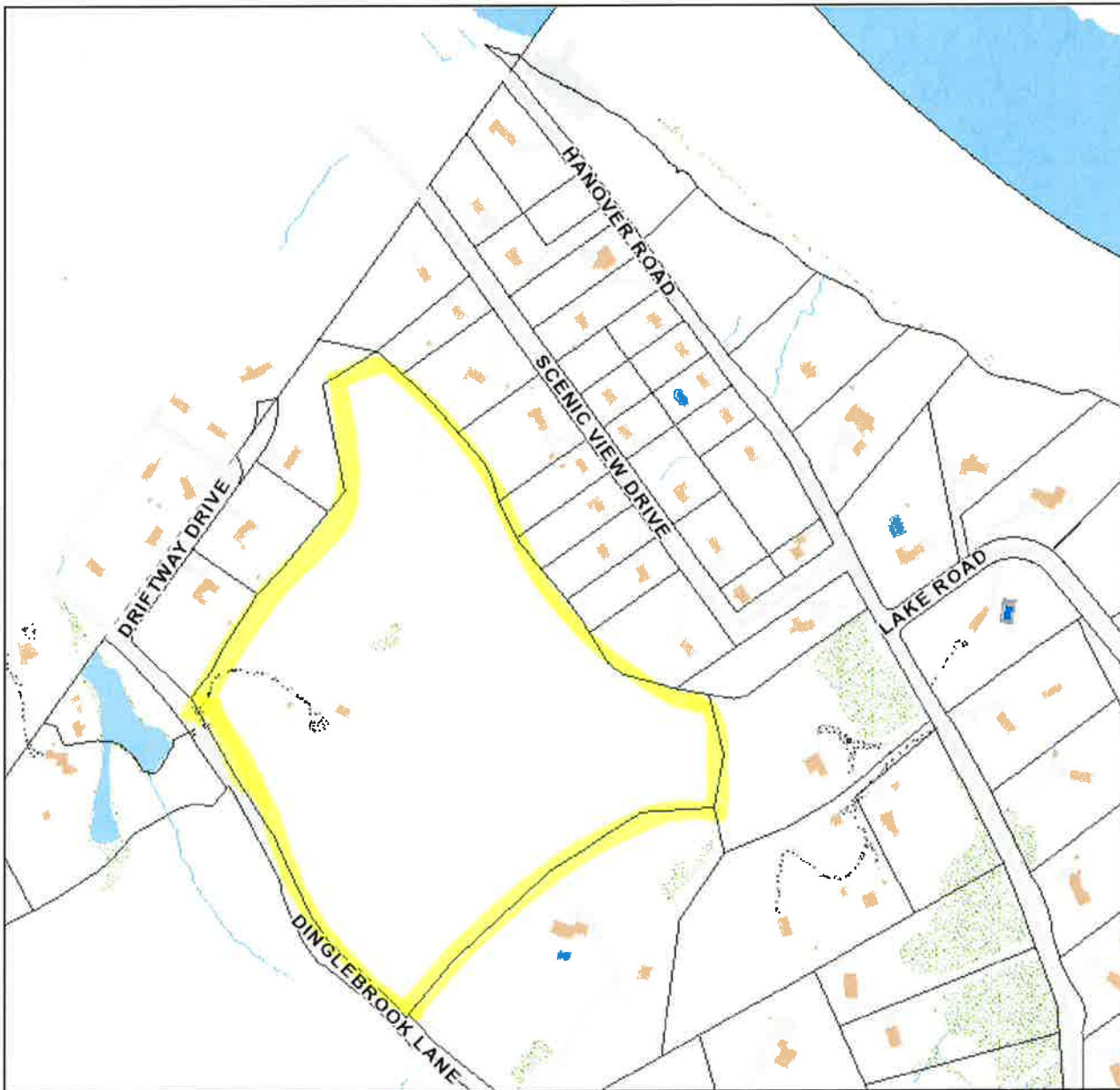
ATTACHMENT 4

Town of Newtown

Geographic Information System (GIS)



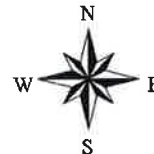
Date Printed: 5/30/2018



MAP DISCLAIMER - NOTICE OF LIABILITY

This map is for assessment purposes only. It is not for legal description or conveyances. All information is subject to verification by any user. The Town of Newtown and its mapping contractors assume no legal responsibility for the information contained herein.

Approximate Scale: 1 inch = 400 feet





Property Information

Property Location	24 DINGLEBROOK LANE
Owner	LUNDGREN PAUL R EST
Co-Owner	LINDA LUNDGREN EXE
Mailing Address	24 DINGLEBROOK LANE NEWTOWN CT 06470
Land Use	4310 CELL SITE
Land Class	I
Zoning Code	R-2
Census Tract	
Sub Lot	
Neighborhood	
Acreage	0
Utilities	Well,Septic
Lot Setting/Desc	
Survey Map	
TC Survey Numbers	

Photo

No Photo Available

Sketch

Primary Construction Details

Year Built	
Stories	
Building Style	
Building Use	
Building Condition	
Floors	
Total Rooms	

Bedrooms	
Full Bathrooms	
Half Bathrooms	
Bath Style	
Kitchen Style	
Roof Style	
Roof Cover	

Exterior Walls	
Interior Walls	
Heating Type	
Heating Fuel	
AC Type	
Gross Bldg Area	
Total Living Area	



Town of Newtown, CT

Property Listing Report

Map Block Lot

22-3-4-C

Account

00174600C

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

Item	Appraised	Assessed
Buildings		
Extras		
Outbuildings		
Land		
Total		

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Total Area		0

Outbuilding and Extra Items

Type	Description
Cell Tower	1 Units
Cellular Shed	400 S.F.
Cellular Shed	360 S.F.
Fence	250 L.F.
Shed	140 S.F.
Cell Tower	1 Units

Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
LUNDGREN PAUL R EST	0857/0723	12/25/2009	

ATTACHMENT 5



Certificate of Mailing — Firm

Name and Address of Sender

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103

TOTAL NO.
of Pieces Listed by Sender

3

TOTAL NO.
of Pieces Received at Post Office™

3

Postmaster, per (name of receiving employee)

J.P.

Affix Stamp Here
Postmark with Date of Receipt.

neopost
06/11/2018
US POSTAGE \$002.38



ZIP 06108
0411122033

USPS® Tracking Number
Firm-specific Identifier

Address
(Name, Street, City, State, and ZIP Code™)

Postage

Fee

Special Handling

Parcel/Airift

1.

Daniel Rosenthal, First Selectman
Town of Newtown
3 Primrose Street
Newtown, CT 06470

2.

George Benson, Director of Planning
Town of Newtown
3 Primrose Street
Newtown, CT 06470

3.

Estate of Paul Lundgren
c/o Linda Lundgren, Exec
24 Dinglebrook Road
Newtown, CT 06470

4.

5.

6.

