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

September 29, 2021

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

RE: **Notice of Exempt Modification for T-Mobile: CT11652A**
Crown Site ID: 806382
74 Goodrich Lane, Portland, CT 06480
Latitude: 41° 36" 29.90" / Longitude: -72° 35' 29.56"

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 152-foot mount on the existing 160-foot monopole tower located at 74 Goodrich Lane, Portland, CT. The tower and property are owned by Crown Castle. T-Mobile now intends to add three (3) new antennas and ancillary equipment at the 152ft level. This modification/proposal includes hardware that is both 4G (LTE) and 5G capable through remote software configuration and either or both services may be turned on or off at various times.

Panned Modification:
Tower:

Installed New:
(3) RFS – APX16DWV-S-E-A20 Antenna
(3) Ericsson- AIR6449 B41 Antenna
(3) RFS – APX16DWV-160WV-S-E-A20 Antennas
(3) Ericsson Radio 4460 B25 + B66 Remote Radios
(3) Ericsson – Radio 4480 B71+B85
(3) Hybrid Cables 6X24
(1) Mount modification per Trylon

Remove:
(3) RFS/Celwave – APXVSPP18-C-A20 Antennas
(3) Commscope – DT465B-2XR Antennas
(3) Alcatel lucent – 1900MHZ RRH
(3) Alcatel Lucent – 800MHZ RRH
(3) Alcatel Lucent – TD-RRH8x20-25
(3) Alcatel Lucent – RRH2x50-800
(4) Hybrid Cable (1-1/4")

Ground:

Install New:
(1) 6160 Cabinet
(1) B160 Battery Cabinet

(3.) RBS 6601 IN 6160 Cabinet
(1.) CSR IXRE V2 Transport Systemr
(1) PSU4813 Voltage Booster
(1) BB6648 IN 6160 SSC Cabinet

Remove:
(1) Sprint CDMA Cabinet
(1) Sprint 60 EC Cabinet

The facility was approved by the Connecticut Siting Council in Docket No. 58 on July 11, 1986. The approval was given with conditions which this exempt modification follows. .

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to The First Selectwoman, Ms. Susan Bransfield, First Selectwoman for the Town of Portland and The Zoning Enforcement Officer, Mr. John Herring. Crown Castle is the tower and property owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.

2. The proposed modifications will not require the extension of the site boundary.

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

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

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

Sincerely,

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

Attachments
cc:

Susan Bransfield, First Selectwoman
Town of Portland
33 East Main Street, 2nd Floor
Portland, CT 06480
860-342-6715

John Herring, Zoning Enforcement Officer
Town of Portland
33 East Main Street, 2nd Floor
Portland, CT 06480
860-342-6719

Crown Castle, Tower Owner & Property Owner

DOCKET NO. 58

AN APPLICATION OF HARTFORD CELLULAR COPANY FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE, AND OPERATION OF FACILITIES TO PROVIDE CELLULAR SERVICE IN HARTFORD, TOLLAND AND MIDDLESEX COUNTIES.	CONNECTICUT SITING COUNCIL
	July 11, 1986.

D E C I S I O N A N D O R D E R

Pursuant to the foregoing opinion, the Connecticut Siting Council (Council) hereby directs that a Certificate of Environmental Compatibility and Public Need as provided by Section 16-50k of the General Statutes of Connecticut (CGS) be issued to the Hartford Cellular Company for the construction, maintenance, and operation of cellular mobile phone telecommunication towers and associated equipment in the towns of Glastonbury, Haddam, Hartford, Portland, Rocky Hill, Somers, Vernon, Windsor, and Willington subject to the conditions below.

1) The proposed Bloomfield and Middlefield sites are rejected without prejudice.

2) The antennas on the Glastonbury tower shall be mounted no higher than the 180' level of this existing tower.

3) The Portland and Rocky Hill towers shall be monopoles.

4) The towers shall be no taller than necessary to provide the proposed service, and in no event shall exceed total heights, including antennas, of

a) 193' at the Haddam site;

b) 173' at the Portland site;

c) 153' at the Rocky Hill site;

d) 173' at the Somers site;

e) 173' at the Vernon site;

f) 153' at the Willington site;

g) 173' at the Windsor site.

5) The Hartford site receive antennas shall be mounted below the top of the high point of the building to preclude visibility.

6) Any future actions requiring the removal of the existing Glastonbury tower to be shared by the certificate holder shall also apply to the equipment mounted on that tower by the certificate holder, regardless of that equipment's status under Chapter 277a of the CGS.

7) The certificate holder shall submit a development and management (D&M) plan for the Haddam, Portland, Rocky Hill, Somers, Vernon and Windsor sites pursuant to Sections 16-50j-75 through 16-50j-77 of the Regulations of State Agencies (RSA), except that irrelevant items in Section 16-50j-76 need only be identified as such. In addition to the requirements of Section 16-50j-76, the D&M plan shall provide plans for evergreen screening around the fenced perimeter at the Haddam, Somers, Vernon, and Windsor sites. The D&M plan shall include a proposal for painting the approved monopole structures to blend with the sky. The D&M plan must be approved prior to facility construction. Any changes to specifications in the D&M plan must be approved by the Council prior to facility operation.

8) All certified facilities shall be constructed, operated, and maintained as specified in the Council's record and in the

site plan required by order number 7.

9) The certificate holder shall comply with any future radiofrequency (RF) standards promulgated by state or federal regulatory agencies. Upon the establishment of any new governmental RF standards, the facilities granted in this decison shall continue to be in compliance with such standards.

10) The certificate holder shall permit public or private entities to share space on the towers approved herein, for due consideration received, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing. In addition to complying with Section 16-50j-73 of the RSA, the certificate holder shall notify the Council of the addition of any equipment to any approved tower.

11) A fence not lower than 8' shall surround each tower and associated equipment.

12) Unless necessary to comply with order 13, no lights shall be installed on any of these towers.

13) The facilities' construction and any future tower sharing shall be in accordance with all applicable federal, state, and municipal laws and regulations. Shared uses by entities not subject to jurisdiction pursuant to Section 16-50k of the CGS shall be subject to all applicable federal, state, and municipal laws and regulations.

14) Construction activities shall take place during daylight working hours.

15) This decision and order shall be void and the towers and associate equipment shall be dismantled and removed, or reapplication for any new use shall be made to the Council before any such new use is made, if the towers do not provide or permanently cease to provide cellular service following completion of construction.

16) This decision and order shall be void if all construction authorized herein is not completed within three years of the issuance of this decision, or within three years of the completion of any appeal if appeal of this decision is taken, unless otherwise approved by the Council.

Pursuant to CGS Section 16-50p, we hereby direct that a copy of the decision and order shall be served on each person listed below. A notice of the issuance shall be published in the Hartford Courant, Middletown Press, Manchester Journal Inquirer, and the Willimantic Chronicle.

The parties to the proceeding are:

Metro Mobile (applicant)
5 Eversley Avenue
Norwalk, Connecticut 06855
ATTN: Armand Mascioli
General Manager

Howard L. Slater, Esq. (its attorneys)
Scott A. Gursky, Esq.
Byrne, Slater,Sandler,
Shulman & Rouse, P.C.
111 Pearl Street
Hartford, Connecticut 06103

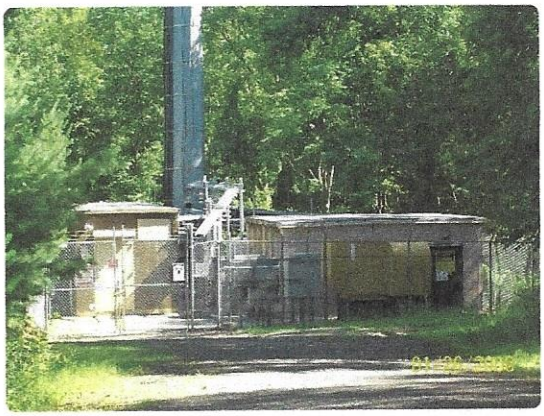
Richard Rubin, Esq.
Fleischman and Walsh, P.C.
1725 N Street, N.W.
Washington, D. C. 20036

qPublic.net™ Town of Portland, CT

Summary

Parcel Number	084-0009
Alternate ID/Map Block Lot	00354100
Location Address	74 GOODRICH LANE
Legal Description	(Note: Not to be used on legal documents.)
Zoning	R25
Land Use	(431) Communication Towers
Acres	0.083
Property Class	400
Neighborhood	600
Tax District	0
Vol/Page	284/47

Map Not Available



Owner

Owner
HALE JOAN J &
CROWN ATLANTIC LLC
PMB 353
4017 WASHINGTON RD
MCMURRAY PA 15317

Valuation

	Appraised Values	Assessed Values
Current Land	$74,900	$52,430
Current Building	$139,200	$97,440
Current Total	$214,100	$149,870

Recent Sales In Area

Sale date range:

From:
09/29/2018

To:
09/29/2021

Sales by Neighborhood

Land

Descr	P	LN	CD	Acres	Frontage	Depth	Base Size	Base Rate	Sq ft.	Incr / Decr	Land-Val
PRIMARY	A	1	1	0.0830	0	0	0.75	174,000	3,615	104000 / 83300	74,940

Total Acres:
0.0830
Total Land-Value:
74,940

Accessory Information

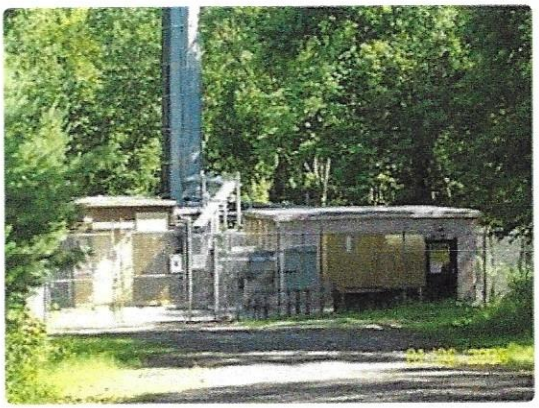
Card 1

Descr	Full Description	Type	Quantity	Year	Size	Area	Grade	Mods	Cond	F	MD%	Value
FENCE CHAI	FENCE CHAIN	FN1	1	1996	8 x 260	2,080	C -AVERAGE		3	3	0	2,570
TOWER CELL	TOWER CELLULAR	TT4	1	1978	1 x 160	160	C -AVERAGE		4	4	0	115,200
MACH SHED	FRAME MACHINERY SHED	SH1	1	1978	1 x 200	200	A -VERY GOOD +		4	4	0	12,000
MACH SHED	FRAME MACHINERY SHED	SH1	1	2000	1 x 96	96	B -GOOD		4	4	0	4,030
PAVING CON	PAVING CONCRETE MAT/SLAB	PC3	1	1996	1 x 2640	2,640	B -GOOD		3	3	0	5,350

Permits

Date	Number	Amount	Purpose
03/04/2021	21-91	20,000	OTHER
05/01/2019	19-149	10,000	OTHER
03/07/2019	19-68	20,000	73 CREP
12/12/2018	18-594	20,000	OTHER
08/02/2017	17-350	15,000	OTHER
02/14/2017	17-56	20,000	OTHER
01/31/2017	17-41	8,000	51 BLDG
08/26/2016	16-363	8,000	51 BLDG
11/12/2015	15-615	15,000	BLDG
11/19/2014	14-499	15,000	BLDG
10/15/2013	13-575	8,000	BLDG
12/21/2012	12-703	3,800	BLDG
07/05/2012	12-339	25,000	BLDG
04/04/2011	10051	10,000	BLDG
06/11/2010	9855	7,000	BLDG
01/14/2010	9715	15,000	BLDG
06/10/2008	9241	15,000	BLDG
11/09/1999	6148	38,600	BLDG

Photos



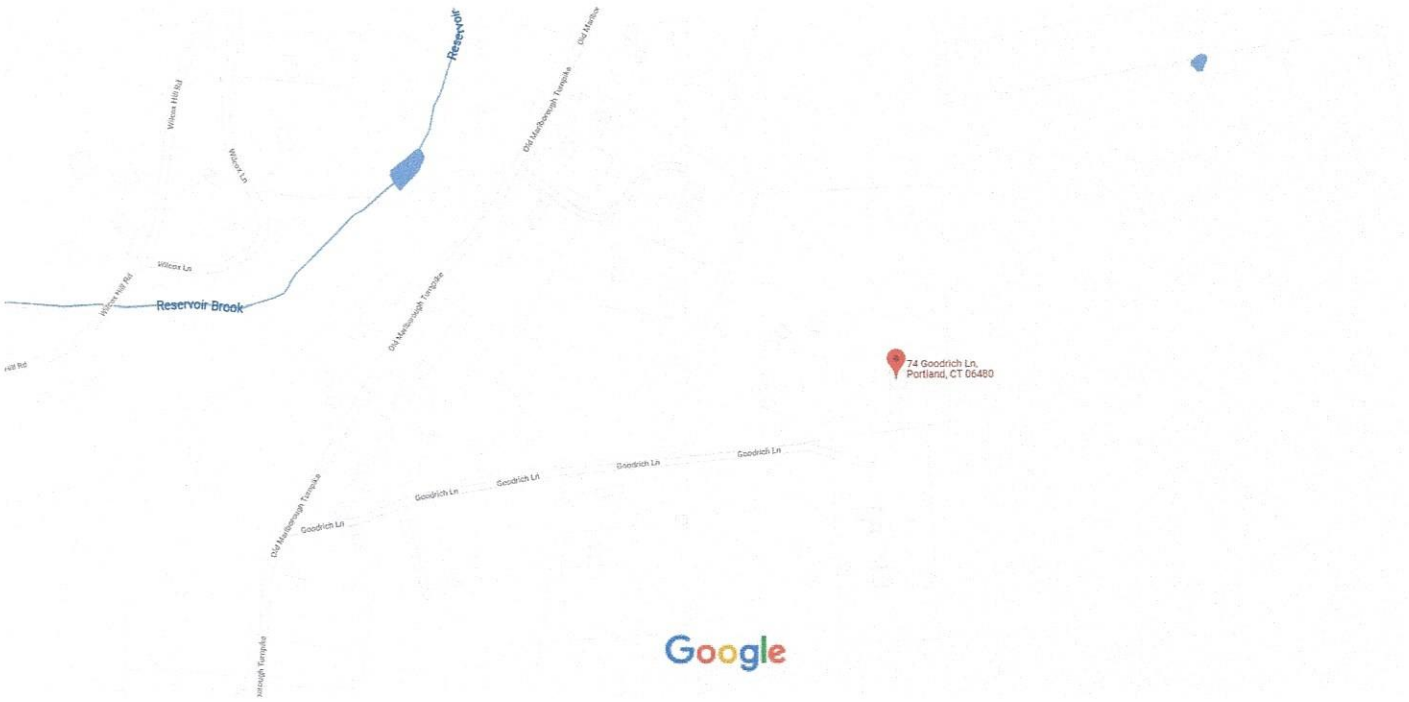
No data available for the following modules: Sales, Residential, Other Dwelling Features, Commercial, Interior/Exterior, Other Features, Tax History, Additions, Sketches.

Developed by Schneider GEOSPATIAL

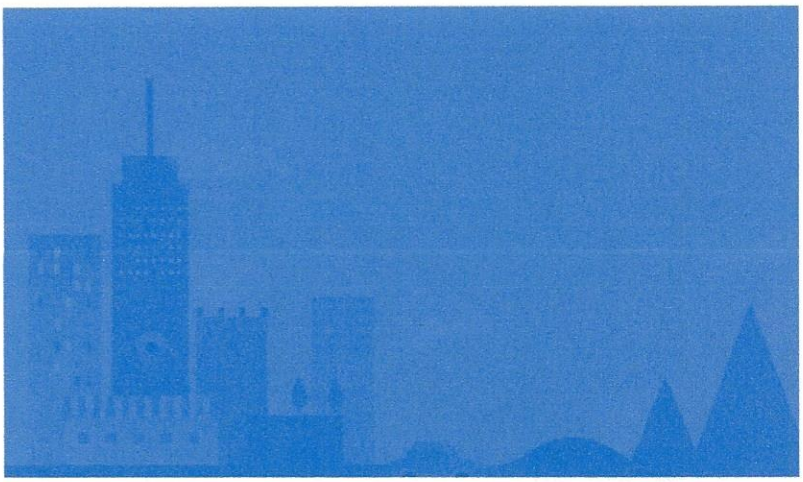
Last Data Upload: 9/29/2021, 1:19:55 AM

Version 2.3.149

74 Goodrich Ln



Map data ©2021 200 ft



74 Goodrich Ln

Building

Directions Save Nearby Send to your phone Share

74 Goodrich Ln, Portland, CT 06480

Barbadora, Jeff

From: TrackingUpdates@fedex.com
Sent: Thursday, September 30, 2021 10:53 AM
To: Barbadora, Jeff
Subject: FedEx Shipment 774837412689: Your package has been delivered

Hi. Your package was delivered Thu, 09/30/2021 at 10:50am.

Delivered to 33 E MAIN ST, PORTLAND, CT 06480
Received by R.CURLEY

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER 774837412689

FROM	Jeff Barbadora 1800 W. Park Drive WESTBOROUGH, MA, US, 01581
TO	Town of Portland Zoning Officer, John Herring 33 East Main Street PORTLAND, CT, US, 06480
REFERENCE	799001.7680
SHIPPER REFERENCE	799001.7680
SHIP DATE	Wed 9/29/2021 06:06 PM
DELIVERED TO	Receptionist/Front Desk
PACKAGING TYPE	FedEx Pak
ORIGIN	WESTBOROUGH, MA, US, 01581
DESTINATION	PORTLAND, CT, US, 06480
SPECIAL HANDLING	Deliver Weekday
NUMBER OF PIECES	1
TOTAL SHIPMENT WEIGHT	1.00 LB
SERVICE TYPE	FedEx Priority Overnight

Barbadora, Jeff

From: TrackingUpdates@fedex.com
Sent: Thursday, September 30, 2021 10:53 AM
To: Barbadora, Jeff
Subject: FedEx Shipment 774837382167: Your package has been delivered

Hi. Your package was delivered Thu, 09/30/2021 at 10:50am.

Delivered to 33 E MAIN ST, PORTLAND, CT 06480
Received by R.CURLEY

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER 774837382167

FROM	Jeff Barbadora 1800 W. Park Drive WESTBOROUGH, MA, US, 01581
TO	Town of Portland First Selectwoman, Susan Bransfield 33 East Main Street 2nd Floor PORTLAND, CT, US, 06480
REFERENCE	799001.7680
SHIPPER REFERENCE	799001.7680
SHIP DATE	Wed 9/29/2021 06:06 PM
DELIVERED TO	Receptionist/Front Desk
PACKAGING TYPE	FedEx Pak
ORIGIN	WESTBOROUGH, MA, US, 01581
DESTINATION	PORTLAND, CT, US, 06480
SPECIAL HANDLING	Deliver Weekday
NUMBER OF PIECES	1
TOTAL SHIPMENT WEIGHT	1.00 LB
SERVICE TYPE	FedEx Priority Overnight

Date: **August 23, 2021**

B+T Group
1717 S Boulder Ave, Suite 300
Tulsa, OK 74119
(918) 587-4630

Subject:	**Structural Analysis Report**	
Carrier Designation:	**Site Number:**	CT11652A
	Site Name:	CT03XC166
Crown Castle Designation:	**BU Number:**	806382
	Site Name:	HRT 082 943274
	JDE Job Number:	673840
	Work Order Number:	1999974
	Order Number:	575186 Rev. 0
Engineering Firm Designation:	**B+T Group Project Number:**	81363.023.01
Site Data:	**74 Goodrich Lane, Portland, Middlesex County, CT** **Latitude *41° 36' 29.9"*, Longitude *-72° 35' 29.56"*** **160 Foot - Monopole**	

B+T Group is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

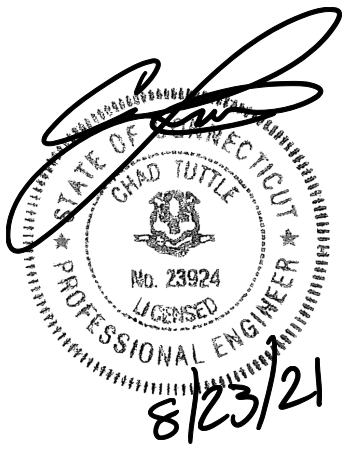
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Proposed Equipment Configuration **Sufficient Capacity-84.0%**

This analysis utilizes an ultimate 3-second gust wind speed of 130 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Rose Denny

Respectfully submitted by: B+T Engineering, Inc.
COA: PEC.0001564; Expires: 2/10/2022



Chad E. Tuttle, P.E.

tnxTower Report - version 8.1.1.0

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1) INTRODUCTION

This is a 160 ft. Monopole designed by Valmont. The tower has been modified by B+T group in May of 2013 and these modifications are considered to be ineffective.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	130 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
150.0	152.0	3	Ericsson	AIR6449 B41_T-MOBILE	3	1-5/8
		3	Ericsson	RADIO 4460 B2/B25 B66_TMO		
		3	Ericsson	RADIO 4480 B71_TMO		
		3	RFS Celwave	APX16DWV-16DWV-S-E-A20		
		3	RFS Celwave	APXVAALL24_43-U-NA20_TMO		
	150.0	6	--	2.375" O.D, sch.40, 96" long pipe		
		1	--	Platform Mount [LP 713-1]		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
158.0	160.0	6	Andrew	SBNHH-1D65B	8	1-5/8
		2	Decibel	DB846F65ZAXY		
		2	Decibel	DB846H80E-SX		
		2	Raycap	RRFDC-3315-PF-48		
		3	Samsung Telecom.	RFV01U-D1A		
		3	Samsung Telecom.	RFV01U-D2A		
		3	VZW	Sub6 Antenna - VZS01		
		3	Commscope	BSAMNT-SBS-1-2		
	158.0	1	--	Platform Mount [LP 713-1]		
142.0	144.0	2	Radiowaves	HP3-11	2	1/2 Conduit
	142.0	1	--	Side Arm Mount [SO 101-3]	2	
136.0	137.0	3	Commscope	SBNH-1D65C-SR	7	1-5/8
		3	Commscope	TMAT1921B78-21A		
		3	Ericsson	ERICSSON AIR 21 B4A B2P		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		3	Ericsson	RRUS 11 B12		
		3	Ericsson	RRUS 11 B2		
	136.0	1	--	T-Arm Mount [TA 602-3]		
118.0	120.0	3	CCI Antennas	DMP65R-BU6D	6 3 2	1-1/4 3/4 3/8
		3	CCI Antennas	OPA65R-BU6D		
		3	Ericsson	RRUS 4449 B5/B12		
		3	Ericsson	RRUS 4478 B14_CCIV2		
		3	Ericsson	RRUS 8843 B2/B66A_CCIV2		
		3	Powerwave Tech.	1001940		
		3	Powerwave Tech.	7770.00		
		6	Powerwave Tech.	LGP13519		
		2	Raycap	DC6-48-60-18-8F		
	118.0	1	--	Platform Mount [LP 304-1_HR-1]		
108.0	108.0	3	Fujitsu	TA08025-B604	1	1-1/2
		3	Fujitsu	TA08025-B605		
		3	JMA Wireless	MX08FRO665-20		
		1	Raycap	RDIDC-9181-PF-48		
		1	--	Commscope MC-PK8-DSH		
61.0	61.0	1	Lucent	KS24019-L112A	1	1/2
		2	--	Side Arm Mount [SO 701-1]		
50.0	50.0	2	--	Side Arm Mount [SO 701-1]	--	--

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
Tower Manufacturer Drawing	255193	CCI Sites
Mount Analysis Report	Date: 07/20/2021	CCI Sites
Tower Modification Drawing	3865159	CCI Sites
Post modification Inspection	3996803	CCI Sites
Foundation Drawing	301226	CCI Sites
Geotech Report	1041653	CCI Sites
Crown CAD package	Date: 07/13/2021	CCI Sites

3.1) Analysis Method

tnxTower (version 8.1.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

3.2) Assumptions

1) The tower and structures were maintained in accordance with the - TIA-222 standard.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	160 - 123.667	Pole	TP29.05x18.87x0.188	1	-11.813	990.374	69.6	Pass
L2	123.667 - 76.25	Pole	TP41.95x27.461x0.313	2	-27.553	2474.062	74.3	Pass
L3	76.25 - 37	Pole	TP52.32x39.715x0.344	3	-39.689	3314.493	84.0	Pass
L4	37 - 0	Pole	TP62x49.672x0.406	4	-57.569	4687.798	76.9	Pass
							Summary	
						Pole (L3)	84.0	Pass
						Rating =	84.0	Pass

Table 5 - Tower Component Stresses vs. Capacity- LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	Base	72.3	Pass
1,2	Base Plate	Base	39.1	Pass
1,2	Base Foundation (Structure)	Base	66.3	Pass
1,2	Base Foundation (Soil Interaction)	Base	64.0	Pass

Structure Rating (max from all components) =	**84.0%**

Notes:
1) See additional documentation in “Appendix C - Additional Calculations” for calculations supporting the % capacity consumed.
2) Rating per TIA-222-H Section 15.5.

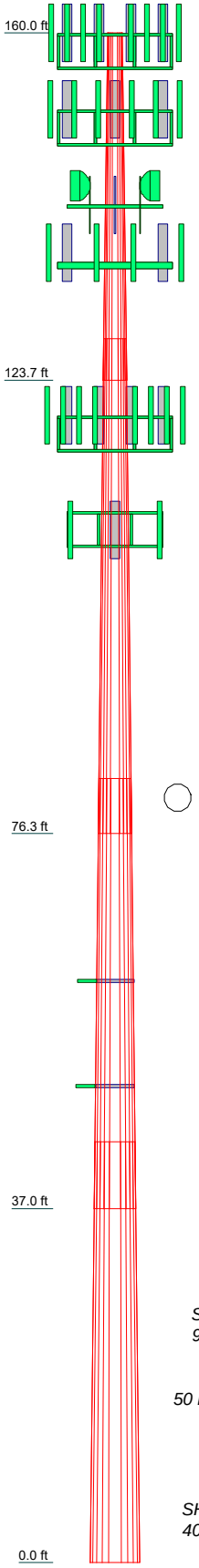
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	36.333	12	0.188	4.333	18.870	29.050		1.8
2	51.750	12	0.313	5.750	27.461	41.950		6.1
3	45.000	12	0.344	7.000	39.715	52.320		7.7
4	44.000	12	0.406		49.672	62.000		10.9
							A572-65	26.5



ALL REACTIONS ARE FACTORED

AXIAL 97 K

SHEAR 9 K

MOMENT 1012 kip-ft

TORQUE 0 kip-ft
50 mph WIND - 1.500 in ICE

AXIAL 58 K

SHEAR 40 K

MOMENT 4450 kip-ft

TORQUE 2 kip-ft
REACTIONS - 130 mph WIND

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 130 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TIA-222-H Annex S
9. TOWER RATING: 84%

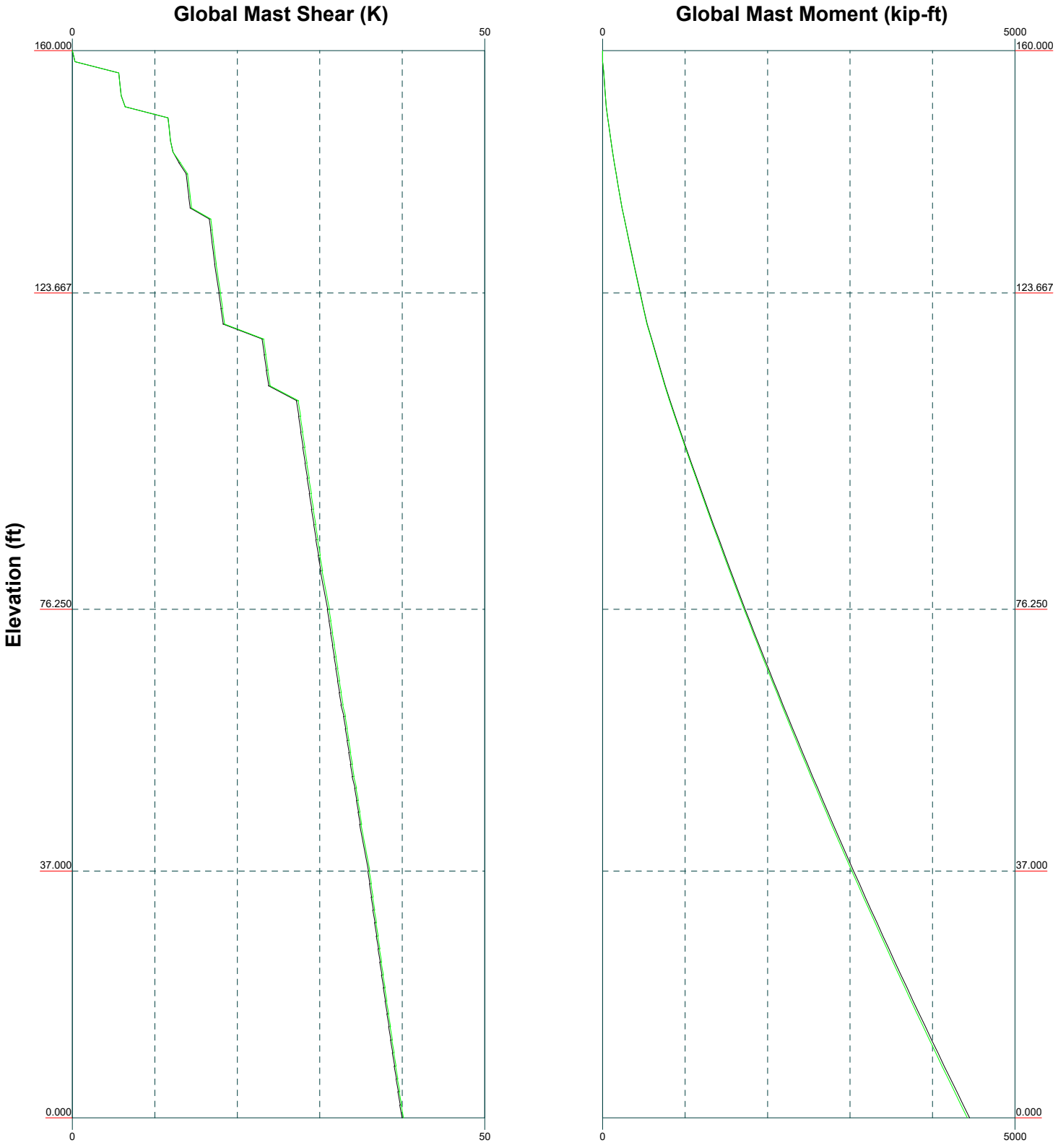
B+T Group
1717 S Boulder Ave, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 587-4630

Job: 81363.023.01 - HRT 082 943274, PA (BU# 806382			
Project:			
Client: Crown Castle	Drawn by: GURUPRASAD	App'd:	
Code: TIA-222-H	Date: 07/31/21	Scale: NTS	
Path:		Dwg No. E-1	

TIA-222-H - 130 mph/50 mph 1.500 in Ice Exposure B

Maximum Values

Vx Vz Mx Mz



B+T Group
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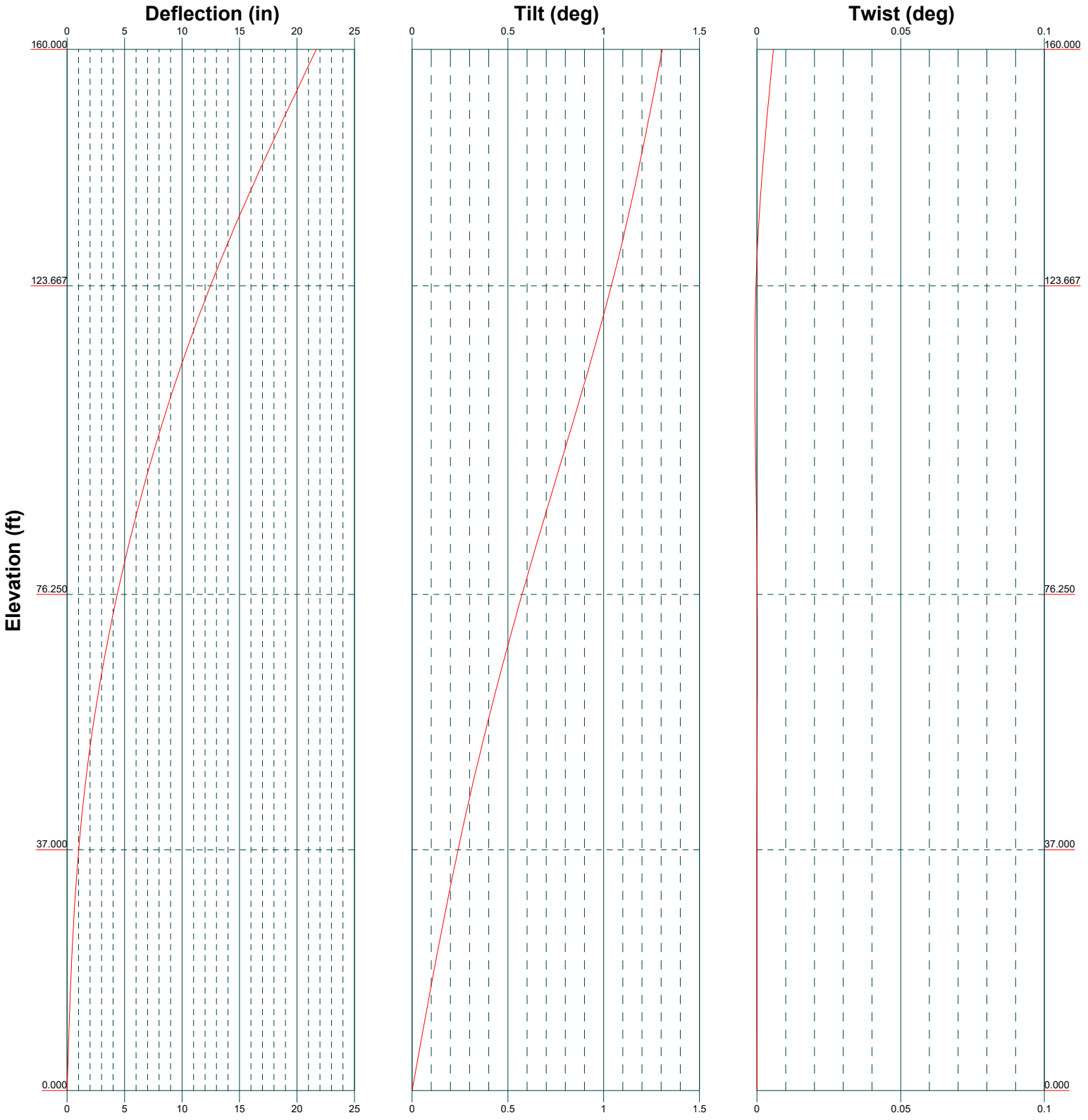
Job: 81363.023.01 - HRT 082 943274, PA (BU# 806382			
Project:			
Client: Crown Castle	Drawn by: GURUPRASAD	App'd:	
Code: TIA-222-H	Date: 07/31/21	Scale: NTS	
Path:		Dwg No. E-4	

TIA-222-H - Service - 60 mph

Maximum Values



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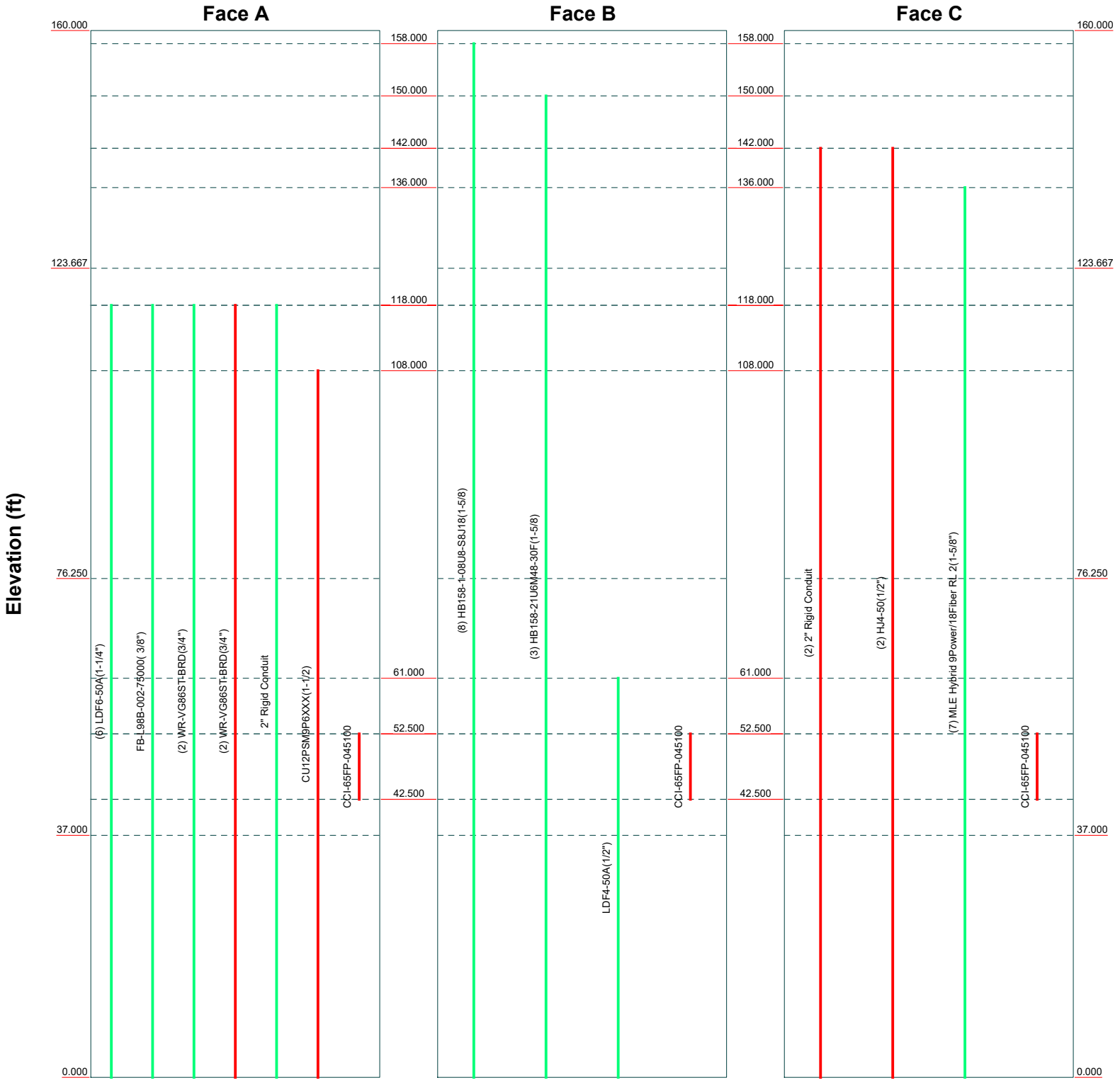
Job: 81363.023.01 - HRT 082 943274, PA (BU# 806382			
Project:			
Client: Crown Castle	Drawn by: GURUPRASAD	App'd:	
Code: TIA-222-H	Date: 07/31/21	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart
0' - 160'

Round | Flat | App In Face | App Out Face | Truss Leg



B+T GRP

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Job: *81363.023.01 - HRT 082 943274, PA (BU# 806382*			
Project:			
Client: Crown Castle	Drawn by: GURUPRASAD	App'd:	
Code: TIA-222-H	Date: 07/31/21	Scale: NTS	
Path:		Dwg No. E-7	

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower is located in Middlesex County, Connecticut.
Tower base elevation above sea level: 317.000 ft.
Basic wind speed of 130 mph.
Risk Category II.
Exposure Category B.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.000 ft.
Nominal ice thickness of 1.500 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
TIA-222-H Annex S.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Tower analysis based on target reliabilities in accordance with Annex S.
Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
Maximum demand-capacity ratio is: 1.05.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

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	160.000-123.667	36.333	4.333	12	18.870	29.050	0.188	0.750	A572-65 (65 ksi)
L2	123.667-76.250	51.750	5.750	12	27.461	41.950	0.313	1.250	A572-65 (65 ksi)
L3	76.250-37.000	45.000	7.000	12	39.715	52.320	0.344	1.375	A572-65 (65 ksi)
L4	37.000-0.000	44.000		12	49.672	62.000	0.406	1.625	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	It/Q in^2	w in	w/t
L1	19.470	11.280	502.514	6.688	9.775	51.410	1018.229	5.551	4.555	24.292
	30.009	17.426	1852.870	10.333	15.048	123.131	3754.417	8.576	7.283	38.842
L2	29.575	27.318	2569.965	9.719	14.225	180.668	5207.445	13.445	6.522	20.871
	43.320	41.898	9271.410	14.906	21.730	426.662	18786.390	20.621	10.405	33.296
L3	42.662	43.579	8622.350	14.095	20.572	419.122	17471.219	21.448	9.722	28.283
	54.044	57.531	19838.067	18.607	27.102	731.984	40197.302	28.315	13.101	38.111
L4	53.311	64.445	19964.737	17.637	25.730	775.933	40453.969	31.718	12.223	30.088
	64.044	80.572	39016.215	22.051	32.116	1214.853	79057.429	39.655	15.527	38.221

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 160.000-123.667				1	1	1			
L2 123.667-76.250				1	1	1			
L3 76.250-37.000				1	1	1			
L4 37.000-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
* *										
2" Rigid Conduit	C	No	Surface Ar (CaAa)	142.000 - 0.000	2	2	0.100 0.200	2.000		0.003
HJ4-50(1/2")	C	No	Surface Ar	142.000 -	2	2	0.200	0.580		0.000

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
			(CaAa)	0.000			0.250			
*										
WR-VG86ST-BRD(3/4")	A	No	Surface Ar (CaAa)	118.000 - 0.000	2	1	-0.470 -0.450	0.795		0.001
*										
CU12PSM9P6XXX(1-1/2)	A	No	Surface Ar (CaAa)	108.000 - 0.000	1	1	0.200 0.250	1.600		0.002
*										
*										
*										
CCI-65FP-045100	A	No	Surface Af (CaAa)	52.500 - 42.500	1	1	0.450 0.500	4.500	11.000	0.015
CCI-65FP-045100	B	No	Surface Af (CaAa)	52.500 - 42.500	1	1	0.450 0.500	4.500	11.000	0.015
CCI-65FP-045100	C	No	Surface Af (CaAa)	52.500 - 42.500	1	1	0.450 0.500	4.500	11.000	0.015
*										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
HB158-1-08U8-S8J18(1-5/8)	B	No	No	Inside Pole	158.000 - 0.000	8	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
HB158-21U6M48-30F(1-5/8)	B	No	No	Inside Pole	150.000 - 0.000	3	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002
							2" Ice	0.000	0.002
*									
MLE Hybrid 9Power/18Fiber RL 2(1-5/8")	C	No	No	Inside Pole	136.000 - 0.000	7	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
LDF6-50A(1-1/4")	A	No	No	Inside Pole	118.000 - 0.000	6	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
FB-L98B-002-75000 (3/8")	A	No	No	Inside Pole	118.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
							2" Ice	0.000	0.000
WR-VG86ST-BRD(3/4")	A	No	No	Inside Pole	118.000 - 0.000	2	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
*									
2" Rigid Conduit	A	No	No	Inside Pole	118.000 - 0.000	1	No Ice	0.000	0.003
							1/2" Ice	0.000	0.003
							1" Ice	0.000	0.003
							2" Ice	0.000	0.003
*									
LDF4-50A(1/2")	B	No	No	Inside Pole	61.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
							1" Ice	0.000	0.000
							2" Ice	0.000	0.000
*									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	160.000-123.667	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.546
		C	0.000	0.000	9.460	0.000	0.204
L2	123.667-76.250	A	0.000	0.000	8.399	0.000	0.457
		B	0.000	0.000	0.000	0.000	0.833
		C	0.000	0.000	24.467	0.000	0.644
L3	76.250-37.000	A	0.000	0.000	16.900	0.000	0.605
		B	0.000	0.000	7.500	0.000	0.846
		C	0.000	0.000	27.753	0.000	0.687
L4	37.000-0.000	A	0.000	0.000	8.861	0.000	0.426
		B	0.000	0.000	0.000	0.000	0.656
		C	0.000	0.000	19.092	0.000	0.503

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	160.000-123.667	A	1.474	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.546
		C		0.000	0.000	25.336	0.000	0.448
L2	123.667-76.250	A	1.423	0.000	0.000	30.067	0.000	0.974
		B		0.000	0.000	0.000	0.000	0.833
		C		0.000	0.000	65.530	0.000	1.274
L3	76.250-37.000	A	1.345	0.000	0.000	40.906	0.000	1.204
		B		0.000	0.000	9.167	0.000	0.937
		C		0.000	0.000	62.407	0.000	1.274
L4	37.000-0.000	A	1.200	0.000	0.000	28.769	0.000	0.865
		B		0.000	0.000	0.000	0.000	0.656
		C		0.000	0.000	48.749	0.000	0.937

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	160.000-123.667	-0.562	1.550	-0.880	2.264
L2	123.667-76.250	-1.561	2.168	-2.577	3.037

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L3	76.250-37.000	-1.574	1.805	-2.852	2.795
L4	37.000-0.000	-1.813	2.078	-3.251	3.209

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	6	2" Rigid Conduit	123.67 - 142.00	1.0000	1.0000
L1	7	HJ4-50(1/2")	123.67 - 142.00	1.0000	1.0000
L2	6	2" Rigid Conduit	76.25 - 123.67	1.0000	1.0000
L2	7	HJ4-50(1/2")	76.25 - 123.67	1.0000	1.0000
L2	15	WR-VG86ST-BRD(3/4")	76.25 - 118.00	1.0000	1.0000
L2	21	CU12PSM9P6XXX(1-1/2)	76.25 - 108.00	1.0000	1.0000
L3	6	2" Rigid Conduit	37.00 - 76.25	1.0000	1.0000
L3	7	HJ4-50(1/2")	37.00 - 76.25	1.0000	1.0000
L3	15	WR-VG86ST-BRD(3/4")	37.00 - 76.25	1.0000	1.0000
L3	21	CU12PSM9P6XXX(1-1/2)	37.00 - 76.25	1.0000	1.0000
L3	31	CCI-65FP-045100	42.50 - 52.50	1.0000	1.0000
L3	32	CCI-65FP-045100	42.50 - 52.50	1.0000	1.0000
L3	33	CCI-65FP-045100	42.50 - 52.50	1.0000	1.0000
L4	6	2" Rigid Conduit	0.00 - 37.00	1.0000	1.0000
L4	7	HJ4-50(1/2")	0.00 - 37.00	1.0000	1.0000
L4	15	WR-VG86ST-BRD(3/4")	0.00 - 37.00	1.0000	1.0000
L4	21	CU12PSM9P6XXX(1-1/2)	0.00 - 37.00	1.0000	1.0000

Effective Width of Flat Linear Attachments / Feed Lines

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L3	31	CCI-65FP-045100	42.50 - 52.50	Auto	0.0000
L3	32	CCI-65FP-045100	42.50 - 52.50	Auto	0.0000
L3	33	CCI-65FP-045100	42.50 - 52.50	Auto	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
DB846H80E-SX w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	158.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.120 4.760 5.420 6.780	6.380 7.050 7.740 9.170	0.052 0.104 0.166 0.325
DB846H80E-SX w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	158.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.120 4.760 5.420 6.780	6.380 7.050 7.740 9.170	0.052 0.104 0.166 0.325
(2) DB846F65ZAXY w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	158.000	No Ice 1/2" Ice 1" Ice 2" Ice	6.100 6.800 7.510 8.980	6.810 7.520 8.240 9.730	0.058 0.119 0.191 0.369
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	158.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.090 4.490 4.890 5.720	3.300 3.680 4.070 4.870	0.066 0.130 0.204 0.386
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	158.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.090 4.490 4.890 5.720	3.300 3.680 4.070 4.870	0.066 0.130 0.204 0.386
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	158.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.090 4.490 4.890 5.720	3.300 3.680 4.070 4.870	0.066 0.130 0.204 0.386
(2) RFV01U-D1A	A	From Leg	4.000 0.000 2.000	0.000	158.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.875 2.045 2.223 2.601	1.250 1.393 1.543 1.865	0.084 0.103 0.124 0.175
RFV01U-D1A	B	From Leg	4.000 0.000 2.000	0.000	158.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.875 2.045 2.223 2.601	1.250 1.393 1.543 1.865	0.084 0.103 0.124 0.175
RFV01U-D2A	B	From Leg	4.000 0.000 2.000	0.000	158.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.875 2.045 2.223 2.601	1.013 1.145 1.284 1.585	0.070 0.087 0.106 0.153
(2) RFV01U-D2A	C	From Leg	4.000 0.000 2.000	0.000	158.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.875 2.045 2.223 2.601	1.013 1.145 1.284 1.585	0.070 0.087 0.106 0.153
RRFDC-3315-PF-48	A	From Leg	4.000 0.000 2.000	0.000	158.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.364 3.597 3.838 4.343	2.192 2.395 2.606 3.049	0.032 0.061 0.093 0.168
RRFDC-3315-PF-48	C	From Leg	4.000 0.000 2.000	0.000	158.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.364 3.597 3.838 4.343	2.192 2.395 2.606 3.049	0.032 0.061 0.093 0.168
Sub6 Antenna - VZS01 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	158.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.915 5.264 5.623 6.371	2.687 3.151 3.631 4.639	0.101 0.141 0.186 0.294
Sub6 Antenna - VZS01 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	158.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.915 5.264 5.623 6.371	2.687 3.151 3.631 4.639	0.101 0.141 0.186 0.294

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Sub6 Antenna - VZS01 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	158.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.915 5.264 5.623 6.371	2.687 3.151 3.631 4.639	0.101 0.141 0.186 0.294
6' x 2" Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	158.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.022 0.033 0.048 0.090
6' x 2" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	158.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.022 0.033 0.048 0.090
Side Arm Mount [SO 102-3]	C	None		0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	3.600 4.180 4.750 5.900	0.075 0.105 0.135 0.195
Platform Mount [LP 713-1]	C	None		0.000	158.000	No Ice 1/2" Ice 1" Ice 2" Ice	32.890 35.760 38.760 45.260	32.890 35.760 38.760 45.260	1.510 2.228 3.026 4.865
*									
AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.190 5.590 6.020 6.900	2.710 3.040 3.380 4.120	0.128 0.174 0.227 0.354
AIR6449 B41_T-MOBILE w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.190 5.590 6.020 6.900	2.710 3.040 3.380 4.120	0.128 0.174 0.227 0.354
AIR6449 B41_T-MOBILE w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.190 5.590 6.020 6.900	2.710 3.040 3.380 4.120	0.128 0.174 0.227 0.354
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	6.290 6.860 7.450 8.680	2.760 3.270 3.790 4.900	0.061 0.105 0.157 0.290
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	6.290 6.860 7.450 8.680	2.760 3.270 3.790 4.900	0.061 0.105 0.157 0.290
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	6.290 6.860 7.450 8.680	2.760 3.270 3.790 4.900	0.061 0.105 0.157 0.290
APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	14.690 15.460 16.230 17.820	6.870 7.550 8.250 9.670	0.183 0.311 0.453 0.782
APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	14.690 15.460 16.230 17.820	6.870 7.550 8.250 9.670	0.183 0.311 0.453 0.782
APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	14.690 15.460 16.230 17.820	6.870 7.550 8.250 9.670	0.183 0.311 0.453 0.782

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RADIO 4460 B2/B25 B66_TMO	A	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.139 2.321 2.511 2.912	1.686 1.850 2.022 2.387	0.109 0.131 0.156 0.217
RADIO 4460 B2/B25 B66_TMO	B	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.139 2.321 2.511 2.912	1.686 1.850 2.022 2.387	0.109 0.131 0.156 0.217
RADIO 4460 B2/B25 B66_TMO	C	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.139 2.321 2.511 2.912	1.686 1.850 2.022 2.387	0.109 0.131 0.156 0.217
RADIO 4480 B71_TMO	A	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.852 3.064 3.284 3.745	1.383 1.543 1.710 2.073	0.093 0.114 0.139 0.199
RADIO 4480 B71_TMO	B	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.852 3.064 3.284 3.745	1.383 1.543 1.710 2.073	0.093 0.114 0.139 0.199
RADIO 4480 B71_TMO	C	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.852 3.064 3.284 3.745	1.383 1.543 1.710 2.073	0.093 0.114 0.139 0.199
L 2.5x2.5x1/4x12'	A	From Leg	4.000 0.000 0.000	0.000	153.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.000 6.363 7.738 10.525	0.500 1.842 3.196 5.941	0.062 0.079 0.106 0.191
L 2.5x2.5x1/4x12'	B	From Leg	4.000 0.000 0.000	0.000	153.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.000 6.363 7.738 10.525	0.500 1.842 3.196 5.941	0.062 0.079 0.106 0.191
L 2.5x2.5x1/4x12'	C	From Leg	4.000 0.000 0.000	0.000	153.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.000 6.363 7.738 10.525	0.500 1.842 3.196 5.941	0.062 0.079 0.106 0.191
(2) 8' x 2.375" Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.900 2.728 3.401 4.396	1.900 2.728 3.401 4.396	0.029 0.044 0.063 0.119
(2) 8' x 2.375" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.900 2.728 3.401 4.396	1.900 2.728 3.401 4.396	0.029 0.044 0.063 0.119
(2) 8' x 2.375" Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.900 2.728 3.401 4.396	1.900 2.728 3.401 4.396	0.029 0.044 0.063 0.119
Platform Mount [LP 713-1]	C	None		0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	32.890 35.760 38.760 45.260	32.890 35.760 38.760 45.260	1.510 2.228 3.026 4.865
*									
(2) 6' x 3" Mount Pipe	A	From Leg	2.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.767 2.129 2.501 3.272	1.767 2.129 2.501 3.272	0.030 0.044 0.061 0.109

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) 6' x 3" Mount Pipe	B	From Leg	2.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.767 2.129 2.501 3.272	1.767 2.129 2.501 3.272	0.030 0.044 0.061 0.109
(2) 6' x 3" Mount Pipe	C	From Leg	2.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.767 2.129 2.501 3.272	1.767 2.129 2.501 3.272	0.030 0.044 0.061 0.109
4' x 2" Horizontal Pipe Mount	B	From Face	0.500 0.000 0.000	0.000	145.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.785 1.028 1.281 1.814	0.785 1.028 1.281 1.814	0.029 0.035 0.044 0.072
4' x 2" Horizontal Pipe Mount	C	From Face	0.500 0.000 0.000	0.000	145.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.785 1.028 1.281 1.814	0.785 1.028 1.281 1.814	0.029 0.035 0.044 0.072
J-Box - 1' x 1' x 4"	C	From Leg	0.500 0.000 0.000	0.000	145.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.133 2.315 2.504 2.904	1.200 1.343 1.493 1.815	0.020 0.039 0.061 0.114
Side Arm Mount [SO 101-3]	C	None		0.000	142.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.810 6.950 8.280 11.540	5.810 6.950 8.280 11.540	0.252 0.341 0.457 0.780
*									
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	136.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.140 3.450 3.770 4.430	2.590 2.880 3.190 3.840	0.111 0.163 0.224 0.374
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	136.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.140 3.450 3.770 4.430	2.590 2.880 3.190 3.840	0.111 0.163 0.224 0.374
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	136.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.140 3.450 3.770 4.430	2.590 2.880 3.190 3.840	0.111 0.163 0.224 0.374
SBNH-1D65C-SR w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	136.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.560 6.070 6.590 7.660	4.470 4.970 5.480 6.520	0.083 0.165 0.260 0.493
SBNH-1D65C-SR w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	136.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.560 6.070 6.590 7.660	4.470 4.970 5.480 6.520	0.083 0.165 0.260 0.493
SBNH-1D65C-SR w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	136.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.560 6.070 6.590 7.660	4.470 4.970 5.480 6.520	0.083 0.165 0.260 0.493
RRUS 11 B2	A	From Leg	4.000 0.000 1.000	0.000	136.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.833 3.043 3.259 3.715	1.182 1.330 1.485 1.826	0.051 0.072 0.095 0.153
RRUS 11 B2	B	From Leg	4.000 0.000 1.000	0.000	136.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.833 3.043 3.259 3.715	1.182 1.330 1.485 1.826	0.051 0.072 0.095 0.153

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RRUS 11 B2	C	From Leg	4.000 0.000 1.000	0.000	136.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.833 3.043 3.259 3.715	1.182 1.330 1.485 1.826	0.051 0.072 0.095 0.153
RRUS 11 B12	A	From Leg	4.000 0.000 1.000	0.000	136.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.833 3.043 3.259 3.715	1.182 1.330 1.485 1.826	0.051 0.072 0.095 0.153
RRUS 11 B12	B	From Leg	4.000 0.000 1.000	0.000	136.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.833 3.043 3.259 3.715	1.182 1.330 1.485 1.826	0.051 0.072 0.095 0.153
RRUS 11 B12	C	From Leg	4.000 0.000 1.000	0.000	136.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.833 3.043 3.259 3.715	1.182 1.330 1.485 1.826	0.051 0.072 0.095 0.153
TMAT1921B78-21A	A	From Leg	4.000 0.000 1.000	0.000	136.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.652 0.755 0.864 1.105	0.300 0.376 0.459 0.648	0.018 0.023 0.030 0.050
TMAT1921B78-21A	B	From Leg	4.000 0.000 1.000	0.000	136.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.652 0.755 0.864 1.105	0.300 0.376 0.459 0.648	0.018 0.023 0.030 0.050
TMAT1921B78-21A	C	From Leg	4.000 0.000 1.000	0.000	136.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.652 0.755 0.864 1.105	0.300 0.376 0.459 0.648	0.018 0.023 0.030 0.050
T-Arm Mount [TA 602-3]	C	None		0.000	136.000	No Ice 1/2" Ice 1" Ice 2" Ice	13.400 16.440 19.700 25.860	13.400 16.440 19.700 25.860	0.774 1.004 1.292 2.053
*									
7770.00 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.746 6.179 6.607 7.488	4.254 5.014 5.711 7.155	0.055 0.103 0.157 0.287
7770.00 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.746 6.179 6.607 7.488	4.254 5.014 5.711 7.155	0.055 0.103 0.157 0.287
7770.00 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.746 6.179 6.607 7.488	4.254 5.014 5.711 7.155	0.055 0.103 0.157 0.287
OPA65R-BU6D w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	12.250 13.000 13.760 15.340	6.050 6.710 7.390 8.790	0.089 0.176 0.275 0.508
OPA65R-BU6D w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	12.250 13.000 13.760 15.340	6.050 6.710 7.390 8.790	0.089 0.176 0.275 0.508
OPA65R-BU6D w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	12.250 13.000 13.760 15.340	6.050 6.710 7.390 8.790	0.089 0.176 0.275 0.508

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
DMP65R-BU6D w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	11.960 12.700 13.460 15.020	5.970 6.630 7.300 8.690	0.115 0.201 0.298 0.529
DMP65R-BU6D w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	11.960 12.700 13.460 15.020	5.970 6.630 7.300 8.690	0.115 0.201 0.298 0.529
DMP65R-BU6D w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	11.960 12.700 13.460 15.020	5.970 6.630 7.300 8.690	0.115 0.201 0.298 0.529
1001940	A	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.176 0.232 0.295 0.444	0.083 0.126 0.178 0.304	0.002 0.004 0.006 0.015
1001940	B	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.176 0.232 0.295 0.444	0.083 0.126 0.178 0.304	0.002 0.004 0.006 0.015
1001940	C	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.176 0.232 0.295 0.444	0.083 0.126 0.178 0.304	0.002 0.004 0.006 0.015
RRUS 8843 B2/B66A_CCIV2	A	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.980 2.157 2.341 2.733	1.695 1.861 2.035 2.405	0.075 0.096 0.119 0.176
RRUS 8843 B2/B66A_CCIV2	B	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.980 2.157 2.341 2.733	1.695 1.861 2.035 2.405	0.075 0.096 0.119 0.176
RRUS 8843 B2/B66A_CCIV2	C	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.980 2.157 2.341 2.733	1.695 1.861 2.035 2.405	0.075 0.096 0.119 0.176
RRUS 4478 B14_CCIV2	A	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.021 2.200 2.386 2.780	1.246 1.396 1.554 1.891	0.059 0.077 0.097 0.147
RRUS 4478 B14_CCIV2	B	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.021 2.200 2.386 2.780	1.246 1.396 1.554 1.891	0.059 0.077 0.097 0.147
RRUS 4478 B14_CCIV2	C	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.021 2.200 2.386 2.780	1.246 1.396 1.554 1.891	0.059 0.077 0.097 0.147
(2) LGP13519	A	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.290 0.362 0.441 0.622	0.181 0.241 0.310 0.473	0.005 0.008 0.012 0.024
(2) LGP13519	B	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.290 0.362 0.441 0.622	0.181 0.241 0.310 0.473	0.005 0.008 0.012 0.024
(2) LGP13519	C	From Leg	4.000	0.000	118.000	No Ice	0.290	0.181	0.005

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1/2" Ice	0.362	0.241	0.008
			2.000			1" Ice	0.441	0.310	0.012
						2" Ice	0.622	0.473	0.024
RRUS 4449 B5/B12	A	From Leg	4.000	0.000	118.000	No Ice	1.968	1.408	0.071
			0.000			1/2" Ice	2.144	1.564	0.090
			2.000			1" Ice	2.328	1.727	0.111
						2" Ice	2.718	2.075	0.163
RRUS 4449 B5/B12	B	From Leg	4.000	0.000	118.000	No Ice	1.968	1.408	0.071
			0.000			1/2" Ice	2.144	1.564	0.090
			2.000			1" Ice	2.328	1.727	0.111
						2" Ice	2.718	2.075	0.163
RRUS 4449 B5/B12	C	From Leg	4.000	0.000	118.000	No Ice	1.968	1.408	0.071
			0.000			1/2" Ice	2.144	1.564	0.090
			2.000			1" Ice	2.328	1.727	0.111
						2" Ice	2.718	2.075	0.163
DC6-48-60-18-8F	A	From Leg	4.000	0.000	118.000	No Ice	1.212	1.212	0.033
			0.000			1/2" Ice	1.892	1.892	0.055
			2.000			1" Ice	2.105	2.105	0.080
						2" Ice	2.570	2.570	0.138
DC6-48-60-18-8F	C	From Leg	4.000	0.000	118.000	No Ice	1.212	1.212	0.033
			0.000			1/2" Ice	1.892	1.892	0.055
			2.000			1" Ice	2.105	2.105	0.080
						2" Ice	2.570	2.570	0.138
3' x 2" Pipe Mount	A	From Leg	4.000	0.000	118.000	No Ice	0.583	0.583	0.011
			0.000			1/2" Ice	0.770	0.770	0.017
			2.000			1" Ice	0.967	0.967	0.024
						2" Ice	1.388	1.388	0.047
3' x 2" Pipe Mount	B	From Leg	4.000	0.000	118.000	No Ice	0.583	0.583	0.011
			0.000			1/2" Ice	0.770	0.770	0.017
			2.000			1" Ice	0.967	0.967	0.024
						2" Ice	1.388	1.388	0.047
(2) 3' x 2" Pipe Mount	C	From Leg	4.000	0.000	118.000	No Ice	0.583	0.583	0.011
			0.000			1/2" Ice	0.770	0.770	0.017
			2.000			1" Ice	0.967	0.967	0.024
						2" Ice	1.388	1.388	0.047
Platform Mount [LP 304-1_HR-1]	C	None		0.000	118.000	No Ice	21.410	21.410	1.605
						1/2" Ice	26.620	26.620	2.056
						1" Ice	31.660	31.660	2.598
						2" Ice	41.380	41.380	3.958
*									
MX08FRO665-20 w/ Mount Pipe	A	From Leg	4.000	0.000	108.000	No Ice	8.010	4.230	0.098
			0.000			1/2" Ice	8.520	4.690	0.184
			0.000			1" Ice	9.040	5.160	0.281
						2" Ice	10.110	6.120	0.512
MX08FRO665-20 w/ Mount Pipe	B	From Leg	4.000	0.000	108.000	No Ice	8.010	4.230	0.098
			0.000			1/2" Ice	8.520	4.690	0.184
			0.000			1" Ice	9.040	5.160	0.281
						2" Ice	10.110	6.120	0.512
MX08FRO665-20 w/ Mount Pipe	C	From Leg	4.000	0.000	108.000	No Ice	8.010	4.230	0.098
			0.000			1/2" Ice	8.520	4.690	0.184
			0.000			1" Ice	9.040	5.160	0.281
						2" Ice	10.110	6.120	0.512
TA08025-B604	A	From Leg	4.000	0.000	108.000	No Ice	1.964	0.981	0.064
			0.000			1/2" Ice	2.138	1.112	0.081
			0.000			1" Ice	2.320	1.250	0.100
						2" Ice	2.705	1.548	0.148
TA08025-B604	B	From Leg	4.000	0.000	108.000	No Ice	1.964	0.981	0.064

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1/2" Ice	2.138	1.112	0.081
			0.000			1" Ice	2.320	1.250	0.100
						2" Ice	2.705	1.548	0.148
TA08025-B604	C	From Leg	4.000	0.000	108.000	No Ice	1.964	0.981	0.064
			0.000			1/2" Ice	2.138	1.112	0.081
			0.000			1" Ice	2.320	1.250	0.100
						2" Ice	2.705	1.548	0.148
TA08025-B605	A	From Leg	4.000	0.000	108.000	No Ice	1.964	1.129	0.075
			0.000			1/2" Ice	2.138	1.267	0.093
			0.000			1" Ice	2.320	1.411	0.114
						2" Ice	2.705	1.723	0.164
TA08025-B605	B	From Leg	4.000	0.000	108.000	No Ice	1.964	1.129	0.075
			0.000			1/2" Ice	2.138	1.267	0.093
			0.000			1" Ice	2.320	1.411	0.114
						2" Ice	2.705	1.723	0.164
TA08025-B605	C	From Leg	4.000	0.000	108.000	No Ice	1.964	1.129	0.075
			0.000			1/2" Ice	2.138	1.267	0.093
			0.000			1" Ice	2.320	1.411	0.114
						2" Ice	2.705	1.723	0.164
RDIDC-9181-PF-48	A	From Leg	4.000	0.000	108.000	No Ice	2.012	1.168	0.022
			0.000			1/2" Ice	2.189	1.311	0.040
			0.000			1" Ice	2.373	1.461	0.060
						2" Ice	2.763	1.784	0.110
8'x2" Antenna Mount Pipe	A	From Leg	2.000	0.000	108.000	No Ice	1.900	1.900	0.030
			0.000			1/2" Ice	2.728	2.728	0.044
			0.000			1" Ice	3.401	3.401	0.064
						2" Ice	4.396	4.396	0.120
(2) 8'x2" Antenna Mount Pipe	A	From Leg	4.000	0.000	108.000	No Ice	1.900	1.900	0.030
			0.000			1/2" Ice	2.728	2.728	0.044
			0.000			1" Ice	3.401	3.401	0.064
						2" Ice	4.396	4.396	0.120
(2) 8'x2" Antenna Mount Pipe	B	From Leg	4.000	0.000	108.000	No Ice	1.900	1.900	0.030
			0.000			1/2" Ice	2.728	2.728	0.044
			0.000			1" Ice	3.401	3.401	0.064
						2" Ice	4.396	4.396	0.120
(2) 8'x2" Antenna Mount Pipe	C	From Leg	4.000	0.000	108.000	No Ice	1.900	1.900	0.030
			0.000			1/2" Ice	2.728	2.728	0.044
			0.000			1" Ice	3.401	3.401	0.064
						2" Ice	4.396	4.396	0.120
Commscope MC-PK8-DSH	A	None		0.000	108.000	No Ice	34.240	34.240	1.749
						1/2" Ice	62.950	62.950	2.099
						1" Ice	91.660	91.660	2.450
						2" Ice	149.080	149.080	3.151
*									
KS24019-L112A	A	From Leg	3.000	0.000	61.000	No Ice	0.141	0.141	0.005
			0.000			1/2" Ice	0.198	0.198	0.007
			0.000			1" Ice	0.262	0.262	0.009
						2" Ice	0.415	0.415	0.018
2' x 2" Pipe Mount	A	From Leg	3.000	0.000	61.000	No Ice	0.023	0.023	0.007
			0.000			1/2" Ice	0.049	0.049	0.008
			0.000			1" Ice	0.085	0.085	0.009
						2" Ice	0.186	0.186	0.013
2' x 2" Pipe Mount	C	From Leg	3.000	0.000	61.000	No Ice	0.023	0.023	0.007
			0.000			1/2" Ice	0.049	0.049	0.008
			0.000			1" Ice	0.085	0.085	0.009
						2" Ice	0.186	0.186	0.013
Side Arm Mount [SO 701-1]	A	From Leg	1.500	0.000	61.000	No Ice	0.850	1.670	0.065

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
						2" Ice	2.010	4.350	0.121
Side Arm Mount [SO 701-1]	C	From Leg	1.500	0.000	61.000	No Ice	0.850	1.670	0.065
			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
						2" Ice	2.010	4.350	0.121
*									
2' x 2" Pipe Mount	A	From Leg	3.000	0.000	50.000	No Ice	0.023	0.023	0.007
			0.000			1/2" Ice	0.049	0.049	0.008
			0.000			1" Ice	0.085	0.085	0.009
						2" Ice	0.186	0.186	0.013
2' x 2" Pipe Mount	C	From Leg	3.000	0.000	50.000	No Ice	0.023	0.023	0.007
			0.000			1/2" Ice	0.049	0.049	0.008
			0.000			1" Ice	0.085	0.085	0.009
						2" Ice	0.186	0.186	0.013
Side Arm Mount [SO 701-1]	A	From Leg	1.500	0.000	50.000	No Ice	0.850	1.670	0.065
			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
						2" Ice	2.010	4.350	0.121
Side Arm Mount [SO 701-1]	C	From Leg	1.500	0.000	50.000	No Ice	0.850	1.670	0.065
			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
						2" Ice	2.010	4.350	0.121
*									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
Radiowaves HP3-11	B	Paraboloid w/Shroud (HP)	From Leg	2.000	70.000		142.000	3.167	No Ice	7.876	0.050
				0.000					1/2" Ice	8.296	0.093
				2.000					1" Ice	8.716	0.135
									2" Ice	9.556	0.220
Radiowaves HP3-11	C	Paraboloid w/Shroud (HP)	From Leg	2.000	78.000		142.000	3.167	No Ice	7.876	0.050
				0.000					1/2" Ice	8.296	0.093
				2.000					1" Ice	8.716	0.135
									2" Ice	9.556	0.220
*											

Load Combinations

Comb. No.	Description
1	Dead Only

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	160 - 123.667	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-30.475	1.761	-1.259
			Max. Mx	8	-11.839	-377.275	-1.257
			Max. My	14	-11.814	-1.096	-380.111

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	8	17.273	-377.275	-1.257
			Max. Vx	2	-17.448	0.475	379.996
			Max. Torque	11			-2.124
L2	123.667 - 76.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-57.938	3.591	-1.310
			Max. Mx	8	-27.576	-1539.522	-6.655
			Max. My	2	-27.553	3.694	1551.573
			Max. Vy	8	30.129	-1539.522	-6.655
			Max. Vx	2	-30.336	3.694	1551.573
			Max. Torque	11			-2.213
L3	76.25 - 37	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-74.139	5.511	-1.662
			Max. Mx	8	-39.699	-2774.303	-11.316
			Max. My	2	-39.689	7.057	2794.598
			Max. Vy	8	34.905	-2774.303	-11.316
			Max. Vx	2	-35.080	7.057	2794.598
			Max. Torque	15			-2.303
L4	37 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-96.642	6.976	-2.815
			Max. Mx	8	-57.569	-4422.153	-17.801
			Max. My	2	-57.569	11.074	4449.842
			Max. Vy	8	39.986	-4422.153	-17.801
			Max. Vx	2	-40.154	11.074	4449.842
			Max. Torque	15			-2.302

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	33	96.642	-0.029	-8.600
	Max. H_x	20	57.591	39.909	0.048
	Max. H_z	3	43.193	0.081	40.122
	Max. M_x	2	4449.842	0.081	40.122
	Max. M_z	8	4422.153	-39.954	-0.133
	Max. Torsion	3	1.874	0.081	40.122
	Min. Vert	7	43.193	-34.534	20.116
	Min. H_x	9	43.193	-39.954	-0.133
	Min. H_z	15	43.193	-0.142	-40.096
	Min. M_x	14	-4447.923	-0.142	-40.096
	Min. M_z	20	-4419.321	39.909	0.048
	Min. Torsion	15	-2.300	-0.142	-40.096

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	47.993	0.000	0.000	0.766	1.574	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	57.591	-0.081	-40.122	-4449.842	11.074	-1.868
0.9 Dead+1.0 Wind 0 deg - No	43.193	-0.081	-40.122	-4401.935	10.473	-1.874

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Ice						
1.2 Dead+1.0 Wind 30 deg - No Ice	57.591	19.884	-34.804	-3863.712	-2198.736	-1.442
0.9 Dead+1.0 Wind 30 deg - No Ice	43.193	19.884	-34.804	-3822.128	-2175.458	-1.446
1.2 Dead+1.0 Wind 60 deg - No Ice	57.591	34.534	-20.116	-2235.560	-3820.865	0.015
0.9 Dead+1.0 Wind 60 deg - No Ice	43.193	34.534	-20.116	-2211.576	-3780.059	0.013
1.2 Dead+1.0 Wind 90 deg - No Ice	57.591	39.954	0.133	17.801	-4422.153	1.329
0.9 Dead+1.0 Wind 90 deg - No Ice	43.193	39.954	0.133	17.373	-4374.836	1.330
1.2 Dead+1.0 Wind 120 deg - No Ice	57.591	34.592	20.177	2241.220	-3826.464	1.802
0.9 Dead+1.0 Wind 120 deg - No Ice	43.193	34.592	20.177	2216.739	-3785.606	1.805
1.2 Dead+1.0 Wind 150 deg - No Ice	57.591	19.962	34.784	3859.575	-2205.042	2.113
0.9 Dead+1.0 Wind 150 deg - No Ice	43.193	19.962	34.784	3817.593	-2181.719	2.118
1.2 Dead+1.0 Wind 180 deg - No Ice	57.591	0.142	40.096	4447.923	-16.374	2.295
0.9 Dead+1.0 Wind 180 deg - No Ice	43.193	0.142	40.096	4399.570	-16.677	2.300
1.2 Dead+1.0 Wind 210 deg - No Ice	57.591	-19.821	34.719	3852.856	2193.170	1.623
0.9 Dead+1.0 Wind 210 deg - No Ice	43.193	-19.821	34.719	3810.932	2168.987	1.628
1.2 Dead+1.0 Wind 240 deg - No Ice	57.591	-34.537	20.033	2224.811	3825.281	0.103
0.9 Dead+1.0 Wind 240 deg - No Ice	43.193	-34.537	20.033	2200.493	3783.441	0.105
1.2 Dead+1.0 Wind 270 deg - No Ice	57.591	-39.909	-0.048	-3.144	4419.321	-1.078
0.9 Dead+1.0 Wind 270 deg - No Ice	43.193	-39.909	-0.048	-3.356	4371.087	-1.078
1.2 Dead+1.0 Wind 300 deg - No Ice	57.591	-34.490	-20.152	-2235.579	3815.110	-1.167
0.9 Dead+1.0 Wind 300 deg - No Ice	43.193	-34.490	-20.152	-2211.628	3773.416	-1.169
1.2 Dead+1.0 Wind 330 deg - No Ice	57.591	-19.902	-34.793	-3859.092	2199.904	-1.547
0.9 Dead+1.0 Wind 330 deg - No Ice	43.193	-19.902	-34.793	-3817.581	2175.674	-1.551
1.2 Dead+1.0 Ice+1.0 Temp	96.642	-0.000	0.000	2.815	6.976	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	96.642	-0.019	-8.604	-1006.184	9.186	-0.415
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	96.642	4.270	-7.459	-872.671	-492.707	-0.365
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	96.642	7.417	-4.307	-503.368	-861.001	-0.106
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	96.642	8.580	0.027	6.279	-997.289	0.157
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	96.642	7.431	4.326	510.413	-862.340	0.294
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	96.642	4.291	7.460	877.697	-494.410	0.408
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	96.642	0.029	8.600	1011.287	3.563	0.489
1.2 Dead+1.0 Wind 210	96.642	-4.259	7.444	876.147	505.401	0.397

Load Combination	Vertical K	Shear$_x$ K	Shear$_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 240	96.642	-7.417	4.293	506.873	875.502	0.127
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 270	96.642	-8.572	-0.013	1.833	1010.482	-0.113
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 300	96.642	-7.414	-4.322	-503.930	873.983	-0.184
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 330	96.642	-4.281	-7.462	-872.153	507.187	-0.310
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	47.993	-0.016	-8.053	-887.331	3.459	-0.387
Dead+Wind 30 deg - Service	47.993	3.991	-6.985	-770.369	-437.497	-0.301
Dead+Wind 60 deg - Service	47.993	6.931	-4.037	-445.475	-761.174	-0.003
Dead+Wind 90 deg - Service	47.993	8.019	0.027	4.156	-881.149	0.268
Dead+Wind 120 deg - Service	47.993	6.943	4.050	447.817	-762.291	0.368
Dead+Wind 150 deg - Service	47.993	4.006	6.981	770.750	-438.753	0.434
Dead+Wind 180 deg - Service	47.993	0.029	8.047	888.152	-2.014	0.474
Dead+Wind 210 deg - Service	47.993	-3.978	6.968	769.401	438.880	0.338
Dead+Wind 240 deg - Service	47.993	-6.932	4.021	444.539	764.545	0.027
Dead+Wind 270 deg - Service	47.993	-8.010	-0.010	-0.022	883.081	-0.216
Dead+Wind 300 deg - Service	47.993	-6.922	-4.045	-445.477	762.517	-0.238
Dead+Wind 330 deg - Service	47.993	-3.994	-6.983	-769.443	440.228	-0.319

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-47.993	0.000	0.000	47.993	0.000	0.000%
2	-0.081	-57.591	-40.122	0.081	57.591	40.122	0.000%
3	-0.081	-43.193	-40.122	0.081	43.193	40.122	0.000%
4	19.884	-57.591	-34.804	-19.884	57.591	34.804	0.000%
5	19.884	-43.193	-34.804	-19.884	43.193	34.804	0.000%
6	34.534	-57.591	-20.116	-34.534	57.591	20.116	0.000%
7	34.534	-43.193	-20.116	-34.534	43.193	20.116	0.000%
8	39.954	-57.591	0.133	-39.954	57.591	-0.133	0.000%
9	39.954	-43.193	0.133	-39.954	43.193	-0.133	0.000%
10	34.592	-57.591	20.177	-34.592	57.591	-20.177	0.000%
11	34.592	-43.193	20.177	-34.592	43.193	-20.177	0.000%
12	19.962	-57.591	34.784	-19.962	57.591	-34.784	0.000%
13	19.962	-43.193	34.784	-19.962	43.193	-34.784	0.000%
14	0.142	-57.591	40.096	-0.142	57.591	-40.096	0.000%
15	0.142	-43.193	40.096	-0.142	43.193	-40.096	0.000%
16	-19.821	-57.591	34.719	19.821	57.591	-34.719	0.000%
17	-19.821	-43.193	34.719	19.821	43.193	-34.719	0.000%
18	-34.537	-57.591	20.033	34.537	57.591	-20.033	0.000%
19	-34.537	-43.193	20.033	34.537	43.193	-20.033	0.000%
20	-39.909	-57.591	-0.048	39.909	57.591	0.048	0.000%
21	-39.909	-43.193	-0.048	39.909	43.193	0.048	0.000%
22	-34.490	-57.591	-20.152	34.490	57.591	20.152	0.000%
23	-34.490	-43.193	-20.152	34.490	43.193	20.152	0.000%
24	-19.902	-57.591	-34.793	19.902	57.591	34.793	0.000%
25	-19.902	-43.193	-34.793	19.902	43.193	34.793	0.000%
26	0.000	-96.642	0.000	0.000	96.642	-0.000	0.000%
27	-0.019	-96.642	-8.604	0.019	96.642	8.604	0.000%
28	4.270	-96.642	-7.459	-4.270	96.642	7.459	0.000%
29	7.416	-96.642	-4.307	-7.417	96.642	4.307	0.000%
30	8.580	-96.642	0.027	-8.580	96.642	-0.027	0.000%
31	7.431	-96.642	4.326	-7.431	96.642	-4.326	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
32	4.291	-96.642	7.460	-4.291	96.642	-7.460	0.000%
33	0.029	-96.642	8.599	-0.029	96.642	-8.600	0.000%
34	-4.259	-96.642	7.444	4.259	96.642	-7.444	0.000%
35	-7.417	-96.642	4.293	7.417	96.642	-4.293	0.000%
36	-8.572	-96.642	-0.013	8.572	96.642	0.013	0.000%
37	-7.414	-96.642	-4.322	7.414	96.642	4.322	0.000%
38	-4.281	-96.642	-7.461	4.281	96.642	7.462	0.000%
39	-0.016	-47.993	-8.053	0.016	47.993	8.053	0.000%
40	3.991	-47.993	-6.985	-3.991	47.993	6.985	0.000%
41	6.931	-47.993	-4.037	-6.931	47.993	4.037	0.000%
42	8.019	-47.993	0.027	-8.019	47.993	-0.027	0.000%
43	6.943	-47.993	4.050	-6.943	47.993	-4.050	0.000%
44	4.006	-47.993	6.981	-4.006	47.993	-6.981	0.000%
45	0.029	-47.993	8.047	-0.029	47.993	-8.047	0.000%
46	-3.978	-47.993	6.968	3.978	47.993	-6.968	0.000%
47	-6.932	-47.993	4.021	6.932	47.993	-4.021	0.000%
48	-8.010	-47.993	-0.010	8.010	47.993	0.010	0.000%
49	-6.922	-47.993	-4.045	6.922	47.993	4.045	0.000%
50	-3.994	-47.993	-6.983	3.994	47.993	6.983	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00005651
3	Yes	4	0.00000001	0.00066291
4	Yes	6	0.00000001	0.00005345
5	Yes	5	0.00000001	0.00044665
6	Yes	6	0.00000001	0.00005408
7	Yes	5	0.00000001	0.00045222
8	Yes	5	0.00000001	0.00006393
9	Yes	4	0.00000001	0.00075120
10	Yes	6	0.00000001	0.00005651
11	Yes	5	0.00000001	0.00047295
12	Yes	6	0.00000001	0.00005251
13	Yes	5	0.00000001	0.00043854
14	Yes	5	0.00000001	0.00005291
15	Yes	4	0.00000001	0.00062680
16	Yes	6	0.00000001	0.00005531
17	Yes	5	0.00000001	0.00046251
18	Yes	6	0.00000001	0.00005469
19	Yes	5	0.00000001	0.00045727
20	Yes	4	0.00000001	0.00090920
21	Yes	4	0.00000001	0.00053610
22	Yes	6	0.00000001	0.00005313
23	Yes	5	0.00000001	0.00044401
24	Yes	6	0.00000001	0.00005575
25	Yes	5	0.00000001	0.00046628
26	Yes	4	0.00000001	0.00004788
27	Yes	5	0.00000001	0.00041019
28	Yes	5	0.00000001	0.00047206
29	Yes	5	0.00000001	0.00047198
30	Yes	5	0.00000001	0.00040516
31	Yes	5	0.00000001	0.00047842
32	Yes	5	0.00000001	0.00047502

33	Yes	5	0.00000001	0.00041334
34	Yes	5	0.00000001	0.00048578
35	Yes	5	0.00000001	0.00048466
36	Yes	5	0.00000001	0.00041304
37	Yes	5	0.00000001	0.00047966
38	Yes	5	0.00000001	0.00048306
39	Yes	4	0.00000001	0.00006891
40	Yes	4	0.00000001	0.00021744
41	Yes	4	0.00000001	0.00022431
42	Yes	4	0.00000001	0.00007010
43	Yes	4	0.00000001	0.00025767
44	Yes	4	0.00000001	0.00021023
45	Yes	4	0.00000001	0.00007488
46	Yes	4	0.00000001	0.00024553
47	Yes	4	0.00000001	0.00023442
48	Yes	4	0.00000001	0.00006462
49	Yes	4	0.00000001	0.00021647
50	Yes	4	0.00000001	0.00025020

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 123.667	21.688	45	1.305	0.006
L2	128 - 76.25	13.458	45	1.074	0.002
L3	82 - 37	5.107	45	0.628	0.001
L4	44 - 0	1.389	45	0.290	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.000	Side Arm Mount [SO 102-3]	45	21.688	1.305	0.006	32682
158.000	DB846H80E-SX w/ Mount Pipe	45	21.149	1.292	0.006	32682
153.000	L 2.5x2.5x1/4x12'	45	19.804	1.259	0.005	23344
150.000	AIR6449 B41_T-MOBILE w/ Mount Pipe	45	19.003	1.238	0.004	16341
145.000	4' x 2" Horizontal Pipe Mount	45	17.684	1.204	0.004	10893
144.000	Radiowaves HP3-11	45	17.423	1.197	0.004	10213
142.000	(2) 6' x 3" Mount Pipe	45	16.905	1.183	0.003	9078
136.000	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	45	15.384	1.138	0.003	6808
118.000	7770.00 w/ Mount Pipe	45	11.253	0.986	0.001	5332
108.000	MX08FRO665-20 w/ Mount Pipe	45	9.272	0.890	0.001	5576
61.000	KS24019-L112A	45	2.705	0.431	0.000	6167
50.000	2' x 2" Pipe Mount	45	1.788	0.338	0.000	6086

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 123.667	108.741	2	6.552	0.028
L2	128 - 76.25	67.508	2	5.395	0.010
L3	82 - 37	25.617	2	3.151	0.003
L4	44 - 0	6.962	2	1.456	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.000	Side Arm Mount [SO 102-3]	2	108.741	6.552	0.028	6673
158.000	DB846H80E-SX w/ Mount Pipe	2	106.040	6.485	0.027	6673
153.000	L 2.5x2.5x1/4x12'	2	99.305	6.318	0.024	4766
150.000	AIR6449 B41_T-MOBILE w/ Mount Pipe	2	95.292	6.217	0.022	3335
145.000	4' x 2" Horizontal Pipe Mount	2	88.682	6.044	0.019	2222
144.000	Radiowaves HP3-11	2	87.375	6.009	0.018	2083
142.000	(2) 6' x 3" Mount Pipe	2	84.778	5.937	0.017	1851
136.000	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	2	77.160	5.715	0.014	1386
118.000	7770.00 w/ Mount Pipe	2	56.452	4.950	0.007	1079
108.000	MX08FRO665-20 w/ Mount Pipe	2	46.519	4.467	0.005	1125
61.000	KS24019-L112A	2	13.567	2.162	0.002	1231
50.000	2' x 2" Pipe Mount	2	8.967	1.694	0.001	1214

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 $\frac{P_u}{\phi P_n}$
L1	160 - 123.667 (1)	TP29.05x18.87x0.188	36.333	0.000	0.0	16.693	-11.813	943.213	0.013
L2	123.667 - 76.25 (2)	TP41.95x27.461x0.313	51.750	0.000	0.0	40.278	-27.553	2356.250	0.012
L3	76.25 - 37 (3)	TP52.32x39.715x0.344	45.000	0.000	0.0	55.361	-39.689	3156.660	0.013
L4	37 - 0 (4)	TP62x49.672x0.406	44.000	0.000	0.0	80.572	-57.569	4464.570	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	160 - 123.667 (1)	TP29.05x18.87x0.188	380.243	531.888	0.715	0.000	531.888	0.000
L2	123.667 -	TP41.95x27.461x0.313	1551.575	2023.500	0.767	0.000	2023.500	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
	76.25 (2)							
L3	76.25 - 37 (3)	TP52.32x39.715x0.344	2794.608	3219.825	0.868	0.000	3219.825	0.000
L4	37 - 0 (4)	TP62x49.672x0.406	4449.858	5609.658	0.793	0.000	5609.658	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	160 - 123.667 (1)	TP29.05x18.87x0.188	17.432	292.958	0.060	0.543	712.485	0.001
L2	123.667 - 76.25 (2)	TP41.95x27.461x0.313	30.336	706.875	0.043	1.521	2488.867	0.001
L3	76.25 - 37 (3)	TP52.32x39.715x0.344	35.080	971.584	0.036	1.870	4274.492	0.000
L4	37 - 0 (4)	TP62x49.672x0.406	40.154	1414.040	0.028	1.868	7661.250	0.000

Pole Interaction Design Data

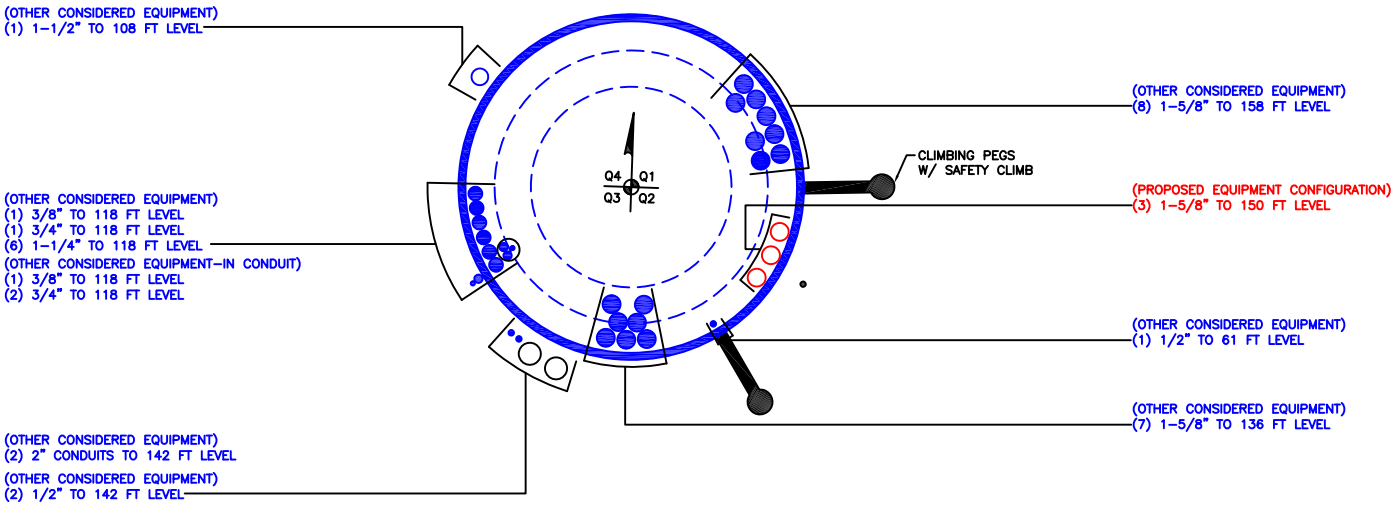
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	160 - 123.667 (1)	0.013	0.715	0.000	0.060	0.001	0.731 ✔	1.050	4.8.2 ✔
L2	123.667 - 76.25 (2)	0.012	0.767	0.000	0.043	0.001	0.780 ✔	1.050	4.8.2 ✔
L3	76.25 - 37 (3)	0.013	0.868	0.000	0.036	0.000	0.882 ✔	1.050	4.8.2 ✔
L4	37 - 0 (4)	0.013	0.793	0.000	0.028	0.000	0.807 ✔	1.050	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	160 - 123.667	Pole	TP29.05x18.87x0.188	1	-11.813	990.374	69.6	Pass
L2	123.667 - 76.25	Pole	TP41.95x27.461x0.313	2	-27.553	2474.062	74.3	Pass
L3	76.25 - 37	Pole	TP52.32x39.715x0.344	3	-39.689	3314.493	84.0	Pass
L4	37 - 0	Pole	TP62x49.672x0.406	4	-57.569	4687.798	76.9	Pass
							Summary	
						Pole (L3)	84.0	Pass
						RATING =	**84.0**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 806382

APPENDIX C

ADDITIONAL CALCULATIONS

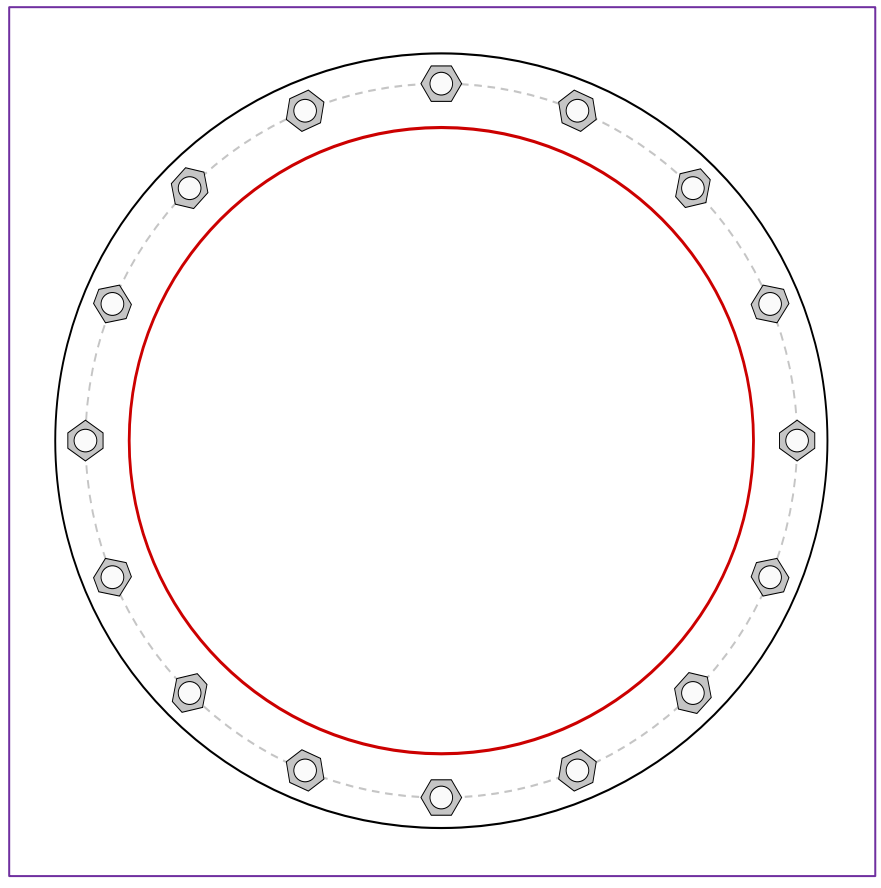
Monopole Base Plate Connection

Site Info	
BU #	806382
Site Name	HRT 082 943274, CT
Order #	575186 Rev#0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	1.75

Applied Loads	
Moment (kip-ft)	4449.86
Axial Force (kips)	57.57
Shear Force (kips)	40.15

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(16) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 70.69" BC

Base Plate Data

76.69" OD x 2.75" Plate (S-128; Fy=60 ksi, Fu=80 ksi)

Stiffener Data

N/A

Pole Data

62" x 0.40625" 12-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_t = 185.17	ϕPn_t = 243.75	**Stress Rating**
Vu = 2.51	ϕVn = 149.1	**72.3%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	22.19	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**39.1%**	**Pass**

Drilled Pier Foundation

BU # :	806382
Site Name:	HRT 082 943274, CT
Order Number:	575186 Rev 0
TIA-222 Revison:	H
Tower Type:	Monopole

Check Limitation	
Apply TIA-222-H Section 15.5:	☑
N/A	☐
Additional Longitudinal Rebar	
Input Effective Depths (else Actual):	☐
Shear Design Options	
Check Shear along Depth of Pier:	☑
Utilize Shear-Friction Methodology:	☐
Override Critical Depth:	☐

Go to Soil Calculations

Applied Loads	Comp.	Uplift
Moment (kip-ft)	4449.86	
Axial Force (kips)	57.57	
Shear Force (kips)	40.15	

Material Properties			Rebar 2, Fy Override (ksi)	Rebar 3, Fy Override (ksi)
Concrete Strength, f'c:	4	ksi		
Rebar Strength, Fy:	60	ksi		
Tie Yield Strength, Fyt:	60	ksi		

Pier Design Data		
Depth	20	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 20' below grade		
Pier Diameter	7.5	ft
Rebar Quantity	36	
Rebar Size	11	
Clear Cover to Ties	4	in
Tie Size	5	
Tie Spacing	9	in

Rebar & Pier Options

Embedded Pole Inputs

Belled Pier Inputs

Analysis Results		
Soil Lateral Check	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	5.00	-
Soil Safety Factor	1.98	-
Max Moment (kip-ft)	4599.41	-
Rating*	*64.0%*	-
Soil Vertical Check	*Compression*	*Uplift*
Skin Friction (kips)	390.26	-
End Bearing (kips)	1079.34	-
Weight of Concrete (kips)	163.02	-
Total Capacity (kips)	1469.60	-
Axial (kips)	220.59	-
Rating*	*14.3%*	-
Reinforced Concrete Flexure	*Compression*	*Uplift*
Critical Depth (ft from TOC)	4.67	-
Critical Moment (kip-ft)	4598.41	-
Critical Moment Capacity	9399.47	-
Rating*	*46.6%*	-
Reinforced Concrete Shear	*Compression*	*Uplift*
Critical Depth (ft from TOC)	15.51	-
Critical Shear (kip)	689.13	-
Critical Shear Capacity	990.45	-
Rating*	*66.3%*	-

Structural Foundation Rating*	**66.3%**
Soil Interaction Rating*	**64.0%**

*Rating per TIA-222-H Section 15.5

Soil Profile

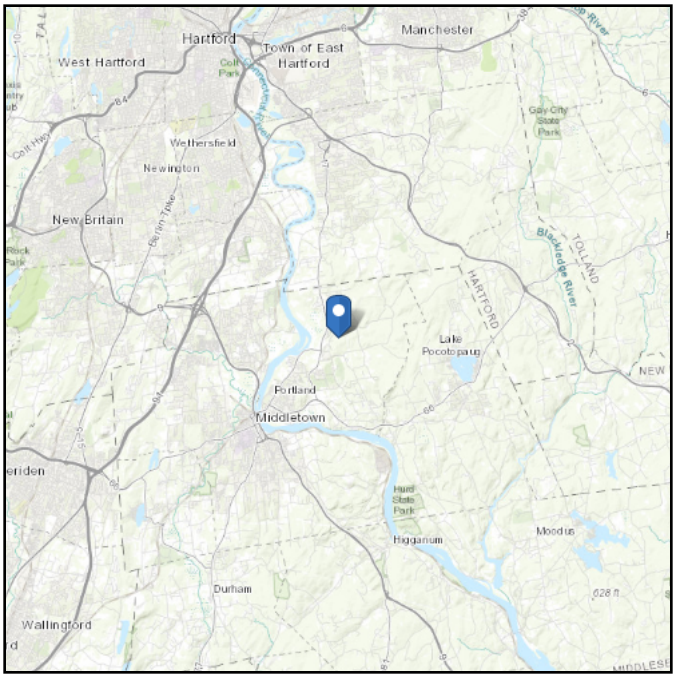
Groundwater Depth	N/A	# of Layers	4

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Net Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	1	1	100	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	1	6	5	110	150	0	34	0.187	0.187				6	Cohesionless
3	6	9.5	3.5	115	150	0	38	0.702	0.702				11	Cohesionless
4	9.5	20	10.5	145	150	0	45	1.780	1.780			30	50	Cohesionless

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-10	**Elevation:**	316.81 ft (NAVD 88)
Risk Category:	II	**Latitude:**	41.608306
Soil Class:	D - Stiff Soil	**Longitude:**	-72.591544



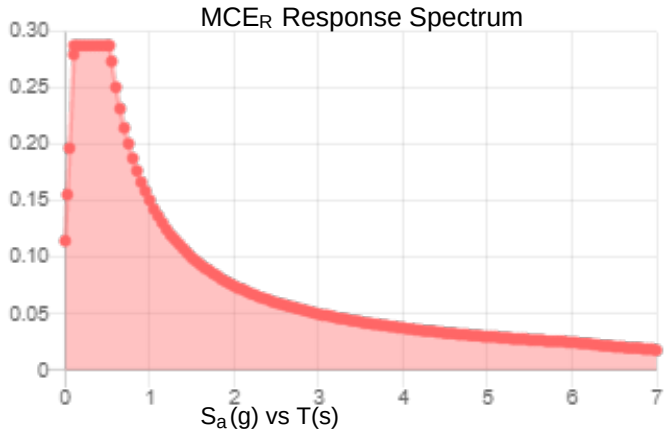
Seismic

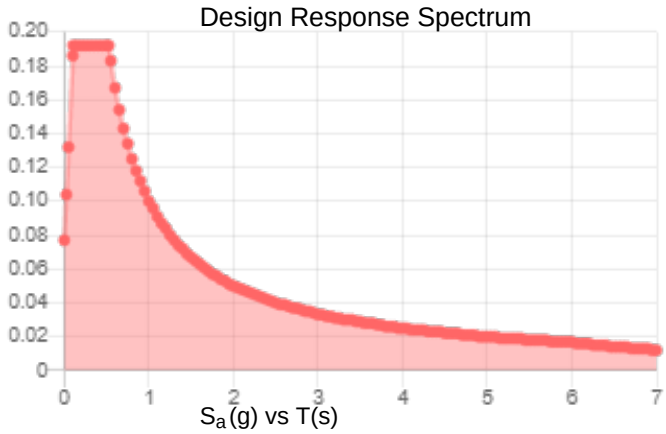
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.18	S_{DS} :	0.192
S_1 :	0.063	S_{D1} :	0.1
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.091
S_{MS} :	0.288	PGA_M :	0.146
S_{M1} :	0.151	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Fri Jul 30 2021

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Fri Jul 30 2021

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Date: **July 20, 2021**

Darcy Tarr
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6589

Trylon
1825 W. Walnut Hill Lane,
Suite 302
Irving, TX 75038
214-930-1730

Subject:	**Mount Analysis Report**	
Carrier Designation:	**T-Mobile Sprint Keep**	
	Carrier Site Number:	CT11652A
	Carrier Site Name:	CT11652A
Crown Castle Designation:	**Crown Castle BU Number:**	806382
	Crown Castle Site Name:	HRT 082 943274
	Crown Castle JDE Job Number:	673840
	Crown Castle Order Number:	575186 Rev. 0
Engineering Firm Designation:	**Trylon Report Designation:**	188031
Site Data:	**74 Goodrich Lane, Portland, Middlesex County, CT, 06480** **Latitude 41°36'29.90" Longitude -72°35'29.56"**	
Structure Information:	**Tower Height & Type:**	**160.0 ft Monopole**
	Mount Elevation:	**150.0 ft**
	Mount Type:	**12.5 ft Platform**

Dear Darcy Tarr,

Trylon is pleased to submit this **"Mount Analysis Report"** to determine the structural integrity of T-Mobile's antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

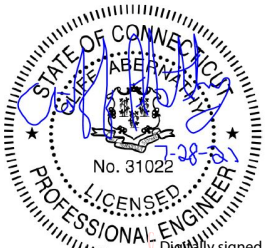
Platform **Sufficient***

***Sufficient upon completion of the changes listed in the 'Recommendations' section of this report.**

This analysis utilizes an ultimate 3-second gust wind speed of 130 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: Ionela Neamtu

Respectfully Submitted by:
Cliff Abernathy, P.E.



Cliff Abernathy Digitally signed by Cliff Abernathy
Date: 2021.07.28 17:13:12 -04'00'

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1) INTRODUCTION

This is an existing 3 sector 12.5 ft Platform, previously analyzed by Hudson Design Group LLC.

The mount has been modified per reinforcement drawings prepared by Hudson in May of 2018. Reinforcement consists of the addition of a L2.5X2.5X0.25 single angle member over the existing handrail member.

2) ANALYSIS CRITERIA

Building Code:	2015 IBC
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	130 mph
Exposure Category:	B
Topographic Factor at Base:	1.00
Topographic Factor at Mount:	1.00
Ice Thickness:	1.50 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.180
Seismic S_1:	0.063
Live Loading Wind Speed:	30 mph
Man Live Load at Mid/End-Points:	250 lb
Man Live Load at Mount Pipes:	500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
150.0	152.0	3	ERICSSON	AIR6449 B41_T-MOBILE	12.5 ft Platform
		3	RFS/CELWAVE	APX16DWV-16DWV-S-E-A20	
		3	RFS/CELWAVE	APXVAALL24_43-U-NA20_TMO	
		3	ERICSSON	RADIO 4460 B2/B25 B66_TMO	
		3	ERICSSON	RADIO 4480 B71_TMO	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Crown Application	T-Mobile Application	575186 Rev. 0	CCI Sites
Mount Analysis Report	Hudson Design Group LLC	7624430	CCI Sites
Exposure Category Determination	Crown Castle	6139551	CCI Sites

3.1) Analysis Method

RISA-3D (Version 17.0.4), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

A tool internally developed, using Microsoft Excel, by Trylon was used to calculate wind loading on all appurtenances, dishes, and mount members for various load cases. Selected output from the analysis is included in Appendix B.

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 *Tower Mount Analysis* (Revision B).

3.2) Assumptions

1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and the referenced drawings.
3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
4) The analysis will be required to be revised if the existing conditions in the field differ from those shown in the above-referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.
5) Prior structural modifications to the tower mounting system are assumed to be installed as shown per available data.
6) Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM A500 (GR B-46)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325

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

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Platform, All Sectors)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1,2,3	Mount Pipe(s)	M49	150.0	83.2	Pass
	Horizontal(s)	M17		66.6	Pass
	Standoff(s)	M16		84.0	Pass
	Plan Bracing(s)	M27		69.9	Pass
	Handrail(s)	M19		67.9	Pass
	Plate(s)	M9		49.3	Pass
	Mount Connection(s)	--		66.3	Pass

Structure Rating (max from all components) =	**84.0%**

Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
2) All sectors are typical
3) Rating per TIA-222-H, Section 15.5

4.1) Recommendations

The mount has sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, the structural modifications listed below must be completed.

1. Installation of (2) new 2.375" O.D, sch.40, 96" long pipe on position #1 and #4, for each sector. The new pipes will be connected to the each face horizontal with (2) 1/2" U-bolts (4 U-bolts per pipe).
2. Installation of (4) new 1/2" U-bolts for the existing pipes from positions #2 and #3, on each sector.

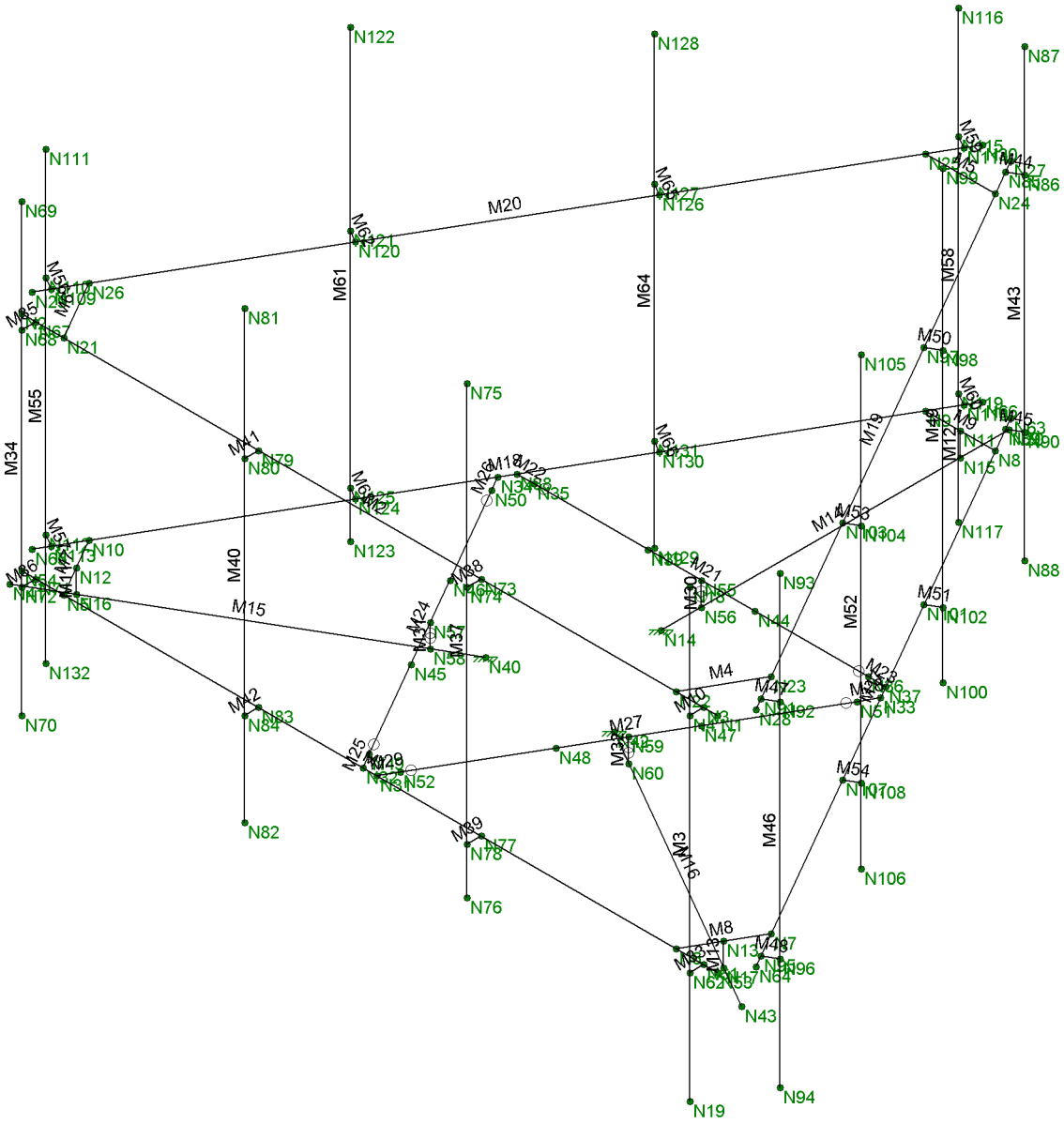
No structural modifications are required at this time, provided that the above-listed changes are implemented.

APPENDIX A

WIRE FRAME AND RENDERED MODELS

Envelope Only Solution

Trylon	806382_HRT 082 943274	SK - 1
IN		July 20, 2021 at 2:40 PM
188031		806382_HRT 082 943274.R3D



Envelope Only Solution

Trylon	806382_HRT 082 943274	SK - 2
IN		July 20, 2021 at 2:41 PM
188031		806382_HRT 082 943274.R3D

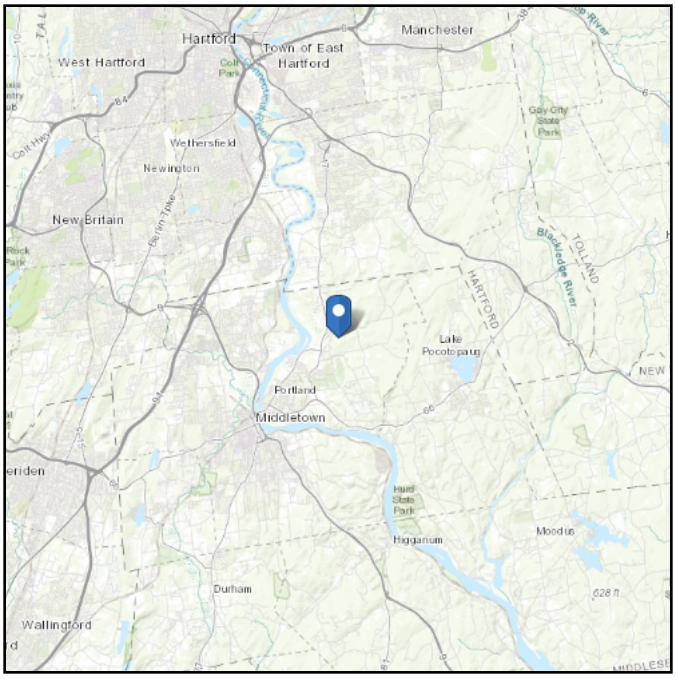
APPENDIX B

SOFTWARE INPUT CALCULATIONS

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-10	**Elevation:**	316.81 ft (NAVD 88)
Risk Category:	II	**Latitude:**	41.608306
Soil Class:	D - Stiff Soil	**Longitude:**	-72.591544



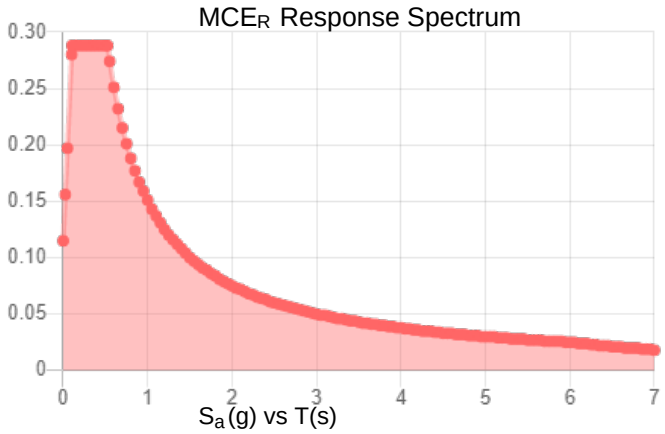
Seismic

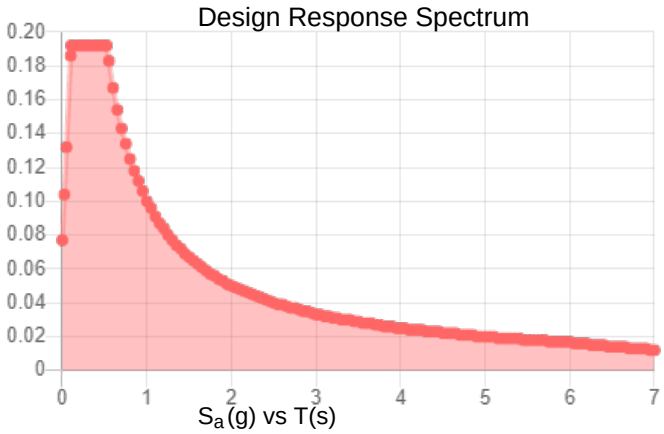
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.18	S_{DS} :	0.192
S_1 :	0.063	S_{D1} :	0.1
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.091
S_{MS} :	0.288	PGA_M :	0.146
S_{M1} :	0.151	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Mon Jul 19 2021

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Mon Jul 19 2021

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Trylon
1825 W. Walnut Hill Lane Suite 120
Irving, TX 75038

TIA LOAD CALCULATOR 2.0

PROJECT DATA	
Job Code:	188031
Carrier Site ID:	CT11652A
Carrier Site Name:	CT11652A

CODES AND STANDARDS	
Building Code:	2015 IBC
Local Building Code:	Connecticut State Building
Design Standard:	TIA-222-H

STRUCTURE DETAILS		
Mount Type:	Platform	--
Mount Elevation:	150.0	ft.
Number of Sectors:	3	--
Structure Type:	Monopole	--
Structure Height:	160.0	ft.

ANALYSIS CRITERIA		
Structure Risk Category:	II	--
Exposure Category:	B	--
Site Class:	D - Default	--
Ground Elevation:	316.81	ft.

TOPOGRAPHIC DATA		
Topographic Category:	1.00	--
Topographic Feature:	N/A	--
Crest Point Elevation:	0.00	ft.
Base Point Elevation:	0.00	ft.
Crest to Mid-Height (L/2):	0.00	ft.
Distance from Crest (x):	0.00	ft.
Base Topo Factor (K_{zt}):	1.00	--
Mount Topo Factor (K_{zt}):	1.00	--

WIND PARAMETERS		
Design Wind Speed:	130	mph
Wind Escalation Factor (K_s):	1.00	--
Velocity Coefficient (K_z):	1.11	--
Directionality Factor (K_d):	0.95	--
Gust Effect Factor (Gh):	1.00	--
Shielding Factor (K_a):	0.90	--
Velocity Pressure (q_z):	45.09	psf

ICE PARAMETERS		
Design Ice Wind Speed:	50	mph
Design Ice Thickness (t_i):	1.50	in
Importance Factor (I_i):	1.00	--
Ice Velocity Pressure (q_{zi}):	45.09	psf
Mount Ice Thickness (t_{iz}):	1.75	in

WIND STRUCTURE CALCULATIONS		
Flat Member Pressure:	81.15	psf
Round Member Pressure:	48.69	psf
Ice Wind Pressure:	7.55	psf

SEISMIC PARAMETERS		
Importance Factor (I_e):	1.00	--
Short Period Accel .(S_s):	0.180	g
1 Second Accel (S_1):	0.063	g
Short Period Des. (S_{DS}):	0.19	g
1 Second Des. (S_{D1}):	0.10	g
Short Period Coeff. (F_a):	1.60	--
1 Second Coeff. (F_v):	2.40	--
Response Coefficient (Cs):	0.10	--
Amplification Factor (A_S):	1.20	--

LOAD COMBINATIONS [LRFD]

#	Description
1	1.4DL
2	1.2DL + 1WL 0 AZI
3	1.2DL + 1WL 30 AZI
4	1.2DL + 1WL 45 AZI
5	1.2DL + 1WL 60 AZI
6	1.2DL + 1WL 90 AZI
7	1.2DL + 1WL 120 AZI
8	1.2DL + 1WL 135 AZI
9	1.2DL + 1WL 150 AZI
10	1.2DL + 1WL 180 AZI
11	1.2DL + 1WL 210 AZI
12	1.2DL + 1WL 225 AZI
13	1.2DL + 1WL 240 AZI
14	1.2DL + 1WL 270 AZI
15	1.2DL + 1WL 300 AZI
16	1.2DL + 1WL 315 AZI
17	1.2DL + 1WL 330 AZI
18	0.9DL + 1WL 0 AZI
19	0.9DL + 1WL 30 AZI
20	0.9DL + 1WL 45 AZI
21	0.9DL + 1WL 60 AZI
22	0.9DL + 1WL 90 AZI
23	0.9DL + 1WL 120 AZI
24	0.9DL + 1WL 135 AZI
25	0.9DL + 1WL 150 AZI
26	0.9DL + 1WL 180 AZI
27	0.9DL + 1WL 210 AZI
28	0.9DL + 1WL 225 AZI
29	0.9DL + 1WL 240 AZI
30	0.9DL + 1WL 270 AZI
31	0.9DL + 1WL 300 AZI
32	0.9DL + 1WL 315 AZI
33	0.9DL + 1WL 330 AZI
34	1.2DL + 1DLi + 1WLi 0 AZI
35	1.2DL + 1DLi + 1WLi 30 AZI
36	1.2DL + 1DLi + 1WLi 45 AZI
37	1.2DL + 1DLi + 1WLi 60 AZI
38	1.2DL + 1DLi + 1WLi 90 AZI
39	1.2DL + 1DLi + 1WLi 120 AZI
40	1.2DL + 1DLi + 1WLi 135 AZI
41	1.2DL + 1DLi + 1WLi 150 AZI

#	Description
42	1.2DL + 1DLi + 1WLi 180 AZI
43	1.2DL + 1DLi + 1WLi 210 AZI
44	1.2DL + 1DLi + 1WLi 225 AZI
45	1.2DL + 1DLi + 1WLi 240 AZI
46	1.2DL + 1DLi + 1WLi 270 AZI
47	1.2DL + 1DLi + 1WLi 300 AZI
48	1.2DL + 1DLi + 1WLi 315 AZI
49	1.2DL + 1DLi + 1WLi 330 AZI
50	(1.2+0.2Sds) + 1.0E 0 AZI
51	(1.2+0.2Sds) + 1.0E 30 AZI
52	(1.2+0.2Sds) + 1.0E 45 AZI
53	(1.2+0.2Sds) + 1.0E 60 AZI
54	(1.2+0.2Sds) + 1.0E 90 AZI
55	(1.2+0.2Sds) + 1.0E 120 AZI
56	(1.2+0.2Sds) + 1.0E 135 AZI
57	(1.2+0.2Sds) + 1.0E 150 AZI
58	(1.2+0.2Sds) + 1.0E 180 AZI
59	(1.2+0.2Sds) + 1.0E 210 AZI
60	(1.2+0.2Sds) + 1.0E 225 AZI
61	(1.2+0.2Sds) + 1.0E 240 AZI
62	(1.2+0.2Sds) + 1.0E 270 AZI
63	(1.2+0.2Sds) + 1.0E 300 AZI
64	(1.2+0.2Sds) + 1.0E 315 AZI
65	(1.2+0.2Sds) + 1.0E 330 AZI
66	(0.9-0.2Sds) + 1.0E 0 AZI
67	(0.9-0.2Sds) + 1.0E 30 AZI
68	(0.9-0.2Sds) + 1.0E 45 AZI
69	(0.9-0.2Sds) + 1.0E 60 AZI
70	(0.9-0.2Sds) + 1.0E 90 AZI
71	(0.9-0.2Sds) + 1.0E 120 AZI
72	(0.9-0.2Sds) + 1.0E 135 AZI
73	(0.9-0.2Sds) + 1.0E 150 AZI
74	(0.9-0.2Sds) + 1.0E 180 AZI
75	(0.9-0.2Sds) + 1.0E 210 AZI
76	(0.9-0.2Sds) + 1.0E 225 AZI
77	(0.9-0.2Sds) + 1.0E 240 AZI
78	(0.9-0.2Sds) + 1.0E 270 AZI
79	(0.9-0.2Sds) + 1.0E 300 AZI
80	(0.9-0.2Sds) + 1.0E 315 AZI
81	(0.9-0.2Sds) + 1.0E 330 AZI
82-88	1.2D + 1.5 Lv1

#	Description
89	1.2D + 1.5Lm + 1.0Wm 0 AZI - MP1
90	1.2D + 1.5Lm + 1.0Wm 30 AZI - MP1
91	1.2D + 1.5Lm + 1.0Wm 45 AZI - MP1
92	1.2D + 1.5Lm + 1.0Wm 60 AZI - MP1
93	1.2D + 1.5Lm + 1.0Wm 90 AZI - MP1
94	1.2D + 1.5Lm + 1.0Wm 120 AZI - MP1
95	1.2D + 1.5Lm + 1.0Wm 135 AZI - MP1
96	1.2D + 1.5Lm + 1.0Wm 150 AZI - MP1
97	1.2D + 1.5Lm + 1.0Wm 180 AZI - MP1
98	1.2D + 1.5Lm + 1.0Wm 210 AZI - MP1
99	1.2D + 1.5Lm + 1.0Wm 225 AZI - MP1
100	1.2D + 1.5Lm + 1.0Wm 240 AZI - MP1
101	1.2D + 1.5Lm + 1.0Wm 270 AZI - MP1
102	1.2D + 1.5Lm + 1.0Wm 300 AZI - MP1
103	1.2D + 1.5Lm + 1.0Wm 315 AZI - MP1
104	1.2D + 1.5Lm + 1.0Wm 330 AZI - MP1
105	1.2D + 1.5Lm + 1.0Wm 0 AZI - MP2
106	1.2D + 1.5Lm + 1.0Wm 30 AZI - MP2
107	1.2D + 1.5Lm + 1.0Wm 45 AZI - MP2
108	1.2D + 1.5Lm + 1.0Wm 60 AZI - MP2
109	1.2D + 1.5Lm + 1.0Wm 90 AZI - MP2
110	1.2D + 1.5Lm + 1.0Wm 120 AZI - MP2
111	1.2D + 1.5Lm + 1.0Wm 135 AZI - MP2
112	1.2D + 1.5Lm + 1.0Wm 150 AZI - MP2
113	1.2D + 1.5Lm + 1.0Wm 180 AZI - MP2
114	1.2D + 1.5Lm + 1.0Wm 210 AZI - MP2
115	1.2D + 1.5Lm + 1.0Wm 225 AZI - MP2
116	1.2D + 1.5Lm + 1.0Wm 240 AZI - MP2
117	1.2D + 1.5Lm + 1.0Wm 270 AZI - MP2
118	1.2D + 1.5Lm + 1.0Wm 300 AZI - MP2
119	1.2D + 1.5Lm + 1.0Wm 315 AZI - MP2
120	1.2D + 1.5Lm + 1.0Wm 330 AZI - MP2

#	Description
121	1.2D + 1.5Lm + 1.0Wm 0 AZI - MP3
122	1.2D + 1.5Lm + 1.0Wm 30 AZI - MP3
123	1.2D + 1.5Lm + 1.0Wm 45 AZI - MP3
124	1.2D + 1.5Lm + 1.0Wm 60 AZI - MP3
125	1.2D + 1.5Lm + 1.0Wm 90 AZI - MP3
126	1.2D + 1.5Lm + 1.0Wm 120 AZI - MP3
127	1.2D + 1.5Lm + 1.0Wm 135 AZI - MP3
128	1.2D + 1.5Lm + 1.0Wm 150 AZI - MP3
129	1.2D + 1.5Lm + 1.0Wm 180 AZI - MP3
130	1.2D + 1.5Lm + 1.0Wm 210 AZI - MP3
131	1.2D + 1.5Lm + 1.0Wm 225 AZI - MP3
132	1.2D + 1.5Lm + 1.0Wm 240 AZI - MP3
133	1.2D + 1.5Lm + 1.0Wm 270 AZI - MP3
134	1.2D + 1.5Lm + 1.0Wm 300 AZI - MP3
135	1.2D + 1.5Lm + 1.0Wm 315 AZI - MP3
136	1.2D + 1.5Lm + 1.0Wm 330 AZI - MP3
137	1.2D + 1.5Lm + 1.0Wm 0 AZI - MP4
138	1.2D + 1.5Lm + 1.0Wm 30 AZI - MP4
139	1.2D + 1.5Lm + 1.0Wm 45 AZI - MP4
140	1.2D + 1.5Lm + 1.0Wm 60 AZI - MP4
141	1.2D + 1.5Lm + 1.0Wm 90 AZI - MP4
142	1.2D + 1.5Lm + 1.0Wm 120 AZI - MP4
143	1.2D + 1.5Lm + 1.0Wm 135 AZI - MP4
144	1.2D + 1.5Lm + 1.0Wm 150 AZI - MP4
145	1.2D + 1.5Lm + 1.0Wm 180 AZI - MP4
146	1.2D + 1.5Lm + 1.0Wm 210 AZI - MP4
147	1.2D + 1.5Lm + 1.0Wm 225 AZI - MP4
148	1.2D + 1.5Lm + 1.0Wm 240 AZI - MP4
149	1.2D + 1.5Lm + 1.0Wm 270 AZI - MP4
150	1.2D + 1.5Lm + 1.0Wm 300 AZI - MP4
151	1.2D + 1.5Lm + 1.0Wm 315 AZI - MP4
152	1.2D + 1.5Lm + 1.0Wm 330 AZI - MP4

*This page shows an example of maintenance loads for (4) pipes, the number of mount pipe LCs may vary per site

EQUIPMENT LOADING

Appurtenance Name/Location	***Qty.***	***Elevation [ft]***	***--***	***EPA $_N$ (ft2)***	***EPA $_T$ (ft2)***	***Weight (lbs)***
AIR6449 B41_T-MOBILE	3	152	No Ice	5.27	2.03	114.63
M3/M55/M43, 0/120/295	--	--	w/ Ice	6.63	3.10	154.77
APXVAALL24_43-U-NA20_TMO	3	152	No Ice	14.67	5.32	149.90
M37/M61/M49, 0/120/295	--	--	w/ Ice	17.04	7.41	428.34
APX16DWV-16DWV-S-E-A20	3	152	No Ice	6.26	1.5	41.00
M34/M58/M46, 0/120/295	--	--	w/ Ice	8.13	3.10	138.92
RADIO 4480 B71_TMO	3	152	No Ice	2.85	1.38	92.60
M3/M55/M43, 0/120/240	--	--	w/ Ice	3.37	1.80	89.82
RADIO 4460 B2/B25 B66_TMO	3	152	No Ice	2.14	1.69	109.00
M34/M58/M46, 0/120/240	--	--	w/ Ice	2.59	2.09	91.14
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
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			No Ice			
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			No Ice			
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			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			

EQUIPMENT LOADING [CONT.]

Appurtenance Name/Location	Qty.	Elevation [ft]	--	EPA $_N$ (ft2)	EPA $_T$ (ft2)	Weight (lbs)
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			

EQUIPMENT WIND CALCULATIONS

Appurtenance Name	*Qty.*	*Elevation [ft]*	K_{zt}	K_z	K_d	t_d	q_z [psf]	q_{zi} [psf]
AIR6449 B41_T-MOBILE	3	152	1.00	1.11	0.95	1.75	45.26	6.69
XVAALL24_43-U-NA20_T	3	152	1.00	1.11	0.95	1.75	45.26	6.69
PX16DWV-16DWV-S-E-A	3	152	1.00	1.11	0.95	1.75	45.26	6.69
RADIO 4480 B71_TMO	3	152	1.00	1.11	0.95	1.75	45.26	6.69
DIO 4460 B2/B25 B66_T	3	152	1.00	1.11	0.95	1.75	45.26	6.69

EQUIPMENT LATERAL WIND FORCE CALCULATIONS

Appurtenance Name	Qty.	--	0° 180°	30° 210°	60° 240°	90° 270°	120° 300°	150° 330°
AIR6449 B41_T-MOBILE	3	No Ice	214.65	115.68	181.66	82.68	181.66	115.68
M3/M55/M43, 0/120/295	--	w/ Ice	39.97	24.00	34.65	18.68	34.65	24.00
PXVAALL24_43-U-NA20_TM	3	No Ice	597.52	311.90	502.32	216.69	502.32	311.90
M37/M61/M49, 0/120/295	--	w/ Ice	102.66	59.13	88.15	44.62	88.15	59.13
APX16DWV-16DWV-S-E-A20	3	No Ice	254.98	109.57	206.51	61.10	206.51	109.57
M34/M58/M46, 0/120/295	--	w/ Ice	48.96	26.27	41.40	18.71	41.40	26.27
RADIO 4480 B71_TMO	3	No Ice	116.17	71.29	101.21	56.33	101.21	71.29
M3/M55/M43, 0/120/240	--	w/ Ice	20.30	13.22	17.94	10.86	17.94	13.22
RADIO 4460 B2/B25 B66_TM	3	No Ice	87.13	73.28	82.51	68.67	82.51	73.28
M34/M58/M46, 0/120/240	--	w/ Ice	15.58	13.36	14.84	12.62	14.84	13.36
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
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		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						

EQUIPMENT LATERAL WIND FORCE CALCULATIONS [CONT.]

Appurtenance Name	Qty.	--	0° 180°	30° 210°	60° 240°	90° 270°	120° 300°	150° 330°
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
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		No Ice						
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		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						

EQUIPMENT SEISMIC FORCE CALCULATIONS

Appurtenance Name	***Qty.***	***Elevation [ft]***	***Weight [lbs]***	F_p [lbs]
AIR6449 B41_T-MOBILE	3	152	114.63	13.21
APXVAALL24_43-U-NA20_TMO	3	152	149.9	17.27
APX16DWV-16DWV-S-E-A20	3	152	41	4.72
RADIO 4480 B71_TMO	3	152	92.6	10.67
RADIO 4460 B2/B25 B66_TMO	3	152	109	12.56

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
Wall Mesh Size (in)	24
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Z
Global Member Orientation Plane	XY
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 15th(360-16): LRFD
Cold Formed Steel Code	AISI S100-16: LRFD
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-16
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	1
Cd X	1
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	a325	29000	11154	.3	.65	.49	89	1.5	105	1.2
2	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
3	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
4	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
5	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
6	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
7	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
8	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3
9	SAE J429, Gr 2	29000	11154	.3	.65	.49	57	1.5	74	1.2

Cold Formed Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E5 F)	Density[k/ft^3]	Yield[ksi]	Fu[ksi]
1	A653 SS Gr33	29500	11346	.3	.65	.49	33	45
2	A653 SS Gr50/1	29500	11346	.3	.65	.49	50	65

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	C5X6.7	C5X6.7	Beam	Channel	A36 Gr.36	Typical	1.97	.47	7.48	.055
2	HSS4X4X4	HSS4X4X4	Beam	Tube	A500 Gr.B R...	Typical	3.37	7.8	7.8	12.8
3	L4X4X4	L4X4X4	Beam	Single Angle	A36 Gr.36	Typical	1.93	3	3	.044
4	LL2.5x2.5x4	LL2.5x2.5x4x0	Beam	Double Angle (No Gap)	A36 Gr.36	Typical	2.38	2.57	1.38	.052
5	Pl 3"x0.375"	Pl 3"x0.375"	Beam	RECT	A36 Gr.36	Typical	1.125	.013	.844	.049

Hot Rolled Steel Section Sets (Continued)

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
6	PIPE_2.0	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
7	Pl 6"x0.5"	Pl 6"x0.5"	Beam	RECT	A36 Gr.36	Typical	3	.063	9	.237
8	Pl 9"x0.5"	Pl 9"x0.5"	Beam	RECT	A36 Gr.36	Typical	4.5	.094	30.375	.362

Cold Formed Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	CF1	162T125-18	Beam	None	A653 SS Gr...	Typical	.078	.013	.042	9e-6

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N14	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N40	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N42	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(...
1	Self Weight	DL			-1		24		6	
2	Structure Wind X	WLX						36		
3	Structure Wind Y	WLY						36		
4	Wind Load 0 AZI	WLX					24			
5	Wind Load 30 AZI	None					48			
6	Wind Load 45 AZI	None					48			
7	Wind Load 60 AZI	None					48			
8	Wind Load 90 AZI	WLY					24			
9	Wind Load 120 AZI	None					48			
10	Wind Load 135 AZI	None					48			
11	Wind Load 150 AZI	None					48			
12	Ice Weight	OL1					24	36	6	
13	Structure Ice Wind X	OL2						36		
14	Structure Ice Wind Y	OL3						36		
15	Ice Wind Load 0 AZI	OL2					24			
16	Ice Wind Load 30 AZI	None					48			
17	Ice Wind Load 45 AZI	None					48			
18	Ice Wind Load 60 AZI	None					48			
19	Ice Wind Load 90 AZI	OL3					24			
20	Ice Wind Load 120 AZI	None					48			
21	Ice Wind Load 135 AZI	None					48			
22	Ice Wind Load 150 AZI	None					48			
23	Seismic Load X	ELX	-.115				24			
24	Seismic Load Y	ELY		-.115			24			
25	Live Load 1 (Lv)	LL					1			
26	Live Load 2 (Lv)	LL					1			
27	Live Load 3 (Lv)	LL					1			
28	Live Load 4 (Lv)	LL				1				
29	Live Load 5 (Lv)	LL				1				
30	Live Load 6 (Lv)	LL				1				
31	Maintenance Load 1 (Lm)	None				1				

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(...
32	Maintenance Load 2 (Lm)	None				1				
33	Maintenance Load 3 (Lm)	None				1				
34	Maintenance Load 4 (Lm)	None				1				
35	Maintenance Load 5 (Lm)	None				1				
36	Maintenance Load 6 (Lm)	None				1				
37	Maintenance Load 7 (Lm)	None				1				
38	Maintenance Load 8 (Lm)	None				1				
39	Maintenance Load 9 (Lm)	None				1				
40	Maintenance Load 10 (Lm)	None				1				
41	Maintenance Load 11 (Lm)	None				1				
42	Maintenance Load 12 (Lm)	None				1				
43	BLC 1 Transient Area Loads	None						76		
44	BLC 12 Transient Area Loads	None						76		

Load Combinations

	Description	S...	P...	S...	B...	Factor	B...	Fac...	B...	Fac...	BLC	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...
1	1.4DL	Yes	Y		DL	1.4																		
2	1.2DL + 1WL 0 AZI	Yes	Y		DL	1.2	2	1	3		4	1												
3	1.2DL + 1WL 30 AZI	Yes	Y		DL	1.2	2	.866	3	.5	5	1												
4	1.2DL + 1WL 45 AZI	Yes	Y		DL	1.2	2	.707	3	.707	6	1												
5	1.2DL + 1WL 60 AZI	Yes	Y		DL	1.2	2	.5	3	.866	7	1												
6	1.2DL + 1WL 90 AZI	Yes	Y		DL	1.2	2		3	1	8	1												
7	1.2DL + 1WL 120 AZI	Yes	Y		DL	1.2	2	-.5	3	.866	9	1												
8	1.2DL + 1WL 135 AZI	Yes	Y		DL	1.2	2	-.707	3	.707	10	1												
9	1.2DL + 1WL 150 AZI	Yes	Y		DL	1.2	2	-.866	3	.5	11	1												
10	1.2DL + 1WL 180 AZI	Yes	Y		DL	1.2	2	-1	3		4	-1												
11	1.2DL + 1WL 210 AZI	Yes	Y		DL	1.2	2	-.866	3	-.5	5	-1												
12	1.2DL + 1WL 225 AZI	Yes	Y		DL	1.2	2	-.707	3	-.707	6	-1												
13	1.2DL + 1WL 240 AZI	Yes	Y		DL	1.2	2	-.5	3	-.866	7	-1												
14	1.2DL + 1WL 270 AZI	Yes	Y		DL	1.2	2		3	-1	8	-1												
15	1.2DL + 1WL 300 AZI	Yes	Y		DL	1.2	2	.5	3	-.866	9	-1												
16	1.2DL + 1WL 315 AZI	Yes	Y		DL	1.2	2	.707	3	-.707	10	-1												
17	1.2DL + 1WL 330 AZI	Yes	Y		DL	1.2	2	.866	3	-.5	11	-1												
18	0.9DL + 1WL 0 AZI	Yes	Y		DL	.9	2	1	3		4	1												
19	0.9DL + 1WL 30 AZI	Yes	Y		DL	.9	2	.866	3	.5	5	1												
20	0.9DL + 1WL 45 AZI	Yes	Y		DL	.9	2	.707	3	.707	6	1												
21	0.9DL + 1WL 60 AZI	Yes	Y		DL	.9	2	.5	3	.866	7	1												
22	0.9DL + 1WL 90 AZI	Yes	Y		DL	.9	2		3	1	8	1												
23	0.9DL + 1WL 120 AZI	Yes	Y		DL	.9	2	-.5	3	.866	9	1												
24	0.9DL + 1WL 135 AZI	Yes	Y		DL	.9	2	-.707	3	.707	10	1												
25	0.9DL + 1WL 150 AZI	Yes	Y		DL	.9	2	-.866	3	.5	11	1												
26	0.9DL + 1WL 180 AZI	Yes	Y		DL	.9	2	-1	3		4	-1												
27	0.9DL + 1WL 210 AZI	Yes	Y		DL	.9	2	-.866	3	-.5	5	-1												
28	0.9DL + 1WL 225 AZI	Yes	Y		DL	.9	2	-.707	3	-.707	6	-1												
29	0.9DL + 1WL 240 AZI	Yes	Y		DL	.9	2	-.5	3	-.866	7	-1												
30	0.9DL + 1WL 270 AZI	Yes	Y		DL	.9	2		3	-1	8	-1												
31	0.9DL + 1WL 300 AZI	Yes	Y		DL	.9	2	.5	3	-.866	9	-1												
32	0.9DL + 1WL 315 AZI	Yes	Y		DL	.9	2	.707	3	-.707	10	-1												
33	0.9DL + 1WL 330 AZI	Yes	Y		DL	.9	2	.866	3	-.5	11	-1												
34	1.2DL + 1DLi + 1WLi 0 A...	Yes	Y		DL	1.2	O...	1	13	1	14		15	1										

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Factor	B...	Fac...	B...	Fac...	BLC	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...
35	1.2DL + 1DLi + 1WLi 30 ...	Yes	Y		DL	1.2	O...	1	13	.866	14	.5	16	1										
36	1.2DL + 1DLi + 1WLi 45 ...	Yes	Y		DL	1.2	O...	1	13	.707	14	.707	17	1										
37	1.2DL + 1DLi + 1WLi 60 ...	Yes	Y		DL	1.2	O...	1	13	.5	14	.866	18	1										
38	1.2DL + 1DLi + 1WLi 90 ...	Yes	Y		DL	1.2	O...	1	13		14	1	19	1										
39	1.2DL + 1DLi + 1WLi 12...	Yes	Y		DL	1.2	O...	1	13	-.5	14	.866	20	1										
40	1.2DL + 1DLi + 1WLi 13...	Yes	Y		DL	1.2	O...	1	13	-.707	14	.707	21	1										
41	1.2DL + 1DLi + 1WLi 15...	Yes	Y		DL	1.2	O...	1	13	-.866	14	.5	22	1										
42	1.2DL + 1DLi + 1WLi 18...	Yes	Y		DL	1.2	O...	1	13	-1	14		15	-1										
43	1.2DL + 1DLi + 1WLi 21...	Yes	Y		DL	1.2	O...	1	13	-.866	14	-.5	16	-1										
44	1.2DL + 1DLi + 1WLi 22...	Yes	Y		DL	1.2	O...	1	13	-.707	14	-.707	17	-1										
45	1.2DL + 1DLi + 1WLi 24...	Yes	Y		DL	1.2	O...	1	13	-.5	14	-.866	18	-1										
46	1.2DL + 1DLi + 1WLi 27...	Yes	Y		DL	1.2	O...	1	13		14	-1	19	-1										
47	1.2DL + 1DLi + 1WLi 30...	Yes	Y		DL	1.2	O...	1	13	.5	14	-.866	20	-1										
48	1.2DL + 1DLi + 1WLi 31...	Yes	Y		DL	1.2	O...	1	13	.707	14	-.707	21	-1										
49	1.2DL + 1DLi + 1WLi 33...	Yes	Y		DL	1.2	O...	1	13	.866	14	-.5	22	-1										
50	(1.2+0.2Sds) + 1.0E 0 AZI	Yes	Y		DL	1.256	E...	1	E...															
51	(1.2+0.2Sds) + 1.0E 30 ...	Yes	Y		DL	1.256	E...	.866	E...	.5														
52	(1.2+0.2Sds) + 1.0E 45 ...	Yes	Y		DL	1.256	E...	.707	E...	.707														
53	(1.2+0.2Sds) + 1.0E 60 ...	Yes	Y		DL	1.256	E...	.5	E...	.866														
54	(1.2+0.2Sds) + 1.0E 90 ...	Yes	Y		DL	1.256	E...		E...	1														
55	(1.2+0.2Sds) + 1.0E 120...	Yes	Y		DL	1.256	E...	-.5	E...	.866														
56	(1.2+0.2Sds) + 1.0E 135...	Yes	Y		DL	1.256	E...	-.707	E...	.707														
57	(1.2+0.2Sds) + 1.0E 150...	Yes	Y		DL	1.256	E...	-.866	E...	.5														
58	(1.2+0.2Sds) + 1.0E 180...	Yes	Y		DL	1.256	E...	-1	E...															
59	(1.2+0.2Sds) + 1.0E 210...	Yes	Y		DL	1.256	E...	-.866	E...	-.5														
60	(1.2+0.2Sds) + 1.0E 225...	Yes	Y		DL	1.256	E...	-.707	E...	-.707														
61	(1.2+0.2Sds) + 1.0E 240...	Yes	Y		DL	1.256	E...	-.5	E...	-.866														
62	(1.2+0.2Sds) + 1.0E 270...	Yes	Y		DL	1.256	E...		E...	-1														
63	(1.2+0.2Sds) + 1.0E 300...	Yes	Y		DL	1.256	E...	.5	E...	-.866														
64	(1.2+0.2Sds) + 1.0E 315...	Yes	Y		DL	1.256	E...	.707	E...	-.707														
65	(1.2+0.2Sds) + 1.0E 330...	Yes	Y		DL	1.256	E...	.866	E...	-.5														
66	(0.9-0.2Sds) + 1.0E 0 AZI	Yes	Y		DL	.844	E...	1	E...															
67	(0.9-0.2Sds) + 1.0E 30 A...	Yes	Y		DL	.844	E...	.866	E...	.5														
68	(0.9-0.2Sds) + 1.0E 45 A...	Yes	Y		DL	.844	E...	.707	E...	.707														
69	(0.9-0.2Sds) + 1.0E 60 A...	Yes	Y		DL	.844	E...	.5	E...	.866														
70	(0.9-0.2Sds) + 1.0E 90 A...	Yes	Y		DL	.844	E...		E...	1														
71	(0.9-0.2Sds) + 1.0E 120 ...	Yes	Y		DL	.844	E...	-.5	E...	.866														
72	(0.9-0.2Sds) + 1.0E 135 ...	Yes	Y		DL	.844	E...	-.707	E...	.707														
73	(0.9-0.2Sds) + 1.0E 150 ...	Yes	Y		DL	.844	E...	-.866	E...	.5														
74	(0.9-0.2Sds) + 1.0E 180 ...	Yes	Y		DL	.844	E...	-1	E...															
75	(0.9-0.2Sds) + 1.0E 210 ...	Yes	Y		DL	.844	E...	-.866	E...	-.5														
76	(0.9-0.2Sds) + 1.0E 225 ...	Yes	Y		DL	.844	E...	-.707	E...	-.707														
77	(0.9-0.2Sds) + 1.0E 240 ...	Yes	Y		DL	.844	E...	-.5	E...	-.866														
78	(0.9-0.2Sds) + 1.0E 270 ...	Yes	Y		DL	.844	E...		E...	-1														
79	(0.9-0.2Sds) + 1.0E 300 ...	Yes	Y		DL	.844	E...	.5	E...	-.866														
80	(0.9-0.2Sds) + 1.0E 315 ...	Yes	Y		DL	.844	E...	.707	E...	-.707														
81	(0.9-0.2Sds) + 1.0E 330 ...	Yes	Y		DL	.844	E...	.866	E...	-.5														
82	1.2D + 1.5 Lv1	Yes	Y		DL	1.2	25	1.5																
83	1.2D + 1.5 Lv2	Yes	Y		DL	1.2	26	1.5																
84	1.2D + 1.5 Lv3	Yes	Y		DL	1.2	27	1.5																
85	1.2D + 1.5 Lv4	Yes	Y		DL	1.2	28	1.5																
86	1.2D + 1.5 Lv5	Yes	Y		DL	1.2	29	1.5																

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Factor	B...	Fac...	B...	Fac...	BLC	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...
87	1.2D + 1.5 Lv6	Yes	Y		DL	1.2	30	1.5																
88	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	4	.068	2	.068	3											
89	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	5	.068	2	.059	3	.034										
90	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	6	.068	2	.048	3	.048										
91	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	7	.068	2	.034	3	.059										
92	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	8	.068	2		3	.068										
93	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	9	.068	2	-.034	3	.059										
94	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	10	.068	2	-.048	3	.048										
95	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	11	.068	2	-.059	3	.034										
96	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	4	.068	2	-.068	3											
97	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	5	.068	2	-.059	3	-.034										
98	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	6	.068	2	-.048	3	-.048										
99	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	7	.068	2	-.034	3	-.059										
100	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	8	.068	2		3	-.068										
101	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	9	.068	2	.034	3	-.059										
102	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	10	.068	2	.048	3	-.048										
103	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	11	.068	2	.059	3	-.034										
104	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	4	.068	2	.068	3											
105	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	5	.068	2	.059	3	.034										
106	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	6	.068	2	.048	3	.048										
107	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	7	.068	2	.034	3	.059										
108	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	8	.068	2		3	.068										
109	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	9	.068	2	-.034	3	.059										
110	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	10	.068	2	-.048	3	.048										
111	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	11	.068	2	-.059	3	.034										
112	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	4	.068	2	-.068	3											
113	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	5	.068	2	-.059	3	-.034										
114	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	6	.068	2	-.048	3	-.048										
115	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	7	.068	2	-.034	3	-.059										
116	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	8	.068	2		3	-.068										
117	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	9	.068	2	.034	3	-.059										
118	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	10	.068	2	.048	3	-.048										
119	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	11	.068	2	.059	3	-.034										
120	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	4	.068	2	.068	3											
121	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	5	.068	2	.059	3	.034										
122	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	6	.068	2	.048	3	.048										
123	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	7	.068	2	.034	3	.059										
124	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	8	.068	2		3	.068										
125	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	9	.068	2	-.034	3	.059										
126	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	10	.068	2	-.048	3	.048										
127	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	11	.068	2	-.059	3	.034										
128	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	4	.068	2	-.068	3											
129	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	5	.068	2	-.059	3	-.034										
130	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	6	.068	2	-.048	3	-.048										
131	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	7	.068	2	-.034	3	-.059										
132	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	8	.068	2		3	-.068										
133	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	9	.068	2	.034	3	-.059										
134	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	10	.068	2	.048	3	-.048										
135	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	11	.068	2	.059	3	-.034										
136	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	4	.068	2	.068	3											
137	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	5	.068	2	.059	3	.034										
138	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	6	.068	2	.048	3	.048										

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Factor	B...	Fac...	B...	Fac...	BLC	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...
139	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	7	.068	2	.034	3	.059										
140	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	8	.068	2		3	.068										
141	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	9	.068	2	-.034	3	.059										
142	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	10	.068	2	-.048	3	.048										
143	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	11	.068	2	-.059	3	.034										
144	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	4	.068	2	-.068	3											
145	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	5	.068	2	-.059	3	-.034										
146	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	6	.068	2	-.048	3	-.048										
147	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	7	.068	2	-.034	3	-.059										
148	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	8	.068	2		3	-.068										
149	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	9	.068	2	.034	3	-.059										
150	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	10	.068	2	.048	3	-.048										
151	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	11	.068	2	.059	3	-.034										
152	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	4	.068	2	.068	3											
153	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	5	.068	2	.059	3	.034										
154	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	6	.068	2	.048	3	.048										
155	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	7	.068	2	.034	3	.059										
156	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	8	.068	2		3	.068										
157	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	9	.068	2	-.034	3	.059										
158	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	10	.068	2	-.048	3	.048										
159	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	11	.068	2	-.059	3	.034										
160	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	4	.068	2	-.068	3											
161	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	5	.068	2	-.059	3	-.034										
162	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	6	.068	2	-.048	3	-.048										
163	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	7	.068	2	-.034	3	-.059										
164	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	8	.068	2		3	-.068										
165	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	9	.068	2	.034	3	-.059										
166	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	10	.068	2	.048	3	-.048										
167	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	11	.068	2	.059	3	-.034										
168	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	4	.068	2	.068	3											
169	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	5	.068	2	.059	3	.034										
170	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	6	.068	2	.048	3	.048										
171	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	7	.068	2	.034	3	.059										
172	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	8	.068	2		3	.068										
173	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	9	.068	2	-.034	3	.059										
174	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	10	.068	2	-.048	3	.048										
175	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	11	.068	2	-.059	3	.034										
176	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	4	.068	2	-.068	3											
177	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	5	.068	2	-.059	3	-.034										
178	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	6	.068	2	-.048	3	-.048										
179	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	7	.068	2	-.034	3	-.059										
180	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	8	.068	2		3	-.068										
181	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	9	.068	2	.034	3	-.059										
182	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	10	.068	2	.048	3	-.048										
183	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	11	.068	2	.059	3	-.034										
184	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	4	.068	2	.068	3											
185	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	5	.068	2	.059	3	.034										
186	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	6	.068	2	.048	3	.048										
187	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	7	.068	2	.034	3	.059										
188	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	8	.068	2		3	.068										
189	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	9	.068	2	-.034	3	.059										
190	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	10	.068	2	-.048	3	.048										

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Factor	B...	Fac...	B...	Fac...	BLC	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...
191	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	11	.068	2	-.059	3	.034												
192	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	4	.068	2	-.068	3													
193	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	5	.068	2	-.059	3	-.034												
194	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	6	.068	2	-.048	3	-.048												
195	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	7	.068	2	-.034	3	-.059												
196	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	8	.068	2		3	-.068												
197	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	9	.068	2	.034	3	-.059												
198	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	10	.068	2	.048	3	-.048												
199	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	11	.068	2	.059	3	-.034												
200	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	4	.068	2	.068	3													
201	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	5	.068	2	.059	3	.034												
202	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	6	.068	2	.048	3	.048												
203	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	7	.068	2	.034	3	.059												
204	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	8	.068	2		3	.068												
205	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	9	.068	2	-.034	3	.059												
206	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	10	.068	2	-.048	3	.048												
207	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	11	.068	2	-.059	3	.034												
208	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	4	.068	2	-.068	3													
209	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	5	.068	2	-.059	3	-.034												
210	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	6	.068	2	-.048	3	-.048												
211	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	7	.068	2	-.034	3	-.059												
212	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	8	.068	2		3	-.068												
213	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	9	.068	2	.034	3	-.059												
214	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	10	.068	2	.048	3	-.048												
215	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	11	.068	2	.059	3	-.034												
216	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	4	.068	2	.068	3													
217	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	5	.068	2	.059	3	.034												
218	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	6	.068	2	.048	3	.048												
219	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	7	.068	2	.034	3	.059												
220	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	8	.068	2		3	.068												
221	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	9	.068	2	-.034	3	.059												
222	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	10	.068	2	-.048	3	.048												
223	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	11	.068	2	-.059	3	.034												
224	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	4	.068	2	-.068	3													
225	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	5	.068	2	-.059	3	-.034												
226	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	6	.068	2	-.048	3	-.048												
227	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	7	.068	2	-.034	3	-.059												
228	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	8	.068	2		3	-.068												
229	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	9	.068	2	.034	3	-.059												
230	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	10	.068	2	.048	3	-.048												
231	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	11	.068	2	.059	3	-.034												

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N14	max	396.66	18	714.151	22	3775.54	34	372.783	14	12093.956	2	2804.446	14
2		min	-11125.868	42	-706.587	30	-1096.713	26	-299.793	22	-7326.228	26	-2782.946	6
3	N40	max	5541.637	47	47.548	23	3745.684	39	5314.412	31	3113.303	31	1114.923	3
4		min	-152.138	23	-9601.872	47	-840.421	31	-9497.446	7	-5452.812	7	-1092.956	11
5	N42	max	5615.401	36	9667.173	37	3818.52	45	11283.342	13	4144.032	21	1211.618	9
6		min	-530.804	28	-545.429	29	-1326.369	21	-7194.213	21	-6592.159	13	-1197.594	17

Envelope Joint Reactions (Continued)

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
7	Totals:	max	5859.405	2	5729.292	22	10326.019	36						
8		min	-5859.415	10	-5729.291	30	2736.526	76						

Envelope AISC 15th(360-16): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[in]	LC	Shea...	Loc.....	L..	phi*Pn...	phi*Pn...	phi*M...	phi*M...	...	Eqn
1	M16	HSS4X4X4	.882	75	13	.109	75 y	44	67846...	139518	16180.5	16180.5	2..	H1-1b
2	M49	PIPE_2.0	.874	82	12	.158	82	10	14916...	32130	1871....	1871....	1..	H1-1b
3	M52	PIPE_2.0	.860	80	11	.180	80	13	14916...	32130	1871....	1871....	2..	H1-1b
4	M14	HSS4X4X4	.791	75	3	.107	75 y	34	67846...	139518	16180.5	16180.5	2..	H1-1b
5	M27	L4X4X4	.734	36	45	.067	36 z	10	39977...	62532	3137....	6060....	1..	H2-1
6	M15	HSS4X4X4	.730	75	7	.107	75 y	38	67846...	139518	16180.5	16180.5	2..	H1-1b
7	M37	PIPE_2.0	.724	86	6	.160	86	4	14916...	32130	1871....	1871....	1	H1-1b
8	M21	L4X4X4	.718	36	35	.070	36 z	5	39977...	62532	3137....	6061....	1..	H2-1
9	M61	PIPE_2.0	.717	86	2	.172	86	14	14916...	32130	1871....	1871....	2..	H1-1b
10	M40	PIPE_2.0	.717	76	13	.141	76	9	14916...	32130	1871....	1871....	2..	H1-1b
11	M24	L4X4X4	.715	36	38	.073	36 z	4	39977...	62532	3137....	6059....	1..	H2-1
12	M19	LL2.5x2.5x4x0	.713	9.375	11	.372	142... y	6	17892...	77112	4440.96	2749....	1	H1-1b
13	M17	C5X6.7	.700	146.875	5	.579	76.... y	47	4719....	63828	1603....	4647....	1	H1-1b
14	M43	PIPE_2.0	.677	72	4	.249	72	13	20866...	32130	1871....	1871....	1	H1-1b
15	M20	LL2.5x2.5x4x0	.677	100	4	.375	7.8... y	6	17892...	77112	4440.96	2749....	2..	H1-1b
16	M1	C5X6.7	.676	3.125	4	.585	76.... y	42	4719....	63828	1603....	4647....	1	H1-1b
17	M64	PIPE_2.0	.672	76	9	.148	76	3	14916...	32130	1871....	1871....	1	H1-1b
18	M46	PIPE_2.0	.669	72	3	.246	72	2	20866...	32130	1871....	1871....	1	H1-1b
19	M2	LL2.5x2.5x4x0	.649	9.375	6	.378	7.8... y	11	17892...	77112	4440.96	2749....	1	H1-1b
20	M18	C5X6.7	.631	146.875	11	.585	76.... y	37	4719....	63828	1603....	4647....	1	H1-1b
21	M34	PIPE_2.0	.579	72	13	.259	72	12	20866...	32130	1871....	1871....	1..	H1-1b
22	M55	PIPE_2.0	.544	72	2	.246	72	3	20866...	32130	1871....	1871....	1..	H1-1b
23	M3	PIPE_2.0	.533	72	14	.213	24	10	20866...	32130	1871....	1871....	1..	H1-1b
24	M58	PIPE_2.0	.521	72	8	.244	72	6	20866...	32130	1871....	1871....	1	H1-1b
25	M9	PI 9"x0.5"	.518	7.5	34	.182	7.5 y	11	82572...	145800	1518.75	24354...	1	H1-1b
26	M8	PI 9"x0.5"	.513	7.5	44	.196	7.5 y	4	82572...	145800	1518.75	27337.5	1..	H1-1b
27	M7	PI 9"x0.5"	.506	7.5	38	.174	7.5 y	14	82572...	145800	1518.75	27337.5	1..	H1-1b
28	M6	PI 6"x0.5"	.321	15	4	.103	15 y	11	55297...	97200	1012.5	11320...	1	H1-1b
29	M5	PI 6"x0.5"	.301	15	5	.092	0 y	6	55297...	97200	1012.5	12150	1..	H1-1b
30	M4	PI 6"x0.5"	.301	15	10	.082	0 y	17	55297...	97200	1012.5	11320...	1	H1-1b
31	M25	PI 3"x0.375"	.274	0	6	.109	3.75 y	4	34218...	36450	284.766	2267....	1	H1-1b
32	M29	PI 3"x0.375"	.273	3.75	14	.099	0 y	10	34218...	36450	284.766	2267....	1	H1-1b
33	M22	PI 3"x0.375"	.208	0	2	.102	3.75 y	5	34218...	36450	284.766	2267....	1	H1-1b
34	M23	PI 3"x0.375"	.207	3.75	3	.103	0 y	5	34218...	36450	284.766	2267....	1	H1-1b
35	M28	PI 3"x0.375"	.180	0	11	.099	3.75 y	10	34218...	36450	284.766	2267....	1	H1-1b
36	M26	PI 3"x0.375"	.176	3.75	9	.109	0 y	4	34218...	36450	284.766	2267....	1	H1-1b

Envelope AISI S100-16: LRFD Cold Formed Steel Code Checks

Member	Shape	Code Check	Loc[in]	LC	Shea...	Loc[i...	Dir	LC	phi*Pn[...	phi*Tn[...	phi*Mn...	phi*Mn...	phi*...	phi*...	Cb	Eqn
No Data to Print ...																

APPENDIX D

ADDITIONAL CALCUATIONS

Trylon

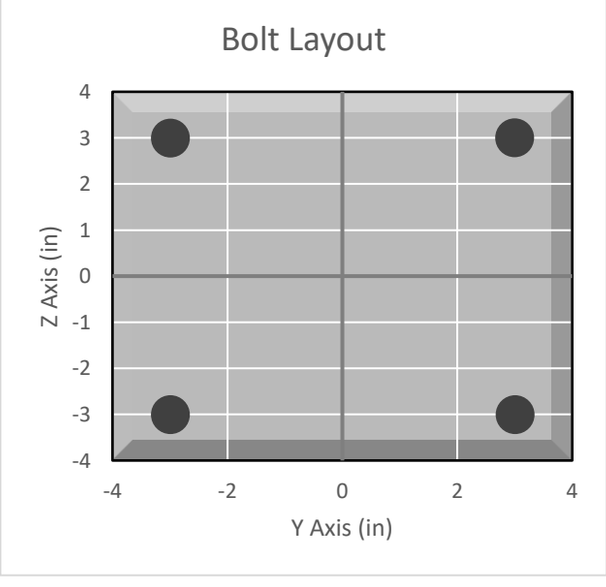
Analysis date: 20.07.2021

BOLT TOOL 1.5.2

Project Data	
Job Code:	188031
Carrier Site ID:	CT11652A
Carrier Site Name:	CT11652A

Code	
Design Standard:	TIA-222-H
Slip Check:	No
Pretension Standard:	AISC

Bolt Properties		
Connection Type:	Bolt	
Diameter:	0.625	in
Grade:	A325	--
Yield Strength (Fy):	92	ksi
Ultimate Strength (Fu):	120	ksi
Number of Bolts:	4	--
Threads Included:	Yes	--
Double Shear:	No	--
Connection Pipe Size:	-	in



Connection Description
Standoff to Monopole

Bolt Check*		
Tensile Capacity (ϕT_n):	20340.1	lbs
Shear Capacity (ϕV_n):	13805.8	lbs
Tension Force (T_u):	14160.1	lbs
Shear Force (V_u):	941.6	lbs
Tension Usage:	66.3%	--
Shear Usage:	6.5%	--
Interaction:	66.3%	Pass
Controlling Member:	M16	--
Controlling LC:	13	--

**Rating per TIA-222-H Section 15.5*

1825 W. Walnut Hill Lane, Suite 120
Irving, Texas 75038

T-Mobile

T-MOBILE SITE NUMBER: CT11652A
T-MOBILE SITE NAME: CT11652A
SITE TYPE: MONOPOLE
TOWER HEIGHT: 160'-0"

BUSINESS UNIT #: 806382
SITE ADDRESS: 74 GOODRICH LANE PORTLAND, CT 06480
COUNTY: MIDDLESEX
JURISDICTION: CONNECTICUT SITING COUNCIL

T-MOBILE SPRINT RETAIN SITE CONFIGURATION: 67E5A998E 6160

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	HRT 082 943274
SITE ADDRESS:	74 GOODRICH LANE PORTLAND, CT 06480
COUNTY:	MIDDLESEX
MAP/PARCEL #:	084-0009
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41.6081919
LONGITUDE:	-72.5914989
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	336 FT
CURRENT ZONING:	R25
JURISDICTION:	CONNECTICUT SITING COUNCIL
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	HALE JOAN J & CROWN ATLANTIC LLC PMB 353 4017 WASHINGTON RD MCMURRAY, PA 15317
TOWER OWNER:	CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	T-MOBILE 35 GRIFFIN ROAD BLOOMFIELD, CT 06002
ELECTRIC PROVIDER:	CONNECTICUT LIGHT & POWER CO
TELCO PROVIDER:	FRONTIER

PROJECT TEAM

A&E FIRM:	B+T GROUP 1717 S. BOULDER AVE. TULSA, OK 74119 MARVIN PHILLIPS marvin.phillips@btgrp.com
CROWN CASTLE USA INC. DISTRICT CONTACTS:	3 CORPORATE PARK DRIVE, SUITE 101 CLIFTON PARK, NY 12065 TRICIA PELON - PROJECT MANAGER TRICIA.PELON@CROWNCASTLE.COM

NOTE:
PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN NOC AT (800) 788-7011 & CROWN CONSTRUCTION MANAGER.

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1.1	OVERALL SITE PLAN
C-1.2	SITE PLAN & ENLARGED SITE PLAN
C-2	FINAL ELEVATION & ANTENNA PLANS
C-3	ANTENNA & CABLE SCHEDULE
C-4	PLUMBING DIAGRAM
C-5	EQUIPMENT SPECS
E-1	AC PANEL SCHEDULES & ONE LINE DIAGRAM
G-1	ANTENNA GROUNDING DIAGRAM
G-2	GROUNDING DETAILS
G-3	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR FULL SIZE. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

PROJECT DESCRIPTION

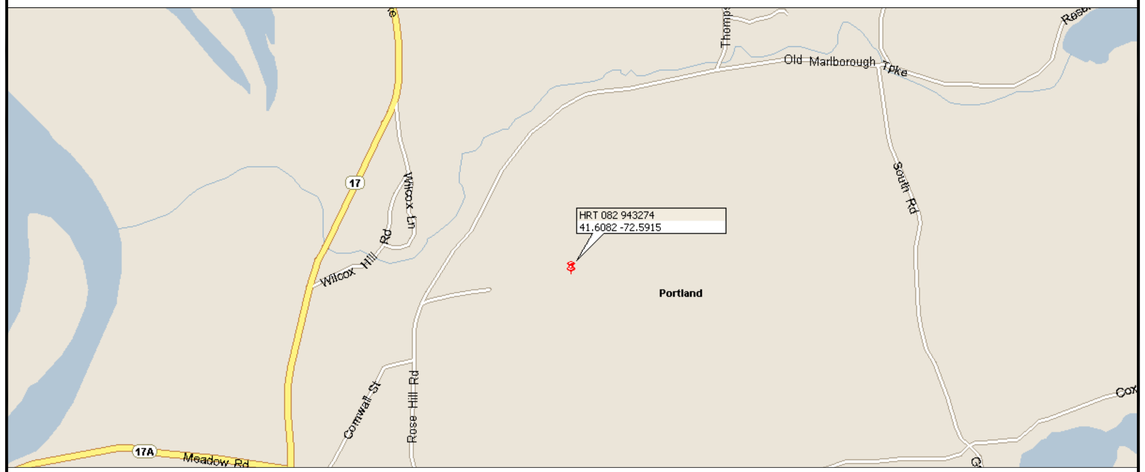
THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

TOWER SCOPE OF WORK:
- REMOVE (6) ANTENNAS
- REMOVE (12) RADIOS
- REMOVE (4) HYBRID CABLES (1-1/4")
- INSTALL (9) ANTENNAS
- INSTALL (6) RADIOS
- INSTALL (3) HYBRID CABLES (6X24)
- INSTALL MOUNT MODIFICATIONS PER MOUNT ANALYSIS BY TRYLON DATED JULY 20, 2021

GROUND SCOPE OF WORK:
- REMOVE (1) SPRINT CDMA CABINET
- REMOVE (1) SPRINT 60EC CABINET
- INSTALL (1) 6160 CABINET
- INSTALL (1) B160 BATTERY CABINET
- INSTALL (1) RBS 6601 INSIDE 6160 CABINET
- INSTALL (3) BB 6648 IN 6160 CABINET
- INSTALL (1) DUG20 IN 6601 INSIDE 6160 CABINET
- INSTALL (1) CSR IXRE V2 TRANSPORT SYSTEM
- UPGRADE 100A PANEL TO 200A SERVICE

NOTE:
THE POWER DESIGN FOR ANY AC ELECTRICAL POWER CHANGES IS TO BE PERFORMED BY OTHERS AND IS SHOWN HERE FOR REFERENCE PURPOSES ONLY. T-MOBILE IS SOLELY RESPONSIBLE FOR THE ELECTRICAL POWER DESIGN

LOCATION MAP



NO SCALE

APPLICABLE CODES/REFERENCE DOCUMENTS

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

CODE TYPE	CODE
BUILDING	2015 IBC W/AMENDMENTS
MECHANICAL	2015 IMC W/AMENDMENTS
ELECTRICAL	2014 NEC

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:	B+T GROUP
DATED:	8/23/21
MOUNT ANALYSIS:	TRYLON
DATED:	7/20/21
AC ELECTRICAL POWER DESIGN:	BY OTHERS
DATED:	
RFDS REVISION:	1
DATED:	6/21/21
ORDER ID:	575186
REVISION:	0

CALL CONNECTICUT ONE CALL
(800) 922-4455 CBYD.COM
CALL 2 WORKING DAYS
BEFORE YOU DIG!

APPROVALS

APPROVAL	SIGNATURE	DATE
PROPERTY OWNER OR REP.		
LAND USE PLANNER		
T-MOBILE		
OPERATIONS		
RF		
NETWORK		
BACKHAUL		
CONSTRUCTION MANAGER		

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

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

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

T-MOBILE
SITE NUMBER: **CT11652A**

BU #: **806382**
HRT 082 943274

74 GOODRICH LANE
PORTLAND, CT 06480

EXISTING
160'-0" MONOPOLE

ISSUED FOR:

REV.	DATE	DRWN	DESCRIPTION	DES./QA
0	9/1/21	JJR	CONSTRUCTION	JJR

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: T-1
REVISION: 0

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

1. NOTICE TO PROCEED– NO WORK SHALL COMMENCE PRIOR TO CROWN CASTLE USA INC. WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN CASTLE USA INC. NOC AT 800–788–7011 & THE CROWN CASTLE USA INC. CONSTRUCTION MANAGER.
2. "LOOK UP" – CROWN CASTLE USA INC. SAFETY CLIMB REQUIREMENT:
   THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR CROWN CASTLE USA INC. POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
4. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN CASTLE USA INC. STANDARD CED–STD–10253, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA–322 (LATEST EDITION).
5. ALL SITE WORK TO COMPLY WITH QAS–STD–10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE," CED–STD–10294 "STANDARD FOR INSTALLATION OF MOUNTS AND APPURTENANCES," AND LATEST VERSION OF ANSI/TIA–1019–A–2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.
11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
13. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, TOWER OWNER, CROWN CASTLE USA INC., AND/OR LOCAL UTILITIES.
14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
18. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
20. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
22. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR: GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION
   CARRIER: T–MOBILE
   TOWER OWNER: CROWN CASTLE USA INC.
2. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.
3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.
4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.
5. SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.
6. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CROWN CASTLE.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
9. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
10. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND CROWN CASTLE PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
11. CONTRACTOR IS TO PERFORM A SITE INVESTIGATION AND IS TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.
12. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF CROWN CASTLE USA INC.
13. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
14. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST–IN–PLACE CONCRETE.
2. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°f AT TIME OF PLACEMENT.
4. CONCRETE EXPOSED TO FREEZE–THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER–TO–CEMENT RATIO (W/C) OF 0.45.
5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:
   #4 BARS AND SMALLER........................40 ksi
   #5 BARS AND LARGER........................60 ksi
6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
   CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH..........3"
   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #6 BARS AND LARGER........................2"
   #5 BARS AND SMALLER........................1–1/2"
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER:
   SLAB AND WALLS........................3/4"
   BEAMS AND COLUMNS........................1–1/2"
7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

GREENFIELD GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE CONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON–ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 ft OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON–METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON–METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD–WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY).

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
   4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
   4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERYIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.
5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).
7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
8. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI–CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP–STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT) OR METAL–CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID–TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION–TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND THE NEC.
21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOLD SPECMATE WIREWAY).
22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON–PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER–ACTUATED) FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3R (OR BETTER) FOR EXTERIOR LOCATIONS.
25. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY–COATED OR NON–CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR CROWN CASTLE USA INC. BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "T–MOBILE".
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

CONDUCTOR COLOR CODE		
SYSTEM	CONDUCTOR	COLOR
120/240V, 1Ø	A PHASE	BLACK
	B PHASE	RED
	NEUTRAL	WHITE
	GROUND	GREEN
120/208V, 3Ø	A PHASE	BLACK
	B PHASE	RED
	C PHASE	BLUE
	NEUTRAL	WHITE
	GROUND	GREEN
277/480V, 3Ø	A PHASE	BROWN
	B PHASE	ORANGE OR PURPLE
	C PHASE	YELLOW
	NEUTRAL	GREY
	GROUND	GREEN
DC VOLTAGE	POS (+)	RED**
	NEG (–)	BLACK**

* SEE NEC 210.5(C)(1) AND (2)
** POLARITY MARKED AT TERMINATION

APWA UNIFORM COLOR CODE:

WHITE	PROPOSED EXCAVATION
PINK	TEMPORARY SURVEY MARKINGS
RED	ELECTRIC POWER LINES, CABLES, CONDUIT, AND LIGHTING CABLES
YELLOW	GAS, OIL, STEAM, PETROLEUM, OR GASEOUS MATERIALS
ORANGE	COMMUNICATION, ALARM OR SIGNAL LINES, CABLES, OR CONDUIT AND TRAFFIC LOOPS
BLUE	POTABLE WATER
PURPLE	RECLAIMED WATER, IRRIGATION, AND SLURRY LINES
GREEN	SEWERS AND DRAIN LINES

ABBREVIATIONS:

ANT	ANTENNA
(E)	EXISTING
FIF	FACILITY INTERFACE FRAME
GEN	GENERATOR
GPS	GLOBAL POSITIONING SYSTEM
GSM	GLOBAL SYSTEM FOR MOBILE
LTE	LONG TERM EVOLUTION
MGB	MASTER GROUND BAR
MW	MICROWAVE
(N)	NEW
NEC	NATIONAL ELECTRIC CODE
(P)	PROPOSED
PP	POWER PLANT
QTY	QUANTITY
RECT	RECTIFIER
RBS	RADIO BASE STATION
RET	REMOTE ELECTRIC TILT
RFDS	RADIO FREQUENCY DATA SHEET
RRH	REMOTE RADIO HEAD
RRU	REMOTE RADIO UNIT
SIAD	SMART INTEGRATED DEVICE
TMA	TOWER MOUNTED AMPLIFIER
TYP	TYPICAL
UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
W.P.	WORK POINT

T · · Mobile · · ·
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

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

T-MOBILE
SITE NUMBER: **CT11652A**

BU #: **806382**
HRT 082 943274

74 GOODRICH LANE
PORTLAND, CT 06480

EXISTING
160'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	9/1/21	JJR	CONSTRUCTION	JJR

STATE OF CONNECTICUT · CHAD TUTTLE · No. 23924 · LICENSED · PROFESSIONAL ENGINEER
9/1/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

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SHEET NUMBER:	REVISION:
T-2	0

SITE PLAN DISCLAIMER:

PROPERTY LINES AND STRUCTURES HAVE BEEN DIGITIZED FROM PREVIOUS PLAN SETS. CROWN CASTLE USA INC. HAS NOT COMPLETED A SITE SURVEY AND THEREFORE MAKES NO CLAIMS AS TO THE ACCURACY OF INFORMATION DEPICTED ON THIS SHEET.

1 OVERALL SITE PLAN

SCALE: 40' 20' 0 40' 1"=40'-0" (FULL SIZE) 1"=80'-0" (11x17)

T-Mobile

35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE

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STATE OF CONNECTICUT No. 23924 LICENSED PROFESSIONAL ENGINEER 9/1/21

B&T ENGINEERING, INC.
PEC.0001564
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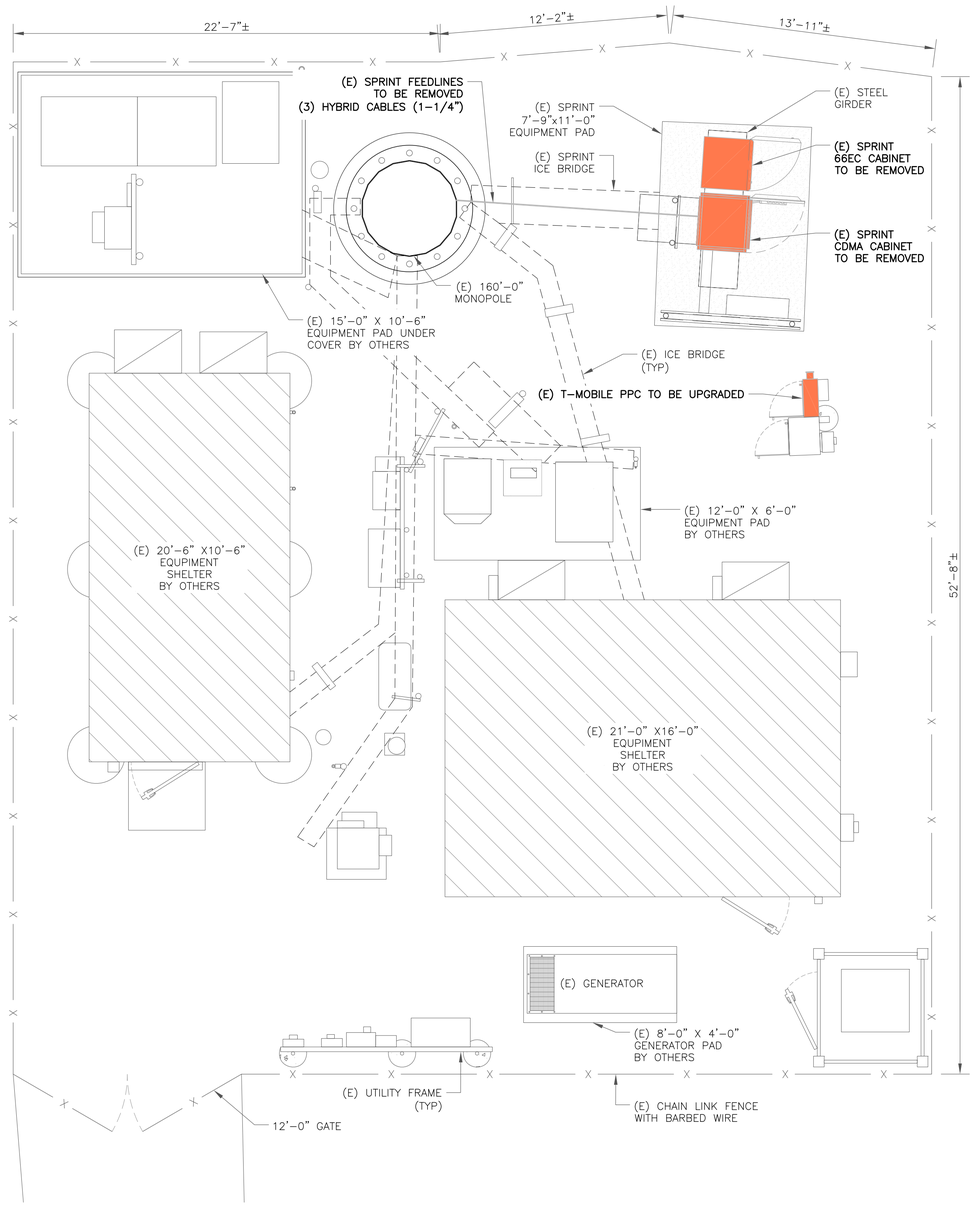
SHEET NUMBER: C-1.1

REVISION: 0

81363.022.01_HRT 082 943274.dwg — Sheet:C-1.1 — User: mjones — Sep 01, 2021 — 10:02pm

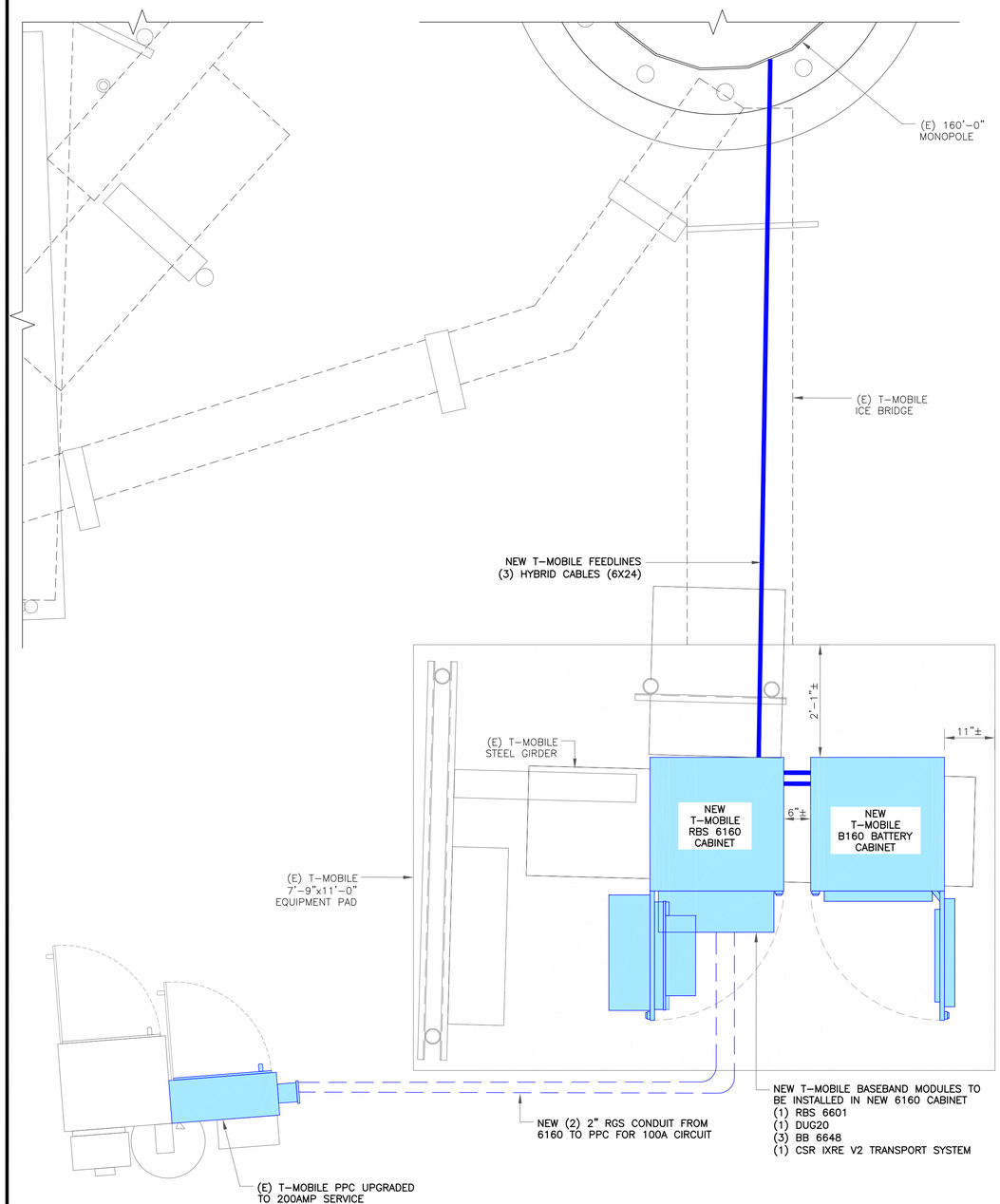


1 SITE PLAN
SCALE: 4' 3' 2' 1' 0 4' 1/4"=1'-0" (FULL SIZE) 1/8"=1'-0" (11x17)

N

NOTES:

THE POWER DESIGN FOR ANY AC ELECTRICAL POWER CHANGES IS TO BE PERFORMED BY OTHERS AND IS SHOWN HERE FOR REFERENCE PURPOSES ONLY. T-MOBILE IS SOLELY RESPONSIBLE FOR THE ELECTRICAL POWER DESIGN.



2 ENLARGED SITE PLAN
SCALE: 1' 6" 0 1' 3/4"=1'-0" (FULL SIZE) 3/8"=1'-0" (11x17)

N

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

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T-MOBILE
SITE NUMBER: **CT11652A**

BU #: **806382**
HRT 082 943274

74 GOODRICH LANE
PORTLAND, CT 06480

EXISTING
160'-0" MONOPOLE

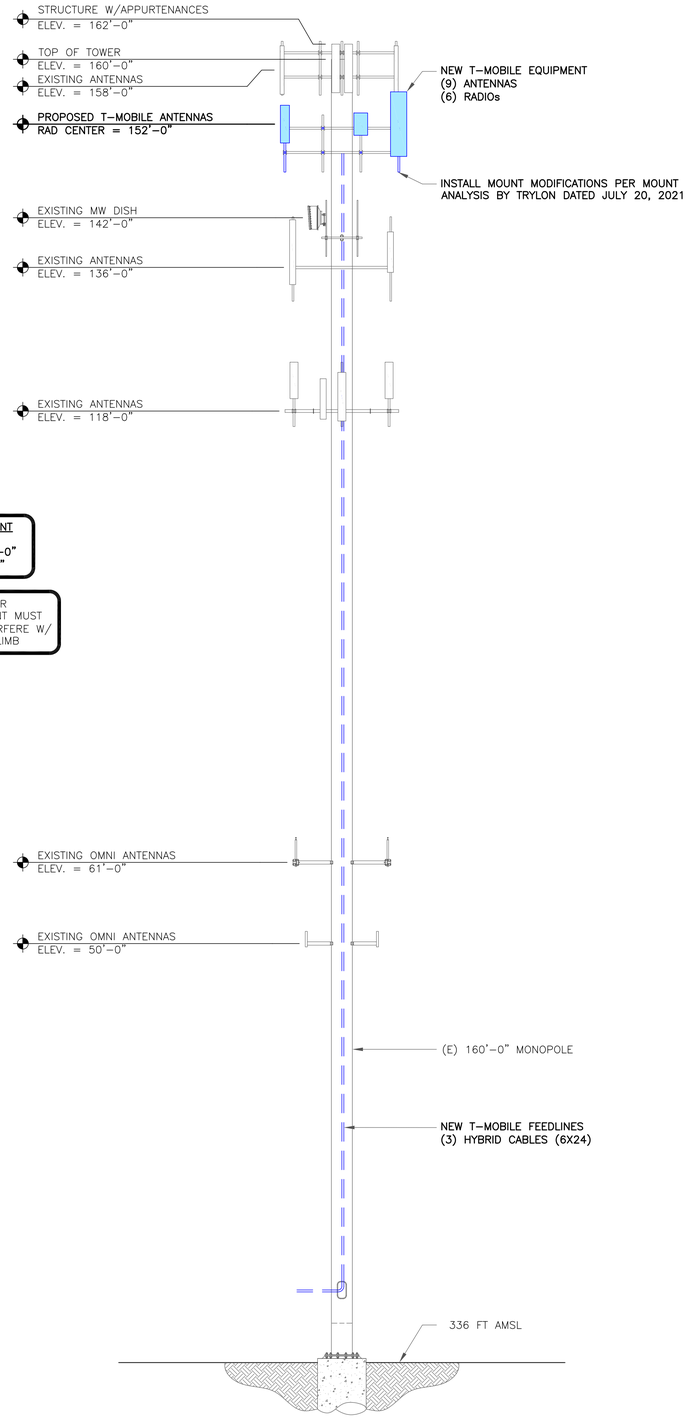
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	9/1/21	JJR	CONSTRUCTION	JJR

STATE OF CONNECTICUT
GUY P. COMERFORD
No. 23924
LICENSED PROFESSIONAL ENGINEER
9/1/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: C-1.2
REVISION: 0

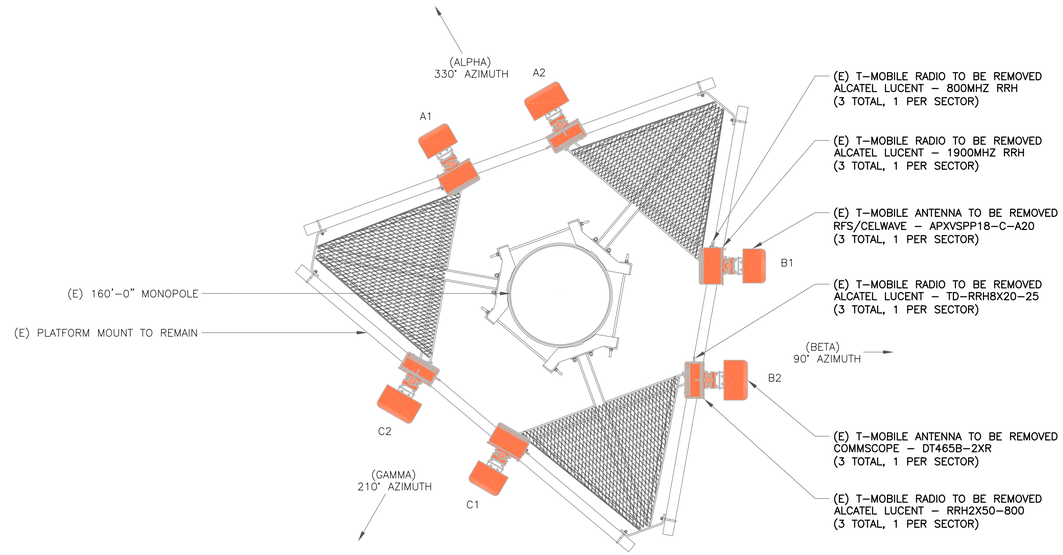


T-MOBILE EQUIPMENT

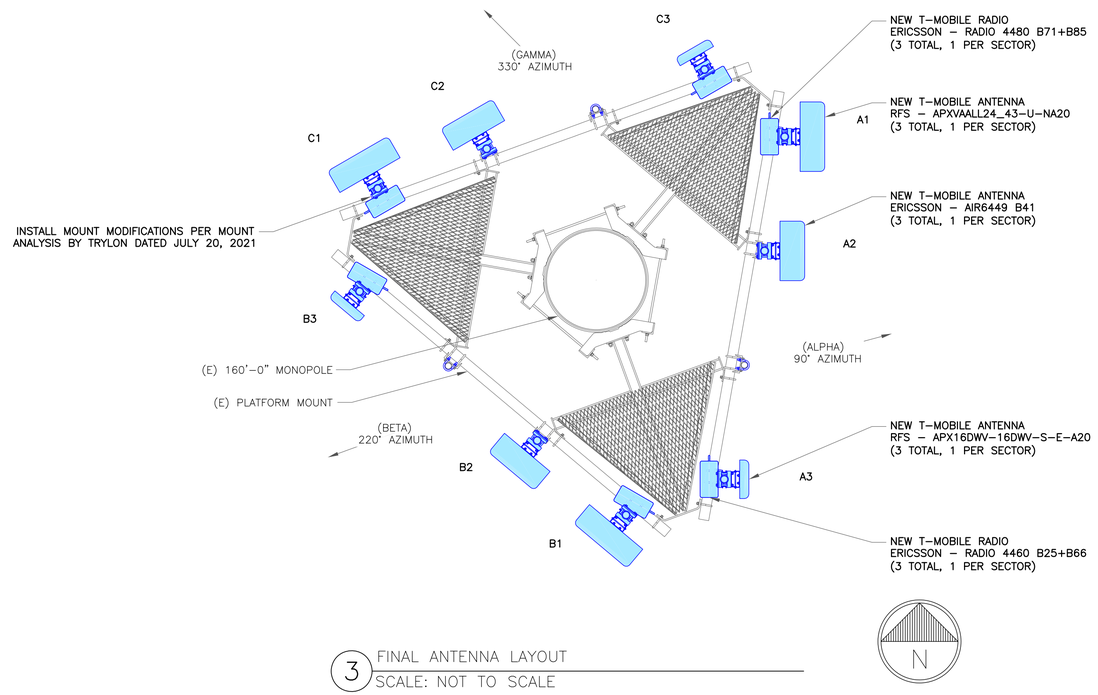
ANTENNA CL: 152'-0"
MOUNT CL: 150'-0"

ANY AND ALL TOWER MOUNTED EQUIPMENT MUST NOT TRAP OR INTERFERE W/ EXISTING SAFETY CLIMB

1 FINAL ELEVATION
SCALE: NOT TO SCALE



2 EXISTING ANTENNA LAYOUT
SCALE: NOT TO SCALE



3 FINAL ANTENNA LAYOUT
SCALE: NOT TO SCALE

T-Mobile
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0	9/1/21	JJR	CONSTRUCTION	JJR

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: C-2

REVISION: 0

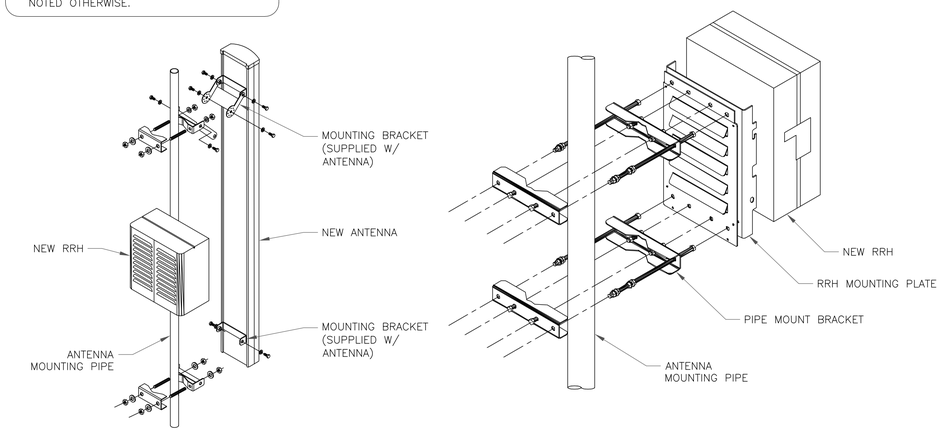
RF SYSTEM SCHEDULE

SECTOR	ANTENNA	TECH	MANUFACTURER	ANTENNA MODEL	AZIMUTH	M-TILT	E-TILT	RAD CENTER	TMA/RRU	FEEDLINE TYPE
ALPHA	A1	L700/L600/N600	RFS	APXVAALL24_43-U-NA20	90°	–	2°/2°	152'-0"	(1) ERICSSON – RADIO 4480 B71+B85	(1) HYBRID CABLE (6X24)
	A2	L2500 / N2500	ERICSSON	AIR6449 B41	90°	–	2°/2°	152'-0"	–	
	A3	L2100/L1900/ G1900	RFS	APX16DWV-16DWV-S-E-A20	90°	–	2°/2°	152'-0"	(1) ERICSSON – RADIO 4460 B25+B66	
BETA	B1	L700/L600/N600	RFS	APXVAALL24_43-U-NA20	220°	–	2°/2°	152'-0"	(1) ERICSSON – RADIO 4480 B71+B85	(1) HYBRID CABLE (6X24)
	B2	L2500 / N2500	ERICSSON	AIR6449 B41	220°	–	2°/2°	152'-0"	–	
	B3	L2100/L1900/ G1900	RFS	APX16DWV-16DWV-S-E-A20	220°	–	2°/2°	152'-0"	(1) ERICSSON – RADIO 4460 B25+B66	
GAMMA	C1	L700/L600/N600	RFS	APXVAALL24_43-U-NA20	330°	–	2°/2°	152'-0"	(1) ERICSSON – RADIO 4480 B71+B85	(1) HYBRID CABLE (6X24)
	C2	L2500 / N2500	ERICSSON	AIR6449 B41	330°	–	2°/2°	152'-0"	–	
	C3	L2100/L1900/ G1900	RFS	APX16DWV-16DWV-S-E-A20	330°	–	2°/2°	152'-0"	(1) ERICSSON – RADIO 4460 B25+B66	

1 ANTENNA AND CABLE SCHEDULE
SCALE: NOT TO SCALE

INSTALLER NOTES:

1. COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRHs RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING.
2. DO NOT OPEN RRH PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.



2 ANTENNA WITH RRH MOUNTING DETAIL
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

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

T-MOBILE
SITE NUMBER: **CT11652A**

BU #: **806382**
HRT 082 943274

74 GOODRICH LANE
PORTLAND, CT 06480

EXISTING
160'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	9/1/21	JJR	CONSTRUCTION	JJR

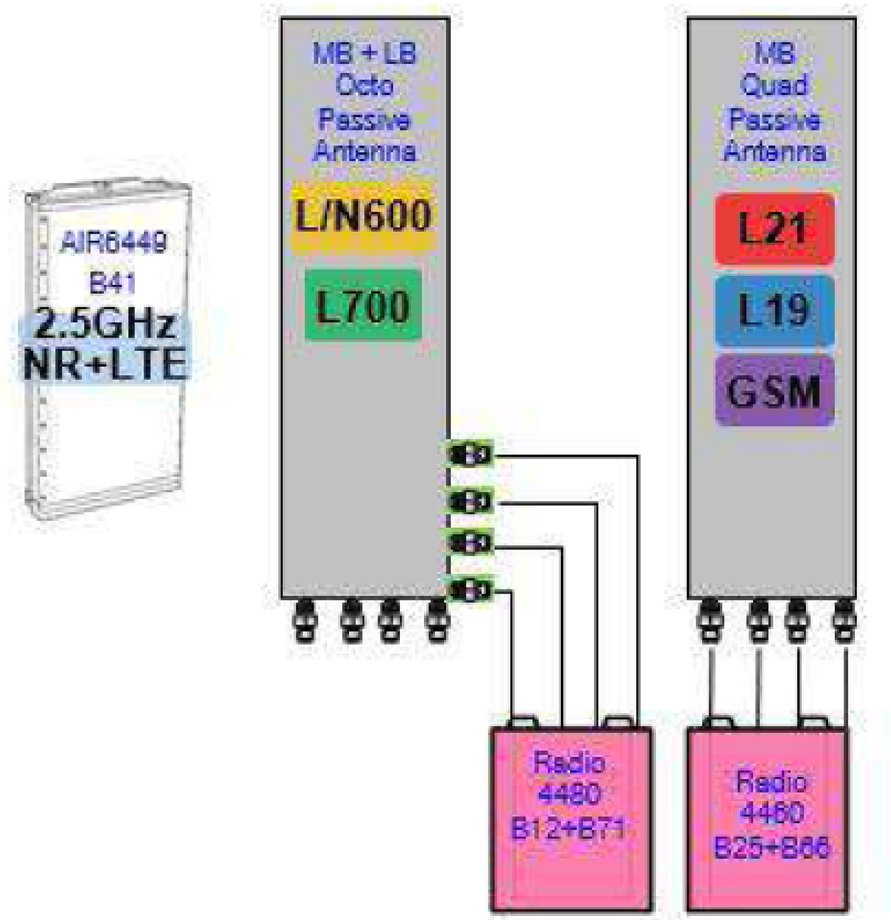
STATE OF CONNECTICUT
SCOTT GRISWOLD LOUT
No. 23924
LICENSED
PROFESSIONAL ENGINEER
9/1/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: C-3

REVISION: 0

67E5A998E.JPG



Notes:

1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

B+T GRP
1717 S. BOULDER
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T-MOBILE
SITE NUMBER: **CT11652A**

BU #: **806382**
HRT 082 943274

74 GOODRICH LANE
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EXISTING
160'-0" MONOPOLE

ISSUED FOR:

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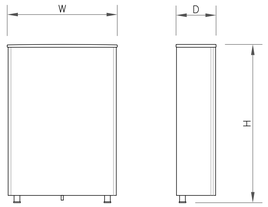
0	9/1/21	JJR	CONSTRUCTION	JJR

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

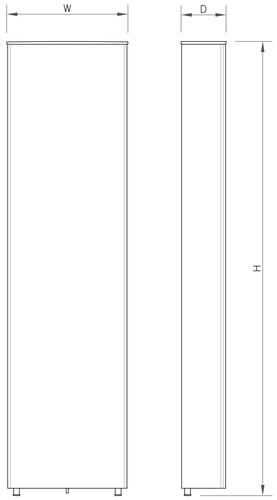
SHEET NUMBER: C-4

REVISION: 0



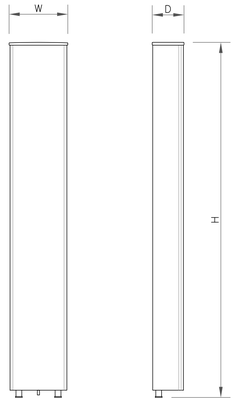
ANTENNA SPECS	
MANUFACTURER	ERICSSON
MODEL #	AIR6449 B41
WIDTH	20.51"
DEPTH	8.54"
HEIGHT	33.11"
WEIGHT	114.63 LBS

1 ANTENNA SPECS
SCALE: NOT TO SCALE



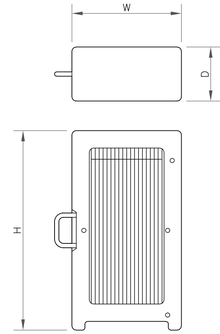
ANTENNA SPECS	
MANUFACTURER	RFS
MODEL #	APXVAALL24_43-U-NA20
WIDTH	24.00"
DEPTH	8.50"
HEIGHT	95.90"
WEIGHT	149.90 LBS

2 ANTENNA SPECS
SCALE: NOT TO SCALE



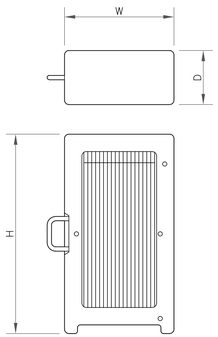
ANTENNA SPECS	
MANUFACTURER	RFS
MODEL #	APX16DWV-16DWV-S-E-A20
WIDTH	13.30"
DEPTH	3.15"
HEIGHT	55.90"
WEIGHT	41.00 LBS

3 ANTENNA SPECS
SCALE: NOT TO SCALE



RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	RADIO 4460 B25+B66
WIDTH	15.10"
DEPTH	11.90"
HEIGHT	17.00"
WEIGHT	109.00 LBS

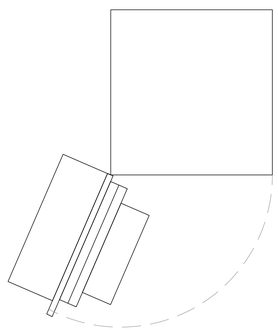
4 RRU SPECS
SCALE: NOT TO SCALE



RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	RADIO 4480 B71+B85
WIDTH	15.70"
DEPTH	7.50"
HEIGHT	21.80"
WEIGHT	92.60 LBS

5 RRU SPECS
SCALE: NOT TO SCALE

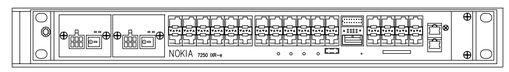
ERICSSON 6160 SSC
WEIGHT: 60.0 LBS
SIZE (HxWxD): 63"x25.6"x33.5" IN.



6 ERICSSON 6160 SSC
SCALE: NOT TO SCALE

BATTERY CABINET SPECIFICATIONS	
MODEL #	B160
MANUF.	ERICSSON
HEIGHT	63"
WIDTH	26"
DEPTH	26"
WEIGHT	

7 ERICSSON B160 BATTERY CABINET
SCALE: NOT TO SCALE



NOKIA CSR IXRE V1 ROUTER
WEIGHT: 11.2 LBS.
SIZE (HxWxD): 1.75x17.25x10.0 IN.

8 NOKIA CSR IXRE V2 VOLTAGE BOOSTER
SCALE: NOT TO SCALE

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PH: (918) 587-4630
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T-MOBILE
SITE NUMBER: **CT11652A**

BU #: **806382**
HRT 082 943274

74 GOODRICH LANE
PORTLAND, CT 06480

EXISTING
160'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	9/1/21	JJR	CONSTRUCTION	JJR

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: C-5

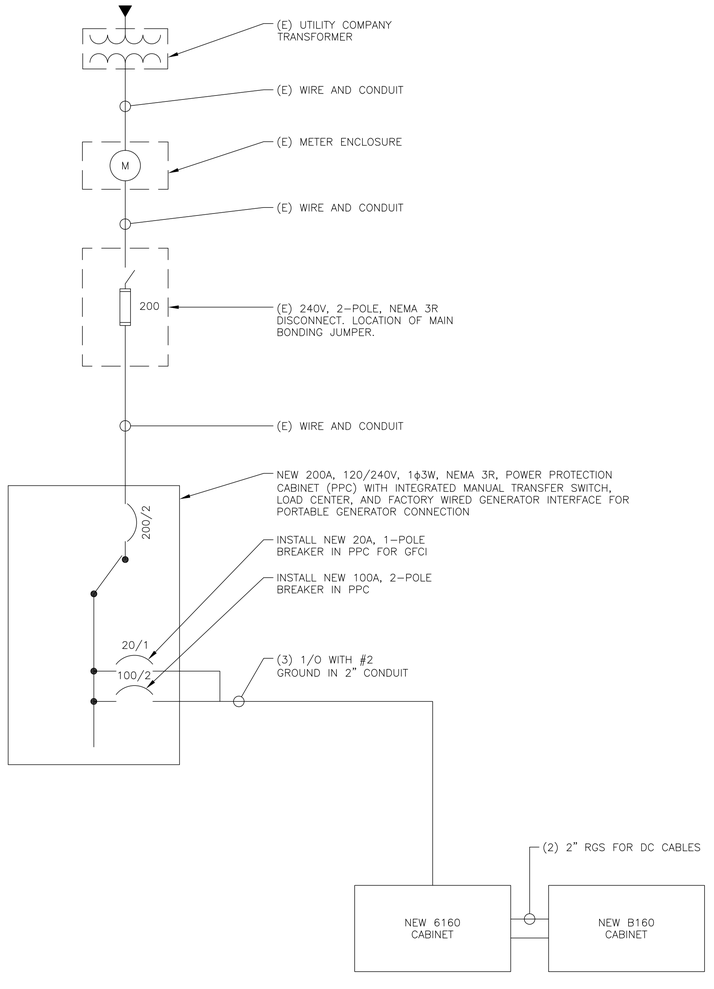
REVISION: 0

FINAL PANEL SCHEDULE							
LOAD	POLES	AMPS	BUS L1	BUS L2	AMPS	POLES	LOAD
MMBTS	2	N/A	1	2	60A	2	SURGE ARRESTOR
			3	4			
			5	6	80A	2	SPARE
DIN-RAIL	1	20A	7	8			
SPARE	1	20A	9	10	15A	1	GFCI
TELCO FAN	1	10A	11	12	100A	2	6160
			13	14			
			15	16	20A	1	B160 BATTERY CABINET
			17	18			
			19	20			
			21	22			
			23	24			

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

EXISTING 100A BREAKER PANEL TO BE REPLACED W/ NEW 200A BREAKER PANEL. SQUARE D P/N: QO12040M200RB (OR APPROVED EQUAL)
REPLACE EXISTING BREAKERS W/ NEW BREAKERS OF SAME AMPERAGE INSIDE NEW PANEL
INSTALL NEW WIRES FOR NEW 6160 CABINET WITH (3) 1/0 AWG THWN (COPPER) AND (1) #2G AWG. MINIMUM CONDUIT SIZE TO BE 2"
UPGRADE FEEDER WIRES TO MEET AMPACITY.
FINAL PANEL DESIGN AND CALCULATIONS FOR WIRE SIZE WERE BASED OFF OF EXISTING DOCUMENTS.

1 AC PANEL SCHEDULE
SCALE: NOT TO SCALE



NOTES:

1. ALL NEW CONDUCTORS TO BE INSTALLED SHALL BE COPPER. ALL CONDUCTORS SHALL BE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 UNLESS NOTED OTHERWISE.
2. CONTRACTOR IS TO FIELD VERIFY ALL EXISTING ITEMS SHOWN ON THE ELECTRICAL ONE-LINE DIAGRAM AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
3. ALL GROUNDING AND BONDING PER THE NEC.

2 ONE LINE DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

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3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

B+T GRP
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SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE
SITE NUMBER: **CT11652A**

BU #: **806382**
HRT 082 943274

74 GOODRICH LANE
PORTLAND, CT 06480

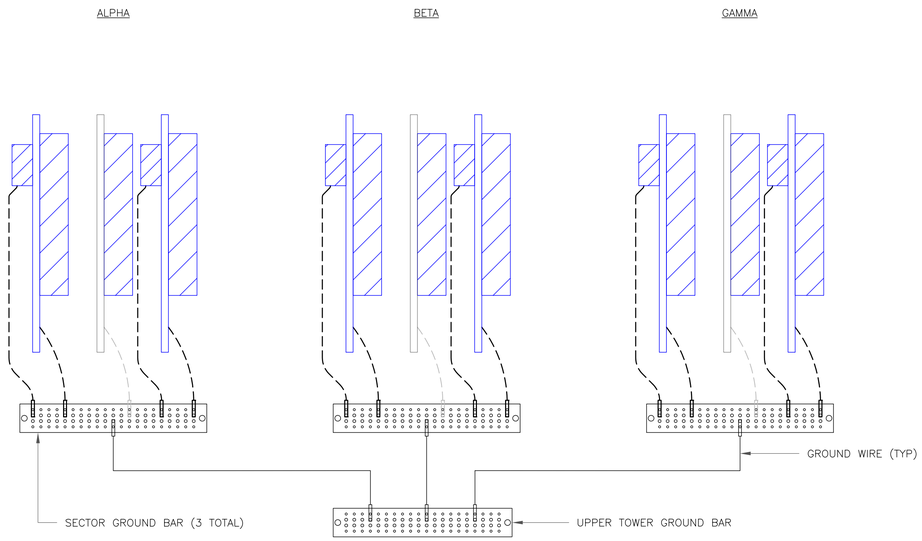
EXISTING
160'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	9/1/21	JJR	CONSTRUCTION	JJR

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: E-1
REVISION: 0



NOTE:

ALL NEW GROUNDS TO BE #6 STRANDED COPPER WITH GREEN INSULATION UNLESS NOTED OTHERWISE.

1 ANTENNA GROUNDING DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

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

T-MOBILE
SITE NUMBER: **CT11652A**

BU #: **806382**
HRT 082 943274

74 GOODRICH LANE
PORTLAND, CT 06480

EXISTING
160'-0" MONOPOLE

ISSUED FOR:

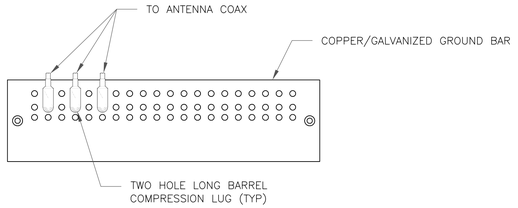
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	9/1/21	JJR	CONSTRUCTION	JJR

STATE OF CONNECTICUT
GREG J. CLARKE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
9/1/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: G-1

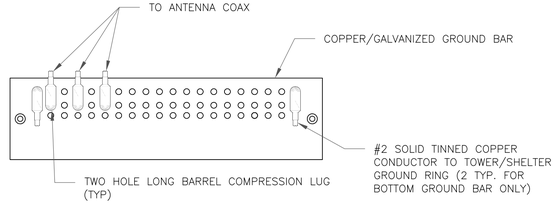
REVISION: 0



NOTES:

1. DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
3. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO ANTENNA MOUNT STEEL.

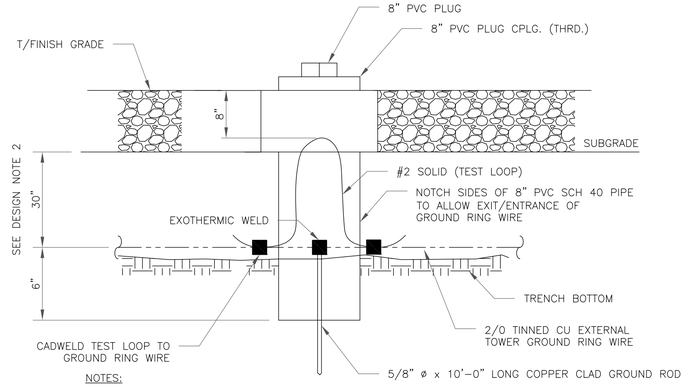
1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
2. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
3. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

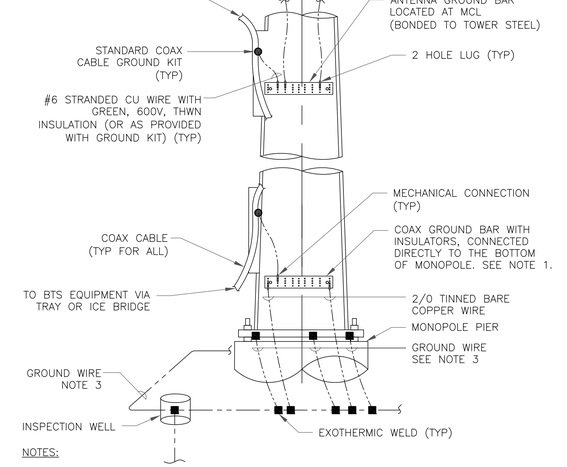
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

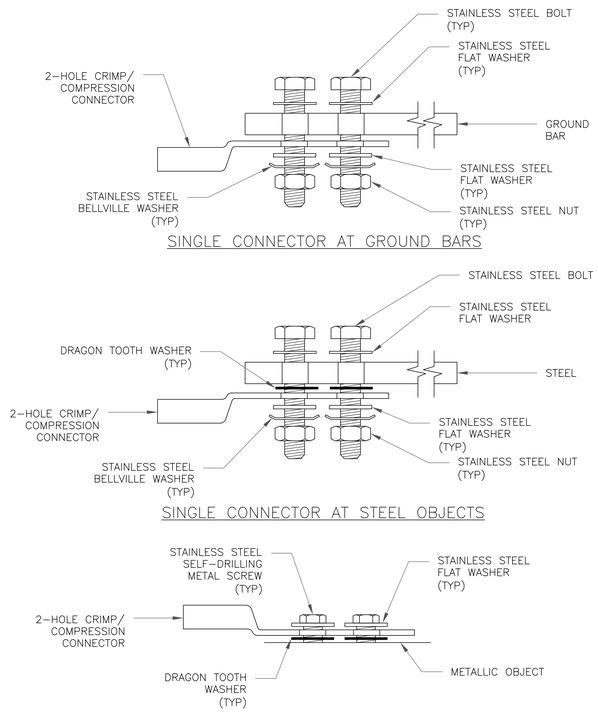
3 INSPECTION WELL DETAIL
SCALE: NOT TO SCALE



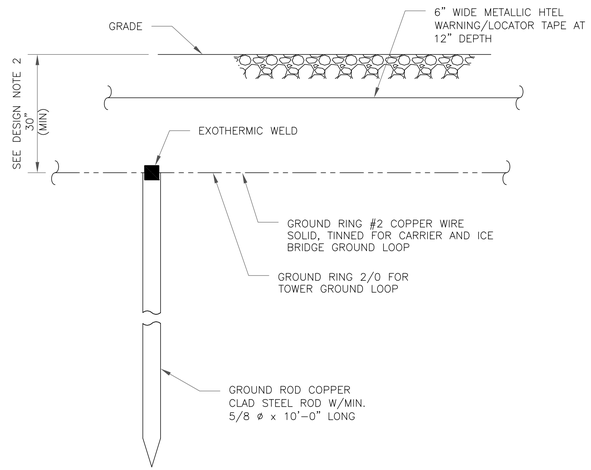
NOTES:

1. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATIONS AND CONNECTION ORIENTATION. COAXIAL CABLES EXCEEDING 200 FEET ON THE TOWER SHALL HAVE GROUND KITS AT THE MIDPOINT. PROVIDE AS REQUIRED.
2. ONLY MECHANICAL CONNECTIONS ARE ALLOWED TO BE MADE TO CROWN CASTLE USA INC. TOWERS. ALL MECHANICAL CONNECTIONS SHALL BE TREATED WITH AN ANTI-OXIDANT COATING.
3. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF THE RECOGNIZED EDITION OF ANSI/TIA 222 AND NFPA 780.

4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

6 GROUND ROD DETAIL
SCALE: NOT TO SCALE

T-Mobile
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BLOOMFIELD, CT 06002

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T-MOBILE
SITE NUMBER: **CT11652A**

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HRT 082 943274

74 GOODRICH LANE
PORTLAND, CT 06480

EXISTING
160'-0" MONOPOLE

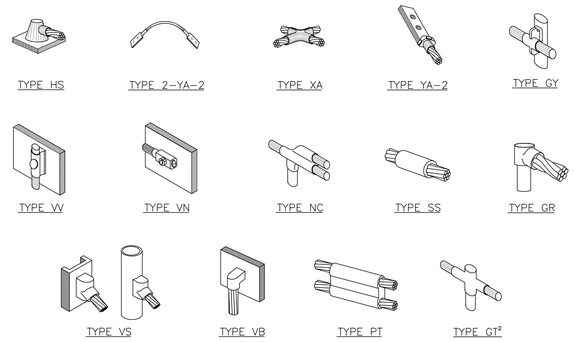
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	9/1/21	JJR	CONSTRUCTION	JJR

STATE OF CONNECTICUT
CHRISTOPHER J. GOUDY
No. 23924
LICENSED
PROFESSIONAL ENGINEER
9/1/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: G-2
REVISION: 0

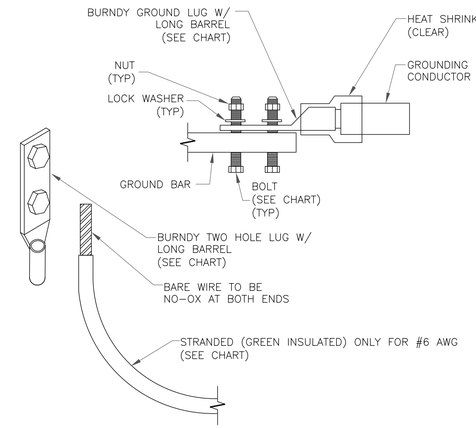


NOTE:

1. ERICO EXOTHERMIC "MOLD TYPES" SHOWN HERE ARE EXAMPLES. CONSULT WITH CONSTRUCTION MANAGER FOR SPECIFIC MOLDS TO BE USED FOR THIS PROJECT.
2. MOLD TYPE ONLY TO BE USED BELOW GRADE WHEN CONNECTING GROUND RING TO GROUND ROD.

1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE

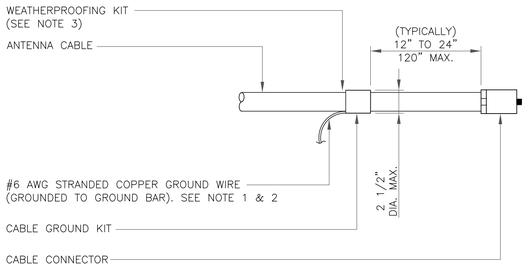
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



NOTES:

1. ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER,GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

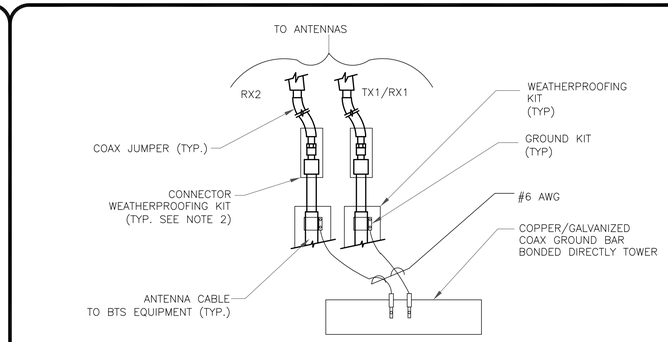
2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

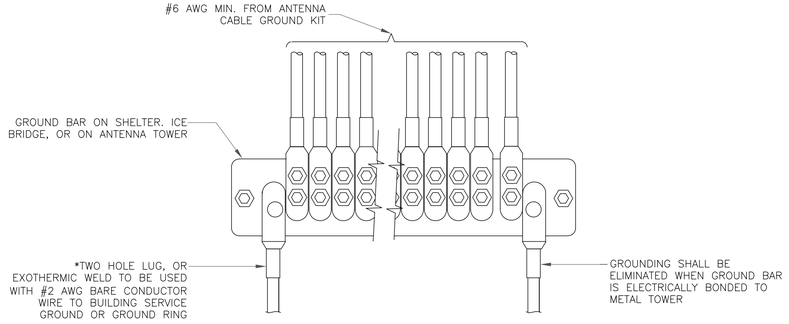
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



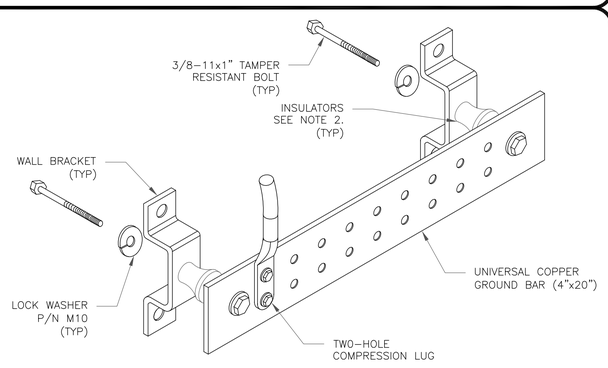
NOTES:

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

4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



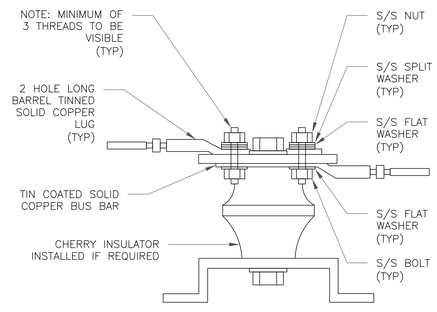
5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



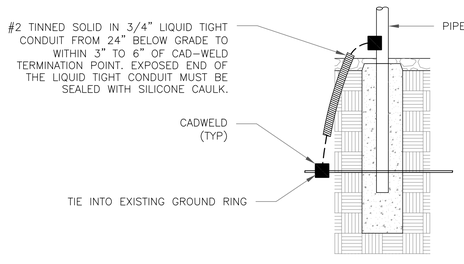
NOTES:

1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

6 GROUND BAR DETAIL
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
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3 CORPORATE PARK DRIVE, SUITE 101
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T-MOBILE
SITE NUMBER: **CT11652A**

BU #: **806382**
HRT 082 943274

74 GOODRICH LANE
PORTLAND, CT 06480

EXISTING
160'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	9/1/21	JJR	CONSTRUCTION	JJR

9/1/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: G-3

REVISION: 0