

INDUSTRIAL AVE,  
SITE 3  
AHWAH NJ 07430  
PHONE: 201.684.0055  
FAX: 201.684.0066



---

August 5, 2021

Members of the Siting Council  
Connecticut Siting Council  
10 Franklin Square  
New Britain, CT 06051

RE: Notice of Exempt Modification  
260 Beckley Road (aka 268 aka 286), Berlin, CT 06037  
Latitude: 41.63166  
Longitude: -72.72986  
T-Mobile Site#: CT11182A - Anchor

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 142' level of the 156' Monopole at the existing facility at 260 Beckley Road, Berlin, CT. The property is owned by South New England Frontier Communications. The tower is owned by American Tower. T-Mobile now intends to add three (3) L2500/N2500 antennas. The new antennas support 5G services and will be installed at the 142' level of the monopole with a new mount.

**Planned Modifications:**

**Tower:**

Install New:

- (3) AIR6449 B41 Antennas
- (3) Radio 4460 B25+B66
- (1) 6x24 Hybrid Cable

Existing to Remain:

- (3) APXVAARR24\_43-U-NA20 Antennas
- (3) Radio 4449 B71+B85
- (2) 6x12 Hybrid Cables

To Be Removed:

- (1) 9x18 HCS
- (12) 1 5/8" Coax Cables

Ground Work:

**Install** (1) B160 Battery Cabinet, (1) Enclosure 6160, (1) BB6648, (1) PSU4813

**Remove:** (1) RBS3106 and all cabinet radios from base station cabinet

This tower was originally approved by the Connecticut Siting Council on May 15, 1984 in Do. 40. Documentation on the original approval of the tower is enclosed with the submission. The proposed modification complies with all previous approvals.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16- SOj-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-SOj-73, a copy of this letter is being sent to Mayor Mark H. Kaczynski, Elected Official, and Christina M. Costa, Town Planner, as well as the property and tower owner.

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

1. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications 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 referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

**Eric Breun**

Transcend Wireless

Cell: 201-658-7728

Email: [ebreun@transcendwireless.com](mailto:ebreun@transcendwireless.com)

Attachments

cc: Mark Kaczynski - Mayor of Berlin

Maureen Giusti - Town Planner

SO New England Frontier Communications - Property Owner

American Tower - Tower Owner

ERIC BREUN  
2016587728  
10 INDUSTRIAL AVE  
MAHWAH NJ 07430

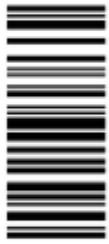
1 LBS

1 OF 1

**SHIP TO:**  
TOWN PLANNER  
MAUREEN GIUSTI  
240 KENSINGTON ROAD  
BERLIN CT 06037

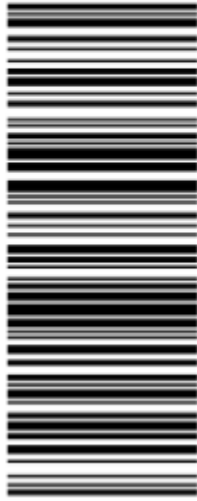


**CT 061 9-02**



**UPS GROUND**

TRACKING #: 1Z V25 742 03 9260 7620



BILLING: P/P

Reference #1: CT11182A

XOL 21.07.05 NV45 31.0A 07/2021\*



TM

ERIC BREUN  
2016587728  
10 INDUSTRIAL AVE  
MAHWAH NJ 07430

1 LBS

1 OF 1

**SHIP TO:**  
CONTACTS MANAGEMENT  
AMERICAN TOWER CORPORATION  
10 PRESIDENTIAL WAY  
WOBBURN MA 01801



**MA 018 9-04**



**UPS GROUND**

TRACKING #: 1Z V25 742 03 9455 7618



BILLING: P/P

Reference #1: CT11182B

XOL 21.07.05 NV45 31.0A 07/2021\*



TM

ERIC BREUN  
2016587728  
10 INDUSTRIAL AVE  
MAHWAH NJ 07430

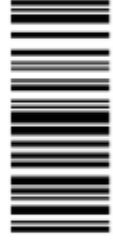
1 LBS

1 OF 1

**SHIP TO:**  
SO NEW ENGLAND FRONTIER COMM  
286 BECKLEY ROAD  
**BERLIN CT 06037**

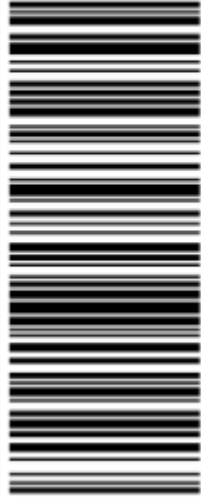


**CT 061 9-02**



**UPS GROUND**

TRACKING #: 1Z V25 742 03 9541 4930



BILLING: P/P

Reference #1: CT11182A

XOL 21.07.05 NV45 31.0A 07/2021\*



TM

ERIC BREUN  
2016587728  
10 INDUSTRIAL AVE  
MAHWAH NJ 07430

1 LBS

1 OF 1

**SHIP TO:**  
MARK KACZYNSKI  
240 KENNINGTON ROAD  
**BERLIN CT 06037**

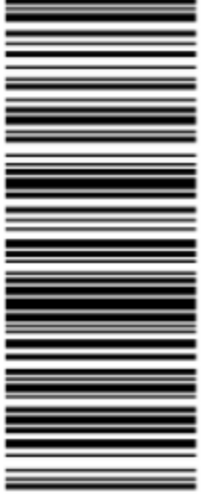


**CT 061 9-02**



**UPS GROUND**

TRACKING #: 1Z V25 742 03 9066 1637



BILLING: P/P

Reference #1: CT11182A

XOL 21.07.05 NV45 31.0A 07/2021\*



TM



**Hello, your package has been delivered.**

**Delivery Date:** Wednesday, 08/04/2021

**Delivery Time:** 12:35 PM

**Left At:** INSIDE DELIV

**Signed by:** BUSH

## **TRANSCEND WIRELESS**

**Tracking Number:** [1ZV257420390661637](#)

**Ship To:**

MARK KACZYNSKI  
240 KENSINGTON ROAD  
BERLIN, CT 06037  
US

**Number of Packages:** 1

**UPS Service:** UPS Ground

**Package Weight:** 1.0 LBS

**Reference Number:** [CT11182A](#)



**Hello, your package has been delivered.**

**Delivery Date:** Wednesday, 08/04/2021

**Delivery Time:** 12:36 PM

**Left At:** INSIDE DELIV

**Signed by:** GUISTI

## **TRANSCEND WIRELESS**

**Tracking Number:** [1ZV257420392607620](#)

**Ship To:**

MAUREEN GIUSTI  
240 KENSINGTON ROAD  
BERLIN, CT 06037  
US

**Number of Packages:** 1

**UPS Service:** UPS Ground

**Package Weight:** 1.0 LBS

**Reference Number:** [CT11182A](#)



**Hello, your package has been delivered.**

**Delivery Date:** Wednesday, 08/04/2021

**Delivery Time:** 11:39 AM

**Left At:** FRONT DESK




**Signed by:** ANCRI

## TRANSCEND WIRELESS

<b>Tracking Number:</b>	<a href="#">1ZV257420394557618</a>
<b>Ship To:</b>	AMERICAN TOWER CORPORATION 10 PRESIDENTIAL WAY WOBURN, MA 01801 US
<b>Number of Packages:</b>	1
<b>UPS Service:</b>	UPS Ground
<b>Package Weight:</b>	1.0 LBS
<b>Reference Number:</b>	<a href="#">CT11182B</a>

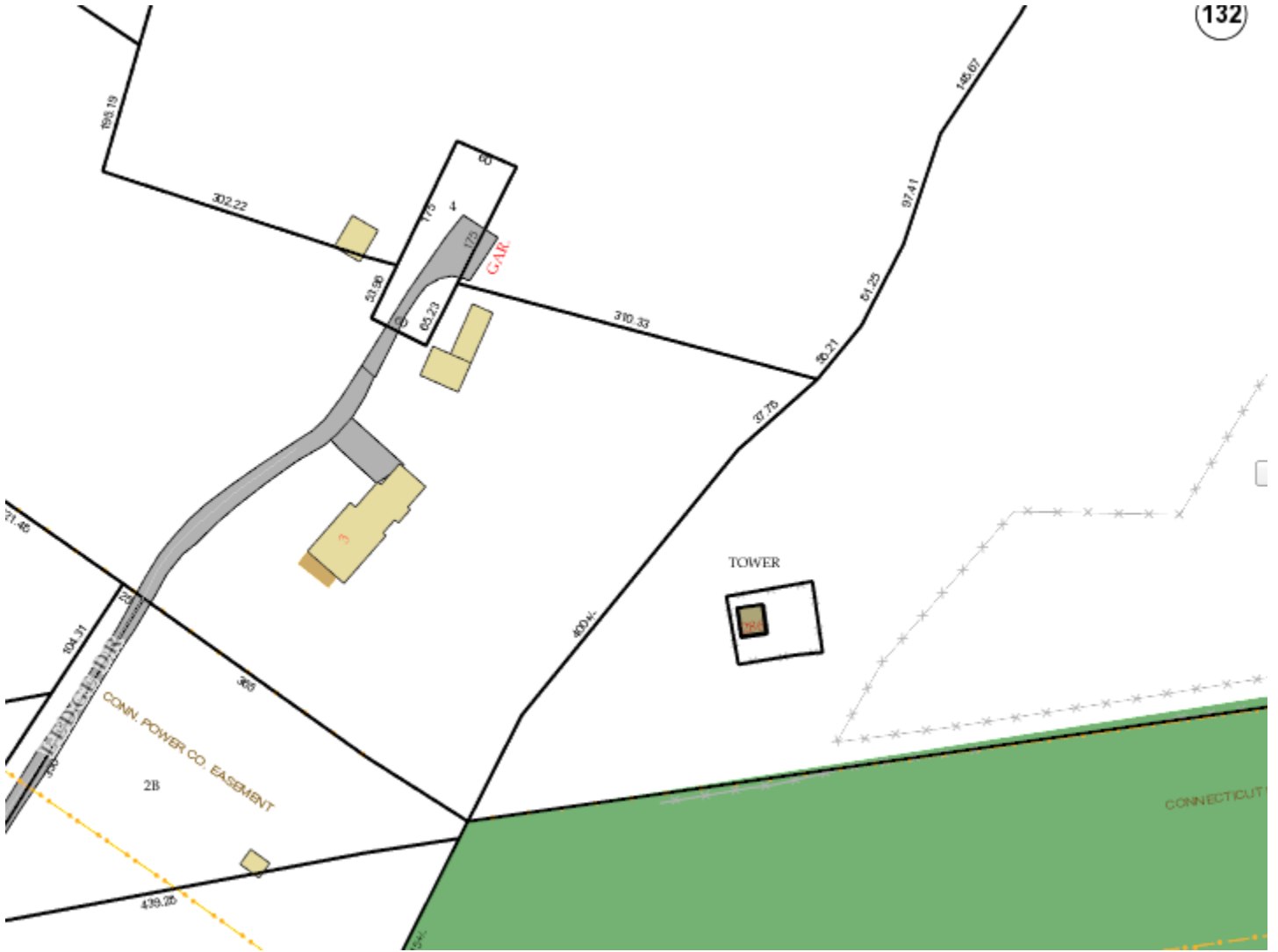
Your shipment from

## TRANSCEND WIRELESS

-  Label Created
-  Shipped
-  Out for Delivery

### Ship To

SO NEW ENGLAND FRONTIER COMM  
286 BECKLEY ROAD  
BERLIN, CT 06037 US





# Town of Berlin, CT

## Property Listing Report

Map Block Lot

11-3-132-7-1

Building # 1

PID 7922

Account

1060060

### Property Information

Property Location	286 BECKLEY RD
Owner	SO NEW ENGLAND %FRONTIER COMMUNICATIONS
Co-Owner	ATTENTION TAX DEPT
Mailing Address	PO BOX 2629 ADDISON TX 75001
Land Use	4310 Tel Rel Twr
Land Class	I
Zoning Code	R-43
Census Tract	4001

District	0
Acreage	0
Utilities	UNKNOWN
Book / Page	0230/0842

### Primary Construction Details

Year Built	0
Building Desc.	Tel Rel Twr
Building Style	UNKNOWN
Stories	
Occupancy	
Exterior Walls	
Exterior Walls 2	
Roof Style	
Roof Cover	
Interior Walls	
Interior Walls 2	
Interior Floors 1	
Interior Floors 2	

Heating Fuel	
Heating Type	
AC Type	
Bedrooms	0
Full Bathrooms	0
Half Bathrooms	0
Extra Fixtures	0
Total Rooms	0
Bath Style	
Kitchen Style	
Fin BSMT Area	
Fin BSMT Quality	
Fin BSMT Area 2	
Fin BSMT Qual 2	

BSMT Garages	0
Fireplaces	0
Whirlpool Tub	0
Building Use	Vacant
Building Condition	
Industrial / Commercial Details (*Residential Not Applicable)	
Heat / AC	NA
Frame Type	NA
Baths / Plumbing	NA
Ceiling / Wall	NA
Rooms / Prtns	NA
Wall Height	NA
First Floor Use	NA

### Photo



### Sketch

No Photo Available



AN APPLICATION SUBMITTED BY THE SOUTHERN : CONNECTICUT SITING  
NEW ENGLAND TELEPHONE COMPANY FOR A  
CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY :  
AND PUBLIC NEED FOR THE CONSTRUCTION, : COUNCIL  
MAINTENANCE, AND OPERATION OF FACILITIES  
TO PROVIDE CELLULAR SERVICE IN THE HARTFORD :  
AND MIDDLESEX COUNTIES. : May 15, 1984

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

Pursuant to the foregoing opinion, the Council hereby directs that a certificate of environmental compatibility and public need as required by section 16-50k of the General Statutes of Connecticut, revisions of 1958, revised to 1983, as amended, be issued to Southern New England Telephone for the construction, operation, and maintenance of a telecommunications tower and associated equipment to provide cellular service at each of the following sites:

Shuttle Meadow Road, Southington, Connecticut;  
Mountain Street, Hartford, Connecticut;  
Prestige Park Road, East Hartford, Connecticut;  
Beckley Road, Berlin, Connecticut;  
Slicer tract, Niederwerfer Road, South Windsor, Connecticut; and  
Kikapoo Road, Middlefield, Connecticut.

The facilities shall be constructed, operated, and maintained as specified in the Council's record on this matter, and subject to the following conditions.

1. The towers shall be no taller than necessary to provide the proposed service and in no event shall exceed
  - a) 150 feet at the Southington site,
  - b) 100 feet at the Hartford site,
  - c) 150 feet at the East Hartford site,
  - d) 150 feet at the Berlin site,
  - e) 75 feet at the South Windsor site, and
  - f) 75 feet at the Middlefield site.
2. A fence not lower than eight feet shall surround each tower and its associated equipment.

3. The applicant or its successor shall notify the Council if and when directional antennas or any other equipment is added to any of these facilities.
4. The applicant or its successor shall permit in accordance with representations made by it during the proceeding public or private entities to share space on the facilities, for due consideration received, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.
5. Unless necessary to comply with condition number seven, below, no lights shall be installed on any of these towers.
6. The facility construction shall be conducted in accordance with all applicable federal, state, and municipal laws and regulations.
7. The applicant shall submit a development and management plan (D&M) for the South Windsor, Southington, and Berlin sites pursuant to sections 16-50j-85 through 16-50j-87 of the regulations of state agencies, except that irrelevant items in section 16-50j-86 need only be identified as such. The D&M plans shall include appropriate evergreen screening of the sites. The applicant shall comply with the reporting requirements of section 16-50j-87 for all sites. The applicant shall consult with Mrs. Claire Aubin and the Town of South Windsor in the preparation of the South Windsor site D&M.
8. Construction activities shall take place during daylight working hours.
9. This decision and order shall be void and the towers and associated equipment approved herein shall be dismantled and removed,



or reapplication for any new use shall be made to the Connecticut Siting 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.

10. This decision and order shall be void if all construction authorized is not completed within three years of the issuance of this decision.

Pursuant to section 16-50p(c) of the General Statutes, we hereby direct that a copy of the opinion and decision and order be served on each person listed below. A notice of the issuance shall be published in the Hartford Courant, Journal Inquirer, and the Middletown Press.

The parties to this proceeding are

Southern New England  
Telephone Company  
Room 314  
227 Church Street  
New Haven, Connecticut 06506

(Applicant)

ATTN: Mr. Peter J. Tyrrell, Esquire

(its attorney)

Town of South Windsor  
1540 Sullivan Avenue  
South Windsor, Connecticut 06074

represented by:

Mr. Richard M. Rittenband  
Town Attorney  
1734 Ellington Road  
South Windsor, Connecticut 06074

Frank Niederwerfer  
260 Niederwerfer Road  
South Windsor, Connecticut 06074

(service waived)

Claire Aubin  
407 Niederwerfer Road  
South Windsor, Connecticut 06074

(service waived)

Betty S. Kleiner  
Chairman  
Hartford Audubon Society, Inc.  
5 Flintlock Ridge  
Simsbury, Connecticut 06070

(service waived)

Roger Thorpe  
2916 Ellington Road  
South Windsor, Connecticut 06074

Intervenors in this proceeding are

Dwight A. Johnson  
Murtha, Cullina, Richter  
and Pinney  
101 Pearl Street  
P.O. Box 3197  
Hartford, Connecticut 06103-0197

representing:

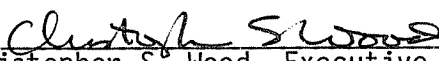
Metromedia TeleCommunications  
Nutmeg Telecommunications, Inc.  
CSI of New Haven  
CSI of Stamford  
Cellular Communications, Inc.  
LIN Cellular Corp.  
Cellular Mobile Services  
Maxcell TeleCommunications, Inc.  
Mobile Cellular Telephone, Inc.  
Cellular Dynamics  
Connecticut Corridor Cellular  
Chase/Post Cellular



STATE OF CONNECTICUT            )  
  :  
COUNTY OF HARTFORD            )        ss.        New Britain, May 15, 1984

I hereby certify that the foregoing is a true and correct copy of the decision and order issued by the Connecticut Siting Council, State of Connecticut.

ATTEST:

  
\_\_\_\_\_  
Christopher S. Wood, Executive Director  
Connecticut Siting Council



**AMERICAN TOWER®**  
CORPORATION

This report was prepared for American Tower Corporation by

**CLS**ENGINEERING  
PLLC

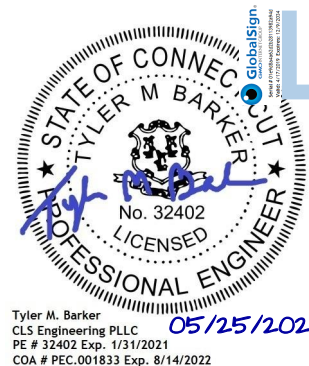
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## Antenna Mount Analysis Report

**ATC Site Name** : Brln - Berlin  
**ATC Asset Number** : 302483  
**Engineering Number** : 13678286\_C8\_02  
**Mount Elevation** : 142 ft  
**Carrier** : T-Mobile  
**Carrier Site Name** : Berlin/ Rt-9 X22\_1  
**Carrier Site Number** : CT11182A  
**Site Location** : 286 Beckley Road  
Berlin, CT 06037-2419  
41.631722, -72.729900  
**County** : Hartford  
**Date** : May 25, 2021  
**Max Usage** : 83%  
**Result** : Pass

Prepared By:  
**Amey Kulkarni**  
CLS Engineering PLLC

Reviewed By:  
**Tyler M. Barker, P.E.**  
CLS Engineering PLLC



**Table of Contents**

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## Introduction

The proposed equipment is to be mounted to the existing Platform w/ Support Rails. This proposed mounting configuration was analyzed using RISA-3D, a commercially available finite element analysis software package. A selection of input and output from our analysis is attached to the end of this report.

## Supporting Documents

<b>Structural Data</b>	Site Photos, dated July 3, 2019 Spec Sheet for Commscope MC-HP12M
<b>Previous Analyses</b>	Structural Analysis by American Tower Corporation, Engineering #OAA754987_C3_01, dated January 3, 2020
<b>Loading Data</b>	ATC Application, Project #13678286 T-Mobile RFDS, Site ID: CT11182A Version: 5, dated April 30, 2021

## Analysis

<b>Codes</b>	TIA-222-H
<b>Basic Wind Speed</b>	118 mph, $V_{ult}$ (3-Second Gust)
<b>Basic Wind Speed w/ Ice</b>	50 mph (3-Second Gust) w/ 1.5" Radial Ice (Escalating)
<b>Exposure Category</b>	B
<b>Topographic Factor Procedure:</b>	Method 2
<b>Feature:</b>	Flat
<b>Crest Height (H):</b>	0 ft
<b>Crest Length (L):</b>	0 ft
<b>Risk Category</b>	II
<b>Maintenance Live Load</b>	$L_M$ : 500 lb
<b>Spectral Response</b>	$S_S$ : 0.20; $S_1$ : 0.06; Site Class: D

## Conclusion

Based on the analysis, the antenna mount meets the requirements per the applicable codes listed above. The mount can support the equipment as described in this report.

If you have any questions or require additional information, please contact American Tower via email at [Engineering@americantower.com](mailto:Engineering@americantower.com). Please include the American Tower site name, site number, and engineering number in the subject line for any questions.

**Antenna Loading**

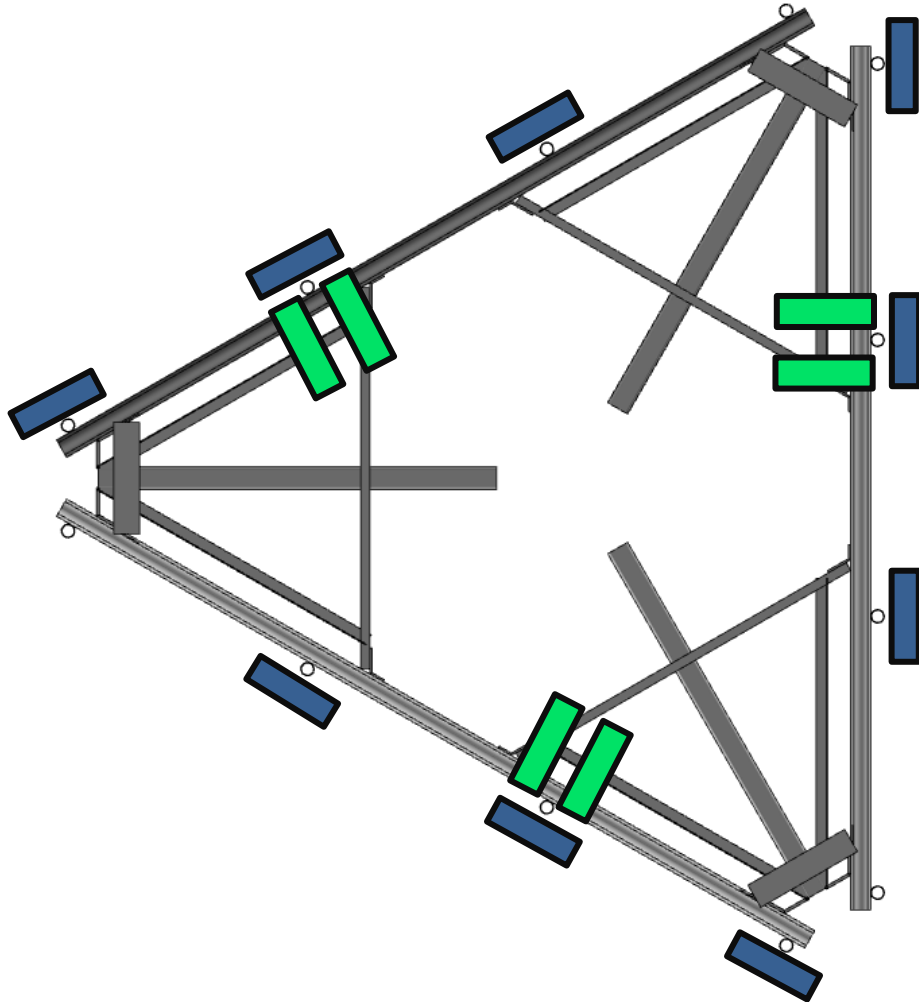
Elevation (ft)		Antennas	
Mount	Rad.	#	Name
142.0	142.0	3	RFS Celwave APXVAARR24_43-U-NA20
		3	Ericsson AIR32 B66Aa/B2a
		3	Ericsson AIR6449 B41
		3	Ericsson Radio 4460 B25+B66
		3	Ericsson RADIO 4449 B71 B85A

**Structure Usages**

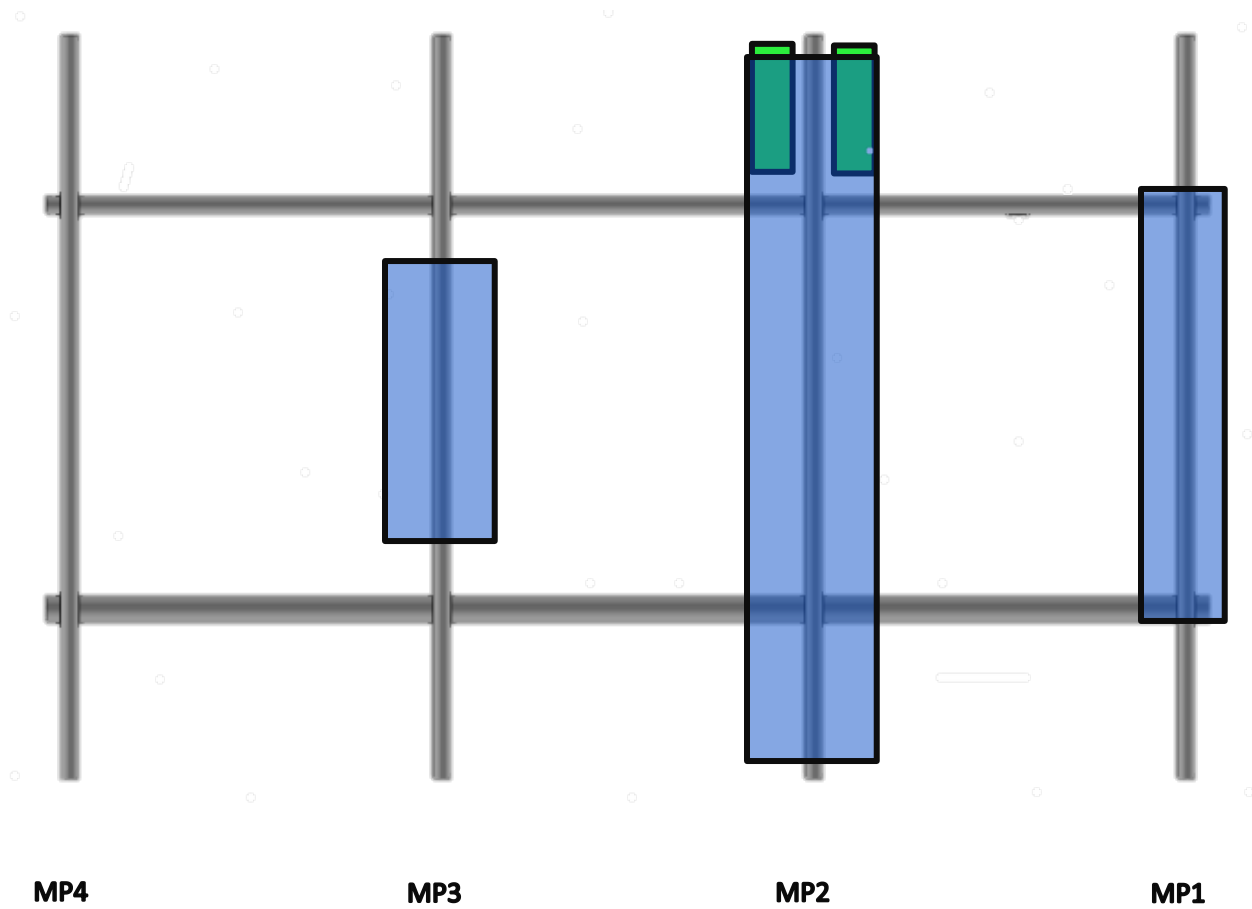
Structural Component	Controlling Usage	Pass/Fail
Channel Connection Plates	83%	Pass
Mount to Tower Connection	58%	Pass
Stand-Off Horizontals	52%	Pass
Mount Pipes	51%	Pass
Platform Base	44%	Pass
Support Rail	34%	Pass
Grating Angles	19%	Pass



Equipment Layout Plan View



Equipment Layout Front Elevation View



### **Standard Conditions**

This analysis is inclusive of the antenna supporting frames/mounts and all recorded connections that will support the equipment listed in this report. It considers only the theoretical capacity of structural components and it is not a condition assessment. The validity of the analysis may be dependent on the accuracy of structural information supplied by others. The client is responsible for verifying this information. If any provided information is revised after completion of this analysis, CLS Engineering PLLC should be notified immediately to revise results.

This analysis assumes the following:

1. The tower or other superstructure and mounts (if existing) were properly constructed as per the original design and have been properly maintained in accordance with applicable code standards.
2. Member sizes and strengths are accurate as supplied or are assumed as stated in the calculations.
3. In the absence of sufficient design information, all welds and connections are assumed to develop at least the capacity of the connected member, unless otherwise stated in this analysis.
4. All prior structural modifications, if any, are assumed to be correctly installed and fully effective.
5. The loading configuration is complete and accurate as supplied and/or as modeled in the previous analysis. All appurtenances are assumed to be properly installed and supported as per manufacturer requirements.
6. Some conservative assumptions may be used regarding appurtenances and their projected areas based on careful interpretation of data supplied, previous experience and standard industry practice.

All opinions and conclusions are considered accurate to a reasonable degree of engineering certainty based upon the evidence available at the time of the report. All opinions and conclusions contained herein are subject to revision based upon receipt of new or updated information. All services are provided exercising a level of care and diligence equivalent to the standard of our profession. No warranty or guarantee, either expressed or implied, is offered. All services are confidential in nature and this report will not be released to any other party without the client's consent. The use of this analysis is limited to the expressed purpose for which it was commissioned and it may not be reused, copied or disseminated for any other purpose without consent from CLS Engineering PLLC.

All services were performed, results obtained and recommendations made in accordance with generally accepted engineering principles and practices. CLS Engineering PLLC is not responsible for the conclusions, opinions or recommendations made by others based on the information supplied in this analysis.

It is not possible to have the fully detailed information necessary to perform a complete and thorough analysis of every structural sub-component of an existing structure. The structural analysis by CLS Engineering PLLC verifies the adequacy of the primary members of the structure. CLS Engineering PLLC provides a limited scope of service in that we cannot verify the adequacy of every weld, bolt, gusset, etc.

Wind & Ice Loading			
Nominal Mount Elevation (AGL), $z_{mount}$	142 ft	$K_a$	0.90
Nominal Rad Elevation (AGL), $z_{rad}$	142 ft	$K_d$	0.95
Elevation AMSL (ft)	195 ft	$K_e$	0.99
TIA Standard	H	$K_z$	1.09
Basic Wind Speed, $V_{ult}$ (bare)	118 mph	$K_{zt}$	1.00
Basic Wind Speed, $V$ (ice)	50 mph	$K_s$	1.00
Design Ice Thickness, $t_i$	1 1/2 in	$t_{iz}$	1.74 in
Exposure Category	B	$G_h$	1.00
Risk Category	II	$q_z$ (bare)	36.7 psf
Seismic Response Coeff., $C_s$	0.11	$q_z$ (ice)	6.6 psf

Live Loading	
At Mount Pipes, $L_M$	500 lb
Joint Labels Considered	1_M1
	1_M2
	1_M3
	1_M4

Member Distributed Loading				
Section Set Label	Shape Label	$F_A$ (lb/ft)		Ice Wt. (lb/ft)
		Bare	Ice	
Standoff Tube	HSS4X4X4	22.04	2.36	14.48
Offset End Plate	PL6x0.5	33.06	5.63	12.46
Face Horizontal Pipe	PIPE_3.5x0.165	11.57	4.14	11.10
Channel Conn. Plate 2	PL2.38X0.375	13.11	3.49	7.40
Channel Conn. Plate 1	PL 6"x0.375"	33.06	5.63	12.29
Angle Grating Supports	L2x2x3	11.02	2.21	8.83
Side Channel	C4X5.4	22.04	4.61	12.80
Support Rail	PIPE_2.0	7.85	3.47	8.72
SR Conn Plate	PL6x1/4	33.06	5.62	12.12
SR Conn Angle	Custom 6.63x4.46_HRB	36.53	2.55	18.40
MOUNT_PIPE_2.0	PIPE_2.0	7.85	3.47	8.72

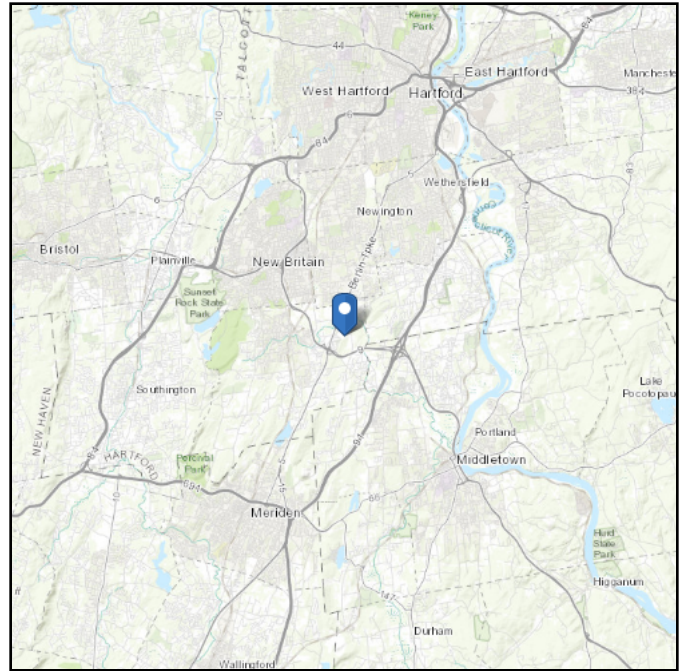
Appurtenances																														
Appurtenance Model	Status	Azimuth Offset ( $^\circ$ , $\cup$ )	Rad Elev. Override (ft)	Swap Width & Depth	Area Factor		Qty. per Azimuth			Total Qty. Override	0° Joints		120° Joints		240° Joints		Height (in)	Width (in)	Depth (in)	Weight (Bare) (lb)	Shape	Weight of Ice (lb)	$EPA_A$ (Bare) (ft $^2$ )		$EPA_A$ (Ice) (ft $^2$ )		$F_A$ (Bare) (lb)		$F_A$ (Ice) (lb)	
					Front	Side	0°	120°	240°		1	2	1	2	1	2							N	T	N	T	N	T		
AIR32 B66Aa/B2a				<input type="checkbox"/>			1	1	1		1_A1T	1_A1B	2_A1T	2_A1B	3_A1T	3_A1B	56.6	12.9	8.7	132.2	Flat	182.05	6.51	4.71	8.55	6.64	215.20	155.78	50.75	39.43
APXVAARR24_43-U-NA20				<input type="checkbox"/>			1	1	1		1_A2T	1_A2B	2_A2T	2_A2B	3_A2T	3_A2B	95.9	24	8.7	153.3	Generic	390.84	14.67	5.32	17.31	7.65	484.96	175.87	102.73	45.38
AIR6449 B41				<input type="checkbox"/>			1	1	1		1_A3T	1_A3B	2_A3T	2_A3B	3_A3T	3_A3B	33.1	20.6	8.6	104	Flat	135.78	5.68	2.49	7.34	3.75	187.84	82.34	43.54	22.26
RADIO 4449 B71 B85A				<input checked="" type="checkbox"/>	0.5	0.5	1	1	1		1_R2TT		2_R2TT		3_R2TT		15	13.2	10.5	75	Flat	72.05	0.66	0.83	1.08	1.28	21.69	27.27	6.38	7.62
Radio 4460 B25+B66				<input checked="" type="checkbox"/>	0.5	0.5	1	1	1		1_R2TT		2_R2TT		3_R2TT		19.6	15.7	12.1	109	Flat	102.54	0.99	1.28	1.50	1.84	32.67	42.39	8.88	10.94

# ASCE 7 Hazards Report

**Address:**  
No Address at This Location

**Standard:** ASCE/SEI 7-16  
**Risk Category:** II  
**Soil Class:** D - Default (see Section 11.4.3)

**Elevation:** 195.28 ft (NAVD 88)  
**Latitude:** 41.631722  
**Longitude:** -72.7299



## Wind

### Results:

Wind Speed:	118 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	98 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2  
Date Accessed: Sat May 22 2021

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

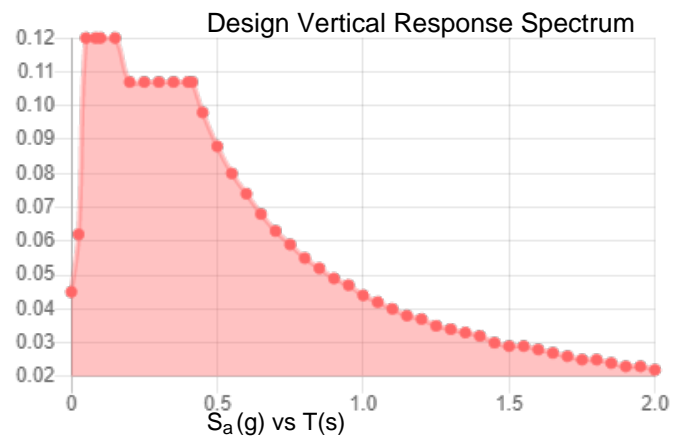
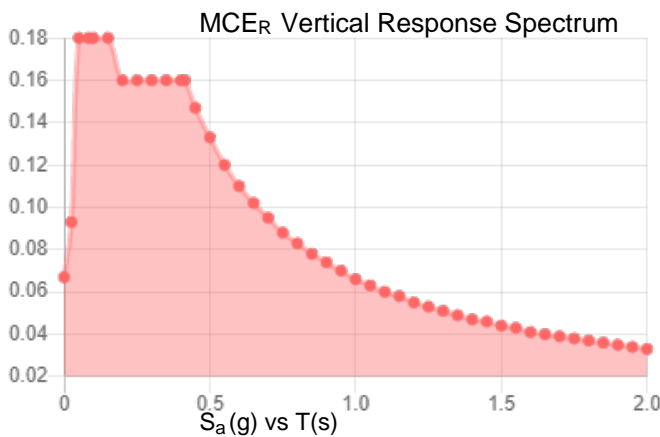
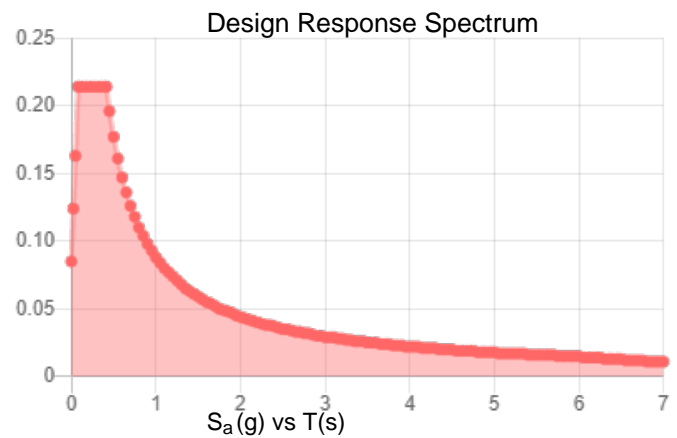
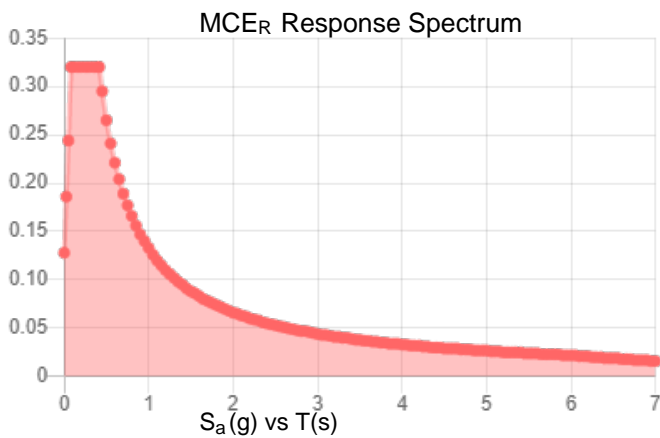
Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

**Site Soil Class:** D - Default (see Section 11.4.3)

**Results:**

$S_s$ :	0.2	$S_{D1}$ :	0.088
$S_1$ :	0.055	$T_L$ :	6
$F_a$ :	1.6	PGA :	0.11
$F_v$ :	2.4	PGA <sub>M</sub> :	0.174
$S_{MS}$ :	0.32	$F_{PGA}$ :	1.58
$S_{M1}$ :	0.133	$I_e$ :	1
$S_{DS}$ :	0.214	$C_v$ :	0.701

**Seismic Design Category** B



**Data Accessed:**

Sat May 22 2021

**Date Source:**

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.



## Ice

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### Results:

Ice Thickness: 1.50 in.

Concurrent Temperature: 15 F

Gust Speed: 50 mph

**Data Source:** Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8

**Date Accessed:** Sat May 22 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.

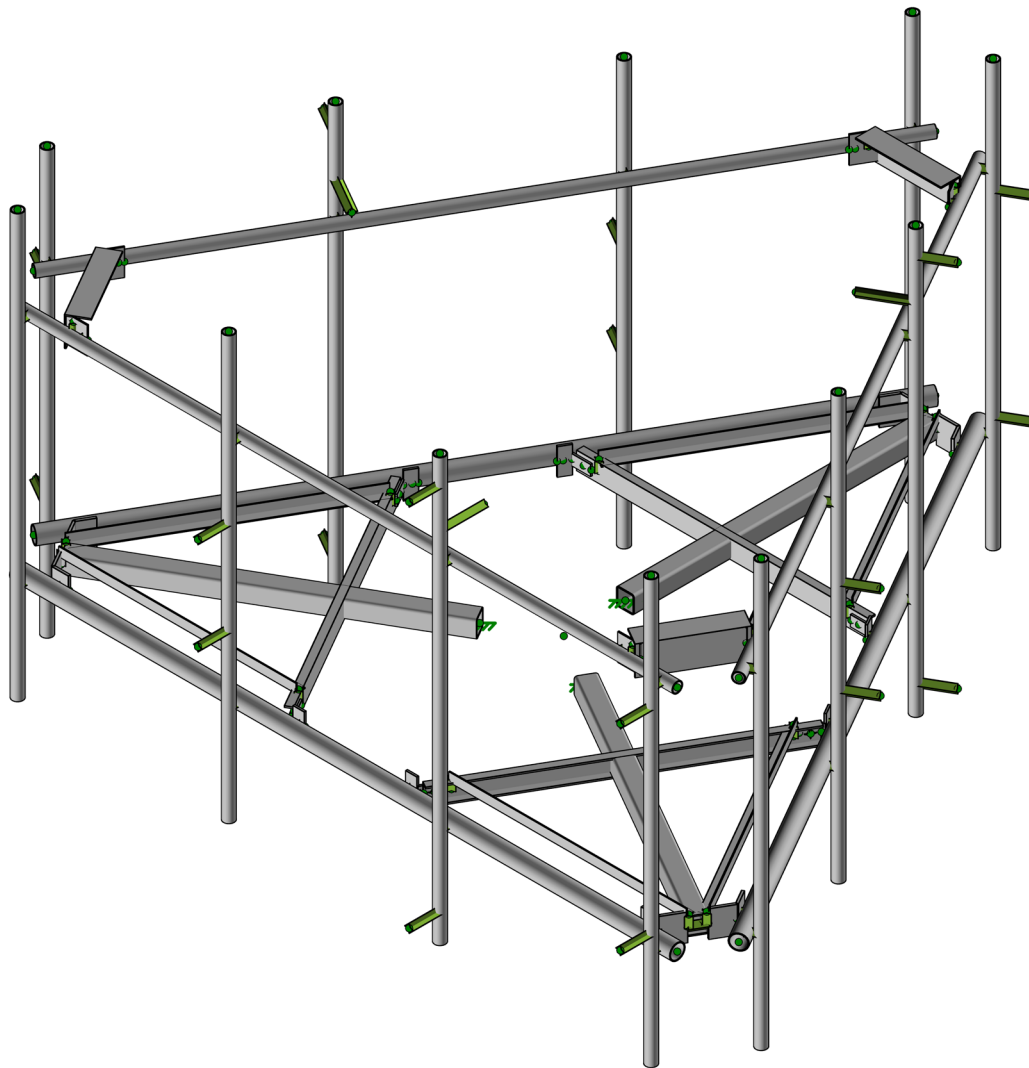
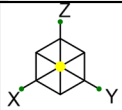
Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

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Envelope Only Solution

Telamon CLS

ADK

41124-13678286\_C8\_02-01-MA

41124-13678286\_C8\_02-BrIn - Berlin

Rendered

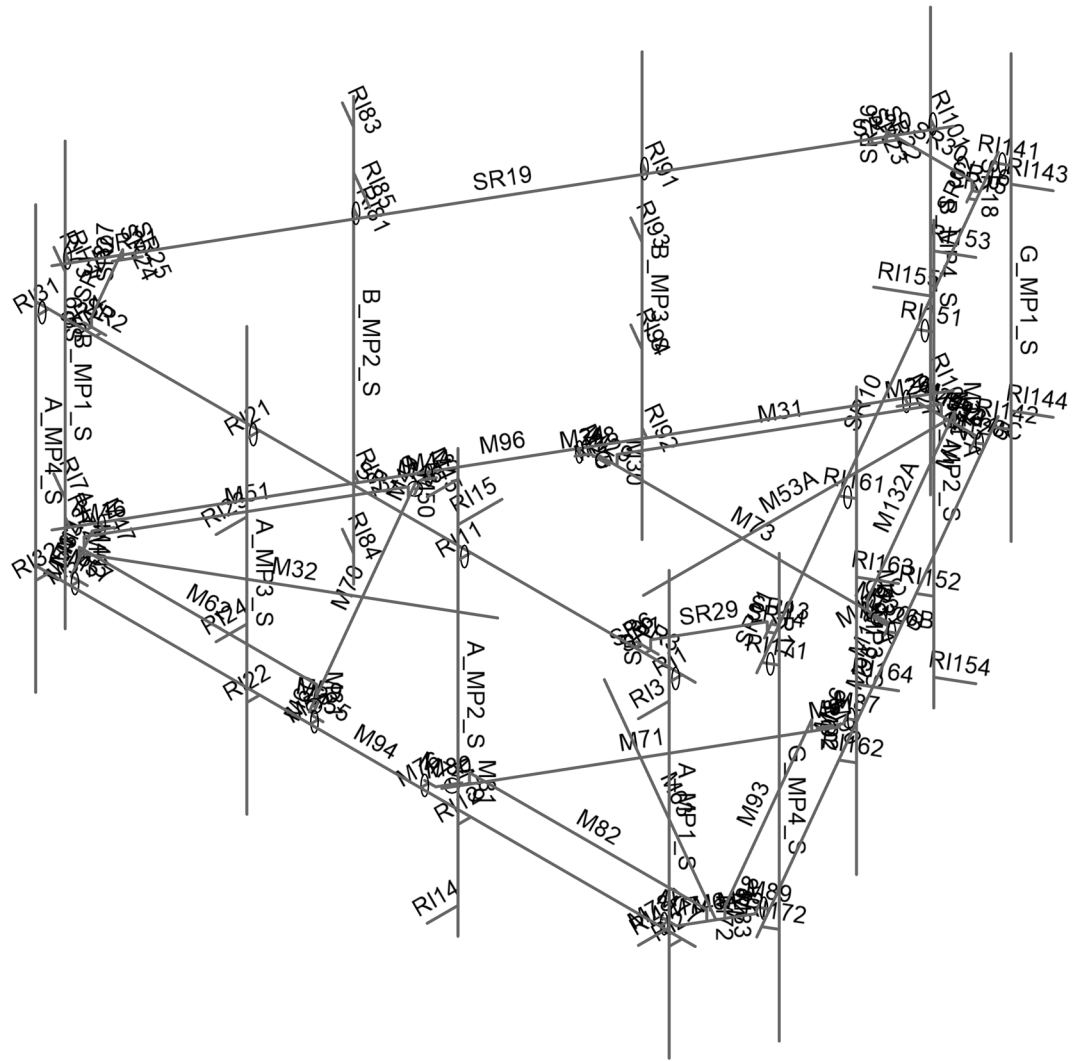
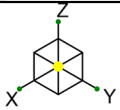
SK-1

May 25, 2021

41124-13678286\_C8\_02-01-MA.r3d

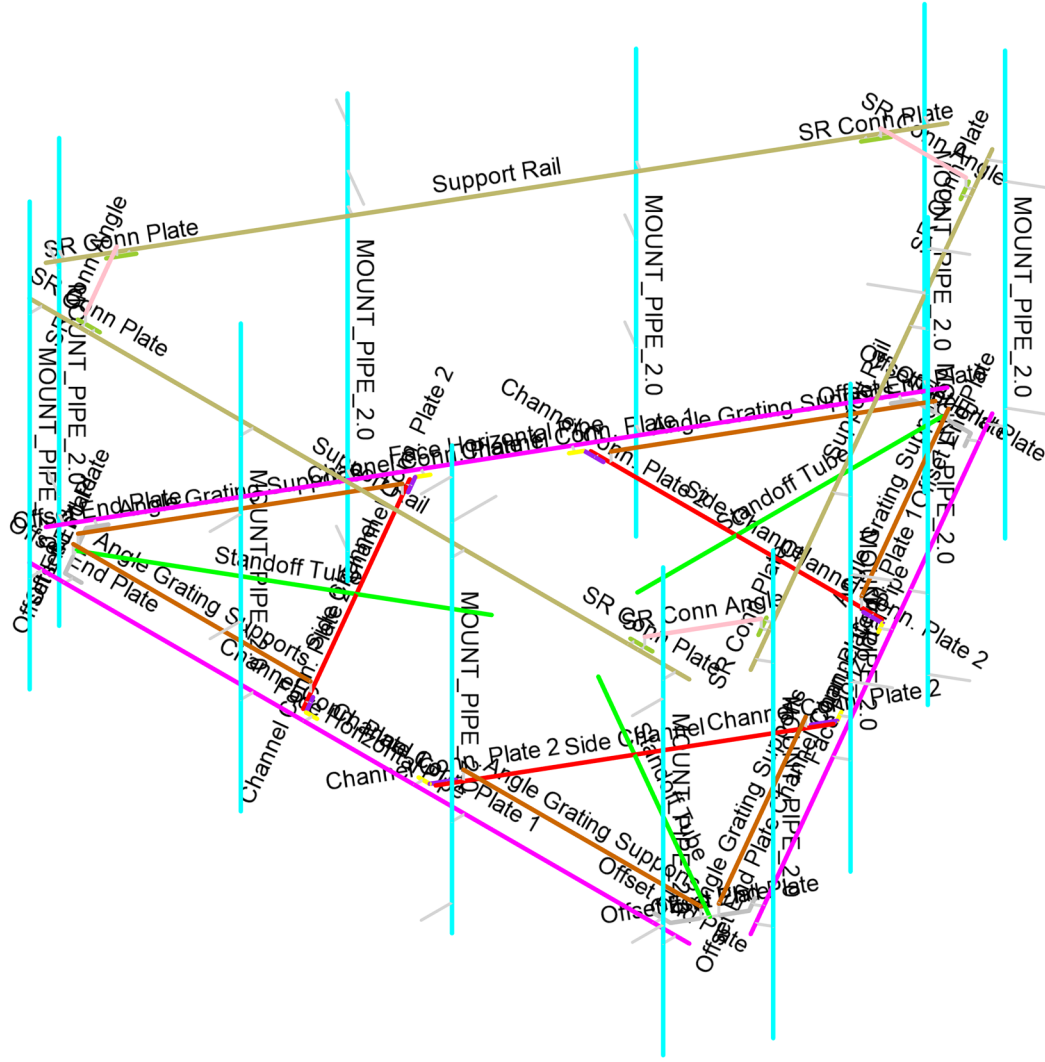
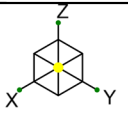






Envelope Only Solution		
Telamon CLS	41124-13678286_C8_02-Brln - Berlin	SK-3
ADK		May 25, 2021
41124-13678286_C8_02-01-MA	Member Labels	41124-13678286_C8_02-01-MA.r3d





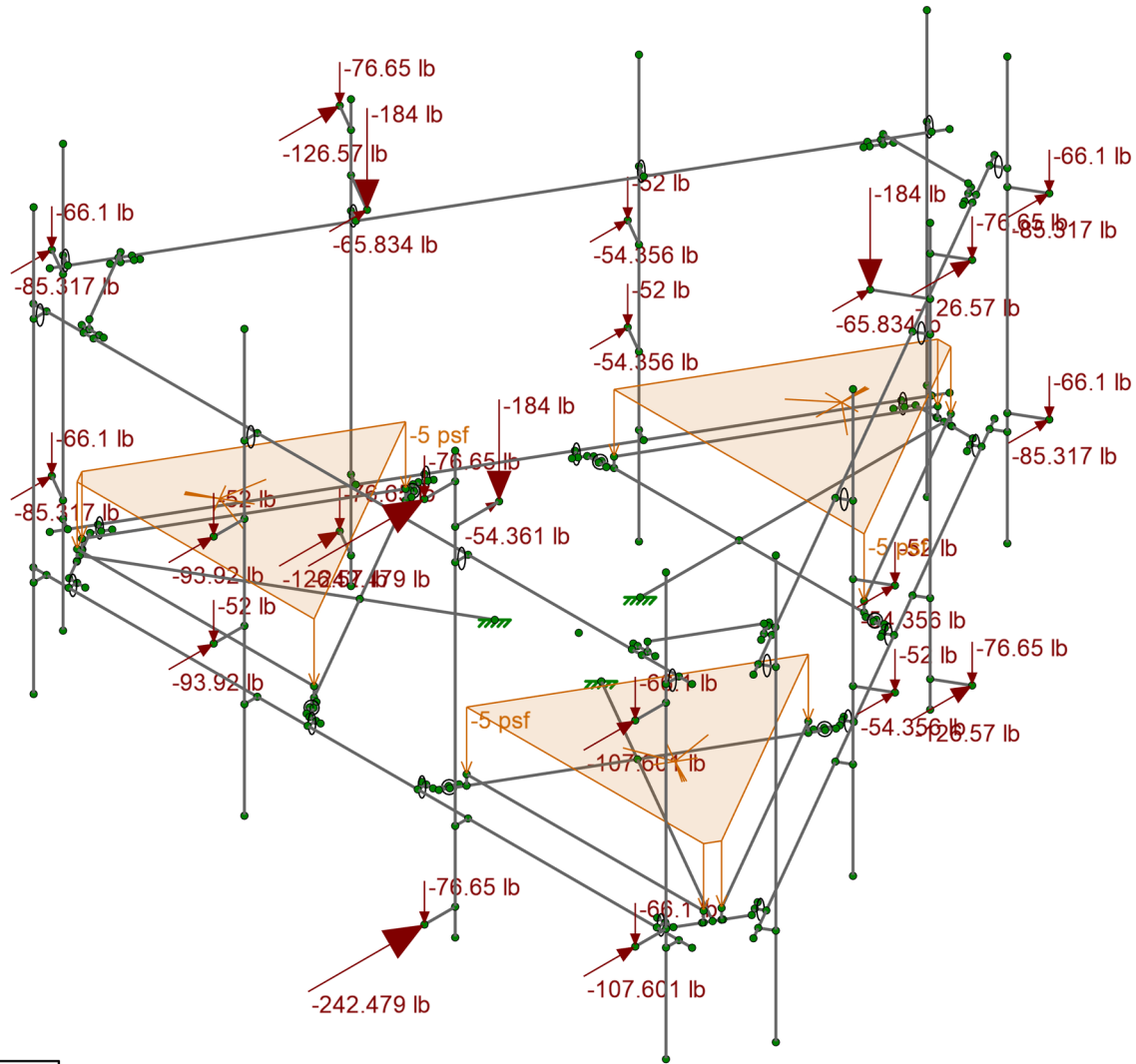
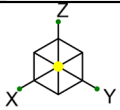
- Section Sets**
- na
  - Standoff Tube
  - Side Channel
  - Offset End Plate
  - Face Horizontal Pipe
  - MOUNT\_PIPE\_2.0
  - Angle Grating Supports
  - Channel Conn. Plate 1
  - Channel Conn. Plate 2
  - Support Rail
  - SR Conn Plate
  - SR Conn Angle
  - RIGID

Envelope Only Solution

Telamon CLS  
 ADK  
 41124-13678286\_C8\_02-01-MA

41124-13678286\_C8\_02-Brln - Berlin  
 Section Sets

SK-5  
 May 25, 2021  
 41124-13678286\_C8\_02-01-MA.r3d



Loads: LC 1, DISPLAY (1.0D + 1.0W\_0 )  
Envelope Only Solution

Telamon CLS

ADK

41124-13678286\_C8\_02-01-MA

41124-13678286\_C8\_02-Brln - Berlin

Joint Loads – Dead and Normal Wind

SK-6

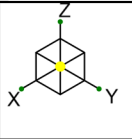
May 25, 2021

41124-13678286\_C8\_02-01-MA.r3d

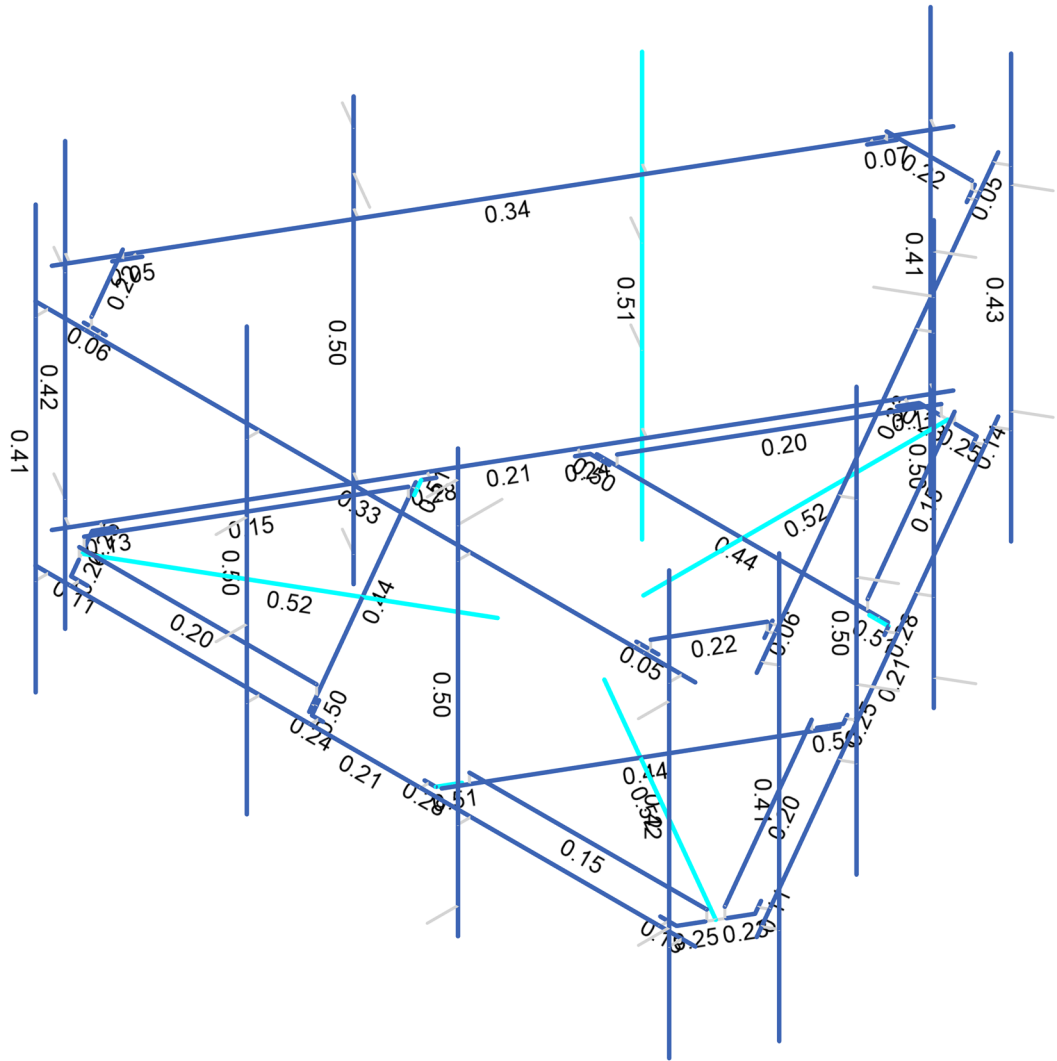








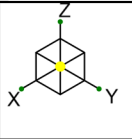
Code Check (Env)	
Black	No Calc
Red	> 1.0
Magenta	.90-1.0
Green	.75-.90
Cyan	.50-.75
Blue	.0-.50



Member Code Checks Displayed (Enveloped)  
Envelope Only Solution

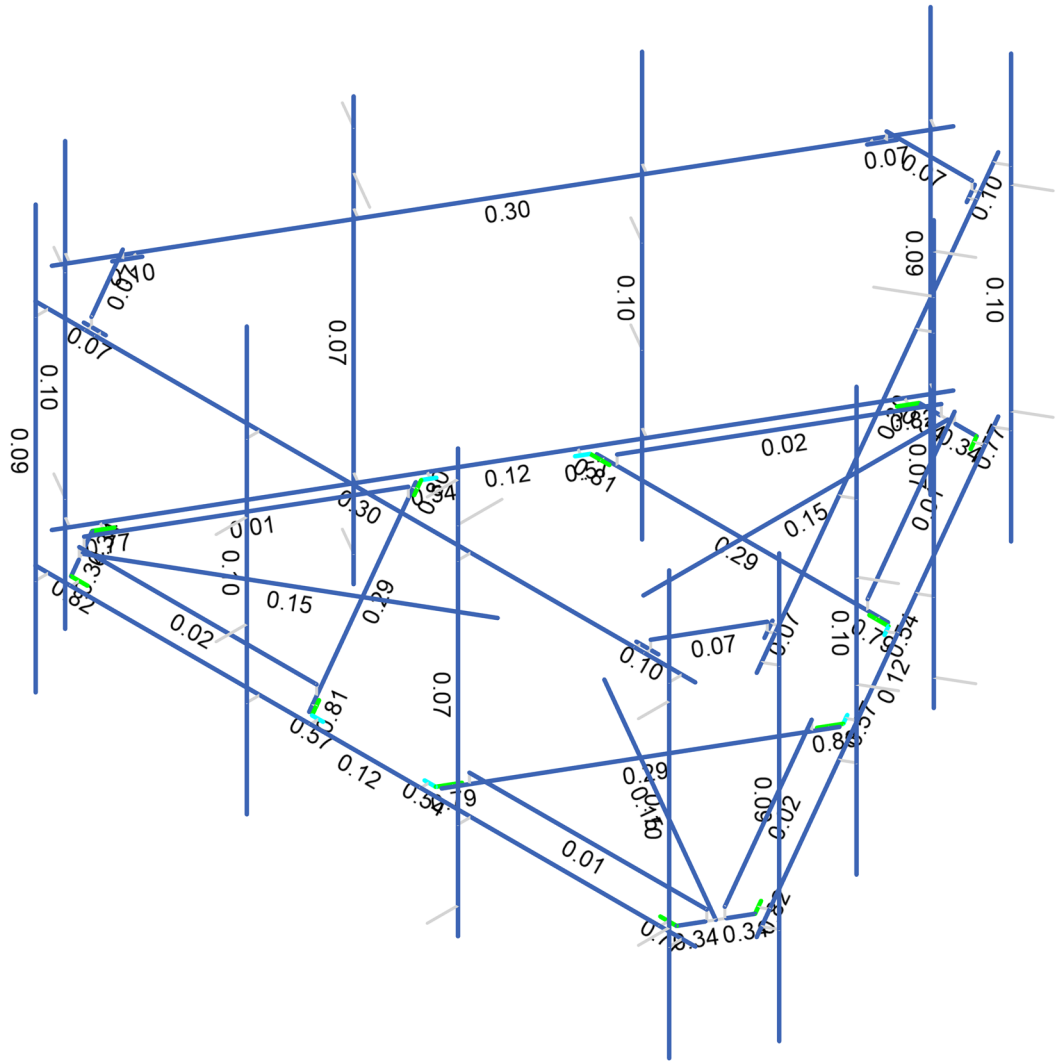
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ADK		May 25, 2021
41124-13678286_C8_02-01-MA	Envelope Member Unity Check Results – Bending	41124-13678286_C8_02-01-MA.r3d





Shear Check (Env)

- No Calc
- > 1.0
- .90-1.0
- .75-.90
- .50-.75
- .0-.50



Member Shear Checks Displayed (Enveloped)  
Envelope Only Solution

Telamon CLS	41124-13678286_C8_02-Brln - Berlin	SK-10
ADK		May 25, 2021
41124-13678286_C8_02-01-MA	Envelope Member Check Results – Shear	41124-13678286_C8_02-01-MA.r3d

**Basic Load Cases**

	BLC Description	Category	Z Gravity	Nodal	Distributed	Area(Member)
1	Dead	DL	-1	24		3
2	Ice Dead	RL		24	63	3
3	BLC 1 Transient Area Loads	None			30	
4	BLC 2 Transient Area Loads	None			30	
5	Structure Wind 0°	None			62	
6	Structure Wind 30°	None			98	
7	Structure Wind 45°	None			126	
8	Structure Wind 60°	None			124	
9	Structure Wind 90°	None			49	
10	Structure Wind 120°	None			124	
11	Structure Wind 135°	None			126	
12	Structure Wind 150°	None			98	
13	Structure Wind 180°	None			62	
14	Structure Wind 210°	None			98	
15	Structure Wind 225°	None			126	
16	Structure Wind 240°	None			124	
17	Structure Wind 270°	None			49	
18	Structure Wind 300°	None			124	
19	Structure Wind 315°	None			126	
20	Structure Wind 330°	None			98	
21	Structure Wind w/ Ice 0°	None			62	
22	Structure Wind w/ Ice 30°	None			98	
23	Structure Wind w/ Ice 45°	None			126	
24	Structure Wind w/ Ice 60°	None			124	
25	Structure Wind w/ Ice 90°	None			49	
26	Structure Wind w/ Ice 120°	None			124	
27	Structure Wind w/ Ice 135°	None			126	
28	Structure Wind w/ Ice 150°	None			98	
29	Structure Wind w/ Ice 180°	None			62	
30	Structure Wind w/ Ice 210°	None			98	
31	Structure Wind w/ Ice 225°	None			126	
32	Structure Wind w/ Ice 240°	None			124	
33	Structure Wind w/ Ice 270°	None			49	
34	Structure Wind w/ Ice 300°	None			124	
35	Structure Wind w/ Ice 315°	None			126	
36	Structure Wind w/ Ice 330°	None			98	
37	Antenna Wind 0°	None		24		
38	Antenna Wind 30°	None		48		
39	Antenna Wind 45°	None		48		
40	Antenna Wind 60°	None		48		
41	Antenna Wind 90°	None		24		
42	Antenna Wind 120°	None		48		
43	Antenna Wind 135°	None		48		
44	Antenna Wind 150°	None		48		
45	Antenna Wind 180°	None		24		
46	Antenna Wind 210°	None		48		
47	Antenna Wind 225°	None		48		
48	Antenna Wind 240°	None		48		
49	Antenna Wind 270°	None		24		
50	Antenna Wind 300°	None		48		
51	Antenna Wind 315°	None		48		
52	Antenna Wind 330°	None		48		
53	Antenna Wind w/ Ice 0°	None		24		
54	Antenna Wind w/ Ice 30°	None		48		
55	Antenna Wind w/ Ice 45°	None		48		
56	Antenna Wind w/ Ice 60°	None		48		
57	Antenna Wind w/ Ice 90°	None		24		
58	Antenna Wind w/ Ice 120°	None		48		

**Basic Load Cases (Continued)**

	BLC Description	Category	Z Gravity	Nodal	Distributed	Area(Member)
59	Antenna Wind w/ Ice 135°	None		48		
60	Antenna Wind w/ Ice 150°	None		48		
61	Antenna Wind w/ Ice 180°	None		24		
62	Antenna Wind w/ Ice 210°	None		48		
63	Antenna Wind w/ Ice 225°	None		48		
64	Antenna Wind w/ Ice 240°	None		48		
65	Antenna Wind w/ Ice 270°	None		24		
66	Antenna Wind w/ Ice 300°	None		48		
67	Antenna Wind w/ Ice 315°	None		48		
68	Antenna Wind w/ Ice 330°	None		48		
69	Seismic X	ELX		24	63	
70	Seismic Y	ELY		24	63	
71	Seismic Z	ELZ		24	63	
72	Maintenance Live 500 (1)	OL1		1		
73	Maintenance Live 500 (2)	OL2		1		
74	Maintenance Live 500 (3)	OL3		1		
75	Maintenance Live 500 (4)	OL4		1		

**Load Combinations**

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	DISPLAY (1.0D + 1.0W_0°)	Yes	Y	DL	1	37	1				
2	1.4D	Yes	Y	DL	1.4						
3	1.2D + 1.0W_0°	Yes	Y	DL	1.2	5	1	37	1		
4	1.2D + 1.0W_30°	Yes	Y	DL	1.2	6	1	38	1		
5	1.2D + 1.0W_45°	Yes	Y	DL	1.2	7	1	39	1		
6	1.2D + 1.0W_60°	Yes	Y	DL	1.2	8	1	40	1		
7	1.2D + 1.0W_90°	Yes	Y	DL	1.2	9	1	41	1		
8	1.2D + 1.0W_120°	Yes	Y	DL	1.2	10	1	42	1		
9	1.2D + 1.0W_135°	Yes	Y	DL	1.2	11	1	43	1		
10	1.2D + 1.0W_150°	Yes	Y	DL	1.2	12	1	44	1		
11	1.2D + 1.0W_180°	Yes	Y	DL	1.2	13	-1	45	-1		
12	1.2D + 1.0W_210°	Yes	Y	DL	1.2	14	-1	46	-1		
13	1.2D + 1.0W_225°	Yes	Y	DL	1.2	15	-1	47	-1		
14	1.2D + 1.0W_240°	Yes	Y	DL	1.2	16	-1	48	-1		
15	1.2D + 1.0W_270°	Yes	Y	DL	1.2	17	-1	49	-1		
16	1.2D + 1.0W_300°	Yes	Y	DL	1.2	18	-1	50	-1		
17	1.2D + 1.0W_315°	Yes	Y	DL	1.2	19	-1	51	-1		
18	1.2D + 1.0W_330°	Yes	Y	DL	1.2	20	-1	52	-1		
19	1.2D + 1.0Di + 1.0Wi_0°	Yes	Y	DL	1.2	21	1	53	1	RL	1
20	1.2D + 1.0Di + 1.0Wi_30°	Yes	Y	DL	1.2	22	1	54	1	RL	1
21	1.2D + 1.0Di + 1.0Wi_45°	Yes	Y	DL	1.2	23	1	55	1	RL	1
22	1.2D + 1.0Di + 1.0Wi_60°	Yes	Y	DL	1.2	24	1	56	1	RL	1
23	1.2D + 1.0Di + 1.0Wi_90°	Yes	Y	DL	1.2	25	1	57	1	RL	1
24	1.2D + 1.0Di + 1.0Wi_120°	Yes	Y	DL	1.2	26	1	58	1	RL	1
25	1.2D + 1.0Di + 1.0Wi_135°	Yes	Y	DL	1.2	27	1	59	1	RL	1
26	1.2D + 1.0Di + 1.0Wi_150°	Yes	Y	DL	1.2	28	1	60	1	RL	1
27	1.2D + 1.0Di + 1.0Wi_180°	Yes	Y	DL	1.2	29	-1	61	-1	RL	1
28	1.2D + 1.0Di + 1.0Wi_210°	Yes	Y	DL	1.2	30	-1	62	-1	RL	1
29	1.2D + 1.0Di + 1.0Wi_225°	Yes	Y	DL	1.2	31	-1	63	-1	RL	1
30	1.2D + 1.0Di + 1.0Wi_240°	Yes	Y	DL	1.2	32	-1	64	-1	RL	1
31	1.2D + 1.0Di + 1.0Wi_270°	Yes	Y	DL	1.2	33	-1	65	-1	RL	1
32	1.2D + 1.0Di + 1.0Wi_300°	Yes	Y	DL	1.2	34	-1	66	-1	RL	1
33	1.2D + 1.0Di + 1.0Wi_315°	Yes	Y	DL	1.2	35	-1	67	-1	RL	1
34	1.2D + 1.0Di + 1.0Wi_330°	Yes	Y	DL	1.2	36	-1	68	-1	RL	1
35	1.2D + 1.0Ev + 1.0Eh_0°	Yes	Y	DL	1.243	ELX	-1	ELY			
36	1.2D + 1.0Ev + 1.0Eh_30°	Yes	Y	DL	1.243	ELX	-0.866	ELY	0.5		
37	1.2D + 1.0Ev + 1.0Eh_45°	Yes	Y	DL	1.243	ELX	-0.707	ELY	0.707		
38	1.2D + 1.0Ev + 1.0Eh_60°	Yes	Y	DL	1.243	ELX	-0.5	ELY	0.866		

**Load Combinations (Continued)**

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
39	1.2D + 1.0Ev + 1.0Eh 90°	Yes	Y	DL	1.243	ELX		ELY	1		
40	1.2D + 1.0Ev + 1.0Eh 120°	Yes	Y	DL	1.243	ELX	0.5	ELY	0.866		
41	1.2D + 1.0Ev + 1.0Eh 135°	Yes	Y	DL	1.243	ELX	0.707	ELY	0.707		
42	1.2D + 1.0Ev + 1.0Eh 150°	Yes	Y	DL	1.243	ELX	0.866	ELY	0.5		
43	1.2D + 1.0Ev + 1.0Eh 180°	Yes	Y	DL	1.243	ELX	1	ELY			
44	1.2D + 1.0Ev + 1.0Eh 210°	Yes	Y	DL	1.243	ELX	0.866	ELY	-0.5		
45	1.2D + 1.0Ev + 1.0Eh 225°	Yes	Y	DL	1.243	ELX	0.707	ELY	-0.707		
46	1.2D + 1.0Ev + 1.0Eh 240°	Yes	Y	DL	1.243	ELX	0.5	ELY	-0.866		
47	1.2D + 1.0Ev + 1.0Eh 270°	Yes	Y	DL	1.243	ELX		ELY	-1		
48	1.2D + 1.0Ev + 1.0Eh 300°	Yes	Y	DL	1.243	ELX	-0.5	ELY	-0.866		
49	1.2D + 1.0Ev + 1.0Eh 315°	Yes	Y	DL	1.243	ELX	-0.707	ELY	-0.707		
50	1.2D + 1.0Ev + 1.0Eh 330°	Yes	Y	DL	1.243	ELX	-0.866	ELY	-0.5		
51	0.9D - 1.0Ev + 1.0Eh 0°	Yes	Y	DL	0.857	ELX	-1	ELY			
52	0.9D - 1.0Ev + 1.0Eh 30°	Yes	Y	DL	0.857	ELX	-0.866	ELY	0.5		
53	0.9D - 1.0Ev + 1.0Eh 45°	Yes	Y	DL	0.857	ELX	-0.707	ELY	0.707		
54	0.9D - 1.0Ev + 1.0Eh 60°	Yes	Y	DL	0.857	ELX	-0.5	ELY	0.866		
55	0.9D - 1.0Ev + 1.0Eh 90°	Yes	Y	DL	0.857	ELX		ELY	1		
56	0.9D - 1.0Ev + 1.0Eh 120°	Yes	Y	DL	0.857	ELX	0.5	ELY	0.866		
57	0.9D - 1.0Ev + 1.0Eh 135°	Yes	Y	DL	0.857	ELX	0.707	ELY	0.707		
58	0.9D - 1.0Ev + 1.0Eh 150°	Yes	Y	DL	0.857	ELX	0.866	ELY	0.5		
59	0.9D - 1.0Ev + 1.0Eh 180°	Yes	Y	DL	0.857	ELX	1	ELY			
60	0.9D - 1.0Ev + 1.0Eh 210°	Yes	Y	DL	0.857	ELX	0.866	ELY	-0.5		
61	0.9D - 1.0Ev + 1.0Eh 225°	Yes	Y	DL	0.857	ELX	0.707	ELY	-0.707		
62	0.9D - 1.0Ev + 1.0Eh 240°	Yes	Y	DL	0.857	ELX	0.5	ELY	-0.866		
63	0.9D - 1.0Ev + 1.0Eh 270°	Yes	Y	DL	0.857	ELX		ELY	-1		
64	0.9D - 1.0Ev + 1.0Eh 300°	Yes	Y	DL	0.857	ELX	-0.5	ELY	-0.866		
65	0.9D - 1.0Ev + 1.0Eh 315°	Yes	Y	DL	0.857	ELX	-0.707	ELY	-0.707		
66	0.9D - 1.0Ev + 1.0Eh 330°	Yes	Y	DL	0.857	ELX	-0.866	ELY	-0.5		
67	1.2D + 1.5Lm 1 + 1.0Wm 0°	Yes	Y	DL	1.2	5	0.068	37	0.068	OL1	1.5
68	1.2D + 1.5Lm 1 + 1.0Wm 30°	Yes	Y	DL	1.2	6	0.068	38	0.068	OL1	1.5
69	1.2D + 1.5Lm 1 + 1.0Wm 45°	Yes	Y	DL	1.2	7	0.068	39	0.068	OL1	1.5
70	1.2D + 1.5Lm 1 + 1.0Wm 60°	Yes	Y	DL	1.2	8	0.068	40	0.068	OL1	1.5
71	1.2D + 1.5Lm 1 + 1.0Wm 90°	Yes	Y	DL	1.2	9	0.068	41	0.068	OL1	1.5
72	1.2D + 1.5Lm 1 + 1.0Wm 120°	Yes	Y	DL	1.2	10	0.068	42	0.068	OL1	1.5
73	1.2D + 1.5Lm 1 + 1.0Wm 135°	Yes	Y	DL	1.2	11	0.068	43	0.068	OL1	1.5
74	1.2D + 1.5Lm 1 + 1.0Wm 150°	Yes	Y	DL	1.2	12	0.068	44	0.068	OL1	1.5
75	1.2D + 1.5Lm 1 + 1.0Wm 180°	Yes	Y	DL	1.2	13	-0.068	45	-0.068	OL1	1.5
76	1.2D + 1.5Lm 1 + 1.0Wm 210°	Yes	Y	DL	1.2	14	-0.068	46	-0.068	OL1	1.5
77	1.2D + 1.5Lm 1 + 1.0Wm 225°	Yes	Y	DL	1.2	15	-0.068	47	-0.068	OL1	1.5
78	1.2D + 1.5Lm 1 + 1.0Wm 240°	Yes	Y	DL	1.2	16	-0.068	48	-0.068	OL1	1.5
79	1.2D + 1.5Lm 1 + 1.0Wm 270°	Yes	Y	DL	1.2	17	-0.068	49	-0.068	OL1	1.5
80	1.2D + 1.5Lm 1 + 1.0Wm 300°	Yes	Y	DL	1.2	18	-0.068	50	-0.068	OL1	1.5
81	1.2D + 1.5Lm 1 + 1.0Wm 315°	Yes	Y	DL	1.2	19	-0.068	51	-0.068	OL1	1.5
82	1.2D + 1.5Lm 1 + 1.0Wm 330°	Yes	Y	DL	1.2	20	-0.068	52	-0.068	OL1	1.5
83	1.2D + 1.5Lm 2 + 1.0Wm 0°	Yes	Y	DL	1.2	5	0.068	37	0.068	OL2	1.5
84	1.2D + 1.5Lm 2 + 1.0Wm 30°	Yes	Y	DL	1.2	6	0.068	38	0.068	OL2	1.5
85	1.2D + 1.5Lm 2 + 1.0Wm 45°	Yes	Y	DL	1.2	7	0.068	39	0.068	OL2	1.5
86	1.2D + 1.5Lm 2 + 1.0Wm 60°	Yes	Y	DL	1.2	8	0.068	40	0.068	OL2	1.5
87	1.2D + 1.5Lm 2 + 1.0Wm 90°	Yes	Y	DL	1.2	9	0.068	41	0.068	OL2	1.5
88	1.2D + 1.5Lm 2 + 1.0Wm 120°	Yes	Y	DL	1.2	10	0.068	42	0.068	OL2	1.5
89	1.2D + 1.5Lm 2 + 1.0Wm 135°	Yes	Y	DL	1.2	11	0.068	43	0.068	OL2	1.5
90	1.2D + 1.5Lm 2 + 1.0Wm 150°	Yes	Y	DL	1.2	12	0.068	44	0.068	OL2	1.5
91	1.2D + 1.5Lm 2 + 1.0Wm 180°	Yes	Y	DL	1.2	13	-0.068	45	-0.068	OL2	1.5
92	1.2D + 1.5Lm 2 + 1.0Wm 210°	Yes	Y	DL	1.2	14	-0.068	46	-0.068	OL2	1.5
93	1.2D + 1.5Lm 2 + 1.0Wm 225°	Yes	Y	DL	1.2	15	-0.068	47	-0.068	OL2	1.5
94	1.2D + 1.5Lm 2 + 1.0Wm 240°	Yes	Y	DL	1.2	16	-0.068	48	-0.068	OL2	1.5
95	1.2D + 1.5Lm 2 + 1.0Wm 270°	Yes	Y	DL	1.2	17	-0.068	49	-0.068	OL2	1.5
96	1.2D + 1.5Lm 2 + 1.0Wm 300°	Yes	Y	DL	1.2	18	-0.068	50	-0.068	OL2	1.5

**Load Combinations (Continued)**

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
97	1.2D + 1.5Lm 2 + 1.0Wm 315°	Yes	Y	DL	1.2	19	-0.068	51	-0.068	OL2	1.5
98	1.2D + 1.5Lm 2 + 1.0Wm 330°	Yes	Y	DL	1.2	20	-0.068	52	-0.068	OL2	1.5
99	1.2D + 1.5Lm 3 + 1.0Wm 0°	Yes	Y	DL	1.2	5	0.068	37	0.068	OL3	1.5
100	1.2D + 1.5Lm 3 + 1.0Wm 30°	Yes	Y	DL	1.2	6	0.068	38	0.068	OL3	1.5
101	1.2D + 1.5Lm 3 + 1.0Wm 45°	Yes	Y	DL	1.2	7	0.068	39	0.068	OL3	1.5
102	1.2D + 1.5Lm 3 + 1.0Wm 60°	Yes	Y	DL	1.2	8	0.068	40	0.068	OL3	1.5
103	1.2D + 1.5Lm 3 + 1.0Wm 90°	Yes	Y	DL	1.2	9	0.068	41	0.068	OL3	1.5
104	1.2D + 1.5Lm 3 + 1.0Wm 120°	Yes	Y	DL	1.2	10	0.068	42	0.068	OL3	1.5
105	1.2D + 1.5Lm 3 + 1.0Wm 135°	Yes	Y	DL	1.2	11	0.068	43	0.068	OL3	1.5
106	1.2D + 1.5Lm 3 + 1.0Wm 150°	Yes	Y	DL	1.2	12	0.068	44	0.068	OL3	1.5
107	1.2D + 1.5Lm 3 + 1.0Wm 180°	Yes	Y	DL	1.2	13	-0.068	45	-0.068	OL3	1.5
108	1.2D + 1.5Lm 3 + 1.0Wm 210°	Yes	Y	DL	1.2	14	-0.068	46	-0.068	OL3	1.5
109	1.2D + 1.5Lm 3 + 1.0Wm 225°	Yes	Y	DL	1.2	15	-0.068	47	-0.068	OL3	1.5
110	1.2D + 1.5Lm 3 + 1.0Wm 240°	Yes	Y	DL	1.2	16	-0.068	48	-0.068	OL3	1.5
111	1.2D + 1.5Lm 3 + 1.0Wm 270°	Yes	Y	DL	1.2	17	-0.068	49	-0.068	OL3	1.5
112	1.2D + 1.5Lm 3 + 1.0Wm 300°	Yes	Y	DL	1.2	18	-0.068	50	-0.068	OL3	1.5
113	1.2D + 1.5Lm 3 + 1.0Wm 315°	Yes	Y	DL	1.2	19	-0.068	51	-0.068	OL3	1.5
114	1.2D + 1.5Lm 3 + 1.0Wm 330°	Yes	Y	DL	1.2	20	-0.068	52	-0.068	OL3	1.5
115	1.2D + 1.5Lm 4 + 1.0Wm 0°	Yes	Y	DL	1.2	5	0.068	37	0.068	OL4	1.5
116	1.2D + 1.5Lm 4 + 1.0Wm 30°	Yes	Y	DL	1.2	6	0.068	38	0.068	OL4	1.5
117	1.2D + 1.5Lm 4 + 1.0Wm 45°	Yes	Y	DL	1.2	7	0.068	39	0.068	OL4	1.5
118	1.2D + 1.5Lm 4 + 1.0Wm 60°	Yes	Y	DL	1.2	8	0.068	40	0.068	OL4	1.5
119	1.2D + 1.5Lm 4 + 1.0Wm 90°	Yes	Y	DL	1.2	9	0.068	41	0.068	OL4	1.5
120	1.2D + 1.5Lm 4 + 1.0Wm 120°	Yes	Y	DL	1.2	10	0.068	42	0.068	OL4	1.5
121	1.2D + 1.5Lm 4 + 1.0Wm 135°	Yes	Y	DL	1.2	11	0.068	43	0.068	OL4	1.5
122	1.2D + 1.5Lm 4 + 1.0Wm 150°	Yes	Y	DL	1.2	12	0.068	44	0.068	OL4	1.5
123	1.2D + 1.5Lm 4 + 1.0Wm 180°	Yes	Y	DL	1.2	13	-0.068	45	-0.068	OL4	1.5
124	1.2D + 1.5Lm 4 + 1.0Wm 210°	Yes	Y	DL	1.2	14	-0.068	46	-0.068	OL4	1.5
125	1.2D + 1.5Lm 4 + 1.0Wm 225°	Yes	Y	DL	1.2	15	-0.068	47	-0.068	OL4	1.5
126	1.2D + 1.5Lm 4 + 1.0Wm 240°	Yes	Y	DL	1.2	16	-0.068	48	-0.068	OL4	1.5
127	1.2D + 1.5Lm 4 + 1.0Wm 270°	Yes	Y	DL	1.2	17	-0.068	49	-0.068	OL4	1.5
128	1.2D + 1.5Lm 4 + 1.0Wm 300°	Yes	Y	DL	1.2	18	-0.068	50	-0.068	OL4	1.5
129	1.2D + 1.5Lm 4 + 1.0Wm 315°	Yes	Y	DL	1.2	19	-0.068	51	-0.068	OL4	1.5
130	1.2D + 1.5Lm 4 + 1.0Wm 330°	Yes	Y	DL	1.2	20	-0.068	52	-0.068	OL4	1.5

**Hot Rolled Steel Properties**

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e <sup>5</sup> F <sup>-1</sup> ]	Density [k/ft <sup>3</sup> ]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
3	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	0.3	0.65	0.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	0.3	0.65	0.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2
7	A1085	29000	11154	0.3	0.65	0.49	50	1.4	65	1.3
8	A500 Gr. C	29000	11154	0.3	0.65	0.527	46	1.5	62	1.2
9	A53 Gr.A	29000	11154	0.3	0.65	0.49	30	1.5	48	1.2
10	A529 Gr. 50	29000	11154	0.3	0.65	0.49	50	1.1	58	1.1

**Hot Rolled Steel Section Sets**

	Label	Shape	Type	Design List	Material	Design Rule Area [in <sup>2</sup> ]	Iyy [in <sup>4</sup> ]	Izz [in <sup>4</sup> ]	J [in <sup>4</sup> ]	
1	Standoff Tube	HSS4X4X4	Beam	None	A500 Gr.B Rect	Typical	3.37	7.8	7.8	12.8
2	Side Channel	C4X5.4	Beam	Channel	A529 Gr. 50	Typical	1.58	0.312	3.85	0.04
3	Offset End Plate	PL6x0.5	Beam	None	A36 Gr.36	Typical	3	0.063	9	0.237
4	Face Horizontal Pipe	PIPE 3.5x0.165	Beam	None	A500 Gr. C	Typical	1.729	2.409	2.409	4.819
5	MOUNT PIPE 2.0	PIPE 2.0	None	None	A53 Gr.B	Typical	1.02	0.627	0.627	1.25
6	Angle Grating Supports	L2x2x3	Beam	Single Angle	A529 Gr. 50	Typical	0.722	0.271	0.271	0.009
7	Channel Conn. Plate 1	PL 6"x0.375"	Beam	None	A36 Gr.36	Typical	2.25	0.026	6.75	0.101

**Hot Rolled Steel Section Sets (Continued)**

	Label	Shape	Type	Design List	Material	Design Rule	Area [in <sup>2</sup> ]	Iyy [in <sup>4</sup> ]	Izz [in <sup>4</sup> ]	J [in <sup>4</sup> ]
8	Channel Conn. Plate 2	PL2.38X0.375	Beam	None	A36 Gr.36	Typical	0.893	0.01	0.421	0.038
9	Support Rail	PIPE_2.0	Beam	None	A53 Gr.B	Typical	1.02	0.627	0.627	1.25
10	SR Conn Plate	PL6x1/4	Beam	None	A36 Gr.36	Typical	1.5	0.008	4.5	0.03
11	SR Conn Angle	Custom 6.63x4.46 HRB	Beam	None	A36 Gr.36	Typical	1.705	3.561	7.467	0.034

**Hot Rolled Steel Design Parameters**

	Label	Shape	Length [in]	Lb y-y [in]	Lb z-z [in]	K y-y	K z-z	Function
1	M53A	Standoff Tube	69.225			2.1	2.1	Lateral
2	M32	Standoff Tube	69.225			2.1	2.1	Lateral
3	M63	Standoff Tube	69.225			2.1	2.1	Lateral
4	M124B	Offset End Plate	4.78					Lateral
5	M127C	Offset End Plate	3.7					Lateral
6	M23	Offset End Plate	4.78					Lateral
7	M26	Offset End Plate	3.7					Lateral
8	M43	Offset End Plate	4.78					Lateral
9	M46	Offset End Plate	3.7					Lateral
10	M54	Offset End Plate	4.78					Lateral
11	M57	Offset End Plate	3.7					Lateral
12	M74	Offset End Plate	4.78					Lateral
13	M77	Offset End Plate	3.7					Lateral
14	M85	Offset End Plate	4.78					Lateral
15	M88	Offset End Plate	3.7					Lateral
16	M94	Face Horizontal Pipe	150	54.43	48			Lateral
17	M95	Face Horizontal Pipe	150	54.43	48			Lateral
18	M96	Face Horizontal Pipe	150	54.43	48			Lateral
19	M130B	Channel Conn. Plate 2	4.36					Lateral
20	M29	Channel Conn. Plate 2	4.36					Lateral
21	M49	Channel Conn. Plate 2	4.36					Lateral
22	M60	Channel Conn. Plate 2	4.36					Lateral
23	M80	Channel Conn. Plate 2	4.36					Lateral
24	M91	Channel Conn. Plate 2	4.36					Lateral
25	M125B	Channel Conn. Plate 1	2.53					Lateral
26	M24	Channel Conn. Plate 1	2.53					Lateral
27	M44	Channel Conn. Plate 1	2.53					Lateral
28	M55	Channel Conn. Plate 1	2.53					Lateral
29	M75	Channel Conn. Plate 1	2.53					Lateral
30	M86	Channel Conn. Plate 1	2.53					Lateral
31	M132A	Angle Grating Supports	53.953			0.65	0.65	Lateral
32	M31	Angle Grating Supports	53.953			0.65	0.65	Lateral
33	M51	Angle Grating Supports	53.953			0.65	0.65	Lateral
34	M62	Angle Grating Supports	53.953			0.65	0.65	Lateral
35	M82	Angle Grating Supports	53.953			0.65	0.65	Lateral
36	M93	Angle Grating Supports	53.953	54.43	48	0.65	0.65	Lateral
37	M70	Side Channel	66.2					Lateral
38	M71	Side Channel	66.2					Lateral
39	M73	Side Channel	66.2					Lateral
40	SR1	Support Rail	150		48			Lateral
41	SR2	SR Conn Plate	5					Lateral
42	SR3	SR Conn Plate	5					Lateral
43	SR10	Support Rail	150		48			Lateral
44	SR11	SR Conn Plate	5					Lateral
45	SR12	SR Conn Plate	5					Lateral
46	SR19	Support Rail	150		48			Lateral
47	SR20	SR Conn Plate	5					Lateral
48	SR21	SR Conn Plate	5					Lateral
49	SR28	SR Conn Angle	19.399					Lateral
50	SR29	SR Conn Angle	19.399					Lateral
51	SR30	SR Conn Angle	19.399					Lateral



**Hot Rolled Steel Design Parameters (Continued)**

	Label	Shape	Length [in]	Lb y-y [in]	Lb z-z [in]	K y-y	K z-z	Function
52	A MP1 S	MOUNT_PIPE_2.0	96					Lateral
53	A MP2 S	MOUNT_PIPE_2.0	96					Lateral
54	A MP3 S	MOUNT_PIPE_2.0	96					Lateral
55	A MP4 S	MOUNT_PIPE_2.0	96					Lateral
56	B MP1 S	MOUNT_PIPE_2.0	96					Lateral
57	B MP2 S	MOUNT_PIPE_2.0	96					Lateral
58	B MP3 S	MOUNT_PIPE_2.0	96					Lateral
59	B MP4 S	MOUNT_PIPE_2.0	96					Lateral
60	G MP1 S	MOUNT_PIPE_2.0	96					Lateral
61	G MP2 S	MOUNT_PIPE_2.0	96					Lateral
62	G MP3 S	MOUNT_PIPE_2.0	96					Lateral
63	G MP4 S	MOUNT_PIPE_2.0	96					Lateral

**Member Advanced Data**

	Label	I Release	J Release	Physical	Deflection Ratio Options	Seismic DR
1	M59A			Yes	** NA **	None
2	M122A			Yes	** NA **	None
3	M126B		OOOXOO	Yes	** NA **	None
4	M128C		OOOXOO	Yes	** NA **	None
5	M129C	OOOOXO		Yes	** NA **	None
6	M131A			Yes	** NA **	None
7	M21			Yes	** NA **	None
8	M25		OOOXOO	Yes	** NA **	None
9	M27		OOOXOO	Yes	** NA **	None
10	M28	OOOOXO		Yes	** NA **	None
11	M30			Yes	** NA **	None
12	M33			Yes	** NA **	None
13	M41			Yes	** NA **	None
14	M45		OOOXOO	Yes	** NA **	None
15	M47		OOOXOO	Yes	** NA **	None
16	M48	OOOOXO		Yes	** NA **	None
17	M50			Yes	** NA **	None
18	M52			Yes	** NA **	None
19	M56		OOOXOO	Yes	** NA **	None
20	M58		OOOXOO	Yes	** NA **	None
21	M59	OOOOXO		Yes	** NA **	None
22	M61			Yes	** NA **	None
23	M64			Yes	** NA **	None
24	M72			Yes	** NA **	None
25	M76		OOOXOO	Yes	** NA **	None
26	M78A		OOOXOO	Yes	** NA **	None
27	M79	OOOOXO		Yes	** NA **	None
28	M81			Yes	** NA **	None
29	M83			Yes	** NA **	None
30	M87		OOOXOO	Yes	** NA **	None
31	M89		OOOXOO	Yes	** NA **	None
32	M90	OOOOXO		Yes	** NA **	None
33	M92			Yes	** NA **	None
34	M53A			Yes	Default	None
35	M32			Yes	Default	None
36	M63			Yes	Default	None
37	M124B			Yes		None
38	M127C			Yes		None
39	M23			Yes		None
40	M26			Yes		None
41	M43			Yes		None
42	M46			Yes		None
43	M54			Yes		None

**Member Advanced Data (Continued)**

	Label	I Release	J Release	Physical	Deflection Ratio Options	Seismic DR
44	M57			Yes		None
45	M74			Yes		None
46	M77			Yes		None
47	M85			Yes		None
48	M88			Yes		None
49	M94			Yes	Default	None
50	M95			Yes	Default	None
51	M96			Yes	Default	None
52	M130B			Yes		None
53	M29			Yes		None
54	M49			Yes		None
55	M60			Yes		None
56	M80			Yes		None
57	M91			Yes		None
58	M125B			Yes		None
59	M24			Yes		None
60	M44			Yes		None
61	M55			Yes		None
62	M75			Yes		None
63	M86			Yes		None
64	M132A			Yes		None
65	M31			Yes		None
66	M51			Yes		None
67	M62			Yes		None
68	M82			Yes		None
69	M93			Yes	Default	None
70	M70			Yes	Default	None
71	M71			Yes	Default	None
72	M73			Yes	Default	None
73	SR1			Yes	Default	None
74	SR2			Yes		None
75	SR3			Yes		None
76	SR4			Yes	** NA **	None
77	SR5			Yes	** NA **	None
78	SR6			Yes	** NA **	None
79	SR7			Yes	** NA **	None
80	SR8			Yes	** NA **	None
81	SR9			Yes	** NA **	None
82	SR10			Yes	Default	None
83	SR11			Yes		None
84	SR12			Yes		None
85	SR13			Yes	** NA **	None
86	SR14			Yes	** NA **	None
87	SR15			Yes	** NA **	None
88	SR16			Yes	** NA **	None
89	SR17			Yes	** NA **	None
90	SR18			Yes	** NA **	None
91	SR19			Yes	Default	None
92	SR20			Yes		None
93	SR21			Yes		None
94	SR22			Yes	** NA **	None
95	SR23			Yes	** NA **	None
96	SR24			Yes	** NA **	None
97	SR25			Yes	** NA **	None
98	SR26			Yes	** NA **	None
99	SR27			Yes	** NA **	None
100	SR28			Yes		None
101	SR29			Yes		None



**Member Advanced Data (Continued)**

	Label	I Release	J Release	Physical	Deflection Ratio Options	Seismic DR
102	SR30			Yes		None
103	RI2			Yes	** NA **	None
104	RI1		OOOXOO	Yes	** NA **	None
105	A MP1 S			Yes	** NA **	None
106	RI3			Yes	** NA **	None
107	RI4			Yes	** NA **	None
108	RI12			Yes	** NA **	None
109	RI11		OOOXOO	Yes	** NA **	None
110	A MP2 S			Yes	** NA **	None
111	RI13			Yes	** NA **	None
112	RI14			Yes	** NA **	None
113	RI15			Yes	** NA **	None
114	RI22			Yes	** NA **	None
115	RI21		OOOXOO	Yes	** NA **	None
116	A MP3 S			Yes	** NA **	None
117	RI23			Yes	** NA **	None
118	RI24			Yes	** NA **	None
119	RI32			Yes	** NA **	None
120	RI31		OOOXOO	Yes	** NA **	None
121	A MP4 S			Yes	** NA **	None
122	RI72			Yes	** NA **	None
123	RI71		OOOXOO	Yes	** NA **	None
124	B MP1 S			Yes	** NA **	None
125	RI73			Yes	** NA **	None
126	RI74			Yes	** NA **	None
127	RI82			Yes	** NA **	None
128	RI81		OOOXOO	Yes	** NA **	None
129	B MP2 S			Yes	** NA **	None
130	RI83			Yes	** NA **	None
131	RI84			Yes	** NA **	None
132	RI85			Yes	** NA **	None
133	RI92			Yes	** NA **	None
134	RI91		OOOXOO	Yes	** NA **	None
135	B MP3 S			Yes	** NA **	None
136	RI93			Yes	** NA **	None
137	RI94			Yes	** NA **	None
138	RI102			Yes	** NA **	None
139	RI101		OOOXOO	Yes	** NA **	None
140	B MP4 S			Yes	** NA **	None
141	RI142			Yes	** NA **	None
142	RI141		OOOXOO	Yes	** NA **	None
143	G MP1 S			Yes	** NA **	None
144	RI143			Yes	** NA **	None
145	RI144			Yes	** NA **	None
146	RI152			Yes	** NA **	None
147	RI151		OOOXOO	Yes	** NA **	None
148	G MP2 S			Yes	** NA **	None
149	RI153			Yes	** NA **	None
150	RI154			Yes	** NA **	None
151	RI155			Yes	** NA **	None
152	RI162			Yes	** NA **	None
153	RI161		OOOXOO	Yes	** NA **	None
154	G MP3 S			Yes	** NA **	None
155	RI163			Yes	** NA **	None
156	RI164			Yes	** NA **	None
157	RI172			Yes	** NA **	None
158	RI171		OOOXOO	Yes	** NA **	None
159	G MP4 S			Yes	** NA **	None

Company :Telamon CLS  
Designer :ADK  
Job Number :41124-13678286\_C8\_02-01-MA  
Model Name:41124-13678286\_C8\_02-Brln - Berlin

5/25/2021  
4:59:28 PM  
Checked By : CAR

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***Member Advanced Data (Continued)***

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Label	I Release	J Release	Physical	Deflection Ratio Options	Seismic DR
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**Node Boundary Conditions**

Node 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 N83A	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2 N278	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3 N279	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

**Envelope Node Reactions**

Node Label	X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1 N83A	max 1619.411	3	1128.129	15	3240.475	19	1583.482	7	8477.275	19	1779.105	7
2	min -2048.466	11	-1132.342	7	461.963	11	-1371.225	15	-60.063	11	-1782.902	15
3 N279	max 1348.569	3	1750.33	16	3240.806	24	7198.09	24	401.785	18	1778.237	12
4	min -1137.527	11	-1376.678	8	462.177	16	-70.389	16	-4594.715	26	-1782.04	4
5 N278	max 1046.301	3	1427.667	14	3240.594	30	43.943	7	451.51	4	1778.14	18
6	min -828.286	11	-1797.029	6	462.011	6	-7485.9	30	-4091.387	28	-1781.817	10
7 Totals:	max 4014.281	3	4013.936	15	9020.076	24						
8	min -4014.28	11	-4013.954	7	2602.839	64						

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

Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [lb-ft]	phi*Mn z-z [lb-ft]	Cb	Eqn
1 M91	PL2.38X0.375	0.497	4.36	14	0.83	1.767	y	13	26550.073	28917	225.914	1433.8	1.809	H1-1b
2 M57	PL6x0.5	0.114	1.85	5	0.817	1.85	y	3	93894.987	97200	1012.5	12150	3	H1-1b
3 M26	PL6x0.5	0.112	1.85	11	0.817	1.85	y	8	93894.987	97200	1012.5	12150	3	H1-1b
4 M88	PL6x0.5	0.111	1.85	16	0.817	1.85	y	14	93894.987	97200	1012.5	12150	3	H1-1b
5 M60	PL2.38X0.375	0.497	4.36	3	0.813	1.767	y	3	26550.073	28917	225.914	1433.8	1.808	H1-1b
6 M29	PL2.38X0.375	0.497	4.36	8	0.812	1.767	y	8	26550.073	28917	225.914	1433.8	1.809	H1-1b
7 M49	PL2.38X0.375	0.511	4.36	8	0.799	1.767	y	9	26550.073	28917	225.914	1433.8	1.891	H1-1b
8 M80	PL2.38X0.375	0.511	4.36	3	0.79	1.767	y	3	26550.073	28917	225.914	1433.8	1.891	H1-1b
9 M130B	PL2.38X0.375	0.511	4.36	14	0.79	1.767	y	14	26550.073	28917	225.914	1433.8	1.891	H1-1b
10 M127C	PL6x0.5	0.136	1.85	13	0.773	1.85	y	14	93894.987	97200	1012.5	12150	3	H1-1b
11 M77	PL6x0.5	0.134	1.85	3	0.773	1.85	y	3	93894.987	97200	1012.5	12150	3	H1-1b
12 M46	PL6x0.5	0.134	1.85	8	0.773	1.85	y	8	93894.987	97200	1012.5	12150	3	H1-1b
13 M86	PL 6"x0.375"	0.253	1.518	13	0.565	0	y	6	70804.859	72900	569.7	9112.5	2.516	H1-1b
14 M55	PL 6"x0.375"	0.244	1.518	18	0.565	0	y	11	70804.859	72900	569.7	9112.5	2.516	H1-1b
15 M24	PL 6"x0.375"	0.244	1.518	7	0.565	0	y	16	70804.859	72900	569.7	9112.5	2.516	H1-1b
16 M44	PL 6"x0.375"	0.28	1.518	9	0.539	0	y	16	70804.859	72900	569.7	9112.5	2.516	H1-1b
17 M125B	PL 6"x0.375"	0.278	1.518	14	0.539	0	y	6	70804.859	72900	569.7	9112.5	2.516	H1-1b
18 M75	PL 6"x0.375"	0.278	1.518	3	0.539	0	y	11	70804.859	72900	569.7	9112.5	2.516	H1-1b
19 M54	PL6x0.5	0.241	4.78	13	0.343	0	y	3	91746.966	97200	1012.5	12150	1.103	H1-1b
20 M23	PL6x0.5	0.234	4.78	18	0.343	0	y	8	91746.966	97200	1012.5	12150	1.101	H1-1b
21 M85	PL6x0.5	0.234	4.78	7	0.343	0	y	14	91746.966	97200	1012.5	12150	1.101	H1-1b
22 M124B	PL6x0.5	0.255	4.78	4	0.342	0	y	14	91746.966	97200	1012.5	12150	1.148	H1-1b
23 M74	PL6x0.5	0.255	4.78	10	0.342	0	y	3	91746.966	97200	1012.5	12150	1.148	H1-1b
24 M43	PL6x0.5	0.254	4.78	15	0.342	0	y	8	91746.966	97200	1012.5	12150	1.148	H1-1b
25 SR19	PIPE 2.0	0.337	11.842	5	0.303	136.579	z	8	6295.422	32130	1871.625	1871.625	2.084	H1-1a
26 SR10	PIPE 2.0	0.333	11.842	10	0.303	136.579	z	14	6295.422	32130	1871.625	1871.625	2.032	H1-1a
27 SR1	PIPE 2.0	0.333	11.842	15	0.303	136.579	z	3	6295.422	32130	1871.625	1871.625	2.032	H1-1a
28 M71	C4X5.4	0.436	33.1	24	0.289	61.671	z	29	16083.422	71100	1666.963	8392.526	1.304	H1-1b
29 M70	C4X5.4	0.436	33.1	30	0.287	61.671	z	34	16083.422	71100	1666.963	8392.365	1.304	H1-1b
30 M73	C4X5.4	0.436	33.1	19	0.287	61.671	z	23	16083.422	71100	1666.963	8392.563	1.304	H1-1b
31 M32	HSS4X4X4	0.525	0	30	0.15	0	y	17	75489.739	139518	16180.5	16180.5	2.551	H1-1b
32 M53A	HSS4X4X4	0.525	0	19	0.147	0	y	7	75489.739	139518	16180.5	16180.5	2.551	H1-1b
33 M63	HSS4X4X4	0.525	0	24	0.147	0	y	12	75489.739	139518	16180.5	16180.5	2.551	H1-1b
34 M96	PIPE 3.5x0.165	0.207	87.632	19	0.12	7.895	z	9	62033.752	71569.836	6336.491	6336.491	1.919	H1-1b
35 M95	PIPE 3.5x0.165	0.207	87.632	24	0.115	7.895	z	14	62033.752	71569.836	6336.491	6336.491	1.919	H1-1b
36 M94	PIPE 3.5x0.165	0.207	87.632	30	0.115	7.895	z	3	62033.752	71569.836	6336.491	6336.491	1.919	H1-1b
37 G_MP1_S	PIPE 2.0	0.427	73.768	9	0.101	73.768	z	13	14916.096	32130	1871.625	1871.625	1.741	H1-1b
38 SR21	PL6x1/4	0.051	1	4	0.1	3.237	y	8	37747.915	48600	253.125	6075	1.396	H1-1b
39 SR12	PL6x1/4	0.051	1	10	0.1	3.237	y	14	37747.915	48600	253.125	6075	1.396	H1-1b
40 SR3	PL6x1/4	0.051	1	15	0.1	3.237	y	3	37747.915	48600	253.125	6075	1.396	H1-1b

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

Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	Pnc [lb]	Pnt [lb]	Mn y-y [lb-ft]	Mn z-z [lb-ft]	Cb	Eqn
41	B_MP1_S	PIPE 2.0	0.424	73.768	4	0.1	73.768	7	14916.096	32130	1871.625	1871.625	1.728	H1-1b
42	A_MP1_S	PIPE 2.0	0.423	73.768	15	0.1	73.768	18	14916.096	32130	1871.625	1871.625	1.725	H1-1b
43	B_MP3_S	PIPE 2.0	0.508	73.768	13	0.099	73.768	17	14916.096	32130	1871.625	1871.625	1.775	H1-1b
44	G_MP3_S	PIPE 2.0	0.502	73.768	18	0.099	73.768	7	14916.096	32130	1871.625	1871.625	1.605	H1-1b
45	A_MP3_S	PIPE 2.0	0.501	73.768	7	0.099	73.768	12	14916.096	32130	1871.625	1871.625	1.736	H1-1b
46	B_MP4_S	PIPE 2.0	0.409	73.768	13	0.085	73.768	14	14916.096	32130	1871.625	1871.625	1.673	H1-1b
47	A_MP4_S	PIPE 2.0	0.405	73.768	8	0.085	73.768	8	14916.096	32130	1871.625	1871.625	1.674	H1-1b
48	G_MP4_S	PIPE 2.0	0.405	73.768	3	0.085	73.768	3	14916.096	32130	1871.625	1871.625	1.393	H1-1b
49	SR30	Custom 6.63x4.46_HRB	0.219	0	6	0.07	19.399	y	1520774.361	55242	1867.775	3812.792	1.5	H2-1
50	SR29	Custom 6.63x4.46_HRB	0.219	0	11	0.07	19.399	y	420774.361	55242	1867.775	3812.792	1.5	H2-1
51	SR28	Custom 6.63x4.46_HRB	0.219	0	16	0.07	19.399	y	1020774.361	55242	1867.775	3812.792	1.5	H2-1
52	SR20	PL6x1/4	0.067	1.763	13	0.065	1.763	y	837747.915	48600	253.125	6075	1.393	H1-1b
53	SR11	PL6x1/4	0.064	1.763	18	0.065	1.763	y	1437747.915	48600	253.125	6075	1.326	H1-1b
54	SR2	PL6x1/4	0.064	3.237	7	0.065	3.237	y	337747.915	48600	253.125	6075	1.326	H1-1b
55	B_MP2_S	PIPE 2.0	0.497	73.768	4	0.065	73.768	15	14916.096	32130	1871.625	1871.625	1.426	H1-1b
56	A_MP2_S	PIPE 2.0	0.497	73.768	15	0.065	73.768	10	14916.096	32130	1871.625	1871.625	1.492	H1-1b
57	G_MP2_S	PIPE 2.0	0.497	73.768	10	0.065	73.768	4	14916.096	32130	1871.625	1871.625	1.596	H1-1b
58	M31	L2x2x3	0.196	53.953	22	0.015	53.953	y	2217933.319	32490	774.606	1444.351	1.5	H2-1
59	M93	L2x2x3	0.196	53.953	27	0.015	53.953	y	2717745.201	32490	774.606	1444.351	1.5	H2-1
60	M62	L2x2x3	0.196	53.953	32	0.015	53.953	y	3217933.319	32490	774.606	1444.351	1.5	H2-1
61	M82	L2x2x3	0.146	53.953	20	0.013	53.953	y	2017933.319	32490	774.606	1444.351	1.5	H2-1
62	M132A	L2x2x3	0.146	53.953	31	0.013	53.953	y	3117933.319	32490	774.606	1444.351	1.5	H2-1
63	M51	L2x2x3	0.146	53.953	26	0.012	53.953	y	2617933.319	32490	774.606	1444.351	1.5	H2-1

# TOWER-MOUNT CONNECTION ANALYSIS

v.1.0.0

SITE INFORMATION	
Site ID	302483.0
Site Name	Brln - Berlin
Project ID	41124-13678286_C8_02-01-MA

ANALYSIS PARAMETERS	
TIA Revision	H

APPLIED FORCES FROM R3D		
Member Label		M63
Member End Label		I
Force-X	F <sub>x</sub> , lbs	-1619.1
Force-Y	F <sub>y</sub> , lbs	3240.6
Force-Z	F <sub>z</sub> , lbs	-1131.9
Moment X-X	M <sub>x</sub> , lbs-ft	-1583.4
Moment Y-Y	M <sub>y</sub> , lbs-ft	-1782.0
Moment Z-Z	M <sub>z</sub> , lbs-ft	8478.3

STANDOFF MEMBER PROPERTIES	
Standoff Member Type	Square/Rect. HSS
Standoff Member Shape	HSS4X4X1/4
Standoff Member Grade	A500-46 Gr.B Rect.
Member to Plate Weld Size, in	1/4

BOLT & PLATE PROPERTIES	
Bolt Quantity	4
Bolt Edge Distance (e), in	1.00
Nominal Bolt Diameter (ØDb), in	0.625
Bolt Grade	A325
Plate Height (H), in	9.00
Plate Width (W), in	9.00
Plate Thickness (T), in	0.75
Plate Grade	A572-50

BOLT ANALYSIS	
Shear Demand (V <sub>u</sub> ), k	1.10
Shear Capacity (ΦR <sub>nv</sub> ), k	13.81
Tension Demand (T <sub>u</sub> ), k	10.91
Tension Capacity (ΦR <sub>nt</sub> ), k	20.34
Shear Utilization	8.0%
Tension Utilization	53.6%
Interaction Utilization	29.4%

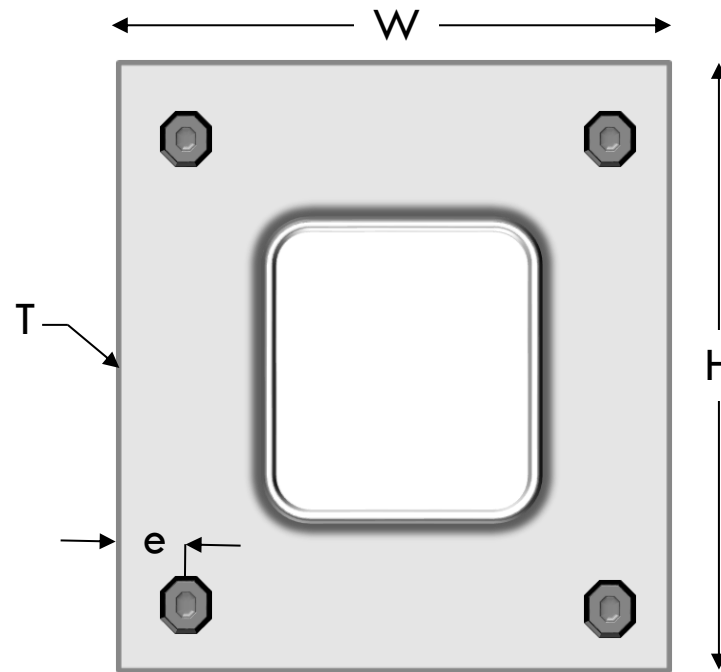
PLATE ANALYSIS	
Moment Demand (M <sub>u</sub> ), k-in	32.72
Flexural Capacity (ΦM <sub>n</sub> ), k-in	56.95
Plate Utilization	57.5%

PASS

PASS



319 Chapanoke Road, Suite 118  
 Raleigh, NC 27603  
 Office: (405) 348-5460  
 Fax: (405) 341-6334



MATERIAL PROPERTIES	
Standoff Member - Yield Strength (F <sub>y</sub> ), ksi	46
Standoff Member - Ultimate Strength (F <sub>u</sub> ), ksi	58
Bolt - Yield Strength (F <sub>y</sub> ), ksi	92
Bolt - Tensile Strength (F <sub>u</sub> ), ksi	120
Plate - Yield Strength (F <sub>y</sub> ), ksi	50
Plate - Ultimate Strength (F <sub>u</sub> ), ksi	65

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

T-Mobile Existing Facility

Site ID: CT11182A

Berlin/ Rt-9 X22\_1  
260 Beckley Road  
Berlin, Connecticut 06037

**July 14, 2021**

**EBI Project Number: 6221003587**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general population allowable limit:	<b>29.62%</b>

July 14, 2021

T-Mobile

Attn: Jason Overbey, RF Manager  
35 Griffin Road South  
Bloomfield, Connecticut 06002

Emissions Analysis for Site: CT11182A - Berlin/ Rt-9 X22\_1

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **260 Beckley Road in Berlin, Connecticut** for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately  $400 \mu\text{W}/\text{cm}^2$  and  $467 \mu\text{W}/\text{cm}^2$ , respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is  $1000 \mu\text{W}/\text{cm}^2$ . Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

## **CALCULATIONS**

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 260 Beckley Road in Berlin, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower. For power density calculations, the broadcast footprint of the AIR6449 antenna has been considered. Due to the beamforming nature of this antenna, the actual beam locations vary depending on demand and are narrow in nature. Using the broadcast footprint accounts for the potential location of beams at any given time.

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

- 1) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 2) 1 NR channel (600 MHz Band) was considered for each sector of the proposed installation. This Channel has a transmit power of 80 Watts.
- 3) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 4) 4 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 5) 4 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.



- 6) 2 UMTS channels (AWS Band - 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 7) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 8) 1 LTE Traffic channel (LTE IC and 2C BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 60 Watts.
- 9) 1 LTE Broadcast channel (LTE IC and 2C BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 20 Watts.
- 10) 1 NR Traffic channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 120 Watts.
- 11) 1 NR Broadcast channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 40 Watts.
- 12) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 13) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 14) The antennas used in this modeling are the Ericsson AIR 32 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24\_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector A, the Ericsson AIR 32 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24\_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector B, the Ericsson AIR 32 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24\_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449

for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

- 15) The antenna mounting height centerline of the proposed antennas is 142 feet above ground level (AGL).
- 16) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.
- 17) All calculations were done with respect to uncontrolled / general population threshold limits.

## T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR 32	Make / Model:	Ericsson AIR 32	Make / Model:	Ericsson AIR 32
Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz
Gain:	15.35 dBd / 15.35 dBd / 15.85 dBd	Gain:	15.35 dBd / 15.35 dBd / 15.85 dBd	Gain:	15.35 dBd / 15.35 dBd / 15.85 dBd
Height (AGL):	142 feet	Height (AGL):	142 feet	Height (AGL):	142 feet
Channel Count:	8	Channel Count:	8	Channel Count:	8
Total TX Power (W):	360 Watts	Total TX Power (W):	360 Watts	Total TX Power (W):	360 Watts
ERP (W):	12,841.53	ERP (W):	12,841.53	ERP (W):	12,841.53
Antenna A1 MPE %:	2.50%	Antenna B1 MPE %:	2.50%	Antenna C1 MPE %:	2.50%
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 16.35 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 16.35 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 16.35 dBd
Height (AGL):	142 feet	Height (AGL):	142 feet	Height (AGL):	142 feet
Channel Count:	9	Channel Count:	9	Channel Count:	9
Total TX Power (W):	380 Watts	Total TX Power (W):	380 Watts	Total TX Power (W):	380 Watts
ERP (W):	11,055.53	ERP (W):	11,055.53	ERP (W):	11,055.53
Antenna A2 MPE %:	3.24%	Antenna B2 MPE %:	3.24%	Antenna C2 MPE %:	3.24%
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449
Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz
Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd	Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd	Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd
Height (AGL):	142 feet	Height (AGL):	142 feet	Height (AGL):	142 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts
ERP (W):	36,356.09	ERP (W):	36,356.09	ERP (W):	36,356.09
Antenna A3 MPE %:	7.07%	Antenna B3 MPE %:	7.07%	Antenna C3 MPE %:	7.07%

Site Composite MPE %	
Carrier	MPE %
T-Mobile (Max at Sector A):	12.80%
AT&T	4.53%
Metro PCS	0.66%
Berlin FD	0.02%
Verizon	7.17%
Sprint	3.36%
Nextel	1.08%
<b>Site Total MPE % :</b>	<b>29.62%</b>

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	12.80%
T-Mobile Sector B Total:	12.80%
T-Mobile Sector C Total:	12.80%
<b>Site Total MPE % :</b>	<b>29.62%</b>

### T-Mobile Maximum MPE Power Values (Sector A)

T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
T-Mobile 1900 MHz GSM	4	1028.30	142.0	8.00	1900 MHz GSM	1000	0.80%
T-Mobile 1900 MHz LTE	2	2056.61	142.0	8.00	1900 MHz LTE	1000	0.80%
T-Mobile 2100 MHz LTE	2	2307.55	142.0	8.97	2100 MHz LTE	1000	0.90%
T-Mobile 600 MHz LTE	2	591.73	142.0	2.30	600 MHz LTE	400	0.58%
T-Mobile 600 MHz NR	1	1577.94	142.0	3.07	600 MHz NR	400	0.77%
T-Mobile 700 MHz LTE	2	648.82	142.0	2.52	700 MHz LTE	467	0.54%
T-Mobile 1900 MHz LTE	2	2203.69	142.0	8.57	1900 MHz LTE	1000	0.86%
T-Mobile 2100 MHz UMTS	2	1294.56	142.0	5.03	2100 MHz UMTS	1000	0.50%
T-Mobile 2500 MHz LTE IC & 2C Traffic	1	11044.63	142.0	21.47	2500 MHz LTE IC & 2C Traffic	1000	2.15%
T-Mobile 2500 MHz LTE IC & 2C Broadcast	1	1074.06	142.0	2.09	2500 MHz LTE IC & 2C Broadcast	1000	0.21%
T-Mobile 2500 MHz NR Traffic	1	22089.26	142.0	42.94	2500 MHz NR Traffic	1000	4.29%
T-Mobile 2500 MHz NR Broadcast	1	2148.13	142.0	4.18	2500 MHz NR Broadcast	1000	0.42%
						<b>Total:</b>	<b>12.80%</b>

• NOTE: Totals may vary by approximately 0.01% due to summation of remainders in calculations.

## Summary

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

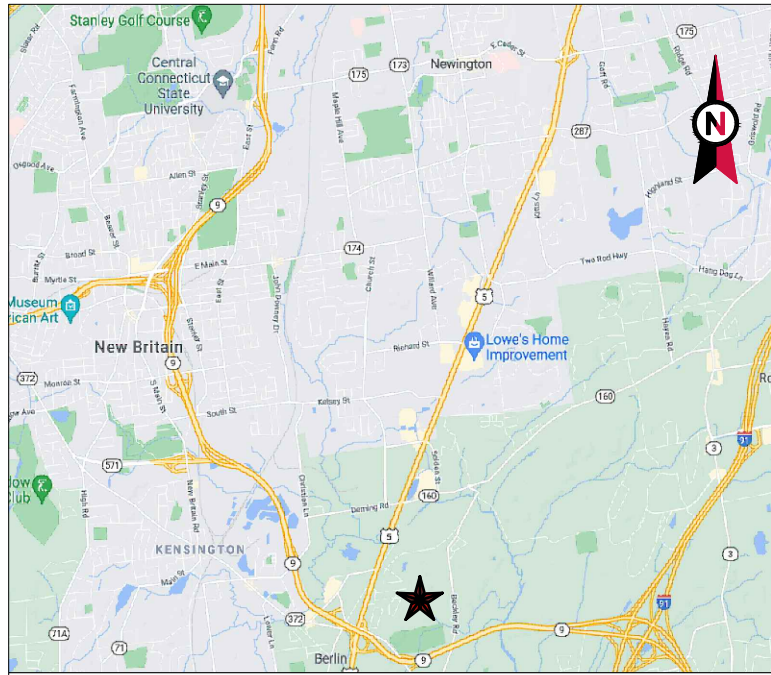
The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	12.80%
Sector B:	12.80%
Sector C:	12.80%
T-Mobile Maximum MPE % (Sector A):	12.80%
Site Total:	29.62%
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **29.62%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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



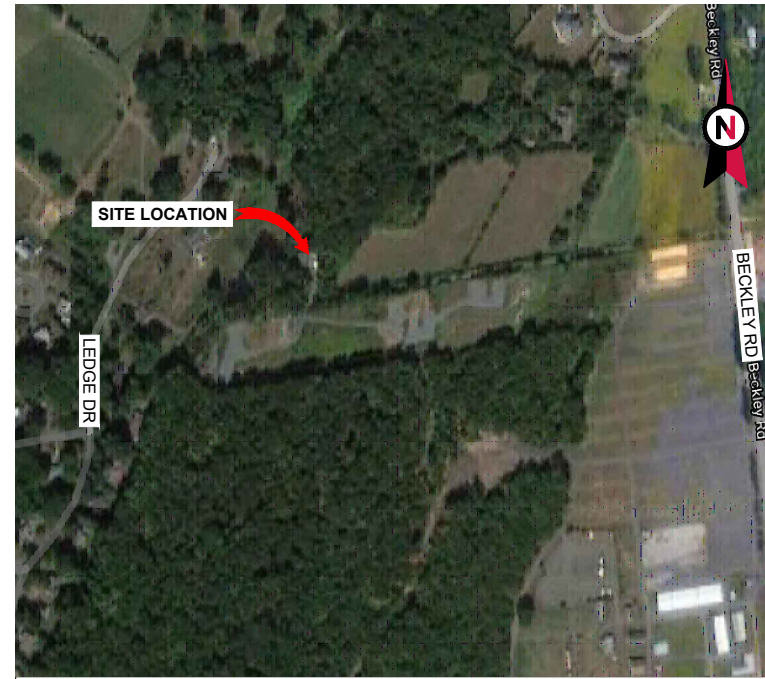


VICINITY MAP



**AMERICAN TOWER®**

ATC SITE NAME: BRLN - BERLIN  
 ATC SITE NUMBER: 302483  
 T-MOBILE SITE NAME: BERLIN/ RT-9 X22\_1  
 T-MOBILE SITE NUMBER: CT11182A  
 SITE ADDRESS: 286 BECKLEY ROAD  
 BERLIN, CT 06037



LOCATION MAP

**T-MOBILE ANCHOR ANTENNA AMENDMENT PLAN  
 67D5997DB\_2XAIR+1OP CONFIGURATION**

COMPLIANCE CODE	PROJECT SUMMARY	PROJECT DESCRIPTION	SHEET INDEX				
ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNMENT AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES.  1. 2015 INTERNATIONAL BUILDING CODE (IBC) 2. 2017 NATIONAL ELECTRIC CODE (NEC) 3. LOCAL BUILDING CODE 4. CITY/COUNTY ORDINANCES	<u>SITE ADDRESS:</u> 286 BECKLEY ROAD BERLIN, CT 06037 COUNTY: HARTFORD  <u>GEOGRAPHIC COORDINATES:</u> LATITUDE: 41.63172222 LONGITUDE: -72.7299 GROUND ELEVATION: 185' AMSL	THE PROPOSED PROJECT INCLUDES MODIFYING GROUND BASED AND TOWER MOUNTED EQUIPMENT AS INDICATED PER BELOW: <u>TOWER WORK:</u> REMOVE (3) AIR32 KRD901146-1_B66A_B2A ANTENNA(S), (12) 1 5/8" COAX CABLE(S), AND (1) 9X18 HCS  INSTALL (3) AIR32 KRD901146-1_B66A_B2A ANTENNA(S), (3) AIR6449 B41 ANTENNA(S), (1) 6X24 HYBRID CABLE, AND (3) 4460 B25+B66 RRH(S)  EXISTING (3) APXVAARR24_43-U-NA2 ANTENNA(S), (3) 4449 B71+B8 5 RRH(S), AND (2) 6X12 HYBRID CABLE(S) TO REMAIN  <u>GROUND WORK:</u> REMOVE (1) RBS3106, AND ALL CABINET RADIOS FROM BASE STATION CABINET  INSTALL (1) B160 BATTERY CABINET, (1) ENCLOSURE 6160, (1) BB6648, (1) IXRE ROUTER, AND (1) PSU4813  EXISTING (1) RBS 6102 CABINET TO REMAIN	SHEET NO:	DESCRIPTION:	REV:	DATE:	BY:
	<u>PROJECT TEAM</u>  <u>TOWER OWNER:</u> AMERICAN TOWER 10 PRESIDENTIAL WAY WOBURN, MA 01801  <u>ENGINEER:</u> KIMLEY-HORN & ASSOCIATES, INC. 421 FAYETTEVILLE ST, STE 600 RALEIGH, NC 27601 COA: PEC.0000738  <u>PROPERTY OWNER:</u> JOHN C MATULIS JR 286 BECKLEY ROAD BERLIN , CT 06037	<u>APPLICANT:</u> T-MOBILE  SUE EMERY susan.emery@t-mobile.com	<u>PROJECT NOTES</u>  1. THE FACILITY IS UNMANNED. 2. A TECHNICIAN WILL VISIT THE SITE APPROXIMATELY ONCE A MONTH FOR ROUTINE INSPECTION AND MAINTENANCE. 3. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT LAND DISTURBANCE OR EFFECT OF STORM WATER DRAINAGE. 4. NO SANITARY SEWER, POTABLE WATER OR TRASH DISPOSAL IS REQUIRED. 5. HANDICAP ACCESS IS NOT REQUIRED.	G-001	TITLE SHEET	0	07/13/21
<u>UTILITY COMPANIES</u>  POWER COMPANY: EVERSOURCE PHONE: (877) 659-6326  TELEPHONE COMPANY: FRONTIER COMMUNICATIONS PHONE: (800) 376-6843		<u>PROJECT LOCATION DIRECTIONS</u>  FROM NEWINGTON, CT:  TAKE MAIN ST TO US-5 S/BERLIN TURNPIKE (2.1), TURN RIGHT ONTO US-5 S/BERLIN TURNPIKE(3.0), TAKE MILDRED RD TO LEDGE DR(0.4), ARRIVE 286 BECKLEY RD	G-002	GENERAL NOTES	0	07/13/21	JW
			C-101	DETAILED SITE PLAN	0	07/13/21	JW
			C-102	DETAILED GROUND PLAN	0	07/13/21	JW
			C-201	TOWER ELEVATION	0	07/13/21	JW
			C-401	ANTENNA INFORMATION & SCHEDULE	0	07/13/21	JW
			C-501	CONSTRUCTION DETAILS	0	07/13/21	JW
			E-501	GROUNDING DETAILS	0	07/13/21	JW
			R-601	SUPPLEMENTAL			
			R-602	SUPPLEMENTAL			
			R-603	SUPPLEMENTAL			
			R-604	SUPPLEMENTAL			
			R-604	SUPPLEMENTAL			
			R-605	SUPPLEMENTAL			



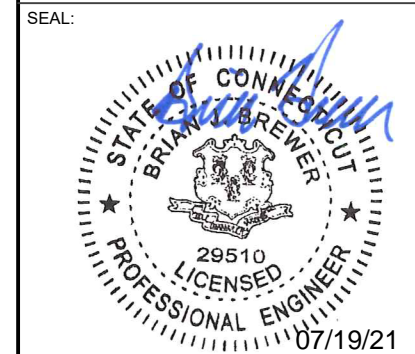
**Kimley»Horn**

COA: PEC.0000738  
 421 FAYETTEVILLE ST, SUITE 600  
 RALEIGH, NC 27601

REV.	DESCRIPTION	BY	DATE
A	PRELIM	RDC	06/15/21
0	ISSUED FOR CONSTRUCTION	JW	07/13/21

ATC SITE NUMBER:  
**302483**  
 ATC SITE NAME:  
**BRLN - BERLIN**  
 T-MOBILE SITE NAME:  
**BERLIN/ RT-9 X22\_1**

SITE ADDRESS:  
 286 BECKLEY ROAD  
 BERLIN, CT 06037



**T-Mobile®**

DATE DRAWN:	07/13/21
ATC JOB NO:	13678286_G3
CUSTOMER ID:	BERLIN/ RT-9 X22_1
CUSTOMER #:	CT11182A

**TITLE SHEET**

SHEET NUMBER:  
**G-001**  
 REVISION:  
**0**

**GENERAL CONSTRUCTION NOTES:**

1. OWNER FURNISHED MATERIALS, T-MOBILE "THE COMPANY" WILL PROVIDE AND THE CONTRACTOR WILL INSTALL
  - A. BTS EQUIPMENT FRAME (PLATFORM) AND ICEBRIDGE SHELTER (GROUND BUILD/CO-LOCATE ONLY)
  - B. AC/TELCO INTERFACE BOX (PPC)
  - C. ICE BRIDGE (CABLE TRAY WITH COVER) (GROUND BUILD/CO-LOCATE ONLY, GC TO FURNISH AND INSTALL FOR ROOFTOP INSTALLATION)
  - D. TOWERS, MONOPOLES
  - E. TOWER LIGHTING
  - F. GENERATORS & LIQUID PROPANE TANK
  - G. ANTENNA STANDARD BRACKETS, FRAMES AND PIPES FOR MOUNTING
  - H. ANTENNAS (INSTALLED BY OTHERS)
  - I. TRANSMISSION LINE
  - J. TRANSMISSION LINE JUMPERS
  - K. TRANSMISSION LINE CONNECTORS WITH WEATHERPROOFING KITS
  - L. TRANSMISSION LINE GROUND KITS
  - M. HANGERS
  - N. HOISTING GRIPS
  - O. BTS EQUIPMENT
2. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL OTHER MATERIALS FOR THE COMPLETE INSTALLATION OF THE SITE INCLUDING, BUT NOT LIMITED TO, SUCH MATERIALS AS FENCING, STRUCTURAL STEEL SUPPORTING SUB-FRAME FOR PLATFORM, ROOFING LABOR AND MATERIALS, GROUNDING RINGS, GROUNDING WIRES, COPPER-CLAD OR XIT CHEMICAL GROUND ROD(S), BUSS BARS, TRANSFORMERS AND DISCONNECT SWITCHES WHERE APPLICABLE, TEMPORARY ELECTRICAL POWER, CONDUIT, LANDSCAPING COMPOUND STONE, CRANES, CORE DRILLING, SLEEPERS AND RUBBER MATTING, REBAR, CONCRETE CAISSONS, PADS AND/OR AUGER MOUNTS, MISCELLANEOUS FASTENERS, CABLE TRAYS, NON-STANDARD ANTENNA FRAMES AND ALL OTHER MATERIAL AND LABOR REQUIRED TO COMPLETE THE JOB ACCORDING TO THE DRAWINGS AND SPECIFICATIONS. IT IS THE POSITION OF T-MOBILE TO APPLY FOR PERMITTING AND CONTRACTOR RESPONSIBLE FOR PICKUP AND PAYMENT OF REQUIRED PERMITS.
3. ALL WORK SHALL CONFORM TO ALL CURRENT APPLICABLE FEDERAL, STATE, AND LOCAL CODES, INCLUDING ANSI/EIA/TIA-222, AND COMPLY WITH ATC CONSTRUCTION SPECIFICATIONS.
4. CONTRACTOR SHALL CONTACT LOCAL 811 FOR IDENTIFICATION OF UNDERGROUND UTILITIES PRIOR TO START OF CONSTRUCTION.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL REQUIRED INSPECTIONS.
6. ALL DIMENSIONS TO, OF, AND ON EXISTING BUILDINGS, DRAINAGE STRUCTURES, AND SITE IMPROVEMENTS SHALL BE VERIFIED IN FIELD BY CONTRACTOR WITH ALL DISCREPANCIES REPORTED TO THE ENGINEER.
7. DO NOT CHANGE SIZE OR SPACING OF STRUCTURAL ELEMENTS.
8. DETAILS SHOWN ARE TYPICAL; SIMILAR DETAILS APPLY TO SIMILAR CONDITIONS UNLESS OTHERWISE NOTED.
9. THESE DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY WHICH SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
10. CONTRACTOR SHALL BRACE STRUCTURES UNTIL ALL STRUCTURAL ELEMENTS NEEDED FOR STABILITY ARE INSTALLED. THESE ELEMENTS ARE AS FOLLOWS: LATERAL BRACING, ANCHOR BOLTS, ETC.
11. CONTRACTOR SHALL DETERMINE EXACT LOCATION OF EXISTING UTILITIES, GROUNDS DRAINS, DRAIN PIPES, VENTS, ETC. BEFORE COMMENCING WORK.
12. INCORRECTLY FABRICATED, DAMAGED, OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE T-MOBILE REP PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH REMEDIAL ACTION SHALL REQUIRE WRITTEN APPROVAL BY THE T-MOBILE REP PRIOR TO PROCEEDING.
13. EACH CONTRACTOR SHALL COOPERATE WITH THE T-MOBILE REP, AND COORDINATE HIS WORK WITH THE WORK OF OTHERS.
14. CONTRACTOR SHALL REPAIR ANY DAMAGE CAUSED BY CONSTRUCTION OF THIS PROJECT TO MATCH EXISTING PRE-CONSTRUCTION CONDITIONS TO THE SATISFACTION OF THE T-MOBILE CONSTRUCTION MANAGER.
15. ALL CABLE/CONDUIT ENTRY/EXIT PORTS SHALL BE WEATHERPROOFED DURING INSTALLATION USING A SILICONE SEALANT.
16. WHERE EXISTING CONDITIONS DO NOT MATCH THOSE SHOWN IN THIS PLAN SET, CONTRACTOR SHALL NOTIFY THE T-MOBILE REP AND ENGINEER OF RECORD IMMEDIATELY.
17. CONTRACTOR SHALL ENSURE ALL SUBCONTRACTORS ARE PROVIDED WITH A COMPLETE AND CURRENT SET OF DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT.
18. CONTRACTOR SHALL REMOVE ALL RUBBISH AND DEBRIS FROM THE SITE AT THE END OF EACH DAY.
19. CONTRACTOR SHALL COORDINATE WORK SCHEDULE WITH AMERICAN TOWER CORPORATION (ATC) AND TAKE PRECAUTIONS TO MINIMIZE IMPACT AND DISRUPTION OF OTHER OCCUPANTS OF THE FACILITY.
20. CONTRACTOR SHALL FURNISH T-MOBILE AND AMERICAN TOWER CORPORATION (ATC) WITH A PDF MARKED UP AS-BUILT SET OF DRAWINGS UPON COMPLETION OF WORK.
21. PRIOR TO SUBMISSION OF BID, CONTRACTOR SHALL COORDINATE WITH T-MOBILE REP TO DETERMINE WHAT, IF ANY, ITEMS WILL BE PROVIDED. ALL ITEMS NOT PROVIDED SHALL BE PROVIDED AND INSTALLED BY THE CONTRACTOR. CONTRACTOR WILL INSTALL ALL ITEMS PROVIDED.

22. PRIOR TO SUBMISSION OF BID, CONTRACTOR SHALL COORDINATE WITH T-MOBILE REP TO DETERMINE IF ANY PERMITS WILL BE OBTAINED BY CONTRACTOR. ALL REQUIRED PERMITS NOT OBTAINED BY T-MOBILE MUST BE OBTAINED, AND PAID FOR, BY THE CONTRACTOR.
23. CONTRACTOR SHALL INSTALL ALL SITE SIGNAGE IN ACCORDANCE WITH T-MOBILE SPECIFICATIONS AND REQUIREMENTS.
24. CONTRACTOR SHALL SUBMIT ALL SHOP DRAWINGS TO T-MOBILE FOR REVIEW AND APPROVAL PRIOR TO FABRICATION.
25. ALL EQUIPMENT SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS AND LOCATED ACCORDING TO T-MOBILE SPECIFICATIONS, AND AS SHOWN IN THESE PLANS.
26. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
27. CONTRACTOR SHALL NOTIFY T-MOBILE REP A MINIMUM OF 48 HOURS IN ADVANCE OF POURING CONCRETE OR BACKFILLING ANY UNDERGROUND UTILITIES, FOUNDATIONS OR SEALING ANY WALL, FLOOR OR ROOF PENETRATIONS FOR ENGINEERING REVIEW AND APPROVAL.
28. CONTRACTOR SHALL BE RESPONSIBLE FOR SITE SAFETY INCLUDING COMPLIANCE WITH ALL APPLICABLE OSHA STANDARDS AND RECOMMENDATIONS AND SHALL PROVIDE ALL NECESSARY SAFETY DEVICES INCLUDING PPE AND PPM AND CONSTRUCTION DEVICES SUCH AS WELDING AND FIRE PREVENTION, TEMPORARY SHORING, SCAFFOLDING, TRENCH BOXES/SLOPING, BARRIERS, ETC.
29. THE CONTRACTOR SHALL PROTECT AT HIS OWN EXPENSE, ALL EXISTING FACILITIES AND SUCH OF HIS NEW WORK LIABLE TO INJURY DURING THE CONSTRUCTION PERIOD. ANY DAMAGE CAUSED BY NEGLIGENCE ON THE PART OF THIS CONTRACTOR OR HIS REPRESENTATIVES, OR BY THE ELEMENTS DUE TO NEGLIGENCE ON THE PART OF THIS CONTRACTOR OR HIS REPRESENTATIVES, EITHER TO THE EXISTING WORK, OR TO HIS WORK OR THE WORK OF ANY OTHER CONTRACTOR, SHALL BE REPAIRED AT HIS EXPENSE TO THE OWNER'S SATISFACTION.
30. ALL WORK SHALL BE INSTALLED IN A FIRST CLASS, NEAT AND WORKMANLIKE MANNER BY MECHANICS SKILLED IN THE TRADE INVOLVED. THE QUALITY OF WORKMANSHIP SHALL BE SUBJECT TO THE APPROVAL OF THE T-MOBILE REP. ANY WORK FOUND BY THE T-MOBILE REP TO BE OF INFERIOR QUALITY AND/OR WORKMANSHIP SHALL BE REPLACED AND/OR REWORKED AT CONTRACTOR EXPENSE UNTIL APPROVAL IS OBTAINED.
31. IN ORDER TO ESTABLISH STANDARDS OF QUALITY AND PERFORMANCE, ALL TYPES OF MATERIALS LISTED HEREINAFTER BY MANUFACTURER'S NAMES AND/OR MANUFACTURER'S CATALOG NUMBER SHALL BE PROVIDED BY THESE MANUFACTURERS AS SPECIFIED.
32. T-MOBILE FURNISHED EQUIPMENT SHALL BE PICKED-UP AT THE T-MOBILE WAREHOUSE, NO LATER THAN 48HR AFTER BEING NOTIFIED INSURED, STORED, UNCRATE, PROTECTED AND INSTALLED BY THE CONTRACTOR WITH ALL APPURTENANCES REQUIRED TO PLACE THE EQUIPMENT IN OPERATION, READY FOR USE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE EQUIPMENT AFTER PICKING IT UP.
33. T-MOBILE OR HIS ARCHITECT/ENGINEER RESERVES THE RIGHT TO REJECT ANY EQUIPMENT OR MATERIALS WHICH, IN HIS OWN OPINION ARE NOT IN COMPLIANCE WITH THE CONTRACT DOCUMENTS, EITHER BEFORE OR AFTER INSTALLATION AND THE EQUIPMENT SHALL BE REPLACED WITH EQUIPMENT CONFORMING TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS BY THE CONTRACTOR AT NO COST TO T-MOBILE OR THEIR ARCHITECT/ENGINEER.

**SPECIAL CONSTRUCTION**

**ANTENNA INSTALLATION NOTES:**

1. WORK INCLUDED:
  - A. ANTENNA AND COAXIAL CABLES ARE FURNISHED BY T-MOBILE UNDER A SEPARATE CONTRACT. THE CONTRACTOR SHALL ASSIST ANTENNA INSTALLATION CONTRACTOR IN TERMS OF COORDINATION AND SITE ACCESS. ERECTION SUBCONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PERSONNEL AND
  - B. INSTALL ANTENNA AS INDICATE ON DRAWINGS AND T-MOBILE SPECIFICATIONS.
  - C. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS
  - D. INSTALL FURNISHED GALVANIZED STEEL OR ALUMINUM WAVEGUIDE.
  - E. CONTRACTOR SHALL PROVIDE FOUR (4) SETS OF SWEEP TESTS USING ANRITZU-PACKARD 8713B RF SCALAR NETWORK ANALYZER. SUBMIT FREQUENCY DOMAIN REFLECTOMETER(FDR) TESTS RESULTS TO THE PROJECT MANAGER. SWEEP TESTS SHALL BE AS PER ATTACHED RFS "MINIMUM FIELD TESTING RECOMMENDED FOR ANTENNA AND HELIAX COAXIAL CABLE SYSTEMS" DATED 10/5/93. TESTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING SERVICE AND BE BOUND AND SUBMITTED WITHIN ONE WEEK OF WORK COMPLETION.
  - F. INSTALL COAXIAL CABLES AND TERMINATING BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTIONS BETWEEN THE ANTENNA AND EQUIPMENT PER MANUFACTURER'S REQUIREMENTS. TERMINATE ALL COAXIAL CABLE THREE (3) FEET IN EXCESS OF ENTRY PORT LOCATION UNLESS OTHERWISE STATED.
  - G. ANTENNA AND COAXIAL CABLE GROUNDING:
2. ALL EXTERIOR #6 GREED GROUND WIRE "DAISY CHAIN" CONNECTIONS ARE TO BE WEATHER SEALED WITH RFS CONNECTORS/SPLICE WEATHERPROOFING KIT #221213 OR EQUAL.
3. ALL COAXIAL CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS OF COAXIAL CABLE (NOT WITHIN BENDS)

ALL DISCREPANCIES FROM WHAT IS SHOWN ON THESE CONSTRUCTION DRAWINGS SHALL BE COMMUNICATED TO ATC ENGINEERING IMMEDIATELY FOR CORRECTION OR RE-DESIGN. FAILURE TO COMMUNICATE DIRECTLY WITH ATC ENGINEERING OR ANY CHANGES FROM THE DESIGN CONDUCTED WITHOUT PRIOR APPROVAL FROM ATC ENGINEERING SHALL BE THE SOLE RESPONSIBILITY OF THE GENERAL CONTRACTOR.



COA: PEC.0000738  
421 FAYETTEVILLE ST, SUITE 600  
RALEIGH, NC 27601

REV.	DESCRIPTION	BY	DATE
A	PRELIM	RDC	06/15/21
0	ISSUED FOR CONSTRUCTION	JW	07/13/21

ATC SITE NUMBER:  
**302483**  
ATC SITE NAME:  
**BRLN - BERLIN**  
T-MOBILE SITE NAME:  
**BERLIN/ RT-9 X22\_1**  
SITE ADDRESS:  
286 BECKLEY ROAD  
BERLIN, CT 06037



DATE DRAWN:	07/13/21
ATC JOB NO:	13678286_G3
CUSTOMER ID:	BERLIN/ RT-9 X22_1
CUSTOMER #:	CT11182A

GENERAL NOTES	
SHEET NUMBER: <b>G-002</b>	REVISION: <b>0</b>

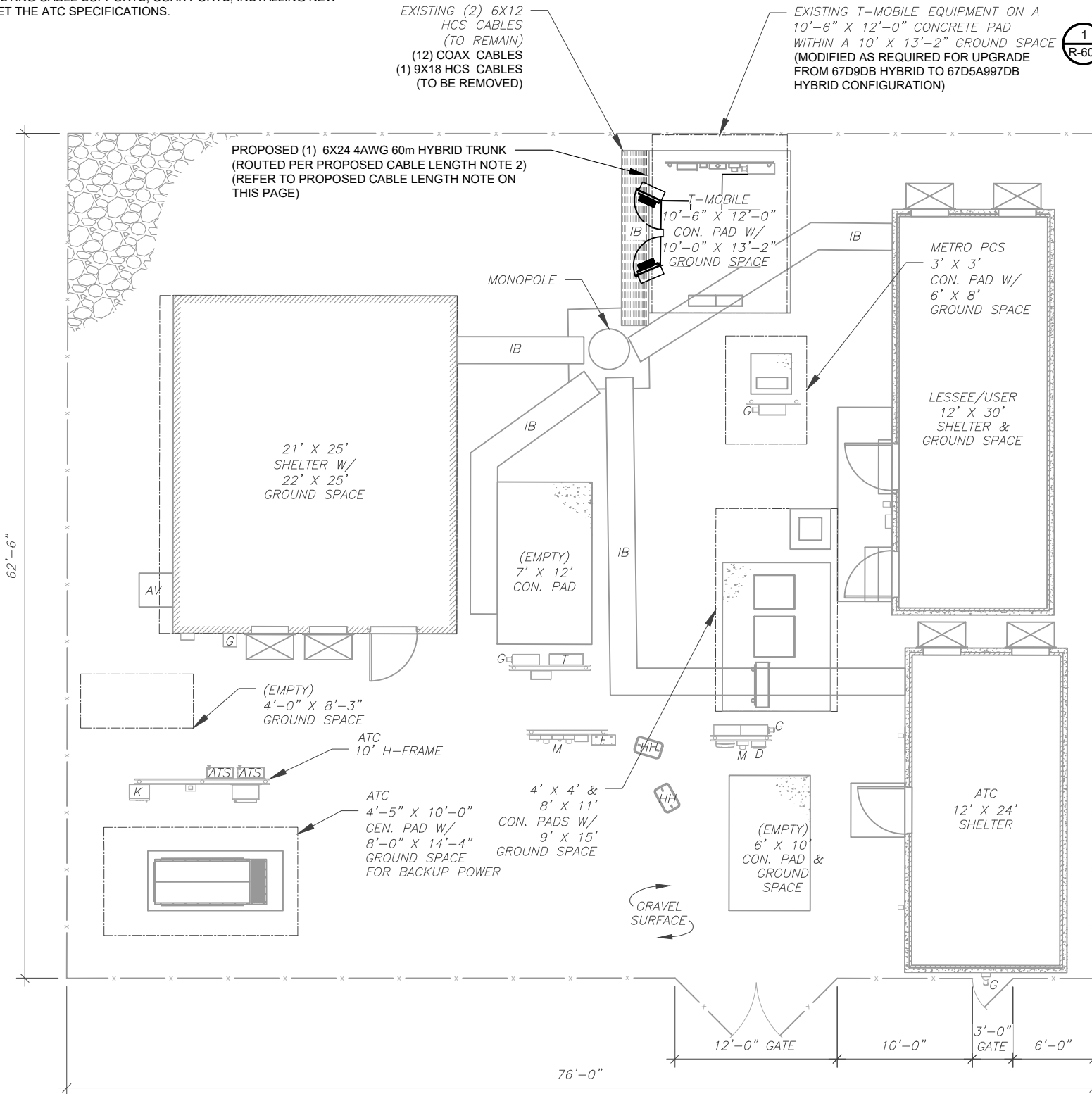
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**SITE PLAN NOTES:**

1. THIS SITE PLAN REPRESENTS THE BEST PRESENT KNOWLEDGE AVAILABLE TO THE ENGINEER AT THE TIME OF THIS DESIGN. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO CONSTRUCTION AND VERIFY ALL EXISTING CONDITIONS RELATED TO THE SCOPE OF WORK FOR THIS PROJECT.
2. ICE BRIDGE, CABLE LADDER, COAX PORT, AND COAX CABLE ARE SHOWN FOR REFERENCE ONLY. CONTRACTOR SHALL CONFIRM THE EXACT LOCATION OF ALL PROPOSED AND EXISTING EQUIPMENT AND STRUCTURES DEPICTED ON THIS PLAN. BEFORE UTILIZING EXISTING CABLE SUPPORTS, COAX PORTS, INSTALLING NEW PORTS OR ANY OTHER EQUIPMENT, CONTRACTOR SHALL VERIFY ALL ASPECTS OF THE COMPONENTS MEET THE ATC SPECIFICATIONS.
3. THIS PROJECT INCLUDES NO INSTALL OR MODIFICATION AT GRADE.

LEGEND	
⊗	GROUNDING TEST WELL
ATS	AUTOMATIC TRANSFER SWITCH
B	BOLLARD
CSC	CELL SITE CABINET
D	DISCONNECT
E	ELECTRICAL
F	FIBER
GEN	GENERATOR
G	GENERATOR RECEPTACAL
HH, V	HAND HOLE, VAULT
IB	ICE BRIDGE
K	KENTROX BOX
LC	LIGHTING CONTROL
M	METER
PB	PULL BOX
PP	POWER POLE
T	TELCO
TRN	TRANSFORMER
-x-	CHAINLINK FENCE



EXISTING (2) 6X12 HCS CABLES (TO REMAIN)  
(12) COAX CABLES  
(1) 9X18 HCS CABLES (TO BE REMOVED)

EXISTING T-MOBILE EQUIPMENT ON A 10'-6" X 12'-0" CONCRETE PAD WITHIN A 10' X 13'-2" GROUND SPACE (MODIFIED AS REQUIRED FOR UPGRADE FROM 67D9DB HYBRID TO 67D5A997DB HYBRID CONFIGURATION)

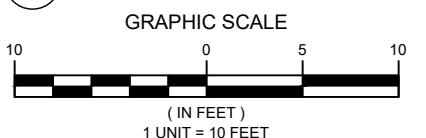
1 2 4  
R-601 C-102 E-501

PROPOSED (1) 6X24 4AWG 60m HYBRID TRUNK (ROUTED PER PROPOSED CABLE LENGTH NOTE 2) (REFER TO PROPOSED CABLE LENGTH NOTE ON THIS PAGE)

**PROPOSED CABLE LENGTH:**

1. ESTIMATED LENGTH OF PROPOSED CABLE IS **178'**. ESTIMATED LENGTH OF CABLE WAS PROVIDED BY CUSTOMER OR CALCULATED BY ADDING THE RAD CENTER AND THE DISTANCE FROM THE SHELTER ENTRY PLATE TO THE TOWER (ALONG THE ICE BRIDGE) AND A SAFETY FACTOR MEASUREMENT OF 15% (OF THE TWO PREVIOUS VALUES), CDS DEFER TO GREATEST CABLE LENGTH.
2. ROUTE PROPOSED CABLES ALONG SAME PATH AS EXISTING CABLES AND IN ACCORDANCE WITH STRUCTURAL ANALYSIS. IF ADEQUATE SPACE EXISTS, ROUTE CABLES THROUGH ENTRY PORT HOLE, UP INSIDE OF MONOPOLE, AND THROUGH EXIT PORT HOLE. IF ROUTING OUTSIDE THE MONOPOLE, ATTACH CABLES USING STAND-OFF ADAPTERS MOUNTED TO TOWER USING STAINLESS STEEL BANDING. ADEQUATELY SECURE CABLES USING EITHER APPROPRIATELY SIZED STAINLESS STEEL SNAP-INS OR MOUNTING HARDWARE AND BRACKETS AS SPECIFIED BY CABLE MANUFACTURER.

**1 DETAILED SITE PLAN**

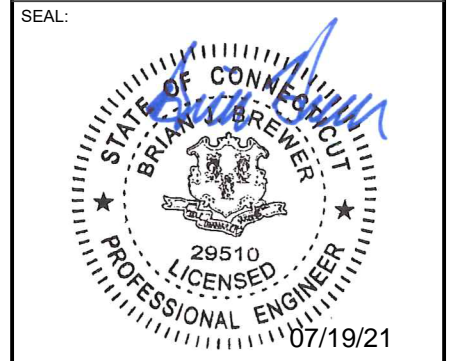


**Kimley»Horn**

COA: PEC.0000738  
421 FAYETTEVILLE ST, SUITE 600  
RALEIGH, NC 27601

REV.	DESCRIPTION	BY	DATE
A	PRELIM	RDC	06/15/21
0	ISSUED FOR CONSTRUCTION	JW	07/13/21

ATC SITE NUMBER:  
**302483**  
ATC SITE NAME:  
**BRLN - BERLIN**  
T-MOBILE SITE NAME:  
**BERLIN/ RT-9 X22\_1**  
SITE ADDRESS:  
286 BECKLEY ROAD  
BERLIN, CT 06037



DATE DRAWN:	07/13/21
ATC JOB NO:	13678286_G3
CUSTOMER ID:	BERLIN/ RT-9 X22_1
CUSTOMER #:	CT11182A

**DETAILED SITE PLAN**

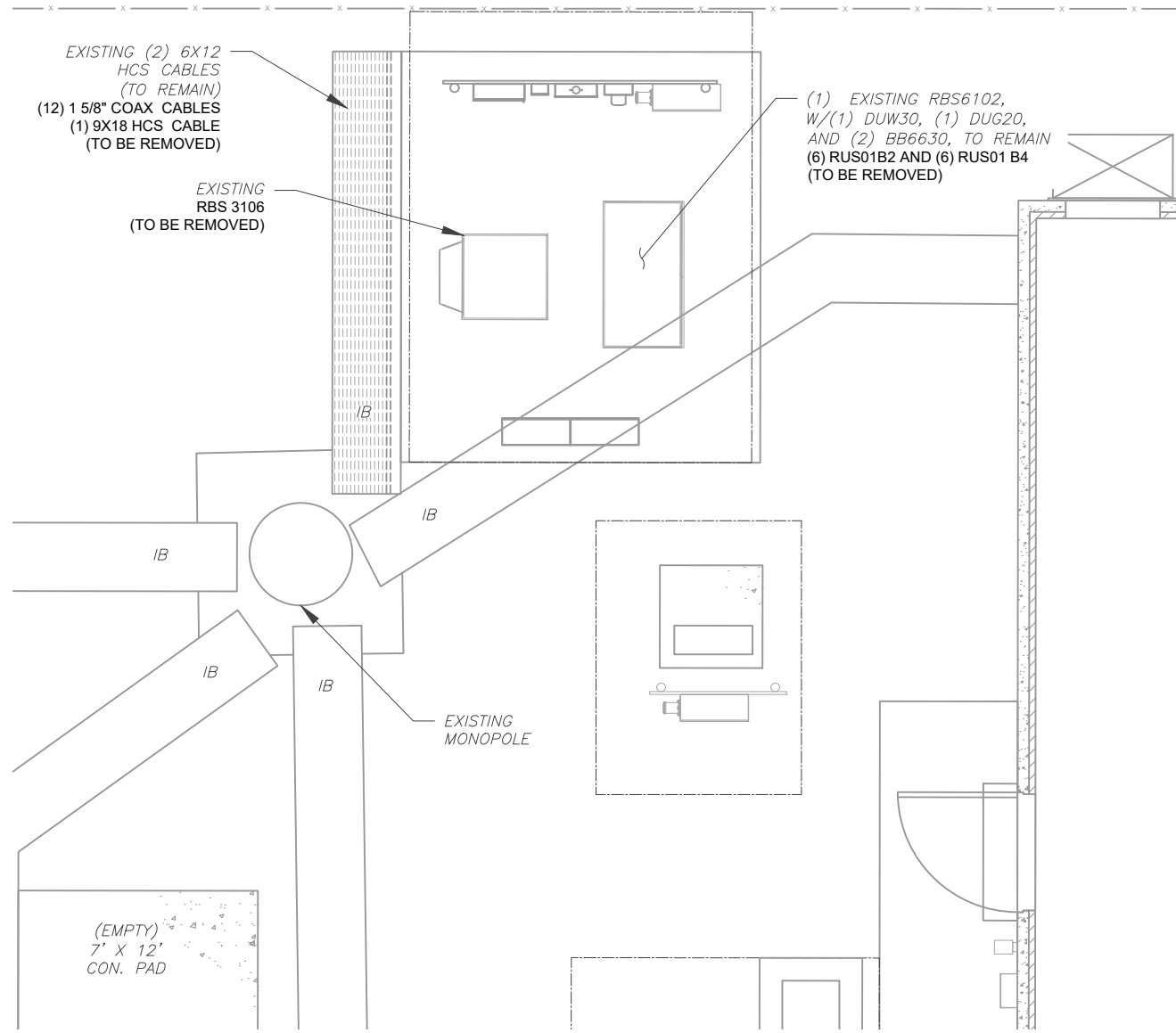
SHEET NUMBER:	REVISION:
<b>C-101</b>	<b>0</b>

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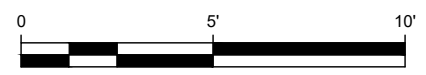


**SITE PLAN NOTES:**

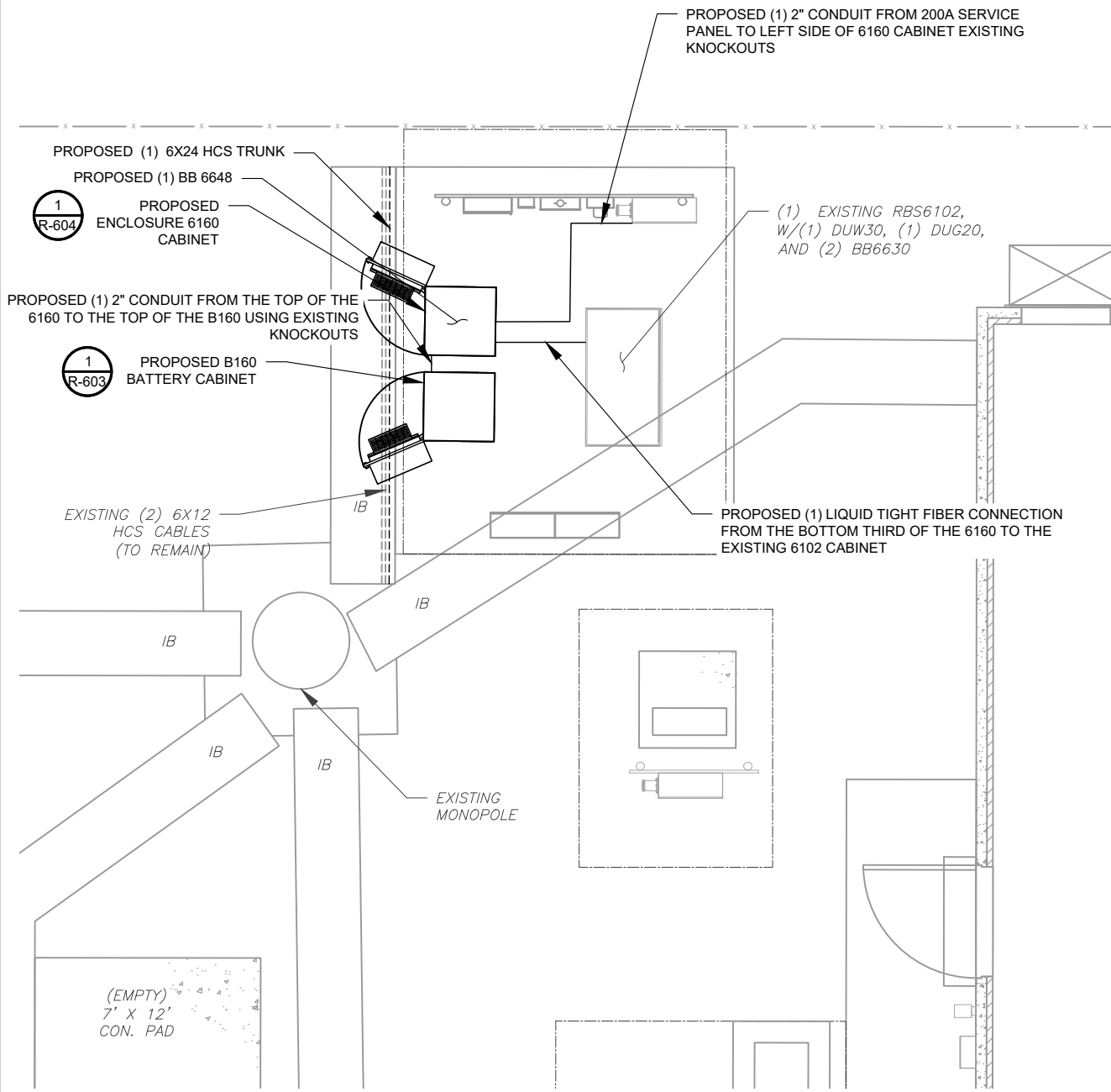
1. CONTRACTOR TO VERIFY THERE IS NO LIVE AAV FIBER RUNNING THROUGH EXISTING DEAD EQUIPMENT. IF SO, THIS WILL NEED TO BE RERUN THROUGH CONDUIT PRIOR TO REMOVING DEAD 2G (6201 CABS) EQUIPMENT.
2. REMOVE EXISTING 2G CABINETS, AND POWER / TELCO WHIPS ASSOCIATED WITH THE DEAD EQUIPMENT IF APPLICABLE.
3. ALL OPEN PORTS NEED TO BE SEALED / WEATHERPROOFED PROPERLY
4. ALL UNNEEDED / EXCESS EQUIPMENT AND GARBAGE TO BE REMOVED FROM EQUIPMENT AREA. DISPOSE OF MATERIALS PROPERLY OFF SITE.



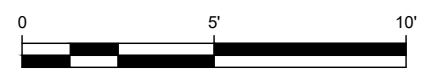
**1 EXISTING GROUND EQUIPMENT LAYOUT**



T-MOBILE CM APPROVAL REQUIRED BEFORE INSTALLING CABINETS



**2 PROPOSED GROUND EQUIPMENT LAYOUT**

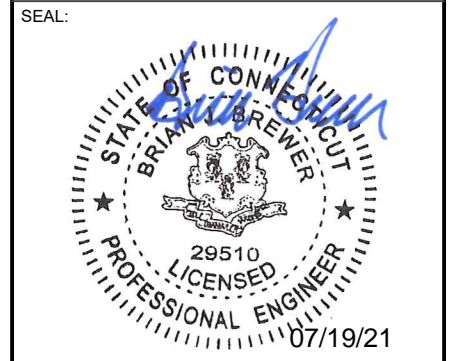


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RALEIGH, NC 27601

REV.	DESCRIPTION	BY	DATE
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ATC SITE NUMBER:  
**302483**  
ATC SITE NAME:  
**BRLN - BERLIN**  
T-MOBILE SITE NAME:  
**BERLIN/ RT-9 X22\_1**  
SITE ADDRESS:  
286 BECKLEY ROAD  
BERLIN, CT 06037



DATE DRAWN:	07/13/21
ATC JOB NO:	13678286_G3
CUSTOMER ID:	BERLIN/ RT-9 X22_1
CUSTOMER #:	CT11182A

**DETAILED GROUND PLAN**

SHEET NUMBER:	REVISION:
<b>C-102</b>	<b>0</b>

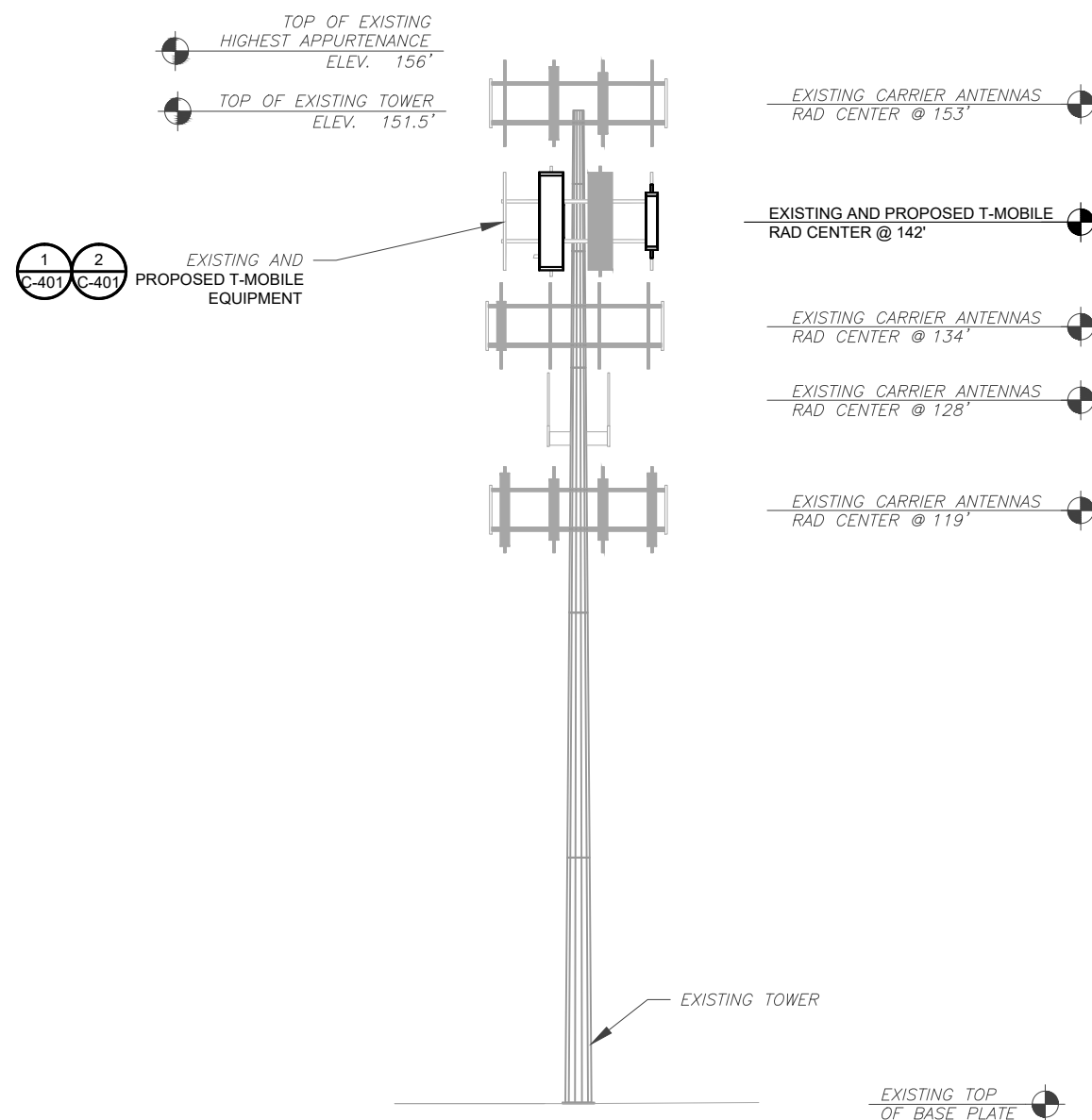
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RALEIGH, NC 27601

PER MOUNT ANALYSIS COMPLETED BY CLS ENGINEERING, DATED MAY 25, 2021, THE EXISTING MOUNT CAN ADEQUATELY SUPPORT THE PROPOSED LOADING



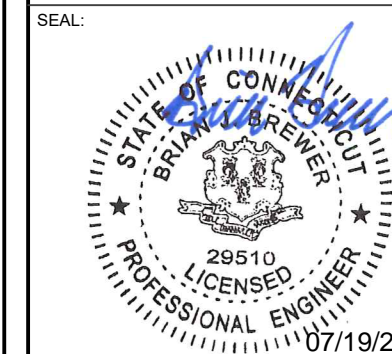
**TOWER NOTE:**

- IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONFIRM WITH THE PROJECT MANAGER THAT THEY HAVE THE MOST RECENT VERSION OF THE STRUCTURAL ANALYSIS BEFORE COMMENCING WORK. EXISTING AND PROPOSED TOWER APPURTENANCES, MOUNTS, AND ANTENNAS ARE SHOWN BASED ON THE STRUCTURAL ANALYSIS.
- WHERE APPLICABLE, ALL NEW ANTENNAS, EQUIPMENT, MOUNTS, CABLING, ETC. SHALL BE PAINTED/SOCKED TO MATCH EXISTING EQUIPMENT IN ACCORDANCE WITH FAA, JURISDICTION, AND/OR OTHER LOCAL REQUIREMENTS.
- ROUTE PROPOSED CABLES ALONG SAME PATH AS EXISTING CABLES AND IN ACCORDANCE WITH STRUCTURAL ANALYSIS. IF ADEQUATE SPACE EXISTS, ROUTE CABLES THROUGH ENTRY PORT HOLE, UP INSIDE OF MONOPOLE, AND THROUGH EXIT PORT HOLE. IF ROUTING OUTSIDE THE MONOPOLE, ATTACH CABLES USING STAND-OFF ADAPTERS MOUNTED TO TOWER USING STAINLESS STEEL BANDING. ADEQUATELY SECURE CABLES USING EITHER APPROPRIATELY SIZED STAINLESS STEEL SNAP-INS OR MOUNTING HARDWARE AND BRACKETS AS SPECIFIED BY CABLE MANUFACTURER.
- TOWER ELEVATIONS ARE MEASURED FROM TOP OF BASE PLATE TO MATCH STRUCTURAL ANALYSIS. ELEVATIONS DO NOT REFLECT TRUE ABOVE GROUND LEVEL (A.G.L.)

1 TOWER ELEVATION  
SCALE: N.T.S.

REV.	DESCRIPTION	BY	DATE
A	PRELIM	RDC	06/15/21
0	ISSUED FOR CONSTRUCTION	JW	07/13/21

ATC SITE NUMBER:  
**302483**  
ATC SITE NAME:  
**BRLN - BERLIN**  
T-MOBILE SITE NAME:  
**BERLIN/ RT-9 X22\_1**  
SITE ADDRESS:  
286 BECKLEY ROAD  
BERLIN, CT 06037



DATE DRAWN:	07/13/21
ATC JOB NO:	13678286_G3
CUSTOMER ID:	BERLIN/ RT-9 X22_1
CUSTOMER #:	CT11182A

**TOWER ELEVATION**

SHEET NUMBER:	REVISION:
<b>C-201</b>	<b>0</b>

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REV.	DESCRIPTION	BY	DATE
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ATC SITE NUMBER:

**302483**

ATC SITE NAME:

**BRLN - BERLIN**

T-MOBILE SITE NAME:

**BERLIN/ RT-9 X22\_1**

SITE ADDRESS:

286 BECKLEY ROAD  
BERLIN, CT 06037

SEAL:



**T-Mobile**

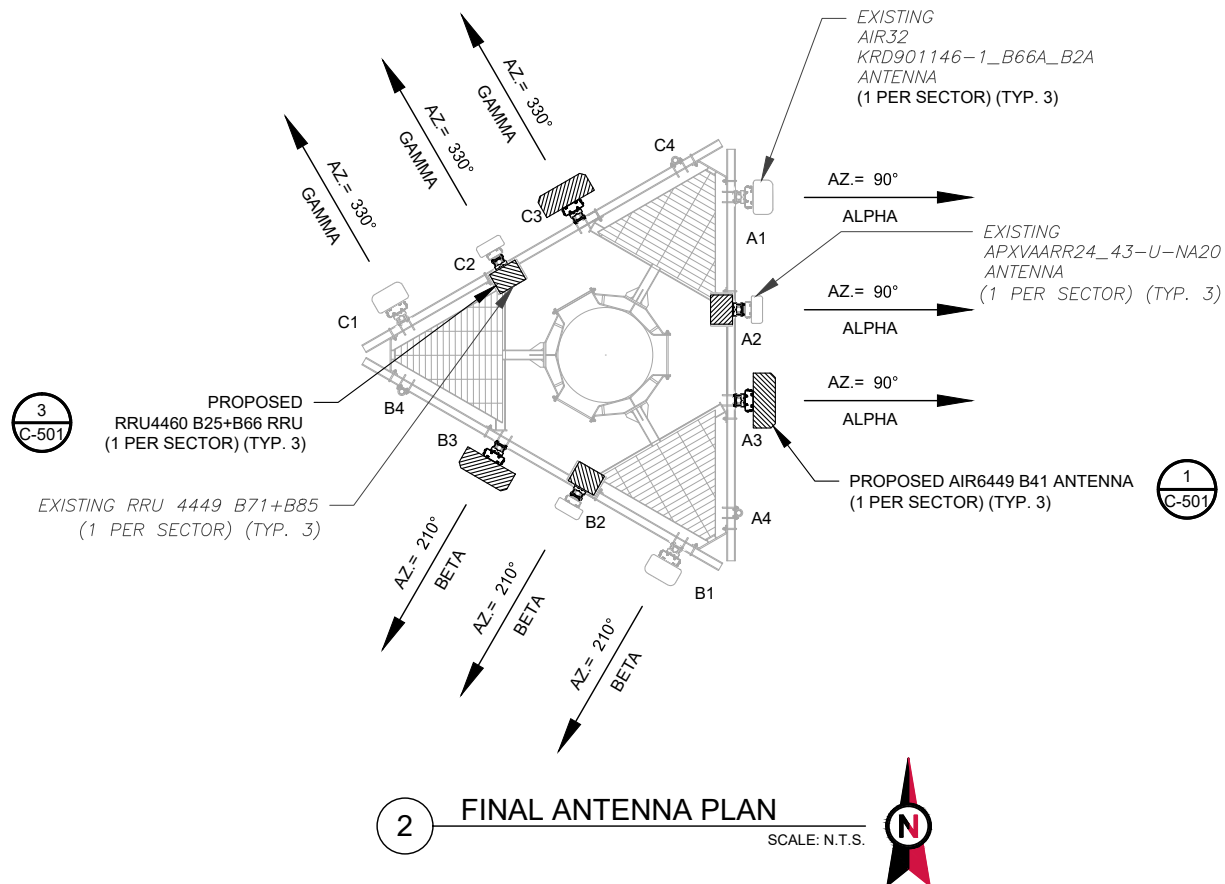
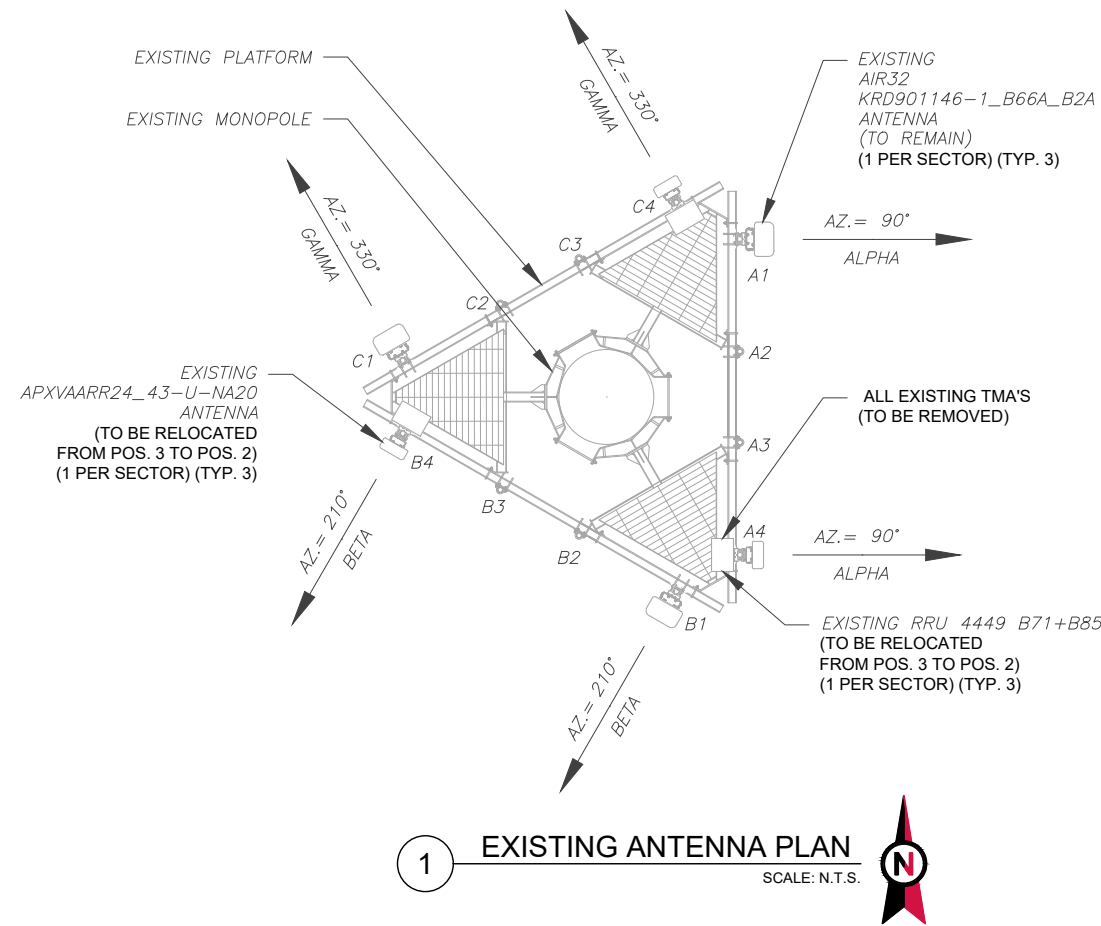
DATE DRAWN:	07/13/21
ATC JOB NO:	13678286_G3
CUSTOMER ID:	BERLIN/ RT-9 X22_1
CUSTOMER #:	CT11182A

**ANTENNA INFORMATION & SCHEDULE**

SHEET NUMBER: REVISION:

**C-401 0**

PER MOUNT ANALYSIS COMPLETED BY CLS ENGINEERING, DATED MAY 25, 2021, THE EXISTING MOUNT CAN ADEQUATELY SUPPORT THE PROPOSED LOADING



EXISTING ANTENNA SCHEDULE									
LOCATION		ANTENNA SUMMARY					NON ANTENNA SUMMARY		
SECTOR	RAD	AZ	POS	ANTENNA	BAND	MECH/ELEC D-TILT	STATUS	ADDITIONAL TOWER MOUNTED EQUIPMENT	STATUS
ALPHA	142'	90°	A1	AIR32 KRD901146-1_B66A_B2A	L2100/L1900	0/2'	RMN	-	-
			A2	-	-	-	-	-	
			A3	-	-	-	-	-	
			A4	APXVAARR24_43-U-NA20	L600/L700/N600/G1900/U2100	0/2'	REL	RRU4449 B71+B85 TMA(S)	REL RMV
BETA	142'	210°	B1	AIR32 KRD901146-1_B66A_B2A	L2100/L1900	0/2'	RMN	-	-
			B2	-	-	-	-	-	
			B3	-	-	-	-	-	
			B4	APXVAARR24_43-U-NA20	L600/L700/N600/G1900/U2100	0/2'	REL	RRU4449 B71+B85 TMA(S)	REL RMV
GAMMA	142'	330°	C1	AIR32 KRD901146-1_B66A_B2A	L2100/L1900	0/2'	RMN	-	-
			C2	-	-	-	-	-	
			C3	-	-	-	-	-	
			C4	APXVAARR24_43-U-NA20	L600/L700/N600/G1900/U2100	0/2'	REL	RRU4449 B71+B85 TMA(S)	REL RMV

**NOTES**

- CONFIRM WITH T-MOBILE REP FOR APPLICABLE UPDATES/REVISIONS AND MOST RECENT RFDS FOR NSN CONFIGURATION (CONFIG). GC TO CAP ALL UNUSED PORTS.
- CONFIRM SPACING OF PROPOSED EQUIP DOES NOT CAUSE TOWER CONFLICTS NOR IMPEDE TOWER CLIMBING PEGS.
- ROUTE HYBRID JUMPERS TO AVOID DAMAGE FROM BEING STEPPED UPON.

**STATUS ABBREVIATIONS**

RMV: TO BE REMOVED  
RMN: TO REMAIN  
REL: TO BE RELOCATED  
ADD: TO BE ADDED

**CABLE LENGTHS FOR JUMPERS**

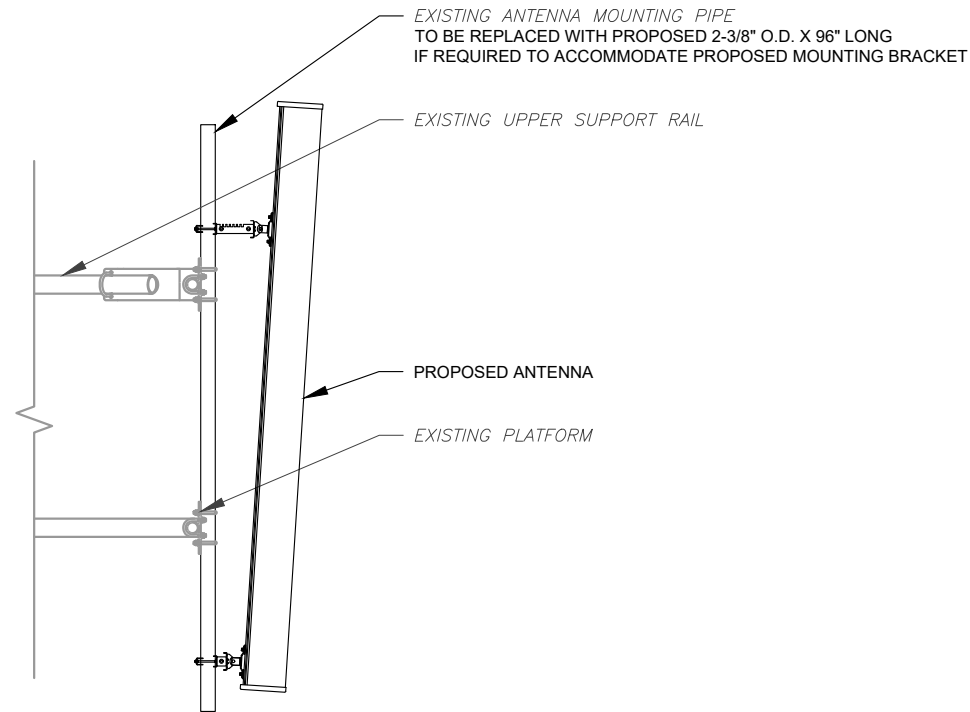
JUNCTION BOX TO RRU: 15'  
RRU TO ANTENNA: 10'

FINAL ANTENNA SCHEDULE									
LOCATION		ANTENNA SUMMARY					NON ANTENNA SUMMARY		
SECTOR	RAD	AZ	POS	ANTENNA	BAND	MECH/ELEC D-TILT	STATUS	ADDITIONAL TOWER MOUNTED EQUIPMENT	STATUS
ALPHA	142'	90°	A1	AIR32 KRD901146-1_B66A_B2A	L2100/L1900/G1900	0°	RMN	-	-
			A2	APXVAARR24_43-U-NA20	L600/L700/N600/G1900/U2100	0°	REL	RRU4449 B71+B85 RRU4460 B25+B66	REL ADD
			A3	AIR6449 B41	L2500/N2500	0°	ADD	-	-
			A4	-	-	-	-	-	
BETA	142'	210°	B1	AIR32 KRD901146-1_B66A_B2A	L2100/L1900/G1900	0°	RMN	-	-
			B2	APXVAARR24_43-U-NA20	L600/L700/N600/G1900/U2100	0°	REL	RRU4449 B71+B85 RRU4460 B25+B66	REL ADD
			B3	AIR6449 B41	L2500/N2500	0°	ADD	-	-
			B4	-	-	-	-	-	
GAMMA	142'	330°	C1	AIR32 KRD901146-1_B66A_B2A	L2100/L1900/G1900	0°	RMN	-	-
			C2	APXVAARR24_43-U-NA20	L600/L700/N600/G1900/U2100	0°	REL	RRU4449 B71+B85 RRU4460 B25+B66	REL ADD
			C3	AIR6449 B41	L2500/N2500	0°	ADD	-	-
			C4	-	-	-	-	-	

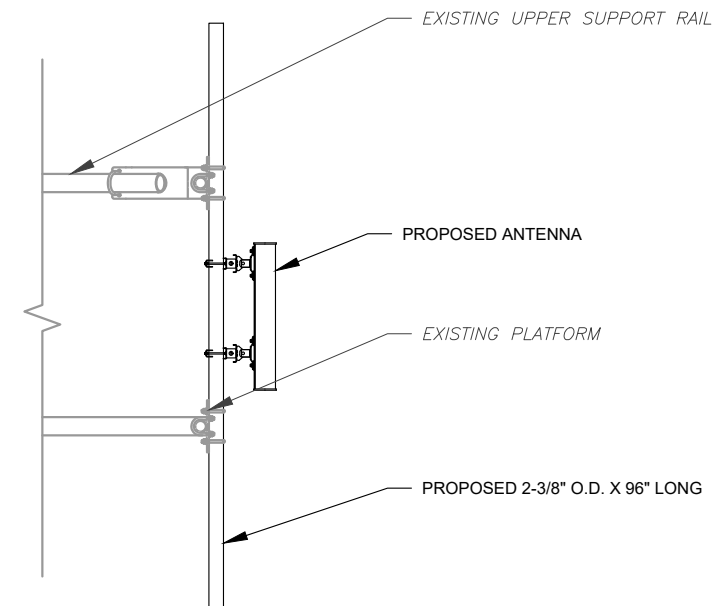
EXISTING FIBER DISTRIBUTION/OVP BOX		EXISTING CABLING SUMMARY		
MODEL NUMBER	STATUS	COAX	HYBRID	STATUS
-	-	(12) 1 5/8"	(1) 1 5/8"	RMV
-	-	-	(2) 1 1/4"	RMN

FINAL FIBER DISTRIBUTION / OVP BOX		FINAL CABLING SUMMARY		
MODEL NUMBER	STATUS	COAX	HYBRID	STATUS
-	-	-	(1) 6X24	ADD
-	-	-	(2) 1 1/4"	RMN

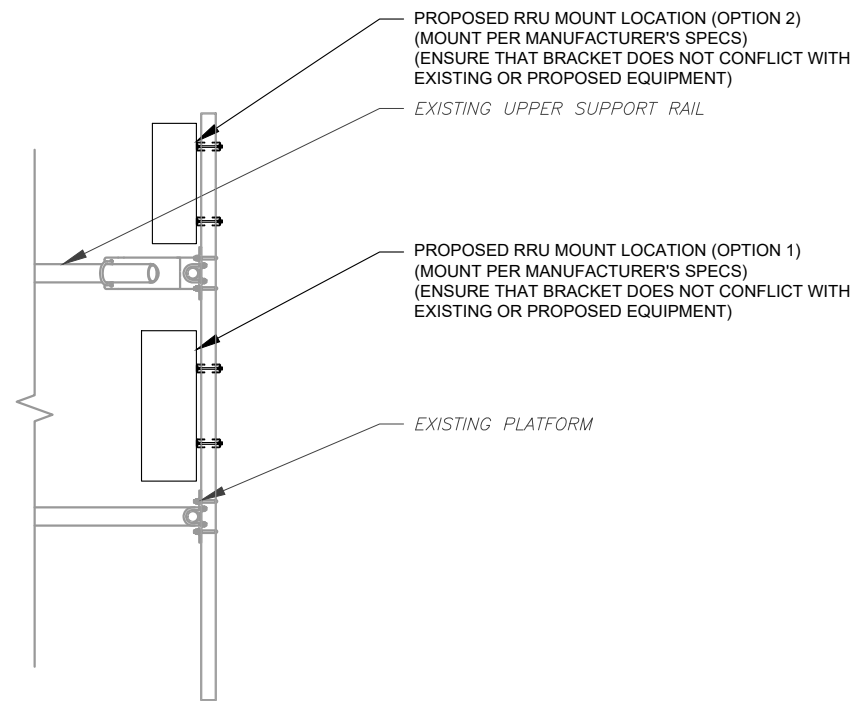
**3 EQUIPMENT SCHEDULES**



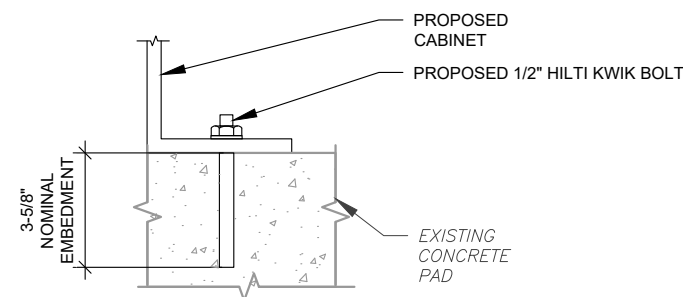
1 PROPOSED ANTENNA MOUNTING DETAIL - TYPICAL  
SCALE: N.T.S.



2 PROPOSED 5G ANTENNA MOUNTING DETAIL - TYPICAL  
SCALE: N.T.S.



3 PROPOSED RRU MOUNTING DETAIL - TYPICAL  
SCALE: N.T.S.



NOTE:  
INSTALL HILTI KWIK BOLT ANCHORS STRICTLY PER INSTALLATION INSTRUCTIONS INCLUDED WITH PRODUCT OR FOUND ONLINE AT WWW.US.HILTI.COM. PROPER INSTALLATION IS CRITICAL FOR FULL PERFORMANCE.

4 CABINET ATTACHMENT DETAIL  
SCALE: NOT TO SCALE



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RALEIGH, NC 27601

REV.	DESCRIPTION	BY	DATE
A	PRELIM	RDC	06/15/21
0	ISSUED FOR CONSTRUCTION	JW	07/13/21

ATC SITE NUMBER:

302483

ATC SITE NAME:

BRLN - BERLIN

T-MOBILE SITE NAME:

BERLIN/ RT-9 X22\_1

SITE ADDRESS:

286 BECKLEY ROAD  
BERLIN, CT 06037

SEAL:



T-Mobile

DATE DRAWN:	07/13/21
ATC JOB NO:	13678286_G3
CUSTOMER ID:	BERLIN/ RT-9 X22_1
CUSTOMER #:	CT11182A

CONSTRUCTION  
DETAILS

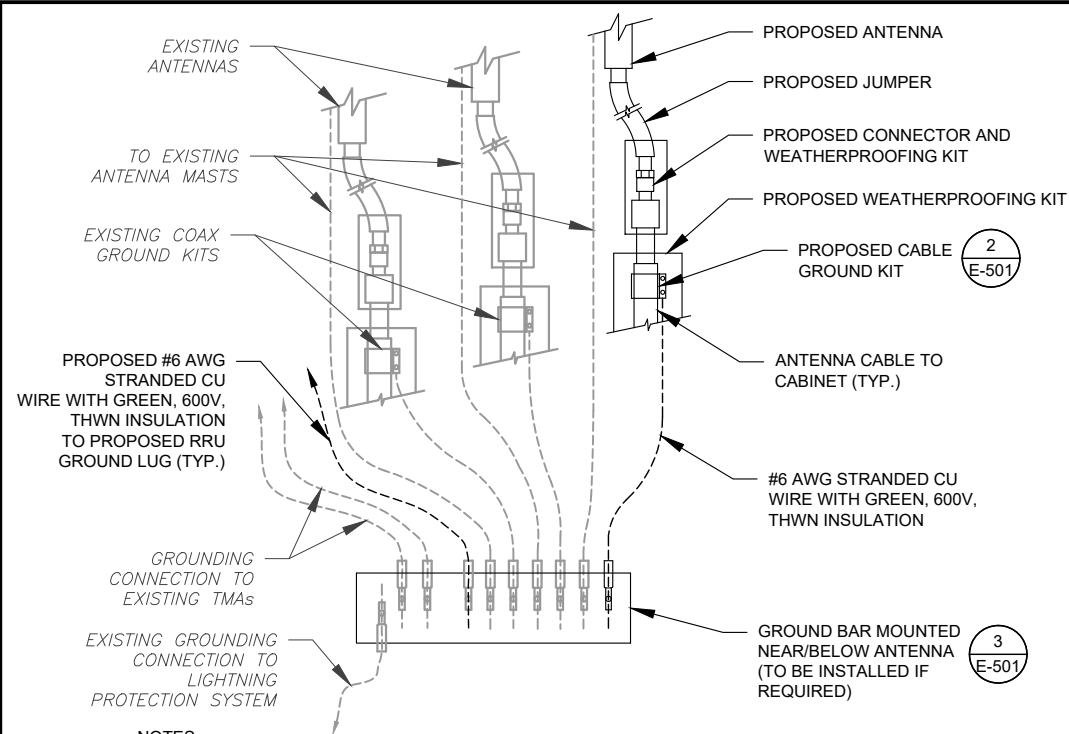
SHEET NUMBER:

C-501

REVISION:

0

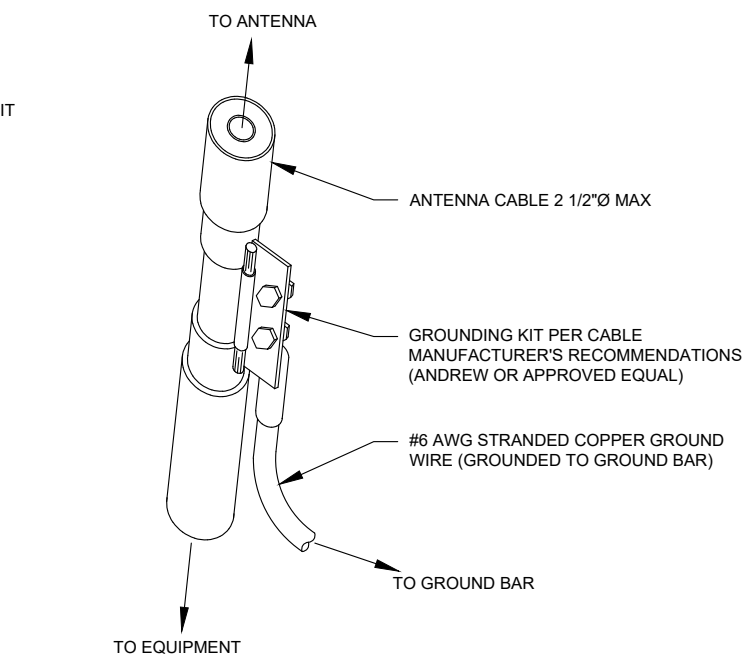




**NOTES:**

1. THIS DETAIL IS INTENDED TO SHOW THE GENERAL GROUNDING REQUIREMENTS. SLIGHT ADJUSTMENTS MAY BE REQUIRED BASED ON EXISTING SITE CONDITIONS. THE CONTRACTOR SHALL MAKE FIELD ADJUSTMENTS AS NEEDED AND INFORM THE CONSTRUCTION MANAGER OF ANY CONFLICTS.
2. SITE GROUNDING SHALL COMPLY WITH T-MOBILE GROUNDING STANDARDS, LATEST EDITION, AND COMPLY WITH T-MOBILE GROUNDING CHECKLIST, LATEST VERSION. WHEN NATIONAL AND LOCAL GROUNDING CODES ARE MORE STRINGENT THEY SHALL GOVERN.

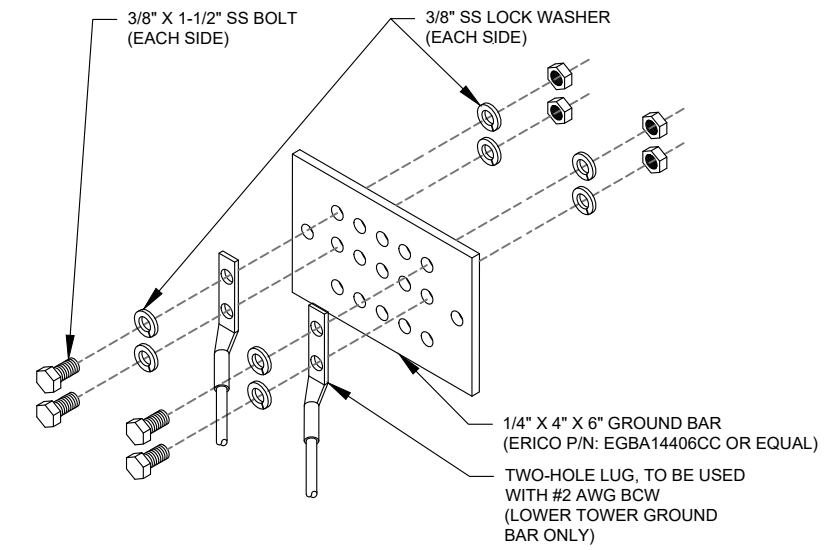
**1 TYPICAL ANTENNA GROUNDING DIAGRAM**  
SCALE: N.T.S.



**GROUND KIT NOTES:**

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. CONTRACTOR SHALL PROVIDE WEATHERPROOFING KIT (ANDREW PART NUMBER 221213) AND INSTALL/TAPE PER MANUFACTURER'S SPECIFICATIONS.

**2 CABLE GROUND KIT CONNECTION DETAIL**  
SCALE: N.T.S.



**GROUND BAR NOTES:**

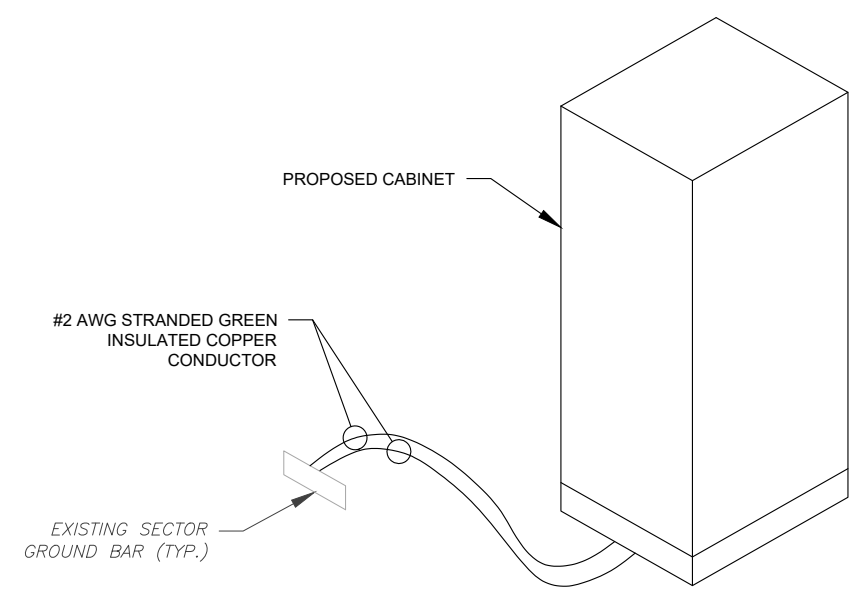
1. GROUND BAR KITS COME WITH ALL HARDWARE, NUTS, BOLTS, WASHERS, ETC. EXCEPT THE STRUCTURAL MOUNTING MEMBER(S).
2. GROUND BAR TO BE BONDED DIRECTLY TO TOWER.

**3 TOWER GROUND BAR DETAIL**  
SCALE: N.T.S.

**ELECTRICAL NOTES:**

1. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE WITH THE T-MOBILE REPRESENTATIVE AND LOCAL UTILITY COMPANY FOR THE INSTALLATION OF CONDUITS, CONDUCTORS, BREAKERS, DISCONNECTS, OR ANY OTHER EQUIPMENT REQUIRED FOR ELECTRICAL SERVICE. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH LATEST EDITION OF THE STATE AND NATIONAL CODES, ORDINANCES AND REGULATIONS APPLICABLE TO THIS PROJECT.
2. ATC HAS NOT VERIFIED ANY EXISTING T-MOBILE GROUND EQUIPMENT OR ELECTRICAL LOADING. PROPOSED WORK BASED ON INSTALLATION CONFIGURATION PROVIDED BY T-MOBILE. CONTRACTOR TO VERIFY EXISTING T-MOBILE PANEL HAS SUFFICIENT SPACE FOR PROPOSED BREAKER. PROPOSED CABLE AND CONDUIT SHALL BE MINIMUM SIZE PER BELOW IN CHART.
3. FOR SPECIFIC CABINET / ANCILLARY EQUIPMENT WIRING REQUIREMENTS, THE T-MOBILE CONTRACTOR SHOULD REFERENCE DESIGN DOCUMENTS PROVIDED BY T-MOBILE FOR THIS CURRENT PROJECT CONFIGURATION, IN ACCORDANCE WITH LOCAL JURISDICTION REQUIREMENTS & NEC STANDARDS & PRACTICES.

OCPD SIZE	WIRE SIZE	GROUND SIZE	CONDUIT SIZE
80A/2P	2#3 AWG	#8 AWG	1-1/4"
100/2P	2#2 AWG	#8 AWG	1-1/4"
125A/2P	2#1 AWG	#8 AWG	1-1/2"
150A/2P	2#1/0 AWG	#8 AWG	1-1/2"



**4 CABINET GROUNDING DETAIL**  
SCALE: N.T.S.



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**302483**

ATC SITE NAME:

**BRLN - BERLIN**

T-MOBILE SITE NAME:

**BERLIN/ RT-9 X22\_1**

SITE ADDRESS:

286 BECKLEY ROAD  
BERLIN, CT 06037

SEAL:



DATE DRAWN:	07/13/21
ATC JOB NO:	13678286_G3
CUSTOMER ID:	BERLIN/ RT-9 X22_1
CUSTOMER #:	CT11182A

**GROUNDING DETAILS**

SHEET NUMBER:

**E-501**

REVISION:

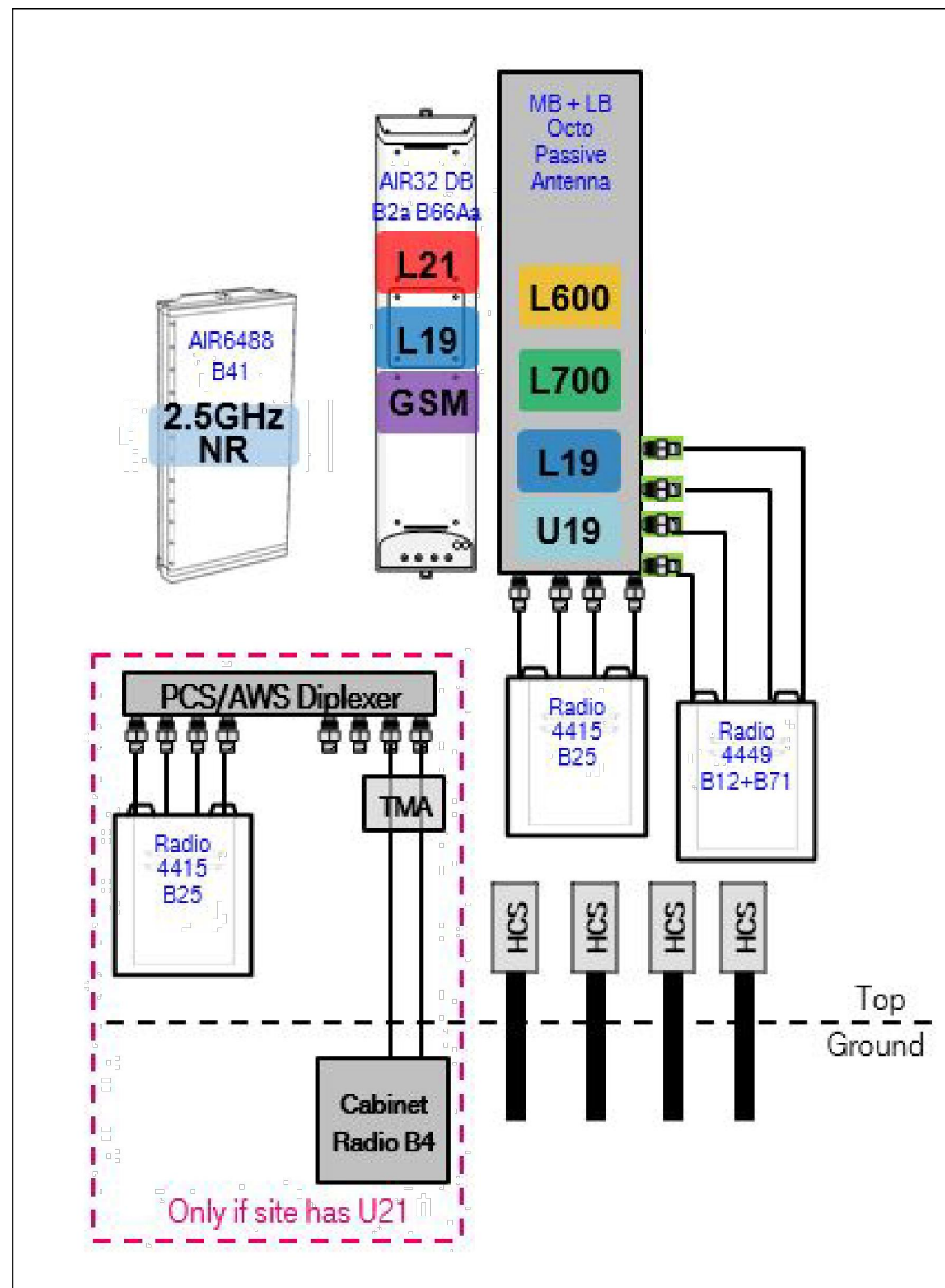
**0**

Proposed RAN Equipment			
Template: 67D5A997DB Hybrid			
Enclosure	1	2	3
Enclosure Type	RBS 6102	Enclosure 6160	B160
Baseband	DU320 (L1900) BB 6630 (L2100, L700, L1900, L800, N800) DUW30 (L2100)	BB 6648 (L2500, N2500)	
Hybrid Cable System	Ericsson 6x12 HCS "Select Length & AWG" (x 2)	Ericsson Hybrid Trunk 5/24 4AWG 60m	
Transport System		PSU 4813	
		CSR IxRe V2 (Gen2)	

**RAN Scope of Work:**

- Remove RBS3106. Move AAV to new Emerson Cabinet.
- U2100 will move to Radio 4450 B25+B66.
- Remove all cabinet radios from existing base station cabinet.
- Add (1) Enclosure 6160.
- Add (1) Battery Cabinet B160.
- Add (1) IxRe Router to new Enclosure 6160.
- Add (1) BB6648 for L2500 and N2500 (MMBB - Mixed Mode Baseband) to new Enclosure 6160.
- Add (1) PSU4813 Voltage Booster to new Enclosure 6160.
- Existing: (12) Coaxial lines; (1) 9X18 HCS; (2) 6X12 HCS.
- Remove all coaxial lines.
- Remove 9X18 HCS.
- Add (1) 6X24 HCS terminating at the Enclosure 6160. Connect DC for AIR6449 to the PSU4813 Voltage Booster.

1 CABINET CONFIGURATION  
SCALE: NOT TO SCALE



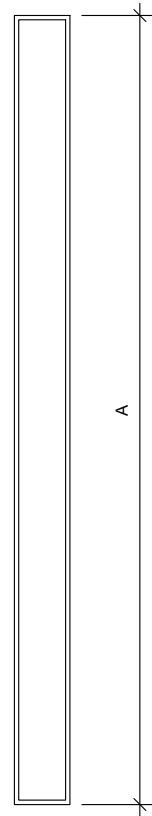
2 ANTENNA CONFIGURATION  
SCALE: NOT TO SCALE

NOTE: THIS SHEET CREATED BY OTHERS AND PROVIDED BY REQUEST OF CUSTOMER WITHOUT EDIT.

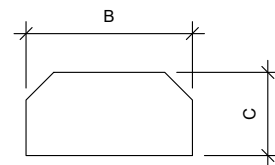
SUPPLEMENTAL

SHEET NUMBER:  
R-601

REVISION:  
A



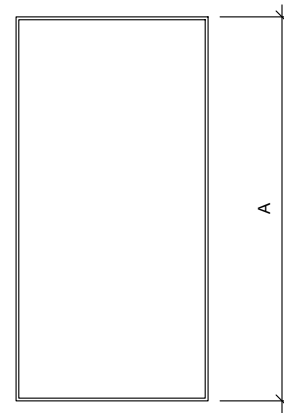
FRONT VIEW



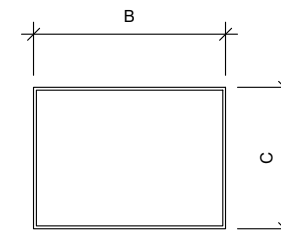
TOP VIEW

**1 ANTENNA SPECIFICATIONS**  
FOR ILLUSTRATIVE PURPOSES ONLY - NOT TO SCALE

ANTENNA SPECIFICATIONS				
ANTENNA MODEL	A	B	C	WEIGHT (LBS)
AIR32 KRD901146-1_B66A_B2A	56.6"	12.9"	8.7"	132.2
AIR6449 B41	33.1"	20.6"	8.6"	104.0



FRONT VIEW



TOP VIEW

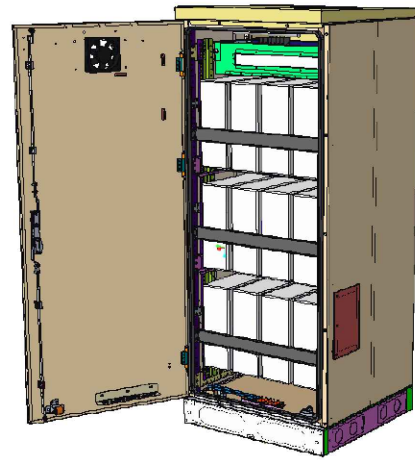
**2 RRU SPECIFICATIONS**  
FOR ILLUSTRATIVE PURPOSES ONLY - NOT TO SCALE

RRU SPECIFICATIONS				
RRU MODEL	A	B	C	WEIGHT (LBS)
4460	19.6"	15.7"	12.1"	109.0

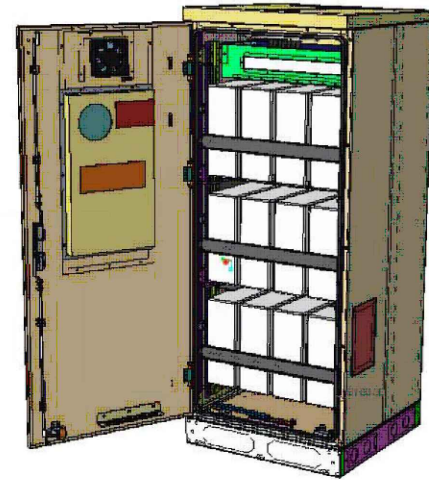
SUPPLEMENTAL

SHEET NUMBER: **R-602** REVISION: **0**

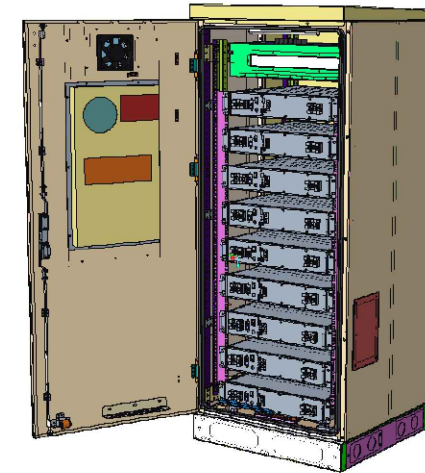
# Enclosure B160



Enclosure B160  
AirCon + VRLA



Enclosure B160  
AirCon + Li-Ion



Enclosure B160  
Convection Cooling  
+ VRLA

PA1 | 2019-02-03 | Ericsson Confidential | Page 1

# Enclosure B160

## Capacity

- VRLA 12V: 100Ah / 150Ah / 170Ah / 190Ah / 210Ah
- Li-Ion: 24U 19" / 23"
- Sodium-Nickel: 3x FIAMM

## Electrical specification

- DC Output: -48VDC/200A
- Battery breakers: 2x 125/2p
- Alarms: Door open, Climate failure, MCB Connection

## Mechanical specification

- Weight: 134kg
- Dimensions: 63 x 26 x 26 in. (incl. Base frame)
- Base frame height: 6 in.
- Material: Galvanized steel (180g/m<sup>2</sup>)
- Color: Powder paint NCS 2002-B
- Door: Front access
- Locking type: Pad lock / cylinder

## Environmental specification

- Ingress protection: VRLA/Sodium IP44  
Li-Ion IP55
  - Relative humidity: 15-100%
- ## Climate system
- Air Conditioner
  - Fan type: DC
  - Cooling capacity: 500W @L35/L35
  - Convection cooling
  - Emergency fan

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SUPPLEMENTAL

SHEET NUMBER:

R-603

REVISION:

0

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# Enclosure 6160 AC

The Enclosure 6160 is a multi-purpose site cabinet designed to support a multitude of equipment such as ERS Baseband, Transport, Li-Ion battery and 3PP vendor equipment. It also provides a highly capable power system and battery back-up - all in a streamlined design and minimized footprint to support cost efficient expansion of mobile broadband.

Being an all-in-one enclosure, the Enclosure 6160 is a very fitting choice for all types of sites where the capacity need is large or room for future expansion is needed. It is ideally used for modernizing existing sites or in greenfield scenarios to match both current and future needs.

With a robust design, IP65 compliance and a sealed Heat Exchanger (HEX) climate system the Enclosure 6160 ensures optimal environmental protection of the active equipment - enabling them for a long-lasting service. The complete system is also integrated and verified for the entire Ericsson Radio System and ensures best-in-class service.

The power system offers 31,5kW of power in total and provides 24kW of -48V DC power for both internal and external consumers.

The equipment space allows 19U of rack space ensuring well enough capacity for existing need and future expansion.

One of the main advantages of the Enclosure 6160 is its default integration with ENM - allowing for advanced remote monitoring and control such as fault management (alarms), inventory management and performance measurements. The cabinet also provides an open O&M interface for integration to 3PP O&M systems.



## Preliminary technical specification for Enclosure 6160 AC

### CAPACITY

Rack space user equipment	19U (19" rack)
Hardware capabilities	Power and CPRI support for multi-standard remote radios (RRU or AIR) ERS Baseband and Transport units Li-Ion batteries 3PP equipment Additional power feed available as option

### MECHANICAL SPECIFICATION

Weight	145 kg (excluding active equipment) 320 lbs (excluding active equipment)
Dimension (H x W x D)	1600 x 650 x 650 mm (incl. Base frame) 63 x 26 x 26 in. (incl. Base frame)
Base frame height	150 mm 6 in.
Mounting position	Ground
Enclosure material	Aluminum
Color	Power paint NCS 2002-B
Door	Front access
Rack type	19" (IEC 60297-3-100)
Locking type	Pad lock or Cylinder

### POWER SYSTEM

Input voltage	3P+N+PE: 346/200-415/240 VAC 2P+N+PE: 208/120-220/127 VAC 1P+N+PE: 200-250 VAC
Input power	<33kW
Output load (-48VDC)	24kW
Total capacity (-48VDC)	31.5kW
AC SPD	Class 2/Type 2
DC SPD	Class 2/Type 2
PSU Slots	9x
Service outlet	Optional
Priority load	8x Circuit Breaker
LLVD 1	6x Circuit Breaker
LLVD 2	6x Circuit Breaker
CB ratings	3A / 5A / 10A / 15A / 20A / 25A / 30A / 40A / 50A / 60A / 80A / 100A
Battery Interface	2x Circuit Breaker
Battery Circuit Breaker rating	125A 2pol (200A)
PSU capacity	3500W

NOTE: THIS SHEET WAS CREATED BY OTHERS AND PROVIDED AT THE REQUEST OF THE CUSTOMER WITHOUT EDIT.

SUPPLEMENTAL

SHEET NUMBER:

R-604

REVISION:

0



This report was prepared for American Tower Corporation by

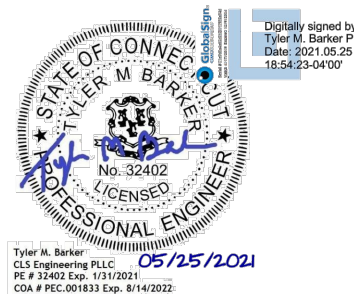


## Antenna Mount Analysis Report

**ATC Site Name** : Brln - Berlin  
**ATC Asset Number** : 302483  
**Engineering Number** : 13678286\_C8\_02  
**Mount Elevation** : 142 ft  
**Carrier** : T-Mobile  
**Carrier Site Name** : Berlin/ Rt-9 X22\_1  
**Carrier Site Number** : CT11182A  
**Site Location** : 286 Beckley Road  
 Berlin, CT 06037-2419  
 41.631722, -72.729900  
**County** : Hartford  
**Date** : May 25, 2021  
**Max Usage** : 83%  
**Result** : Pass

Prepared By:  
 Amey Kulkarni  
 CLS Engineering PLLC

Reviewed By:  
 Tyler M. Barker, P.E.  
 CLS Engineering PLLC



**Mount Analysis for American Tower**  
 302483 - Brln - Berlin

May 25, 2021  
 CLS Engineering PLLC Project #41124-13678286\_C8\_02-01-MA

### Introduction

The proposed equipment is to be mounted to the existing Platform w/ Support Rails. This proposed mounting configuration was analyzed using RISA-3D, a commercially available finite element analysis software package. A selection of input and output from our analysis is attached to the end of this report.

### Supporting Documents

<b>Structural Data</b>	Site Photos, dated July 3, 2019 Spec Sheet for Commscope MC-HP12M
<b>Previous Analyses</b>	Structural Analysis by American Tower Corporation, Engineering #OAA754987_C3_01, dated January 3, 2020
<b>Loading Data</b>	ATC Application, Project #13678286 T-Mobile RFDS, Site ID: CT11182A Version: 5, dated April 30, 2021

### Analysis

<b>Codes</b>	TIA-222-H
<b>Basic Wind Speed</b>	118 mph, $V_{ult}$ (3-Second Gust)
<b>Basic Wind Speed w/ Ice</b>	50 mph (3-Second Gust) w/ 1.5" Radial Ice (Escalating)
<b>Exposure Category</b>	B
<b>Topographic Factor Procedure:</b>	Method 2
<b>Feature:</b>	Flat
<b>Crest Height (H):</b>	0 ft
<b>Crest Length (L):</b>	0 ft
<b>Risk Category</b>	II
<b>Maintenance Live Load</b>	$L_M$ : 500 lb
<b>Spectral Response</b>	$S_s$ : 0.20; $S_1$ : 0.06; Site Class: D

### Conclusion

Based on the analysis, the antenna mount meets the requirements per the applicable codes listed above. The mount can support the equipment as described in this report.

If you have any questions or require additional information, please contact American Tower via email at [Engineering@americantower.com](mailto:Engineering@americantower.com). Please include the American Tower site name, site number, and engineering number in the subject line for any questions.



**AMERICAN TOWER®**  
CORPORATION

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## Structural Analysis Report

**Structure** : 150 ft Monopole  
**ATC Site Name** : Brln - Berlin, CT  
**ATC Asset Number** : 302483  
**Engineering Number** : 13678286\_C3\_03  
**Proposed Carrier** : T-MOBILE  
**Carrier Site Name** : Berlin/ Rt-9 X22\_1  
**Carrier Site Number** : CT11182A  
**Site Location** : 286 Beckley Road  
Berlin, CT 06037-2419  
41.631700,-72.729900  
**County** : Hartford  
**Date** : June 30, 2021  
**Max Usage** : 99%  
**Result** : Pass

Prepared By:  
Garret D. Heath  
Structural Engineer II

Reviewed By:



Authorized by "EOR"  
30 Jun 2021 06:34:48

**COA: PEC.0001553**



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Deflection, Twist, and Sway.....	3
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Calculations .....	Attached



## Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 150 ft monopole to reflect the change in loading by T-MOBILE.

## Supporting Documents

<b>Tower Drawings</b>	ITT Meyer Type "B", dated July 21, 2001 Mapping by Smith Cullum Acq. #CT-0019, dated July 21, 2001 Mapping by ATC Report #0682, dated January 7, 2016
<b>Foundation Drawing</b>	SpectraSite Project #CT-0019, dated May 29, 2003
<b>Geotechnical Report</b>	Daniel G. Loucks Project #CT-0019, dated December 21, 2001
<b>Modifications</b>	Scientel Project #Berlin-CT0019, dated July 30, 2002 ATC Project #11912109_P5_02, dated October 3, 2017
<b>Mount Analysis</b>	ATC Project 13678286_C8_02, dated May 25, 2021 (Passing)

## Analysis

The tower was analyzed using tnxTower version 8.0.7.4 analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

<b>Basic Wind Speed:</b>	118 mph (3-Second Gust)
<b>Basic Wind Speed w/ Ice:</b>	No Ice Considered
<b>Code:</b>	ANSI/TIA-222-H / 2015 IBC / 2018 Connecticut State Building Code
<b>Exposure Category:</b>	C
<b>Risk Category:</b>	II
<b>Topographic Factor Procedure:</b>	Method 1
<b>Topographic Category:</b>	1
<b>Crest Height (H):</b>	0 ft

## Conclusion

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report.

If you have any questions or require additional information, please contact American Tower via email at [Engineering@americantower.com](mailto:Engineering@americantower.com). Please include the American Tower site name, site number, and engineering number in the subject line for any questions.





**Existing and Reserved Equipment**

Elev. <sup>1</sup> (ft)	Qty	Equipment	Mount Type	Lines	Carrier
	2	Raycap DC6-48-60-18-8F(32.8 lbs)	Platform with Handrails	(2) 0.39" (10mm) Fiber Trunk (4) 0.78" (19.7mm) 8 AWG 6 (12) 1 1/4" Coax (1) 3" conduit	AT&T MOBILITY
	6	Powerwave Allgon LGP21401			
	3	Ericsson RRUS 11 (Band 12) (55 lb)			
	3	Ericsson RRUS 32 (50.8 lbs)			
	3	Ericsson RRUS 32 B2			
	3	Powerwave Allgon 7770.00			
	3	Quintel QS66512-2			
	3	CCI OPA-65R-LCUU-H6			
	3	Ericsson RRUS 4426 B66			
	6	CCI TPX-070821			
142.0	3	RFS APXVAARR24_43-U-NA20	Platform with Handrails	(2) 1 1/4" (1.25"-31.8mm) Fiber	T-MOBILE
	3	Ericsson AIR32 B66Aa/B2a			
132.7	3	Alcatel-Lucent 800 MHz 2X50W RRH w/ Filter	Platform with Handrails	(4) 1 1/4" Hybriflex Cable	SPRINT NEXTEL
127.0	3	Commscope DT465B-2XR			
	1	RFS APXV9ERR18-C-A20			
	2	RFS APXVSP18-C-A20			
	3	Alcatel-Lucent TD-RRH8x20			
	3	Alcatel-Lucent RRH2x50-08			
3	Alcatel-Lucent 4x40W RRH (88 lb)				
119.7	3	Alcatel-Lucent RRH2x60	Platform with Handrails	(2) 1 5/8" (1.63"-41.3mm) Fiber (12) 1 5/8" Coax	VERIZON WIRELESS
116.0	3	Samsung RT4401-48A			
	3	Samsung B2/B66A RRH-BR049			
	3	Samsung B5/B13 RRH-BR04C			
	2	Raycap RRFDC-3315-PF-48 (32lbs)			
	3	Samsung Outdoor CBRS 20W RRH –Clip-on Antenna			
	3	Amphenol Antel BXA-70080-6CF-EDIN-4			
	6	Commscope SBNHH-1D65B			
3	Samsung MT6407-77A				
115.0	6	Commscope SBNHH-1D65B			

**Equipment to be Removed**

Elev. <sup>1</sup> (ft)	Qty	Equipment	Mount Type	Lines	Carrier
142.0	3	Ericsson KRY 112 144/2	-	(1) 1 5/8" (1.63"-41.3mm) Fiber (12) 1 5/8" Coax	T-MOBILE
	3	Ericsson Radio 4449 B12,B71			
	3	Ericsson KRY 112 489/2			



**Proposed Equipment**

Elev. <sup>1</sup> (ft)	Qty	Equipment	Mount Type	Lines	Carrier
142.0	3	Ericsson Radio 4449 B71 B85A	Platform with Handrails	(1) 1 5/8" Hybriflex	T-MOBILE
	3	Ericsson Radio 4460 B25+B66			
	3	Ericsson Air6449 B41			

<sup>1</sup> Contracted elevations are shown for appurtenances within contracted installation tolerances. Appurtenances outside of contract limits are shown at installed elevations.

Install proposed lines inside the pole shaft.

**Structure Usages**

Structural Component	Controlling Usage	Pass/Fail
Anchor Bolts	80%	Pass
Shaft	64%	Pass
Base Plate	18%	Pass

**Foundations**

Reaction Component	Analysis Reactions	% of Usage
Moment (Kips-Ft)	3380.0	99%
Axial (Kips)	50.0	19%
Shear (Kips)	32.0	55%

The structure base reactions resulting from this analysis were found to be acceptable through analysis based on geotechnical and foundation information, therefore no modification or reinforcement of the foundation will be required.

**Deflection and Sway\***

Antenna Elevation (ft)	Antenna	Carrier	Deflection (ft)	Sway (Rotation) (°)
142.0	Ericsson Radio 4449 B71 B85A	T-MOBILE	1.541	1.129
	Ericsson Radio 4460 B25+B66			
	Ericsson Air6449 B41			

\*Deflection and Sway was evaluated considering a design wind speed of 60 mph (3-Second Gust) per ANSI/TIA-222-H



## **Standard Conditions**

All engineering services performed by A.T. Engineering Service, PLLC are prepared on the basis that the information used is current and correct. This information may consist of, but is not limited to the following:

- Information supplied by the client regarding antenna, mounts and feed line loading
- Information from drawings, design and analysis documents, and field notes in the possession of A.T. Engineering Service, PLLC

It is the responsibility of the client to ensure that the information provided to A.T. Engineering Service, PLLC and used in the performance of our engineering services is correct and complete.

All assets of American Tower Corporation, its affiliates and subsidiaries (collectively "American Tower") are inspected at regular intervals. Based upon these inspections and in the absence of information to the contrary, American Tower assumes that all structures were constructed in accordance with the drawings and specifications.

Unless explicitly agreed by both the client and A.T. Engineering Service, PLLC, all services will be performed in accordance with the current revision of ANSI/TIA-222.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. A.T. Engineering Service, PLLC is not responsible for the conclusions, opinions and recommendations made by others based on the information supplied herein.



## DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
CBC23SR-43	152	Air6449 B41	142
CBC23SR-43	152	Air6449 B41	142
CBC23SR-43	152	Air6449 B41	142
DC6-48-60-0-8C-EV	152	800 MHz 2X50W RRH w/ Filter	134
ION-M23 SDARS	152	800 MHz 2X50W RRH w/ Filter	134
ION-M23 SDARS	152	800 MHz 2X50W RRH w/ Filter	134
ION-M23 SDARS	152	Round Platform w/ Handrails	127
DC6-48-60-18-8F(32.8 lbs)	151.5	RRH2x50-08	127
RRUS 4426 B66	151.5	RRH2x50-08	127
RRUS 4426 B66	151.5	RRH2x50-08	127
RRUS 4426 B66	151.5	DT465B-2XR	127
RRUS 11 (Band 12) (55 lb)	151.5	DT465B-2XR	127
RRUS 11 (Band 12) (55 lb)	151.5	DT465B-2XR	127
RRUS 11 (Band 12) (55 lb)	151.5	Round Platform w/ Handrails	127
RRUS 32 (50.8 lbs)	151.5	(2) 4x40W RRH (88 lb)	127
RRUS 32 (50.8 lbs)	151.5	(2) 4x40W RRH (88 lb)	127
RRUS 32 (50.8 lbs)	151.5	(2) 4x40W RRH (88 lb)	127
RRUS 32 B2	151.5	TD-RRH8x20	127
RRUS 32 B2	151.5	TD-RRH8x20	127
RRUS 32 B2	151.5	TD-RRH8x20	127
7770.00	151.5	APXVSP18-C-A20	127
7770.00	151.5	APXVSP18-C-A20	127
7770.00	151.5	APXV9ERR18-C-A20	127
QS66512-2	151.5	Round Platform w/ Handrails	119
QS66512-2	151.5	B2/B66A RRH-BR049	116
QS66512-2	151.5	B2/B66A RRH-BR049	116
OPA-65R-LCUU-H6	151.5	B2/B66A RRH-BR049	116
OPA-65R-LCUU-H6	151.5	RRFDC-3315-PF-48 (32lbs)	116
OPA-65R-LCUU-H6	151.5	RRFDC-3315-PF-48 (32lbs)	116
Flat Platform w/ Handrails	151.5	MT6407-77A	116
(2) TPX-070821	151.5	BXA-70080-6CF-EDIN-4	116
(2) TPX-070821	151.5	BXA-70080-6CF-EDIN-4	116
(2) TPX-070821	151.5	BXA-70080-6CF-EDIN-4	116
(2) LGP21401	151.5	(2) SBNHH-1D65B	116
(2) LGP21401	151.5	(2) SBNHH-1D65B	116
(2) LGP21401	151.5	(2) SBNHH-1D65B	116
DC6-48-60-18-8F(32.8 lbs)	151.5	B5/B13 RRH-BR04C	116
AIR32 B66Aa/B2a	142	Outdoor CBRS 20W RRH –Clip-on Antenna	116
AIR32 B66Aa/B2a	142	Outdoor CBRS 20W RRH –Clip-on Antenna	116
AIR32 B66Aa/B2a	142	Outdoor CBRS 20W RRH –Clip-on Antenna	116
APXVAARR24_43-U-NA20	142	Outdoor CBRS 20W RRH –Clip-on Antenna	116
APXVAARR24_43-U-NA20	142	Outdoor CBRS 20W RRH –Clip-on Antenna	116
APXVAARR24_43-U-NA20	142	Outdoor CBRS 20W RRH –Clip-on Antenna	116
Radio 4449 B71 B85A	142	RT4401-48A	116
Radio 4449 B71 B85A	142	RT4401-48A	116
Radio 4449 B71 B85A	142	RT4401-48A	116
Radio 4460 B25+B66	142	B5/B13 RRH-BR04C	116
Radio 4460 B25+B66	142	B5/B13 RRH-BR04C	116
Radio 4460 B25+B66	142	B5/B13 RRH-BR04C	116

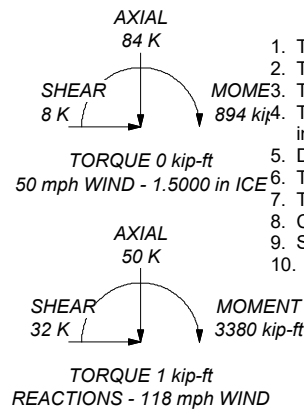
### MATERIAL STRENGTH

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

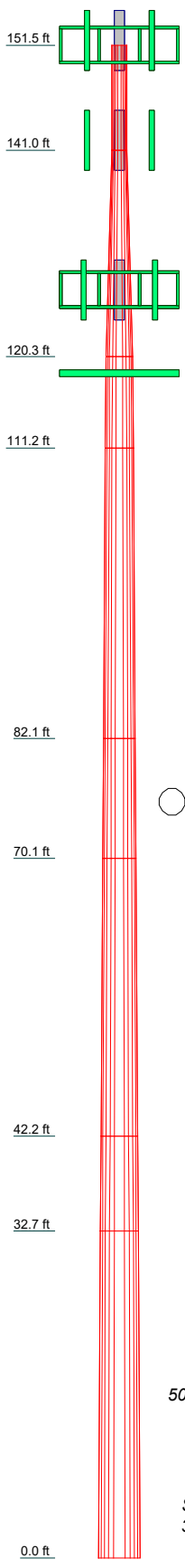
### TOWER DESIGN NOTES

- Tower is located in Hartford County, Connecticut.
- Tower designed for Exposure B to the TIA-222-H Standard.
- Tower designed for a 118 mph basic wind in accordance with the TIA-222-H Standard. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
- Deflections are based upon a 60 mph wind.
- Tower Risk Category II.
- Topographic Category 1 with Crest Height of 0.00 ft
- Combined pole and wrap structure.
- Sections modeled to have equivalent inertia to pole and wrap combined.
- TOWER RATING: 64.5%

ALL REACTIONS ARE FACTORED



Section	Length (ft)	Number of Sides	Thickness (in)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	10.50	12	0.2400	17.1872	17.7841	A572-65	0.5
2	20.67	12	0.3059	17.7841	31.5570	A572-65	1.7
3	9.14	12	0.3063	31.5570	33.0280	A572-65	1.0
4	29.11	12	0.3141	33.0280	38.3470	A572-65	3.5
5	12.02	12	0.3804	38.3470	39.7110	A572-65	1.9
6	27.82	12	0.4014	39.7110	43.9500	A572-65	5.1
7	9.53	12	0.4706	43.9500	45.0640	A572-65	2.2
8	32.71	12	0.4906	45.0640	49.5520	A572-65	8.2
							24.1



<b>ATC Engineering</b>		Job: <b>Brin-Berlin (302483)</b>	
3500 Regency Parkway, Suite 100		Project: <b>13678286_C3_03</b>	
Cary, NC 27518		Client: T-MOBILE	Drawn by: Garret.Heath
Phone: (919) 466-5258		Code: TIA-222-H	Date: 06/30/21
FAX:		Path:	App'd: _____
			Scale: NTS
			Dwg No. E-1

<b>tnxTower</b>  <b>ATC Engineering</b> 3500 Regency Parkway, Suite 100 Cary, NC 27518 Phone: (919) 466-5258 FAX:	<b>Job</b>	Brln-Berlin (302483)	<b>Page</b>	1 of 17
	<b>Project</b>	13678286_C3_03	<b>Date</b>	11:32:34 06/30/21
	<b>Client</b>	T-MOBILE	<b>Designed by</b>	Garret.Heath

## 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 Hartford County, Connecticut.
- Tower base elevation above sea level: 0.00 ft.
- Basic wind speed of 118 mph.
- Risk Category II.
- Exposure Category B.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 1.5000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- Combined pole and wrap structure..
- Sections modeled to have equivalent inertia to pole and wrap combined..
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

- |  |   |   |
|--|---|---|
| <ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Horizontals</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Magnification</li> <li>√ Use Code Stress Ratios</li> <li>√ Use Code Safety Factors - Guys</li> <li>Escalate Ice</li> <li>Always Use Max Kz</li> <li>Use Special Wind Profile</li> <li>Include Bolts In Member Capacity</li> <li>Leg Bolts Are At Top Of Section</li> <li>Secondary Horizontal Braces Leg</li> <li>Use Diamond Inner Bracing (4 Sided)</li> <li>SR Members Have Cut Ends</li> <li>SR Members Are Concentric</li> </ul> | <ul style="list-style-type: none"> <li>Distribute Leg Loads As Uniform</li> <li>Assume Legs Pinned</li> <li>√ Assume Rigid Index Plate</li> <li>√ Use Clear Spans For Wind Area</li> <li>Use Clear Spans For KL/r</li> <li>Retension Guys To Initial Tension</li> <li>√ Bypass Mast Stability Checks</li> <li>√ Use Azimuth Dish Coefficients</li> <li>√ Project Wind Area of Appurt.</li> <li>Autocalc Torque Arm Areas</li> <li>Add IBC .6D+W Combination</li> <li>Sort Capacity Reports By Component</li> <li>Triangulate Diamond Inner Bracing</li> <li>Treat Feed Line Bundles As Cylinder</li> <li>Ignore KL/ry For 60 Deg. Angle Legs</li> </ul> | <ul style="list-style-type: none"> <li>Use ASCE 10 X-Brace Ly Rules</li> <li>Calculate Redundant Bracing Forces</li> <li>Ignore Redundant Members in FEA</li> <li>SR Leg Bolts Resist Compression</li> <li>All Leg Panels Have Same Allowable</li> <li>Offset Girt At Foundation</li> <li>√ Consider Feed Line Torque</li> <li>Include Angle Block Shear Check</li> <li>Use TIA-222-H Bracing Resist. Exemption</li> <li>Use TIA-222-H Tension Splice Exemption</li> <li style="text-align: center;">Poles</li> <li>√ Include Shear-Torsion Interaction</li> <li>Always Use Sub-Critical Flow</li> <li>Use Top Mounted Sockets</li> <li>Pole Without Linear Attachments</li> <li>Pole With Shroud Or No Appurtenances</li> <li>Outside and Inside Corner Radii Are Known</li> </ul> |
|--|---|---|

## Tapered Pole Section Geometry

<b>tnxTower</b>  <b>ATC Engineering</b> 3500 Regency Parkway, Suite 100 Cary, NC 27518 Phone: (919) 466-5258 FAX:	<b>Job</b> Brln-Berlin (302483)	<b>Page</b> 2 of 17
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Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	151.50-141.00	10.50	0.00	12	17.1872	17.7841	0.2400	0.9600	A572-65 (65 ksi)
L2	141.00-120.33	20.67	0.00	12	17.7841	31.5570	0.3059	2.0000	A572-65 (65 ksi)
L3	120.33-111.19	9.14	0.00	12	31.5570	33.0280	0.3063	2.0000	A572-65 (65 ksi)
L4	111.19-82.08	29.11	0.00	12	33.0280	38.3470	0.3141	2.2000	A572-65 (65 ksi)
L5	82.08-70.06	12.02	0.00	12	38.3470	39.7110	0.3804	2.4000	A572-65 (65 ksi)
L6	70.06-42.24	27.82	0.00	12	39.7110	43.9500	0.4014	2.6000	A572-65 (65 ksi)
L7	42.24-32.71	9.53	0.00	12	43.9500	45.0640	0.4706	2.8000	A572-65 (65 ksi)
L8	32.71-0.00	32.71		12	45.0640	49.5520	0.4906	3.0000	A572-65 (65 ksi)

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	I/Q in <sup>2</sup>	w in	w/t
L1	17.7088	13.0968	480.1168	6.0671	8.9030	53.9277	972.8469	6.4458	3.9630	16.512
L2	18.3268	13.5581	532.6554	6.2808	9.2122	57.8209	1079.3043	6.6729	4.1229	17.179
L3	32.5075	30.7823	3837.2246	11.1879	16.3465	234.7425	7775.2574	15.1501	7.2213	23.607
L4	34.0157	33.0869	4519.6700	11.7116	17.1085	264.1768	9158.0767	16.2844	7.5039	23.89
L5	39.5224	38.4666	7102.1213	13.6158	19.8637	357.5419	14390.8231	18.9321	8.9294	28.429
L6	40.9157	48.1756	9512.0483	14.0804	20.5703	462.4166	19273.9886	23.7106	9.1523	24.06
L7	46.4229	67.5738	17151.6341	15.9644	23.3432	734.7608	34753.8607	33.2578	10.3241	21.938
L8	51.0537	77.5039	23811.6328	17.5640	25.6679	927.6801	48248.8237	38.1450	11.4090	23.255

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 151.50-141.00				1	1	1			
L2 141.00-120.33				1	1	1			
L3 120.33-111.19				1	1	1			
L4 111.19-82.08				1	1	1			
L5 82.08-70.06				1	1	1			
L6 70.06-42.24				1	1	1			
L7 42.24-32.71				1	1	1			

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Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor $A_f$	Adjust. Factor $A_r$	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft <sup>2</sup>	in					in	in	in
L8 32.71-0.00				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 plf
***										
1 5/8" Coax	B	No	Surface Ar (CaAa)	119.00 - 5.00	6	6	0.300 0.500	1.9800		0.82
1 5/8" (1.63"-41.3mm) Fiber	C	No	Surface Ar (CaAa)	119.00 - 5.00	2	2	-0.490 -0.480	1.6300		1.61
***										
4" Wrap Seams	A	No	Surface Ar (CaAa)	141.00 - 5.00	1	1	0.000 0.000	4.0000		0.00
4" Wrap Seams	B	No	Surface Ar (CaAa)	141.00 - 5.00	1	1	0.000 0.000	4.0000		0.00
4" Wrap Seams	C	No	Surface Ar (CaAa)	141.00 - 5.00	1	1	0.000 0.000	4.0000		0.00

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

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		$C_A A_A$ ft <sup>2</sup> /ft	Weight plf	
1 1/4" Coax	C	No	No	Inside Pole	151.50 - 5.00	12	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.66 0.66 0.66 0.66	
0.39" (10mm) Fiber Trunk	C	No	No	Inside Pole	151.50 - 5.00	2	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.06 0.06 0.06 0.06	
0.78" (19.7mm) 8 AWG 6	C	No	No	Inside Pole	151.50 - 5.00	4	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.59 0.59 0.59 0.59	
3" conduit	C	No	No	Inside Pole	151.50 - 5.00	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	1.78 1.78 1.78 1.78	
***										
1 1/4" (1.25"-31.8mm) Fiber	C	No	No	Inside Pole	142.00 - 5.00	2	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	1.05 1.05 1.05 1.05	
***										
1 1/4" Hybriflex	C	No	No	Inside Pole	127.00 - 5.00	4	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.66 0.66 0.66	

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Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		$C_{AA}$ ft <sup>2</sup> /ft	Weight plf
***							2" Ice	0.00	0.66
0.82" (20.8mm) 8 AWG 6	C	No	No	Inside Pole	151.50 - 5.00	2	No Ice	0.00	0.62
							1/2" Ice	0.00	0.62
							1" Ice	0.00	0.62
							2" Ice	0.00	0.62
***									
1 5/8" Hybriflex	C	No	No	Inside Pole	142.00 - 5.00	1	No Ice	0.00	1.30
							1/2" Ice	0.00	1.30
							1" Ice	0.00	1.30
							2" Ice	0.00	1.30

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight K
L1	151.50-141.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.14
L2	141.00-120.33	A	0.000	0.000	8.268	0.000	0.00
		B	0.000	0.000	8.268	0.000	0.00
		C	0.000	0.000	8.268	0.000	0.37
L3	120.33-111.19	A	0.000	0.000	3.656	0.000	0.00
		B	0.000	0.000	12.934	0.000	0.04
		C	0.000	0.000	6.202	0.000	0.20
L4	111.19-82.08	A	0.000	0.000	11.644	0.000	0.00
		B	0.000	0.000	46.227	0.000	0.14
		C	0.000	0.000	21.134	0.000	0.66
L5	82.08-70.06	A	0.000	0.000	4.808	0.000	0.00
		B	0.000	0.000	19.088	0.000	0.06
		C	0.000	0.000	8.727	0.000	0.27
L6	70.06-42.24	A	0.000	0.000	11.128	0.000	0.00
		B	0.000	0.000	44.178	0.000	0.14
		C	0.000	0.000	20.197	0.000	0.63
L7	42.24-32.71	A	0.000	0.000	3.812	0.000	0.00
		B	0.000	0.000	15.134	0.000	0.05
		C	0.000	0.000	6.919	0.000	0.22
L8	32.71-0.00	A	0.000	0.000	11.084	0.000	0.00
		B	0.000	0.000	44.003	0.000	0.14
		C	0.000	0.000	20.117	0.000	0.63

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

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight K
L1	151.50-141.00	A	1.741	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.14
L2	141.00-120.33	A	1.720	0.000	0.000	15.379	0.000	0.25

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Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight K
		B		0.000	0.000	15.379	0.000	0.25
		C		0.000	0.000	15.379	0.000	0.61
L3	120.33-111.19	A	1.701	0.000	0.000	6.765	0.000	0.11
		B		0.000	0.000	21.683	0.000	0.32
		C		0.000	0.000	13.267	0.000	0.38
L4	111.19-82.08	A	1.670	0.000	0.000	21.364	0.000	0.34
		B		0.000	0.000	76.742	0.000	1.12
		C		0.000	0.000	45.376	0.000	1.26
L5	82.08-70.06	A	1.631	0.000	0.000	8.728	0.000	0.13
		B		0.000	0.000	31.477	0.000	0.45
		C		0.000	0.000	18.526	0.000	0.51
L6	70.06-42.24	A	1.581	0.000	0.000	19.926	0.000	0.30
		B		0.000	0.000	72.236	0.000	1.01
		C		0.000	0.000	42.260	0.000	1.17
L7	42.24-32.71	A	1.519	0.000	0.000	6.707	0.000	0.10
		B		0.000	0.000	24.479	0.000	0.33
		C		0.000	0.000	14.210	0.000	0.39
L8	32.71-0.00	A	1.396	0.000	0.000	18.821	0.000	0.26
		B		0.000	0.000	69.642	0.000	0.89
		C		0.000	0.000	39.784	0.000	1.08

### Feed Line Center of Pressure

Section	Elevation ft	$CP_x$ in	$CP_z$ in	$CP_x$ Ice in	$CP_z$ Ice in
L1	151.50-141.00	0.0000	0.0000	0.0000	0.0000
L2	141.00-120.33	0.0000	0.0000	0.0000	0.0000
L3	120.33-111.19	4.0222	1.5387	3.9571	1.6107
L4	111.19-82.08	4.7022	1.7990	4.6115	1.8759
L5	82.08-70.06	4.8836	1.8686	4.8565	1.9738
L6	70.06-42.24	5.0232	1.9222	5.0469	2.0488
L7	42.24-32.71	5.1475	1.9699	5.2158	2.1140
L8	32.71-0.00	4.7307	1.8104	4.9166	1.9863

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

### Shielding Factor $K_a$

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	$K_a$ No Ice	$K_a$ Ice
L2	15	4" Wrap Seams	120.33 - 141.00	1.0000	1.0000
L2	16	4" Wrap Seams	120.33 - 141.00	1.0000	1.0000
L2	17	4" Wrap Seams	120.33 - 141.00	1.0000	1.0000
L3	12	1 5/8" Coax	111.19 - 119.00	1.0000	1.0000

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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	$K_a$ No Ice	$K_a$ Ice
L3	13	1 5/8" (1.63"-41.3mm) Fiber	111.19 - 119.00	1.0000	1.0000
L3	15	4" Wrap Seams	111.19 - 120.33	1.0000	1.0000
L3	16	4" Wrap Seams	111.19 - 120.33	1.0000	1.0000
L3	17	4" Wrap Seams	111.19 - 120.33	1.0000	1.0000
L4	12	1 5/8" Coax	82.08 - 111.19	1.0000	1.0000
L4	13	1 5/8" (1.63"-41.3mm) Fiber	82.08 - 111.19	1.0000	1.0000
L4	15	4" Wrap Seams	82.08 - 111.19	1.0000	1.0000
L4	16	4" Wrap Seams	82.08 - 111.19	1.0000	1.0000
L4	17	4" Wrap Seams	82.08 - 111.19	1.0000	1.0000
L5	12	1 5/8" Coax	70.06 - 82.08	1.0000	1.0000
L5	13	1 5/8" (1.63"-41.3mm) Fiber	70.06 - 82.08	1.0000	1.0000
L5	15	4" Wrap Seams	70.06 - 82.08	1.0000	1.0000
L5	16	4" Wrap Seams	70.06 - 82.08	1.0000	1.0000
L5	17	4" Wrap Seams	70.06 - 82.08	1.0000	1.0000
L6	12	1 5/8" Coax	42.24 - 70.06	1.0000	1.0000
L6	13	1 5/8" (1.63"-41.3mm) Fiber	42.24 - 70.06	1.0000	1.0000
L6	15	4" Wrap Seams	42.24 - 70.06	1.0000	1.0000
L6	16	4" Wrap Seams	42.24 - 70.06	1.0000	1.0000
L6	17	4" Wrap Seams	42.24 - 70.06	1.0000	1.0000
L7	12	1 5/8" Coax	32.71 - 42.24	1.0000	1.0000
L7	13	1 5/8" (1.63"-41.3mm) Fiber	32.71 - 42.24	1.0000	1.0000
L7	15	4" Wrap Seams	32.71 - 42.24	1.0000	1.0000
L7	16	4" Wrap Seams	32.71 - 42.24	1.0000	1.0000
L7	17	4" Wrap Seams	32.71 - 42.24	1.0000	1.0000
L8	12	1 5/8" Coax	5.00 - 32.71	1.0000	1.0000
L8	13	1 5/8" (1.63"-41.3mm) Fiber	5.00 - 32.71	1.0000	1.0000
L8	15	4" Wrap Seams	5.00 - 32.71	1.0000	1.0000
L8	16	4" Wrap Seams	5.00 - 32.71	1.0000	1.0000
L8	17	4" Wrap Seams	5.00 - 32.71	1.0000	1.0000

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	$C_{AA}$ Front	$C_{AA}$ Side	Weight	
			Horz Lateral	Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
(2) TPX-070821	A	From Leg	3.00	0.00	0.0000	151.50	No Ice	0.00	0.18	0.01
			0.00	0.50			1/2" Ice	0.00	0.25	0.01
							1" Ice	0.00	0.32	0.02
							2" Ice	0.00	0.49	0.03
(2) TPX-070821	B	From Leg	3.00	0.00	0.0000	151.50	No Ice	0.00	0.18	0.01
			0.00	0.50			1/2" Ice	0.00	0.25	0.01
							1" Ice	0.00	0.32	0.02
							2" Ice	0.00	0.49	0.03
(2) TPX-070821	C	From Leg	3.00	0.00	0.0000	151.50	No Ice	0.00	0.18	0.01
			0.00	0.50			1/2" Ice	0.00	0.25	0.01
							1" Ice	0.00	0.32	0.02
							2" Ice	0.00	0.49	0.03

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Vert					
(2) LGP21401	A	From Leg	3.00	0.0000	151.50	No Ice	0.00	0.36	0.01
			0.00			1/2" Ice	1.45	0.48	0.02
			0.50			1" Ice	1.61	0.60	0.03
						2" Ice	1.97	0.87	0.05
(2) LGP21401	B	From Leg	3.00	0.0000	151.50	No Ice	0.00	0.36	0.01
			0.00			1/2" Ice	1.45	0.48	0.02
			0.50			1" Ice	1.61	0.60	0.03
						2" Ice	1.97	0.87	0.05
(2) LGP21401	C	From Leg	3.00	0.0000	151.50	No Ice	0.00	0.36	0.01
			0.00			1/2" Ice	1.45	0.48	0.02
			0.50			1" Ice	1.61	0.60	0.03
						2" Ice	1.97	0.87	0.05
DC6-48-60-18-8F(32.8 lbs)	B	From Leg	0.50	0.0000	151.50	No Ice	1.28	0.79	0.02
			0.00			1/2" Ice	1.27	1.27	0.04
			0.50			1" Ice	1.45	1.45	0.05
						2" Ice	1.83	1.83	0.10
DC6-48-60-18-8F(32.8 lbs)	C	From Leg	0.50	0.0000	151.50	No Ice	1.28	0.79	0.02
			0.00			1/2" Ice	1.27	1.27	0.04
			0.50			1" Ice	1.45	1.45	0.05
						2" Ice	1.83	1.83	0.10
RRUS 4426 B66	A	From Leg	3.00	0.0000	151.50	No Ice	1.65	0.73	0.05
			0.00			1/2" Ice	1.81	0.84	0.06
			0.50			1" Ice	1.98	0.97	0.08
						2" Ice	2.34	1.25	0.11
RRUS 4426 B66	B	From Leg	3.00	0.0000	151.50	No Ice	1.65	0.73	0.05
			0.00			1/2" Ice	1.81	0.84	0.06
			0.50			1" Ice	1.98	0.97	0.08
						2" Ice	2.34	1.25	0.11
RRUS 4426 B66	C	From Leg	3.00	0.0000	151.50	No Ice	1.65	0.73	0.05
			0.00			1/2" Ice	1.81	0.84	0.06
			0.50			1" Ice	1.98	0.97	0.08
						2" Ice	2.34	1.25	0.11
RRUS 11 (Band 12) (55 lb)	A	From Leg	3.00	0.0000	151.50	No Ice	0.00	1.07	0.06
			0.00			1/2" Ice	2.72	1.21	0.07
			0.50			1" Ice	2.92	1.36	0.10
						2" Ice	3.35	1.68	0.15
RRUS 11 (Band 12) (55 lb)	B	From Leg	3.00	0.0000	151.50	No Ice	0.00	1.07	0.06
			0.00			1/2" Ice	2.72	1.21	0.07
			0.50			1" Ice	2.92	1.36	0.10
						2" Ice	3.35	1.68	0.15
RRUS 11 (Band 12) (55 lb)	C	From Leg	3.00	0.0000	151.50	No Ice	0.00	1.07	0.06
			0.00			1/2" Ice	2.72	1.21	0.07
			0.50			1" Ice	2.92	1.36	0.10
						2" Ice	3.35	1.68	0.15
RRUS 32 (50.8 lbs)	B	From Leg	3.00	0.0000	151.50	No Ice	0.00	2.42	0.08
			0.00			1/2" Ice	0.00	2.64	0.10
			0.50			1" Ice	0.00	2.86	0.14
						2" Ice	0.00	3.32	0.21
RRUS 32 (50.8 lbs)	C	From Leg	3.00	0.0000	151.50	No Ice	0.00	2.42	0.08
			0.00			1/2" Ice	0.00	2.64	0.10
			0.50			1" Ice	0.00	2.86	0.14
						2" Ice	0.00	3.32	0.21
RRUS 32 (50.8 lbs)	C	From Leg	3.00	0.0000	151.50	No Ice	0.00	2.42	0.08
			0.00			1/2" Ice	0.00	2.64	0.10
			0.50			1" Ice	0.00	2.86	0.14
						2" Ice	0.00	3.32	0.21
RRUS 32 B2	A	From Leg	3.00	0.0000	151.50	No Ice	0.00	1.67	0.05



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	<b>Client</b>	T-MOBILE	<b>Designed by</b>	Garret.Heath

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
			Horz ft	Lateral Vert ft					
				0.00		1/2" Ice	0.00	1.86	0.07
				0.50		1" Ice	0.00	2.05	0.10
						2" Ice	0.00	2.46	0.16
RRUS 32 B2	A	From Leg	3.00	0.0000	151.50	No Ice	0.00	1.67	0.05
			0.00			1/2" Ice	0.00	1.86	0.07
			0.50			1" Ice	0.00	2.05	0.10
						2" Ice	0.00	2.46	0.16
RRUS 32 B2	C	From Leg	3.00	0.0000	151.50	No Ice	0.00	1.67	0.05
			0.00			1/2" Ice	0.00	1.86	0.07
			0.50			1" Ice	0.00	2.05	0.10
						2" Ice	0.00	2.46	0.16
7770.00	A	From Leg	3.00	0.0000	151.50	No Ice	5.51	2.93	0.04
			0.00			1/2" Ice	6.31	3.27	0.07
			0.50			1" Ice	6.75	3.63	0.11
						2" Ice	7.66	4.35	0.20
7770.00	B	From Leg	3.00	0.0000	151.50	No Ice	5.51	2.93	0.04
			0.00			1/2" Ice	6.31	3.27	0.07
			0.50			1" Ice	6.75	3.63	0.11
						2" Ice	7.66	4.35	0.20
7770.00	C	From Leg	3.00	0.0000	151.50	No Ice	5.51	2.93	0.04
			0.00			1/2" Ice	6.31	3.27	0.07
			0.50			1" Ice	6.75	3.63	0.11
						2" Ice	7.66	4.35	0.20
QS66512-2	A	From Leg	3.00	0.0000	151.50	No Ice	8.13	5.00	0.11
			0.00			1/2" Ice	9.23	5.80	0.17
			0.50			1" Ice	10.33	6.60	0.23
						2" Ice	12.53	8.20	0.34
QS66512-2	B	From Leg	3.00	0.0000	151.50	No Ice	8.13	5.00	0.11
			0.00			1/2" Ice	9.23	5.80	0.17
			0.50			1" Ice	10.33	6.60	0.23
						2" Ice	12.53	8.20	0.34
QS66512-2	C	From Leg	3.00	0.0000	151.50	No Ice	8.13	5.00	0.11
			0.00			1/2" Ice	9.23	5.80	0.17
			0.50			1" Ice	10.33	6.60	0.23
						2" Ice	12.53	8.20	0.34
OPA-65R-LCUU-H6	A	From Leg	3.00	0.0000	151.50	No Ice	9.66	5.52	0.07
			0.00			1/2" Ice	10.13	5.97	0.13
			0.50			1" Ice	10.61	6.43	0.20
						2" Ice	11.58	7.38	0.35
OPA-65R-LCUU-H6	B	From Leg	3.00	0.0000	151.50	No Ice	9.66	5.52	0.07
			0.00			1/2" Ice	10.13	5.97	0.13
			0.50			1" Ice	10.61	6.43	0.20
						2" Ice	11.58	7.38	0.35
OPA-65R-LCUU-H6	C	From Leg	3.00	0.0000	151.50	No Ice	9.66	5.52	0.07
			0.00			1/2" Ice	10.13	5.97	0.13
			0.50			1" Ice	10.61	6.43	0.20
						2" Ice	11.58	7.38	0.35
Flat Platform w/ Handrails	C	None		0.0000	151.50	No Ice	42.40	42.40	2.00
						1/2" Ice	48.40	48.40	2.45
						1" Ice	54.40	54.40	2.90
						2" Ice	66.40	66.40	3.80
***									
AIR32 B66Aa/B2a	A	From Leg	3.00	0.0000	142.00	No Ice	6.51	2.70	0.13
			0.00			1/2" Ice	7.78	3.22	0.18
			0.00			1" Ice	9.05	3.74	0.22
						2" Ice	11.59	4.78	0.32
AIR32 B66Aa/B2a	B	From Leg	3.00	0.0000	142.00	No Ice	6.51	2.70	0.13

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
			Horz Lateral ft	Vert ft					
				0.00		1/2" Ice	7.78	3.22	0.18
				0.00		1" Ice	9.05	3.74	0.22
						2" Ice	11.59	4.78	0.32
AIR32 B66Aa/B2a	C	From Leg	3.00	0.0000	142.00	No Ice	6.51	2.70	0.13
			0.00			1/2" Ice	7.78	3.22	0.18
			0.00			1" Ice	9.05	3.74	0.22
						2" Ice	11.59	4.78	0.32
APXVAARR24_43-U-NA20	A	From Leg	3.00	0.0000	142.00	No Ice	20.24	5.15	0.13
			0.00			1/2" Ice	23.53	5.99	0.24
			0.00			1" Ice	26.82	6.83	0.35
						2" Ice	33.40	8.51	0.58
APXVAARR24_43-U-NA20	B	From Leg	3.00	0.0000	142.00	No Ice	20.24	5.15	0.13
			0.00			1/2" Ice	23.53	5.99	0.24
			0.00			1" Ice	26.82	6.83	0.35
						2" Ice	33.40	8.51	0.58
APXVAARR24_43-U-NA20	C	From Leg	3.00	0.0000	142.00	No Ice	20.24	5.15	0.13
			0.00			1/2" Ice	23.53	5.99	0.24
			0.00			1" Ice	26.82	6.83	0.35
						2" Ice	33.40	8.51	0.58
Round Platform w/ Handrails	C	None		0.0000	127.00	No Ice	27.20	27.20	2.00
						1/2" Ice	34.20	34.20	2.40
						1" Ice	41.20	41.20	2.80
						2" Ice	55.20	55.20	3.60
***									
RRH2x50-08	A	From Face	3.00	0.0000	127.00	No Ice	1.70	1.10	0.05
			0.00			1/2" Ice	2.27	1.80	0.07
			0.00			1" Ice	2.84	2.50	0.09
						2" Ice	3.98	3.90	0.12
RRH2x50-08	B	From Face	3.00	0.0000	127.00	No Ice	1.70	1.10	0.05
			0.00			1/2" Ice	2.27	1.80	0.07
			0.00			1" Ice	2.84	2.50	0.09
						2" Ice	3.98	3.90	0.12
RRH2x50-08	C	From Face	3.00	0.0000	127.00	No Ice	1.70	1.10	0.05
			0.00			1/2" Ice	2.27	1.80	0.07
			0.00			1" Ice	2.84	2.50	0.09
						2" Ice	3.98	3.90	0.12
800 MHz 2X50W RRH w/ Filter	A	From Leg	3.00	0.0000	134.00	No Ice	0.00	1.93	0.06
			0.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
						2" Ice	2.83	2.68	0.17
800 MHz 2X50W RRH w/ Filter	B	From Leg	3.00	0.0000	134.00	No Ice	0.00	1.93	0.06
			0.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
						2" Ice	2.83	2.68	0.17
800 MHz 2X50W RRH w/ Filter	C	From Leg	3.00	0.0000	134.00	No Ice	0.00	1.93	0.06
			0.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
						2" Ice	2.83	2.68	0.17
(2) 4x40W RRH (88 lb)	A	From Leg	3.00	0.0000	127.00	No Ice	0.00	3.80	0.09
			0.00			1/2" Ice	0.00	4.06	0.12
			0.00			1" Ice	0.00	4.34	0.15
						2" Ice	0.00	4.91	0.24
(2) 4x40W RRH (88 lb)	C	From Leg	3.00	0.0000	127.00	No Ice	0.00	3.80	0.09
			0.00			1/2" Ice	0.00	4.06	0.12
			0.00			1" Ice	0.00	4.34	0.15
						2" Ice	0.00	4.91	0.24
(2) 4x40W RRH (88 lb)	B	From Leg	3.00	0.0000	127.00	No Ice	0.00	3.80	0.09

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
				0.00			1/2" Ice	0.00	4.06	0.12
				0.00			1" Ice	0.00	4.34	0.15
							2" Ice	0.00	4.91	0.24
TD-RRH8x20	A	From Face	3.00	0.0000	127.00	No Ice	0.00	1.40	0.07	
			0.00			1/2" Ice	4.59	1.61	0.09	
			0.00			1" Ice	4.88	1.82	0.12	
						2" Ice	5.48	2.27	0.18	
TD-RRH8x20	B	From Face	3.00	0.0000	127.00	No Ice	0.00	1.40	0.07	
			0.00			1/2" Ice	4.59	1.61	0.09	
			0.00			1" Ice	4.88	1.82	0.12	
						2" Ice	5.48	2.27	0.18	
TD-RRH8x20	C	From Face	3.00	0.0000	127.00	No Ice	0.00	1.40	0.07	
			0.00			1/2" Ice	4.59	1.61	0.09	
			0.00			1" Ice	4.88	1.82	0.12	
						2" Ice	5.48	2.27	0.18	
APXVSPP18-C-A20	A	From Leg	3.00	0.0000	127.00	No Ice	8.02	5.28	0.06	
			0.00			1/2" Ice	8.48	5.74	0.11	
			0.00			1" Ice	8.94	6.20	0.16	
						2" Ice	9.89	7.14	0.29	
APXVSPP18-C-A20	B	From Leg	3.00	0.0000	127.00	No Ice	8.02	5.28	0.06	
			0.00			1/2" Ice	8.48	5.74	0.11	
			0.00			1" Ice	8.94	6.20	0.16	
						2" Ice	9.89	7.14	0.29	
APXV9ERR18-C-A20	C	From Leg	3.00	0.0000	127.00	No Ice	8.02	5.81	0.06	
			0.00			1/2" Ice	8.48	6.27	0.11	
			0.00			1" Ice	8.94	6.73	0.17	
						2" Ice	9.89	7.68	0.31	
DT465B-2XR	A	From Leg	3.00	0.0000	127.00	No Ice	9.10	5.97	0.06	
			0.00			1/2" Ice	9.56	6.43	0.12	
			0.00			1" Ice	10.04	6.90	0.18	
						2" Ice	11.00	7.84	0.33	
DT465B-2XR	B	From Leg	3.00	0.0000	127.00	No Ice	9.10	5.97	0.06	
			0.00			1/2" Ice	9.56	6.43	0.12	
			0.00			1" Ice	10.04	6.90	0.18	
						2" Ice	11.00	7.84	0.33	
DT465B-2XR	C	From Leg	3.00	0.0000	127.00	No Ice	9.10	5.97	0.06	
			0.00			1/2" Ice	9.56	6.43	0.12	
			0.00			1" Ice	10.04	6.90	0.18	
						2" Ice	11.00	7.84	0.33	
Round Platform w/ Handrails	C	None		0.0000	127.00	No Ice	27.20	27.20	2.00	
						1/2" Ice	34.20	34.20	2.40	
						1" Ice	41.20	41.20	2.80	
						2" Ice	55.20	55.20	3.60	
***										
Round Platform w/ Handrails	C	None		0.0000	119.00	No Ice	27.20	27.20	2.00	
						1/2" Ice	34.20	34.20	2.40	
						1" Ice	41.20	41.20	2.80	
						2" Ice	55.20	55.20	3.60	
***										
CBC23SR-43	A	From Leg	3.00	0.0000	152.00	No Ice	0.00	0.15	0.01	
			0.00			1/2" Ice	0.00	0.17	0.01	
			0.00			1" Ice	0.54	0.19	0.01	
						2" Ice	0.66	0.23	0.01	
CBC23SR-43	B	From Leg	3.00	0.0000	152.00	No Ice	0.00	0.15	0.01	
			0.00			1/2" Ice	0.00	0.17	0.01	
			0.00			1" Ice	0.54	0.19	0.01	
						2" Ice	0.66	0.23	0.01	

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Vert					
CBC23SR-43	C	From Leg	3.00	0.0000	152.00	No Ice	0.00	0.15	0.01
			0.00	0.00		1/2" Ice	0.00	0.17	0.01
			0.00	0.00		1" Ice	0.54	0.19	0.01
			0.00	0.00		2" Ice	0.66	0.23	0.01
DC6-48-60-0-8C-EV	A	From Leg	3.00	0.0000	152.00	No Ice	1.02	1.02	0.02
			0.00	0.00		1/2" Ice	1.10	1.10	0.02
			0.00	0.00		1" Ice	1.18	1.18	0.02
			0.00	0.00		2" Ice	1.34	1.34	0.02
ION-M23 SDARS	A	From Leg	3.00	0.0000	152.00	No Ice	1.84	1.76	0.05
			0.00	0.00		1/2" Ice	2.02	1.94	0.06
			0.00	0.00		1" Ice	2.20	2.12	0.07
			0.00	0.00		2" Ice	2.56	2.48	0.09
ION-M23 SDARS	B	From Leg	3.00	0.0000	152.00	No Ice	1.84	1.76	0.05
			0.00	0.00		1/2" Ice	2.02	1.94	0.06
			0.00	0.00		1" Ice	2.20	2.12	0.07
			0.00	0.00		2" Ice	2.56	2.48	0.09
ION-M23 SDARS	C	From Leg	3.00	0.0000	152.00	No Ice	1.84	1.76	0.05
			0.00	0.00		1/2" Ice	2.02	1.94	0.06
			0.00	0.00		1" Ice	2.20	2.12	0.07
			0.00	0.00		2" Ice	2.56	2.48	0.09
***									
Outdoor CBRS 20W RRH -Clip-on Antenna	A	From Leg	3.00	0.0000	116.00	No Ice	0.89	0.10	0.00
			0.00	0.00		1/2" Ice	0.98	0.11	0.01
			0.00	0.00		1" Ice	1.07	0.12	0.01
			0.00	0.00		2" Ice	1.25	0.14	0.02
Outdoor CBRS 20W RRH -Clip-on Antenna	B	From Leg	3.00	0.0000	116.00	No Ice	0.89	0.10	0.00
			0.00	0.00		1/2" Ice	0.98	0.11	0.01
			0.00	0.00		1" Ice	1.07	0.12	0.01
			0.00	0.00		2" Ice	1.25	0.14	0.02
Outdoor CBRS 20W RRH -Clip-on Antenna	C	From Leg	3.00	0.0000	116.00	No Ice	0.89	0.10	0.00
			0.00	0.00		1/2" Ice	0.98	0.11	0.01
			0.00	0.00		1" Ice	1.07	0.12	0.01
			0.00	0.00		2" Ice	1.25	0.14	0.02
RT4401-48A	A	From Leg	3.00	0.0000	116.00	No Ice	1.00	0.50	0.02
			0.00	0.00		1/2" Ice	1.09	0.55	0.02
			0.00	0.00		1" Ice	1.18	0.60	0.03
			0.00	0.00		2" Ice	1.36	0.70	0.03
RT4401-48A	B	From Leg	3.00	0.0000	116.00	No Ice	1.00	0.50	0.02
			0.00	0.00		1/2" Ice	1.09	0.55	0.02
			0.00	0.00		1" Ice	1.18	0.60	0.03
			0.00	0.00		2" Ice	1.36	0.70	0.03
RT4401-48A	C	From Leg	3.00	0.0000	116.00	No Ice	1.00	0.50	0.02
			0.00	0.00		1/2" Ice	1.09	0.55	0.02
			0.00	0.00		1" Ice	1.18	0.60	0.03
			0.00	0.00		2" Ice	1.36	0.70	0.03
B5/B13 RRH-BR04C	A	From Leg	3.00	0.0000	116.00	No Ice	1.88	1.01	0.07
			0.00	0.00		1/2" Ice	2.00	1.08	0.08
			0.00	0.00		1" Ice	2.12	1.15	0.09
			0.00	0.00		2" Ice	2.36	1.29	0.11
B5/B13 RRH-BR04C	B	From Leg	3.00	0.0000	116.00	No Ice	1.88	1.01	0.07
			0.00	0.00		1/2" Ice	2.00	1.08	0.08
			0.00	0.00		1" Ice	2.12	1.15	0.09
			0.00	0.00		2" Ice	2.36	1.29	0.11
B5/B13 RRH-BR04C	C	From Leg	3.00	0.0000	116.00	No Ice	1.88	1.01	0.07
			0.00	0.00		1/2" Ice	2.00	1.08	0.08
			0.00	0.00		1" Ice	2.12	1.15	0.09
			0.00	0.00		2" Ice	2.36	1.29	0.11

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Vert					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
B2/B66A RRH-BR049	A	From Leg	3.00	0.0000	116.00	No Ice	1.88	1.25	0.08
			0.00	1/2" Ice		2.00	1.34	0.09	
			0.00	1" Ice		2.12	1.43	0.10	
				2" Ice		2.36	1.61	0.12	
B2/B66A RRH-BR049	B	From Leg	3.00	0.0000	116.00	No Ice	1.88	1.25	0.08
			0.00	1/2" Ice		2.00	1.34	0.09	
			0.00	1" Ice		2.12	1.43	0.10	
				2" Ice		2.36	1.61	0.12	
B2/B66A RRH-BR049	C	From Leg	3.00	0.0000	116.00	No Ice	1.88	1.25	0.08
			0.00	1/2" Ice		2.00	1.34	0.09	
			0.00	1" Ice		2.12	1.43	0.10	
				2" Ice		2.36	1.61	0.12	
RRFDC-3315-PF-48 (32lbs)	A	From Leg	3.00	0.0000	116.00	No Ice	2.80	2.49	0.03
			0.00	1/2" Ice		2.97	2.64	0.04	
			0.00	1" Ice		3.14	2.79	0.06	
				2" Ice		3.48	3.09	0.08	
RRFDC-3315-PF-48 (32lbs)	B	From Leg	3.00	0.0000	116.00	No Ice	2.80	2.49	0.03
			0.00	1/2" Ice		2.97	2.64	0.04	
			0.00	1" Ice		3.14	2.79	0.06	
				2" Ice		3.48	3.09	0.08	
MT6407-77A	A	From Leg	3.00	0.0000	116.00	No Ice	4.71	1.05	0.08
			0.00	1/2" Ice		4.93	1.10	0.10	
			0.00	1" Ice		5.15	1.15	0.11	
				2" Ice		5.59	1.25	0.14	
BXA-70080-6CF-EDIN-4	A	From Leg	3.00	0.0000	116.00	No Ice	5.76	2.65	0.02
			0.00	1/2" Ice		6.10	2.80	0.04	
			0.00	1" Ice		6.44	2.95	0.05	
				2" Ice		7.12	3.25	0.09	
BXA-70080-6CF-EDIN-4	B	From Leg	3.00	0.0000	116.00	No Ice	5.76	2.65	0.02
			0.00	1/2" Ice		6.10	2.80	0.04	
			0.00	1" Ice		6.44	2.95	0.05	
				2" Ice		7.12	3.25	0.09	
BXA-70080-6CF-EDIN-4	C	From Leg	3.00	0.0000	116.00	No Ice	5.76	2.65	0.02
			0.00	1/2" Ice		6.10	2.80	0.04	
			0.00	1" Ice		6.44	2.95	0.05	
				2" Ice		7.12	3.25	0.09	
(2) SBNHH-1D65B	A	From Leg	3.00	0.0000	116.00	No Ice	8.17	3.13	0.05
			0.00	1/2" Ice		8.58	3.28	0.08	
			0.00	1" Ice		8.99	3.43	0.10	
				2" Ice		9.81	3.73	0.15	
(2) SBNHH-1D65B	B	From Leg	3.00	0.0000	116.00	No Ice	8.17	3.13	0.05
			0.00	1/2" Ice		8.58	3.28	0.08	
			0.00	1" Ice		8.99	3.43	0.10	
				2" Ice		9.81	3.73	0.15	
(2) SBNHH-1D65B	C	From Leg	3.00	0.0000	116.00	No Ice	8.17	3.13	0.05
			0.00	1/2" Ice		8.58	3.28	0.08	
			0.00	1" Ice		8.99	3.43	0.10	
				2" Ice		9.81	3.73	0.15	
***									
Radio 4449 B71 B85A	A	From Leg	3.00	0.0000	142.00	No Ice	1.65	1.31	0.07
			0.00	1/2" Ice		1.77	1.41	0.08	
			0.00	1" Ice		1.89	1.51	0.09	
				2" Ice		2.13	1.71	0.11	
Radio 4449 B71 B85A	B	From Leg	3.00	0.0000	142.00	No Ice	1.65	1.31	0.07
			0.00	1/2" Ice		1.77	1.41	0.08	
			0.00	1" Ice		1.89	1.51	0.09	
				2" Ice		2.13	1.71	0.11	

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Lateral					
Radio 4449 B71 B85A	C	From Leg	3.00	0.0000	142.00	No Ice	1.65	1.31	0.07
			0.00			1/2" Ice	1.77	1.41	0.08
			0.00			1" Ice	1.89	1.51	0.09
						2" Ice	2.13	1.71	0.11
Radio 4460 B25+B66	A	From Leg	3.00	0.0000	142.00	No Ice	2.56	1.98	0.11
			0.00			1/2" Ice	2.72	2.09	0.12
			0.00			1" Ice	2.88	2.20	0.13
						2" Ice	3.20	2.42	0.16
Radio 4460 B25+B66	B	From Leg	3.00	0.0000	142.00	No Ice	2.56	1.98	0.11
			0.00			1/2" Ice	2.72	2.09	0.12
			0.00			1" Ice	2.88	2.20	0.13
						2" Ice	3.20	2.42	0.16
Radio 4460 B25+B66	C	From Leg	3.00	0.0000	142.00	No Ice	2.56	1.98	0.11
			0.00			1/2" Ice	2.72	2.09	0.12
			0.00			1" Ice	2.88	2.20	0.13
						2" Ice	3.20	2.42	0.16
Air6449 B41	A	From Leg	3.00	0.0000	142.00	No Ice	5.68	1.44	0.10
			0.00			1/2" Ice	5.91	1.50	0.12
			0.00			1" Ice	6.14	1.56	0.14
						2" Ice	6.60	1.68	0.18
Air6449 B41	B	From Leg	3.00	0.0000	142.00	No Ice	5.68	1.44	0.10
			0.00			1/2" Ice	5.91	1.50	0.12
			0.00			1" Ice	6.14	1.56	0.14
						2" Ice	6.60	1.68	0.18
Air6449 B41	C	From Leg	3.00	0.0000	142.00	No Ice	5.68	1.44	0.10
			0.00			1/2" Ice	5.91	1.50	0.12
			0.00			1" Ice	6.14	1.56	0.14
						2" Ice	6.60	1.68	0.18

## Load Combinations

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

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<i>Comb. No.</i>	<i>Description</i>
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 Tower Deflections - Service Wind

<i>Section No.</i>	<i>Elevation</i>	<i>Horz. Deflection</i>	<i>Gov. Load</i>	<i>Tilt</i>	<i>Twist</i>
	<i>ft</i>	<i>ft</i>	<i>Comb.</i>	<i>°</i>	<i>°</i>
L1	151.5 - 141	1.732	40	1.1609	0.0015
L2	141 - 120.33	1.522	40	1.1245	0.0008
L3	120.33 - 111.19	1.135	40	1.0231	0.0005
L4	111.19 - 82.08	0.976	40	0.9751	0.0005
L5	82.08 - 70.06	0.535	40	0.7426	0.0004
L6	70.06 - 42.24	0.390	40	0.6400	0.0003
L7	42.24 - 32.71	0.141	40	0.3783	0.0001
L8	32.71 - 0	0.085	40	0.2946	0.0001

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

<i>Elevation</i>	<i>Appurtenance</i>	<i>Gov. Load</i>	<i>Deflection</i>	<i>Tilt</i>	<i>Twist</i>	<i>Radius of Curvature</i>
<i>ft</i>		<i>Comb.</i>	<i>ft</i>	<i>°</i>	<i>°</i>	<i>ft</i>
152.00	CBC23SR-43	40	1.732	1.1609	0.0015	19653
151.50	(2) TPX-070821	40	1.732	1.1609	0.0015	19653
142.00	AIR32 B66Aa/B2a	40	1.541	1.1285	0.0008	10914

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Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			ft	°	°	ft
134.00	800 MHz 2X50W RRH w/ Filter	40	1.387	1.0932	0.0005	10500
127.00	Round Platform w/ Handrails	40	1.256	1.0578	0.0003	11959
119.00	Round Platform w/ Handrails	40	1.112	1.0164	0.0005	12343
116.00	Outdoor CBRS 20W RRH –Clip-on Antenna	40	1.059	1.0013	0.0005	10838

### Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	ft		°	°
L1	151.5 - 141	7.547	4	5.0632	0.0068
L2	141 - 120.33	6.631	4	4.9100	0.0036
L3	120.33 - 111.19	4.947	4	4.4657	0.0022
L4	111.19 - 82.08	4.252	4	4.2553	0.0024
L5	82.08 - 70.06	2.331	4	3.2392	0.0017
L6	70.06 - 42.24	1.698	4	2.7908	0.0013
L7	42.24 - 32.71	0.615	4	1.6486	0.0006
L8	32.71 - 0	0.371	4	1.2835	0.0005

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

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			ft	°	°	ft
152.00	CBC23SR-43	4	7.547	5.0632	0.0068	4653
151.50	(2) TPX-070821	4	7.547	5.0632	0.0068	4653
142.00	AIR32 B66Aa/B2a	4	6.717	4.9269	0.0038	2582
134.00	800 MHz 2X50W RRH w/ Filter	4	6.042	4.7738	0.0023	2468
127.00	Round Platform w/ Handrails	4	5.473	4.6177	0.0016	2780
119.00	Round Platform w/ Handrails	4	4.844	4.4363	0.0023	2859
116.00	Outdoor CBRS 20W RRH –Clip-on Antenna	4	4.613	4.3700	0.0024	2511

### Compression Checks

### Pole Design Data

Section No.	Elevation	Size	L	L <sub>u</sub>	Kl/r	A	P <sub>u</sub>	φP <sub>n</sub>	Ratio
	ft		ft	ft		in <sup>2</sup>	K	K	$\frac{P_u}{\phi P_n}$
L1	151.5 - 141 (1)	TP17.7841x17.1872x0.24	10.50	0.00	0.0	13.5581	-6.60	793.15	0.008
L2	141 - 120.33 (2)	TP31.557x17.7841x0.3059	20.67	0.00	0.0	30.7823	-15.19	1800.76	0.008
L3	120.33 - 111.19 (3)	TP33.028x31.557x0.3063	9.14	0.00	0.0	32.2730	-20.05	1887.97	0.011



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Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
L4	111.19 - 82.08 (4)	TP38.347x33.028x0.3141	29.11	0.00	0.0	38.4666	-25.20	2250.29	0.011
L5	82.08 - 70.06 (5)	TP39.711x38.347x0.3804	12.02	0.00	0.0	48.1756	-28.03	2818.27	0.010
L6	70.06 - 42.24 (6)	TP43.95x39.711x0.4014	27.82	0.00	0.0	56.2869	-35.42	3292.78	0.011
L7	42.24 - 32.71 (7)	TP45.064x43.95x0.4706	9.53	0.00	0.0	67.5738	-38.49	3953.07	0.010
L8	32.71 - 0 (8)	TP49.552x45.064x0.4906	32.71	0.00	0.0	77.5039	-49.94	4533.98	0.011

### Pole Bending Design Data

Section No.	Elevation ft	Size	M <sub>ux</sub> kip-ft	φM <sub>ux</sub> kip-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M <sub>uy</sub> kip-ft	φM <sub>uy</sub> kip-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
L1	151.5 - 141 (1)	TP17.7841x17.1872x0.24	55.179	355.165	0.155	0.000	355.165	0.000
L2	141 - 120.33 (2)	TP31.557x17.7841x0.3059	263.288	1338.433	0.197	0.000	1338.433	0.000
L3	120.33 - 111.19 (3)	TP33.028x31.557x0.3063	417.625	1443.525	0.289	0.000	1443.525	0.000
L4	111.19 - 82.08 (4)	TP38.347x33.028x0.3141	1039.125	1890.267	0.550	0.000	1890.267	0.000
L5	82.08 - 70.06 (5)	TP39.711x38.347x0.3804	1334.892	2624.083	0.509	0.000	2624.083	0.000
L6	70.06 - 42.24 (6)	TP43.95x39.711x0.4014	2086.850	3329.325	0.627	0.000	3329.325	0.000
L7	42.24 - 32.71 (7)	TP45.064x43.95x0.4706	2364.800	4308.633	0.549	0.000	4308.633	0.000
L8	32.71 - 0 (8)	TP49.552x45.064x0.4906	3380.292	5333.258	0.634	0.000	5333.258	0.000

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V <sub>u</sub> K	φV <sub>n</sub> K	Ratio $\frac{V_u}{\phi V_n}$	Actual T <sub>u</sub> kip-ft	φT <sub>n</sub> kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	151.5 - 141 (1)	TP17.7841x17.1872x0.24	7.61	237.94	0.032	0.271	367.203	0.001
L2	141 - 120.33 (2)	TP31.557x17.7841x0.3059	14.22	540.23	0.026	0.482	1485.058	0.000
L3	120.33 - 111.19 (3)	TP33.028x31.557x0.3063	18.52	566.39	0.033	0.110	1630.242	0.000
L4	111.19 - 82.08 (4)	TP38.347x33.028x0.3141	23.83	675.09	0.035	0.782	2258.500	0.000
L5	82.08 - 70.06 (5)	TP39.711x38.347x0.3804	25.40	845.48	0.030	0.782	2925.058	0.000
L6	70.06 - 42.24 (6)	TP43.95x39.711x0.4014	28.68	987.84	0.029	0.781	3784.067	0.000
L7	42.24 - 32.71 (7)	TP45.064x43.95x0.4706	29.67	1185.92	0.025	0.780	4651.850	0.000
L8	32.71 - 0 (8)	TP49.552x45.064x0.4906	32.42	1360.19	0.024	0.780	5870.033	0.000

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### Pole Interaction Design Data

Section No.	Elevation ft	Ratio	Ratio	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		$P_u$	$M_{ux}$	$M_{uy}$	$V_u$	$T_u$			
		$\phi P_n$	$\phi M_{ux}$	$\phi M_{uy}$	$\phi V_n$	$\phi T_n$			
L1	151.5 - 141 (1)	0.008	0.155	0.000	0.032	0.001	0.165	1.000	4.8.2 ✓
L2	141 - 120.33 (2)	0.008	0.197	0.000	0.026	0.000	0.206	1.000	4.8.2 ✓
L3	120.33 - 111.19 (3)	0.011	0.289	0.000	0.033	0.000	0.301	1.000	4.8.2 ✓
L4	111.19 - 82.08 (4)	0.011	0.550	0.000	0.035	0.000	0.562	1.000	4.8.2 ✓
L5	82.08 - 70.06 (5)	0.010	0.509	0.000	0.030	0.000	0.520	1.000	4.8.2 ✓
L6	70.06 - 42.24 (6)	0.011	0.627	0.000	0.029	0.000	0.638	1.000	4.8.2 ✓
L7	42.24 - 32.71 (7)	0.010	0.549	0.000	0.025	0.000	0.559	1.000	4.8.2 ✓
L8	32.71 - 0 (8)	0.011	0.634	0.000	0.024	0.000	0.645	1.000	4.8.2 ✓

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail	
L1	151.5 - 141	Pole	TP17.7841x17.1872x0.24	1	-6.60	793.15	16.5	Pass	
L2	141 - 120.33	Pole	TP31.557x17.7841x0.3059	2	-15.19	1800.76	20.6	Pass	
L3	120.33 - 111.19	Pole	TP33.028x31.557x0.3063	3	-20.05	1887.97	30.1	Pass	
L4	111.19 - 82.08	Pole	TP38.347x33.028x0.3141	4	-25.20	2250.29	56.2	Pass	
L5	82.08 - 70.06	Pole	TP39.711x38.347x0.3804	5	-28.03	2818.27	52.0	Pass	
L6	70.06 - 42.24	Pole	TP43.95x39.711x0.4014	6	-35.42	3292.78	63.8	Pass	
L7	42.24 - 32.71	Pole	TP45.064x43.95x0.4706	7	-38.49	3953.07	55.9	Pass	
L8	32.71 - 0	Pole	TP49.552x45.064x0.4906	8	-49.94	4533.98	64.5	Pass	
							Summary		
							Pole (L8)	64.5	Pass
							<b>RATING =</b>	<b>64.5</b>	<b>Pass</b>



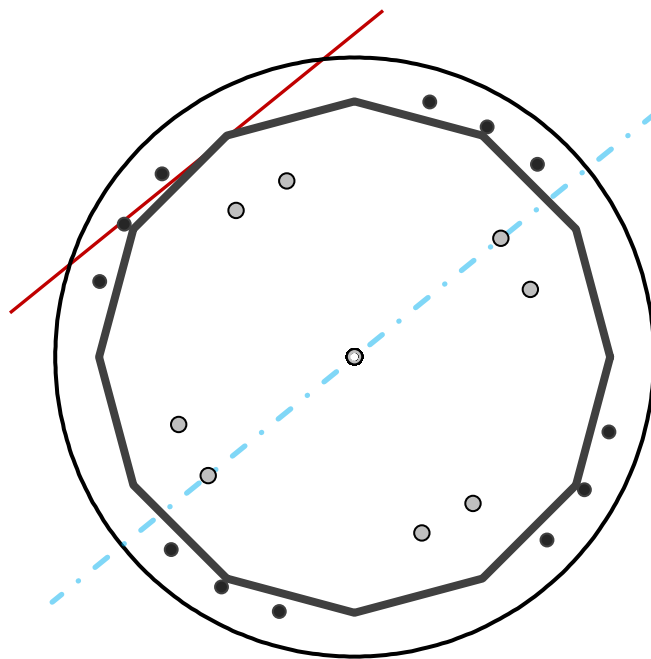
## Base Plate & Anchor Rod Analysis

Pole Dimensions		
Number of Sides	12	-
Diameter	51	in
Thickness	3/4	in
Orientation Offset	0	°

Base Reactions		
Moment, Mu	3,380.0	k-ft
Axial, Pu	50.0	k
Shear, Vu	32.0	k
Neutral Axis	39	°

Report Capacities		
Component	Capacity	Result
Base Plate	18%	Pass
Anchor Rods	80%	Pass
Dwyidag	-	-

Base Plate		
Shape	Round	-
Diameter, $\phi$	62	in
Thickness	2	in
Grade	A572-60	
Yield Strength, Fy	60	ksi
Tensile Strength, Fu	75	ksi
Clip	N/A	in
Orientation Offset		°
Anchor Rod Detail	c	$\eta=0.55$
Clear Distance	N/A	in
Applied Moment, Mu	283.0	k
Bending Stress, $\phi Mn$	1577.0	k



Original Anchor Rods		
Arrangement	Cluster	-
Quantity	12	-
Diameter, $\phi$	1 3/4	in
Bolt Circle	55	in
Grade	Other	
Yield Strength, Fy	128	ksi
Tensile Strength, Fu	150	ksi
Spacing	6.5	in
Orientation Offset	15	°
Applied Force, Pu	156.4	k
Anchor Rods, $\phi Pn$	213.7	k

Additional Anchor Rods		
Quantity	8	-
Diameter, $\phi$	2 1/4	in
Bolt Circle	39	in
Grade	A615-75	
Yield Strength, Fy	75	ksi
Tensile Strength, Fu	100	ksi
Bypass Base?	No	
Orientation Offset		°
Applied Force, Pu	190.2	k
Additional Rod, $\phi Pn$	243.6	k

# Calculations for Monopole Base Plate & Anchor Rod Analysis

## Reaction Distribution

Reaction	Shear Vu	Moment Mu	Factor
-	k	k-ft	-
Base Forces	32.0	3380.0	1.00
Anchor Rod Forces	28.9	2147.8	0.64
Additional Bolt (Grp1) Forces	3.1	1232.2	0.36
Additional Bolt (Grp2) Forces	0.0	0.0	0.00
Dywidag Forces	0.0	0.0	0.00
Stiffener Forces	0.0	0.0	0.00

## Geometric Properties

Section	Gross Area	Net Area	Individual Inertia	Threads per Inch	Moment of Inertia
-	in <sup>2</sup>	in <sup>2</sup>	in <sup>4</sup>	#	in <sup>4</sup>
Pole	117.0509	9.7542	1.8426		36967.22
Bolt	2.4053	1.8995	0.2871	5	8622.24
Bolt1	3.9761	3.2477	0.8393	4.5	4946.45
Bolt2	0.0000	0.0000	0.0000	0	0.00
Dywidag	0.0000	0.0000	0.0000		0.00
Stiffener	0.0000	0.0000	0.0000		0.00

### Base Plate

Shape	Round	-
Diameter, D	62	in
Thickness, t	2	in
Yield Strength, Fy	60	ksi
Tensile Strength, Fu	75	ksi
Base Plate Chord	35.256	in
Detail Type	c	-
Detail Factor	0.55	-
Clear Distance	N/A	-

### Anchor Rods

Anchor Rod Quantity, N	12	-
Rod Diameter, d	1.75	in
Bolt Circle, BC	55	in
Yield Strength, Fy	127.7	ksi
Tensile Strength, Fu	150	ksi
Applied Axial, Pu	156.4	k
Applied Shear, Vu	0.5	k
Compressive Capacity, $\phi P_n$	213.7	k
Tensile Capacity, $\phi R_{nt}$	0.732	OK
Interaction Capacity	0.736	OK

### External Base Plate

Chord Length AA	25.204	in
Additional AA	4.000	in
Section Modulus, Z	29.204	in <sup>3</sup>
Applied Moment, Mu	283.0	k-ft
Bending Capacity, $\phi M_n$	1577.0	k-ft
Capacity, Mu/ $\phi M_n$	0.179	OK
Chord Length AB	21.156	in
Additional AB	4.000	in
Section Modulus, Z	25.156	in <sup>3</sup>
Applied Moment, Mu	125.6	k-ft
Bending Capacity, $\phi M_n$	1358.4	k-ft
Capacity, Mu/ $\phi M_n$	0.092	OK

### Additional Bolt Group 1

Bolt Quantity, N	8	-
Bolt Diameter, d	2.25	in
Bolt Circle, BC	39	in
Yield Strength, Fy	75	ksi
Tensile Strength, Fu	100	ksi
Applied Axial, Pu	190.2	k
Applied Shear, Vu	2.0	k
Compressive Capacity, $\phi P_n$	243.6	k
Compressive Capacity, $\phi P_n$	0.781	OK
Interaction Capacity	0.796	OK

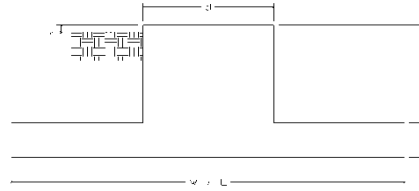
Bend Line Length	0.000	in
Additional Bend Line	0.000	in
Section Modulus, Z	0.000	in <sup>3</sup>
Applied Moment, Mu	#N/A	k-ft
Bending Capacity, $\phi M_n$	0.0	k-ft
Capacity, Mu/ $\phi M_n$		

### Internal Base Plate

Arc Length	0.000	in
Section Modulus, Z	0.000	in <sup>3</sup>
Moment Arm	0.000	in
Applied Moment, Mu	0.0	k-ft
Bending Capacity, $\phi M_n$	0.0	k-ft
Capacity, Mu/ $\phi M_n$		

Site Name: Brln-Berlin  
 Site Number: 302483  
 Engineering Number: 13678286  
 Engineer: GDH  
 Date: 06/30/21  
 Tower Type: MP

Program Last Updated: 10/17/2019



**Design Loads (Factored) - Analysis per TIA-222-H Standards**

Design / Analysis / Mapping:	Mapping	
Compression/Leg:	50	k
Total Shear:	32	k
Moment:	3380	k-ft
Tower + Appurtenance Weight:	50	k
Depth to Base of Foundation (l + t - h):	8	ft
Diameter of Pier (d):	7	ft
Height of Pier above Ground (h):	0.5	ft
Width of Pad (W):	11	ft
Length of Pad (L):	11	ft
Thickness of Pad (t):	2.6	ft
Tower Leg Center to Center:	0	ft
Number of Tower Legs:	1	-
Tower Center from Mat Center:	0	ft
Depth Below Ground Surface to Water Table:	99	ft
Unit Weight of Concrete:	150	pcf
Unit Weight of Soil Above Water Table:	135	pcf
Unit Weight of Water:	62.4	pcf
Unit Weight of Soil Below Water Table:	72.6	pcf
Friction Angle of Uplift:	35	°
Ultimate Coefficient of Shear Friction:	0.35	-
Ultimate Compressive Bearing Pressure:	26000	psf
Ultimate Passive Pressure on Pad Face:	500	psf
<b>Factored Moment Applied to Rock Anchors</b>	<b>3170</b>	<b>k-ft</b>
$\phi_{\text{Soil and Concrete Weight}}$ :	0.9	-
$\phi_{\text{Soil}}$ :	0.75	-

**Rock Anchor Usage**

Rock Anchor Resistance:	3360.0	k
Rock Anchor Tensile Resistance:	0.993	Result: OK

**Overturning Moment Usage**

Design OTM:	3652.0	k-ft
Weight of Soil and Concrete OTM Resistance:	141.4	k
OTM Resistance from Soil and Concrete:	777.6	k-ft
OTM Resistance from Tower:	229.2	k-ft
OTM Resistance from Soil Failure:	428.1	k-ft
OTM Resistance from Passive Pressure on Pad Face:	16.5	k-ft
OTM Resistance:	4476.3	k-ft
Design OTM / OTM Resistance:	0.816	Result: OK

**Soil Bearing Pressure Usage**

Total Weight (Foundation, Soil, Tower):	187.0	k
Factored Nominal Bearing Pressure:	19500	psf
Net Bearing Pressure/Factored Nominal Bearing Pressure:	0.19	Result: OK
Load Direction Controlling Design Bearing Pressure:	Diagonal to Pad Edge	

**Sliding Factor of Safety**

Total Factored Sliding Resistance:	58.7	k
Sliding Design / Sliding Resistance:	0.55	Result: OK