

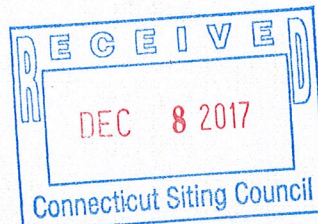


ORIGINAL

Aaron Meyers, Site Acquisition
c/o New Cingular Wireless, PCS LLC (AT&T)
Centerline Communications, LLC
95 Ryan Drive, Suite 1
Raynham, MA 02767
Mobile: (774) 420-4202
ameyers@clinellc.com

DATE December 4th, 2017

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



EM-CING-132-171208

RE: Notice of Exempt Modification // Site Number: CT5303
59 McGuire Road, South Windsor, CT 06074 (Site Name: South Windsor)
N 41.802992 // W 72.617211

Dear Ms. Bachman:

New Cingular Wireless, PCS, LLC ("AT&T") currently maintains nine (9) antennas at the 123-foot level of the existing 150-foot Monopole tower at 59 McGuire Road, South Windsor, CT 06074. The tower is owned by Crown Castle. The property is owned by G. Edward King. AT&T now intends to swap six (6) antennas for its LTE upgrade. These antennas would be installed at the 123-foot level of the tower. AT&T also intends to install six (6) remote radio units, three (3) surge arrestor, two (2) DC power lines and one (1) fiber line.

The current proposal involves an antenna swap only (6); six antennas will be added.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Carolyn Mirek, Mayor of South Windsor, CT, as well as the tower owner, Crown Castle and the ground owner, G. Edward King.

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

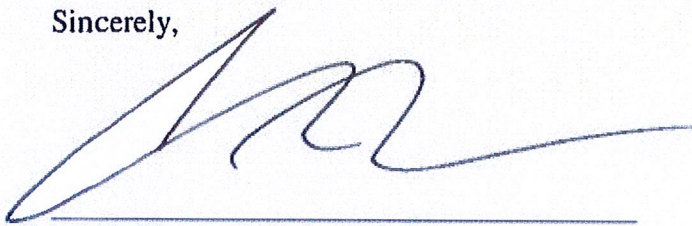
Attached to accommodate this filing are construction drawings dated September 5, 2017 by Hudson Design Group, LLC, a structural analysis dated August 11, 2017 by Paul J. Ford & Company and an Emissions Analysis Report dated October 13, 2017 by Centerline Communications, LLC.

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 as shown in the attached structural analysis by Paul J. Ford & Company, dated August 11, 2017.

For the foregoing reasons, AT&T 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,



Aaron Meyers, Site Acquisition
c/o New Cingular Wireless, PCS LLC (AT&T)
Centerline Communications, LLC
95 Ryan Drive, Suite 1
Raynham, MA 02767
Mobile: (774) 420-4202
ameyers@centerlincommunications.com

Attachments

cc: Carolyn Mirek - as elected official
Crown Castle - as tower owner
G. Edward King - as property owner

Aaron Meyers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Thursday, December 7, 2017 9:24 AM
To: Aaron Meyers
Subject: UPS Delivery Notification, Tracking Number 1Z9Y45030305562684



Your package has been delivered.

Delivery Date: Thursday, 12/07/2017
Delivery Time: 09:14 AM

At the request of CENTERLINE SITE ACQUISITION this notice alerts you that the status of the shipment listed below has changed.

Shipment Detail

Tracking Number:	<u>1Z9Y45030305562684</u>
Ship To:	Licensing Document Execution Crown Castle 2000 CORPORATE DR CANONSBURG, PA 15317 US
UPS Service:	UPS GROUND
Number of Packages:	1
Weight:	1.0 LBS
Delivery Location:	FRONT DESK BROWNFIELD



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Aaron Meyers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Wednesday, December 6, 2017 10:44 AM
To: Aaron Meyers
Subject: UPS Delivery Notification, Tracking Number 1Z9Y45030310757651



Your package has been delivered.

Delivery Date: Wednesday, 12/06/2017
Delivery Time: 10:36 AM

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Shipment Detail

Tracking Number:	<u>1Z9Y45030310757651</u>
Ship To:	Eric Barz Town Planner 275 BROAD ST WINDSOR, CT 06095 US
UPS Service:	UPS GROUND
Number of Packages:	1
Weight:	1.0 LBS
Delivery Location:	OFFICE MADISON



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Aaron Meyers

From: UPS Quantum View <pkginfo@ups.com>
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To: Aaron Meyers
Subject: UPS Delivery Notification, Tracking Number 1Z9Y45030302290661



Your package has been delivered.

Delivery Date: Wednesday, 12/06/2017
Delivery Time: 10:34 AM

At the request of CENTERLINE SITE ACQUISITION this notice alerts you that the status of the shipment listed below has changed.

Shipment Detail

Tracking Number:	<u>1Z9Y45030302290661</u>
Ship To:	Peter Souza Town Manager 275 BROAD ST WINDSOR, CT 06095 US
UPS Service:	UPS GROUND
Number of Packages:	1
Weight:	1.0 LBS
Delivery Location:	OFFICE ALBERT



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Aaron Meyers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Wednesday, December 6, 2017 10:38 AM
To: Aaron Meyers
Subject: UPS Delivery Notification, Tracking Number 1Z9Y45030300425671



Your package has been delivered.

Delivery Date: Wednesday, 12/06/2017
Delivery Time: 10:34 AM

At the request of CENTERLINE SITE ACQUISITION this notice alerts you that the status of the shipment listed below has changed.

Shipment Detail

Tracking Number:	<u>1Z9Y45030300425671</u>
Ship To:	Donald Trink Mayor of Windsor 275 BROAD ST WINDSOR, CT 06095 US
UPS Service:	UPS GROUND
Number of Packages:	1
Weight:	1.0 LBS
Delivery Location:	OFFICE ALBERT



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Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT5303

South Windsor - Burnham
59 McGuire Road
South Windsor, CT 6074

October 13, 2017

Centerline Communications Project Number: 950012-007

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	6.78 %



October 13, 2017

AT&T Mobility – New England
Attn: John Benedetto, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 06040

Emissions Analysis for Site: **CT5303 – South Windsor - Burnham**

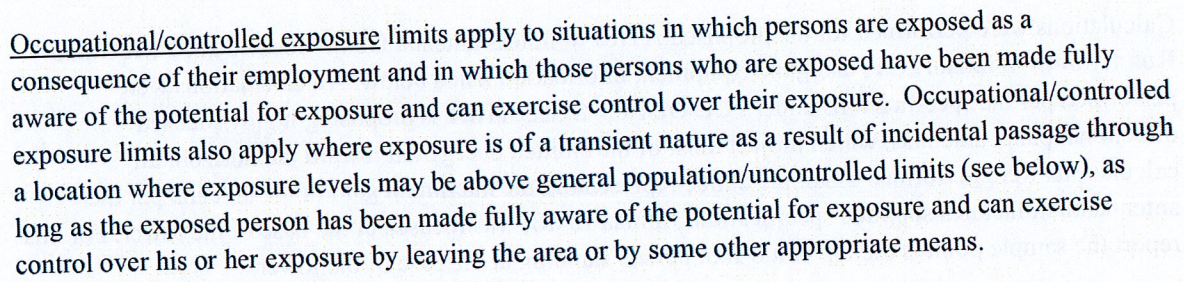
Centerline Communications, LLC ("Centerline") was directed to analyze the proposed AT&T facility located at **59 McGuire Road, South Windsor, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

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.

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limits for the 700 and 850 MHz Bands are approximately $467 \mu\text{W}/\text{cm}^2$ and $567 \mu\text{W}/\text{cm}^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) 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.





CALCULATIONS

Calculations were performed for the proposed AT&T Wireless antenna facility located at **59 McGuire Road, South Windsor, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
UMTS	850 MHz	2	30
UMTS	1900 MHz (PCS)	2	30
LTE	700 MHz	2	60
LTE	1900 MHz (PCS)	2	60
LTE	2300 MHz (WCS)	2	60

Table 1: Channel Data Table



The following antennas listed in *Table 2* were used in the modeling for transmission in the 700 MHz, 850 MHz, 1900 MHz (PCS) and 2300 MHz (WCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Powerwave 7770	123
A	2	CCI HPA-65R-BUU-H6	123
A	3	Quintel QS66512-2	123
B	1	Powerwave 7770	123
B	2	CCI HPA-65R-BUU-H8	123
B	3	CCI TPA-65R-LCUUUU-H8	123
C	1	Powerwave 7770	123
C	2	Commscope SBNHH-1D65A	123
C	3	Quintel QS46512-2	123

Table 2: Antenna Data

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



RESULTS

Per the calculations completed for the proposed AT&T configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.73
Antenna A2	CCI HPA-65R-BUU-H6	700 MHz / 1900 MHz (PCS)	11.95 / 14.75	4	240	5,462.56	2.00
Antenna A3	Quintel QS66512-2	2300 MHz (WCS)	14.85	2	120	3,665.91	0.96
Sector A Composite MPE%							3.69
Antenna B1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.73
Antenna B2	CCI HPA-65R-BUU-H8	700 MHz / 1900 MHz (PCS)	13.15 / 14.95	4	240	6,229.75	2.38
Antenna B3	CCI TPA-65R-LCUUUU-H8	2300 MHz (WCS)	14.45	2	120	3,343.35	0.88
Sector B Composite MPE%							3.99
Antenna C1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.73
Antenna C2	Commscope SBNHH-1D65A	700 MHz / 1900 MHz (PCS)	10.85 / 14.55	4	240	4,880.65	1.72
Antenna C3	Quintel QS46512-2	2300 MHz (WCS)	14.05	2	120	3,049.17	0.80
Sector C Composite MPE%							3.25

Table 3: AT&T Emissions Levels



The Following table (*table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum AT&T MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, the sector with the largest calculated MPE% is Sector B. *Table 5* below shows a summary for each AT&T Sector as well as the composite MPE value for the site.

Site Composite MPE%	
Carrier	MPE%
AT&T – Max Sector Value	3.99 %
Sprint	0.48 %
T-Mobile	2.31 %
Site Total MPE %:	6.78 %

Table 4: All Carrier MPE Contributions

AT&T Sector A Total:	3.69 %
AT&T Sector B Total:	3.99 %
AT&T Sector C Total:	3.25 %
Site Total:	6.78 %

Table 5: Site MPE Summary



FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated AT&T sector(s). For this site, the sector with the largest calculated MPE% is Sector B.

AT&T Frequency Band / Technology (Sector B)	# 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
AT&T 850 MHz UMTS	2	414.12	123	2.18	850 MHz	567	0.38%
AT&T 1900 MHz (PCS) UMTS	2	656.33	123	3.45	1900 MHz (PCS)	1000	0.34%
AT&T 700 MHz LTE	2	1,239.23	123	6.51	700 MHz	467	1.39%
AT&T 1900 MHz (PCS) LTE	2	1,875.65	123	9.85	1900 MHz (PCS)	1000	0.99%
AT&T 2300 MHz (WCS) LTE	2	1,671.67	123	8.78	2300 MHz (WCS)	1000	0.88%
						Total:	3.99%

Table 6: AT&T Maximum Sector MPE Power Values



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 AT&T 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:

AT&T Sector	Power Density Value (%)
Sector A:	3.69 %
Sector B:	3.99 %
Sector C:	3.25 %
AT&T Maximum Total (Sector B):	3.99 %
Site Total:	6.78 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **6.78 %** 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.

A handwritten signature in black ink, appearing to read "Scott Heffernan", is positioned above the contact information.

Scott Heffernan
RF Engineering Director
Centerline Communications, LLC
95 Ryan Drive, Suite 1
Raynham, MA 02767

Date: August 11, 2017

Marianne Dunst
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704)405-6580

Paul J. Ford and Company
250 East Broad St., Suite 600
Columbus, OH 43215
614-221-6679
mtimas@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	AT&T Mobility Co-Locate	
	Carrier Site Number:	CT5303
	Carrier Site Name:	South Windsor
Crown Castle Designation:	Crown Castle BU Number:	876327
	Crown Castle Site Name:	KINGS LOT
	Crown Castle JDE Job Number:	448329
	Crown Castle Work Order Number:	1442930
	Crown Castle Application Number:	397676 Rev. 0
Engineering Firm Designation:	Paul J. Ford and Company Project Number: 37517-2698.002.7805	
Site Data:	59 McGuire Road, SOUTH WINDSOR, Hartford County, CT Latitude 41° 48' 10.77", Longitude -72° 37' 1.96" 150 Foot - Monopole Tower	

Dear Marianne Dunst,

Paul J. Ford and Company is pleased to submit this "Structural Analysis Report" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 1068628, in accordance with application 397676, revision 0.

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

LC7: Existing + Reserved + Proposed Equipment

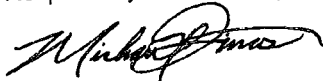
Sufficient Capacity

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

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 were used in this analysis.

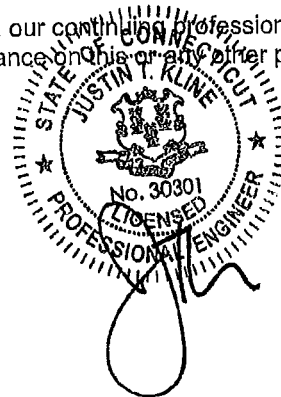
We at Paul J. Ford and Company appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:



Michael Timas, EI
Structural Designer

tnxTower Report - version 7.0.5.1



8.15.17

Date: **August 11, 2017**

Marianne Dunst
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704)405-6580

Paul J. Ford and Company
250 East Broad St., Suite 600
Columbus, OH 43215
614-221-6679
mtimas@pjfweb.com

Subject: Structural Analysis Report

Carrier Designation:

AT&T Mobility Co-Locate

Carrier Site Number:

CT5303

Carrier Site Name:

South Windsor

Crown Castle Designation:

Crown Castle BU Number:

876327

Crown Castle Site Name:

KINGS LOT

Crown Castle JDE Job Number:

448329

Crown Castle Work Order Number:

1442930

Crown Castle Application Number:

397676 Rev. 0

Engineering Firm Designation:

Paul J. Ford and Company Project Number: 37517-2698.002.7805

Site Data:

59 McGuire Road, SOUTH WINDSOR, Hartford County, CT
Latitude 41° 48' 10.77", Longitude -72° 37' 1.96"
150 Foot - Monopole Tower

Dear Marianne Dunst,

Paul J. Ford and Company is pleased to submit this "**Structural Analysis Report**" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 1068628, in accordance with application 397676, revision 0.

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

LC7: Existing + Reserved + Proposed Equipment

Sufficient Capacity

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

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 were used in this analysis.

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

Respectfully submitted by:

Michael Timas, EI
Structural Designer

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1) INTRODUCTION

This tower is a 150-ft Monopole tower designed by ROHN in December of 1996. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-E.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 were used in this analysis.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
122.0	123.0	1	cci antennas	HPA-65R-BUU-H6 w/ Mount Pipe	1 2	3/8 3/4	-
		1	cci antennas	HPA-65R-BUU-H8 w/ Mount Pipe			
		1	cci antennas	TPA-65R-LCUUUU-H8 w/ Mount Pipe			
		1	commscope	SBNHH-1D65A w/ Mount Pipe			
		1	quintel technology	QS46512-2 w/ Mount Pipe			
		1	quintel technology	QS66512-2 w/ Mount Pipe			
	122.0	3	ericsson	RRUS 32			
		3	ericsson	RRUS 32 B2			
		3	kaelus	DBC0061F1V51-2			
		1	raycap	DC6-48-60-18-8F			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
148.0	149.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-	1
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Side Arm Mount [SO 102-3]			
146.0	148.0	1	rfs celwave	APXV9ERR18-C-A20 w/ Mount Pipe	3 1	1-1/4 1	1
		2	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
	146.0	1	tower mounts	Platform Mount [LP 502-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
146.0	146.0	3	alcatel lucent	TD-RRH8x20-25	1	5/8	2
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
138.0	138.0	3	commscope	LNx-6515DS-VTM w/ Mount Pipe	7	1-5/8	1
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
		3	ericsson	RRUS 11 B12			
		1	tower mounts	Platform Mount [LP 1201-1]			
124.0	122.0	3	ericsson	RRUS 11	-	-	1
		1	tower mounts	Side Arm Mount [SO 102-3]			
122.0	123.0	3	powerwave technologies	7770.00 w/ Mount Pipe	-	-	3
		6	powerwave technologies	LGP2140X			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		1	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			
		1	kmw communications	AM-X-CD-14-65-00T-RET w/ Mount Pipe			
		1	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
	122.0	1	raycap	DC6-48-60-18-8F	2 1 12	3/4 3/8 1-1/4	1
		6	powerwave technologies	LGP2140X			
		1	tower mounts	T-Arm Mount [TA 602-3]			
13.0	14.0	1	lucent	KS24019-L112A	1	1/2	1
	13.0	1	tower mounts	Side Arm Mount [SO 701-1]			
12.0	13.0	1	lucent	KS24019-L112A	1	1/2	1
	12.0	1	tower mounts	Side Arm Mount [SO 701-1]			

- Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
-	-	-	-	-	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 07-11433G, 09/30/09	2192521	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Rohn, 34738SW, 12/19/96	1620564	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Rohn, 34738SW, 12/19/96	1619441	CCISITES
4-POST-MODIFICATION INSPECTION	Vertical Soultions, 080627.06, 11/11/08	2366960	CCISITES
4-POST-MODIFICATION INSPECTION	ETS, 160294, 5/3/2016	6250604	CCISITES

3.1) Analysis Method

tnxTower (version 7.0.5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 4) Monopole was modified in conformance with referenced modification drawings
- 5) In accordance with discussions with CCI Corporate Engineering: Based on the assumption that the monopole manufacturer (ROHN/PiRod) has designed the flange plates at splices to adequately develop the full capacity of the unreinforced shaft section using unpublished and/or proprietary methodologies, we are assuming that if our analysis shows that both the existing shaft and the existing flange bolts are at a usage capacity of 105% or less, then the existing flange plates are at a usage capacity of 105% or less and no additional analysis of the flange plate is required.
- 6) The shaft reinforcement and post installed anchors from document ID 2366960 were found to be ineffective and therefore not considered in this analysis

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P _{allow} (K)	% Capacity	Pass / Fail
L1	150 - 120	Pole	P24x0.25	1	-10.17	662.26	72.4	Pass
L2	120 - 90	Pole	30" x 0.375"	2	-15.37	1311.06	91.3	Pass
L3	90 - 78.04	Pole	36" x 0.375"	3	-17.83	1490.10	83.9	Pass
L4	78.04 - 60	Pole	RPS 36" x 0.51087"	4	-22.67	1947.97	88.5	Pass
L5	60 - 30	Pole	RPS 42" x 0.58495"	5	-33.05	2667.26	84.2	Pass
L6	30 - 7	Pole	RPS 42" x 0.65547"	6	-44.18	3045.79	95.3	Pass
L7	7 - 4	Pole	RPS 42" x 0.67553"	7	-45.41	3090.13	96.2	Pass
L8	4 - 0	Pole	RPS 42" x 0.82394"	8	-47.34	3593.36	83.4	Pass
							Summary	
						Pole (L7)	96.2	Pass
						Rating =	96.2	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	89.5	Pass
1	Base Plate	0	60.1	Pass
1	Base Foundation Structural Steel	0	29.3	Pass
1	Base Foundation Soil Interaction	0	82.8	Pass
1	Flange Connection	30	99.9	Pass
1	Flange Connection	60	91.0	Pass
1,2	Flange Connection	90	91.3	Pass
1,2	Flange Connection	120	72.4	Pass

Structure Rating (max from all components) =	99.9%
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Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) See Assumption #5

4.1) Recommendations

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

APPENDIX A
TNXTOWER OUTPUT

Tower Input Data

There is a pole section.

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

The following design criteria apply:

- 1) Tower is located in Hartford County, Connecticut.
- 2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
- 3) Basic wind speed of 97 mph.
- 4) Structure Class II.
- 5) Exposure Category C.
- 6) Topographic Category 1.
- 7) Crest Height 0.0000 ft.
- 8) Nominal ice thickness of 1.0000 in.
- 9) Ice thickness is considered to increase with height.
- 10) Ice density of 56.00 pcf.
- 11) A wind speed of 50 mph is used in combination with ice.
- 12) Temperature drop of 50 °F.
- 13) Deflections calculated using a wind speed of 60 mph.
- 14) A non-linear (P-delta) analysis was used.
- 15) Pressures are calculated at each section.
- 16) Stress ratio used in pole design is 1.
- 17) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	✓ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	✓ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
✓ Use Code Stress Ratios	Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
✓ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	✓ Bypass Mast Stability Checks	✓ Consider Feed Line Torque
Always Use Max Kz	✓ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	✓ Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist.
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Use TIA-222-G Tension Splice
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Exemption
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Poles
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	✓ Include Shear-Torsion Interaction
SR Members Are Concentric		Always Use Sub-Critical Flow
		Use Top Mounted Sockets

Pole Section Geometry

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L1	150.0000- 120.0000	30.0000	P24x0.25	A53-B-42 (42 ksi)	5.00
L2	115.0000- 85.0000	30.0000	30" x 0.375"	A53-B-42 (42 ksi)	5.00
L3	85.0000-73.0400	11.9600	36" x 0.375"	A53-B-42 (42 ksi)	5.00
L4	73.0400-55.0000	18.0400	RPS 36" x 0.51087"	Reinf 38.45 ksi (38 ksi)	5.00
L5	55.0000-25.0000	30.0000	RPS 42" x 0.58495"	Reinf 38.94 ksi (39 ksi)	5.00
L6	25.0000-2.0000	23.0000	RPS 42" x 0.65547"	Reinf 39.75 ksi	5.00

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L7	2.0000-1.0000	3.0000	RPS 42" x 0.67553"	(40 ksi) Reinf 39.15 ksi	5.00
L8	1.0000-3.0000	4.0000	RPS 42" x 0.82394"	(39 ksi) Reinf 37.46 ksi (37 ksi)	

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontal in	Double Angle Stitch Bolt Spacing Redundants in
L1 150.0000- 120.0000				1	1	1			
L2 120.0000- 90.0000				1	1	1			
L3 90.0000- 78.0400				1	1	1			
L4 78.0400- 60.0000				1	1	1			
L5 60.0000- 30.0000				1	1	1			
L6 30.0000- 7.0000				1	1	1			
L7 7.0000- 4.0000				1	1	1			
L8 4.0000- 0.0000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _A A _A ft ² /ft	Weight plf
HB114-1-08U4-M5J(1- 1/4)	C	No	CaAa (Out Of Face)	146.0000 - 0.0000	1	No Ice 1/2" Ice 1" Ice 0.1540 0.2540 0.3540	1.08 2.33 4.18
HB114-1-08U4-M5J(1- 1/4)	C	No	CaAa (Out Of Face)	146.0000 - 0.0000	2	No Ice 1/2" Ice 1" Ice 0.0000 0.0000 0.0000	1.08 2.33 4.18
MLE 14F x 8(1)	C	No	CaAa (Out Of Face)	146.0000 - 0.0000	1	No Ice 1/2" Ice 1" Ice 0.0000 0.0000 0.0000	0.77 1.69 3.21
HB058-M12-XXXF(5/8)	C	No	CaAa (Out Of Face)	146.0000 - 0.0000	1	No Ice 1/2" Ice 1" Ice 0.0000 0.0000 0.0000	0.24 1.06 2.49
***** AL7-50(1-5/8)	C	No	Inside Pole	138.0000 - 0.0000	6	No Ice 1/2" Ice 1" Ice 0.0000 0.0000 0.0000	0.52 0.52 0.52
MLE Hybrid 9Power/18Fiber RL 2(1-5/8) *****	C	No	CaAa (Out Of Face)	138.0000 - 0.0000	1	No Ice 1/2" Ice 1" Ice 0.1625 0.2625 0.3625	1.07 2.37 4.28
2" Conduit (1 1/2" EMT)	C	No	Inside Pole	122.0000 - 0.0000	2	No Ice 1/2" Ice 1" Ice 0.0000 0.0000 0.0000	1.16 1.16 1.16
LDF6-50A(1-1/4)	C	No	Inside Pole	122.0000 - 0.0000	12	No Ice 1/2" Ice 1" Ice 0.0000 0.0000 0.0000	0.60 0.60 0.60
FB-L98B-002- 75000(3/8)	C	No	Inside Pole	122.0000 - 0.0000	1	No Ice 1/2" Ice 1" Ice 0.0000 0.0000 0.0000	0.06 0.06 0.06
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	122.0000 - 0.0000	2	No Ice 1/2" Ice 1" Ice 0.0000 0.0000 0.0000	0.58 0.58 0.58

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C _A A _A ft ² /ft	Weight plf
FB-L98B-002-75000(3/8)	C	No	Inside Pole	122.0000 - 0.0000	1	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	122.0000 - 0.0000	2	No Ice	0.0000	0.58
						1/2" Ice	0.0000	0.58
						1" Ice	0.0000	0.58

LDF4-50A(1/2)	C	No	Inside Pole	13.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15

LDF4-50A(1/2)	C	No	Inside Pole	12.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15

1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	15.0000 - 0.0000	1	No Ice	0.2083	0.00
						1/2" Ice	0.3194	0.00
						1" Ice	0.4306	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	29.5000 - 1.0000	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	60.0000 - 30.0000	1	No Ice	0.2083	0.00
						1/2" Ice	0.3194	0.00
						1" Ice	0.4306	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	80.0000 - 60.0000	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section n	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	150.0000-120.0000	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	6.929	0.21
L2	120.0000-90.0000	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	9.495	0.61
L3	90.0000-78.0400	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	4.112	0.24
L4	78.0400-60.0000	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	8.716	0.37
L5	60.0000-30.0000	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	15.745	0.61
L6	30.0000-7.0000	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	12.696	0.47
L7	7.0000-4.0000	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	2.075	0.06
L8	4.0000-0.0000	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	2.599	0.08

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section n	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	150.0000-120.0000	A	2.303	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L2	120.0000- 90.0000	C A B C	2.245	0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000	0.000 0.000 0.000 36.440	27.192 0.000 0.000 0.000	1.82 0.00 0.00 2.48
L3	90.0000-78.0400	A B C	2.196	0.000 0.000 0.000	0.000 0.000 0.000	0.000 0.000 0.000	0.000 0.000 15.574	0.00 0.00 0.96
L4	78.0400-60.0000	A B C	2.153	0.000 0.000 0.000	0.000 0.000 0.000	0.000 0.000 0.000	0.000 0.000 32.885	0.00 0.00 1.40
L5	60.0000-30.0000	A B C	2.063	0.000 0.000 0.000	0.000 0.000 0.000	0.000 0.000 0.000	0.000 0.000 54.254	0.00 0.00 2.19
L6	30.0000-7.0000	A B C	1.888	0.000 0.000 0.000	0.000 0.000 0.000	0.000 0.000 0.000	0.000 0.000 42.855	0.00 0.00 1.52
L7	7.0000-4.0000	A B C	1.672	0.000 0.000 0.000	0.000 0.000 0.000	0.000 0.000 0.000	0.000 0.000 6.310	0.00 0.00 0.18
L8	4.0000-0.0000	A B C	1.511	0.000 0.000 0.000	0.000 0.000 0.000	0.000 0.000 0.000	0.000 0.000 7.368	0.00 0.00 0.22

Feed Line Center of Pressure

Section	Elevation ft	CP _X in	CP _Z in	CP _X Ice in	CP _Z Ice in
L1	150.0000- 120.0000	-0.2690	0.1553	-0.7157	0.4132
L2	120.0000-90.0000	-0.3649	0.2107	-0.9647	0.5570
L3	90.0000-78.0400	-0.4007	0.2313	-1.0871	0.6276
L4	78.0400-60.0000	-0.5406	0.3121	-1.3710	0.7915
L5	60.0000-30.0000	-0.5929	0.3423	-1.4547	0.8399
L6	30.0000-7.0000	-0.6194	0.3576	-1.4920	0.8614
L7	7.0000-4.0000	-0.7501	0.4331	-1.6258	0.9387
L8	4.0000-0.0000	-0.7120	0.4111	-1.4971	0.8644

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
(2) PCS 1900MHz 4x45W- 65MHz	A	From Leg	1.0000 0.00 1.00	0.00	148.0000	No Ice 2.3218 1/2" 2.5266 Ice 2.7388	2.2381 2.4407 2.6507	0.06 0.08 0.11
PCS 1900MHz 4x45W- 65MHz	B	From Leg	1.0000 0.00 1.00	0.00	148.0000	No Ice 2.3218 1/2" 2.5266 Ice 2.7388	2.2381 2.4407 2.6507	0.06 0.08 0.11
800MHz 2X50W RRH W/FILTER	B	From Leg	1.0000 0.00 1.00	0.00	148.0000	No Ice 2.0583 1/2" 2.2398 Ice 2.4287	1.9317 2.1087 2.2931	0.06 0.09 0.11
(2) 800MHz 2X50W RRH W/FILTER	C	From Leg	1.0000 0.00 1.00	0.00	148.0000	No Ice 2.0583 1/2" 2.2398 Ice 2.4287	1.9317 2.1087 2.2931	0.06 0.09 0.11
2.375" OD x 4" Mount Pipe	A	From Leg	0.0000 0.00 0.00	0.00	148.0000	No Ice 0.8657 1/2" 1.1106 Ice 1.3648	0.8657 1.1106 1.3648	0.02 0.03 0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
2.375" OD x 4' Mount Pipe	B	From Leg	0.0000 0.00 0.00	0.00	148.0000	1" Ice No Ice 1/2" Ice	0.8657 1.1106 1.3648	0.8657 1.1106 1.3648	0.02 0.03 0.04
2.375" OD x 4' Mount Pipe	C	From Leg	0.0000 0.00 0.00	0.00	148.0000	1" Ice No Ice 1/2" Ice	0.8657 1.1106 1.3648	0.8657 1.1106 1.3648	0.02 0.03 0.04
Side Arm Mount [SO 102-3]	C	None		0.00	148.0000	1" Ice No Ice 1/2" Ice	3.0000 3.4800 3.9600	3.0000 3.4800 3.9600	0.08 0.11 0.14

APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.00	146.0000	1" Ice No Ice 1/2" Ice	6.5799 7.0306 7.4733	4.9591 5.7544 6.4723	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.00	146.0000	1" Ice No Ice 1/2" Ice	6.5799 7.0306 7.4733	4.9591 5.7544 6.4723	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.00	146.0000	1" Ice No Ice 1/2" Ice	6.5799 7.0306 7.4733	4.9591 5.7544 6.4723	0.08 0.13 0.19
TD-RRH8x20-25	A	From Leg	4.0000 0.00 2.00	0.00	146.0000	1" Ice No Ice 1/2" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.07 0.10 0.13
TD-RRH8x20-25	B	From Leg	4.0000 0.00 2.00	0.00	146.0000	1" Ice No Ice 1/2" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.07 0.10 0.13
TD-RRH8x20-25	C	From Leg	4.0000 0.00 2.00	0.00	146.0000	1" Ice No Ice 1/2" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.07 0.10 0.13
APXV9ERR18-C-A20 w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.00	146.0000	1" Ice No Ice 1/2" Ice	8.2619 8.8215 9.3462	7.4708 8.6564 9.5559	0.09 0.16 0.24
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.00	146.0000	1" Ice No Ice 1/2" Ice	8.2619 8.8215 9.3462	6.9458 8.1266 9.0212	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.00	146.0000	1" Ice No Ice 1/2" Ice	8.2619 8.8215 9.3462	6.9458 8.1266 9.0212	0.08 0.15 0.23
Platform Mount [LP 502-1]	C	None		0.00	146.0000	1" Ice No Ice 1/2" Ice	32.3472 45.6677 58.9882	32.3472 45.6677 58.9882	0.93 1.19 1.46

ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	138.0000	1" Ice No Ice 1/2" Ice	6.3292 6.7751 7.2137	5.6424 6.4259 7.1313	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	138.0000	1" Ice No Ice 1/2" Ice	6.3292 6.7751 7.2137	5.6424 6.4259 7.1313	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.0000 0.00	0.00	138.0000	1" Ice No Ice 1/2"	6.3292 6.7751	5.6424 6.4259	0.11 0.17

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
			0.00			Ice	7.2137	7.1313	0.23
						1" Ice			
ERICSSON AIR 21 B4A	A	From Leg	4.0000	0.00	138.0000	No Ice	6.3186	5.6334	0.11
B2P w/ Mount Pipe			0.00			1/2"	6.7646	6.4160	0.17
			0.00			Ice	7.2032	7.1208	0.23
						1" Ice			
ERICSSON AIR 21 B4A	B	From Leg	4.0000	0.00	138.0000	No Ice	6.3186	5.6334	0.11
B2P w/ Mount Pipe			0.00			1/2"	6.7646	6.4160	0.17
			0.00			Ice	7.2032	7.1208	0.23
						1" Ice			
ERICSSON AIR 21 B4A	C	From Leg	4.0000	0.00	138.0000	No Ice	6.3186	5.6334	0.11
B2P w/ Mount Pipe			0.00			1/2"	6.7646	6.4160	0.17
			0.00			Ice	7.2032	7.1208	0.23
						1" Ice			
LNx-6515DS-VTM w/	A	From Leg	4.0000	0.00	138.0000	No Ice	11.6828	9.8418	0.08
Mount Pipe			0.00			1/2"	12.4043	11.3657	0.17
			0.00			Ice	13.1351	12.9138	0.27
						1" Ice			
LNx-6515DS-VTM w/	B	From Leg	4.0000	0.00	138.0000	No Ice	11.6828	9.8418	0.08
Mount Pipe			0.00			1/2"	12.4043	11.3657	0.17
			0.00			Ice	13.1351	12.9138	0.27
						1" Ice			
LNx-6515DS-VTM w/	C	From Leg	4.0000	0.00	138.0000	No Ice	11.6828	9.8418	0.08
Mount Pipe			0.00			1/2"	12.4043	11.3657	0.17
			0.00			Ice	13.1351	12.9138	0.27
						1" Ice			
KRY 112 144/1	A	From Leg	4.0000	0.00	138.0000	No Ice	0.3500	0.1750	0.01
			0.00			1/2"	0.4259	0.2343	0.01
			0.00			Ice	0.5093	0.3009	0.02
						1" Ice			
KRY 112 144/1	B	From Leg	4.0000	0.00	138.0000	No Ice	0.3500	0.1750	0.01
			0.00			1/2"	0.4259	0.2343	0.01
			0.00			Ice	0.5093	0.3009	0.02
						1" Ice			
KRY 112 144/1	C	From Leg	4.0000	0.00	138.0000	No Ice	0.3500	0.1750	0.01
			0.00			1/2"	0.4259	0.2343	0.01
			0.00			Ice	0.5093	0.3009	0.02
						1" Ice			
RRUS 11 B12	A	From Leg	4.0000	0.00	138.0000	No Ice	2.8333	1.1821	0.05
			0.00			1/2"	3.0426	1.3299	0.07
			0.00			Ice	3.2593	1.4848	0.10
						1" Ice			
RRUS 11 B12	B	From Leg	4.0000	0.00	138.0000	No Ice	2.8333	1.1821	0.05
			0.00			1/2"	3.0426	1.3299	0.07
			0.00			Ice	3.2593	1.4848	0.10
						1" Ice			
RRUS 11 B12	C	From Leg	4.0000	0.00	138.0000	No Ice	2.8333	1.1821	0.05
			0.00			1/2"	3.0426	1.3299	0.07
			0.00			Ice	3.2593	1.4848	0.10
						1" Ice			
Platform Mount [LP 1201-1]	C	None		0.00	138.0000	No Ice	23.1000	23.1000	2.10
						1/2"	26.8000	26.8000	2.50
						Ice	30.5000	30.5000	2.90
						1" Ice			

RRUS 11	A	From Leg	1.0000	0.00	124.0000	No Ice	2.7908	1.1923	0.05
			0.00			1/2"	2.9984	1.3395	0.07
			0.00			Ice	3.2134	1.4957	0.10
						1" Ice			
RRUS 11	B	From Leg	1.0000	0.00	124.0000	No Ice	2.7908	1.1923	0.05
			0.00			1/2"	2.9984	1.3395	0.07
			0.00			Ice	3.2134	1.4957	0.10
						1" Ice			
RRUS 11	C	From Leg	1.0000	0.00	124.0000	No Ice	2.7908	1.1923	0.05
			0.00			1/2"	2.9984	1.3395	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
			0.00						
Side Arm Mount [SO 102-3]	C	None		0.00	124.0000	Ice 1" Ice No Ice 1/2" Ice 1" Ice	3.2134 3.0000 3.4800 3.9600	1.4957 3.0000 3.4800 3.9600	0.10 0.08 0.11 0.14

QS46512-2 w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.00	122.0000	No Ice 1/2" Ice 1" Ice	5.7906 6.2070 6.6235	5.8760 6.5786 7.2517	0.12 0.18 0.24
QS66512-2 w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.00	122.0000	No Ice 1/2" Ice 1" Ice	8.3708 8.9314 9.4571	8.4625 9.6573 10.5478	0.14 0.21 0.30
SBNHH-1D65A w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.00	122.0000	No Ice 1/2" Ice 1" Ice	6.1829 6.6201 7.0525	5.2399 6.0141 6.7168	0.05 0.11 0.17
HPA-65R-BUU-H6 w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.00	122.0000	No Ice 1/2" Ice 1" Ice	9.8953 10.4700 11.0098	8.1125 9.3041 10.2095	0.08 0.16 0.25
HPA-65R-BUU-H8 w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.00	122.0000	No Ice 1/2" Ice 1" Ice	13.2134 13.8986 14.5871	9.5823 11.0517 12.4963	0.10 0.20 0.30
TPA-65R-LCUUUU-H8 w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.00	122.0000	No Ice 1/2" Ice 1" Ice	13.5353 14.2380 14.9495	10.9597 12.4861 14.0367	0.11 0.22 0.33
DC6-48-60-18-8F	A	From Leg	4.0000 0.00 0.00	0.00	122.0000	No Ice 1/2" Ice 1" Ice	0.9167 1.4583 1.6431	0.9167 1.4583 1.6431	0.02 0.04 0.06
RRUS 32 B2	A	From Leg	4.0000 0.00 0.00	0.00	122.0000	No Ice 1/2" Ice 1" Ice	2.7313 2.9531 3.1823	1.6681 1.8552 2.0493	0.05 0.07 0.10
RRUS 32 B2	B	From Leg	4.0000 0.00 0.00	0.00	122.0000	No Ice 1/2" Ice 1" Ice	2.7313 2.9531 3.1823	1.6681 1.8552 2.0493	0.05 0.07 0.10
RRUS 32 B2	C	From Leg	4.0000 0.00 0.00	0.00	122.0000	No Ice 1/2" Ice 1" Ice	2.7313 2.9531 3.1823	1.6681 1.8552 2.0493	0.05 0.07 0.10
RRUS 32	A	From Leg	4.0000 0.00 0.00	0.00	122.0000	No Ice 1/2" Ice 1" Ice	2.8571 3.0830 3.3163	1.7766 1.9677 2.1658	0.06 0.08 0.10
RRUS 32	B	From Leg	4.0000 0.00 0.00	0.00	122.0000	No Ice 1/2" Ice 1" Ice	2.8571 3.0830 3.3163	1.7766 1.9677 2.1658	0.06 0.08 0.10
RRUS 32	C	From Leg	4.0000 0.00 0.00	0.00	122.0000	No Ice 1/2" Ice 1" Ice	2.8571 3.0830 3.3163	1.7766 1.9677 2.1658	0.06 0.08 0.10
DBC0061F1V51-2	A	From Leg	4.0000 0.00 0.00	0.00	122.0000	No Ice 1/2" Ice 1" Ice	0.2133 0.2793 0.3526	0.4133 0.4959 0.5859	0.01 0.02 0.02
DBC0061F1V51-2	B	From Leg	4.0000 0.00	0.00	122.0000	No Ice 1/2"	0.2133 0.2793	0.4133 0.4959	0.01 0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _{AA} A _A Front ft ²	C _{AA} A _A Side ft ²	Weight K
			0.00						
DBC0061F1V51-2	C	From Leg	4.0000 0.00 0.00	0.00	122.0000	Ice 1" Ice No Ice	0.3526 0.2133 0.2793	0.5859 0.4133 0.4959	0.02 0.01 0.02
						1/2" Ice	0.3526	0.5859	0.02
7770.00 w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.00	122.0000	1" Ice No Ice 1/2"	5.7460 6.1791 6.6067	4.2543 5.0137 5.7109	0.06 0.10 0.16
7770.00 w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.00	122.0000	1" Ice No Ice 1/2"	5.7460 6.1791 6.6067	4.2543 5.0137 5.7109	0.06 0.10 0.16
7770.00 w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.00	122.0000	1" Ice No Ice 1/2"	5.7460 6.1791 6.6067	4.2543 5.0137 5.7109	0.06 0.10 0.16
(2) LGP2140X	B	From Leg	4.0000 0.00 1.00	0.00	122.0000	1" Ice No Ice 1/2"	1.0800 1.2137 1.3548	0.3580 0.4536 0.5563	0.01 0.02 0.03
(4) LGP2140X	C	From Leg	4.0000 0.00 1.00	0.00	122.0000	1" Ice No Ice 1/2"	1.0800 1.2137 1.3548	0.3580 0.4536 0.5563	0.01 0.02 0.03
DC6-48-60-18-8F	A	From Leg	4.0000 0.00 1.00	0.00	122.0000	1" Ice No Ice 1/2"	0.9167 1.4583 1.6431	0.9167 1.4583 1.6431	0.02 0.04 0.06
T-Arm Mount [TA 602-3]	C	None		0.00	122.0000	1" Ice No Ice 1/2"	11.5900 15.4400 19.2900	11.5900 15.4400 19.2900	0.77 0.99 1.21
*****						Ice			
KS24019-L112A	A	From Leg	4.0000 0.00 1.00	0.00	13.0000	1" Ice No Ice 1/2"	0.1407 0.1979 0.2621	0.1407 0.1979 0.2621	0.01 0.01 0.01
Side Arm Mount [SO 701-1]	A	None		0.00	13.0000	1" Ice No Ice 1/2"	0.8500 1.1400 1.4300	1.6700 2.3400 3.0100	0.07 0.08 0.09
*****						Ice			
KS24019-L112A	A	From Leg	4.0000 0.00 1.00	0.00	12.0000	1" Ice No Ice 1/2"	0.1407 0.1979 0.2621	0.1407 0.1979 0.2621	0.01 0.01 0.01
Side Arm Mount [SO 701-1]	C	None		0.00	12.0000	1" Ice No Ice 1/2"	0.8500 1.1400 1.4300	1.6700 2.3400 3.0100	0.07 0.08 0.09
*****						Ice			
(3) Bridge Stiffener (138.5" x 15.5" x 1.25")	C	None		0.00	30.0000	1" Ice No Ice 1/2"	2.4045 3.7047 5.0172	21.8330 22.7112 23.5969	0.55 0.63 0.72
						Ice			

Tower Pressures - No Ice

$$G_H = 1.100$$

Section Elevation	z	K _Z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	ft ²		ft ²	ft ²	ft ²			
L1 150.0000- 120.0000	135.0000	1.348	30.85	60.000	A	0.000	60.000	60.000	100.00	0.000	0.000
					B	0.000	60.000		100.00	0.000	0.000
					C	0.000	60.000		100.00	0.000	6.929
L2 120.0000- 90.0000	105.0000	1.279	29.26	75.000	A	0.000	75.000	75.000	100.00	0.000	0.000
					B	0.000	75.000		100.00	0.000	0.000
					C	0.000	75.000		100.00	0.000	9.495
L3 90.0000- 78.0400	84.0200	1.22	27.92	35.880	A	0.000	35.880	35.880	100.00	0.000	0.000
					B	0.000	35.880		100.00	0.000	0.000
					C	0.000	35.880		100.00	0.000	4.112
L4 78.0400- 60.0000	69.0200	1.171	26.79	54.120	A	0.000	54.120	54.120	100.00	0.000	0.000
					B	0.000	54.120		100.00	0.000	0.000
					C	0.000	54.120		100.00	0.000	8.716
L5 60.0000- 30.0000	45.0000	1.07	24.48	105.000	A	0.000	105.000	105.000	100.00	0.000	0.000
				0	B	0.000	105.000		100.00	0.000	0.000
					C	0.000	105.000		100.00	0.000	15.745
L6 30.0000- 7.0000	18.5000	0.887	20.30	80.500	A	0.000	80.500	80.500	100.00	0.000	0.000
					B	0.000	80.500		100.00	0.000	0.000
					C	0.000	80.500		100.00	0.000	12.696
L7 7.0000- 4.0000	5.5000	0.85	19.45	10.500	A	0.000	10.500	10.500	100.00	0.000	0.000
					B	0.000	10.500		100.00	0.000	0.000
					C	0.000	10.500		100.00	0.000	2.075
L8 4.0000- 0.0000	2.0000	0.85	19.45	14.000	A	0.000	14.000	14.000	100.00	0.000	0.000
					B	0.000	14.000		100.00	0.000	0.000
					C	0.000	14.000		100.00	0.000	2.599

Tower Pressure - With Ice

$$G_H = 1.100$$

Section Elevation	z	K _Z	q _z	t _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	in	ft ²		ft ²	ft ²	ft ²			
L1 150.0000- 120.0000	135.0000	1.348	8.20	2.3026	71.513	A	0.000	71.513	71.513	100.00	0.000	0.000
						B	0.000	71.513		100.00	0.000	0.000
						C	0.000	71.513		100.00	0.000	27.192
L2 120.0000- 90.0000	105.0000	1.279	7.77	2.2454	86.227	A	0.000	86.227	86.227	100.00	0.000	0.000
						B	0.000	86.227		100.00	0.000	0.000
						C	0.000	86.227		100.00	0.000	36.440
L3 90.0000- 78.0400	84.0200	1.22	7.42	2.1959	40.257	A	0.000	40.257	40.257	100.00	0.000	0.000
						B	0.000	40.257		100.00	0.000	0.000
						C	0.000	40.257		100.00	0.000	15.574
L4 78.0400- 60.0000	69.0200	1.171	7.12	2.1532	60.594	A	0.000	60.594	60.594	100.00	0.000	0.000
						B	0.000	60.594		100.00	0.000	0.000
						C	0.000	60.594		100.00	0.000	32.885
L5 60.0000- 30.0000	45.0000	1.07	6.50	2.0630	115.315	A	0.000	115.315	115.315	100.00	0.000	0.000
						B	0.000	115.315		100.00	0.000	0.000
						C	0.000	115.315		100.00	0.000	54.254
L6 30.0000- 7.0000	18.5000	0.887	5.39	1.8875	87.736	A	0.000	87.736	87.736	100.00	0.000	0.000
						B	0.000	87.736		100.00	0.000	0.000
						C	0.000	87.736		100.00	0.000	42.855
L7 7.0000- 4.0000	5.5000	0.85	5.17	1.6719	11.336	A	0.000	11.336	11.336	100.00	0.000	0.000
						B	0.000	11.336		100.00	0.000	0.000
						C	0.000	11.336		100.00	0.000	6.310
L8 4.0000- 0.0000	2.0000	0.85	5.17	1.5111	15.007	A	0.000	15.007	15.007	100.00	0.000	0.000
						B	0.000	15.007		100.00	0.000	0.000
						C	0.000	15.007		100.00	0.000	7.368

Tower Pressure - Service

$$G_H = 1.100$$

Section Elevation ft	z ft	K _z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 150.0000- 120.0000	135.0000	1.348	10.56	60.000	A	0.000	60.000	60.000	100.00	0.000	0.000
					B	0.000	60.000		100.00	0.000	0.000
					C	0.000	60.000		100.00	0.000	0.000
L2 120.0000- 90.0000	105.0000	1.279	10.02	75.000	A	0.000	75.000	75.000	100.00	0.000	6.929
					B	0.000	75.000		100.00	0.000	0.000
					C	0.000	75.000		100.00	0.000	0.000
L3 90.0000- 78.0400	84.0200	1.22	9.56	35.880	A	0.000	35.880	35.880	100.00	0.000	9.495
					B	0.000	35.880		100.00	0.000	0.000
					C	0.000	35.880		100.00	0.000	0.000
L4 78.0400- 60.0000	69.0200	1.171	9.17	54.120	A	0.000	54.120	54.120	100.00	0.000	4.112
					B	0.000	54.120		100.00	0.000	0.000
					C	0.000	54.120		100.00	0.000	0.000
L5 60.0000- 30.0000	45.0000	1.07	8.38	105.00 0	A	0.000	105.000	105.000	100.00	0.000	8.716
					B	0.000	105.000		100.00	0.000	0.000
					C	0.000	105.000		100.00	0.000	0.000
L6 30.0000- 7.0000	18.5000	0.887	6.95	80.500	A	0.000	80.500	80.500	100.00	0.000	15.745
					B	0.000	80.500		100.00	0.000	0.000
					C	0.000	80.500		100.00	0.000	0.000
L7 7.0000- 4.0000	5.5000	0.85	6.66	10.500	A	0.000	10.500	10.500	100.00	0.000	12.696
					B	0.000	10.500		100.00	0.000	0.000
					C	0.000	10.500		100.00	0.000	0.000
L8 4.0000- 0.0000	2.0000	0.85	6.66	14.000	A	0.000	14.000	14.000	100.00	0.000	2.075
					B	0.000	14.000		100.00	0.000	0.000
					C	0.000	14.000		100.00	0.000	2.599

Load Combinations

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

Comb. No.	Description
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	150 - 120	Pole	Max Tension	8	0.00	0.00	0.00
			Max. Compression	26	-32.85	3.39	-2.74
			Max. Mx	20	-10.17	279.81	-0.56
			Max. My	14	-10.21	0.54	-278.39
			Max. Vy	20	-17.58	279.81	-0.56
			Max. Vx	14	17.32	0.54	-278.39
			Max. Torque	11			-1.83
L2	120 - 90	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.39	6.10	-4.35
			Max. Mx	20	-15.38	852.10	-4.19
			Max. My	14	-15.41	4.26	-842.80
			Max. Vy	20	-20.50	852.10	-4.19
			Max. Vx	14	20.24	4.26	-842.80
			Max. Torque	11			-2.35
L3	90 - 78.04	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-46.67	7.28	-5.05
			Max. Mx	20	-17.84	1104.74	-5.64
			Max. My	14	-17.86	5.75	-1092.29
			Max. Vy	20	-21.74	1104.74	-5.64
			Max. Vx	14	21.48	5.75	-1092.29
			Max. Torque	13			-2.63
L4	78.04 - 60	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54.15	8.98	-6.04
			Max. Mx	20	-22.67	1515.66	-7.82
			Max. My	14	-22.69	7.99	-1498.46
			Max. Vy	20	-23.78	1515.66	-7.82
			Max. Vx	14	23.52	7.99	-1498.46
			Max. Torque	13			-3.24
L5	60 - 30	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-69.11	11.91	-7.75
			Max. Mx	20	-33.05	2281.83	-11.44
			Max. My	14	-33.06	11.73	-2256.72
			Max. Vy	20	-27.21	2281.83	-11.44
			Max. Vx	14	26.95	11.73	-2256.72
			Max. Torque	13			-4.42
L6	30 - 7	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-84.47	13.73	-8.60
			Max. Mx	20	-44.18	2990.40	-14.10
			Max. My	14	-44.18	14.55	-2959.25
			Max. Vy	20	-31.78	2990.40	-14.10
			Max. Vx	14	31.52	14.55	-2959.25
			Max. Torque	13			-5.18
L7	7 - 4	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-86.00	13.93	-8.72

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L8	4 - 0	Pole	Max. Mx	20	-45.41	3086.03	-14.45
			Max. My	14	-45.41	14.91	-3054.11
			Max. Vy	20	-32.00	3086.03	-14.45
			Max. Vx	14	31.75	14.91	-3054.11
			Max. Torque	13			-5.31
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-88.30	14.17	-8.86
			Max. Mx	20	-47.34	3214.59	-14.91
			Max. My	14	-47.34	15.39	-3181.66
			Max. Vy	20	-32.29	3214.59	-14.91
			Max. Vx	14	32.04	15.39	-3181.66
			Max. Torque	13			-5.46

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	88.30	-0.00	0.00
	Max. H _x	21	35.51	32.28	-0.11
	Max. H _z	2	47.35	-0.11	32.03
	Max. M _x	2	3180.08	-0.11	32.03
	Max. M _z	8	3211.92	-32.28	0.11
	Max. Torsion	25	5.46	16.04	27.68
	Min. Vert	9	35.51	-32.28	0.11
	Min. H _x	9	35.51	-32.28	0.11
	Min. H _z	15	35.51	0.11	-32.03
	Min. M _x	14	-3181.66	0.11	-32.03
	Min. M _z	20	-3214.59	32.28	-0.11
	Min. Torsion	13	-5.46	-16.04	-27.68

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	39.46	-0.00	0.00	0.63	1.02	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	47.35	0.11	-32.03	-3180.08	-12.88	-4.42
0.9 Dead+1.6 Wind 0 deg - No Ice	35.51	0.11	-32.03	-3150.70	-13.07	-4.42
1.2 Dead+1.6 Wind 30 deg - No Ice	47.35	16.24	-27.79	-2761.02	-1617.70	-2.20
0.9 Dead+1.6 Wind 30 deg - No Ice	35.51	16.24	-27.79	-2735.59	-1602.99	-2.20
1.2 Dead+1.6 Wind 60 deg - No Ice	47.35	28.01	-16.11	-1601.89	-2788.69	0.62
0.9 Dead+1.6 Wind 60 deg - No Ice	35.51	28.01	-16.11	-1587.21	-2763.11	0.62
1.2 Dead+1.6 Wind 90 deg - No Ice	47.35	32.28	-0.11	-13.36	-3211.92	3.27
0.9 Dead+1.6 Wind 90 deg - No Ice	35.51	32.28	-0.11	-13.42	-3182.49	3.27
1.2 Dead+1.6 Wind 120 deg - No Ice	47.35	27.90	15.92	1579.00	-2774.62	5.04
0.9 Dead+1.6 Wind 120 deg - No Ice	35.51	27.90	15.92	1564.15	-2749.17	5.04
1.2 Dead+1.6 Wind 150 deg - No Ice	47.35	16.04	27.68	2748.51	-1593.27	5.46
0.9 Dead+1.6 Wind 150 deg - No Ice	35.51	16.04	27.68	2722.81	-1578.78	5.46
1.2 Dead+1.6 Wind 180 deg - No Ice	47.35	-0.11	32.03	3181.66	15.39	4.42
0.9 Dead+1.6 Wind 180 deg	35.51	-0.11	32.03	3151.96	14.93	4.42

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturing Moment, M _x kip-ft	Overturing Moment, M _z kip-ft	Torque kip-ft
- No Ice						
1.2 Dead+1.6 Wind 210 deg	47.35	-16.24	27.79	2762.61	1620.23	2.20
- No Ice						
0.9 Dead+1.6 Wind 210 deg	35.51	-16.24	27.79	2736.77	1604.87	2.20
- No Ice						
1.2 Dead+1.6 Wind 240 deg	47.35	-28.01	16.11	1603.46	2791.23	-0.62
- No Ice						
0.9 Dead+1.6 Wind 240 deg	35.51	-28.01	16.11	1588.38	2765.00	-0.62
- No Ice						
1.2 Dead+1.6 Wind 270 deg	47.35	-32.28	0.11	14.91	3214.59	-3.26
- No Ice						
0.9 Dead+1.6 Wind 270 deg	35.51	-32.28	0.11	14.57	3184.46	-3.27
- No Ice						
1.2 Dead+1.6 Wind 300 deg	47.35	-27.90	-15.92	-1577.45	2777.14	-5.04
- No Ice						
0.9 Dead+1.6 Wind 300 deg	35.51	-27.90	-15.92	-1563.00	2751.04	-5.04
- No Ice						
1.2 Dead+1.6 Wind 330 deg	47.35	-16.04	-27.68	-2746.95	1595.77	-5.46
- No Ice						
0.9 Dead+1.6 Wind 330 deg	35.51	-16.04	-27.68	-2721.65	1580.64	-5.46
- No Ice						
1.2 Dead+1.0 Ice+1.0 Temp	88.30	0.00	-0.00	8.86	14.17	0.00
1.2 Dead+1.0 Wind 0	88.30	0.02	-11.29	-1193.43	12.02	-2.45
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 30	88.30	5.68	-9.79	-1033.55	-591.49	-1.33
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 60	88.30	9.82	-5.66	-594.27	-1032.67	0.14
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 90	88.30	11.33	-0.02	6.64	-1193.25	1.58
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 120	88.30	9.80	5.63	608.18	-1030.34	2.59
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 150	88.30	5.65	9.77	1049.17	-587.45	2.91
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 180	88.30	-0.02	11.29	1211.38	16.69	2.45
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 210	88.30	-5.68	9.79	1051.51	620.21	1.33
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 240	88.30	-9.82	5.66	612.23	1061.39	-0.14
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 270	88.30	-11.33	0.02	11.31	1221.96	-1.58
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 300	88.30	-9.80	-5.63	-590.23	1059.05	-2.59
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 330	88.30	-5.65	-9.77	-1031.22	616.16	-2.91
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	39.46	0.02	-6.85	-676.40	-1.95	-0.18
Dead+Wind 30 deg - Service	39.46	3.47	-5.95	-587.19	-343.54	-0.03
Dead+Wind 60 deg - Service	39.46	5.99	-3.45	-340.48	-592.79	0.13
Dead+Wind 90 deg - Service	39.46	6.91	-0.02	-2.35	-682.92	0.26
Dead+Wind 120 deg - Service	39.46	5.97	3.41	336.58	-589.79	0.31
Dead+Wind 150 deg - Service	39.46	3.43	5.92	585.50	-338.33	0.28
Dead+Wind 180 deg - Service	39.46	-0.02	6.85	677.71	4.06	0.18
Dead+Wind 210 deg - Service	39.46	-3.47	5.95	588.51	345.65	0.03
Dead+Wind 240 deg - Service	39.46	-5.99	3.45	341.79	594.90	-0.13
Dead+Wind 270 deg - Service	39.46	-6.91	0.02	3.66	685.03	-0.26
Dead+Wind 300 deg - Service	39.46	-5.97	-3.41	-335.27	591.89	-0.31
Dead+Wind 330 deg - Service	39.46	-3.43	-5.92	-584.19	340.44	-0.28

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-39.46	0.00	0.00	39.46	-0.00	0.000%
2	0.11	-47.35	-32.03	-0.11	47.35	32.03	0.001%
3	0.11	-35.51	-32.03	-0.11	35.51	32.03	0.003%
4	16.24	-47.35	-27.79	-16.24	47.35	27.79	0.000%
5	16.24	-35.51	-27.79	-16.24	35.51	27.79	0.000%
6	28.01	-47.35	-16.11	-28.01	47.35	16.11	0.000%
7	28.01	-35.51	-16.11	-28.01	35.51	16.11	0.000%
8	32.28	-47.35	-0.11	-32.28	47.35	0.11	0.003%
9	32.28	-35.51	-0.11	-32.28	35.51	0.11	0.003%
10	27.90	-47.35	15.92	-27.90	47.35	-15.92	0.000%
11	27.90	-35.51	15.92	-27.90	35.51	-15.92	0.000%
12	16.04	-47.35	27.68	-16.04	47.35	-27.68	0.000%
13	16.04	-35.51	27.68	-16.04	35.51	-27.68	0.000%
14	-0.11	-47.35	32.03	0.11	47.35	-32.03	0.001%
15	-0.11	-35.51	32.03	0.11	35.51	-32.03	0.001%
16	-16.24	-47.35	27.79	16.24	47.35	-27.79	0.000%
17	-16.24	-35.51	27.79	16.24	35.51	-27.79	0.000%
18	-28.01	-47.35	16.11	28.01	47.35	-16.11	0.000%
19	-28.01	-35.51	16.11	28.01	35.51	-16.11	0.000%
20	-32.28	-47.35	0.11	32.28	47.35	-0.11	0.001%
21	-32.28	-35.51	0.11	32.28	35.51	-0.11	0.001%
22	-27.90	-47.35	-15.92	27.90	47.35	15.92	0.000%
23	-27.90	-35.51	-15.92	27.90	35.51	15.92	0.000%
24	-16.04	-47.35	-27.68	16.04	47.35	27.68	0.000%
25	-16.04	-35.51	-27.68	16.04	35.51	27.68	0.000%
26	0.00	-88.30	0.00	-0.00	88.30	0.00	0.001%
27	0.02	-88.30	-11.29	-0.02	88.30	11.29	0.001%
28	5.68	-88.30	-9.79	-5.68	88.30	9.79	0.000%
29	9.82	-88.30	-5.66	-9.82	88.30	5.66	0.000%
30	11.33	-88.30	-0.02	-11.33	88.30	0.02	0.001%
31	9.80	-88.30	5.63	-9.80	88.30	-5.63	0.000%
32	5.65	-88.30	9.77	-5.65	88.30	-9.77	0.000%
33	-0.02	-88.30	11.29	0.02	88.30	-11.29	0.001%
34	-5.68	-88.30	9.79	5.68	88.30	-9.79	0.000%
35	-9.82	-88.30	5.66	9.82	88.30	-5.66	0.000%
36	-11.33	-88.30	0.02	11.33	88.30	-0.02	0.001%
37	-9.80	-88.30	-5.63	9.80	88.30	5.63	0.000%
38	-5.65	-88.30	-9.77	5.65	88.30	9.77	0.000%
39	0.02	-39.46	-6.85	-0.02	39.46	6.85	0.002%
40	3.47	-39.46	-5.95	-3.47	39.46	5.95	0.002%
41	5.99	-39.46	-3.45	-5.99	39.46	3.45	0.002%
42	6.91	-39.46	-0.02	-6.91	39.46	0.02	0.002%
43	5.97	-39.46	3.41	-5.97	39.46	-3.41	0.002%
44	3.43	-39.46	5.92	-3.43	39.46	-5.92	0.002%
45	-0.02	-39.46	6.85	0.02	39.46	-6.85	0.002%
46	-3.47	-39.46	5.95	3.47	39.46	-5.95	0.002%
47	-5.99	-39.46	3.45	5.99	39.46	-3.45	0.002%
48	-6.91	-39.46	0.02	6.91	39.46	-0.02	0.002%
49	-5.97	-39.46	-3.41	5.97	39.46	3.41	0.002%
50	-3.43	-39.46	-5.92	3.43	39.46	5.92	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	16	0.00000001	0.00007867
3	Yes	15	0.00002941	0.00013892
4	Yes	19	0.00000001	0.00007933
5	Yes	18	0.00000001	0.00013871
6	Yes	19	0.00000001	0.00008023
7	Yes	18	0.00000001	0.00014022
8	Yes	15	0.00004341	0.00014285
9	Yes	15	0.00002937	0.00011652
10	Yes	19	0.00000001	0.00008423
11	Yes	18	0.00000001	0.00014770
12	Yes	19	0.00000001	0.00007481
13	Yes	18	0.00000001	0.00013079
14	Yes	16	0.00000001	0.00009874
15	Yes	16	0.00000001	0.00007853
16	Yes	19	0.00000001	0.00008272
17	Yes	18	0.00000001	0.00014471
18	Yes	19	0.00000001	0.00008223
19	Yes	18	0.00000001	0.00014371
20	Yes	16	0.00000001	0.00008606
21	Yes	16	0.00000001	0.00006844
22	Yes	19	0.00000001	0.00007508
23	Yes	18	0.00000001	0.00013114
24	Yes	19	0.00000001	0.00008412
25	Yes	18	0.00000001	0.00014759
26	Yes	11	0.00000001	0.00008173
27	Yes	17	0.00000001	0.00013604
28	Yes	18	0.00000001	0.00008882
29	Yes	18	0.00000001	0.00008960
30	Yes	17	0.00000001	0.00013489
31	Yes	18	0.00000001	0.00009404
32	Yes	18	0.00000001	0.00008960
33	Yes	17	0.00000001	0.00013901
34	Yes	18	0.00000001	0.00009628
35	Yes	18	0.00000001	0.00009544
36	Yes	17	0.00000001	0.00013914
37	Yes	18	0.00000001	0.00009081
38	Yes	18	0.00000001	0.00009532
39	Yes	14	0.00000001	0.00002948
40	Yes	14	0.00000001	0.00004635
41	Yes	14	0.00000001	0.00004430
42	Yes	14	0.00000001	0.00003064
43	Yes	14	0.00000001	0.00005429
44	Yes	14	0.00000001	0.00004047
45	Yes	14	0.00000001	0.00002983
46	Yes	14	0.00000001	0.00004791
47	Yes	14	0.00000001	0.00005123
48	Yes	14	0.00000001	0.00003113
49	Yes	14	0.00000001	0.00004027
50	Yes	14	0.00000001	0.00005289

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 120	19.71	47	1.15	0.00
L2	120 - 90	12.72	47	1.01	0.00
L3	90 - 78.04	7.08	47	0.74	0.00
L4	78.04 - 60	5.35	47	0.64	0.00
L5	60 - 30	3.23	47	0.48	0.00
L6	30 - 7	0.86	47	0.27	0.00
L7	7 - 4	0.04	47	0.06	0.00
L8	4 - 0	0.01	47	0.03	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
148.0000	(2) PCS 1900MHz 4x45W-65MHz	47	19.22	1.14	0.00	42574
146.0000	APXVTM14-C-120 w/ Mount Pipe	47	18.74	1.14	0.00	42574
138.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	47	16.83	1.10	0.00	17739
124.0000	RRUS 11	47	13.60	1.03	0.00	8188
122.0000	QS46512-2 w/ Mount Pipe	47	13.15	1.02	0.00	7636
30.0000	(3) Bridge Stiffener (138.5" x 15.5" x 1.25")	47	0.86	0.27	0.00	7456
13.0000	KS24019-L112A	47	0.16	0.12	0.00	6187
12.0000	KS24019-L112A	47	0.14	0.11	0.00	6123

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 120	92.39	18	5.40	0.02
L2	120 - 90	59.66	18	4.73	0.02
L3	90 - 78.04	33.22	18	3.48	0.01
L4	78.04 - 60	25.10	18	2.98	0.01
L5	60 - 30	15.17	18	2.24	0.01
L6	30 - 7	4.03	18	1.25	0.00
L7	7 - 4	0.21	18	0.30	0.00
L8	4 - 0	0.07	18	0.16	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
148.0000	(2) PCS 1900MHz 4x45W-65MHz	18	90.13	5.37	0.02	9220
146.0000	APXVTM14-C-120 w/ Mount Pipe	18	87.87	5.33	0.02	9220
138.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	18	78.90	5.19	0.02	3840
124.0000	RRUS 11	18	63.77	4.85	0.02	1770
122.0000	QS46512-2 w/ Mount Pipe	18	61.70	4.79	0.02	1650
30.0000	(3) Bridge Stiffener (138.5" x 15.5" x 1.25")	18	4.03	1.25	0.00	1589
13.0000	KS24019-L112A	18	0.76	0.57	0.00	1319
12.0000	KS24019-L112A	18	0.65	0.53	0.00	1305

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
L1	150 - 120 (1)	P24x0.25	30.000	0.0000	0.0	18.653	-10.17	662.26	0.015
L2	120 - 90 (2)	30" x 0.375"	30.000	0.0000	0.0	34.901	-15.37	1311.06	0.012
L3	90 - 78.04 (3)	36" x 0.375"	11.960	0.0000	0.0	41.969	-17.83	1490.10	0.012
L4	78.04 - 60 (4)	RPS 36" x 0.51087"	18.040	0.0000	0.0	56.958	-22.67	1947.97	0.012
L5	60 - 30 (5)	RPS 42" x 0.58495"	30.000	0.0000	0.0	76.107	-33.05	2667.26	0.012
L6	30 - 7 (6)	RPS 42" x 0.65547"	23.000	0.0000	0.0	85.137	-44.18	3045.79	0.015
L7	7 - 4 (7)	RPS 42" x 0.67553"	3.0000	0.0000	0.0	87.700	-45.41	3090.13	0.015
L8	4 - 0 (8)	RPS 42" x 0.82394"	4.0000	0.0000	0.0	106.58	-47.34	3593.36	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{ux} kip-ft	φM _{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M _{uy} kip-ft	φM _{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	150 - 120 (1)	P24x0.25	279.88	396.68	0.706	0.00	396.68	0.000
L2	120 - 90 (2)	30" x 0.375"	853.26	947.86	0.900	0.00	947.86	0.000
L3	90 - 78.04 (3)	36" x 0.375"	1106.33	1338.81	0.826	0.00	1338.81	0.000
L4	78.04 - 60 (4)	RPS 36" x 0.51087"	1517.92	1738.45	0.873	0.00	1738.45	0.000
L5	60 - 30 (5)	RPS 42" x 0.58495"	2285.19	2757.07	0.829	0.00	2757.07	0.000
L6	30 - 7 (6)	RPS 42" x 0.65547"	2994.57	3192.00	0.938	0.00	3192.00	0.000
L7	7 - 4 (7)	RPS 42" x 0.67553"	3090.32	3264.01	0.947	0.00	3264.01	0.000
L8	4 - 0 (8)	RPS 42" x 0.82394"	3219.02	3925.29	0.820	0.00	3925.29	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V _u K	φV _n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T _u kip-ft	φT _n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	150 - 120 (1)	P24x0.25	17.61	331.13	0.053	0.67	648.61	0.001
L2	120 - 90 (2)	30" x 0.375"	20.54	655.53	0.031	0.67	1598.37	0.000
L3	90 - 78.04 (3)	36" x 0.375"	21.78	745.05	0.029	0.67	2189.07	0.000
L4	78.04 - 60 (4)	RPS 36" x 0.51087"	23.82	973.98	0.024	0.67	2840.20	0.000
L5	60 - 30 (5)	RPS 42" x 0.58495"	27.25	1333.63	0.020	0.67	4539.50	0.000
L6	30 - 7 (6)	RPS 42" x 0.65547"	31.81	1522.90	0.021	0.62	5166.37	0.000
L7	7 - 4 (7)	RPS 42" x 0.67553"	32.03	1545.06	0.021	0.62	5236.56	0.000
L8	4 - 0 (8)	RPS 42" x 0.82394"	32.33	1796.68	0.018	0.62	6046.49	0.000

Pole Interaction Design Data

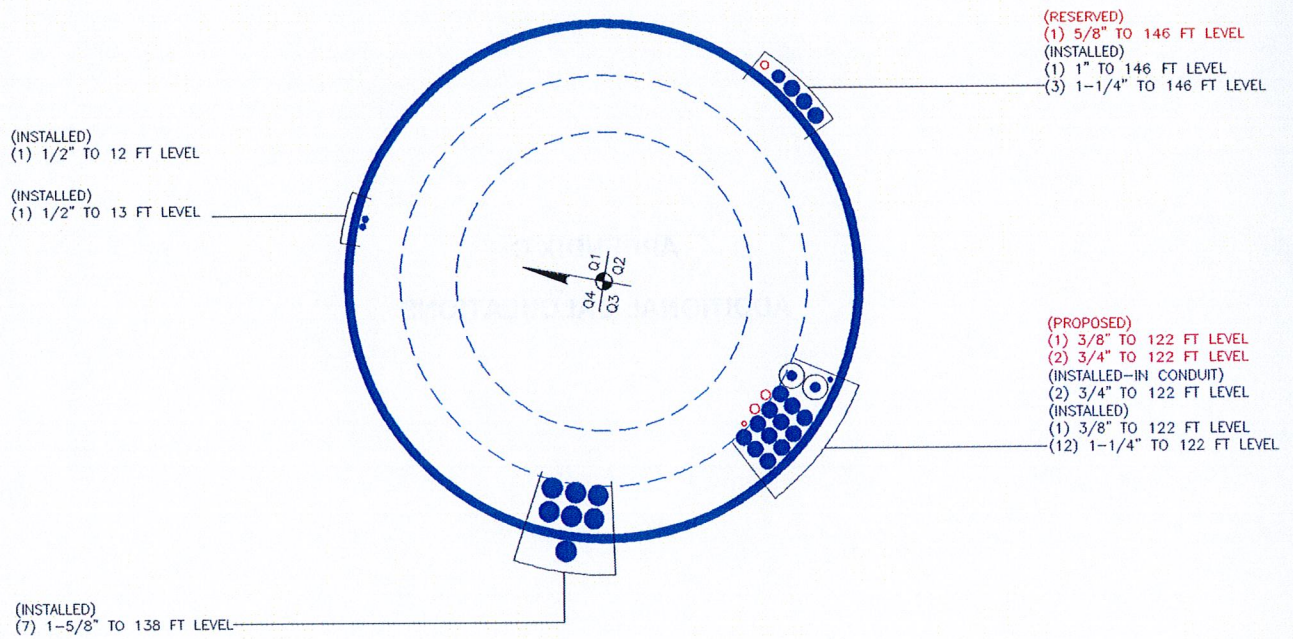
Section No.	Elevation ft	Ratio P_u	Ratio M_{ux}	Ratio M_{uy}	Ratio V_u	Ratio T_u	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		ϕP_n	ϕM_{nx}	ϕM_{ny}	ϕV_n	ϕT_n			
L1	150 - 120 (1)	0.015	0.706	0.000	0.053	0.001	0.724	1.000	4.8.2
L2	120 - 90 (2)	0.012	0.900	0.000	0.031	0.000	0.913	1.000	4.8.2
L3	90 - 78.04 (3)	0.012	0.826	0.000	0.029	0.000	0.839	1.000	4.8.2
L4	78.04 - 60 (4)	0.012	0.873	0.000	0.024	0.000	0.885	1.000	4.8.2
L5	60 - 30 (5)	0.012	0.829	0.000	0.020	0.000	0.842	1.000	4.8.2
L6	30 - 7 (6)	0.015	0.938	0.000	0.021	0.000	0.953	1.000	4.8.2
L7	7 - 4 (7)	0.015	0.947	0.000	0.021	0.000	0.962	1.000	4.8.2
L8	4 - 0 (8)	0.013	0.820	0.000	0.018	0.000	0.834	1.000	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	150 - 120	Pole	P24x0.25	1	-10.17	662.26	72.4	Pass
L2	120 - 90	Pole	30" x 0.375"	2	-15.37	1311.06	91.3	Pass
L3	90 - 78.04	Pole	36" x 0.375"	3	-17.83	1490.10	83.9	Pass
L4	78.04 - 60	Pole	RPS 36" x 0.51087"	4	-22.67	1947.97	88.5	Pass
L5	60 - 30	Pole	RPS 42" x 0.58495"	5	-33.05	2667.26	84.2	Pass
L6	30 - 7	Pole	RPS 42" x 0.65547"	6	-44.18	3045.79	95.3	Pass
L7	7 - 4	Pole	RPS 42" x 0.67553"	7	-45.41	3090.13	96.2	Pass
L8	4 - 0	Pole	RPS 42" x 0.82394"	8	-47.34	3593.36	83.4	Pass
							Summary	
							Pole (L7)	96.2 Pass
							RATING =	96.2 Pass

APPENDIX B

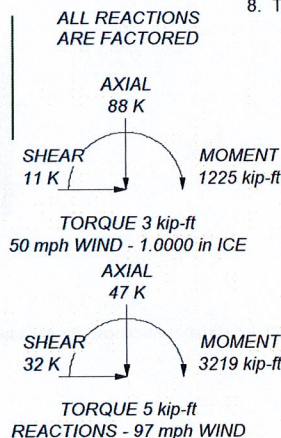
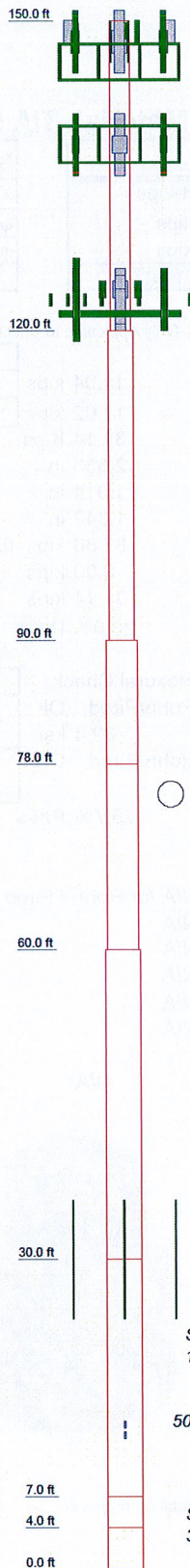
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7	8
Size	P24x0.25	30" x 0.375"	36" x 0.375"	RPS 36" x 0.51087"	RPS 42" x 0.58495"	RPS 42" x 0.65547"	RPS 42" x 0.65547"	RPS 42" x 0.65547"
Length (ft)	30.0000	30.0000	11.9600	18.0400	30.0000	23.0000	4.0000	4.0000
Socket Length (ft)	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000
Grade	A53-B-42	A53-B-42	A53-B-42	Reinf 38.45 ksi	Reinf 38.94 ksi	Reinf 38.75 ksi	Reinf 38.75 ksi	Reinf 38.75 ksi
Weight (K)	1.9	3.6	1.7	3.5	7.8	6.7	0.9	1.5



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) PCS 1900MHz 4x45W-65MHz	148	RRUS 11 B12	138
PCS 1900MHz 4x45W-65MHz	148	RRUS 11 B12	138
800MHz 2X50W RRH W/FILTER	148	Platform Mount [LP 1201-1]	138
(2) 800MHz 2X50W RRH W/FILTER	148	RRUS 11	124
2.375" OD x 4" Mount Pipe	148	RRUS 11	124
2.375" OD x 4" Mount Pipe	148	RRUS 11	124
2.375" OD x 4" Mount Pipe	148	Side Arm Mount [SO 102-3]	124
Side Arm Mount [SO 102-3]	148	QS46512-2 w/ Mount Pipe	122
APXVTM14-C-120 w/ Mount Pipe	146	QS66512-2 w/ Mount Pipe	122
APXVTM14-C-120 w/ Mount Pipe	146	SBNHH-1D65A w/ Mount Pipe	122
APXVTM14-C-120 w/ Mount Pipe	146	HPA-65R-BUU-H8 w/ Mount Pipe	122
TD-RRH8x20-25	146	HPA-65R-BUU-H8 w/ Mount Pipe	122
TD-RRH8x20-25	146	TPA-65R-LCUUUU-H8 w/ Mount Pipe	122
TD-RRH8x20-25	146	DC6-48-60-18-8F	122
APXV9ERR18-C-A20 w/ Mount Pipe	146	RRUS 32 B2	122
APXVSP18-C-A20 w/ Mount Pipe	146	RRUS 32 B2	122
APXVSP18-C-A20 w/ Mount Pipe	146	RRUS 32 B2	122
Platform Mount [LP 502-1]	146	RRUS 32	122
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	138	RRUS 32	122
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	138	RRUS 32	122
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	138	DBC0061F1V51-2	122
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	138	DBC0061F1V51-2	122
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	138	DBC0061F1V51-2	122
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	138	7770.00 w/ Mount Pipe	122
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	138	7770.00 w/ Mount Pipe	122
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	138	7770.00 w/ Mount Pipe	122
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	138	(2) LGP2140X	122
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	138	(4) LGP2140X	122
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	138	DC6-48-60-18-8F	122
LNX-6515DS-VTM w/ Mount Pipe	138	T-Arm Mount [TA 602-3]	122
LNX-6515DS-VTM w/ Mount Pipe	138	(3) Bridge Stiffener (138.5" x 15.5" x 1.25")	30
LNX-6515DS-VTM w/ Mount Pipe	138	Side Arm Mount [SO 701-1]	13
KRY 112 144/1	138	KS24019-L112A	13
KRY 112 144/1	138	Side Arm Mount [SO 701-1]	12
RRUS 11 B12	138	KS24019-L112A	12

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi	Reinf 39.75 ksi	40 ksi	50 ksi
Reinf 38.45 ksi	38 ksi	48 ksi	Reinf 39.15 ksi	39 ksi	49 ksi
Reinf 38.94 ksi	39 ksi	49 ksi	Reinf 37.46 ksi	37 ksi	47 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.0000 ft
8. TOWER RATING: 96.2%



Paul J. Ford and Company
250 East Broad St., Suite 600
Columbus, OH 43215
Phone: 614-221-6679
FAX:

Job: **150' MP; Kings Lot; South Windsor, CT**
Project: **PJF# 37517-2698.002.7805 (BU# 876327)**
Client: **Crown Castle International** Drawn by: **mtimas** App'd:
Code: **TIA-222-G** Date: **08/15/17** Scale: **NTS**
Path: Dwg No. **E-1**

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

Site Data

BU#: 876327
Site Name: Kings Lot
App #:

Pole Manufacturer: Rohn

Bolt Data

Qty: 12
Diameter (in.): 1.5 Bolt Fu: 105
Bolt Material: A325 Bolt Fy: 81
N/A: 0 <-- Disregard
N/A: 0 <-- Disregard
Circle (in.): 35

Plate Data

Diam: 41 in
Thick, t: 2 in
Grade (Fy): 36 ksi
Strength, Fu: 58 ksi
Single-Rod B-eff: 6.28 in

Stiffener Data (Welding at Both Sides)

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

Pole Data

Diam: 24 in
Thick: 0.25 in
Grade: 42 ksi
of Sides: 0 "0" IF Round
Fu: 63 ksi
Reinf. Fillet Weld: 0 "0" if None

Reactions

Mu: 279.88 ft-kips
Axial, Pu: 10.17 kips
Shear, Vu: 17.61 kips
Elevation: 120 feet

Bolt Threads:

X-Excluded
 $\phi V_n = \phi(0.55 A_b F_u)$
 $\phi = 0.75, \phi^* V_n$ (kips):
76.54

If No stiffeners, Criteria: TIA G <-Only Applicable to Unstiffened Cases

Flange Bolt Results

Bolt Tension Capacity, $\phi^* T_n, B1$: 111.04 kips
Adjusted $\phi^* T_n$ (due to $V_u = V_u / Q_t$), B: 111.02 kips
Max Bolt directly applied Tu: 31.14 Kips
Min PL "tc" for B cap. w/o Pry: 2.535 in
Min PL "treq" for actual T w/ Pry: 1.014 in
Min PL "t1" for actual T w/o Pry: 1.342 in
T allowable with Prying: 87.60 kips $0 \leq \alpha \leq 1$ case
Prying Force, q: 0.00 kips
Total Bolt Tension = Tu + q: 31.14 kips
Prying Bolt Stress Ratio = (Tu + q) / (B): 28.0% **Pass**

Exterior Flange Plate Results

Flexural Check
Compression Side Plate Stress: Rohn/Pirod, OK
Allowable Plate Stress: 32.4 ksi
Compression Plate Stress Ratio: Rohn/Pirod, OK
No Prying
Tension Side Stress Ratio, $(treq/t)^2$: 25.7% **Pass**

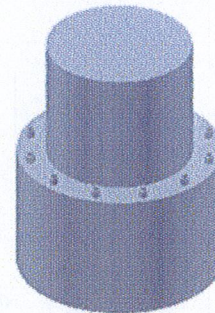
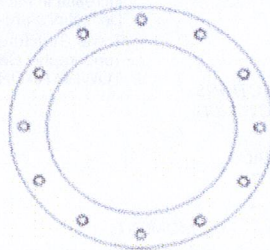
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Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A



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

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

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

Site Data

BU#: 876327

Site Name: Kings Lot

App #:

Reactions

Mu	279.88	ft-kips
Axial, Pu:	10.17	kips
Shear, Vu:	17.61	kips
Elevation:	120	feet

Bolt Threads:

X-Excluded
$\phi V_n = \phi(0.55 A_b F_u)$
$\phi = 0.75, \phi V_n$ (kips):
76.54

Pole Manufacturer: Rohn

If No stiffeners, Criteria: TIA G <-Only Applicable to Unstiffened Cases

Flange Bolt Results

Bolt Tension Capacity, $\phi^*T_n, B1$:	111.04 kips
Adjusted ϕ^*T_n (due to $V_u = V_u/Q_t$), B:	111.02 kips
Max Bolt directly applied T_u :	31.14 Kips
Min. PL "tc" for B cap. w/o Pry:	1.376 in
Min PL "treq" for actual T w/ Pry:	0.543 in
Min PL "t1" for actual T w/o Pry:	0.729 in
T allowable w/o Prying:	111.04 kips $\alpha < 0$ case
Prying Force, q:	0.00 kips
Total Bolt Tension = $T_u + q$:	31.14 kips
Non-Prying Bolt Stress Ratio, T_u/B :	28.0% Pass

Rigid

ϕ^*T_n
$\phi T_n [(1 - (V_u/\phi V_n)^2)^{0.5}]$

Bolt Data

Qty:	12	
Diameter (in.):	1.5	Bolt Fu: 105
Bolt Material:	A325	Bolt Fy: 81
N/A:	0	<-- Disregard
N/A:	0	<-- Disregard
Circle (in.):	35	

Plate Data

Diam:	41	in
Thick, t:	2	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	7.85	in

Stiffener Data (Welding at Both Sides)

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

Exterior Flange Plate Results

Flexural Check	Rohn/Pirol, OK
Compression Side Plate Stress:	32.4 ksi
Allowable Plate Stress:	32.4 ksi
Compression Plate Stress Ratio:	Rohn/Pirol, OK
No Prying	
Tension Side Stress Ratio, $(treq/t)^2$:	7.4% Pass

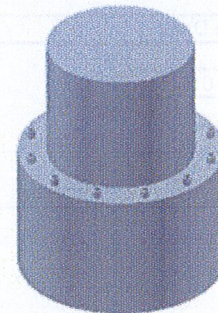
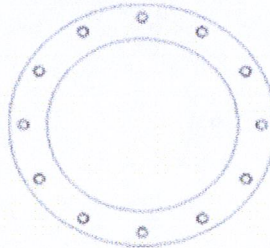
Rigid

TIA G
ϕ^*F_y
Comp. Y.L. Length:
18.03

n/a

Stiffener Results

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



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

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

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

Site Data

BU#: 876327
Site Name: *Kings Lot*
App #:

Reactions

Mu	853.26	ft-kips
Axial, Pu:	15.37	kips
Shear, Vu:	20.54	kips
Elevation:	90	feet

Bolt Threads:

X-Excluded
$\phi V_n = \phi(0.55 \cdot A_b \cdot F_u)$
$\phi = 0.75, \phi \cdot V_n$ (kips):
76.54

Pole Manufacturer: **Rohn**

If No stiffeners, Criteria: **TIA G** <-Only Applicable to Unstiffened Cases

Bolt Data

Qty:	16	
Diameter (in.):	1.5	Bolt Fu: 105
Bolt Material:	A325	Bolt Fy: 81
N/A:	0	<-- Disregard
N/A:	0	<-- Disregard
Circle (in.):	41	

Flange Bolt Results

Bolt Tension Capacity, $\phi \cdot T_n, B1$: 111.04 kips
Adjusted $\phi \cdot T_n$ (due to $V_u = V_u / Q_{ty}$), **B**: 111.02 kips
Max Bolt directly applied T_u : 61.47 Kips
Min. PL "tc" for **B cap. w/o Pry**: 2.618 in
Min PL "treq" for actual **T w/ Pry**: 1.479 in
Min PL "t1" for actual **T w/o Pry**: 1.948 in
T allowable with Prying: 85.19 kips $0 \leq \alpha \leq 1$ case
Prying Force, q: 0.00 kips
Total Bolt Tension = $T_u + q$: 61.47 kips
Prying Bolt Stress Ratio = $(T_u + q) / (B)$: 55.4% **Pass**

Rigid

$\phi \cdot T_n$
$\phi T_n [(1 - (V_u / \phi V_n)^2)^{0.5}]$

Plate Data

Diam:	47	in
Thick, t:	2	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	5.89	in

Exterior Flange Plate Results

Flexural Check
Compression Side Plate Stress: Rohn/Pirol, OK
Allowable Plate Stress: 32.4 ksi
Compression Plate Stress Ratio: Rohn/Pirol, OK
No Prying
Tension Side Stress Ratio, $(treq/t)^2$: 54.7% **Pass**

Rigid

TIA G
$\phi \cdot F_y$
Comp. Y.L. Length:
27.95

Stiffener Data (Welding at Both Sides)

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

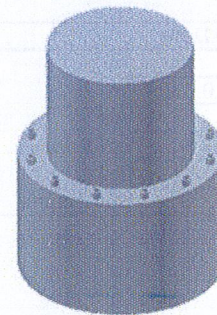
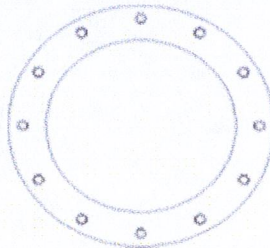
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Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A



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

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

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

Site Data

BU#: 876327
Site Name: Kings Lot
App #:

Pole Manufacturer: Rohn

Bolt Data

Qty:	16	
Diameter (in.):	1.5	Bolt Fu: 105
Bolt Material:	A325	Bolt Fy: 81
N/A:	0	<-- Disregard
N/A:	0	<-- Disregard
Circle (in.):	41	

Plate Data

Diam:	47	in
Thick, t:	2	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	7.07	in

Stiffener Data (Welding at Both Sides)

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

Pole Data

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

Reactions

Mu	853.26	ft-kips
Axial, Pu:	15.37	kips
Shear, Vu:	20.54	kips
Elevation:	90	feet

Bolt Threads:

X-Excluded
$\phi V_n = \phi(0.55 A_b F_u)$
$\phi = 0.75, \phi V_n$ (kips):
76.54

If No stiffeners, Criteria:

TIA G

<-Only Applicable to Unstiffened Cases

Flange Bolt Results

Bolt Tension Capacity, $\phi T_n, B1$: 111.04 kips
Adjusted ϕT_n (due to $V_u = V_u / Q_t$), B: 111.02 kips
Max Bolt directly applied T_u : 61.47 Kips
Min. PL "tc" for B cap. w/o Pry: 1.451 in
Min PL "treg" for actual T w/ Pry: 0.809 in
Min PL "t1" for actual T w/o Pry: 1.079 in
T allowable w/o Prying: 111.04 kips $\alpha < 0$ case
Prying Force, q: 0.00 kips
Total Bolt Tension = $T_u + q$: 61.47 kips
Non-Prying Bolt Stress Ratio, T_u / B : 55.4% **Pass**

Exterior Flange Plate Results

Flexural Check
Compression Side Plate Stress: Rohn/Pirod, OK
Allowable Plate Stress: 32.4 ksi
Compression Plate Stress Ratio: Rohn/Pirod, OK
No Prying
Tension Side Stress Ratio, $(treq/t)^2$: 16.4% **Pass**

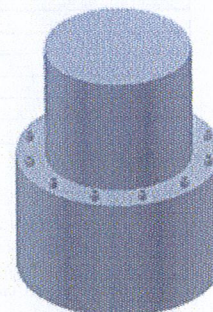
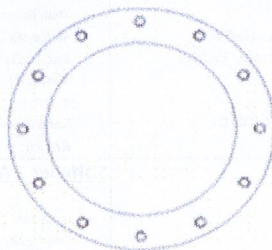
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A



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

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

Welded Bridge Stiffener Analysis per TIA-222-G & AISC 13th Ed. (Black)

General Parameters and Loading:

Flange Elevation:	60.00	ft
TIA Reference Standard:	TIA-222-G	
AISC Manual:	13th Ed. (Black)	
Method:	LRFD	
ASD Stress Increase, ASIF:	N/A	
Moment, Muf:	1517.9	k-ft
Axial, Puf:	22.7	kips
Shear, Vf:	23.8	kips

Pole Parameters:

	Upper Pole	Lower Pole
Pole Diameter, Dp:	36.00	42.00
Pole Thickness, tp:	0.3750	0.3750
Pole Fy:	42	42
Pole Fu:	63	63
Flange Diameter, Df:	53.00	53.00

Bridge Stiffener Parameters:

	Stiffener Type 1	Stiffener Type 2
Qty. Stiffeners:	3	0
Upper Weld Length, L1:	66.25	0.00
Lower Weld Length, L2:	67.13	0.00
Weld Size, w:	0.3750	0.0000
Electrode:	E80	E70
Effective Stiffener Width, Ws:	7.00	0.00
Stiffener Thickness, ts:	1.25	0.00
Notch, n:	0.50	0.00
Stiffener Fy:	65	0
Stiffener Fu:	80	0
Unbraced Length, L:	4.63	0.00
K:	0.80	0.00
Stiffener Spacing:	Symmetric	Symmetric
Start Angle, for Symmetric:	60	0
Stiffener Circle:	61.00	53.00
Upper Eccentricity, e1:	12.50	8.50
Lower Eccentricity, e2:	9.50	5.50

Flange Bolt Parameters:

Number of Bolt Circles:

(1) Bolt Circle

	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	0	0	
Bolt Diameter:	1.50	0.00	in
Bolt Circle:	47.00	0.00	in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	0	degrees
Bolt Area, Ag:	0.0000	0.0000	
Max. Tension:	0.00	0.00	kips
Max. Net Tension:	0.00	0.00	kips
Max. Net Compression:	0.00	0.00	kips
Moment to Bolt Circle:	0.00	0.00	k-ft
Axial to Bolt Circle:	0.00	0.00	kips
Shear to Bolt Circle:	0.00	0.00	kips
Equivalent Bolt Circle:	0.00	0.00	in

Weld Analysis per AISC Tables 8-4 & 8-3:

	Stiffener Type 1	Stiffener Type 2
D:	6	0
a:	0.1887	0.0000
k:	0	0
C:	3.5462	3.7100
C1:	1.0300	1.0000
Φ:	0.7500	0.7500
Stiffener Axial, Pu:	405.9	0.0
Axial Capacity, ΦPn:	1088.9	0.0
Ratio:	37.3%	0.0%
Lower Pole		
D:	6	0
a:	0.1415	0.0000
k:	0	0
C:	3.6785	3.7100
C1:	1.0300	1.0000
Φ:	0.7500	0.7500
Stiffener Axial, Pu:	405.9	0.0
Axial Capacity, ΦPn:	1144.5	0.0
Ratio:	35.5%	0.0%

Pole Analysis per AISC Table J2.5 & Sect. J4.2:

	Stiffener Type 1	Stiffener Type 2
Stiffener Axial, Pu:	405.9	0.0
Effective Throat, te:	0.2651	0.0000
Shear Stress, fu:	3.1	0.0
Section Modulus, S:	1463.0	0.0
Bending Stress, fub:	3.5	0.0
Combined Stress, fu:	4.6	0.0
Φ:	1.0000	0.0000
Stress Capacity, ΦFn:	9.5	0.0
Ratio:	49.0%	0.0%
Lower Pole		
Stiffener Axial, Pu:	405.9	0.0
Effective Throat, te:	0.2651	0.0000
Shear Stress, fu:	3.0	0.0
Section Modulus, S:	1501.9	0.0
Bending Stress, fub:	2.6	0.0
Combined Stress, fu:	4.0	0.0
Φ:	1.0000	0.0000
Stress Capacity, ΦFn:	9.5	0.0
Ratio:	42.0%	0.0%

Stiffener 1 Analysis per AISC Sect. D2, E3 & E7

	Stiffener Type 1
Gross Area, Ag:	8.7500
Effective Net Area, Aen:	8.7500
Stiffener Axial, Pu:	405.9
Stiffener Stress, fu:	46.4
b:	16.0000
b / ts:	12.8000
Q, Where Qa = 1.0:	0.8794
r:	0.3608
K L / r:	10.2537
Φ:	0.9000
Axial Capacity, ΦFcr:	51.00
Φ:	0.9000
Ten. Yielding Cap., ΦFnt:	58.50
Φ:	0.7500
Ten. Rupture Cap., ΦFnr:	60.00
Ratio:	91.0%

Stiffener 2 Analysis per AISC Sect. D2, E3 & E7

	Stiffener Type 2
Gross Area, Ag:	0.0000
Effective Net Area, Aen:	0.0000
Stiffener Axial, Pu:	0.0
Stiffener Stress, fu:	0.0
b:	0.0000
b / ts:	0.0000
Q, Where Qa = 1.0:	0.0000
r:	0.0000
K L / r:	0.0000
Φ:	0.0000
Axial Capacity, ΦFcr:	0.00
Φ:	0.0000
Ten. Yielding Cap., ΦFnt:	0.00
Φ:	0.0000
Ten. Rupture Cap., ΦFnr:	0.00
Ratio:	0.0%

Analysis Summary:

Bridge Stiffener Type 1
 Weld Analysis Ratio: 37.3% PASS
 Pole Analysis Ratio: 49.0% PASS
 Stiffener Analysis Ratio: 91.0% PASS

Bridge Stiffener Type 2
 Weld Analysis Ratio: 0.0% PASS
 Pole Analysis Ratio: 0.0% PASS
 Stiffener Analysis Ratio: 0.0% PASS

v2.1, Effective Date: 05-03-17

Welded Bridge Stiffener Analysis per TIA-222-G & AISC 13th Ed. (Black)

General Parameters and Loading:

Flange Elevation:	30.00	ft
TIA Reference Standard:	TIA-222-G	
AISC Manual:	13th Ed. (Black)	
Method:	LRFD	
ASD Stress Increase, ASIF:	N/A	
Moment, Muf:	2285.2	k-ft
Axial, Puf:	33.1	kips
Shear, Vf:	27.3	kips

Pole Parameters:

	Upper Pole	Lower Pole
Pole Diameter, Dp:	42.00	42.00
Pole Thickness, tp:	0.3750	0.5000
Pole Fy:	42	42
Pole Fu:	63	63
Flange Diameter, Df:	53.00	53.00

Bridge Stiffener Parameters:

	Stiffener Type 1	Stiffener Type 2
Qty. Stiffeners:	3	0
Upper Weld Length, L1:	66.25	0.00
Lower Weld Length, L2:	67.13	0.00
Weld Size, w:	0.3750	0.0000
Electrode:	E80	E70
Effective Stiffener Width, Ws:	9.00	0.00
Stiffener Thickness, ts:	1.25	0.00
Notch, n:	0.50	0.00
Stiffener Fy:	65	0
Stiffener Fu:	80	0
Unbraced Length, L:	4.63	0.00
K:	0.80	0.00
Stiffener Spacing:	Symmetric	Symmetric
Start Angle, for Symmetric:	60	0
Stiffener Circle:	63.00	53.00
Upper Eccentricity, e1:	10.50	5.50
Lower Eccentricity, e2:	10.50	5.50

Flange Bolt Parameters:

Number of Bolt Circles:	(1) Bolt Circle	
	Bolt Circle 1	Bolt Circle 2
Qty. Bolts:	0	0
Bolt Diameter:	1.50	0.00
Bolt Circle:	47.00	0.00
Bolt Spacing:	Symmetric	Symmetric
Start Angle, for Symmetric:	0	0
Bolt Area, Ag:	0.0000	0.0000
Max. Tension:	0.00	0.00
Max. Net Tension:	0.00	0.00
Max. Net Compression:	0.00	0.00
Moment to Bolt Circle:	0.00	0.00
Axial to Bolt Circle:	0.00	0.00
Shear to Bolt Circle:	0.00	0.00
Equivalent Bolt Circle:	0.00	0.00

Weld Analysis per AISC Tables 8-4 & 8-3:

	Stiffener Type 1	Stiffener Type 2	
Upper Pole			
D:	6	0	Num. of Sixteenths in Weld
a:	0.1585	0.0000	= e1 / L1
k:	0	0	
C:	3.6428	3.7100	Tabulated Coefficient
C1:	1.0300	1.0000	Coefficient for Electrode
φ:	0.7500	0.7500	
Stiffener Axial, Pu:	591.6	0.0	kips
Axial Capacity, ΦPn:	1118.6	0.0	kips = Φ C C1 D L
Ratio:	52.9%	0.0%	
Lower Pole			
D:	6	0	Num. of Sixteenths in Weld
a:	0.1564	0.0000	= e2 / L2
k:	0	0	
C:	3.6494	3.7100	Tabulated Coefficient
C1:	1.0300	1.0000	Coefficient for Electrode
φ:	0.7500	0.7500	
Stiffener Axial, Pu:	591.6	0.0	kips
Axial Capacity, ΦPn:	1135.4	0.0	kips = Φ C C1 D L
Ratio:	52.1%	0.0%	

Pole Analysis per AISC Table J2.5 & Sect. J4.2:

	Stiffener Type 1	Stiffener Type 2	
Upper Pole			
Stiffener Axial, Pu:	591.6	0.0	kips
Effective Throat, te:	0.2651	0.0000	in = 0.707 w
Shear Stress, fu:	4.5	0.0	kips/in = Pu / (2 L1)
Section Modulus, S:	1463.0	0.0	in ² = L1 ² / 3
Bending Stress, fub:	4.2	0.0	kips/in = Pu e1 / S
Combined Stress, fu:	6.2	0.0	kips/in = (fu ² + fub ²) ^{1/2}
φ:	1.0000	0.0000	
Stress Capacity, ΦFn:	9.5	0.0	kips/in = Φ 0.6 Fy tp
Ratio:	65.2%	0.0%	
Lower Pole			
Stiffener Axial, Pu:	591.6	0.0	kips
Effective Throat, te:	0.2651	0.0000	in = 0.707 w
Shear Stress, fu:	4.4	0.0	kips/in = Pu / (2 L2)
Section Modulus, S:	1501.9	0.0	in ² = L2 ² / 3
Bending Stress, fub:	4.1	0.0	kips/in = Pu e2 / S
Combined Stress, fu:	6.0	0.0	kips/in = (fu ² + fub ²) ^{1/2}
φ:	1.0000	0.0000	
Stress Capacity, ΦFn:	12.6	0.0	kips/in = Φ 0.6 Fy tp
Ratio:	48.0%	0.0%	

Stiffener 1 Analysis per AISC Sect. D2, E3 & E7

	Stiffener Type 1	
Gross Area, Ag:	11.2500	in ²
Effective Net Area, Aen:	11.2500	in ² = Ag U, where U = 1.000
Stiffener Axial, Pu:	591.6	kips
Stiffener Stress, fu:	52.6	kips = Pu / Ag
b:	15.0000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	12.0000	in
Q, Where Qa = 1.0:	0.9082	= Qa 1.34 - 0.76 (b / ts) (Fy / E) ^{1/2}
r:	0.3608	in ³
K L / r:	10.2537	
φ:	0.9000	
Axial Capacity, ΦFcr:	52.65	kips = Φ Q [0.658 ^Q Fy / Fy] Fy
φ:	0.9000	
Ten. Yielding Cap., ΦFnt:	58.50	kips = Φ Fy
φ:	0.7500	
Ten. Rupture Cap., ΦFnr:	60.00	kips = Φ Fu (Aen / Ag)
Ratio:	99.9%	

Stiffener 2 Analysis per AISC Sect. D2, E3 & E7

	Stiffener Type 2	
Gross Area, Ag:	0.0000	in ²
Effective Net Area, Aen:	0.0000	in ² = Ag U, where U = 1.000
Stiffener Axial, Pu:	0.0	kips
Stiffener Stress, fu:	0.0	kips = Pu / Ag
b:	0.0000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	0.0000	in
Q, Where Qa = 1.0:	0.0000	
r:	0.0000	in ³
K L / r:	0.0000	
φ:	0.0000	
Axial Capacity, ΦFcr:	0.00	kips = Φ Fy
φ:	0.0000	
Ten. Yielding Cap., ΦFnt:	0.00	kips = Φ Fy
φ:	0.0000	
Ten. Rupture Cap., ΦFnr:	0.00	kips = Φ Fu (Aen / Ag)
Ratio:	0.0%	

Analysis

Summary:

Bridge Stiffener Type 1
Weld Analysis Ratio: 52.9% PASS
Pole Analysis Ratio: 65.2% PASS
Stiffener Analysis Ratio: 99.9% PASS

Bridge Stiffener Type 2
Weld Analysis Ratio: 0.0% PASS
Pole Analysis Ratio: 0.0% PASS
Stiffener Analysis Ratio: 0.0% PASS

v4.4 - Effective 7-12-13

Asymmetric Anchor Rod Analysis

Moment = 3219 k-ft
 Axial = 47.0 kips
 Shear = 32.0 kips
 Anchor Qty = 23

TIA Ref. = G
 ASIF = N/A
 Max Ratio = 105.0%

Location = Base Plate
 η = 0.50 for BP, Rev. G Sect. 4.9.9
 Threads = N/A for FP, Rev. G

**** For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. ****

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in ²	Area, in ²	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.500	A354 Gr BC	109	125	0.0	47.00	0.00	1.77	85.73	82.52	87.92	0.00	141.00	62.4%
2	1.500	A354 Gr BC	109	125	20.0	47.00	0.00	1.77	80.81	77.59	82.99	0.00	141.00	58.9%
3	1.500	A354 Gr BC	109	125	40.0	47.00	0.00	1.77	76.08	72.87	78.27	0.00	141.00	55.5%
4	1.500	A354 Gr BC	109	125	60.0	47.00	0.00	1.77	73.21	70.00	75.40	0.00	141.00	53.5%
5	1.500	A354 Gr BC	109	125	80.0	47.00	0.00	1.77	73.47	70.26	75.66	0.00	141.00	53.7%
6	1.500	A354 Gr BC	109	125	100.0	47.00	0.00	1.77	76.86	73.65	79.05	0.00	141.00	56.1%
7	1.500	A354 Gr BC	109	125	120.0	47.00	0.00	1.77	82.13	78.91	84.32	0.00	141.00	59.8%
8	1.500	A354 Gr BC	109	125	140.0	47.00	0.00	1.77	87.56	84.35	89.75	0.00	141.00	63.7%
9	1.500	A354 Gr BC	109	125	160.0	47.00	0.00	1.77	91.84	88.63	94.03	0.00	141.00	66.7%
10	1.500	A354 Gr BC	109	125	180.0	47.00	0.00	1.77	94.31	91.10	96.50	0.00	141.00	68.4%
11	1.500	A354 Gr BC	109	125	200.0	47.00	0.00	1.77	95.04	91.82	97.22	0.00	141.00	69.0%
12	1.500	A354 Gr BC	109	125	220.0	47.00	0.00	1.77	94.59	91.37	96.77	0.00	141.00	68.6%
13	1.500	A354 Gr BC	109	125	240.0	47.00	0.00	1.77	93.77	90.56	95.96	0.00	141.00	68.1%
14	1.500	A354 Gr BC	109	125	260.0	47.00	0.00	1.77	93.22	90.01	95.41	0.00	141.00	67.7%
15	1.500	A354 Gr BC	109	125	280.0	47.00	0.00	1.77	93.07	89.86	95.26	0.00	141.00	67.6%
16	1.500	A354 Gr BC	109	125	300.0	47.00	0.00	1.77	92.89	89.68	95.08	0.00	141.00	67.4%
17	1.500	A354 Gr BC	109	125	320.0	47.00	0.00	1.77	91.95	88.74	94.14	0.00	141.00	66.8%
18	1.500	A354 Gr BC	109	125	340.0	47.00	0.00	1.77	89.62	86.40	91.81	0.00	141.00	65.1%
19	2.250	A193 Gr B7	105	125	20.0	64.50	0.00	3.98	253.63	246.40	258.55	0.00	325.00	79.6%
20	2.250	A193 Gr B7	105	125	70.0	64.50	0.00	3.98	232.38	225.15	237.31	0.00	325.00	73.0%
21	2.250	A193 Gr B7	105	125	110.0	64.50	0.00	3.98	248.91	241.68	253.83	0.00	325.00	78.1%
22	2.250	A193 Gr B7	105	125	197.0	64.50	0.00	3.98	285.94	278.70	290.86	0.00	325.00	89.5%
23	2.250	A193 Gr B7	105	125	302.0	64.50	0.00	3.98	280.43	273.20	285.35	0.00	325.00	87.8%

51.69

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

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

Site Data

BU#:	876327
Site Name:	Kings Lot
App #:	397676 Rev.0
Pole Manufacturer:	Other

Anchor Rod Data

Qty:	18	
Diam:	1.5	in
Rod Material:	Other	
Strength (Fu):	125	ksi
Yield (Fy):	109	ksi
Bolt Circle:	47	in

Plate Data

Diam:	53	in
Thick:	2	in
Grade:	36	ksi
Single-Rod B-eff:	7.33	in

Stiffener Data (Welding at both sides)

Config:	1	*
Weld Type:	Both	
Groove Depth:	0.25	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.25	in
Fillet V. Weld:	0.25	in
Width:	5.75	in
Height:	14.25	in
Thick:	0.5	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data

Diam:	42	in
Thick:	0.5	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Reactions

Mu:	1646.6254	ft-kips
Axial, Pu:	28.9	kips
Shear, Vu:	19.7	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

Reactions have been adjusted to account for additional anchor rods.

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

Anchor Rod Results

Max Rod (Cu+ Vu/rf): 97.2 Kips

SEE ASYMMETRICAL SPREADSHEET FOR ANCHOR ROD CALCS

Stiffened
AISC LRFD
ϕ^*T_n

Base Plate Results

Base Plate Stress: 19.5 ksi
Allowable Plate Stress: 32.4 ksi
Base Plate Stress Ratio: 60.1% **Pass**

Flexural Check

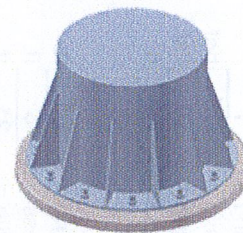
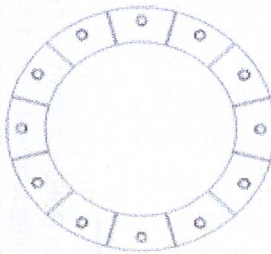
Stiffened
AISC LRFD
ϕ^*F_y
Y.L. Length:
N/A, Roark

Stiffener Results

Horizontal Weld : 44.2% **Pass**
Vertical Weld: 34.0% **Pass**
Plate Flex+Shear, $f_b/F_b + (f_v/F_v)^2$: 14.5% **Pass**
Plate Tension+Shear, $f_t/F_t + (f_v/F_v)^2$: 45.5% **Pass**
Plate Comp. (AISC Bracket): 48.4% **Pass**

Pole Results

Pole Punching Shear Check: 8.8% **Pass**



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

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

foundation loads

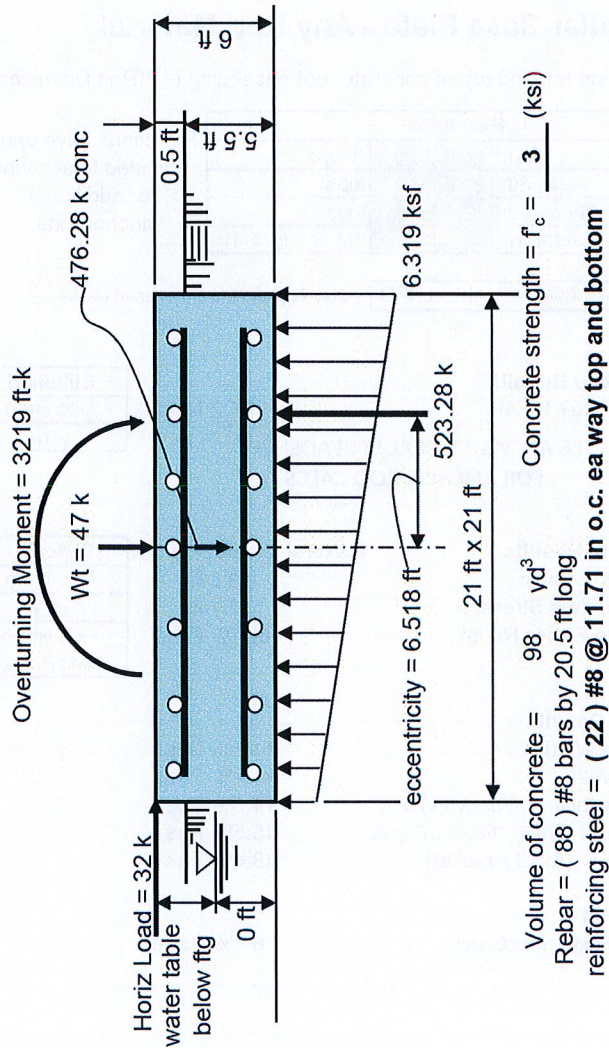
Limit states Tower or Pole Weight = 47 kips
 limit states total horizontal force = 32 kips
 limit states overturning moment = 3219 ft-kips

soil properties

Safety factor against overturning = 1
 Soil Density = 115 pcf
 Ultimate soil bearing = 16 ksf
 Depth to water table = 99 ft

mat dimensions

depth to bottom of footing = 5.5 ft
 Footing thickness = 6 ft
 Footing Width = 21 ft
 Footing Length = 21 ft
 Tower/Pole Center Offset = 0 ft

Summary of analysis resultsOverturning Moment: (Stress Ratio = 0.828) < **CONTROLLING CRITERIA**

Calculated Ultimate Overturning Moment = 3411 ft-kips
 Resisting Moment = 4120.8 ft-kips

Factor of Safety against overturning = 1.208 > 1 okay

Soil Bearing

(Stress Ratio = 0.527)

Limit States Maximum Net Soil Bearing = 12 ksf

Calculated limit states Soil Bearing Pressure = 6.319 ksf < 12 ksf okay

Bending Moment

(Stress Ratio = 0.293)

Ultimate Bending Moment Resistance = 5216 ft-kips

Calculated Ultimate Bending Moment = 1527 ft-kips < 5216 ft-kips okay

Bending Shear

(Stress Ratio = 0.188)

Ultimate Bending Shear Resistance = 1584 kips

Calculated Ultimate Bending Shear = 298 kips < 1584 kips okay

Rebar strength = $F_y = 60$ (ksi)
 minimum cover over rebar = 3 inches

PROJECT INFORMATION		
SCOPE OF WORK:	**** BIRD SITE ****	
	ITEMS TO BE MOUNTED ON THE EXISTING MONOPOLE:	
	•(1) AT&T ANTENNA (HPA-65R-BUU-H6) @ POS. 2 (TOTAL OF 1 FOR ALPHA SECTOR) •(1) AT&T ANTENNA (QS66512-2) @ POS. 4 (TOTAL OF 1 FOR ALPHA SECTOR) •(1) AT&T ANTENNA (HPA-65R-BUU-H8) @ POS. 2 (TOTAL OF 1 FOR BETA SECTOR) •(1) AT&T ANTENNA (TPA-65R-LCUUUU-H8) @ POS. 4 (TOTAL OF 1 FOR BETA SECTOR) •(1) AT&T ANTENNA (SBNHH-1D65A) @ POS. 2 (TOTAL OF 1 FOR GAMMA SECTOR) •(1) AT&T ANTENNA (QS46512-2) @ POS. 4 (TOTAL OF 1 FOR GAMMA SECTOR) •(1) AT&T RRUS-32 WCS (TYP. OF 1 PER SECTOR, TOTAL OF 3) •(1) AT&T RRUS-32 B2 (TYP. OF 1 PER SECTOR, TOTAL OF 3) • REPLACE (3) DIPLEXERS WITH (3) DBC0061F1V51-2 LOW BAND COMBINERS. • INSTALL (1) DC6-48-60-18-8F SQUID ALONG WITH (2) DC TRUNKS AND (1) ALARM CABLE. • NEW JUMPER CABLES: COAX JUMPERS (4) PER SECTOR FROM EACH RRU (TOTAL OF 12). • NEW FIBER JUMPERS: FIBER JUMPERS (2) FROM THE SQUID TO EACH RRU (TOTAL OF 6). • INSTALL NEW 2" STD.(2.38" O.D.) PIPE BRACE SECURED TO THE MOUNT AND TOWER (TYP. OF 1 PER SECTOR, TOTAL OF 3). • INSTALL NEW 2-1/2" STD. (2.88" O.D.) TO REPLACE EXISTING 2" STD. (2.38" O.D.) PIPES (TYP. OF 2 PER SECTOR, TOTAL OF 6).	
	ITEMS TO BE MOUNTED INSIDE EXISTING EQUIPMENT:	
	• PROPOSED (1) FIBER MANAGEMENT BOX ON ICE BRIDGE POST ALONG WITH (1) OUTDOOR RATED DC6. • REPLACE (3) DIPLEXERS WITH (3) DBC0061F1V51-2 LOW BAND COMBINERS. • REPLACE EXISTING DUL BBU WITH 5216 AND ADD (1) XMU IN EXISTING PURCELL.	
	ITEMS TO REMAIN:	
	•(3) ANTENNAS, (3) RRU'S, (6) TMA'S, (12) COAX CABLES, (2) DC POWER CABLES, (1) FIBER RUNS & (1) SURGE ARRESTOR.	
SITE ADDRESS:	1. THE 1ST SQUID INSTALLED WILL BE ALARMED TO THE LOWEST BAND (OR FIRST INSTALLED) RRU/RRU ON THE ALPHA SECTOR. IN THE EVENT THE ALARM CABLE CANNOT BE CONNECTED TO ALPHA IT WILL BE ACCEPTABLE TO ALARM TO THE CLOSEST PHYSICAL SECTOR ON AN EXCEPTION BASIS.	
	2. 2ND SQUID INSTALLED WILL BE ALARMED TO THE LOWEST BAND (OR FIRST INSTALLED) RRU/RRU ON THE BETA SECTOR.	
	3. 3RD SQUID INSTALLED WILL BE ALARMED TO THE LOWEST BAND (OR FIRST INSTALLED) RRU/RRU ON THE GAMMA SECTOR.	
	4. SQUID ALARMS ARE NOT TO BE DAISY CHAINED.	
LATITUDE:	59 MCGUIRE ROAD	
	SOUTH WINDSOR, CT 06074	
	41.802992 N 41' 48' 10.77" N	
	72.617211 W 72' 37' 1.96" W	
LONGITUDE:	MONOPOLE/OUTDOOR EQUIPMENT	
	150'-0"±	
	122'-0"±	
	TELECOMMUNICATIONS FACILITY	
TYPE OF SITE:	TELECOMMUNICATIONS FACILITY	
	TELECOMMUNICATIONS FACILITY	

DRAWING INDEX		
SHEET NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	1
GN-1	GENERAL NOTES	1
A-1	COMPOUND & EQUIPMENT PLAN	1
A-2	ANTENNA LAYOUTS & ELEVATION	1
A-3	DETAILS	1
A-4	SCHEMATIC AND NOTES	1
RF-1	PLUMBING DIAGRAM	1
G-1	GROUNDING DETAILS	1

CROWN CASTLE SITE NAME: KINGS LOT
CROWN CASTLE SITE #: 876327



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FAX: (978) 336-5586



**CROWN
CASTLE**

500 CUMMINGS PARK DR. #3600
WOBURN, MA 01801



at&t

SITE NUMBER: CT5303
SITE NAME: SOUTH WINDSOR
CCI SITE # 876327
59 MCGUIRE ROAD
SOUTH WINDSOR, CT 06074
HARTFORD COUNTY



at&t

500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067



SITE NUMBER: CT5303

SITE NAME: SOUTH WINDSOR

PROJECT: LTE 2C/3C 2018 UPGRADE

BU# 876327 -KINGS LOT

NOTE:
ALL CONSTRUCTION ACTIVITIES ARE TO BE COMPLETED DIRECTLY THROUGH CROWN. CONTRACTOR MUST HAVE CONSTRUCTION PO AND NTP FROM CROWN DIRECT IN ORDER TO BEGIN. PLEASE CONTACT THE CROWN CONSTRUCTION MANAGER: TAMMY NOSEK 518-860-7063

VICINITY MAP

DIRECTIONS TO SITE:
DEPART ENTERPRISE DR TOWARD CAPITOL BLVD 0.4 MI TURN LEFT ONTO CAPITOL BLVD 0.2 MI TURN LEFT ONTO WEST ST 0.2 MI TAKE RAMP LEFT FOR I-91 NORTH 7.8 MI AT EXIT 29, TAKE RAMP RIGHT FOR CT-15 NORTH / US-5 NORTH TOWARD E. HARTFORD / BOSTON 0.6 MI AT EXIT 90, TAKE RAMP RIGHT FOR US-5 NORTH TOWARD E. RIVER DR / NORWICH 0.6 MI TURN LEFT ONTO US-5 / MAIN ST ECONO LODGE ON THE CORNER 0.9 MI KEEP STRAIGHT ONTO US-5 / US-44 / MAIN ST 0.4 MI KEEP STRAIGHT ONTO US-5 / MAIN ST 1.2 MI TURN LEFT ONTO KING ST 1.3 MI TURN RIGHT ONTO MCGUIRE RD 523 FT ARRIVE AT 67 MCGUIRE RD, SOUTH WINDSOR, CT 06074



GENERAL NOTES	
1.	THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2.	THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3.	CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T MOBILITY REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.
4.	CONSTRUCTION DRAWINGS ARE VALID FOR SIX MONTHS AFTER ENGINEER OF RECORD'S STAMPED AND SIGNED SUBMITTAL DATE LISTED HEREIN.

72 HOURS

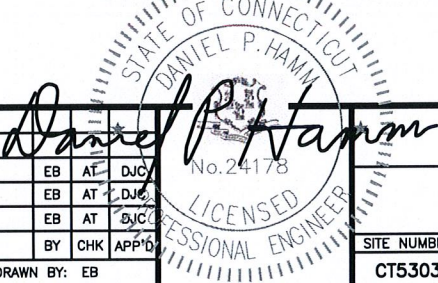


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OR CALL 811

UNDERGROUND SERVICE ALERT



Daniel P. Hamm
No. 24178
LICENSED PROFESSIONAL ENGINEER

AT&T	
TITLE SHEET (LTE 2C/3C)	
SITE NUMBER	DRAWING NUMBER
CT5303	T-1
REV	1

GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS 2 AWG STRANDED COPPER FOR OUTDOOR BTS.
6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO GROUND BAR.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWS COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
- CONTRACTOR – CROWN CASTLE
SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
OWNER – AT&T MOBILITY
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
16. CONSTRUCTION SHALL COMPLY WITH SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T SITES."
17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
20. APPLICABLE BUILDING CODES:
SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
BUILDING CODE: IBC 2012 WITH 2016 CT BUILDING CODE AMENDMENTS
ELECTRICAL CODE: REFER TO ELECTRICAL DRAWINGS
LIGHTENING CODE: REFER TO ELECTRICAL DRAWINGS

SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

MANUAL OF STEEL CONSTRUCTION, ASD, FOURTEENTH EDITION;

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-G, STRUCTURAL STANDARDS FOR STEEL

EQUIPMENT AND ANTENNA SUPPORTING STRUCTURES; REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	EQ	EQUAL	REQ	REQUIRED
AWG	AMERICAN WIRE GAUGE	GC	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
BBU	BATTERY BACKUP UNIT	GRC	GALVANIZED RIGID CONDUIT	TBD	TO BE DETERMINED
BTCW	BARE TINNED SOLID COPPER WIRE	MGB	MASTER GROUND BAR	TBR	TO BE REMOVED
BGR	BURIED GROUND RING	MIN	MINIMUM	TBRR	TO BE REMOVED AND REPLACED
BTS	BASE TRANSCEIVER STATION	P	PROPOSED	TYP	TYPICAL
E	EXISTING	NTS	NOT TO SCALE	UG	UNDER GROUND
EGB	EQUIPMENT GROUND BAR	RAD	RADIATION CENTER LINE (ANTENNA)	VIF	VERIFY IN FIELD
EGR	EQUIPMENT GROUND RING	REF	REFERENCE		



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**CROWN
CASTLE**

500 CUMMINGS PARK DR. #3600
WOBURN, MA 01801

SITE NUMBER: CT5303
SITE NAME: SOUTH WINDSOR
CCI SITE # 876327

59 MCGUIRE ROAD
SOUTH WINDSOR, CT 06074
HARTFORD COUNTY



at&t

500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

1	11/29/17	REVISED FOR CONSTRUCTION	EB	AT	DJC				
0	10/26/17	REVISED FOR REVIEW	EB	AT	DJC				
A	09/05/17	ISSUED FOR REVIEW	EB	AT	BJC				
NO.	DATE	REVISIONS	BY	CHK	APP'D				
SCALE: AS SHOWN		DESIGNED BY: AT	DRAWN BY: EB						



Daniel P. Hamm
No. 24178
LICENSED PROFESSIONAL ENGINEER

AT&T		
GENERAL NOTES (LTE 2C/3C)		
SITE NUMBER	DRAWING NUMBER	REV
CT5303	GN-1	1

NOTE:

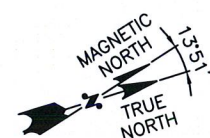
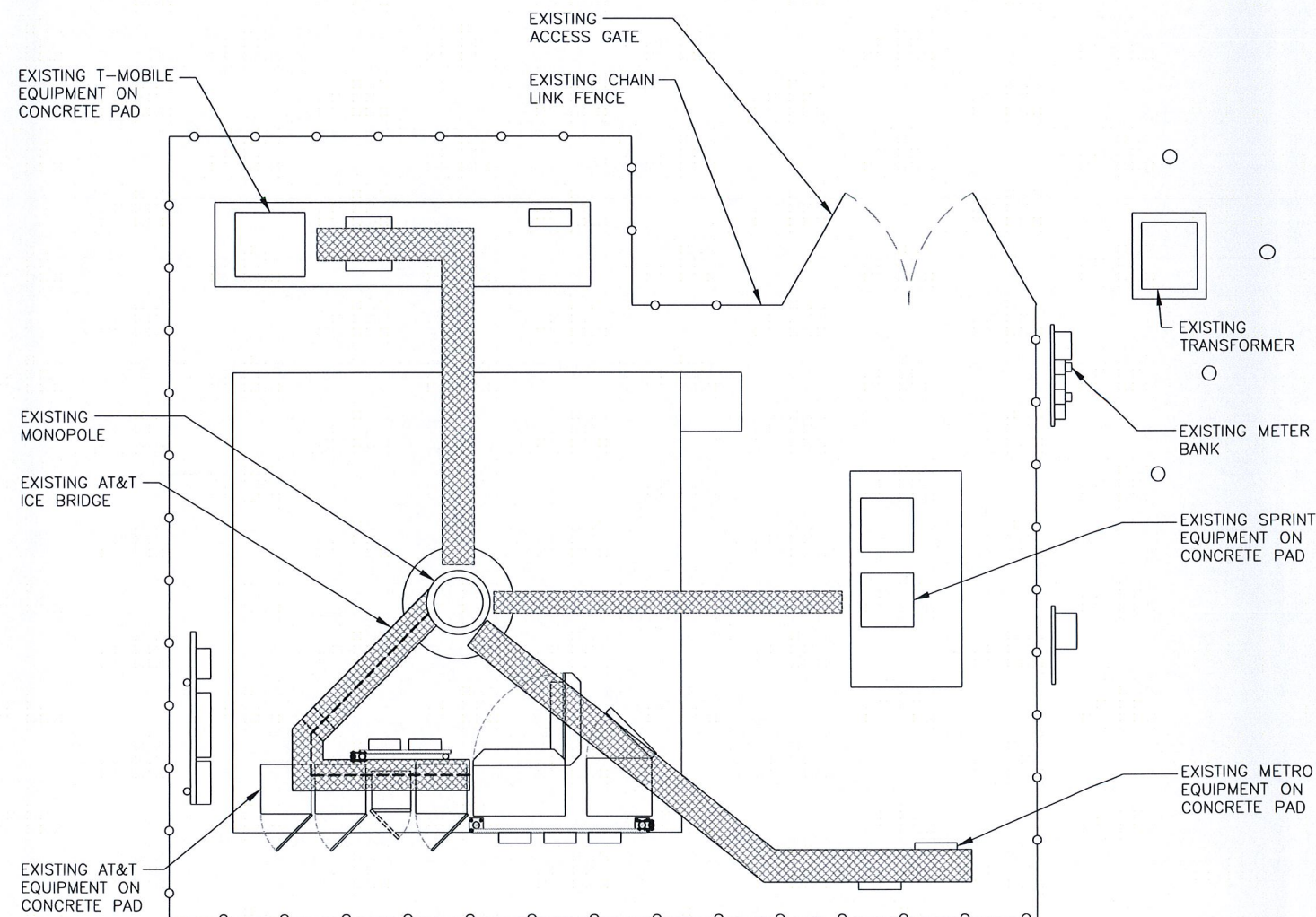
ALL ANTENNAS AND LINES TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE AND FINAL AT&T RF DATA SHEET.

NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING **ANTENNA MOUNT** TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY: HUDSON DESIGN GROUP, LLC. DATED: OCTOBER 23, 2017

NOTE:

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

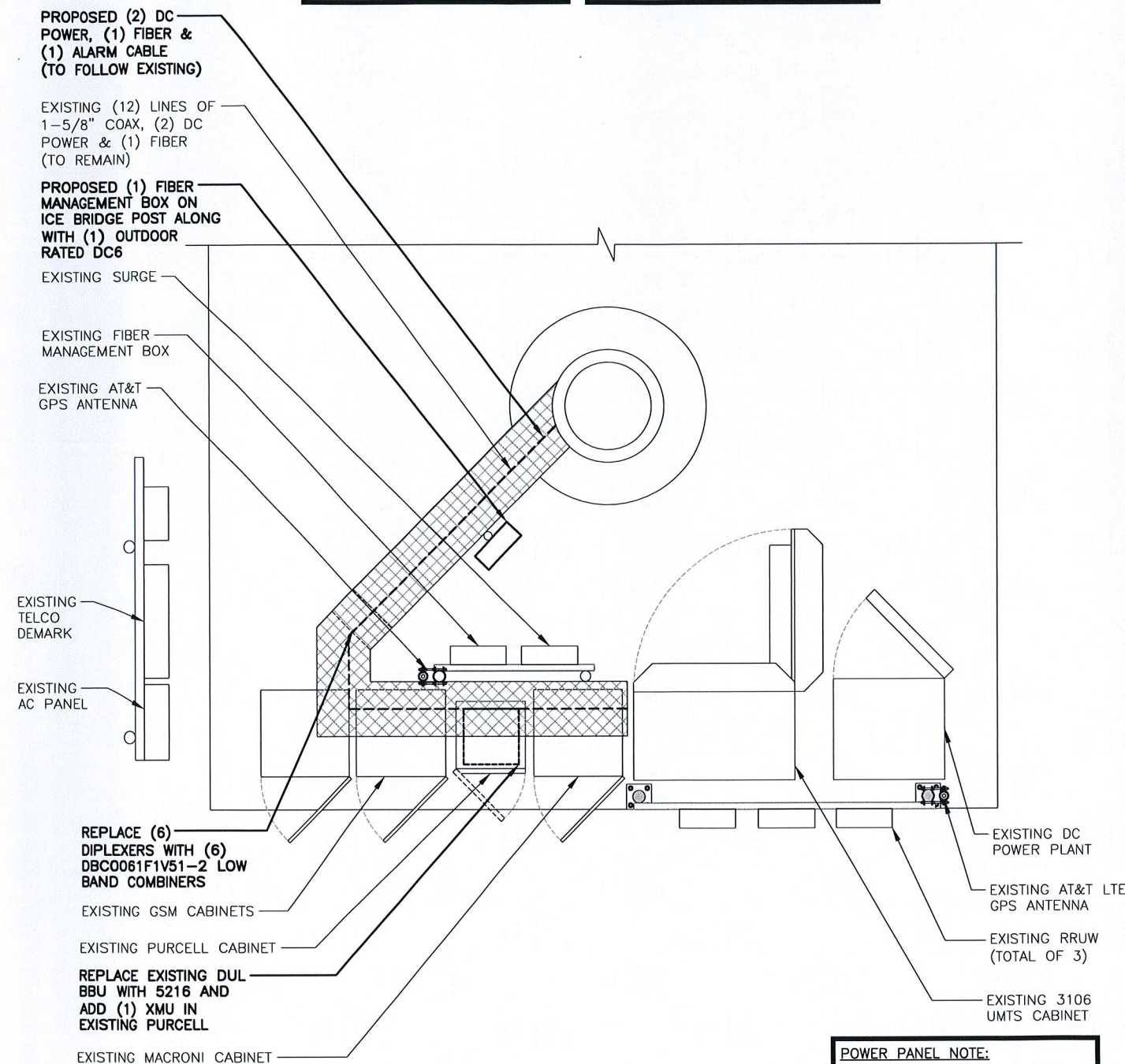


COMPOUND PLAN

22x34 SCALE: 1/4"=1'-0"
11x17 SCALE: 1/8"=1'-0"

1
A-1

0 2'-0" 4'-0" 8'-0" 12'-0"



EQUIPMENT PLAN

22x34 SCALE: 1/2"=1'-0"
11x17 SCALE: 1/4"=1'-0"

2
A-1

0 1'-0" 2'-0" 4'-0" 6'-0"

POWER PANEL NOTE:

ADD (6) 30AMP SP DC BREAKER FOR NEW RRU ADDS, IF NEEDED

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CROWN CASTLE

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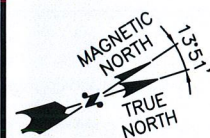
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SCALE: AS SHOWN DESIGNED BY: AT DRAWN BY: EB					

STATE OF CONNECTICUT
DANIEL P. HAMM
No. 24178
LICENSED PROFESSIONAL ENGINEER

AT&T

COMPOUND & EQUIPMENT PLAN
(LTE 2C/3C)

SITE NUMBER	DRAWING NUMBER	REV
CT5303	A-1	1



EXISTING RRU-11
(TYP. 1 PER SECTOR,
TOTAL OF 3) (TO REMAIN)

BETA
SECTOR
LTE
230°

BETA
SECTOR
UMTS/GSM
230°

EXISTING SURGE
ARRESTOR TO REMAIN

ALPHA
SECTOR
UMTS/GSM
110°

ALPHA
SECTOR
LTE
110°

ALPHA
SECTOR
UMTS/GSM
110°

EXISTING ANTENNA PLAN

SCALE: N.T.S.

1
A-2

PROPOSED AT&T ANTENNA
(TPA-65R-LCUUUU-H8)
● POS. 4 (TOTAL OF 1 FOR BETA
SECTOR) (REPLACE EXISTING)

EXISTING RRU-11
(TYP. 1 PER SECTOR,
TOTAL OF 3) (TO REMAIN)

EXISTING SURGE
ARRESTOR (TO REMAIN)

BETA
SECTOR
LTE
230°

PROPOSED AT&T ANTENNA
(HPA-65R-BUUU-H8) ● POS. 2
(TOTAL OF 1 FOR BETA
SECTOR) (REPLACE EXISTING)

BETA
SECTOR
UMTS/GSM
230°

INSTALL NEW 2" STD. (2.38"
O.D.) PIPE BRACE SECURED TO
THE MOUNT AND TOWER (TYP.
OF 1 PER SECTOR, TOTAL OF 3)
(VERIFY LENGTH IN FIELD)

PROPOSED 2-1/2" STD. (2.88"
O.D.) TO REPLACE EXISTING 2"
STD. (2.38" O.D.) PIPE (TYP. OF
2 PER SECTOR, TOTAL OF 6)

PROPOSED AT&T COMBINERS
(DBC0061F1V51-2)
● POS. 4 (TYP. 1 PER
SECTOR, TOTAL OF 3)
(REPLACE EXISTING GSM
COMPONENTS)

PROPOSED AT&T ANTENNA
(QS6512-2) ● POS. 4
(TOTAL OF 1 FOR ALPHA
SECTOR) (REPLACE EXISTING)

PROPOSED ANTENNA PLAN

SCALE: N.T.S.

2
A-2

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**CROWN
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at&t

500 ENTERPRISE DRIVE, SUITE 3A
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A	09/05/17	ISSUED FOR REVIEW	EB	AT	DJC
SCALE: AS SHOWN DESIGNED BY: AT DRAWN BY: EB					

ELEVATION
22x34 SCALE: 3/32"=1'-0"
11x17 SCALE: 3/64"=1'-0"
No. 24178
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER	DRAWING NUMBER	REV
CT5303	A-2	1

AT&T
ANTENNA LAYOUTS & ELEVATION
(LTE 2C/3C)

NOTE:

AN ANALYSIS FOR THE CAPACITY OF
THE EXISTING ANTENNA MOUNT TO
SUPPORT THE PROPOSED LOADING
HAS BEEN COMPLETED BY:
HUDSON DESIGN GROUP, LLC.
DATED: OCTOBER 23, 2017

NOTE:

ALL ANTENNAS AND LINES TO BE
INSTALLED IN ACCORDANCE WITH
STRUCTURAL ANALYSIS PROVIDED
BY CROWN CASTLE AND FINAL
AT&T RF DATA SHEET.

NOTE:

REFER TO THE FINAL RF DATA
SHEET FOR FINAL ANTENNA
SETTINGS.

EXISTING UMTS/GSM ANTENNA ● POS. 1
(TYP. 1 PER SECTOR, TOTAL OF 3) TO BE
VERTICALLY CENTERED ON ANTENNA MOUNT
HORIZONTAL PIPE (SEE MOUNT ANALYSIS
BY HDG DATED 10/23/17)

PROPOSED AT&T ANTENNA
(QS46512-2) ● POS. 4
(TOTAL OF 1 FOR GAMMA
SECTOR) (REPLACE EXISTING)

● OF EXISTING UMTS/GSM AT&T
ANTENNAS (TO BE RELOCATED)
ELEV. 123'-0"± (AGL)

● OF PROPOSED &
EXISTING AT&T ANTENNAS
ELEV. 122'-0"± (AGL)

EXISTING TMA ● POS. 4
(TYP. OF 2 PER SECTOR,
TOTAL OF 6) (TO BE
REMOVED)

EXISTING TMA ● POS. 1
(TYP. OF 2 PER SECTOR,
TOTAL OF 6) (TO REMAIN)

EXISTING UMTS/GSM
ANTENNA ● POS. 1
(TYP. 1 PER SECTOR,
TOTAL OF 3) (TO REMAIN)

PROPOSED 2-1/2" STD. (2.88"
O.D.) TO REPLACE EXISTING 2"
STD. (2.38" O.D.) PIPE (TYP. OF
2 PER SECTOR, TOTAL OF 6)
INSTALL NEW 2" STD. (2.38" O.D.)
PIPE BRACE SECURED TO THE MOUNT
AND TOWER (TYP. OF 1 PER SECTOR,
TOTAL OF 3) (VERIFY LENGTH IN FIELD)

ENLARGED ANTENNA ELEVATION

22x34 SCALE: 3/8"=1'-0"
11x17 SCALE: 3/16"=1'-0"

4
A-2

0 1'-4" 2'-8" 5'-4" 8'-0"

NOTE:

EXISTING ANTENNAS TO BE
LOWERED VERTICALLY CENTERED
ON ANTENNA MOUNT HORIZONTAL
PIPE

TOP OF EXISTING MONOPOLE
ELEV. 150'-0"± (AGL)

EXISTING ANTENNAS
(BY OTHERS)

● OF EXISTING UMTS/GSM AT&T
ANTENNAS (TO BE RELOCATED)
ELEV. 123'-0"± (AGL)

● OF PROPOSED &
EXISTING AT&T ANTENNAS
ELEV. 122'-0"± (AGL)

PROPOSED AT&T RRU'S 32
(WCS) ● POS. 4 (TYP. 1 PER
SECTOR, TOTAL OF 3)

PROPOSED AT&T ANTENNA
(QS46512-2) ● POS. 4
(TOTAL OF 1 FOR GAMMA
SECTOR) (REPLACE EXISTING)

PROPOSED 2-1/2" STD. (2.88"
O.D.) TO REPLACE EXISTING 2"
STD. (2.38" O.D.) PIPE (TYP. OF
2 PER SECTOR, TOTAL OF 6)

PROPOSED (2) DC
POWER, (1) FIBER &
(1) ALARM CABLE
(TO FOLLOW EXISTING)

EXISTING (12) LINES OF
1-5/8" COAX, (2) DC
POWER & (1) FIBER
(TO REMAIN)

EXISTING
MONOPOLE

NOTE:

GROUND LEVEL EQUIPMENT
NOT SHOWN FOR CLARITY

GROUND LEVEL
ELEV. 0'-0"± (AGL)

0 5'-4" 10'-8" 21'-4" 32'-0"

FINAL ANTENNA SCHEDULE															
SECTOR	BAND	ANTENNA		SIZE (INCHES) (L X W X D)	RAD CENTER	AZIMUTH	COMBINERS		TMA'S		RRU'S		SIZE (INCHES) (L X W X D)	COAX JUMPERS	FIBER JUMPERS
ALPHA	850 MHZ/1900 MHZ	EXISTING	7770.00	55X11X5	122'-0"±	110'			EXISTING EXISTING	LGP21401 LGP21401	EXISTING	RRU-11	19.7X17.0X7.2	-	-
	700 MHZ/1900 MHZ	PROPOSED	HPA-65R-BUU-H6	72X14.8X9	122'-0"±	110'					PROPOSED	RRU-32 B2	27.2X12.1X7.0	2*	1*
	700 MHZ/1900MHZ	PROPOSED	QS66512-2	52X12X9.6	122'-0"±	110'	PROPOSED	DBC0061F1V51-2			PROPOSED	RRU-32 WCS	27.2X12.1X7.0	2*	1*
BETA	850 MHZ/1900 MHZ	EXISTING	7770.00	55X11X5	122'-0"±	230'			EXISTING EXISTING	LGP21401 LGP21401	EXISTING	RRU-11	19.7X17.0X7.2	-	-
	700 MHZ/1900 MHZ	PROPOSED	HPA-65R-BUU-H8	92.4X14.8X7.4	122'-0"±	230'					PROPOSED	RRU-32 B2	27.2X12.1X7.0	2*	1*
	850 MHZ/1900MHZ	PROPOSED	TPA-65R-LCUUUU-H8	96X14.4X8.6	122'-0"±	230'	PROPOSED	DBC0061F1V51-2			PROPOSED	RRU-32 WCS	27.2X12.1X7.0	2*	1*
GAMMA	850 MHZ/1900 MHZ	EXISTING	7770.00	55X11X5	122'-0"±	350'			EXISTING EXISTING	LGP21401 LGP21401	EXISTING	RRU-11	19.7X17.0X7.2	-	-
	700 MHZ/1900 MHZ	PROPOSED	SBNHH-1D65A	55.6X11.9X7.1	122'-0"±	350'					PROPOSED	RRU-32 B2	27.2X12.1X7.0	2*	1*
	850 MHZ/1900MHZ	PROPOSED	QS46512-2	52X12X9.6	122'-0"±	350'	PROPOSED	DBC0061F1V51-2			PROPOSED	RRU-32 WCS	27.2X12.1X7.0	2*	1*

FINAL ANTENNA CONFIGURATION TABLE 4 A-3

*COAX JUMPER NOTE:
COAX JUMPERS (4) PER SECTOR,
FROM EACH RRU (TOTAL OF 12).

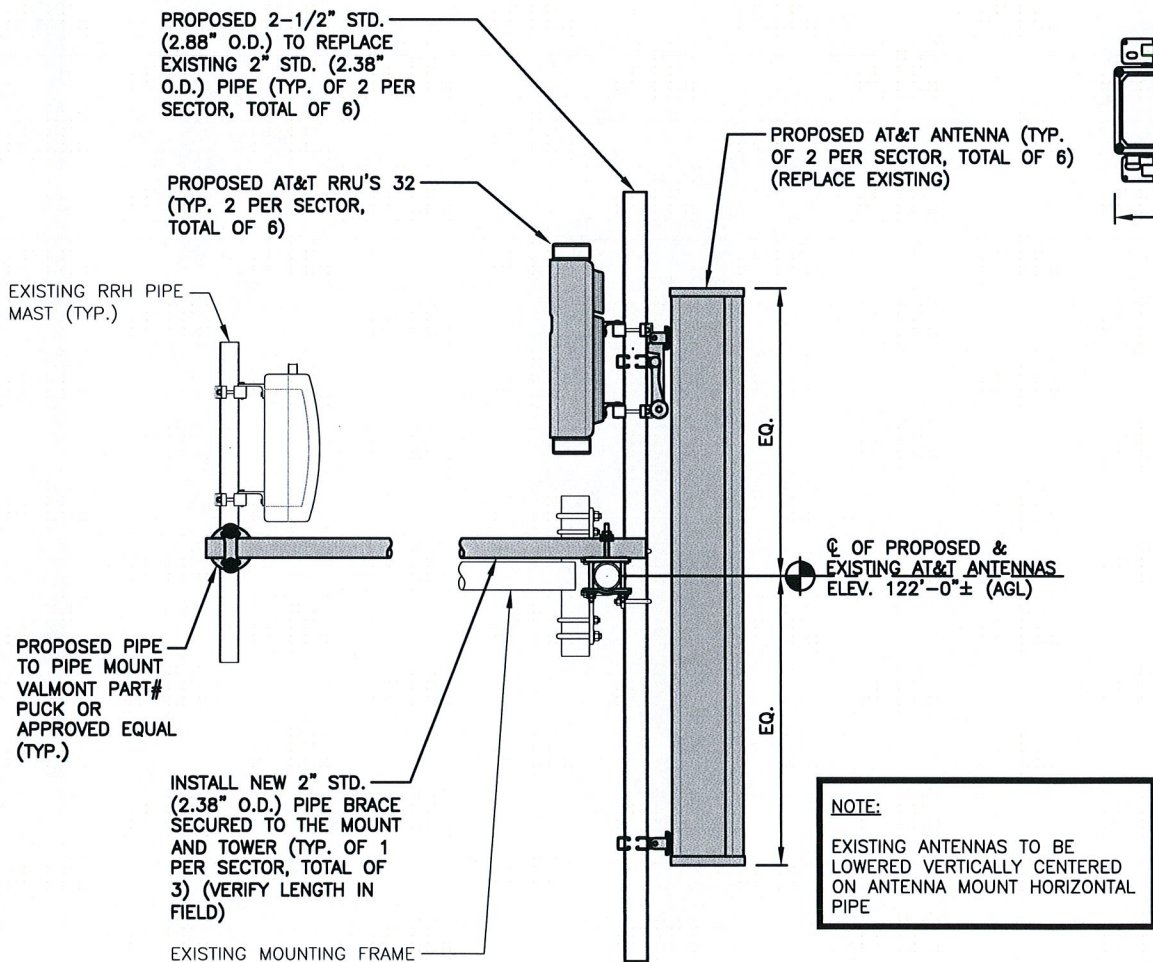
**FIBER JUMPER NOTE:
FIBER JUMPERS (2) PER SECTOR,
FROM THE SQUID TO EACH RRU
(TOTAL OF 6).

NOTE:
REFER TO THE FINAL RF DATA
SHEET FOR FINAL ANTENNA
SETTINGS.

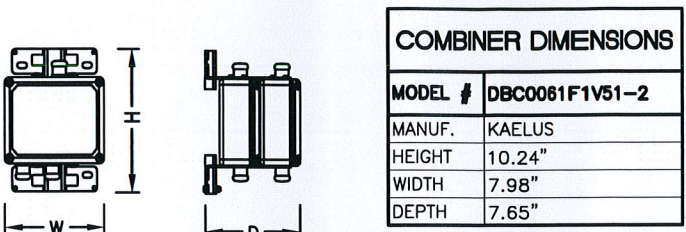
NOTE:
ALL ANTENNAS AND LINES TO BE
INSTALLED IN ACCORDANCE WITH
STRUCTURAL ANALYSIS PROVIDED
BY CROWN CASTLE AND FINAL
AT&T RF DATA SHEET.

NOTE:
AN ANALYSIS FOR THE CAPACITY OF
THE EXISTING ANTENNA MOUNT TO
SUPPORT THE PROPOSED LOADING
HAS BEEN COMPLETED BY:
HUDSON DESIGN GROUP, LLC.
DATED: OCTOBER 23, 2017

NOTE:
1. THE 1ST SQUID INSTALLED WILL
BE ALARMED TO THE LOWEST BAND
(OR FIRST INSTALLED) RRH/RRU ON
THE ALPHA SECTOR. IN THE EVENT
THE ALARM CABLE CANNOT BE
CONNECTED TO ALPHA IT WILL BE
ACCEPTABLE TO ALARM TO THE
CLOSEST PHYSICAL SECTOR ON AN
EXCEPTION BASIS.
2. 2ND SQUID INSTALLED WILL BE
ALARMED TO THE LOWEST BAND (OR
FIRST INSTALLED) RRH/RRU ON THE
BETA SECTOR.
3. 3RD SQUID INSTALLED WILL BE
ALARMED TO THE LOWEST BAND (OR
FIRST INSTALLED) RRH/RRU ON THE
GAMMA SECTOR.
4. SQUID ALARMS ARE NOT TO BE
DAISY CHAINED.



PROPOSED ANTENNA & RRH MOUNTING DETAIL 1 A-3
22x34 SCALE: 1"=1'-0"
11x17 SCALE: 1/2"=1'-0"



PROPOSED COMBINER 2 A-3
SCALE: N.T.S.

RRU CHART				
QUANTITY	MODEL	L	W	D
3(E)	RRUS-11	19.7"	17.0"	7.2"
-	RRUS-12	20.4"	18.5"	7.5"
6(P)	RRUS-32	27.2"	12.1"	7.0"
-	RRUS-E2	20.4"	18.5"	7.5"
-	LTE-A2	16.4"	15.2"	3.4"

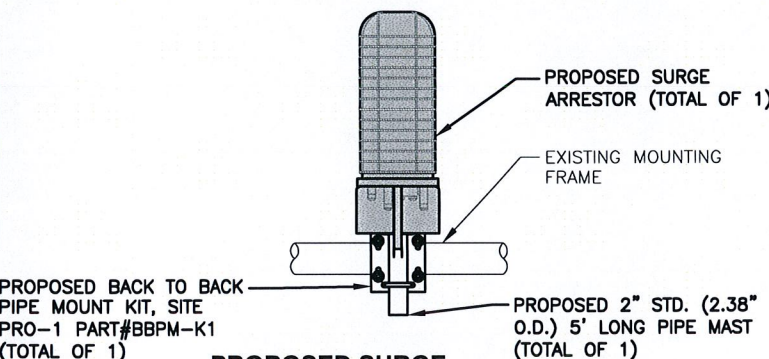
NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS

NOTE:
SEE RFDS FOR RRH
FREQUENCY AND
MODEL NUMBER

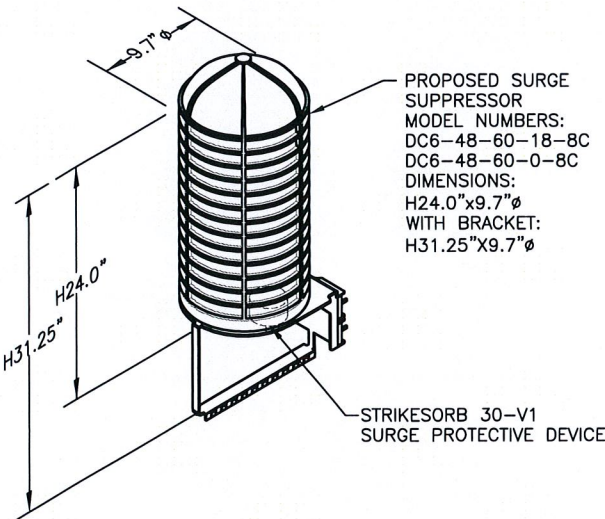
PROPOSED RRU REFER TO THE
FINAL RFDS AND CHART FOR
QUANTITY, MODEL AND DIMENSIONS

NOTE:
MOUNT PER MANUFACTURER'S
SPECIFICATIONS.

PROPOSED RRU DETAIL 3 A-3
SCALE: N.T.S.



PROPOSED SURGE ARRESTOR MOUNTING DETAIL 5 A-3
SCALE: N.T.S.



DC SURGE SUPPRESSOR DETAIL 6 A-3
SCALE: N.T.S.

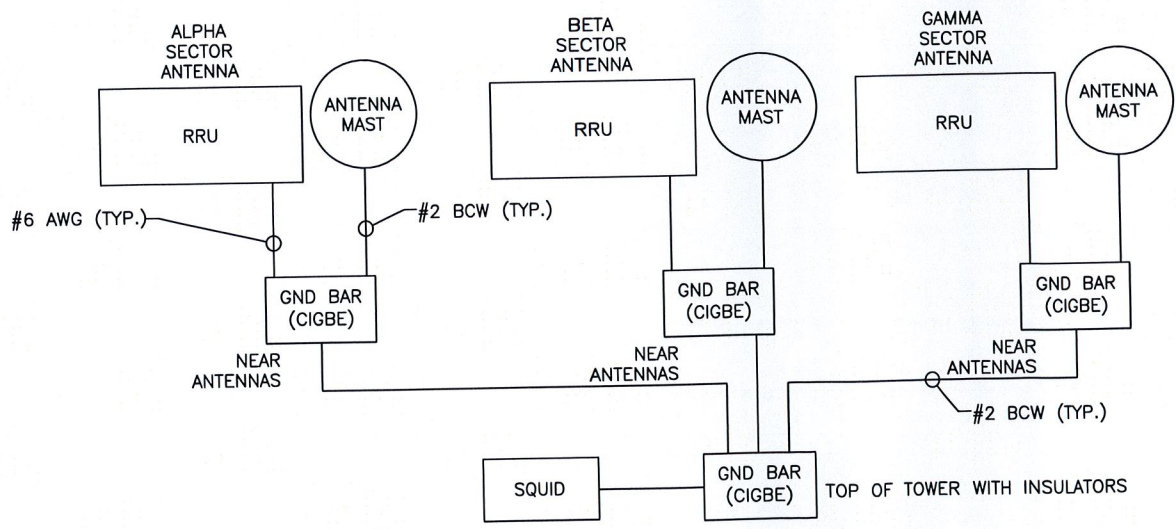
COAX COLOR CODING AND IDENTIFICATION NOTES

- 1. SECTOR ORIENTATION/AZIMUTH WILL VARY FROM REGION TO REGION AND IS SITE SPECIFIC. REFER TO RF REPORT FOR EACH SITE TO DETERMINE THE ANTENNA LOCATION AND FUNCTION OF EACH TOWER SECTOR FACE.
- 2. THE ANTENNA SYSTEM COAX SHALL BE LABELED WITH VINYL TAPE EXCEPT IN LOCATIONS WHERE ENVIRONMENTAL CONDITIONS CAUSE PHYSICAL DAMAGE, THE PHYSICAL TAGS ARE PREFERRED.
- 3. THE STANDARD IS BASED ON 8 COLORED TAPES-RED, BLUE, GREEN, YELLOW, ORANGE, BROWN, WHITE, AND VIOLET. THESE TAPES MUST BE 3/4" WIDE & UV RESISTANT SUCH AS SCOTCH 35 VINYL ELECTRICAL COLOR CODING TAPE AND SHOULD BE READILY AVAILABLE TO THE ELECTRICIAN OR SUBCONTRACTOR ON SITE.
- 4. USING COLOR BANDS ON THE CABLES, MARK ALL RF CABLE BY SECTOR AND CABLE NUMBER AS SHOWN ON "CABLE MARKING COLOR CONVENTION TABLE".
- 5. WHEN AN EXISTING COAXIAL LINE THAT IS INTENDED TO BE A SHARED LINE BETWEEN GSM/3G AND IS-136/TDMA IS ENCOUNTERED, THE SUBCONTRACTOR SHALL REMOVE THE EXISTING COLOR CODING SCHEME AND REPLACE IT WITH THE COLOR CODING AND TAGGING STANDARD THAT IS OUTLINED IN THE CURRENT VERSION OF ND-00027. IN THE ABSENCE OF AN EXISTING COLOR CODING AND TAGGING SCHEME, OR WHEN INSTALLING PROPOSED COAXIAL CABLES, THE GUIDELINE SHALL BE IMPLEMENTED AT THE SITE REGARDLESS OF TECHNOLOGY.
- 6. ALL COLOR CODE TAPE SHALL BE 3M-35 AND SHALL BE INSTALLED USING A MINIMUM OF 3 WRAPS OF TAPE AND SHALL BE NEATLY TRIMMED AND SMOOTHED OUT SO AS TO AVOID UNRAVELING.
- 7. ALL COLOR BANDS INSTALLED AT THE TOP OF THE TOWER SHALL BE A MINIMUM OF 3" WIDE, AND SHALL HAVE A MINIMUM OF 3/4" OF SPACE BETWEEN EACH COLOR.
- 8. ALL COLOR CODES SHALL BE INSTALLED SO AS TO ALIGN NEATLY WITH ONE ANOTHER FROM SIDE TO SIDE.
- 9. IF EXISTING CABLES AT THE SITE ALREADY HAVE A COLOR CODING SCHEME AND THEY ARE NOT INTENDED TO BE REUSED OR SHARED WITH THE GSM TECHNOLOGY, THE EXISTING COLOR CODING SCHEME SHALL REMAIN UNTOUCHED.

CABLE MARKING TAGS

WHEN USING THE ALTERNATIVE LABELING METHOD, EACH RF CABLE SHALL BE IDENTIFIED WITH A METAL ID TAG MADE OF STAINLESS STEEL OR BRASS, THE TAG SHALL BE 1 1/2" IN DIAMETER WITH 1/4" STAMPED LETTERS AND NUMBERS INDICATING THE SECTOR, ANTENNA POSITION, AND CABLE NUMBER. THE ID MARKING LOCATIONS SHOULD BE AS PER CABLING MARKING LOCATIONS TABLE. THE TAG SHOULD BE ATTACHED WITH CORROSION PROOF WIRE AROUND THE CABLE AT THE SAME LOCATION AS DEFINED ABOVE. THE TAG SHOULD BE LABELED AS SHOWN ON THE GSM AND UMTS LINE TAG DETAIL.

CABLE MARKING LOCATIONS TABLE	
NO.	LOCATIONS
①	EACH TOP JUMPER SHALL BE COLOR CODED WITH 1 SET OF 3" WIDE BANDS
②	EACH MAIN COAX SHALL BE COLORED RED WITH 1 SET OF 3" WIDE BANDS NEAR THE TOP JUMPER CONNECTION AND WITH 1 SET OF 3/4" WIDE COLOR BANDS. JUST PRIOR TO ENTERING THE BTS FOR THE TRANSMITTER BUILDING.
③	CABLE ENTRY PORT ON THE INTERIOR OF THE SHELTER.
④	ALL BOTTOM JUMPERS SHALL BE COLORED WITH 1 SET OF 3/4" WIDE BANDS ON EACH END OF THE BOTTOM JUMPERS.
⑤	ALL BOTTOM JUMPERS SHALL BE COLORED WITH 1 SET OF 3/4" WIDE BANDS ON EACH END OF THE BOTTOM JUMPERS.



NOTE:
TOWER GROUNDED, GROUND BAR TO HAVE INSULATORS.

SCHEMATIC DIAGRAM GROUNDING SYSTEM

PLUMBING DIAGRAM TO BE INSERTED ONCE
FINAL PLUMBING DIAGRAM IS AVAILABLE

- NOTES:
- 1. CONTRACTOR TO CONFIRM ALL PARTS.
 - 2. INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS.

NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

PLUMBING DIAGRAM 1
SCALE: N.T.S. RF-1



HUDSON
Design Group LLC

45 BEECHWOOD DRIVE
NORTH ANDOVER, MA 01845

TEL: (978) 557-5553
FAX: (978) 336-5586



**CROWN
CASTLE**

500 CUMMINGS PARK DR. #3600
WOBURN, MA 01801

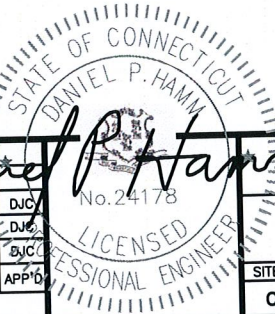
SITE NUMBER: CT5303
SITE NAME: SOUTH WINDSOR
CCI SITE # 876327
59 MCGUIRE ROAD
SOUTH WINDSOR, CT 06074
HARTFORD COUNTY



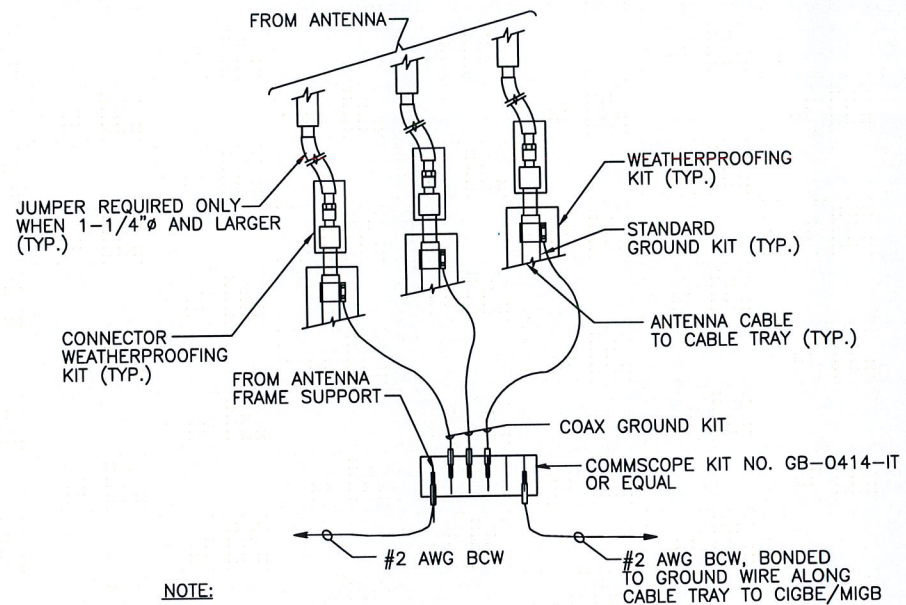
at&t

500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

1	11/29/17	REVISED FOR CONSTRUCTION	EB	AT	DJC
0	10/28/17	REVISED FOR REVIEW	EB	AT	DJC
A	09/05/17	ISSUED FOR REVIEW	EB	AT	DJC
NO.	DATE	REVISIONS	BY	CHK	APP'D
SCALE: AS SHOWN		DESIGNED BY: AT	DRAWN BY: EB		

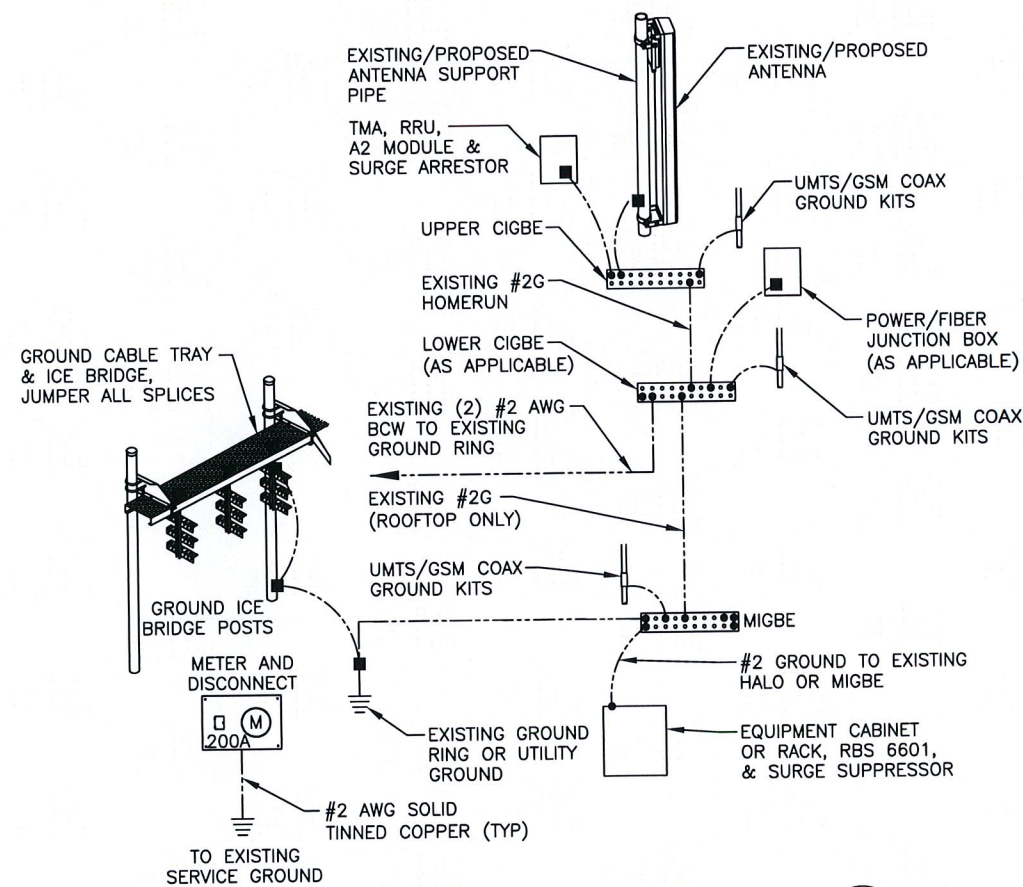


AT&T		
PLUMBING DIAGRAM (LTE 2C/3C)		
SITE NUMBER	DRAWING NUMBER	REV
CT5303	RF-1	1



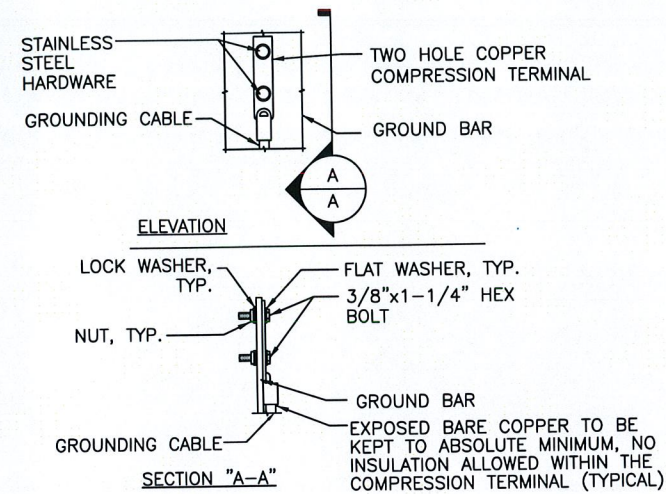
GROUND WIRE TO GROUND BAR CONNECTION DETAIL
SCALE: N.T.S.

2
G-1



GROUNDING RISER DIAGRAM
SCALE: N.T.S.

1
G-1



- NOTE:
1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
 2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATION.
 3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB

TYPICAL GROUND BAR CONNECTION DETAIL
SCALE: N.T.S.

3
G-1

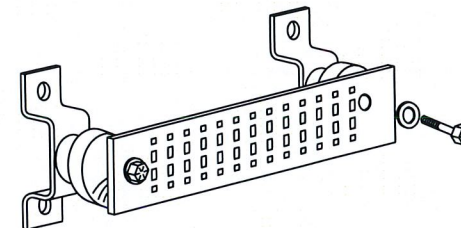
EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

SECTION "P" - SURGE PRODUCERS

- CABLE ENTRY PORTS (HATCH PLATES) (#2)
- GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
- TELCO GROUND BAR
- COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
- +24V POWER SUPPLY RETURN BAR (#2)
- 48V POWER SUPPLY RETURN BAR (#2)
- RECTIFIER FRAMES.

SECTION "A" - SURGE ABSORBERS

- INTERIOR GROUND RING (#2)
- EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
- METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
- BUILDING STEEL (IF AVAILABLE) (#2)



GROUND BAR - DETAIL
SCALE: N.T.S.

4
G-1

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	11/29/17	REVISED FOR CONSTRUCTION	EB	AT	DJC
0	10/26/17	REVISED FOR REVIEW	EB	AT	DJC
A	09/05/17	ISSUED FOR REVIEW	EB	AT	DJC



AT&T		
GROUNDING DETAILS (LTE 2C/3C)		
SITE NUMBER	DRAWING NUMBER	REV
CT5303	G-1	1