MARY CAULFIELD
978-994-0252
CENTERLINE COMMUNICATIONS
750 WEST CENTER STREET
WEST BRIDGEWATER MA 02379

1 LBS

1 OF 1

SHIP TO:
CONNECTICUT SITING COUNCIL
10 FRANKLIN SQUARE
NEW BRITAIN CT 06051-2655

CT 067 9-06

UPS GROUND
TRACKING #: 1Z 9Y4 503 03 0110 6639

BILLING: P/P

XOL 18.03.09 NV45 99.0A 04/2018

MARY CAULFIELD
978-994-0252
CENTERLINE COMMUNICATIONS
750 WEST CENTER STREET
WEST BRIDGEWATER MA 02379

1 LBS **1 OF 1**

SHIP TO:
J. CHRISTOPHER KERVICK
TOWN OF WINDSOR LOCKS
FIRST SELECTMEN'S OFFICE
50 CHURCH STREET
WINDSOR LOCKS CT 06096

CT 060 9-02

UPS GROUND
TRACKING #: 1Z 9Y4 503 03 0243 5648

BILLING: P/P

XOL 18.03.09 NV45 99.0A 04/2018

MARY CAULFIELD
978-994-0252
CENTERLINE COMMUNICATIONS
750 WEST CENTER STREET
WEST BRIDGEWATER MA 02379

1 LBS

1 OF 1

SHIP TO:
JENNIFER RODRIQUEZ
TOWN OF WINDSOR LOCKS
TOWN PLANNER
50 CHURCH STREET
WINDSOR LOCKS CT 06096

CT 060 9-02

UPS GROUND
TRACKING #: 1Z 9Y4 503 03 0956 6655

BILLING: P/P

XOL 18.03.09 NV45 99.0A 04/2018

MARY CAULFIELD
978-994-0252
CENTERLINE COMMUNICATIONS
750 WEST CENTER STREET
WEST BRIDGEWATER MA 02379

1 LBS

1 OF 1

SHIP TO:
CARLA SHORTER
SBA COMMUNICATIONS CORPORATION
8051 CONGRESS AVENUE
BOCA RATON FL 33487-1307

FL 332 6-07

UPS GROUND
TRACKING #: 1Z 9Y4 503 03 2200 4478

BILLING: P/P

XOL 18.03.09 NV45 99.0A 04/2018

Mary Caulfield, Site Acquisition Consultant
c/o New Cingular Wireless, PCS LLC (AT&T)
Centerline Communications, LLC
750 West Center Street, Suite 301
West Bridgewater, MA 02379
Mobile: (978) 994-0252
MCaulfield@centerlinecommunications.com

June 13, 2018

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

RE: Notice of Exempt Modification // Site Number: CT5270 (Name: Windsor Locks)
2-4 Volunteer Drive, Windsor Locks, CT 06082
N 41.9281055555556// W -72.6467833333333

Dear Ms. Bachman:

New Cingular Wireless, PCS, LLC ("AT&T") currently maintains 6 total antennas at the 164-foot mount on the existing 195-foot monopole tower, located at 2 Volunteer Drive, Windsor Locks, CT. The tower is owned by MCM Acquisition 2017, LLC, an SBA Corporation entity. The property is owned by the Town of Windsor Locks. AT&T now intends to add 3 new LTE (1900/2300 band) antennas for its LTE upgrade. AT&T also intends to install 6 new remote radios; and certain in-cabinet upgrades at the base.

Note that this facility was originally approved prior to the Council's jurisdiction, on 6/29/1999 by the Town of Windsor Locks Planning Department through Zoning Sign-off.

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 J. Christopher Kervick, First Selectman and representative for the Town of Windsor Locks as Property Owner, Jennifer Rodriquez, Town Planner, as well as SBA Communications, the tower owner.

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

Attached to accommodate this filing are construction drawings dated a May 23, 2018 by Hudson Design Group LLC, a structural analysis dated May 8, 2018 by Allpro Consulting Group, Inc. and an Emissions Analysis Report dated March 26, 2018 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 an ineligible change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading, pursuant to the structural analysis by Allpro Consulting Group, Inc., dated May 8, 2018.

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,

_____

Mary Caulfield, Site Acquisition Consultant
c/o New Cingular Wireless, PCS LLC (AT&T)
Centerline Communications, LLC
750 West Center Street, Suite 301
West Bridgewater, MA 02379
Mobile: (978) 994-0252
MCaulfield@centerlinecommunications.com

cc: J. Christopher Kervick, Town of Windsor Locks First Selectman / Property Owner
Jennifer Rodriquez, Town of Windsor Town Planner
SBA Corporation, Tower Owner

ALLPRO
CONSULTING GROUP, INC.
9221 Lyndon B. Johnson Freeway, #204, Dallas, TX 75243 ★ PHONE 972-231-8893 ★ FAX 1-866-364-8375
www.allprocgi.com ★ e-mail: info@allprocgi.com

Tower Structural Analysis Report for
SBA Communications Corporation

Existing 195' Self Support Tower

SBA Site Name: Windsor Locks @ Volunteer Drive
SBA Site ID: CT22108-A-01
Carrier Name: AT&T
Carrier ID/Name: CT5270/Windsor Locks
App. #: 79355, v1

Site Location:
2-4 Volunteer Drive,
Windsor Locks, CT 06096
Hartford County
Latitude: 41.9281°
Longitude: -72.64 68°

ACGI # 18-2973

ANALYSIS RESULTS		
Tower Components	63.7 %	Pass
Foundation	32.6 %	Pass
Net Change in tower stress	+0.4 %	Change from previous structural analysis by FDH Velocitel, Project # 17QKYA1400, dated 08/23/2017.

Prepared By:
Anita Lama, EIT
Staff Engineer

05/08/2018
Approved By:
Joji Geroge, P.E.
CT PE #24444

TABLE OF CONTENTS

1. ANALYSIS SUMMARY

The existing 195' Self Support Tower located in Windsor Locks, CT was analyzed by Allpro Consulting Group, Inc. (ACGI) for the existing loads and the AT&T antennas, radios and coax as authorized by SBA Communication Corp. Based on the results of the analysis, the existing tower with below mentioned proposed and existing loading is found **to be in compliance** with *TIA-222-G-Addendum 2, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and IBC 2012.*

2. SCOPE & SOURCE OF INFORMATION

The purpose of this structural analysis is to determine whether the existing structure is capable of supporting additional loads proposed loads.

SOURCE OF INFORMATION		
Tower Data:	Pirod Inc. FDH Velocitel	Original tower design drawings by Pirod Inc., Eng File # A-115761-1, dated 01/10/2001. Previous Structural Analysis Report by FDH Velocitel, Project # 17QKYA1400, dated 08/23/2017.
Foundation Data:	Pirod Inc.	Original tower design drawings by Pirod Inc., Eng File # A-115761-1, dated 01/10/2001.
Geotechnical Report:	Tectonic Engineering Consultants,P.C.	Geotechnical Report by Tectonic Engineering Consultants,P.C., Job # 2295 01, dated 05/18/1999
Loading Data:	FDH Velocitel SBA Communication Corp.	Existing loading as per previous Structural Analysis by FDH Velocitel, Project # 17QKYA1400 dated 08/23/2017. Proposed AT&T loading as per App. # 79355, v1
Authorization:	SBA Communication Corp.	

3. ANALYSIS METHODS & DATA

The analysis was performed in accordance with Telecommunication Industry Association specification TIA-222-G-Addendum 2. The tower was modeled using TNX Tower, a 3-D finite element program. TNX Tower is a general-purpose modeling, analysis, and design program created specifically for communication towers using the EIA-222-C, EIA-222-D, TIA/EIA-222-F or TIA-222-G standards. The 3-D model included the tower, with existing appurtenances and all proposed loads.

SITE DATA	
SBA Site Name:	Windsor Locks @ Volunteer Drive
SBA Site Number:	CT22108-A-01
Carrier Site ID/Name:	CT5270/ Windsor Locks/AT&T
City, State:	Windsor Locks, CT
County:	Hartford
Code Wind Load Requirement:	TIA-222-G & IBC 2012 (Ultimate wind speed of 125 mph 3 sec gust equivalent to Nominal design wind speed of 97 mph)
Wind Load Used:	TIA-222-G Code: • Nominal design wind speed of 97 mph (3 second gust wind speed) • Structure: Class II*. • Exposure: Category B • Topographic Category: 1 • Crest height 0.00 ft. • A wind speed of 50 mph is used in combination with ice. • Nominal ice thickness of 0.5 in.
Seismic Check:	Ss=0.235g < 1.0g, thus seismic loading can be ignored as per section 2.7.3 of ANSI/TIA-222-G code

*This structural analysis is based upon the tower being classified as a class II; however, if a different classification is required subsequent to the date hereof, the tower classification will be changed to meet such requirement and a new structural analysis will be run.

TOWER DATA	
Tower Type:	3-legs Self Support Tower
Height:	195'
Cross Section:	Triangle
Steel Strength:	Legs – 50 ksi, Braces – 36 ksi
Type of Foundation:	Mat Foundation

TOWER HISTORY	
Tower Manufacturer / Model:	Pirod Inc.
Date of Original Design:	01/10/2001
Previous Modifications:	
Original Design Code Reqts.:	EIA/TIA-222-F,85 MPH+1/2" ice

4. CONCLUSIONS

RESULT SUMMARY		
MEMBER	**% Capacity**	**Pass/Fail**
Leg	**55.7 %**	**Pass**
Diagonal	**63.7 %**	**Pass**
Horizontal	**9.1 %**	**Pass**
Girts	**19.6 %**	**Pass**
Bolt Checks	**59.2 %**	**Pass**
Anchor Bolt Check	**42.61 %**	**Pass**
Overall Tower Rating: 63.7% (Pass)		

FOUNDATION RESULT SUMMARY		
REACTION	*% Capacity*	*Pass/Fail*
Overturning	**31.5 %**	**Pass**
Soil Pressure	**32.6 %**	**Pass**
Horizontal Shear	**7.7 %**	**Pass**

As per the results of the analysis, the existing tower is **in code compliance** for the new and existing antenna loads.
Maximum tower member stress **is less than 100%,** making it **in compliance** under the TIA-222-G –Addendum 2 code and IBC 2012.

5. ASSUMPTIONS

This analysis was completed based on the following assumptions:

- Tower has been properly maintained.
- Tower erection was in accordance to manufacturer drawings.
- Leg flanges have been properly designed by manufacturer to not be a limiting reaction.
- Welds have been properly designed and installed by manufacturer to not be a limiting reaction.
- Foundation was constructed in accordance to manufacturer drawings.
- Foundation does not have structural damage
- Bolts have been properly tightened according to manufacturer specifications.
- Appurtenance, mount and transmission line sizes and weights are best estimates using the tnxTower database and manufacturer information.

6. DISCLAIMER

Installation procedures and related loading are not within the scope of this analysis. A contractor experienced in similar work should perform all installation work. The engineering services provided by Allpro Consulting Group, Inc. (ACGI) are limited to the computer analysis and calculations of the structure with the proposed and existing loads. This analysis is considered void if the loading mentioned in this report is changed or is different as installed. It is assumed that the existing structure is properly maintained and is in good condition free of any defects. Scope of this analysis does not include existing connections, except as noted in this report. It is assumed that the tower is in good condition and free from damage and defects.

ACGI does not make any warranties, expressed or implied in connection with this engineering analysis report and disclaims any liability arising from deficiencies or any existing conditions of the original structure. ACGI will not be responsible for consequential or incidental damages sustained by any parties as a result of any data or conclusions included in this Report. The maximum liability of ACGI pursuant to this report shall be limited to the consulting fee received for the preparation of the report.

7. APPURTENANCE LISTING

EXISTING ANTENNA LOAD DESCRIPTION					
ELEV (ft.)	***Qty.***	***Antenna Description***	***Mount Type & Qty.***	TX. LINE (in)	***TENANT***
203.4'±	1	Andrew DB224-A	Direct	(1)7/8"	WLPD
183.7'±	5	Andrew 20' Dipoles w/ (4) Element	(3) 15' T-Frame @171.5'	(8) 7/8"	
182.8'±	1	2.5" Ø x 20.0' Omni			
180.6'±	1	1.3" Ø x 13.0' Omni			
179.1'±	1	1.3" Ø x 10.0' Omni			
161.5'±	3	Kathrein 800 10121 antenna	(3) 15' T-Frame @161.5'	(9) 1-5/8" (1) 0.39" fiber & (2)0.78" DC lines(within 3" conduit)	AT&T
	3	Andrew SBNH-1D6565C antenna			
	6	Powerwave LGP 21401 TMA			
	6	Ericsson RRUS 11(band 12)			
	1	DC6-48-60-18-8F DC Surge			
146.8'±	1	Raycap RRFDC-3315-PF-48	Direct	(12) 1-5/8" (1) 1-1/4"	Verizon
145.7'±	1	6.0' x 1.0' x 6.5" Panel	(3) 12.5' T-Frame @146'		
	2	Amphenol BXA-70063/6CF-EDIN			
	3	Antel BXA-171063-12CF-EDIN-5			
145.5'±	3	Alcatel-Lucent 9442 RRH2x40 AWS			
138.3'±	3	EMS RR90-17-02DP	(3) 15' T-Frames @135'	(18) 1-5/8"	T-Mobile
	3	RFS 4.7'x1.1'x3.5' Panel			
	3	7" x 6" x 3" TMA			
137.8'±	3	Andrew LNX-6515DS-A1M			
116.8'±	3	RFS APXVSPP18-C-A20	(3) 15' T-Frames @112.3'	(4) 1-1/4" Fiber "	Sprint
115'±	3	RFS APXVTM14-C-I20			
	3	Alcatel-Lucent TD-RRH8x20-25			
110.3'±	3	Alcatel-Lucent 800 MHz RRH	Direct		
107.6'±	3	Alcatel-Lucent 1900 MHz RRH	Direct		
104.6'±	1	Andrew 3.3' Dish	(3).3' Standoffs @101.4'	(2) 1/2" (1) 1-5/16" Conduit	Clearwire
104'±	1	Andrew VHLP1-23-DW1			
	3	Argus LLPX310R-V1			
103.8'±	3	Alcatel-Lucent SPI-22132825WB			
102.4'±	1	(1) 12" x 12" x 6.38" Junction Box	Direct		
75.9'±	1	(1) 3.5" Ø x 8" GPS	(1) 3.5' Standoff@74'	(1) 1/2"	Unknown
60'±	1	(1) PCTEL GPS-TMG-HR-26N	Direct	(1) 1/2"	Sprint

FINAL AT&T ANTENNA LOAD DESCRIPTION					
ELEV (ft.)	***Qty.***	***Antenna Description***	***Mount Type & Qty.***	***TX. LINE (in)***	***TENANT***
161.5'±	3	Kathrein 800 10121 antenna	(3) 15' T-Frame @161.5'	(9) 1-5/8" (1) 0.39" fiber &(2)0.78" DC lines(within 3" conduit)	AT&T
	3	Andrew SBNH-1D6565C antenna			
	3	**Cci TPA-65R-LCUUUU-H8 antenna**			
	6	Powerwave LGP 21401 TMA			
	6	**Kathrein 860 10025**			
	3	**Ericsson RRUS 32 B2**			
	3	Ericsson RRUS 11(Band 12)			
	3	**EricssonRRUS 32 B30**			
	2	**DC6-48-60-18-8F DC Surge**			

Notes:

1. ACGI should be notified of any discrepancies found in the data listed in this report.
2. Notify Allpro Consulting Group, Inc. of any potential physical & other interference with existing antennas for a redesign.

8. SUMMARY OF WORKING PERCENTAGE OF STRUCTURAL COMPONENTS

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	øP$_{allow}$ K	% Capacity	Pass Fail
T1	195 - 185	Leg	1 3/4	1	-2.16	81.93	2.6	Pass
T2	185 - 170	Leg	1 3/4	37	-10.11	80.23	12.6	Pass
T3	170 - 150	Leg	2	91	-37.41	112.40	33.3	Pass
T4	150 - 140	Leg	Pirod 105244	157	-43.71	142.49	30.7	Pass
T5	140 - 120	Leg	Pirod 105217	166	-82.23	214.86	38.3	Pass
T6	120 - 100	Leg	Pirod 105218	184	-118.55	300.68	39.4	Pass
T7	100 - 80	Leg	Pirod 105218	199	-154.90	300.68	51.5	Pass
T8	80 - 60	Leg	Pirod 105219	212	-189.76	399.87	47.5	Pass
T9	60 - 40	Leg	Pirod 105219	227	-222.58	399.87	55.7	Pass
T10	40 - 20	Leg	Pirod 105220	242	-254.16	512.38	49.6	Pass
							50.5 (b)	
T11	20 - 0	Leg	Pirod 105220	257	-283.44	512.38	55.3	Pass
T1	195 - 185	Diagonal	3/4	14	-0.42	5.08	8.3	Pass
T2	185 - 170	Diagonal	3/4	53	-1.30	5.00	26.0	Pass
T3	170 - 150	Diagonal	7/8	102	-3.06	7.86	38.9	Pass
T4	150 - 140	Diagonal	L2 1/2x2 1/2x3/16	162	-6.40	13.56	47.2	Pass
							50.2 (b)	
T5	140 - 120	Diagonal	L2 1/2x2 1/2x3/16	175	-6.18	10.95	56.5	Pass
							58.1 (b)	
T6	120 - 100	Diagonal	L3x3x3/16	190	-7.10	14.96	47.5	Pass
							59.2 (b)	
T7	100 - 80	Diagonal	L3x3x5/16	205	-7.50	19.32	38.8	Pass
							38.9 (b)	
T8	80 - 60	Diagonal	L3x3x5/16	220	-7.62	15.76	48.3	Pass
T9	60 - 40	Diagonal	L3x3x5/16	235	-7.83	12.87	60.9	Pass
T10	40 - 20	Diagonal	L3 1/2x3 1/2x5/16	250	-8.20	17.15	47.8	Pass
T11	20 - 0	Diagonal	L3 1/2x3 1/2x5/16	265	-9.15	14.36	63.7	Pass
T1	195 - 185	Horizontal	3/4	16	-0.03	2.62	1.0	Pass
T2	185 - 170	Horizontal	3/4	55	-0.24	2.62	9.1	Pass
T3	170 - 150	Horizontal	7/8	148	-0.41	4.74	8.6	Pass
T1	195 - 185	Top Girt	7/8	4	-0.04	4.86	0.8	Pass
T2	185 - 170	Top Girt	7/8	41	-0.14	4.86	2.8	Pass
T3	170 - 150	Top Girt	1	93	-0.83	8.30	10.1	Pass
T5	140 - 120	Top Girt	L2 1/2x2 1/2x3/16	167	-1.50	14.47	10.4	Pass
							19.6 (b)	
T1	195 - 185	Bottom Girt	7/8	8	-0.15	4.86	3.0	Pass
T2	185 - 170	Bottom Girt	7/8	44	-0.67	4.86	13.7	Pass
T3	170 - 150	Bottom Girt	1	95	-1.04	6.77	15.4	Pass
T2	185 - 170	Mid Girt	7/8	47	-0.12	4.86	2.4	Pass
T3	170 - 150	Mid Girt	1	98	0.42	25.45	1.6	Pass
							Summary	
						Leg (T9)	55.7	Pass
						Diagonal (T11)	63.7	Pass
						Horizontal (T2)	9.1	Pass
						Top Girt (T5)	19.6	Pass
						Bottom Girt (T3)	15.4	Pass
						Mid Girt (T2)	2.4	Pass
						Bolt Checks	59.2	Pass
						RATING =	**63.7**	**Pass**

APPENDIX

TOWER DATA

This site will be taken offline on May 31st 2018. Please start using the new site at https://hazards.atcouncil.org.

Search Results

Query Date: Wed Apr 25 2018
Latitude: 41.9274
Longitude: -72.6472

ASCE 7-10 Windspeeds (3-sec peak gust in mph*):

Risk Category I: 110
Risk Category II: 121
Risk Category III-IV: 130
MRI 10-Year:** 76
MRI 25-Year:** 86
MRI 50-Year:** 92
MRI 100-Year:** 98

ASCE 7-05 Windspeed:
97 (3-sec peak gust in mph)
ASCE 7-93 Windspeed:
79 (fastest mile in mph)

*Miles per hour
**Mean Recurrence Interval

Users should consult with local building officials to determine if there are community-specific wind speed requirements that govern.

Print your results

WINDSPEED WEBSITE DISCLAIMER

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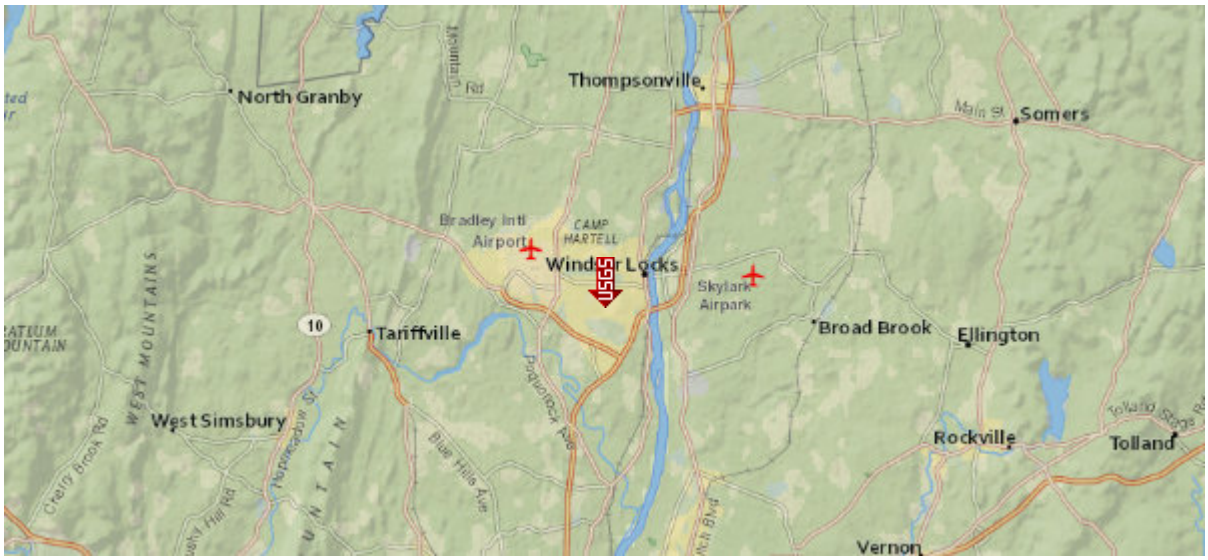
USGS Design Maps Summary Report

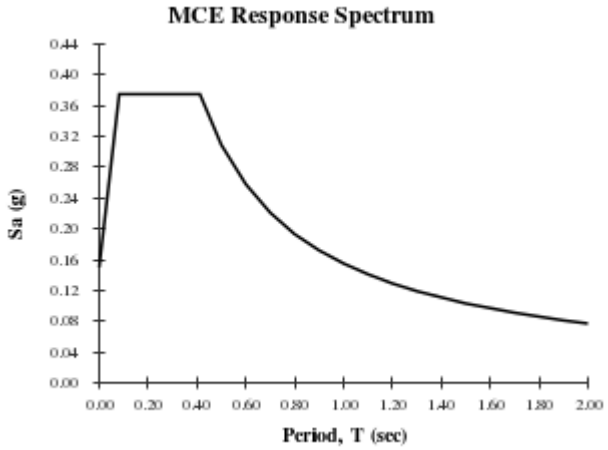
User–Specified Input

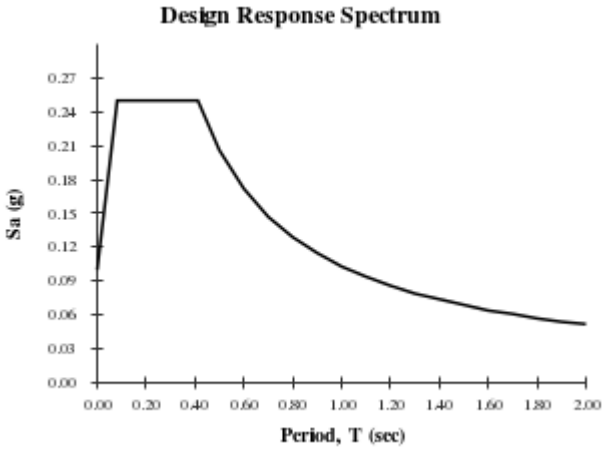
Building Code Reference Document	2006/2009 International Building Code (which utilizes USGS hazard data available in 2002)
Site Coordinates	41.9274°N, 72.6472°W
Site Soil Classification	Site Class D – "Stiff Soil"
Occupancy Category	I/II/III

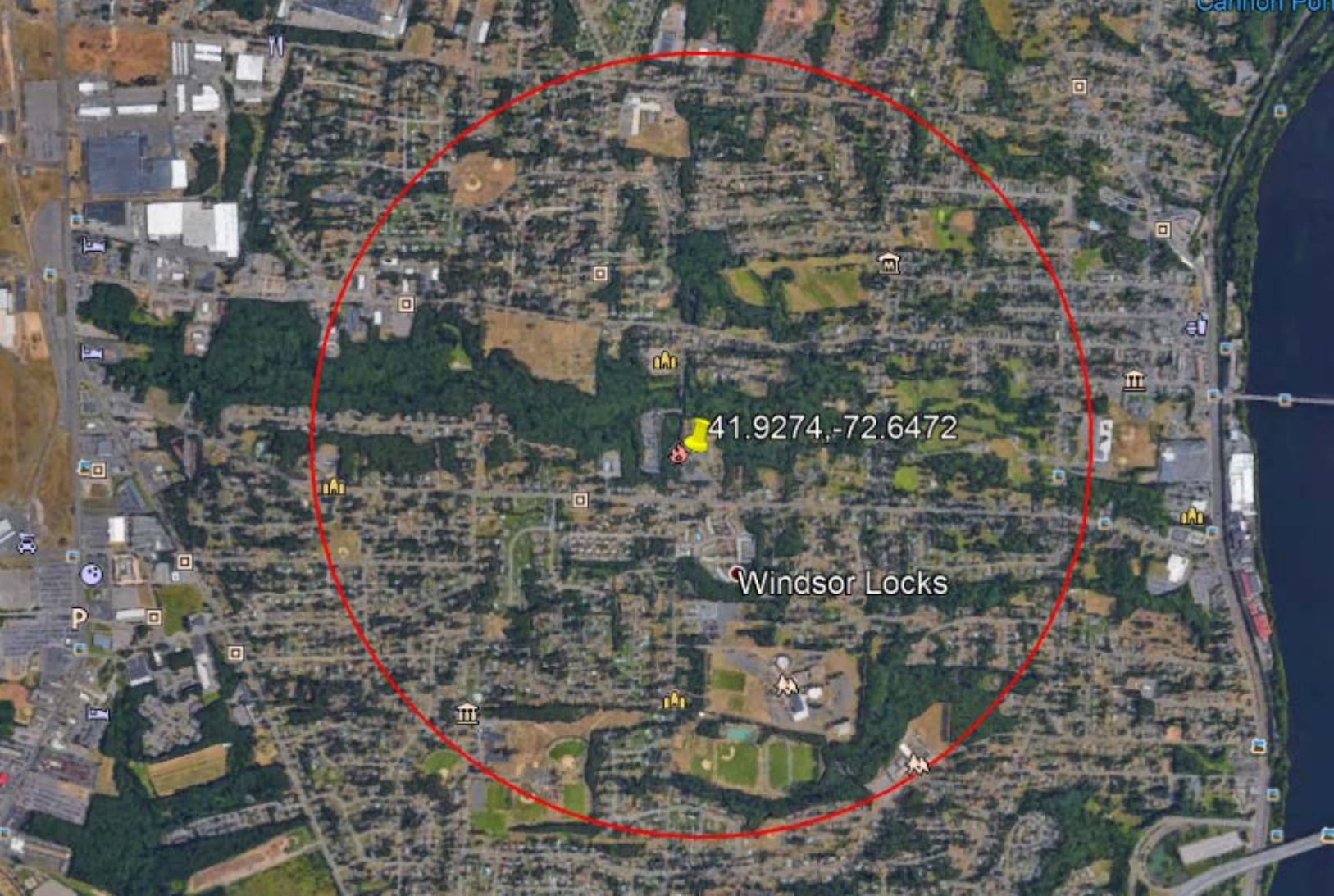


USGS–Provided Output

S_S =	0.235 g	S_{MS} =	0.375 g	S_{DS} =	0.250 g
S_1 =	0.064 g	S_{M1} =	0.155 g	S_{D1} =	0.103 g



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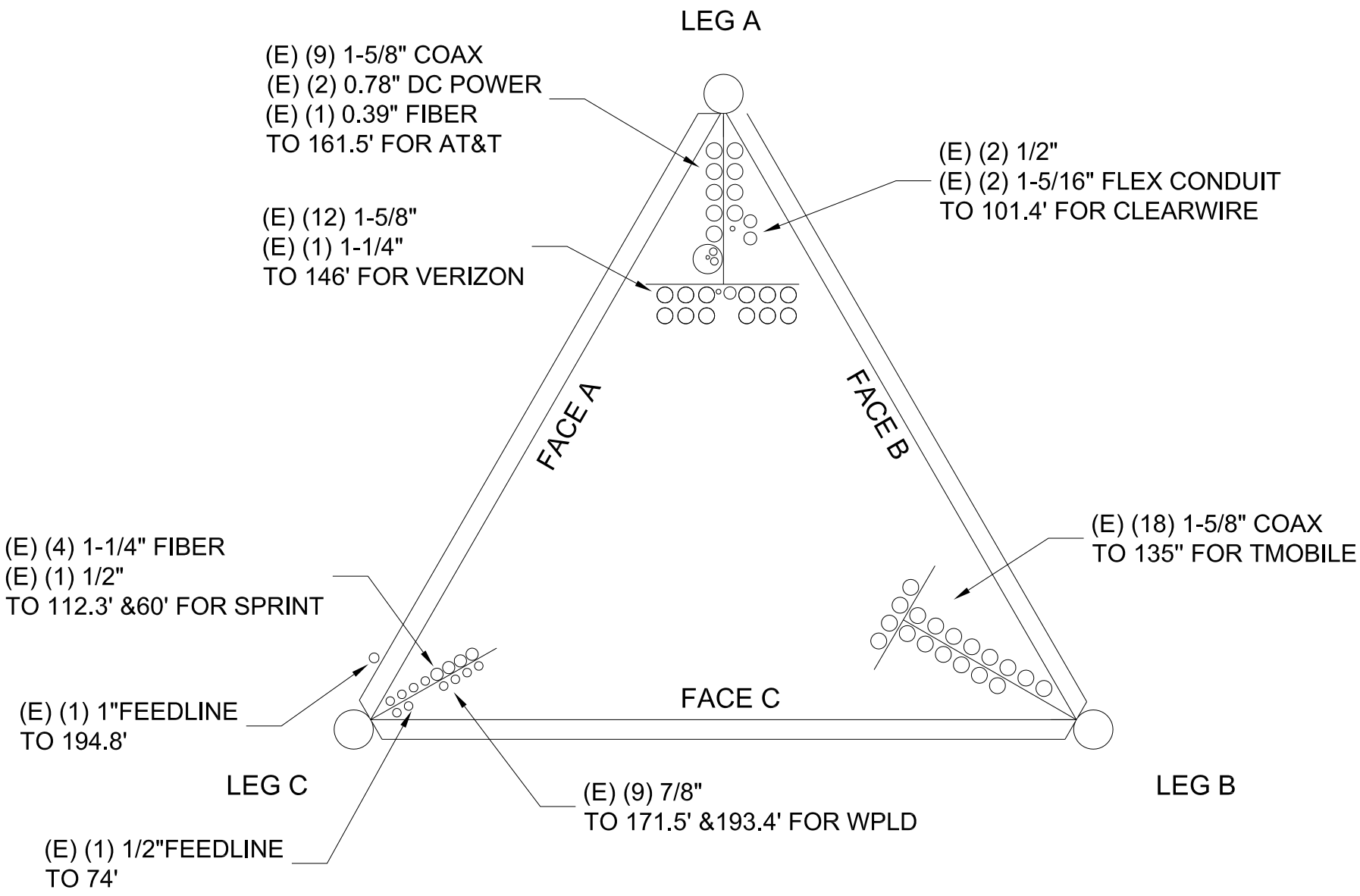
Windsor Locks

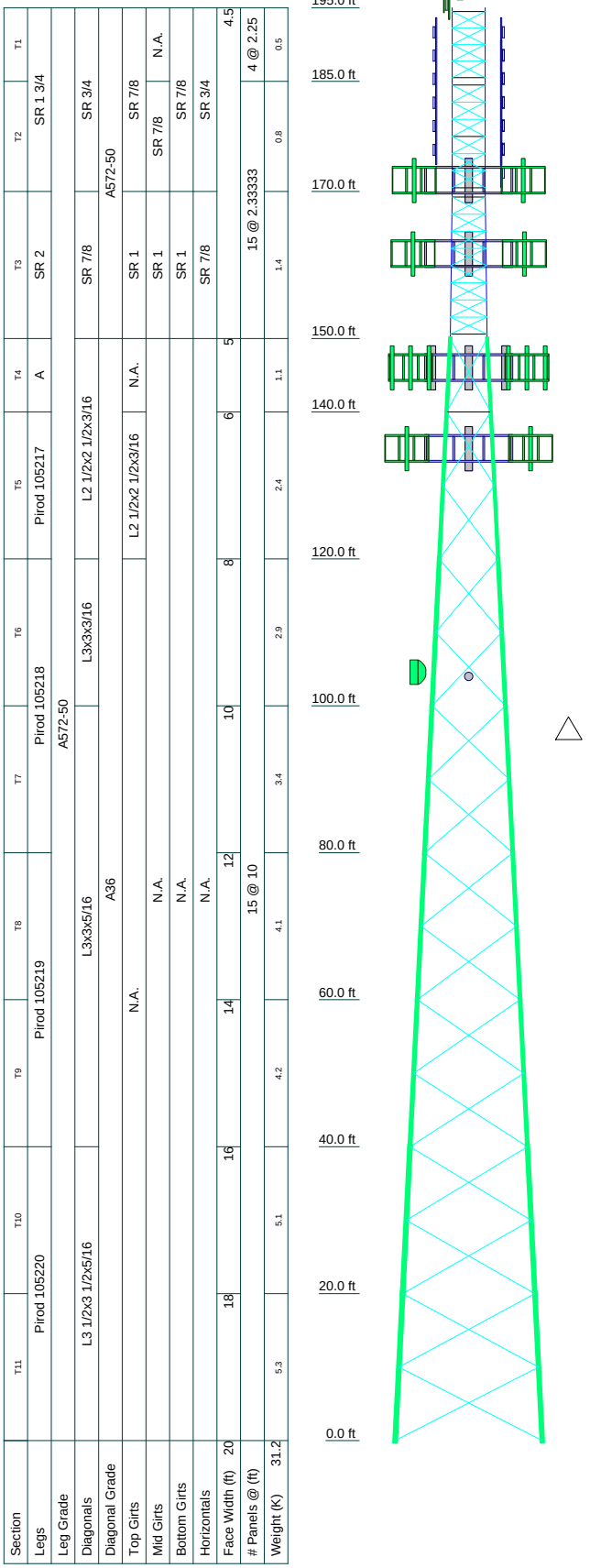
COAX LAYOUT



COAX LAYOUT

N.T.S.

TOWER ELEVATION DRAWINGS



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Beacon	194.8	(2) Pipe Mount	146
Lightning Rod	194.6	(2) Pipe Mount	146
DB224-A Omni	193.4	(2) Pipe Mount	146
(2) 20' 4 Element Dipole	171.5	RFS 4.7'x1.1'x3.5' Panel	135
(2) 20' 4 Element Dipole	171.5	7" x 6" x 3" TMA	135
20' 4 Element Dipole	171.5	7" x 6" x 3" TMA	135
20'x2.5" Omni	171.5	7" x 6" x 3" TMA	135
13'x2" Omni	171.5	LNX-6515DS-A1M w/ Mount Pipe	135
10' x 1.38" omni	171.5	LNX-6515DS-A1M w/ Mount Pipe	135
(3) 15' T-Frames	171.5	LNX-6515DS-A1M w/ Mount Pipe	135
(5) Pipe Mount	171.5	(3) 15' T-Frames	135
(5) Pipe Mount	171.5	(2) Pipe Mount	135
(5) Pipe Mount	171.5	(2) Pipe Mount	135
800 10121 w/ Mount Pipe	161.5	(2) Pipe Mount	135
800 10121 w/ Mount Pipe	161.5	RR90-17-02DP w/ Mount Pipe	135
800 10121 w/ Mount Pipe	161.5	RR90-17-02DP w/ Mount Pipe	135
(3) 15' T-Frames	161.5	RR90-17-02DP w/ Mount Pipe	135
(2) Pipe Mount	161.5	RFS 4.7'x1.1'x3.5' Panel	135
(2) Pipe Mount	161.5	RFS 4.7'x1.1'x3.5' Panel	135
(2) Pipe Mount	161.5	APXVSPP18-C-A20 w/ Mount Pipe	112.3
SBNH-1D6565C	161.5	APXVSPP18-C-A20 w/ Mount Pipe	112.3
SBNH-1D6565C	161.5	TD-RRH8x20-25	112.3
SBNH-1D6565C	161.5	TD-RRH8x20-25	112.3
TPA-65R-LCUUUU-H8	161.5	TD-RRH8x20-25	112.3
TPA-65R-LCUUUU-H8	161.5	APXVTM14-C-I20 w/ Mount Pipe	112.3
TPA-65R-LCUUUU-H8	161.5	APXVTM14-C-I20 w/ Mount Pipe	112.3
(2) LGP 21401 TMA	161.5	APXVTM14-C-I20 w/ Mount Pipe	112.3
(2) LGP 21401 TMA	161.5	APXVSPP18-C-A20 w/ Mount Pipe	112.3
(2) LGP 21401 TMA	161.5	(3) 15' T-Frames	112.3
(2) 860 10025	161.5	(2) Pipe Mount	112.3
(2) 860 10025	161.5	(2) Pipe Mount	112.3
(2) 860 10025	161.5	(2) Pipe Mount	112.3
RRUS 11 (Band 12)	161.5	800 MHz RRH	109.6
RRUS 11 (Band 12)	161.5	800 MHz RRH	109.6
RRUS 11 (Band 12)	161.5	800 MHz RRH	109.6
RRUS 32 B2	161.5	1900 MHz RRH	106.5
RRUS 32 B2	161.5	1900 MHz RRH	106.5
RRUS 32 B2	161.5	1900 MHz RRH	106.5
RRUS 32 B30	161.5	12" x 12" x 6.38" Junction Box	101.8
RRUS 32 B30	161.5	SPI-22132825WB RRH	101.4
RRUS 32 B30	161.5	LLPX310R w/ Mount Pipe	101.4
DC6-48-60-18-8F	161.5	LLPX310R w/ Mount Pipe	101.4
DC6-48-60-18-8F	161.5	SPI-22132825WB RRH	101.4
RRFDC-3315-PF-48	146	(3) 1.3' Standoffs	101.4
6' x 1' x 7" Panel	146	Pipe Mount	101.4
Pipe Mount [PM 601-1]	146	Pipe Mount	101.4
BXA-70063-6CF-EDIN w/ Mount Pipe	146	Pipe Mount	101.4
BXA-70063-6CF-EDIN w/ Mount Pipe	146	SPI-22132825WB RRH	101.4
BXA-171063-12CF-EDIN-5 w/Mount Pipe	146	LLPX310R w/ Mount Pipe	101.4
		3.3' Dish	101.4
BXA-171063-12CF-EDIN-5 w/Mount Pipe	146	VHLP1-23-DW1	101.4
BXA-171063-12CF-EDIN-5 w/Mount Pipe	146	Sidemarker	94.5
		Sidemarker	94.5
9442 RRH2x40 AWS RRH	146	Sidemarker	94.5
9442 RRH2x40 AWS RRH	146	3.37" Ø x 7.5" GPS	74
9442 RRH2x40 AWS RRH	146	(1) 3.5' Standoff	74
(3) 12.5' T-Frames	146	GPS-TMG-HR-26N	60

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	Pirod 105244		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

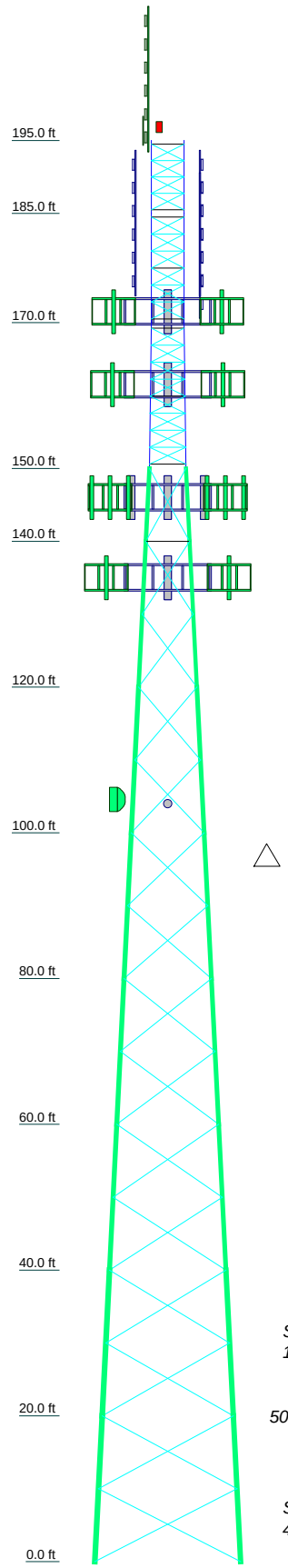
TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B 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 0.00 ft

Allpro Consulting Group,Inc.
9221 Lyndon B. Johnson Fwy,Suite#204
Dallas,TX 75243
Phone: 972-231-8893
FAX: 866-364-8375

Job: ***CT22108-A_Windsor Locks @ Volunteer Drive***			
Project:			
Client: SBA Network Communications, Inc.	Drawn by: Anita Lama	App'd:	
Code: TIA-222-G	Date: 05/04/18	Scale: NTS	
Path:		Dwg No. E-1	

Section		T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11		
Legs		SR 1 3/4		SR 2	A	Pirod 105217	Pirod 105218		Pirod 105219		Pirod 105220			
Leg Grade		A572-50												
Diagonals	SR 3/4			SR 7/8		L2 1/2x2 1/2x3/16	L3x3x3/16		L3x3x5/16		L3 1/2x3 1/2x5/16			
Diagonal Grade	A572-50								A36					
Top Girts	SR 7/8			SR 1	N.A.	L2 1/2x2 1/2x3/16			N.A.					
Mid Girts	N.A.			SR 1					N.A.					
Bottom Girts	SR 7/8			SR 1					N.A.					
Horizontals	SR 3/4			SR 7/8					N.A.					
Face Width (ft)	4.5			15 @ 2.33333		5	6	8	10	12	14	16	18	20
# Panels @ (ft)	4 @ 2.25								15 @ 10					
Weight (K)	0.5	0.8	1.4	1.1	2.4	2.9	3.4	4.1	4.2	5.1	5.3	31.2		



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	Pirod 105244		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

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5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 63.7%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 291 K
SHEAR: 30 K

UPLIFT: -250 K
SHEAR: 26 K

AXIAL 213 K
SHEAR 15 K *MOMENT 1763 kip-ft*
TORQUE 5 kip-ft
50 mph WIND - 1.0000 in ICE

AXIAL 65 K
SHEAR 46 K *MOMENT 4671 kip-ft*
TORQUE 18 kip-ft
REACTIONS - 97 mph WIND

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Project:			
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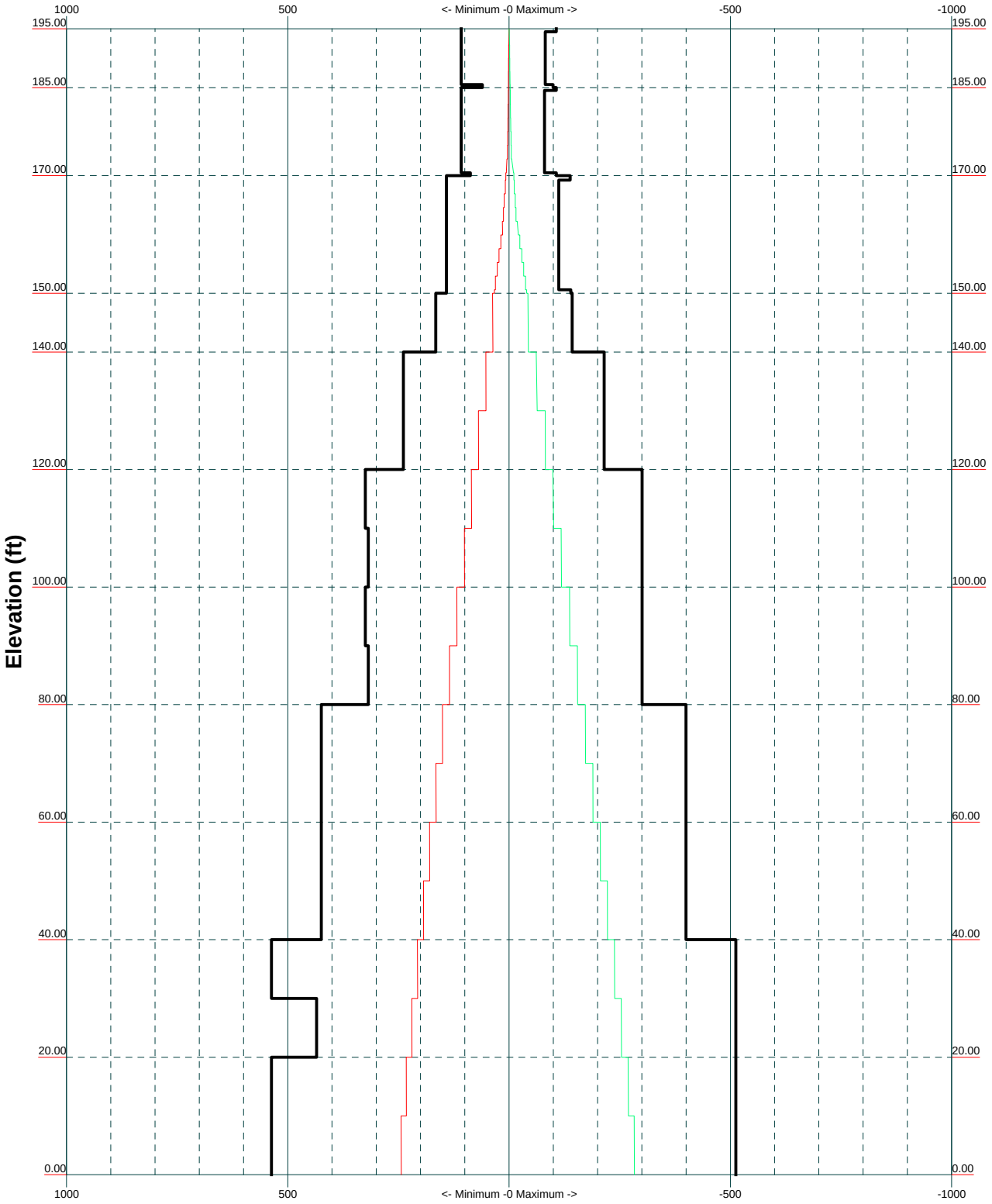
Path:		Dwg No. E-1	

MISCELLANEOUS PLOTS

TIA-222-G - 97 mph/50 mph 1.0000 in Ice Exposure B

Leg Capacity ——— **Leg Compression (K)**



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Project:			
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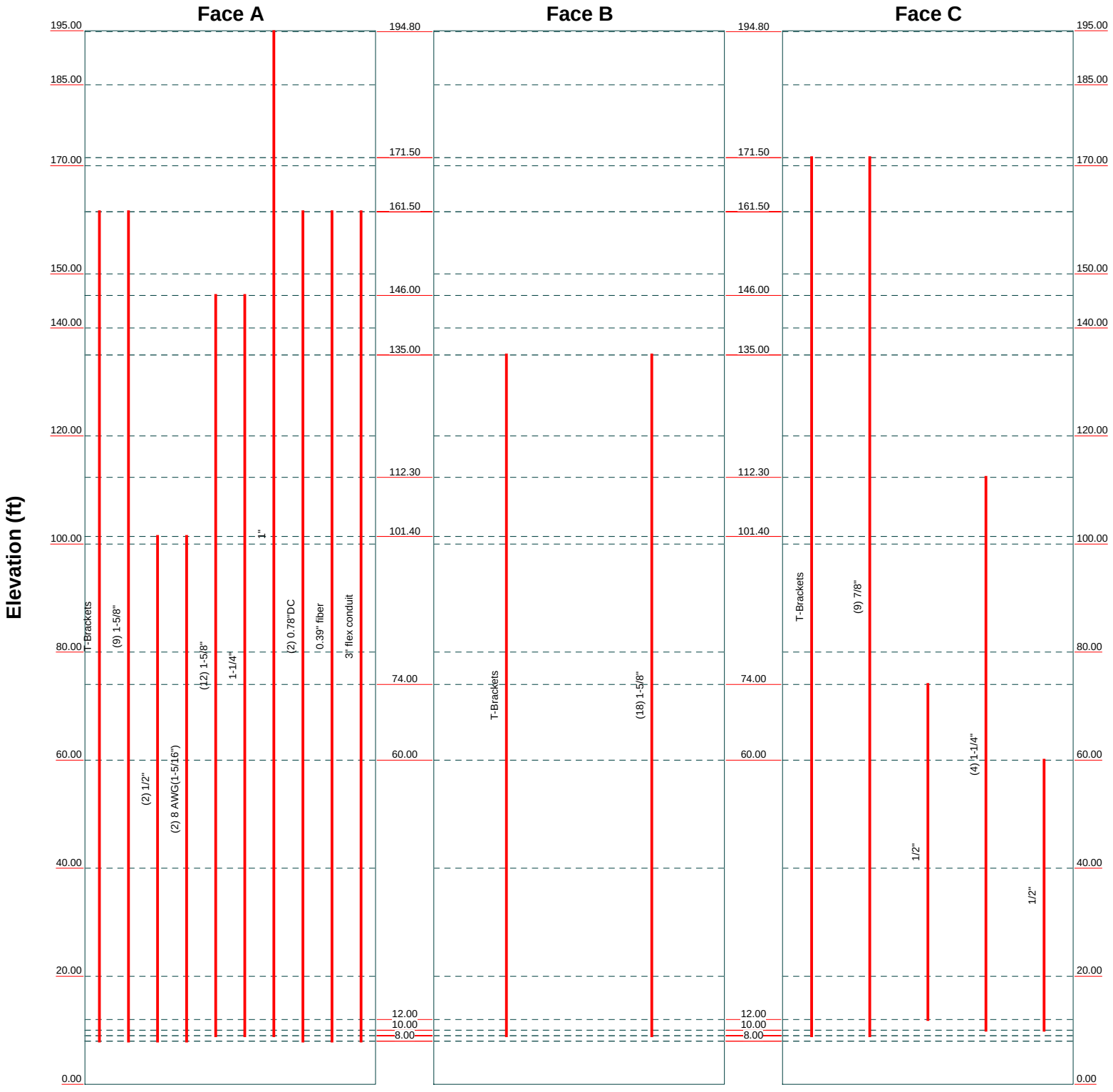
Code: TIA-222-G		Date: 05/04/18	Scale: NTS
Path:			Dwg No. E-3

Feed Line Distribution Chart
0' - 195'

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



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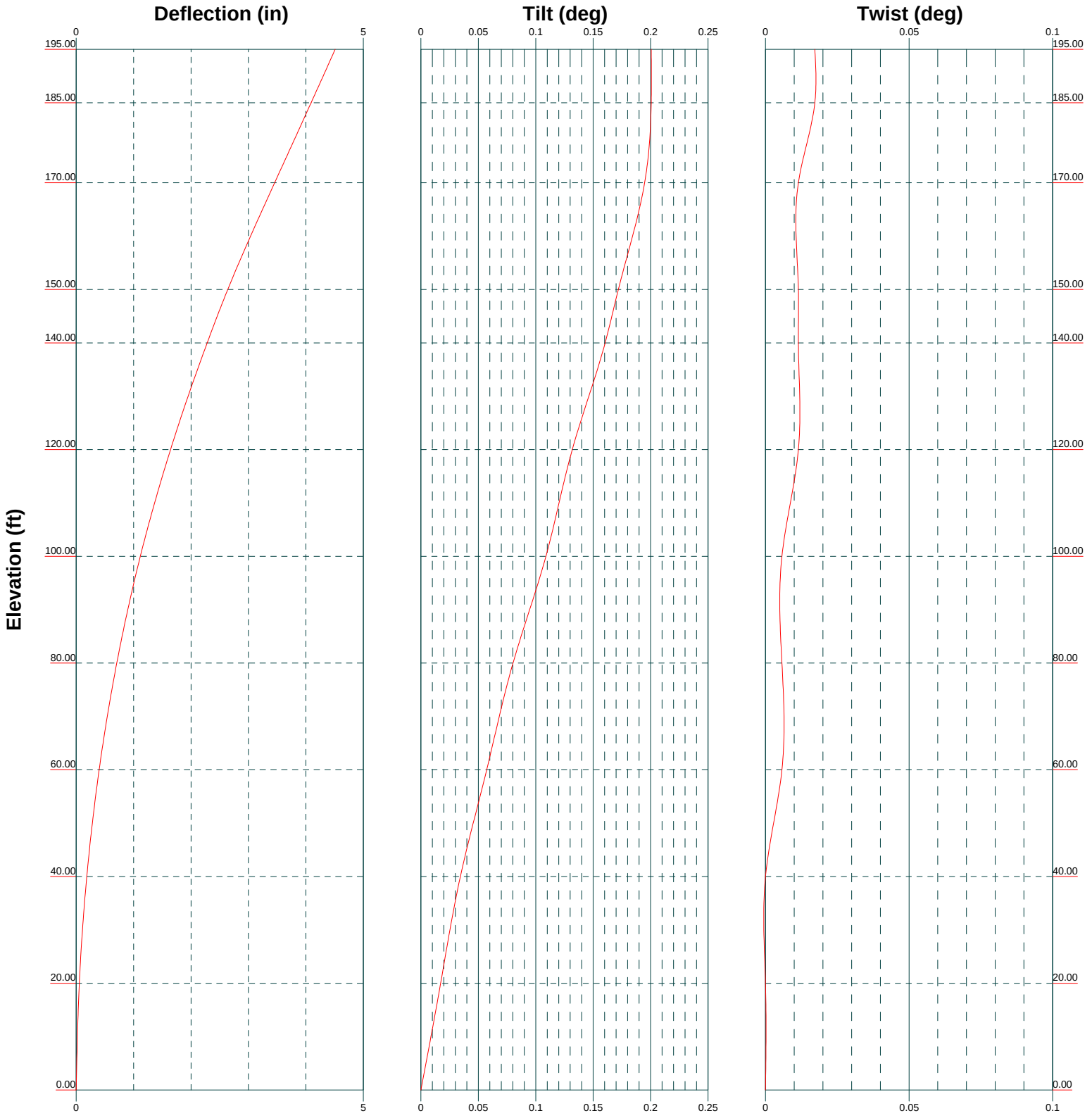
Job: *CT22108-A_Windsor Locks @ Volunteer Drive*			
Project:			
Client: SBA Network Communications, Inc.	Drawn by: Anita Lama	App'd:	
Code: TIA-222-G	Date: 05/04/18	Scale: NTS	
Path:		Dwg No. E-7	

TIA-222-G - Service - 60 mph

Maximum Values



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Project:			
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Code: TIA-222-G	Date: 05/04/18	Scale: NTS	
Path:		Dwg No. E-5	

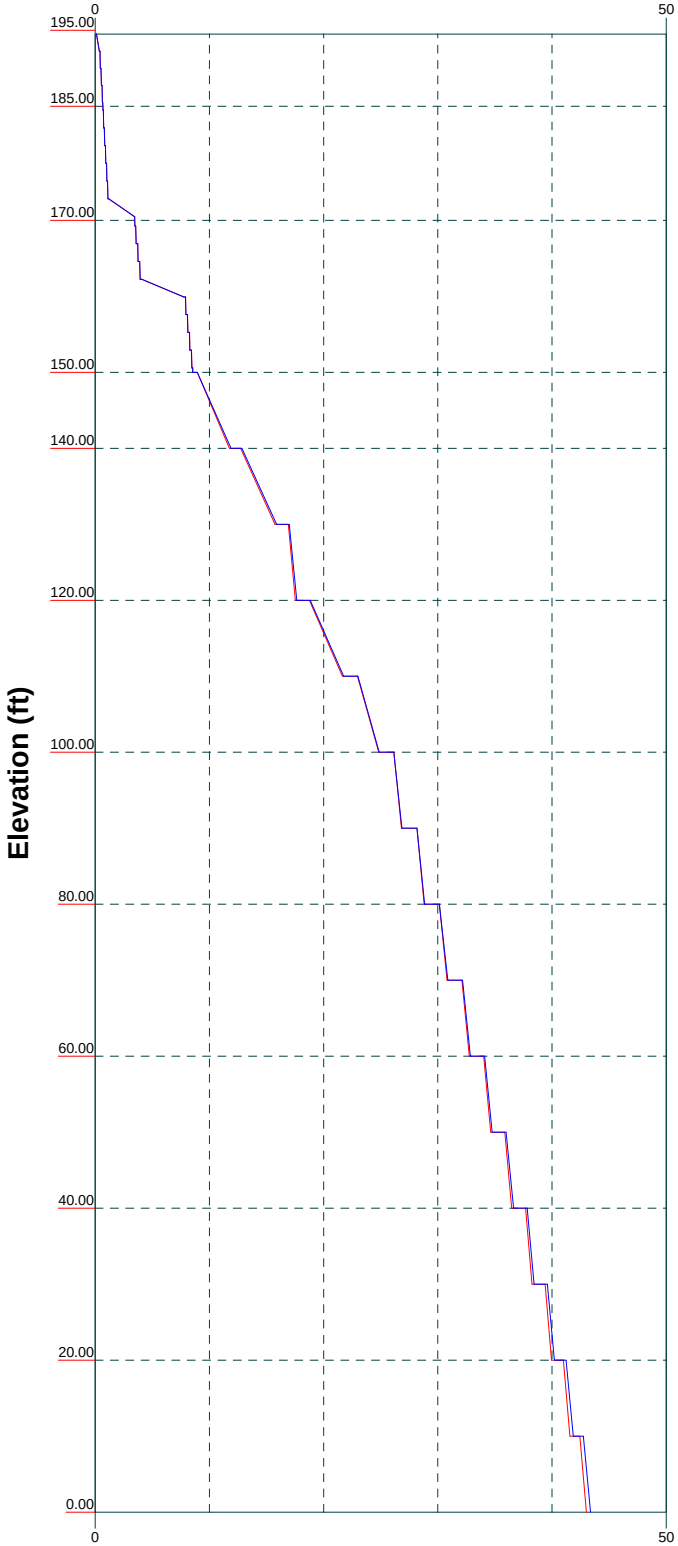
TIA-222-G - 97 mph/50 mph 1.0000 in Ice Exposure B

Vx Vz

Maximum Values

Mx Mz

Global Mast Shear (K)



Global Mast Moment (kip-ft)

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Project:			
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Code: TIA-222-G	Date: 05/04/18	Scale: NTS	
Path:		Dwg No. E-4	

TNX CALCULATION PRINTOUT

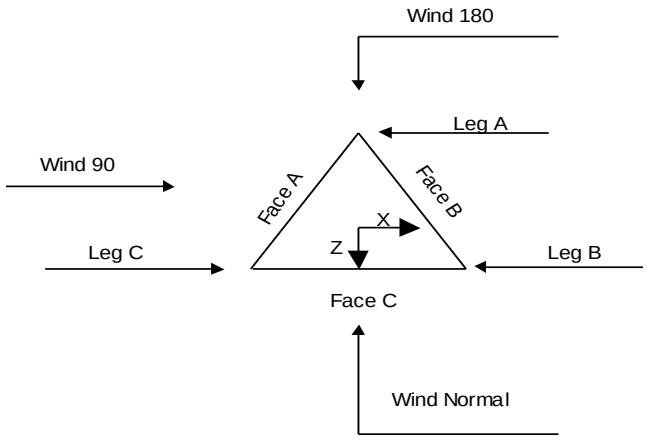
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 195.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 4.50 ft at the top and 20.00 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
Basic wind speed of 97 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
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. Exemption
√	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
√	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
√	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	195.00-185.00			4.50	1	10.00
T2	185.00-170.00			4.50	1	15.00
T3	170.00-150.00			4.50	1	20.00
T4	150.00-140.00			5.00	1	10.00
T5	140.00-120.00			6.00	1	20.00
T6	120.00-100.00			8.00	1	20.00
T7	100.00-80.00			10.00	1	20.00
T8	80.00-60.00			12.00	1	20.00
T9	60.00-40.00			14.00	1	20.00
T10	40.00-20.00			16.00	1	20.00
T11	20.00-0.00			18.00	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	195.00-185.00	2.25	X Brace	No	Steps	6.0000	6.0000
T2	185.00-170.00	2.33	X Brace	No	Steps	6.0000	6.0000
T3	170.00-150.00	2.33	X Brace	No	Steps	9.0000	7.0000
T4	150.00-140.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T5	140.00-120.00	10.00	X Brace	No	No	0.0000	0.0000
T6	120.00-100.00	10.00	X Brace	No	No	0.0000	0.0000
T7	100.00-80.00	10.00	X Brace	No	No	0.0000	0.0000
T8	80.00-60.00	10.00	X Brace	No	No	0.0000	0.0000
T9	60.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T10	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T11	20.00-0.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 195.00-185.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T2 185.00-170.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T3 170.00-150.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T4 150.00-140.00	Truss Leg	Pirod 105244	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 140.00-120.00	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 120.00-100.00	Truss Leg	Pirod 105218	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T7 100.00-80.00	Truss Leg	Pirod 105218	A572-50 (50 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)
T8 80.00-60.00	Truss Leg	Pirod 105219	A572-50 (50 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)
T9 60.00-40.00	Truss Leg	Pirod 105219	A572-50 (50 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)
T10 40.00-20.00	Truss Leg	Pirod 105220	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T11 20.00-0.00	Truss Leg	Pirod 105220	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 195.00-185.00	Solid Round	7/8	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T2 185.00-170.00	Solid Round	7/8	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T3 170.00-150.00	Solid Round	1	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T5 140.00-120.00	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 195.00-185.00	None	Flat Bar		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T2 185.00-170.00	1	Solid Round	7/8	A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T3 170.00-150.00	1	Solid Round	1	A36 (36 ksi)	Solid Round	7/8	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 195.00-185.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T2 185.00-170.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T3 170.00-150.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T4 150.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T5 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T6 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T7 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T8 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T9 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T10 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T11 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 195.00-185.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T2	Yes	Yes	1	1	1	1	1	1	1	1
185.00-170.00				1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1
170.00-150.00				1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1
150.00-140.00				1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1
140.00-120.00				1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1
T7	Yes	Yes	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T8	Yes	Yes	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T9	Yes	Yes	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T10	Yes	Yes	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T11	Yes	Yes	1	1	1	1	1	1	1	1
20.00-0.00				1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Truss-Leg K Factors: Truss-Legs Used As Leg Members — Leg Panels	X Brace Diagonals	Z Brace Diagonals	Truss-Legs Used As Inner Members — Leg Panels	X Brace Diagonals	Z Brace Diagonals
T4	1	0.5	0.85	1	0.5	0.85
150.00-140.00						
T5	1	0.5	0.85	1	0.5	0.85
140.00-120.00						
T6	1	0.5	0.85	1	0.5	0.85
120.00-100.00						
T7	1	0.5	0.85	1	0.5	0.85
100.00-80.00						
T8	1	0.5	0.85	1	0.5	0.85
80.00-60.00						
T9	1	0.5	0.85	1	0.5	0.85
60.00-40.00						
T10	1	0.5	0.85	1	0.5	0.85
40.00-20.00						
T11	1	0.5	0.85	1	0.5	0.85
20.00-0.00						

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 195.00-185.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	1
T2 185.00-170.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	1
T3 170.00-150.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	1
T4 150.00-140.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	1
T5 140.00-120.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	1
T6 120.00-100.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	1
T7 100.00-80.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	1
T8 80.00-60.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	1
T9 60.00-40.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	1
T10 40.00-20.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	1
T11 20.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	1

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 195.00-185.00	Sleeve DS	0.6250 A325N	4	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 185.00-170.00	Sleeve DS	0.6250 A325N	5	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 170.00-150.00	Flange	1.0000 A325SC	6	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 150.00-140.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 140.00-120.00	Flange	1.0000 A325N	6	1.0000 A325N	1	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 120.00-100.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 100.00-80.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 80.00-60.00	Flange	1.2500 A325N >1"	6	1.2500 A325N>1"	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 60.00-40.00	Flange	1.2500 A325N >1"	6	1.2500 A325N>1"	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T10 40.00-20.00	Flange	1.2500 A325N >1"	6	1.2500 A325N>1"	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T11 20.00-0.00	Flange	0.7500 A325N	0	1.2500 A325N>1"	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
*** Wave Guide 1 ***												
T-Brackets	A	No	Af (CaAa)	161.50 - 8.00	-10.0000	0.43	1	1	1.0000	1.0000		8.40
1-5/8"	A	No	Ar (CaAa)	161.50 - 8.00	-8.0000	0.45	9	5	0.5000	1.9800		0.82
***												
1/2"	A	No	Ar (CaAa)	101.40 - 8.00	-10.0000	0.45	2	2	0.0000	0.5800		0.15
8 AWG(1-5/16")	A	No	Ar (CaAa)	101.40 - 8.00	-10.0000	0.44	2	2	0.5000	1.3500		1.00
***												
1-5/8"	A	No	Ar (CaAa)	146.00 - 9.00	-18.0000	0.4	12	2	0.5000	1.9800		0.82
1-1/4"	A	No	Ar (CaAa)	146.00 - 9.00	-18.0000	0.4	1	1	0.5000	1.5500		0.66
***												
*** Wave Guide 2 ***												
T-Brackets	B	No	Af (CaAa)	135.00 - 9.00	-9.0000	0.43	1	1	1.0000	1.0000		8.40
1-5/8"	B	No	Ar (CaAa)	135.00 - 9.00	-8.0000	0.42	18	9	0.5000	1.9800		0.82
*** Wave Guide 3 ***												
T-Brackets	C	No	Af (CaAa)	171.50 - 9.00	-10.0000	0.42	1	1	1.0000	1.0000		8.40
7/8"	C	No	Ar (CaAa)	171.50 - 9.00	-10.0000	0.42	9	4	0.5000	1.1100		0.54
***												
1/2"	C	No	Ar (CaAa)	74.00 - 12.00	-4.0000	0.44	1	1	0.5800	0.5800		0.15
***												
***												
1"	A	No	Ar (CaAa)	194.80 - 9.00	0.0000	-0.45	1	1	0.5000	1.2500		0.58
***												
***												
1-1/4"	C	No	Ar (CaAa)	112.30 - 10.00	-12.0000	0.43	4	4	0.5000	1.5500		0.66
1/2"	C	No	Ar (CaAa)	60.00 - 10.00	-12.0000	0.43	1	1	0.0000	0.5800		0.15
***												
0.78"DC	A	No	Ar (CaAa)	161.50 - 8.00	-8.0000	0.42	2	2	0.5000	0.8650		0.15
0.39" fiber	A	No	Ar (CaAa)	161.50 - 8.00	-8.0000	0.42	1	1	0.5000	0.5800		0.03
3" flex conduit	A	No	Ar (CaAa)	161.50 - 8.00	-8.0000	0.42	1	1	0.5000	3.0000		1.90

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C_AA_A ft^2/ft	Weight plf
***							
***							

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	195.00-185.00	A	0.000	0.000	1.225	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	185.00-170.00	A	0.000	0.000	1.875	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	1.748	0.000	0.02
T3	170.00-150.00	A	0.000	0.000	31.016	0.000	0.22
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	23.313	0.000	0.27
T4	150.00-140.00	A	0.000	0.000	41.233	0.000	0.25
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	11.657	0.000	0.13
T5	140.00-120.00	A	0.000	0.000	102.713	0.000	0.58
		B	0.000	0.000	55.960	0.000	0.35
		C	0.000	0.000	23.313	0.000	0.27
T6	120.00-100.00	A	0.000	0.000	103.254	0.000	0.58
		B	0.000	0.000	74.613	0.000	0.46
		C	0.000	0.000	30.939	0.000	0.30
T7	100.00-80.00	A	0.000	0.000	110.433	0.000	0.63
		B	0.000	0.000	74.613	0.000	0.46
		C	0.000	0.000	35.713	0.000	0.32
T8	80.00-60.00	A	0.000	0.000	110.433	0.000	0.63
		B	0.000	0.000	74.613	0.000	0.46
		C	0.000	0.000	36.525	0.000	0.32
T9	60.00-40.00	A	0.000	0.000	110.433	0.000	0.63
		B	0.000	0.000	74.613	0.000	0.46
		C	0.000	0.000	38.033	0.000	0.32
T10	40.00-20.00	A	0.000	0.000	110.433	0.000	0.63
		B	0.000	0.000	74.613	0.000	0.46
		C	0.000	0.000	38.033	0.000	0.32
T11	20.00-0.00	A	0.000	0.000	63.604	0.000	0.37
		B	0.000	0.000	41.037	0.000	0.25
		C	0.000	0.000	20.066	0.000	0.17

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	195.00-185.00	A	2.383	0.000	0.000	5.895	0.000	0.11
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	185.00-170.00	A	2.366	0.000	0.000	8.974	0.000	0.17
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	3.585	0.000	0.08
T3	170.00-150.00	A	2.342	0.000	0.000	74.029	0.000	1.44
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	47.533	0.000	1.05
T4	150.00-140.00	A	2.319	0.000	0.000	79.170	0.000	1.58
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	23.640	0.000	0.52
T5	140.00-120.00	A	2.294	0.000	0.000	183.352	0.000	3.69
		B		0.000	0.000	61.722	0.000	1.53
		C		0.000	0.000	47.002	0.000	1.03
T6	120.00-100.00	A	2.256	0.000	0.000	184.843	0.000	3.66
		B		0.000	0.000	81.903	0.000	2.02
		C		0.000	0.000	67.543	0.000	1.32
T7	100.00-80.00	A	2.211	0.000	0.000	222.642	0.000	4.04

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		0.000	0.000	81.439	0.000	1.99
		C		0.000	0.000	79.870	0.000	1.49
T8	80.00-60.00	A	2.156	0.000	0.000	219.650	0.000	3.93
		B		0.000	0.000	80.872	0.000	1.95
		C		0.000	0.000	85.747	0.000	1.56
T9	60.00-40.00	A	2.085	0.000	0.000	215.762	0.000	3.80
		B		0.000	0.000	80.135	0.000	1.91
		C		0.000	0.000	96.631	0.000	1.69
T10	40.00-20.00	A	1.981	0.000	0.000	210.105	0.000	3.61
		B		0.000	0.000	79.064	0.000	1.84
		C		0.000	0.000	93.962	0.000	1.60
T11	20.00-0.00	A	1.775	0.000	0.000	115.888	0.000	1.88
		B		0.000	0.000	42.319	0.000	0.94
		C		0.000	0.000	45.572	0.000	0.74

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	195.00-185.00	-26.1913	12.9377	-26.1913	12.9377
T2	185.00-170.00	-24.7528	10.6478	-25.3201	11.3706
T3	170.00-150.00	-12.0091	-10.9369	-13.0095	-6.7621
T4	150.00-140.00	-4.2227	-19.2821	-6.2404	-15.3084
T5	140.00-120.00	2.6864	-9.6164	0.0232	-9.9473
T6	120.00-100.00	0.6351	-8.9869	-3.0985	-9.6598
T7	100.00-80.00	-1.8524	-14.1016	-5.6677	-17.2174
T8	80.00-60.00	-3.3162	-16.7597	-9.0080	-19.0372
T9	60.00-40.00	-5.2851	-19.0232	-13.9134	-19.3503
T10	40.00-20.00	-6.4756	-21.8758	-16.0981	-22.0956
T11	20.00-0.00	-6.0689	-27.1814	-15.2676	-28.3377

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	22	1"	185.00 - 194.80	0.6000	0.3486
T2	16	T-Brackets	170.00 - 171.50	0.6000	0.3492
T2	17	7/8"	170.00 - 171.50	0.6000	0.3492
T2	22	1"	170.00 - 185.00	0.6000	0.3492
T3	2	T-Brackets	150.00 - 161.50	0.6000	0.3719
T3	3	1-5/8"	150.00 - 161.50	0.6000	0.3719
T3	16	T-Brackets	150.00 - 170.00	0.6000	0.3719
T3	17	7/8"	150.00 -	0.6000	0.3719

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T3	22	1"	170.00 150.00 -	0.6000	0.3719
T3	30	0.78"DC	170.00 150.00 -	0.0000	0.0000
T3	31	0.39" fiber	161.50 150.00 -	0.0000	0.0000
T3	32	3" flex conduit	161.50 150.00 -	0.6000	0.3719
T4	2	T-Brackets	161.50 140.00 -	0.6000	0.2606
T4	3	1-5/8"	150.00 140.00 -	0.6000	0.2606
T4	9	1-5/8"	150.00 140.00 -	0.6000	0.2606
T4	10	1-1/4"	146.00 140.00 -	0.6000	0.2606
T4	16	T-Brackets	146.00 140.00 -	0.6000	0.2606
T4	17	7/8"	150.00 140.00 -	0.6000	0.2606
T4	22	1"	150.00 140.00 -	0.6000	0.2606
T4	30	0.78"DC	150.00 140.00 -	0.0000	0.0000
T4	31	0.39" fiber	150.00 140.00 -	0.0000	0.0000
T4	32	3" flex conduit	150.00 140.00 -	0.6000	0.2606
T5	2	T-Brackets	150.00 120.00 -	0.6000	0.3563
T5	3	1-5/8"	140.00 120.00 -	0.6000	0.3563
T5	9	1-5/8"	140.00 120.00 -	0.6000	0.3563
T5	10	1-1/4"	140.00 120.00 -	0.6000	0.3563
T5	13	T-Brackets	140.00 120.00 -	0.6000	0.3563
T5	14	1-5/8"	135.00 120.00 -	0.6000	0.3563
T5	16	T-Brackets	135.00 120.00 -	0.6000	0.3563
T5	17	7/8"	140.00 120.00 -	0.6000	0.3563
T5	22	1"	140.00 120.00 -	0.6000	0.3563
T5	30	0.78"DC	140.00 120.00 -	0.0000	0.0000
T5	31	0.39" fiber	140.00 120.00 -	0.0000	0.0000
T5	32	3" flex conduit	140.00 120.00 -	0.6000	0.3563
T6	2	T-Brackets	140.00 100.00 -	0.6000	0.4666
T6	3	1-5/8"	120.00 100.00 -	0.6000	0.4666
T6	6	1/2"	120.00 100.00 -	0.6000	0.4666
T6	7	8 AWG(1-5/16")	101.40 100.00 -	0.6000	0.4666
T6	9	1-5/8"	101.40 100.00 -	0.6000	0.4666

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			120.00		
T6	10	1-1/4"	100.00 - 120.00	0.6000	0.4666
T6	13	T-Brackets	100.00 - 120.00	0.6000	0.4666
T6	14	1-5/8"	100.00 - 120.00	0.6000	0.4666
T6	16	T-Brackets	100.00 - 120.00	0.6000	0.4666
T6	17	7/8"	100.00 - 120.00	0.6000	0.4666
T6	22	1"	100.00 - 120.00	0.6000	0.4666
T6	27	1-1/4"	100.00 - 112.30	0.6000	0.4666
T6	30	0.78"DC	100.00 - 120.00	0.0000	0.0000
T6	31	0.39" fiber	100.00 - 120.00	0.0000	0.0000
T6	32	3" flex conduit	100.00 - 120.00	0.6000	0.4666
T7	2	T-Brackets	80.00 - 100.00	0.6000	0.5394
T7	3	1-5/8"	80.00 - 100.00	0.6000	0.5394
T7	6	1/2"	80.00 - 100.00	0.6000	0.5394
T7	7	8 AWG(1-5/16")	80.00 - 100.00	0.6000	0.5394
T7	9	1-5/8"	80.00 - 100.00	0.6000	0.5394
T7	10	1-1/4"	80.00 - 100.00	0.6000	0.5394
T7	13	T-Brackets	80.00 - 100.00	0.6000	0.5394
T7	14	1-5/8"	80.00 - 100.00	0.6000	0.5394
T7	16	T-Brackets	80.00 - 100.00	0.6000	0.5394
T7	17	7/8"	80.00 - 100.00	0.6000	0.5394
T7	22	1"	80.00 - 100.00	0.6000	0.5394
T7	27	1-1/4"	80.00 - 100.00	0.6000	0.5394
T7	30	0.78"DC	80.00 - 100.00	0.0000	0.0000
T7	31	0.39" fiber	80.00 - 100.00	0.0000	0.0000
T7	32	3" flex conduit	80.00 - 100.00	0.6000	0.5394
T8	2	T-Brackets	60.00 - 80.00	0.6000	0.5903
T8	3	1-5/8"	60.00 - 80.00	0.6000	0.5903
T8	6	1/2"	60.00 - 80.00	0.6000	0.5903
T8	7	8 AWG(1-5/16")	60.00 - 80.00	0.6000	0.5903
T8	9	1-5/8"	60.00 - 80.00	0.6000	0.5903
T8	10	1-1/4"	60.00 - 80.00	0.6000	0.5903
T8	13	T-Brackets	60.00 - 80.00	0.6000	0.5903
T8	14	1-5/8"	60.00 - 80.00	0.6000	0.5903
T8	16	T-Brackets	60.00 - 80.00	0.6000	0.5903
T8	17	7/8"	60.00 - 80.00	0.6000	0.5903
T8	19	1/2"	60.00 - 74.00	0.6000	0.5903
T8	22	1"	60.00 - 80.00	0.6000	0.5903
T8	27	1-1/4"	60.00 - 80.00	0.6000	0.5903
T8	30	0.78"DC	60.00 - 80.00	0.0000	0.0000
T8	31	0.39" fiber	60.00 - 80.00	0.0000	0.0000
T8	32	3" flex conduit	60.00 - 80.00	0.6000	0.5903
T9	2	T-Brackets	40.00 - 60.00	0.6000	0.6000
T9	3	1-5/8"	40.00 - 60.00	0.6000	0.6000
T9	6	1/2"	40.00 - 60.00	0.6000	0.6000
T9	7	8 AWG(1-5/16")	40.00 - 60.00	0.6000	0.6000
T9	9	1-5/8"	40.00 - 60.00	0.6000	0.6000
T9	10	1-1/4"	40.00 - 60.00	0.6000	0.6000
T9	13	T-Brackets	40.00 - 60.00	0.6000	0.6000
T9	14	1-5/8"	40.00 - 60.00	0.6000	0.6000
T9	16	T-Brackets	40.00 - 60.00	0.6000	0.6000
T9	17	7/8"	40.00 - 60.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T9	19	1/2"	40.00 - 60.00	0.6000	0.6000
T9	22	1"	40.00 - 60.00	0.6000	0.6000
T9	27	1-1/4"	40.00 - 60.00	0.6000	0.6000
T9	28	1/2"	40.00 - 60.00	0.6000	0.6000
T9	30	0.78"DC	40.00 - 60.00	0.0000	0.0000
T9	31	0.39" fiber	40.00 - 60.00	0.0000	0.0000
T9	32	3" flex conduit	40.00 - 60.00	0.6000	0.6000
T10	2	T-Brackets	20.00 - 40.00	0.6000	0.6000
T10	3	1-5/8"	20.00 - 40.00	0.6000	0.6000
T10	6	1/2"	20.00 - 40.00	0.6000	0.6000
T10	7	8 AWG(1-5/16")	20.00 - 40.00	0.6000	0.6000
T10	9	1-5/8"	20.00 - 40.00	0.6000	0.6000
T10	10	1-1/4"	20.00 - 40.00	0.6000	0.6000
T10	13	T-Brackets	20.00 - 40.00	0.6000	0.6000
T10	14	1-5/8"	20.00 - 40.00	0.6000	0.6000
T10	16	T-Brackets	20.00 - 40.00	0.6000	0.6000
T10	17	7/8"	20.00 - 40.00	0.6000	0.6000
T10	19	1/2"	20.00 - 40.00	0.6000	0.6000
T10	22	1"	20.00 - 40.00	0.6000	0.6000
T10	27	1-1/4"	20.00 - 40.00	0.6000	0.6000
T10	28	1/2"	20.00 - 40.00	0.6000	0.6000
T10	30	0.78"DC	20.00 - 40.00	0.0000	0.0000
T10	31	0.39" fiber	20.00 - 40.00	0.0000	0.0000
T10	32	3" flex conduit	20.00 - 40.00	0.6000	0.6000
T11	2	T-Brackets	8.00 - 20.00	0.6000	0.6000
T11	3	1-5/8"	8.00 - 20.00	0.6000	0.6000
T11	6	1/2"	8.00 - 20.00	0.6000	0.6000
T11	7	8 AWG(1-5/16")	8.00 - 20.00	0.6000	0.6000
T11	9	1-5/8"	9.00 - 20.00	0.6000	0.6000
T11	10	1-1/4"	9.00 - 20.00	0.6000	0.6000
T11	13	T-Brackets	9.00 - 20.00	0.6000	0.6000
T11	14	1-5/8"	9.00 - 20.00	0.6000	0.6000
T11	16	T-Brackets	9.00 - 20.00	0.6000	0.6000
T11	17	7/8"	9.00 - 20.00	0.6000	0.6000
T11	19	1/2"	12.00 - 20.00	0.6000	0.6000
T11	22	1"	9.00 - 20.00	0.6000	0.6000
T11	27	1-1/4"	10.00 - 20.00	0.6000	0.6000
T11	28	1/2"	10.00 - 20.00	0.6000	0.6000
T11	30	0.78"DC	8.00 - 20.00	0.0000	0.0000
T11	31	0.39" fiber	8.00 - 20.00	0.0000	0.0000
T11	32	3" flex conduit	8.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Beacon	A	From Face	0.00 0.00 1.30	0.0000	194.80	No Ice 1/2" Ice 1" Ice	2.00 2.50 3.00	2.00 2.50 3.00	0.02 0.03 0.04
Lightning Rod	C	From Leg	1.30	0.0000	194.60	No Ice	0.25	0.25	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	0.66	0.66	0.03
			1.70			1" Ice	0.97	0.97	0.04
Sidemarker	A	From Leg	1.00	0.0000	94.50	No Ice	0.38	0.38	0.01
			0.00			1/2" Ice	0.63	0.63	0.02
			0.00			1" Ice	0.75	0.75	0.03
Sidemarker	B	From Leg	1.00	0.0000	94.50	No Ice	0.38	0.38	0.01
			0.00			1/2" Ice	0.63	0.63	0.02
			0.00			1" Ice	0.75	0.75	0.03
Sidemarker	C	From Leg	1.00	0.0000	94.50	No Ice	0.38	0.38	0.01
			0.00			1/2" Ice	0.63	0.63	0.02
			0.00			1" Ice	0.75	0.75	0.03
***									
DB224-A Omni	C	From Leg	0.50	0.0000	193.40	No Ice	6.38	6.38	0.04
			0.00			1/2" Ice	8.53	8.53	0.08
			10.00			1" Ice	10.71	10.71	0.14
***									
(2) 20' 4 Element Dipole	A	From Face	3.80	0.0000	171.50	No Ice	4.00	4.00	0.04
			0.00			1/2" Ice	6.03	6.03	0.07
			12.20			1" Ice	8.07	8.07	0.11
(2) 20' 4 Element Dipole	B	From Face	3.80	0.0000	171.50	No Ice	4.00	4.00	0.04
			0.00			1/2" Ice	6.03	6.03	0.07
			12.20			1" Ice	8.07	8.07	0.11
20' 4 Element Dipole	C	From Face	3.80	0.0000	171.50	No Ice	4.00	4.00	0.04
			0.00			1/2" Ice	6.03	6.03	0.07
			12.20			1" Ice	8.07	8.07	0.11
20'x2.5" Omni	C	From Face	3.80	0.0000	171.50	No Ice	5.00	5.00	0.03
			0.00			1/2" Ice	7.03	7.03	0.07
			11.30			1" Ice	9.07	9.07	0.12
13'x2" Omni	B	From Face	3.80	0.0000	171.50	No Ice	2.60	2.60	0.03
			0.00			1/2" Ice	3.92	3.92	0.05
			9.10			1" Ice	5.27	5.27	0.07
10' x 1.38" omni	C	From Face	3.80	0.0000	171.50	No Ice	1.38	1.38	0.02
			0.00			1/2" Ice	2.40	2.40	0.03
			7.60			1" Ice	3.44	3.44	0.05
(3) 15' T-Frames	C	None		0.0000	171.50	No Ice	27.35	27.35	1.89
						1/2" Ice	38.29	38.29	2.64
						1" Ice	49.23	49.23	3.40
(5) Pipe Mount	A	From Face	3.80	0.0000	171.50	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
(5) Pipe Mount	B	From Face	3.80	0.0000	171.50	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
(5) Pipe Mount	C	From Face	3.80	0.0000	171.50	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
***									
800 10121 w/ Mount Pipe	A	From Face	3.80	0.0000	161.50	No Ice	5.39	4.60	0.07
			0.00			1/2" Ice	5.81	5.35	0.11
			3.30			1" Ice	6.23	6.05	0.17
800 10121 w/ Mount Pipe	B	From Face	3.80	0.0000	161.50	No Ice	5.39	4.60	0.07
			0.00			1/2" Ice	5.81	5.35	0.11
			3.30			1" Ice	6.23	6.05	0.17
800 10121 w/ Mount Pipe	C	From Face	3.80	0.0000	161.50	No Ice	5.39	4.60	0.07
			0.00			1/2" Ice	5.81	5.35	0.11
			3.30			1" Ice	6.23	6.05	0.17
(3) 15' T-Frames	C	None		0.0000	161.50	No Ice	27.35	27.35	1.89

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1/2" Ice	38.29	38.29	2.64
						1" Ice	49.23	49.23	3.40
(2) Pipe Mount	A	From Face	3.80	0.0000	161.50	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
(2) Pipe Mount	B	From Face	3.80	0.0000	161.50	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
(2) Pipe Mount	C	From Face	3.80	0.0000	161.50	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
***									
RRFDC-3315-PF-48	A	From Leg	0.50	0.0000	146.00	No Ice	3.02	1.96	0.03
			0.00			1/2" Ice	3.24	2.15	0.06
			0.80			1" Ice	3.47	2.35	0.09
6' x 1' x 7" Panel	A	From Leg	4.00	0.0000	146.00	No Ice	8.13	5.28	0.04
			0.00			1/2" Ice	8.59	5.74	0.09
			-0.30			1" Ice	9.05	6.20	0.15
Pipe Mount [PM 601-1]	A	From Leg	4.00	0.0000	146.00	No Ice	3.00	0.90	0.07
			0.00			1/2" Ice	3.74	1.12	0.08
			-0.30			1" Ice	4.48	1.34	0.09
BXA-70063-6CF-EDIN w/ Mount Pipe	B	From Leg	4.00	0.0000	146.00	No Ice	7.81	5.80	0.04
			0.00			1/2" Ice	8.36	6.95	0.10
			-0.30			1" Ice	8.87	7.82	0.17
BXA-70063-6CF-EDIN w/ Mount Pipe	C	From Leg	4.00	0.0000	146.00	No Ice	7.81	5.80	0.04
			0.00			1/2" Ice	8.36	6.95	0.10
			-0.30			1" Ice	8.87	7.82	0.17
BXA-171063-12CF-EDIN-5 w/Mount Pipe	A	From Leg	4.00	0.0000	146.00	No Ice	5.02	5.28	0.04
			0.00			1/2" Ice	5.57	6.45	0.09
			-0.30			1" Ice	6.09	7.33	0.14
BXA-171063-12CF-EDIN-5 w/Mount Pipe	B	From Leg	4.00	0.0000	146.00	No Ice	5.02	5.28	0.04
			0.00			1/2" Ice	5.57	6.45	0.09
			-0.30			1" Ice	6.09	7.33	0.14
BXA-171063-12CF-EDIN-5 w/Mount Pipe	C	From Leg	4.00	0.0000	146.00	No Ice	5.02	5.28	0.04
			0.00			1/2" Ice	5.57	6.45	0.09
			-0.30			1" Ice	6.09	7.33	0.14
9442 RRH2x40 AWS RRH	A	From Leg	4.00	0.0000	146.00	No Ice	2.50	1.89	0.05
			0.00			1/2" Ice	2.71	2.08	0.07
			-0.50			1" Ice	2.93	2.27	0.10
9442 RRH2x40 AWS RRH	B	From Leg	4.00	0.0000	146.00	No Ice	2.50	1.89	0.05
			0.00			1/2" Ice	2.71	2.08	0.07
			-0.50			1" Ice	2.93	2.27	0.10
9442 RRH2x40 AWS RRH	C	From Leg	4.00	0.0000	146.00	No Ice	2.50	1.89	0.05
			0.00			1/2" Ice	2.71	2.08	0.07
			-0.50			1" Ice	2.93	2.27	0.10
(3) 12.5' T-Frames	A	None		0.0000	146.00	No Ice	30.02	30.02	0.95
						1/2" Ice	40.48	40.48	1.40
						1" Ice	50.94	50.94	1.86
(2) Pipe Mount	A	From Leg	4.00	0.0000	146.00	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
(2) Pipe Mount	B	From Leg	4.00	0.0000	146.00	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
(2) Pipe Mount	C	From Leg	4.00	0.0000	146.00	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***									
RR90-17-02DP w/ Mount Pipe	A	From Leg	3.80 0.00 3.30	0.0000	135.00	No Ice 1/2" Ice 1" Ice	4.59 5.02 5.44	3.32 4.09 4.78	0.03 0.07 0.12
RR90-17-02DP w/ Mount Pipe	B	From Leg	3.80 0.00 3.30	0.0000	135.00	No Ice 1/2" Ice 1" Ice	4.59 5.02 5.44	3.32 4.09 4.78	0.03 0.07 0.12
RR90-17-02DP w/ Mount Pipe	C	From Leg	3.80 0.00 3.30	0.0000	135.00	No Ice 1/2" Ice 1" Ice	4.59 5.02 5.44	3.32 4.09 4.78	0.03 0.07 0.12
RFS 4.7'x1.1'x3.5' Panel	A	From Leg	3.80 0.00 3.30	0.0000	135.00	No Ice 1/2" Ice 1" Ice	5.80 6.16 6.52	2.42 2.76 3.10	0.02 0.05 0.09
RFS 4.7'x1.1'x3.5' Panel	B	From Leg	3.80 0.00 3.30	0.0000	135.00	No Ice 1/2" Ice 1" Ice	5.80 6.16 6.52	2.42 2.76 3.10	0.02 0.05 0.09
RFS 4.7'x1.1'x3.5' Panel	C	From Leg	3.80 0.00 3.30	0.0000	135.00	No Ice 1/2" Ice 1" Ice	5.80 6.16 6.52	2.42 2.76 3.10	0.02 0.05 0.09
7" x 6" x 3" TMA	A	From Leg	3.80 0.00 3.30	0.0000	135.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.17 0.23 0.30	0.01 0.01 0.02
7" x 6" x 3" TMA	B	From Leg	3.80 0.00 3.30	0.0000	135.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.17 0.23 0.30	0.01 0.01 0.02
7" x 6" x 3" TMA	C	From Leg	3.80 0.00 3.30	0.0000	135.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.17 0.23 0.30	0.01 0.01 0.02
LNX-6515DS-A1M w/ Mount Pipe	A	From Leg	3.80 0.00 2.80	0.0000	135.00	No Ice 1/2" Ice 1" Ice	11.78 12.50 13.18	10.85 12.32 13.46	0.12 0.22 0.33
LNX-6515DS-A1M w/ Mount Pipe	B	From Leg	3.80 0.00 2.80	0.0000	135.00	No Ice 1/2" Ice 1" Ice	11.78 12.50 13.18	10.85 12.32 13.46	0.12 0.22 0.33
LNX-6515DS-A1M w/ Mount Pipe	C	From Leg	3.80 0.00 2.80	0.0000	135.00	No Ice 1/2" Ice 1" Ice	11.78 12.50 13.18	10.85 12.32 13.46	0.12 0.22 0.33
(3) 15' T-Frames	C	None		0.0000	135.00	No Ice 1/2" Ice 1" Ice	27.35 38.29 49.23	27.35 38.29 49.23	1.89 2.64 3.40
(2) Pipe Mount	A	From Leg	3.80 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	1.20 1.50 1.81	1.20 1.50 1.81	0.02 0.03 0.04
(2) Pipe Mount	B	From Leg	3.80 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	1.20 1.50 1.81	1.20 1.50 1.81	0.02 0.03 0.04
(2) Pipe Mount	C	From Leg	3.80 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	1.20 1.50 1.81	1.20 1.50 1.81	0.02 0.03 0.04
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APXVTM14-C-I20 w/ Mount Pipe	A	From Leg	4.50 0.00 2.70	0.0000	112.30	No Ice 1/2" Ice 1" Ice	6.65 7.14 7.60	5.03 5.89 6.63	0.08 0.13 0.20
APXVTM14-C-I20 w/ Mount Pipe	B	From Leg	4.50 0.00 2.70	0.0000	112.30	No Ice 1/2" Ice 1" Ice	6.65 7.14 7.60	5.03 5.89 6.63	0.08 0.13 0.20

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVTM14-C-I20 w/ Mount Pipe	C	From Leg	4.50	0.0000	112.30	No Ice	6.65	5.03	0.08
			0.00			1/2" Ice	7.14	5.89	0.13
			2.70			1" Ice	7.60	6.63	0.20
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.50	0.0000	112.30	No Ice	8.26	6.95	0.08
			0.00			1/2" Ice	8.82	8.13	0.15
			4.50			1" Ice	9.35	9.02	0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.50	0.0000	112.30	No Ice	8.26	6.95	0.08
			0.00			1/2" Ice	8.82	8.13	0.15
			4.50			1" Ice	9.35	9.02	0.23
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.50	0.0000	112.30	No Ice	8.26	6.95	0.08
			0.00			1/2" Ice	8.82	8.13	0.15
			4.50			1" Ice	9.35	9.02	0.23
TD-RRH8x20-25	A	From Leg	4.50	0.0000	112.30	No Ice	3.70	1.29	0.07
			0.00			1/2" Ice	3.95	1.46	0.09
			2.70			1" Ice	4.20	1.64	0.12
TD-RRH8x20-25	B	From Leg	4.50	0.0000	112.30	No Ice	3.70	1.29	0.07
			0.00			1/2" Ice	3.95	1.46	0.09
			2.70			1" Ice	4.20	1.64	0.12
TD-RRH8x20-25	C	From Leg	4.50	0.0000	112.30	No Ice	3.70	1.29	0.07
			0.00			1/2" Ice	3.95	1.46	0.09
			2.70			1" Ice	4.20	1.64	0.12
800 MHz RRH	A	From Leg	0.50	0.0000	109.60	No Ice	2.13	1.77	0.05
			0.00			1/2" Ice	2.32	1.95	0.07
			0.70			1" Ice	2.51	2.13	0.10
800 MHz RRH	B	From Leg	0.50	0.0000	109.60	No Ice	2.13	1.77	0.05
			0.00			1/2" Ice	2.32	1.95	0.07
			0.70			1" Ice	2.51	2.13	0.10
800 MHz RRH	C	From Leg	0.50	0.0000	109.60	No Ice	2.13	1.77	0.05
			0.00			1/2" Ice	2.32	1.95	0.07
			0.70			1" Ice	2.51	2.13	0.10
1900 MHz RRH	A	From Leg	0.50	0.0000	106.50	No Ice	2.31	2.38	0.06
			0.00			1/2" Ice	2.52	2.58	0.08
			1.10			1" Ice	2.73	2.79	0.11
1900 MHz RRH	B	From Leg	0.50	0.0000	106.50	No Ice	2.31	2.38	0.06
			0.00			1/2" Ice	2.52	2.58	0.08
			1.10			1" Ice	2.73	2.79	0.11
1900 MHz RRH	C	From Leg	0.50	0.0000	106.50	No Ice	2.31	2.38	0.06
			0.00			1/2" Ice	2.52	2.58	0.08
			1.10			1" Ice	2.73	2.79	0.11
(3) 15' T-Frames	C	None		0.0000	112.30	No Ice	34.86	34.86	1.73
						1/2" Ice	49.79	49.79	2.32
						1" Ice	64.72	64.72	2.91
(2) Pipe Mount	A	From Leg	4.50	0.0000	112.30	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
(2) Pipe Mount	B	From Leg	4.50	0.0000	112.30	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
(2) Pipe Mount	C	From Leg	4.50	0.0000	112.30	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
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LLPX310R w/ Mount Pipe	A	From Leg	1.30	0.0000	101.40	No Ice	4.69	3.16	0.05
			0.00			1/2" Ice	5.07	3.74	0.09
			2.60			1" Ice	5.47	4.33	0.13
LLPX310R w/ Mount Pipe	B	From Leg	1.30	0.0000	101.40	No Ice	4.69	3.16	0.05
			0.00			1/2" Ice	5.07	3.74	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			2.60			1" Ice	5.47	4.33	0.13
LLPX310R w/ Mount Pipe	C	From Leg	1.30	0.0000	101.40	No Ice	4.69	3.16	0.05
			0.00			1/2" Ice	5.07	3.74	0.09
			2.60			1" Ice	5.47	4.33	0.13
SPI-22132825WB RRH	A	From Leg	1.30	0.0000	101.40	No Ice	0.00	0.00	0.00
			0.00			1/2" Ice	0.00	0.00	0.00
			2.40			1" Ice	0.00	0.00	0.00
SPI-22132825WB RRH	B	From Leg	1.30	0.0000	101.40	No Ice	0.00	0.00	0.00
			0.00			1/2" Ice	0.00	0.00	0.00
			2.40			1" Ice	0.00	0.00	0.00
SPI-22132825WB RRH	C	From Leg	0.00	0.0000	101.40	No Ice	0.00	0.00	0.00
			0.00			1/2" Ice	0.00	0.00	0.00
			2.40			1" Ice	0.00	0.00	0.00
(3) 1.3' Standoffs	C	None		0.0000	101.40	No Ice	9.50	9.50	0.22
						1/2" Ice	11.80	11.80	0.32
						1" Ice	14.10	14.10	0.41
Pipe Mount	A	From Leg	1.30	0.0000	101.40	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
Pipe Mount	B	From Leg	1.30	0.0000	101.40	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
Pipe Mount	C	From Leg	1.30	0.0000	101.40	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
12" x 12" x 6.38" Junction Box	A	From Leg	0.50	0.0000	101.80	No Ice	1.20	0.64	0.02
			0.00			1/2" Ice	1.34	0.74	0.03
			0.60			1" Ice	1.48	0.86	0.04
***									
3.37" Ø x 7.5" GPS	C	From Leg	3.50	0.0000	74.00	No Ice	0.12	0.12	0.00
			0.00			1/2" Ice	0.18	0.18	0.00
			1.90			1" Ice	0.25	0.25	0.00
(1) 3.5' Standoff	C	From Leg	1.75	0.0000	74.00	No Ice	0.85	1.67	0.07
			0.00			1/2" Ice	1.14	2.34	0.08
			0.00			1" Ice	1.43	3.01	0.09
***									
GPS-TMG-HR-26N	C	From Leg	0.50	0.0000	60.00	No Ice	0.21	0.13	0.00
			0.00			1/2" Ice	0.27	0.18	0.00
			0.00			1" Ice	0.33	0.24	0.01
***									
SBNH-1D6565C	A	From Face	3.80	0.0000	161.50	No Ice	11.45	7.70	0.05
			0.00			1/2" Ice	12.06	8.29	0.12
			0.00			1" Ice	12.69	8.89	0.19
SBNH-1D6565C	B	From Face	3.80	0.0000	161.50	No Ice	11.45	7.70	0.05
			0.00			1/2" Ice	12.06	8.29	0.12
			0.00			1" Ice	12.69	8.89	0.19
SBNH-1D6565C	C	From Face	3.80	0.0000	161.50	No Ice	11.45	7.70	0.05
			0.00			1/2" Ice	12.06	8.29	0.12
			0.00			1" Ice	12.69	8.89	0.19
TPA-65R-LCUUUU-H8	A	From Face	3.80	0.0000	161.50	No Ice	13.01	8.82	0.08
			0.00			1/2" Ice	13.60	9.42	0.15
			0.00			1" Ice	14.21	10.03	0.24
TPA-65R-LCUUUU-H8	B	From Face	3.80	0.0000	161.50	No Ice	13.01	8.82	0.08
			0.00			1/2" Ice	13.60	9.42	0.15
			0.00			1" Ice	14.21	10.03	0.24
TPA-65R-LCUUUU-H8	C	From Face	3.80	0.0000	161.50	No Ice	13.01	8.82	0.08
			0.00			1/2" Ice	13.60	9.42	0.15

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	14.21	10.03	0.24
(2) LGP 21401 TMA	A	From Face	3.80	0.0000	161.50	No Ice	0.82	0.35	0.01
			0.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.02
(2) LGP 21401 TMA	B	From Face	3.80	0.0000	161.50	No Ice	0.82	0.35	0.01
			0.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.02
(2) LGP 21401 TMA	C	From Face	3.80	0.0000	161.50	No Ice	0.82	0.35	0.01
			0.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.02
(2) 860 10025	A	From Face	3.80	0.0000	161.50	No Ice	0.14	0.12	0.01
			0.00			1/2" Ice	0.20	0.17	0.01
			0.00			1" Ice	0.26	0.23	0.01
(2) 860 10025	B	From Face	3.80	0.0000	161.50	No Ice	0.14	0.12	0.01
			0.00			1/2" Ice	0.20	0.17	0.01
			0.00			1" Ice	0.26	0.23	0.01
(2) 860 10025	C	From Face	3.80	0.0000	161.50	No Ice	0.14	0.12	0.01
			0.00			1/2" Ice	0.20	0.17	0.01
			0.00			1" Ice	0.26	0.23	0.01
RRUS 11 (Band 12)	A	From Face	3.80	0.0000	161.50	No Ice	2.52	1.07	0.06
			0.00			1/2" Ice	2.72	1.21	0.07
			0.00			1" Ice	2.92	1.36	0.10
RRUS 11 (Band 12)	B	From Face	3.80	0.0000	161.50	No Ice	2.52	1.07	0.06
			0.00			1/2" Ice	2.72	1.21	0.07
			0.00			1" Ice	2.92	1.36	0.10
RRUS 11 (Band 12)	C	From Face	3.80	0.0000	161.50	No Ice	2.52	1.07	0.06
			0.00			1/2" Ice	2.72	1.21	0.07
			0.00			1" Ice	2.92	1.36	0.10
RRUS 32 B2	A	From Face	3.80	0.0000	161.50	No Ice	2.74	1.67	0.05
			0.00			1/2" Ice	2.96	1.86	0.07
			0.00			1" Ice	3.19	2.05	0.10
RRUS 32 B2	B	From Face	3.80	0.0000	161.50	No Ice	2.74	1.67	0.05
			0.00			1/2" Ice	2.96	1.86	0.07
			0.00			1" Ice	3.19	2.05	0.10
RRUS 32 B2	C	From Face	3.80	0.0000	161.50	No Ice	2.74	1.67	0.05
			0.00			1/2" Ice	2.96	1.86	0.07
			0.00			1" Ice	3.19	2.05	0.10
RRUS 32 B30	A	From Face	3.80	0.0000	161.50	No Ice	2.74	1.67	0.05
			0.00			1/2" Ice	2.96	1.86	0.07
			0.00			1" Ice	3.19	2.05	0.10
RRUS 32 B30	B	From Face	3.80	0.0000	161.50	No Ice	2.74	1.67	0.05
			0.00			1/2" Ice	2.96	1.86	0.07
			0.00			1" Ice	3.19	2.05	0.10
RRUS 32 B30	C	From Face	3.80	0.0000	161.50	No Ice	2.74	1.67	0.05
			0.00			1/2" Ice	2.96	1.86	0.07
			0.00			1" Ice	3.19	2.05	0.10
DC6-48-60-18-8F	A	From Leg	0.50	0.0000	161.50	No Ice	1.21	1.21	0.03
			0.00			1/2" Ice	1.89	1.89	0.05
			0.00			1" Ice	2.11	2.11	0.08
DC6-48-60-18-8F	B	From Leg	0.50	0.0000	161.50	No Ice	1.21	1.21	0.03
			0.00			1/2" Ice	1.89	1.89	0.05
			0.00			1" Ice	2.11	2.11	0.08

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft °	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
3.3' Dish	C	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 3.20	0.0000		101.40	3.30	No Ice 1/2" Ice 1" Ice	8.55 8.99 9.43	0.04 0.09 0.13
VHLP1-23-DW1 ***	A	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 2.60	0.0000		101.40	1.27	No Ice 1/2" Ice 1" Ice	1.28 1.45 1.62	0.01 0.02 0.03

Truss-Leg Properties

Section Designation	Area in^2	Area Ice in^2	Self Weight K	Ice Weight K	Equiv. Diameter in	Equiv. Diameter Ice in	Leg Area in^2
Pirod 105244	1026.8606	3412.2617	0.56	0.98	7.1310	23.6963	3.6816
Pirod 105217	2130.7479	7060.8454	0.62	1.86	7.3984	24.5168	5.3014
Pirod 105218	2263.4687	7099.2516	0.75	1.83	7.8593	24.6502	7.2158
Pirod 105218	2263.4687	7059.6326	0.75	1.78	7.8593	24.5126	7.2158
Pirod 105219	2441.8688	7083.1231	0.94	1.76	8.4787	24.5942	9.4248
Pirod 105219	2441.8688	7020.0558	0.94	1.67	8.4787	24.3752	9.4248
Pirod 105220	2578.8005	7000.2743	1.12	1.56	8.9542	24.3065	11.9282
Pirod 105220	2578.8005	6818.0737	1.12	1.32	8.9542	23.6739	11.9282

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

Comb. No.	Description
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	195 - 185	4.510	41	0.2004	0.0193
T2	185 - 170	4.091	41	0.1998	0.0167
T3	170 - 150	3.456	41	0.1959	0.0113
T4	150 - 140	2.640	41	0.1747	0.0125
T5	140 - 120	2.281	41	0.1592	0.0114
T6	120 - 100	1.643	41	0.1318	0.0087
T7	100 - 80	1.117	41	0.1078	0.0065
T8	80 - 60	0.707	41	0.0805	0.0051
T9	60 - 40	0.400	47	0.0585	0.0037
T10	40 - 20	0.185	47	0.0360	0.0024
T11	20 - 0	0.055	47	0.0180	0.0012

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
194.80	Beacon	41	4.502	0.2004	0.0193	488833
194.60	Lightning Rod	41	4.493	0.2004	0.0192	488833
193.40	DB224-A Omni	41	4.443	0.2003	0.0190	488833

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
171.50	(2) 20' 4 Element Dipole	41	3.520	0.1967	0.0118	758294
161.50	800 10121 w/ Mount Pipe	41	3.099	0.1891	0.0118	58410
146.00	RRFDC-3315-PF-48	41	2.493	0.1686	0.0122	32600
135.00	RR90-17-02DP w/ Mount Pipe	41	2.112	0.1517	0.0107	48255
112.30	APXVTM14-C-I20 w/ Mount Pipe	41	1.427	0.1227	0.0078	40158
109.60	800 MHz RRH	41	1.355	0.1196	0.0074	40296
106.50	1900 MHz RRH	41	1.275	0.1159	0.0071	40456
104.60	3.3' Dish	41	1.228	0.1136	0.0069	40555
104.00	VHLP1-23-DW1	41	1.213	0.1129	0.0069	40587
101.80	12" x 12" x 6.38" Junction Box	41	1.160	0.1101	0.0066	40748
101.40	LLPX310R w/ Mount Pipe	41	1.150	0.1096	0.0066	40789
94.50	Sidemarker	41	0.994	0.1003	0.0060	42337
74.00	3.37" Ø x 7.5" GPS	47	0.604	0.0735	0.0047	48447
60.00	GPS-TMG-HR-26N	47	0.400	0.0585	0.0037	52198

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	195 - 185	18.793	6	0.8328	0.0809
T2	185 - 170	17.041	6	0.8299	0.0697
T3	170 - 150	14.394	19	0.8131	0.0471
T4	150 - 140	11.012	19	0.7249	0.0521
T5	140 - 120	9.524	19	0.6617	0.0475
T6	120 - 100	6.871	19	0.5484	0.0366
T7	100 - 80	4.682	19	0.4490	0.0271
T8	80 - 60	2.968	19	0.3360	0.0214
T9	60 - 40	1.681	19	0.2446	0.0156
T10	40 - 20	0.777	19	0.1505	0.0098
T11	20 - 0	0.232	19	0.0753	0.0048

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
194.80	Beacon	6	18.758	0.8327	0.0807	128418
194.60	Lightning Rod	6	18.723	0.8327	0.0805	128418
193.40	DB224-A Omni	6	18.513	0.8324	0.0793	128418
171.50	(2) 20' 4 Element Dipole	6	14.658	0.8164	0.0492	89734
161.50	800 10121 w/ Mount Pipe	19	12.913	0.7846	0.0493	14186
146.00	RRFDC-3315-PF-48	19	10.400	0.7001	0.0509	7870
135.00	RR90-17-02DP w/ Mount Pipe	19	8.822	0.6311	0.0447	11711
112.30	APXVTM14-C-I20 w/ Mount Pipe	19	5.971	0.5106	0.0325	9685
109.60	800 MHz RRH	19	5.672	0.4975	0.0311	9715
106.50	1900 MHz RRH	19	5.340	0.4824	0.0297	9750
104.60	3.3' Dish	19	5.143	0.4729	0.0289	9771
104.00	VHLP1-23-DW1	19	5.081	0.4699	0.0287	9779
101.80	12" x 12" x 6.38" Junction Box	19	4.859	0.4586	0.0278	9815
101.40	LLPX310R w/ Mount Pipe	19	4.820	0.4565	0.0276	9825
94.50	Sidemarker	19	4.165	0.4181	0.0253	10198

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
74.00	3.37" Ø x 7.5" GPS	19	2.540	0.3068	0.0197	11649
60.00	GPS-TMG-HR-26N	19	1.681	0.2446	0.0156	12548

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	195	Leg	A325N	0.6250	4	0.61	24.85	0.024 ✔	1	Bolt DS
T2	185	Leg	A325N	0.6250	5	2.17	24.85	0.087 ✔	1	Bolt DS
T3	170	Leg	A325SC	1.0000	6	5.52	53.01	0.104 ✔	1	Bolt Tension
T4	150	Leg	A325N	1.0000	6	6.20	53.01	0.117 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	5.35	10.66	0.502 ✔	1	Member Block Shear
T5	140	Leg	A325N	1.0000	6	11.51	53.01	0.217 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	6.19	10.66	0.581 ✔	1	Member Block Shear
		Top Girt	A325N	1.0000	1	2.09	10.66	0.196 ✔	1	Member Block Shear
T6	120	Leg	A325N	1.0000	6	16.82	53.01	0.317 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	6.92	11.68	0.592 ✔	1	Member Block Shear
T7	100	Leg	A325N	1.0000	6	22.44	53.01	0.423 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	7.58	19.47	0.389 ✔	1	Member Block Shear
T8	80	Leg	A325N >1"	1.2500	6	27.53	72.48	0.380 ✔	1	Bolt Tension
		Diagonal	A325N>1' '	1.2500	1	7.50	20.30	0.370 ✔	1	Member Block Shear
T9	60	Leg	A325N >1"	1.2500	6	32.24	72.48	0.445 ✔	1	Bolt Tension
		Diagonal	A325N>1' '	1.2500	1	7.71	20.30	0.380 ✔	1	Member Block Shear
T10	40	Leg	A325N >1"	1.2500	6	36.64	72.48	0.505 ✔	1	Bolt Tension
		Diagonal	A325N>1' '	1.2500	1	8.01	23.70	0.338 ✔	1	Member Block Shear
T11	20	Diagonal	A325N>1' '	1.2500	1	8.63	23.70	0.364 ✔	1	Member Block Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 185	1 3/4	10.00	2.25	61.7 K=1.00	2.4053	-2.16	81.93	0.026 [1] ✔
T2	185 - 170	1 3/4	15.00	2.33	64.0 K=1.00	2.4053	-10.11	80.23	0.126 [1] ✔
T3	170 - 150	2	20.00	2.33	56.0 K=1.00	3.1416	-37.41	112.40	0.333 [1] ✔
T4	150 - 140	Pirod 105244	10.02	10.02	45.4 K=1.00	3.6816	-43.71	142.49	0.307 [1] ✔
T5	140 - 120	Pirod 105217	20.03	10.02	37.8 K=1.00	5.3014	-82.23	214.86	0.383 [1] ✔
T6	120 - 100	Pirod 105218	20.03	10.02	32.4 K=1.00	7.2158	-118.55	300.68	0.394 [1] ✔
T7	100 - 80	Pirod 105218	20.03	10.02	32.4 K=1.00	7.2158	-154.90	300.68	0.515 [1] ✔
T8	80 - 60	Pirod 105219	20.03	10.02	28.4 K=1.00	9.4248	-189.76	399.87	0.475 [1] ✔
T9	60 - 40	Pirod 105219	20.03	10.02	28.4 K=1.00	9.4248	-222.58	399.87	0.557 [1] ✔
T10	40 - 20	Pirod 105220	20.03	10.02	25.2 K=1.00	11.9282	-254.16	512.38	0.496 [1] ✔
T11	20 - 0	Pirod 105220	20.03	10.02	25.2 K=1.00	11.9282	-283.44	512.38	0.553 [1] ✔

[1] P_u / ϕP_n controls

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T4	150 - 140	0.5	1.48	121.0	165.67	0.1963	0.65	3.39	0.193 ✔
T5	140 - 120	0.5	1.47	120.0	238.57	0.1963	0.71	3.34	0.214 ✔
T6	120 - 100	0.5	1.46	119.0	324.71	0.1963	0.72	3.38	0.213 ✔
T7	100 - 80	0.5	1.46	119.0	324.71	0.1963	0.25	3.38	0.074 ✔
T8	80 - 60	0.625	1.45	94.4	424.12	0.3068	0.18	6.96	0.026 ✔
T9	60 - 40	0.625	1.45	94.4	424.12	0.3068	0.16	6.96	0.024 ✔
T10	40 - 20	0.625	1.43	93.6	536.77	0.3068	0.80	7.01	0.114 ✔
T11	20 - 0	0.625	1.43	93.6	536.77	0.3068	1.30	7.01	0.185 ✔

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 185	3/4	5.03	2.43	140.2 K=0.90	0.4418	-0.42	5.08	0.083 [1] ✔
T2	185 - 170	3/4	5.07	2.45	141.3 K=0.90	0.4418	-1.30	5.00	0.260 [1] ✔
T3	170 - 150	7/8	5.48	2.66	131.5 K=0.90	0.6013	-3.06	7.86	0.389 [1] ✔
T4	150 - 140	L2 1/2x2 1/2x3/16	11.42	4.98	120.8 K=1.00	0.9023	-6.40	13.56	0.472 [1] ✔
T5	140 - 120	L2 1/2x2 1/2x3/16	12.50	5.63	136.4 K=1.00	0.9023	-6.18	10.95	0.565 [1] ✔
T6	120 - 100	L3x3x3/16	13.80	6.33	127.3 K=1.00	1.0898	-7.10	14.96	0.475 [1] ✔
T7	100 - 80	L3x3x5/16	15.24	7.08	144.3 K=1.00	1.7800	-7.50	19.32	0.388 [1] ✔
T8	80 - 60	L3x3x5/16	16.80	7.84	159.7 K=1.00	1.7800	-7.62	15.76	0.483 [1] ✔
T9	60 - 40	L3x3x5/16	18.45	8.68	176.8 K=1.00	1.7800	-7.83	12.87	0.609 [1] ✔
T10	40 - 20	L3 1/2x3 1/2x5/16	20.16	9.54	165.9 K=1.00	2.0900	-8.20	17.15	0.478 [1] ✔
T11	20 - 0	L3 1/2x3 1/2x5/16	21.92	10.43	181.3 K=1.00	2.0900	-9.15	14.36	0.637 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 185	3/4	4.50	4.35	195.1 K=0.70	0.4418	-0.03	2.62	0.010 [1] ✔
T2	185 - 170	3/4	4.50	4.35	195.1 K=0.70	0.4418	-0.24	2.62	0.091 [1] ✔
T3	170 - 150	7/8	4.58	4.41	169.4 K=0.70	0.6013	-0.41	4.74	0.086 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 185	7/8	4.50	4.35	167.2 K=0.70	0.6013	-0.04	4.86	0.008 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	185 - 170	7/8	4.50	4.35	167.2 K=0.70	0.6013	-0.14	4.86	0.028 [1] ✔
T3	170 - 150	1	4.52	4.35	146.2 K=0.70	0.7854	-0.83	8.30	0.101 [1] ✔
T5	140 - 120	L2 1/2x2 1/2x3/16	6.00	4.58	115.6 K=1.04	0.9023	-1.50	14.47	0.104 [1] ✔

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 185	7/8	4.50	4.35	167.2 K=0.70	0.6013	-0.15	4.86	0.030 [1] ✔
T2	185 - 170	7/8	4.50	4.35	167.2 K=0.70	0.6013	-0.67	4.86	0.137 [1] ✔
T3	170 - 150	1	4.99	4.82	161.9 K=0.70	0.7854	-1.04	6.77	0.154 [1] ✔

[1] P_u / ϕP_n controls

Mid Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	185 - 170	7/8	4.50	4.35	167.2 K=0.70	0.6013	-0.12	4.86	0.024 [1] ✔
T3	170 - 150	1	4.75	4.59	154.1 K=0.70	0.7854	-0.09	7.47	0.012 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 185	1 3/4	10.00	0.50	13.7	1.2339	1.52	60.15	0.025 [1] [#] ✔
T2	185 - 170	1 3/4	15.00	0.50	13.7	1.7942	7.19	87.47	0.082 [1] [#] ✔
T3	170 - 150	2	20.00	0.58	14.0	3.1416	33.14	141.37	0.234 [1] ✔
T4	150 - 140	Pirod 105244	10.02	10.02	45.4	3.6816	37.19	165.67	0.224 [1] ✔
T5	140 - 120	Pirod 105217	20.03	10.02	37.8	5.3014	69.07	238.57	0.290 [1] ✔
T6	120 - 100	Pirod 105218	20.03	10.02	32.4	7.2158	100.89	324.71	0.311 [1] ✔
T7	100 - 80	Pirod 105218	20.03	10.02	32.4	7.2158	134.63	324.71	0.415 [1] ✔
T8	80 - 60	Pirod 105219	20.03	10.02	28.4	9.4248	165.18	424.12	0.389 [1] ✔
T9	60 - 40	Pirod 105219	20.03	10.02	28.4	9.4248	193.42	424.12	0.456 [1] ✔
T10	40 - 20	Pirod 105220	20.03	10.02	25.2	11.9282	219.82	536.77	0.410 [1] ✔
T11	20 - 0	Pirod 105220	20.03	10.02	25.2	11.9282	243.96	536.77	0.454 [1] ✔

[1] P_u / ϕP_n controls
[#] Based on net area of leg in section below

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T4	150 - 140	0.5	1.48	121.0	165.67	0.1963	0.65	3.39	0.193 ✔
T5	140 - 120	0.5	1.47	120.0	238.57	0.1963	0.71	3.34	0.214 ✔
T6	120 - 100	0.5	1.46	119.0	324.71	0.1963	0.72	3.38	0.213 ✔
T7	100 - 80	0.5	1.46	119.0	324.71	0.1963	0.25	3.38	0.074 ✔
T8	80 - 60	0.625	1.45	94.4	424.12	0.3068	0.18	6.96	0.026 ✔
T9	60 - 40	0.625	1.45	94.4	424.12	0.3068	0.16	6.96	0.024 ✔
T10	40 - 20	0.625	1.43	93.6	536.77	0.3068	0.80	7.01	0.114 ✔
T11	20 - 0	0.625	1.43	93.6	536.77	0.3068	1.30	7.01	0.185 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 185	3/4	5.03	2.43	155.8	0.4418	0.41	19.88	0.020 [1] ✔
T2	185 - 170	3/4	5.07	2.45	156.9	0.4418	1.24	19.88	0.063 [1] ✔
T3	170 - 150	7/8	5.48	2.66	146.1	0.6013	3.04	27.06	0.112 [1] ✔
T4	150 - 140	L2 1/2x2 1/2x3/16	11.42	4.98	80.0	0.9023	5.35	29.24	0.183 [1] ✔
T5	140 - 120	L2 1/2x2 1/2x3/16	12.50	5.63	90.0	0.9023	6.19	29.24	0.212 [1] ✔
T6	120 - 100	L3x3x3/16	13.80	6.33	83.5	1.0898	6.92	35.31	0.196 [1] ✔
T7	100 - 80	L3x3x5/16	14.50	6.73	90.3	1.7800	7.58	57.67	0.131 [1] ✔
T8	80 - 60	L3x3x5/16	16.80	7.84	105.3	1.7800	7.50	57.67	0.130 [1] ✔
T9	60 - 40	L3x3x5/16	18.45	8.68	116.2	1.7800	7.71	57.67	0.134 [1] ✔
T10	40 - 20	L3 1/2x3 1/2x5/16	20.16	9.54	108.8	2.0900	8.01	67.72	0.118 [1] ✔
T11	20 - 0	L3 1/2x3 1/2x5/16	21.92	10.43	118.6	2.0900	8.63	67.72	0.127 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 185	3/4	4.50	4.35	278.7	0.4418	0.05	19.88	0.003 [1] ✔
T2	185 - 170	3/4	4.50	4.35	278.7	0.4418	0.29	19.88	0.014 [1] ✔
T3	170 - 150	7/8	4.87	4.70	257.9	0.6013	0.50	27.06	0.018 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 185	7/8	4.50	4.35	238.9	0.6013	0.02	27.06	0.001 [1] ✔
T2	185 - 170	7/8	4.50	4.35	238.9	0.6013	0.12	27.06	0.005 [1] ✔
T3	170 - 150	1	4.52	4.35	208.9	0.7854	0.80	35.34	0.023 [1] ✔
T5	140 - 120	L2 1/2x2 1/2x3/16	6.00	4.58	77.1	0.9023	2.09	29.24	0.071 [1] ✔

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 185	7/8	4.50	4.35	238.9	0.6013	0.17	27.06	0.006 [1] ✔
T2	185 - 170	7/8	4.50	4.35	238.9	0.6013	0.69	27.06	0.026 [1] ✔
T3	170 - 150	1	4.99	4.82	231.3	0.7854	1.34	35.34	0.038 [1] ✔

[1] P_u / ϕP_n controls

Mid Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	185 - 170	7/8	4.50	4.35	238.9	0.6013	0.14	19.48	0.007 [1] ✔
T3	170 - 150	1	4.75	4.59	220.1	0.7854	0.42	25.45	0.016 [1] ✔

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	195 - 185	Leg	1 3/4	1	-2.16	81.93	2.6	Pass
T2	185 - 170	Leg	1 3/4	37	-10.11	80.23	12.6	Pass
T3	170 - 150	Leg	2	91	-37.41	112.40	33.3	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	øP$_{allow}$ K	% Capacity	Pass Fail
T4	150 - 140	Leg	Pirod 105244	157	-43.71	142.49	30.7	Pass
T5	140 - 120	Leg	Pirod 105217	166	-82.23	214.86	38.3	Pass
T6	120 - 100	Leg	Pirod 105218	184	-118.55	300.68	39.4	Pass
T7	100 - 80	Leg	Pirod 105218	199	-154.90	300.68	51.5	Pass
T8	80 - 60	Leg	Pirod 105219	212	-189.76	399.87	47.5	Pass
T9	60 - 40	Leg	Pirod 105219	227	-222.58	399.87	55.7	Pass
T10	40 - 20	Leg	Pirod 105220	242	-254.16	512.38	49.6	Pass
							50.5 (b)	
T11	20 - 0	Leg	Pirod 105220	257	-283.44	512.38	55.3	Pass
T1	195 - 185	Diagonal	3/4	14	-0.42	5.08	8.3	Pass
T2	185 - 170	Diagonal	3/4	53	-1.30	5.00	26.0	Pass
T3	170 - 150	Diagonal	7/8	102	-3.06	7.86	38.9	Pass
T4	150 - 140	Diagonal	L2 1/2x2 1/2x3/16	162	-6.40	13.56	47.2	Pass
							50.2 (b)	
T5	140 - 120	Diagonal	L2 1/2x2 1/2x3/16	175	-6.18	10.95	56.5	Pass
							58.1 (b)	
T6	120 - 100	Diagonal	L3x3x3/16	190	-7.10	14.96	47.5	Pass
							59.2 (b)	
T7	100 - 80	Diagonal	L3x3x5/16	205	-7.50	19.32	38.8	Pass
							38.9 (b)	
T8	80 - 60	Diagonal	L3x3x5/16	220	-7.62	15.76	48.3	Pass
T9	60 - 40	Diagonal	L3x3x5/16	235	-7.83	12.87	60.9	Pass
T10	40 - 20	Diagonal	L3 1/2x3 1/2x5/16	250	-8.20	17.15	47.8	Pass
T11	20 - 0	Diagonal	L3 1/2x3 1/2x5/16	265	-9.15	14.36	63.7	Pass
T1	195 - 185	Horizontal	3/4	16	-0.03	2.62	1.0	Pass
T2	185 - 170	Horizontal	3/4	55	-0.24	2.62	9.1	Pass
T3	170 - 150	Horizontal	7/8	148	-0.41	4.74	8.6	Pass
T1	195 - 185	Top Girt	7/8	4	-0.04	4.86	0.8	Pass
T2	185 - 170	Top Girt	7/8	41	-0.14	4.86	2.8	Pass
T3	170 - 150	Top Girt	1	93	-0.83	8.30	10.1	Pass
T5	140 - 120	Top Girt	L2 1/2x2 1/2x3/16	167	-1.50	14.47	10.4	Pass
							19.6 (b)	
T1	195 - 185	Bottom Girt	7/8	8	-0.15	4.86	3.0	Pass
T2	185 - 170	Bottom Girt	7/8	44	-0.67	4.86	13.7	Pass
T3	170 - 150	Bottom Girt	1	95	-1.04	6.77	15.4	Pass
T2	185 - 170	Mid Girt	7/8	47	-0.12	4.86	2.4	Pass
T3	170 - 150	Mid Girt	1	98	0.42	25.45	1.6	Pass
							Summary	
						Leg (T9)	55.7	Pass
						Diagonal (T11)	63.7	Pass
						Horizontal (T2)	9.1	Pass
						Top Girt (T5)	19.6	Pass
						Bottom Girt (T3)	15.4	Pass
						Mid Girt (T2)	2.4	Pass
						Bolt Checks	59.2	Pass
						RATING =	**63.7**	**Pass**

MATHCAD CALCULATION PRINTOUT

EXISTING 195' SST TOWER ANCHOR ROD CHECK

REACTIONS ON THE FOUNDATION

As per Tnx output (see attached)

Down load; $Pv := 291 \cdot kips$ Shear; $S := 26 \cdot kips$

Uplift load; $P_{up} := 250 \cdot kips$ Moment; $M := 0 \cdot kips \cdot ft$

Anchor Rod Data is as per tower design by Pirod Inc.,Eng file #A-115761-1,dated 01/10/2001

Number of Anchor Rods: $N_{anchors} := 6$

Diameter of Anchors: $D_{anchors} := 1.25in$

Net Tensile Area of Anchors: $A_{anchors} := .969in^2$ (Table 7-18, AISC 14th)

Ultimate Tensile Stress: $F_{anchors} := 150ksi$ (ASTM A-687)

Saftey Factor for Anchor: $\phi_{anchor} := 0.8$ (Section 4.9.9, TIA-222-G Addendum 1)

Allowable Axial Load per Anchor: $T_{cap} := \phi_{anchor} \cdot F_{anchors} \cdot A_{anchors}$

$T_{cap} = 116.28 \cdot kips$

Interaction Equation for Anchor Rods as per Section 4.9.9, TIA-222-G Addendum 1 and Figure 4.4

For detail type (C) as per Figure 4.4 $\eta := 0.55$

Maximum Load on Anchor: $T_{max} := \dfrac{P_{up} + \dfrac{S}{\eta}}{N_{anchors}}$ $T_{max} = 49.55 \cdot kips$

Anchor Rod Capacity: $\dfrac{T_{max}}{T_{cap}} = 42.61 \cdot \%$ OK!

Summary

-Foundation Reactions from Tower Base-

$S = 26 \cdot kips$

Down load $Pv = 291 \cdot kips$

Uplift load $P_{up} = 250 \cdot kips$

Moment $M = 0 \cdot ft \cdot kip$

Anchor Rod Check $T_{max} = 49.55 \cdot kips$ < $T_{cap} = 116.28 \cdot kips$

$Anchor\_Rod\_Check := if(T_{max} < T_{cap}, "OK", "Not OK")$

$Anchor\_Rod\_Check = "OK"$

Existing 195 ft. Self Supported Tower Foundation Check

Customer Name: SBA Communications Corporation
Customer Site Name: Windsor Locks
Customer Site ID: CT22108-A-01

Carrier Name: AT&T

ACGI Job # 18-2973

Foundation check

-Foundation Reactions-

((As per TNX output results from the Tower Structural Analysis by Allpro Consulting Group Inc.)

Tower		Individual Legs	
Total Shear	$S := 46 \cdot kips$	Compression on Pedestal:	$P_c := 291 \cdot kips$
Moment	$M := 4671 \cdot ft\_K$	Uplift on Pedestal:	$P_{up} := 250 \cdot kips$
Down load, Tower weight	$Pv := 65 \cdot kips$	Shear on Pedestal:	$Sh := 30 \cdot kips$

-Soil Properties- **Soil data is as per Geotechnical Engineering Services Report** Tectonic Engineering Consultants,P.C., Job # 2295 01, dated 05/18/1999.

Allowable Bearing Capacity	$Brg_{allw} := 3500 \cdot psf$	$SF_b := 2$
Ultimate Bearing Capacity	$Brg_{ult} := Brg_{allw} \cdot SF_b = 7 \cdot ksf$	
Internal angle of friction for soil,	$\phi := 28.0 \cdot deg$	
Unit wt. of soil,	$\gamma_s := 0.100 \cdot kcf$	
Alowable Passive Pressure	see next page	
Cohesion of soil,	$c_u := 0.0 \cdot ksf$	
Friction Factor	$FF := 0.4$	
Depth to be neglected	$L_{neg} := 3.33 \cdot ft$	

-Material Parameters-

Conforming to the design requirements as in ACI 318-10

Unit wt. of concrete,	$\gamma_c := 0.150 \cdot kcf$
Concrete compressive strength,	$f_c := 3000 \cdot psi$

-Factor of Safety for soil strength-

$\phi_{s\_Bear} := 0.75$	as per TIA-222-G code for bearing, 9.4.1
$\phi_{s\_friction} := 0.75$	as per TIA-222-G code for skin friction resistance, 9.4.1
$\phi_{s\_lateral} := 0.75$	as per TIA-222-G code for lateral resistance, 9.4.1
$\phi_{s\_uplift} := 0.75$	as per TIA-222-G code for lateral resistance, 9.4.1

DIMENSIONS

(Dimensions as per original foundation design by CENTRAL TOWER INC., project #I-382, dated 05/08/2000)

Tower face width $TWFW := 20\cdot ft$ Tower ht. $Tw_{ht} := 195\cdot ft$

The tower location is eccentric by $L_{pe} := 2.88\cdot ft$

Type of column, col.t=0 for circular,=1 for rectangular/square $col_t := 0$

Depth of mat, $D_f := 10\cdot ft$

Thickness of mat, $T_f := 3.5\cdot ft$

Pedestal size, $Ped_s := 5\cdot ft$ No. of pedestals $Nped := 3$

Extension above the grade, $E_g := 5\cdot ft$

Mat Dimensions, LxB $L := 29.5\cdot ft$ x $B := 29.5ft$

$Brg_{allw} = 3.5\cdot ksf$

MAT CALCULATIONS

$K_p := \tan\left(45\cdot deg + \frac{\phi}{2}\right)^2$ $K_p = 2.77$

$P_{pave} := \frac{\left(D_f - T_f - L_{neg}\right)\cdot K_p\cdot \gamma_s + \left(D_f - L_{neg}\right)\cdot K_p\cdot \gamma_s}{2}$ $P_{pave} = 1.363\cdot ksf$

Safety against overturning and location of resultant on the base

Resisting Moments about mid axis parallel to base

$Area_{ped} := if\left(col_t = 1, Ped_s^2, \frac{\pi}{4}\cdot Ped_s^2\right)$ $Area_{ped} = 19.635\,ft^2$

component	value, kips	lever arm, ft	resisting moment, ft-kips
1) Concrete wt.	$C_w := L\cdot B\cdot T_f\cdot\left(\gamma_c\right) + Area_{ped}\cdot\gamma_c\cdot\left(D_f + E_g - T_f\right)\cdot Nped$	$L_c := \frac{L}{2}$	$R_c := C_w\cdot L_c$
	$C_w = 558.492\cdot kips$	$L_c = 14.75\,ft$	$R_c = 8237.759\cdot ft\_K$
2) Soil wt.	$S_w := \left[L\cdot B\cdot\left(D_f - T_f\right) - Area_{ped}\cdot\left(D_f - T_f\right)\cdot Nped\right]\cdot\gamma_s$	$L_s := \frac{L}{2}$	$R_s := S_w\cdot L_s$
	$S_w = 527.374\cdot kips$	$L_s = 14.75\,ft$	$R_s = 7778.772\cdot ft\_K$
3) Wt. of soil wedge	$W_w := \left(D_f\right)\cdot\frac{1}{2}\cdot\left(D_f\cdot\tan(\phi)\right)\cdot B\cdot\left(\gamma_s\right)$	$L_w := \left(L + D_f\cdot\frac{\tan(\phi)}{3}\right)$	$R_w := W_w\cdot L_w$
	$W_w = 78.427\cdot kips$	$L_w = 31.272\,ft$	$R_w = 2452.602\cdot ft\_K$

4) Passive pressure $Pe_p := T_f \cdot B \cdot P_{pave}$ $Pe_p = 140.704 \cdot kips$ $L_p := \frac{T_f}{3}$ $L_p = 1.167\,ft$ $R_p := Pe_p \cdot L_p$ $R_p = 164.155 \cdot ft\_K$

5) Vertical $Pv = 65 \cdot kips$

$S_{w1} := L \cdot B \cdot D_f \cdot \gamma_s$ $S_{w1} = 870.25 \cdot kips$ <--- for net calcs $L_v := \frac{L}{2}$ $L_v = 14.75\,ft$ $R_v := Pv \cdot L_v$ $R_v = 958.75 \cdot ft\_K$

Total weight $T_w := C_w + S_w + W_w + Pv$ $T_w = 1229.294 \cdot kips$

Total resisting Moment= $M_r := R_c + R_s + R_w + R_p + R_v$ $M_r = 19592.038 \cdot ft\_K$

Overturning Moments

component	value, kips	lever arm, ft	Overturning Moment ft-kips
1) Moment on foundation due to eccentric location of tower	$Pv = 65 \cdot kips$	$L_{pe} = 2.88\,ft$	$M_{pe} := L_{pe} \cdot Pv$ $M_{pe} = 187.2 \cdot ft\_K$
2) Moment on foundation	-	-	$M = 4671 \cdot ft\_K$
3) Moment due to horizontal shear	$S_t := S$	$L_{hs} := D_f + E_g$ $L_{hs} = 15\,ft$	$O_{hs} := L_{hs} \cdot S_t$ $O_{hs} = 690 \cdot ft\_K$

Total Overturning Moment= $M_o := M + O_{hs} + M_{pe}$ $M_o = 5548.2 \cdot ft\_K$

Check Safety Factor against Overturning about mid axis parallel to base

$SF := \frac{0.9 M_r}{M_o}$ $SF = 3.178$ > 1.0 **O.K!**

Calculate eccentricity, e

$e := \frac{M_o}{T_w}$ $e = 4.513\,ft$

Check location of eccentricity and determine pressure distribution under the mat

$L_{loc} := \frac{L}{6}$ $L_{loc} = 4.917\,ft$ For net bearing calcs $T_{w1} := S_{w1}$ $T_{w1} = 870.25 \cdot kips$

$P_{max1} := if\left[e \le L_{loc}, \frac{T_w}{L \cdot B} \cdot \left[1 + \left(6 \cdot \frac{e}{L}\right)\right], 4 \cdot \frac{T_w}{3 \cdot B \cdot (L - 2 \cdot e)}\right]$ $P_{max1} = 2.709 \cdot ksf$

$P_{max2} := \left(\frac{T_{w1}}{L \cdot B}\right)$ $P_{max2} = 1 \cdot ksf$ $P_{net} := P_{max1} - P_{max2}$ $P_{max} := P_{net}$

Net soil pressure, $P_{net} = 1.709 \cdot ksf$ < $Brg_{ult} \cdot \phi_{s\_Bear} = 5.25 \cdot ksf$ **O.K.!**

$P_{min} := if\left[e \le L_{loc}, \frac{T_w}{L \cdot B} \cdot \left[1 - \left(6 \cdot \frac{e}{L}\right)\right], 0 \cdot ksf\right]$ $P_{min} = 0.116 \cdot ksf$

Check for horizontal shear $P_{hor} := Pe_p + (Pv + C_w + S_w) \cdot FF$

$P_{hor} = 601.051 \cdot kips$ > $S = 46 \cdot kips$ Since P.hor > S It is safe!

REINFORCED CONCRETE CHECK CALCULATIONS

General Input parameters

Rebar yield strength, $f_y := 60000.psi$

Concrete Cover $cc := 3.0 \cdot in$

Reduction factors as per respective ACI 318-11 sections

$\phi_{shear} := 0.85$ as per ACI 9.3.2.3

$\phi_{compr} := 0.75$ as per ACI 9.3.2.2

$\phi_{axten} := 0.9$ as per ACI 9.3.2.2 a

Reinforced concrete load factor as per EIA 3.1.16 $RC_{fac} := 1.0$

(Loads already factored under TIA/EIA-222-G Code

Check for wide beam or single shear in mat

Allowable shear stress in concrete for wide beam shear criteria=

$\nu_{wide} := 2 \cdot \phi_{shear} \cdot \sqrt{f_c \cdot psi}$ $\nu_{wide} = 93.113 \cdot psi$

Effective depth of stee $d := T_f - cc$ $d = 39 \cdot in$ $L_{eff} := if(e \le L_{loc}, L, L - 2 \cdot e)$ $L_{eff} = 29.5\,ft$

$$dist := if\left[Nped = 3, \left(\frac{L}{2} - \frac{1}{3} \cdot \sin(60 \cdot deg) \cdot TWFW - \frac{1}{2} \cdot Ped_s - d\right), \left(\frac{L}{2} - \frac{TWFW}{2} - \frac{1}{2} \cdot Ped_s - d\right)\right]$$

Factor load by RC $P_{maxf} := P_{max} \cdot RC_{fac}$ $P_{minf} := P_{min} \cdot RC_{fac}$

shear on the face of concrete=

$$Shear_{wide} := (dist) \cdot B \cdot \left| \frac{\left[P_{maxf} + \left[P_{maxf} - \frac{P_{maxf} - P_{minf}}{L_{eff}} \cdot (dist)\right]\right]}{2} \right| \qquad Shear_{wide} = 154.397 \cdot kips$$

Area of concrete in shear= $A_{shear} := B \cdot d$ $A_{shear} = 13806 \cdot in^2$

Shear stress acting on concrete face= $\nu_{act} := \frac{Shear_{wide}}{A_{shear}}$ $\nu_{act} = 11.183 \cdot psi$

Check for punching or two-way shear in mat

Calculate allowable shear stress in concrete for punching/two-way shear

$\beta := \frac{L}{B}$ $\beta = 1$ $\nu_{punch} := if\left[\left(2 + \frac{4}{\beta}\right) \cdot \phi_{shear} \cdot \sqrt{f_c \cdot psi} \le 4 \cdot \phi_{shear} \cdot \sqrt{f_c \cdot psi}, \left(2 + \frac{4}{\beta}\right) \cdot \phi_{shear} \cdot \sqrt{f_c \cdot psi}, 4 \cdot \phi_{shear} \cdot \sqrt{f_c}\right.$

$\nu_{punch} = 186.226 \cdot psi$ $Area_{col} := if\left[col_t = 0, \frac{\pi}{4} \cdot (Ped_s + d)^2, (Ped_s + d)^2\right]$

$P_{avg} := \frac{P_{maxf} + P_{minf}}{2}$ $Peri_{col} := if\left[col_t = 0, 2 \cdot \pi \cdot \frac{Ped_s + d}{2}, 4 \cdot (Ped_s + d)\right]$

Factor vertical load $Pvf := RC_{fac} \cdot Pv$

Shear stress acting on the concrete face= $\nu_{act} := \frac{P_c - Area_{col} \cdot P_{avg}}{Peri_{col} \cdot d \cdot 4}$

$\nu_{act} = 4.992 \cdot psi$ < $\nu_{punch} = 186.226 \cdot psi$ **O.K!**

Check of Pedestal Column

Check pedestal steel for uplift

$d_i := Ped_s - 2 \cdot cc$ $d_i = 54 \cdot in$

Effective diameter/size= $D_{eff} := Ped_s - cc \cdot 2$ $D_{eff} = 54 \cdot in$ $h := Ped_s$ $h = 60 \cdot in$

$D_{pier} := Ped_s$

$M_{col} := Sh \cdot (D_f - T_f + E_g)$ $M_{col} = 345 \cdot ft\_K$ $\sigma_{bend} := 0.6 \cdot f_y$ $\sigma_{bend} = 36000 \cdot psi$

-Minimum required area of steel per ACI-

$Area_{stlmin} := 0.005 \cdot \frac{\pi}{4} \cdot D_{pier}^2$ -(ACI 10.8.4) & (ACI 10.9.1)

$Area_{stlmin} = 14.137 \cdot in^2$

-Rebar details-

Selected rebar size $d_{bar} := 8$

-Rebar details-

$No := (0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7 \quad 8 \quad 9 \quad 10 \quad 11 \quad 12 \quad 13 \quad 14 \quad 15 \quad 16 \quad 17 \quad 18)^T$

$d_h := (0 \quad 0 \quad 0 \quad 0.375 \quad 0.5 \quad 0.625 \quad 0.75 \quad 0.875 \quad 1.00 \quad 1.125 \quad 1.25 \quad 1.41 \quad 0 \quad 0 \quad 1.693 \quad 0 \quad 0 \quad 0 \quad 2.257)^T \cdot in$

$A_b := (0 \quad 0 \quad 0 \quad 0.11 \quad 0.20 \quad 0.31 \quad 0.44 \quad 0.60 \quad 0.79 \quad 1.00 \quad 1.27 \quad 1.56 \quad 0 \quad 0 \quad 2.25 \quad 0 \quad 0 \quad 0 \quad 4.00)^T \cdot in^2$

$B_1 := d_{bar}$ $d_{b_{B_1}} = 1 \cdot in$ Bar area= $Area_{abar} := A_{b_{B_1}}$ $Area_{abar} = 0.79 \cdot in^2$

-Number of vertical rebars required-

$Lg_{dia} := d_{b_{B_1}}$

$NRB := ceil\left(\frac{Area_{stlmin}}{Area_{abar}}\right)$ $NRB = 18$ $Area_{stluse} := Area_{abar} \cdot NRB$ $Area_{stluse} = 14.22 \cdot in^2$

Provided $NRB_{pr} := 27$

$Mn := 31038.689 \cdot in \cdot kips$

$0.9 \cdot Mn = 2327.902 \cdot kips \cdot ft$ > $M_{col} = 345 \cdot kips \cdot ft$ **OK** $\frac{M_{col}}{0.9Mn} = 14.82 \cdot \%$

Provided ($NRB_{pr} = 27$) $d_{bar} = 8$ vertical bars **OK**

Vertical bar spacing $S_{bar} := D_{eff} \cdot \frac{\pi}{NRB} - d_{b_{B_1}}$ $S_{bar} = 8.425 \cdot in$

Check pedestal in compression

Allowable compressive load on column ACI 10.15= $P_{comp} := \phi_{compr} \cdot 0.85 \cdot f_c \cdot Area_{ped}$ $P_{comp} = 5407.466 \cdot k$

$P_{comp} = 5407.466 \cdot kips$ > $P_c = 291 \cdot kips$ **O.K!**

Check of mat footing

$C_{wped} := Area_{ped} \cdot \gamma_c \cdot (D_f + E_g - T_f) \cdot Nped$ Wt. of concrete pedestals

$P_{upnet} := P_{up} - \frac{C_{wped} + S_w \cdot 0.95}{Nped}$ $P_{upnet} = 49.128 \cdot kips$

Calculate bending moment for mat design:

$\phi_{bend} := 0.9$ $Langle := if(Nped = 3, \sin(60 \cdot deg), 1)$ ACI 9.3.2.2

$\beta_1 := if\left[f_c \le 4000 \cdot psi, 0.85, if\left[f_c \ge 8000 \cdot psi, 0.65, 0.85 - \left(\frac{f_c}{psi} - 4000\right) \cdot 0.05\right]\right]$ ACI 10.2.7.3

$B_{mo} := RC_{fac} \cdot \left[(TWFW \cdot P_{upnet}) \cdot Langle + S_t \cdot (D_f + E_g)\right]$ $B_{mo} = 1540.919 \cdot ft\_K$

$B_{mo1} := \frac{P_{max} - P_{min}}{(L - 2 \cdot e) \cdot 2} \cdot \left(TWFW \cdot Langle \cdot \frac{1}{3} + \frac{Ped_s}{2}\right) \cdot \left[\left[(L - 2 \cdot e) - \left(TWFW \cdot Langle \cdot \frac{1}{3} + \frac{Ped_s}{2}\right)\right]^2 \cdot 0.5\right] \cdot B$

$W_e := TWFW \cdot Langle + Ped_s$ $W_e = 22.321\,ft$ Reinforcement middle bandwidth. $B_{mo1} = 706.794 \cdot ft\_K$

Use B_{mo1}

required R_u $R_u := \frac{B_{mo1}}{\phi_{bend} \cdot B \cdot d^2}$ $R_u = 17.502 \cdot psi$ $m := \frac{f_y}{\beta_1 \cdot f_c}$ $m = 23.529$

required

$\rho := \frac{1}{m} \cdot \left[1 - \sqrt{1 - \left(\frac{2 \cdot m \cdot R_u}{f_y}\right)}\right]$ $\rho = 0$

required area of steel for mat=

$Ast_f := \rho \cdot B \cdot d$ $Ast_f = 4.041 \cdot in^2$

minimum area of steel required,

$Ast_{minf} := .0018 \cdot B \cdot T_f$ $Ast_{minf} = 26.762 \cdot in^2$ per ACI 10.5.3 & 7.12

$Ast_{fuse} := if(Ast_f > Ast_{minf}, Ast_f, Ast_{minf})$ $Ast_{fuse} = 26.762 \cdot in^2$

bar size provided

$f_{bar} := 9$ $f_{dia} := \frac{f_{bar}}{8} \cdot in$ $f_{dia} = 1.125 \cdot in$ $f_{abar} := \pi \cdot \frac{f_{dia}^2}{4}$ $f_{abar} = 0.994 \cdot in^2$

Number of bars required= $Nf_{bars} := \frac{Ast_{fuse}}{f_{abar}}$ $Nf_{bars} = 26.923$ $Nf_{bars} := ceil(Nf_{bars})$

Required $Nf_{bars} = 27$ *bars each way in the footing at the top and bottom*

Provided Reinforcement is (39) #9 bars OK!

Summary

-Foundation Reactions-

Shear $S = 46 \cdot kips$

Down load $Pv = 65 \cdot kips$ (Weight)

Uplift load $P_{up} = 250 \cdot kips$

Moment; $M = 4671 \cdot ft \cdot kip$

Size of Mat

$L = 29.5\,ft$ $B = 29.5\,ft$

Depth of base of mat $D_f = 10\,ft$ Thickness of Mat $T_f = 3.5\,ft$

Pedestal size $Ped_s = 5\,ft$

Stability Calculations

Safety Factor against Overturning $SF = 3.178$ > 1.0 $\frac{1.0}{SF} = 31.465 \cdot \%$ **O.K !**

Net soil pressure $P_{net} = 1.709 \cdot ksf < Brg_{ult} \cdot \phi_{s\_Bear} = 5.25 \cdot ksf$ $\frac{P_{net}}{Brg_{ult} \cdot \phi_{s\_Bear}} = 32.557 \cdot \%$ **O.K.!**

Check for horizontal shear $P_{hor} = 601.051 \cdot kips > S = 46 \cdot kips$ $\frac{S}{P_{hor}} = 7.653 \cdot \%$ **O.K.!**

```
================================================================================

                     LPile for Windows, Version 2016-09.010

                  Analysis of Individual Piles and Drilled Shafts
                 Subjected to Lateral Loading Using the p-y Method
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--------------------------------------------------------------------------------
                              Files Used for Analysis
--------------------------------------------------------------------------------

Path to file locations:
\2018\Structural\18-2973 CT22108-A-01 Windsor Locks @ Volunteer Drive_AT&T_SA
SBA_SST\Lpile\

Name of input data file:
18-2973.lp9d

Name of output report file:
18-2973.lp9o

Name of plot output file:
18-2973.lp9p

Name of runtime message file:
18-2973.lp9r



--------------------------------------------------------------------------------
                             Date and Time of Analysis
--------------------------------------------------------------------------------

               Date:  May 4, 2018                 Time:  13:21:30
```

Problem Title

18-2973
Job Number:
Client:
Engineer:
Description:

Program Options and Settings

Computational Options:
 - Compute nonlinear bending properties of pile only
Engineering Units Used for Data Input and Computations:
 - US Customary System Units (pounds, feet, inches)

Output Options:
 - Output files use decimal points to denote decimal symbols.
 - Print using wide report formats

Pile Structural Properties and Geometry

Number of pile sections defined = 1
Total length of pile = 15.000 ft
Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	60.0000
2	15.000	60.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

```
   Section 1 is a round drilled shaft, bored pile, or CIDH pile
   Length of section                                  =    15.000000 ft
   Shaft Diameter                                     =    60.000000 in
   Shear capacity of section                          =       0.0000 lbs




--------------------------------------------------------------------------------
     Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness
--------------------------------------------------------------------------------

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:
-------------------

Dimensions and Properties of Drilled Shaft (Bored Pile):
--------------------------------------------------------

Length of Section                                   =    15.000000 ft
Shaft Diameter                                      =    60.000000 in
Concrete Cover Thickness                            =     2.935810 in
Number of Reinforcing Bars                          =           27 bars
Yield Stress of Reinforcing Bars                    =       60000. psi
Modulus of Elasticity of Reinforcing Bars           =    29000000. psi
Gross Area of Shaft                                 =        2827. sq. in.
Total Area of Reinforcing Steel                     =    21.330000 sq. in.
Area Ratio of Steel Reinforcement                   =         0.75 percent
Edge-to-Edge Bar Spacing                            =     5.167828 in
Maximum Concrete Aggregate Size                     =     0.750000 in
Ratio of Bar Spacing to Aggregate Size              =         6.89
Offset of Center of Rebar Cage from Center of Pile  =       0.0000 in

Axial Structural Capacities:
----------------------------

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As  =     8435.364 kips
Tensile Load for Cracking of Concrete               =    -1087.600 kips
Nominal Axial Tensile Capacity                      =    -1279.800 kips


Reinforcing Bar Dimensions and Positions Used in Computations:

     Bar          Bar Diam.      Bar Area          X              Y
    Number         inches         sq. in.        inches         inches
  ----------     ----------     ----------     ----------     ----------
      1            1.000000       0.790000      26.564190        0.00000
      2            1.000000       0.790000      25.848148       6.126124
      3            1.000000       0.790000      23.738627      11.921987
      4            1.000000       0.790000      20.349350      17.075132
      5            1.000000       0.790000      15.863034      21.307753
      6            1.000000       0.790000      10.521538      24.391667
      7            1.000000       0.790000       4.612823      26.160620
```

8	1.000000	0.790000	-1.544570	26.519247
9	1.000000	0.790000	-7.618695	25.448215
10	1.000000	0.790000	-13.282095	23.005263
11	1.000000	0.790000	-18.229453	19.322091
12	1.000000	0.790000	-22.194057	14.597261
13	1.000000	0.790000	-24.962173	9.085488
14	1.000000	0.790000	-26.384572	3.083914
15	1.000000	0.790000	-26.384572	-3.083914
16	1.000000	0.790000	-24.962173	-9.085488
17	1.000000	0.790000	-22.194057	-14.597261
18	1.000000	0.790000	-18.229453	-19.322091
19	1.000000	0.790000	-13.282095	-23.005263
20	1.000000	0.790000	-7.618695	-25.448215
21	1.000000	0.790000	-1.544570	-26.519247
22	1.000000	0.790000	4.612823	-26.160620
23	1.000000	0.790000	10.521538	-24.391667
24	1.000000	0.790000	15.863034	-21.307753
25	1.000000	0.790000	20.349350	-17.075132
26	1.000000	0.790000	23.738627	-11.921987
27	1.000000	0.790000	25.848148	-6.126124

NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero = 5.168 inches
between bars 18 and 19.

Ratio of bar spacing to maximum aggregate size = 6.89

Concrete Properties:

Compressive Strength of Concrete	=	3000. psi
Modulus of Elasticity of Concrete	=	3122019. psi
Modulus of Rupture of Concrete	=	-410.791918 psi
Compression Strain at Peak Stress	=	0.001634
Tensile Strain at Fracture of Concrete	=	-0.0001160
Maximum Coarse Aggregate Size	=	0.750000 in

Input Axial Thrust Forces:

Number of Axial Thrust Force Values Determined from Input Data = 2

Number	Axial Thrust Force kips
1	-0.250
2	0.291

Definitions of Run Messages and Notes:

```
  C = concrete in section has cracked in tension.
  Y = stress in reinforcing steel has reached yield stress.
  T = ACI 318 criteria for tension-controlled section met, tensile strain in
      reinforcement exceeds 0.005 while simultaneously compressive strain in
      concrete more than 0.003. See ACI 318, Section 10.3.4.
  Z = depth of tensile zone in concrete section is less than 10 percent of
      section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
Position of neutral axis is measured from edge of compression side of pile.
Compressive stresses and strains are positive in sign.
Tensile stresses and strains are negative in sign.


Axial Thrust Force =     -0.250 kips

    Bending       Bending       Bending      Depth to      Max Comp      Max Tens
Max Conc      Max Steel  Run
   Curvature      Moment       Stiffness      N Axis        Strain        Strain
Stress        Stress    Msg
    rad/in.       in-kip        kip-in2         in           in/in         in/in
ksi           ksi
------------- ------------- ------------- ------------- ------------- ------------- ----
--------- ------------- ---
  4.16667E-07         1051.   2521447057.    29.9449878    0.00001248   -0.00001252
 0.0451972    -0.3595397
  8.33333E-07         2096.   2515454403.    29.9724468    0.00002498   -0.00002502
 0.0901341    -0.7184159
   0.00000125         3137.   2509461748.    29.9815996    0.00003748   -0.00003752
 0.1347267    -1.0772920
   0.00000167         4172.   2503469092.    29.9861759    0.00004998   -0.00005002
 0.1789750    -1.4361682
   0.00000208         5203.   2497476435.    29.9889216    0.00006248   -0.00006252
 0.2228789    -1.7950443
   0.00000250         6229.   2491483779.    29.9907520    0.00007498   -0.00007502
 0.2664385    -2.1539205
   0.00000292         7249.   2485491123.    29.9920593    0.00008748   -0.00008752
 0.3096538    -2.5127966
   0.00000333         8265.   2479498466.    29.9930397    0.00009998    -0.0001000
 0.3525248    -2.8716728
   0.00000375         9276.   2473505810.    29.9938022     0.0001125    -0.0001125
 0.3950514    -3.2305490
   0.00000417         9276.   2226155229.    13.8112423    0.00005755    -0.0001925
 0.2032132    -5.5448916 C
   0.00000458         9276.   2023777481.    13.8178609    0.00006333    -0.0002117
 0.2232498    -6.0985010 C
   0.00000500         9276.   1855129357.    13.8241102    0.00006912    -0.0002309
 0.2432272    -6.6520040 C
   0.00000542         9276.   1712427099.    13.8300776    0.00007491    -0.0002501
 0.2631455    -7.2054003 C
   0.00000583         9276.   1590110878.    13.8358257    0.00008071    -0.0002693
 0.2830044    -7.7586895 C
   0.00000625         9276.   1484103486.    13.8414003    0.00008651    -0.0002885
 0.3028040    -8.3118712 C
   0.00000667         9276.   1391347018.    13.8468357    0.00009231    -0.0003077
 0.3225440    -8.8649451 C
```

```
  0.00000708         9276.   1309503076.    13.8521582    0.00009812    -0.0003269
0.3422245    -9.4179108 C
  0.00000750         9276.   1236752905.    13.8573884     0.0001039    -0.0003461
0.3618452    -9.9707680 C
  0.00000792         9276.   1171660647.    13.8625424     0.0001097    -0.0003653
 0.3814061   -10.5235163 C
  0.00000833         9276.   1113077614.    13.8676331     0.0001156    -0.0003844
 0.4009071   -11.0761553 C
  0.00000875         9276.   1060073919.    13.8726711     0.0001214    -0.0004036
 0.4203481   -11.6286847 C
  0.00000917         9276.   1011888740.    13.8776648     0.0001272    -0.0004228
 0.4397290   -12.1811041 C
  0.00000958         9276.    967893578.    13.8826215     0.0001330    -0.0004420
 0.4590497   -12.7334131 C
  0.00001000         9276.    927564679.    13.8875471     0.0001389    -0.0004611
 0.4783100   -13.2856113 C
  0.00001042         9276.    890462092.    13.8924465     0.0001447    -0.0004803
 0.4975100   -13.8376984 C
  0.00001083         9276.    856213550.    13.8973240     0.0001506    -0.0004994
 0.5166494   -14.3896740 C
  0.00001125         9276.    824501937.    13.9021831     0.0001564    -0.0005186
 0.5357282   -14.9415378 C
  0.00001167         9276.    795055439.    13.9070270     0.0001622    -0.0005378
 0.5547463   -15.4932892 C
  0.00001208         9276.    767639734.    13.9118583     0.0001681    -0.0005569
 0.5737035   -16.0449280 C
  0.00001250         9276.    742051743.    13.9166795     0.0001740    -0.0005760
 0.5925998   -16.5964537 C
  0.00001292         9276.    718114590.    13.9214924     0.0001798    -0.0005952
 0.6114350   -17.1478659 C
  0.00001333         9276.    695673509.    13.9262990     0.0001857    -0.0006143
 0.6302091   -17.6991644 C
  0.00001375         9276.    674592494.    13.9311007     0.0001916    -0.0006334
 0.6489219   -18.2503486 C
  0.00001417         9276.    654751538.    13.9358990     0.0001974    -0.0006526
 0.6675733   -18.8014181 C
  0.00001458         9276.    636044351.    13.9406951     0.0002033    -0.0006717
 0.6861632   -19.3523727 C
  0.00001500         9276.    618376452.    13.9454902     0.0002092    -0.0006908
 0.7046916   -19.9032118 C
  0.00001542         9276.    601663575.    13.9502851     0.0002151    -0.0007099
 0.7231583   -20.4539350 C
  0.00001583         9276.    585830323.    13.9550809     0.0002210    -0.0007290
 0.7415631   -21.0045420 C
  0.00001625         9276.    570809033.    13.9598783     0.0002268    -0.0007482
 0.7599060   -21.5550323 C
  0.00001708         9276.    542964690.    13.9694809     0.0002386    -0.0007864
 0.7964057   -22.6556615 C
  0.00001792         9276.    517710518.    13.9790981     0.0002505    -0.0008245
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  0.00001875         9276.    494701162.    13.9887340     0.0002623    -0.0008627
 0.8686570   -24.8555011 C
  0.00001958         9276.    473650049.    13.9983924     0.0002741    -0.0009009
 0.9044068   -25.9547048 C
  0.00002042         9301.    455550994.    14.0080764     0.0002860    -0.0009390
 0.9399048   -27.0534267 C
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1.0448789   -30.3466648 C
 0.00002375        10800.    454739986.    14.0471176     0.0003336    -0.0010914
1.0793604   -31.4434231 C
 0.00002458        11174.    454533861.    14.0569642     0.0003456    -0.0011294
1.1135853   -32.5396813 C
 0.00002542        11547.    454326464.    14.0668487     0.0003575    -0.0011675
1.1475527   -33.6354357 C
 0.00002625        11921.    454117823.    14.0767724     0.0003695    -0.0012055
1.1812615   -34.7306824 C
 0.00002708        12293.    453907961.    14.0867367     0.0003815    -0.0012435
1.2147108   -35.8254177 C
 0.00002792        12666.    453696896.    14.0967427     0.0003935    -0.0012815
1.2478995   -36.9196375 C
 0.00002875        13038.    453484927.    14.1064642     0.0004056    -0.0013194
1.2808005   -38.0136104 C
 0.00002958        13409.    453271900.    14.1160686     0.0004176    -0.0013574
1.3134247   -39.1072150 C
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1.3457834   -40.2003192 C
 0.00003125        14151.    452842563.    14.1353996     0.0004417    -0.0014333
1.3778756   -41.2929197 C
 0.00003208        14522.    452626246.    14.1451280     0.0004538    -0.0014712
1.4097002   -42.3850128 C
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1.4412562   -43.4765947 C
 0.00003375        15261.    452190339.    14.1647145     0.0004781    -0.0015469
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1.5343018   -46.7482336 C
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1.5647727   -47.8377310 C
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1.5949695   -48.9266971 C
 0.00003792        17104.    451081597.    14.2144734     0.0005390    -0.0017360
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 0.00003875        17471.    450856628.    14.2245669     0.0005512    -0.0017738
1.6545367   -51.1030179 C
 0.00003958        17837.    450630535.    14.2347092     0.0005635    -0.0018115
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1.7418038   -54.3634100 C
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1.7703325   -55.4490989 C
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1.7985791   -56.5342262 C
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1.8265424   -57.6187872 C
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1.9882988   -60.0000000 CY
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2.1050470   -60.0000000 CY
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2.1872415   -60.0000000 CY
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2.2625941   -60.0000000 CY
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2.3955848   -60.0000000 CY
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2.9035292   -60.0000000 CY
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    0.0001396        29662.    212503673.    11.8895465     0.0016596    -0.0067154
  2.9997175   -60.0000000 CY
    0.0001429        29727.    207999557.    11.8277401     0.0016904    -0.0068846
  2.9971029   -60.0000000 CY
    0.0001462        29790.    203691827.    11.7695308     0.0017213    -0.0070537
  2.9978344   -60.0000000 CY
    0.0001496        29852.    199570981.    11.7147269     0.0017523    -0.0072227
  2.9997174   -60.0000000 CY
    0.0001529        29913.    195613634.    11.6594062     0.0017829    -0.0073921
  2.9975627   -60.0000000 CY
    0.0001562        29971.    191815915.    11.6058891     0.0018134    -0.0075616
  2.9966591   -60.0000000 CY
    0.0001596        30029.    188173059.    11.5553096     0.0018440    -0.0077310
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    0.0001629        30085.    184664400.    11.5067542     0.0018746    -0.0079004
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  2.9953899   -60.0000000 CY
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  2.9966988   -60.0000000 CY
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  2.9989017   -60.0000000 CY
    0.0001762        30260.    171685379.    11.3217228     0.0019955    -0.0085795
  2.9999239   -60.0000000 CY
    0.0001796        30297.    168708427.    11.2794947     0.0020256    -0.0087494
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2.9978972    60.0000000 CY
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2.9975689    60.0000000 CY
    0.0002829        31019.    109640554.    10.4067698     0.0029442    -0.0140308
2.9921972    60.0000000 CY
    0.0003029        31080.    102600847.    10.2879950     0.0031164    -0.0150586
2.9956745    60.0000000 CYT
    0.0003229        31131.     96406814.    10.1938008     0.0032917    -0.0160833
2.9976498    60.0000000 CYT
    0.0003429        31172.     90903643.    10.1242340     0.0034718    -0.0171032
2.9847641    60.0000000 CYT
    0.0003629        31205.     85983957.    10.0690084     0.0036542    -0.0181208
2.9974128    60.0000000 CYT
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    0.0003829        31228.     81553912.    10.0248724     0.0038387    -0.0191363
2.9953249    60.0000000 CYT


Axial Thrust Force =      0.291 kips

    Bending       Bending       Bending      Depth to      Max Comp      Max Tens
Max Conc      Max Steel  Run
   Curvature      Moment       Stiffness      N Axis        Strain        Strain
Stress        Stress    Msg
    rad/in.       in-kip        kip-in2         in           in/in         in/in
ksi           ksi
------------- ------------- ------------- ------------- ------------- ------------- ----
--------- ------------- ---
  4.16667E-07         1051.   2521446941.    30.0641957    0.00001253   -0.00001247
0.0453783     0.3596507
  8.33333E-07         2096.   2515454345.    30.0322340    0.00002503   -0.00002497
0.0903143     0.7185290
   0.00000125         3137.   2509461709.    30.0215807    0.00003753   -0.00003747
0.1349061     1.0774073
   0.00000167         4172.   2503469062.    30.0162545    0.00005003   -0.00004997
0.1791535     1.4362856
   0.00000208         5203.   2497476412.    30.0130592    0.00006253   -0.00006247
0.2230566     1.7951640
   0.00000250         6229.   2491483759.    30.0109292    0.00007503   -0.00007497
0.2666154     2.1540424
   0.00000292         7249.   2485491106.    30.0094081    0.00008753   -0.00008747
0.3098298     2.5129208
   0.00000333         8265.   2479498451.    30.0082675     0.0001000   -0.00009997
0.3526999     2.8717992
   0.00000375         9276.   2473505796.    30.0073806     0.0001125    -0.0001125
0.3952257     3.2306777
   0.00000417         9276.   2226155217.    13.8659345    0.00005777    -0.0001922
 0.2040213    -5.5382829 C
   0.00000458         9276.   2023777470.    13.8676356    0.00006356    -0.0002114
 0.2240559    -6.0918851 C
   0.00000500         9276.   1855129347.    13.8697871    0.00006935    -0.0002307
 0.2440313    -6.6453809 C
   0.00000542         9276.   1712427090.    13.8722874    0.00007514    -0.0002499
 0.2639475    -7.1987698 C
   0.00000583         9276.   1590110869.    13.8750638    0.00008094    -0.0002691
 0.2838045    -7.7520517 C
   0.00000625         9276.   1484103478.    13.8780630    0.00008674    -0.0002883
 0.3036020    -8.3052261 C
   0.00000667         9276.   1391347010.    13.8812452    0.00009254    -0.0003075
 0.3233399    -8.8582926 C
   0.00000708         9276.   1309503069.    13.8845797    0.00009835    -0.0003267
 0.3430183    -9.4112509 C
   0.00000750         9276.   1236752898.    13.8880429     0.0001042    -0.0003458
 0.3626370    -9.9641007 C
   0.00000792         9276.   1171660640.    13.8916160     0.0001100    -0.0003650
  0.3821959   -10.5168415 C
   0.00000833         9276.   1113077608.    13.8952840     0.0001158    -0.0003842
  0.4016948   -11.0694730 C
   0.00000875         9276.   1060073913.    13.8990349     0.0001216    -0.0004034
  0.4211337   -11.6219949 C
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0.4598312   -12.7267081 C
 0.00001000         9276.    927564674.    13.9106938     0.0001391    -0.0004609
0.4790894   -13.2788988 C
 0.00001042         9276.    890462087.    13.9146926     0.0001449    -0.0004801
0.4982873   -13.8309783 C
 0.00001083         9276.    856213545.    13.9187389     0.0001508    -0.0004992
0.5174246   -14.3829462 C
 0.00001125         9276.    824501932.    13.9228284     0.0001566    -0.0005184
0.5365013   -14.9348022 C
 0.00001167         9276.    795055435.    13.9269578     0.0001625    -0.0005375
0.5555173   -15.4865459 C
 0.00001208         9276.    767639730.    13.9311241     0.0001683    -0.0005567
0.5744724   -16.0381769 C
 0.00001250         9276.    742051739.    13.9353245     0.0001742    -0.0005758
0.5933665   -16.5896949 C
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0.6121996   -17.1410993 C
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0.6309716   -17.6923899 C
 0.00001375         9276.    674592490.    13.9481097     0.0001918    -0.0006332
0.6496823   -18.2435662 C
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0.6683316   -18.7946279 C
 0.00001458         9276.    636044348.    13.9567697     0.0002035    -0.0006715
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 0.00001500         9276.    618376449.    13.9611365     0.0002094    -0.0006906
0.7054456   -19.8964056 C
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0.7423128   -20.9977198 C
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0.7606535   -21.5482020 C
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0.8333950   -23.7489559 C
 0.00001875         9276.    494701159.    14.0013857     0.0002625    -0.0008625
0.8693913   -24.8486217 C
 0.00001958         9276.    473650046.    14.0105350     0.0002744    -0.0009006
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 0.00002042         9309.    455968444.    14.0197517     0.0002862    -0.0009388
0.9406303   -27.0465139 C
 0.00002125         9685.    455750926.    14.0290335     0.0002981    -0.0009769
0.9758711   -28.1447333 C
 0.00002208        10060.    455533231.    14.0383787     0.0003100    -0.0010150
1.0108583   -29.2424635 C
 0.00002292        10434.    455315276.    14.0477858     0.0003219    -0.0010531
1.0455908   -30.3397010 C
 0.00002375        10809.    455096988.    14.0572536     0.0003339    -0.0010911
1.0800678   -31.4364419 C
 0.00002458        11182.    454878305.    14.0667811     0.0003458    -0.0011292
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1.1819551   -34.7236484 C
 0.00002708        12302.    454219346.    14.0957153     0.0003818    -0.0012432
1.2153997   -35.8183657 C
 0.00002792        12674.    453998789.    14.1052122     0.0003938    -0.0012812
1.2485632   -36.9127802 C
 0.00002875        13046.    453777751.    14.1145560     0.0004058    -0.0013192
1.2814473   -38.0068644 C
 0.00002958        13418.    453556122.    14.1239518     0.0004178    -0.0013572
1.3140669   -39.1004518 C
 0.00003042        13789.    453333849.    14.1333997     0.0004299    -0.0013951
1.3464210   -40.1935392 C
 0.00003125        14160.    453110904.    14.1428996     0.0004420    -0.0014330
1.3785085   -41.2861228 C
 0.00003208        14530.    452887261.    14.1524516     0.0004541    -0.0014709
1.4103284   -42.3781988 C
 0.00003292        14900.    452662895.    14.1620556     0.0004662    -0.0015088
1.4418798   -43.4697634 C
 0.00003375        15270.    452437782.    14.1717118     0.0004783    -0.0015467
1.4731614   -44.5608128 C
 0.00003458        15639.    452211900.    14.1814204     0.0004904    -0.0015846
1.5041722   -45.6513428 C
 0.00003542        16008.    451985229.    14.1911816     0.0005026    -0.0016224
1.5349112   -46.7413497 C
 0.00003625        16376.    451757749.    14.2009955     0.0005148    -0.0016602
1.5653772   -47.8308293 C
 0.00003708        16744.    451529441.    14.2108626     0.0005270    -0.0016980
1.5955692   -48.9197774 C
 0.00003792        17112.    451300285.    14.2207830     0.0005392    -0.0017358
1.6254861   -50.0081900 C
 0.00003875        17479.    451070266.    14.2307570     0.0005514    -0.0017736
1.6551266   -51.0960628 C
 0.00003958        17846.    450839400.    14.2407851     0.0005637    -0.0018113
1.6844897   -52.1833903 C
 0.00004042        18212.    450607602.    14.2508676     0.0005760    -0.0018490
1.7135742   -53.2701705 C
 0.00004125        18578.    450374889.    14.2610049     0.0005883    -0.0018867
1.7423789   -54.3563978 C
 0.00004208        18943.    450141246.    14.2711973     0.0006006    -0.0019244
1.7709026   -55.4420678 C
 0.00004292        19308.    449906657.    14.2814454     0.0006129    -0.0019621
1.7991442   -56.5271759 C
 0.00004375        19673.    449671107.    14.2917496     0.0006253    -0.0019997
1.8271023   -57.6117175 C
 0.00004458        20037.    449434580.    14.3021104     0.0006376    -0.0020374
1.8547759   -58.6956880 C
 0.00004542        20401.    449197063.    14.3125282     0.0006500    -0.0020750
1.8821636   -59.7790825 C
 0.00004625        20764.    448958539.    14.3230036     0.0006624    -0.0021126
1.9092642   -60.0000000 CY
 0.00004708        21127.    448718994.    14.3335370     0.0006749    -0.0021501
1.9360765   -60.0000000 CY
 0.00004792        21490.    448478413.    14.3441291     0.0006873    -0.0021877
1.9625990   -60.0000000 CY
```

```
 0.00004875        21851.    448234069.    14.3547510     0.0006998    -0.0022252
1.9888275   -60.0000000 CY
 0.00004958        22187.    447471861.    14.3597343     0.0007120    -0.0022630
2.0141689   -60.0000000 CY
 0.00005292        23214.    438694678.    14.3144146     0.0007575    -0.0024175
2.1055729   -60.0000000 CY
 0.00005625        24009.    426830943.    14.2299960     0.0008004    -0.0025746
2.1877572   -60.0000000 CY
 0.00005958        24662.    413908490.    14.1283879     0.0008418    -0.0027332
2.2630956   -60.0000000 CY
 0.00006292        25214.    400759353.    14.0144595     0.0008817    -0.0028933
2.3322532   -60.0000000 CY
 0.00006625        25684.    387683908.    13.8943578     0.0009205    -0.0030545
2.3960798   -60.0000000 CY
 0.00006958        26093.    374983320.    13.7739602     0.0009584    -0.0032166
2.4554163   -60.0000000 CY
 0.00007292        26466.    362956370.    13.6588219     0.0009960    -0.0033790
2.5110639   -60.0000000 CY
 0.00007625        26780.    351210790.    13.5419088     0.0010326    -0.0035424
2.5624474   -60.0000000 CY
 0.00007958        27081.    340278802.    13.4297164     0.0010688    -0.0037062
2.6104448   -60.0000000 CY
 0.00008292        27336.    329675392.    13.3142367     0.0011040    -0.0038710
2.6543835   -60.0000000 CY
 0.00008625        27570.    319657746.    13.2044477     0.0011389    -0.0040361
2.6953673   -60.0000000 CY
 0.00008958        27800.    310326677.    13.1033344     0.0011738    -0.0042012
2.7338149   -60.0000000 CY
 0.00009292        27990.    301241488.    13.0006881     0.0012080    -0.0043670
2.7688381   -60.0000000 CY
 0.00009625        28170.    292679914.    12.9041665     0.0012420    -0.0045330
2.8013024   -60.0000000 CY
 0.00009958        28347.    284652817.    12.8090004     0.0012756    -0.0046994
2.8308681   -60.0000000 CY
  0.0001029        28506.    276977414.    12.7162085     0.0013087    -0.0048663
2.8577417   -60.0000000 CY
  0.0001063        28641.    269562171.    12.6238153     0.0013413    -0.0050337
2.8818722   -60.0000000 CY
  0.0001096        28773.    262565190.    12.5374695     0.0013739    -0.0052011
2.9037923   -60.0000000 CY
  0.0001129        28903.    255971731.    12.4573694     0.0014066    -0.0053684
2.9235408   -60.0000000 CY
  0.0001163        29030.    249718620.    12.3819614     0.0014394    -0.0055356
2.9410290   -60.0000000 CY
  0.0001196        29140.    243677087.    12.3071335     0.0014717    -0.0057033
2.9560571   -60.0000000 CY
  0.0001229        29233.    237830199.    12.2275087     0.0015030    -0.0058720
2.9684703   -60.0000000 CY
  0.0001263        29326.    232282923.    12.1524809     0.0015343    -0.0060407
2.9788431   -60.0000000 CY
  0.0001296        29417.    227014088.    12.0822946     0.0015657    -0.0062093
2.9871842   -60.0000000 CY
  0.0001329        29508.    222002612.    12.0166024     0.0015972    -0.0063778
2.9934677   -60.0000000 CY
  0.0001363        29594.    217203505.    11.9538403     0.0016287    -0.0065463
2.9976497   -60.0000000 CY
```

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    0.0001396        29673.    212583430.    11.8929112     0.0016601    -0.0067149
  2.9997340   -60.0000000 CY
    0.0001429        29738.    208078081.    11.8310873     0.0016909    -0.0068841
  2.9970035   -60.0000000 CY
    0.0001462        29801.    203768428.    11.7728195     0.0017218    -0.0070532
  2.9978816   -60.0000000 CY
    0.0001496        29864.    199645742.    11.7179602     0.0017528    -0.0072222
  2.9997344   -60.0000000 CY
    0.0001529        29924.    195687456.    11.6629230     0.0017835    -0.0073915
  2.9974510   -60.0000000 CY
    0.0001562        29983.    191888044.    11.6093505     0.0018140    -0.0075610
  2.9967251   -60.0000000 CY
    0.0001596        30041.    188243567.    11.5587187     0.0018446    -0.0077304
  2.9990961   -60.0000000 CY
    0.0001629        30096.    184733752.    11.5101402     0.0018752    -0.0078998
  2.9999916   -60.0000000 CY
    0.0001662        30147.    181333339.    11.4627607     0.0019057    -0.0080693
  2.9952744   -60.0000000 CY
    0.0001696        30194.    178045569.    11.4165834     0.0019361    -0.0082389
  2.9967676   -60.0000000 CY
    0.0001729        30232.    174838268.    11.3696253     0.0019660    -0.0084090
  2.9989414   -60.0000000 CY
    0.0001762        30271.    171749775.    11.3249752     0.0019960    -0.0085790
  2.9999341   -60.0000000 CY
    0.0001796        30309.    168771489.    11.2827109     0.0020262    -0.0087488
  2.9967797   -60.0000000 CY
    0.0001829        30346.    165899085.    11.2425593     0.0020565    -0.0089185
  2.9943357   -60.0000000 CY
    0.0002029        30556.    150584928.    11.0301522     0.0022382    -0.0099368
2.9952528    60.0000000 CY
    0.0002229        30703.    137733853.    10.8327307     0.0024148    -0.0109602
2.9912668    60.0000000 CY
    0.0002429        30826.    126898423.    10.6694612     0.0025918    -0.0119832
2.9977450    60.0000000 CY
    0.0002629        30943.    117689631.    10.5391863     0.0027709    -0.0130041
2.9976463    60.0000000 CY
    0.0002829        31031.    109681401.    10.4099745     0.0029452    -0.0140298
2.9920089    60.0000000 CY
    0.0003029        31091.    102638829.    10.2911901     0.0031174    -0.0150576
2.9958085    60.0000000 CYT
    0.0003229        31143.     96442300.    10.1968759     0.0032927    -0.0160823
2.9974435    60.0000000 CYT
    0.0003429        31184.     90936581.    10.1273329     0.0034728    -0.0171022
2.9850409    60.0000000 CYT
    0.0003629        31216.     86015114.    10.0720332     0.0036553    -0.0181197
2.9975298    60.0000000 CYT
    0.0003829        31240.     81583061.    10.0279428     0.0038399    -0.0191351
2.9950807    60.0000000 CYT


-------------------------------------------------------------------------------
   Summary of Results for Nominal (Unfactored) Moment Capacity for Section 1
-------------------------------------------------------------------------------

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.
```

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain
1	-0.250	31038.689	0.00300000
2	0.291	31049.905	0.00300000

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.70).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, Section 9.3.2.2 or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor for Moment	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	31039.	-0.162500	20175.	449156937.
2	0.65	31050.	0.189150	20182.	449339802.
1	0.70	31039.	-0.175000	21727.	448144808.
2	0.70	31050.	0.203700	21735.	448312729.
1	0.75	31039.	-0.187500	23279.	437421784.
2	0.75	31050.	0.218250	23287.	437602765.

The analysis ended normally.

Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT5270
FA#: 10071333

Windsor Locks
2 Volunteer Drive
Windsor Locks, CT 06096

March 26, 2018

Centerline Communications Project Number: 950012-076

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**12.28 %**

March 26, 2018

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

Emissions Analysis for Site: **CT5270 – Windsor Locks**

Centerline Communications, LLC ("Centerline") was directed to analyze the proposed AT&T facility located at **2 Volunteer Drive, Windsor Locks, 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 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ 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 ($\mu W/cm^2$). The general population exposure limits for the 700 and 850 MHz Bands are approximately 467 $\mu W/cm^2$ and 567 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were performed for the proposed AT&T Wireless antenna facility located at **2 Volunteer Drive, Windsor Locks, 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	1900 MHz (PCS)	4	40
LTE	2300 MHz (WCS)	4	30
LTE	700 MHz	2	40

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	Kathrein 800-10121	164
A	2	CCI TPA-65R-LCUUUU-H8	164
A	3	Commscope SBNH-1D6565C	164
B	1	Kathrein 800-10121	164
B	2	CCI TPA-65R-LCUUUU-H8	164
B	3	Commscope SBNH-1D6565C	164
C	1	Kathrein 800-10121	164
C	2	CCI TPA-65R-LCUUUU-H8	164
C	3	Commscope SBNH-1D6565C	164

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	Kathrein 800-10121	850 MHz / 1900 MHz (PCS)	11.45 / 14.35	4	120	2,471.44	0.45
Antenna A2	CCI TPA-65R-LCUUUU-H8	1900 MHz (PCS) / 2300 MHz (WCS)	13.75 / 14.45	8	280	7,137.54	1.03
Antenna A3	Commscope SBNH-1D6565C	700 MHz	13.65	2	80	1,853.92	0.57
						Sector A Composite MPE%	**2.05**
Antenna B1	Kathrein 800-10121	850 MHz / 1900 MHz (PCS)	11.45 / 14.35	4	120	2,471.44	0.45
Antenna B2	CCI TPA-65R-LCUUUU-H8	1900 MHz (PCS) / 2300 MHz (WCS)	13.75 / 14.45	8	280	7,137.54	1.03
Antenna B3	Commscope SBNH-1D6565C	700 MHz	13.65	2	80	1,853.92	0.57
						Sector B Composite MPE%	**2.05**
Antenna C1	Kathrein 800-10121	850 MHz / 1900 MHz (PCS)	11.45 / 14.35	4	120	2,471.44	0.45
Antenna C2	CCI TPA-65R-LCUUUU-H8	1900 MHz (PCS) / 2300 MHz (WCS)	13.75 / 14.45	8	280	7,137.54	1.03
Antenna C3	Commscope SBNH-1D6565C	700 MHz	13.65	2	80	1,853.92	0.57
						Sector C Composite MPE%	**2.05**

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, all three sectors have the same configuration yielding the same results on all three sectors. *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	**2.05 %**
T-Mobile	0.85 %
Verizon Wireless	3.16 %
Clearwire	0.10 %
Clearwire MW	0.21 %
Sprint	4.47 %
Windsor Fire Dept	1.44 %
Site Total MPE %:	**12.28 %**

Table 4: All Carrier MPE Contributions

AT&T Sector A Total:	2.05 %
AT&T Sector B Total:	2.05 %
AT&T Sector C Total:	2.05 %
Site Total:	12.28 %

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, all three sectors have the same configuration yielding the same results on all three sectors.

AT&T _ Frequency Band / Technology Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 850 MHz UMTS	2	418.91	164	1.21	850 MHz	567	0.21%
AT&T 1900 MHz (PCS) UMTS	2	816.81	164	2.35	1900 MHz (PCS)	1000	0.24%
AT&T 1900 MHz (PCS) LTE	4	948.55	164	5.46	1900 MHz (PCS)	1000	0.55%
AT&T 2300 MHz (WCS) LTE	4	835.84	164	4.81	2300 MHz (WCS)	1000	0.48%
AT&T 700 MHz LTE	2	926.96	164	2.67	700 MHz	467	0.57%
						Total:	**2.05%**

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:

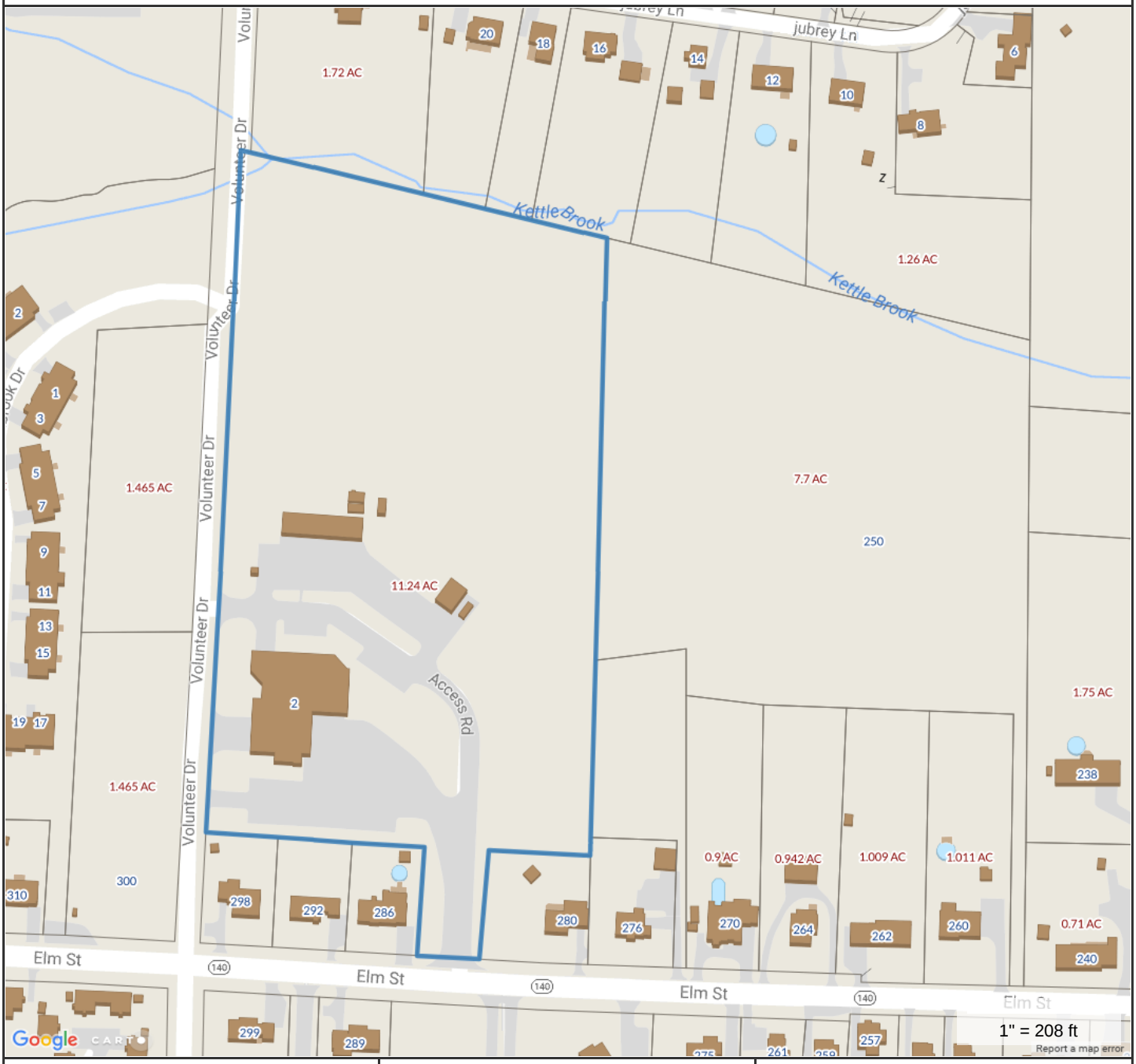
AT&T Sector	Power Density Value (%)
Sector A:	2.05 %
Sector B:	2.05 %
Sector C:	2.05 %
AT&T Maximum Total (per sector):	2.05 %
Site Total:	12.28 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **12.28 %** 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.

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

2-4 Volunteer Drive Windsor Locks CT



Property Information

Property ID	23300
Location	2 VOLUNTEER DRIVE
Owner	WINDSOR LOCKS TOWN OF

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of Windsor Locks, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Parcels updated 11/15/2017
Properties updated 11/15/2017

4 VOLUNTEER DRIVE

Location	4 VOLUNTEER DRIVE	**Mblu**	34/ 62/ 80/ 4/
UID	00023300	**Owner**	WINDSOR LOCKS TOWN OF
Assessment	$1,292,200	**Appraisal**	$1,845,800
PID	1943	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$1,328,100	$517,700	$1,845,800
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$929,800	$362,400	$1,292,200

Owner of Record

Owner	WINDSOR LOCKS TOWN OF	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	50 CHURCH ST WINDSOR LOCKS, CT 06096	**Book & Page**	113/299
		Sale Date	11/16/1972

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
WINDSOR LOCKS TOWN OF	$0		113/299	11/16/1972

Building Information

Building 1 : Section 1

Year Built:	1975
Living Area:	16,268
Replacement Cost:	$1,619,556
Building Percent Good:	75
Replacement Cost Less Depreciation:	$1,214,700

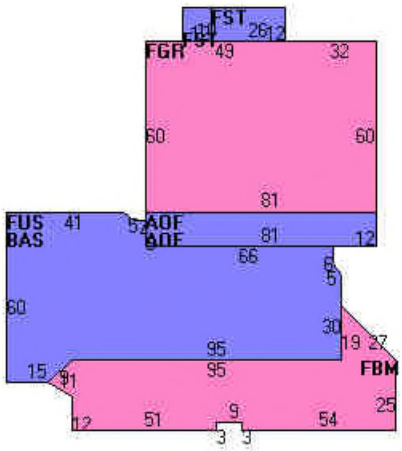
Building Attributes	
Field	**Description**

STYLE	Other Municip
MODEL	Ind/Comm
Stories:	1
Occupancy	
Exterior Wall A	Brick
Exterior Wall B	
Roof Structure	Flat
Roof Cover	Tar & Gravel
Interior Wall A	Drywall/Sheet
Interior Wall B	Minim/Masonry
Interior Floor A	Ceram Clay Til
Interior Floor B	Carpet
Heating Fuel	Oil
Heating Type	Forced Air-Duc
AC Type	Central
Bldg Use	Municipal
Total Rooms	
Total Bedrooms	00
Total Baths	0
Fireplace Types	
Fireplaces	
Heat/AC	Heat/AC Pkg
Frame Type	Masonry
Baths/Plumbing	Average
Ceiling/Wall	Ceil and Walls
Rooms/Prtns	Average
Wall Height	11.00
% Comn Wall	0.00

Building Photo

(http://images.vgsi.com/photos/WindsorlocksCTPhotos//00\00\3

Building Layout



(http://images.vgsi.com/photos/WindsorlocksCTPhotos//Sketches

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	5,418	5,418
FUS	Upper Sty	5,418	5,418
FBM	Fin Bsmt	3,056	3,056
AOF	Office	1,944	1,944
FST	Utility	432	432
FGR	Fin Garage	4,860	0
		21,128	16,268

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
SPRK	Sprinklers	15836.00 S.F.	$9,500	1

Parcel Information

Use Code	901I
Description	Municipal
Deeded Acres	11.20

Land

Land Use

Use Code	901I
Description	Municipal
Zone	RESA
Neighborhood	
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	11.20
Frontage	947
Depth	0
Assessed Value	$362,400
Appraised Value	$517,700

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
GAR1	Garage	G	Good	2592.00 S.F.	$50,500	1
PAV	Paving	A	Asphalt	46600.00 S.F.	$38,400	1
GAR1	Garage	A	Average	800.00 S.F.	$15,000	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$1,324,100	$517,700	$1,841,800
2012	$1,324,100	$337,500	$1,661,600
2007	$1,585,800	$294,000	$1,879,800

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$927,000	$362,400	$1,289,400
2012	$927,000	$236,300	$1,163,300
2007	$1,110,200	$205,900	$1,316,100

PROJECT INFORMATION

SCOPE OF WORK:

ITEMS TO BE MOUNTED ON THE EXISTING LATTICE TOWER:
- NEW AT&T ANTENNA: (TPA-65R-LCUUUU-H8) (TYP. OF 1 PER SECTOR, TOTAL OF 3)
- NEW AT&T RRUS: RRUS-32 B2 (PCS) (TYP. OF 1 PER SECTOR, TOTAL OF 3)
- NEW AT&T RRUS: RRUS-32 (WCS) (TYP. OF 1 PER SECTOR, TOTAL OF 3)
- NEW AT&T SURGE ARRESTOR: (DC6-48-60-18-8C) (TOTAL OF 1)
- NEW JUMPER CABLES: COAX JUMPER (2) PER SECTOR FROM EACH RRU (TOTAL OF 6)
- NEW FIBER JUMPERS: FIBER JUMPERS (3) FROM THE SQUID TO EACH RRU (TOTAL OF 9)

- SECURE THE EXISTING PIPE MASTS TO THE EXISTING MOUNT WITH A MINIMUM OF TWO POINTS OF CONNECTION (TYP. OF 4 PER SECTOR, TOTAL OF 12)

- RELOCATED EXISTING PIPE BRACE (TYP. OF 1 PER SECTOR, TOTAL OF 3)

- INSTALL NEW 2" STD. (2.38" O.D.) PIPE BRACE SECURED TO THE EXISTING MOUNT AND THE TOWER LEG (TYP. OF 1 PER SECTOR, TOTAL OF 3)

ITEMS TO BE MOUNTED INSIDE EXISTING EQUIPMENT SHELTER:
- INSTALL (1) FIBER BOX ON ICE BRIDGE POST.
- INSTALL (1) FIBER TRAY & (1) DC12 IN EXISTING LTE RACK.
- SWAP BBU TO 5216 & ADD (1) XMU IN EXISTING LTE RACK.
- INSTALL (2) 150AMP POLE BREAKER IN EXISTING GALAXY POWER PLANT.
- INSTALL (1) 48V CONVERTER SHELF IN LTE RACK & INSTALL (5) CONVERTER MODS, (4) FOR NEW SHELF & (1) FOR EXISTING.
- INSTALL (6) 30AMP BREAKERS & (1) 25AMP BREAKER IN EXISTING & PROPOSED CONVERTER SHELF.

ITEMS TO REMAIN:
- (6) ANTENNAS, (3) RRU'S, (9) 1-5/8" COAX CABLES, (2) DC POWER CABLES, & (1) FIBER RUNS.

SQUID ALARMING (NOT TO BE DAISY CHAINED).
- 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.
- 2ND SQUID INSTALLED WILL BE ALARMED TO THE LOWEST BAND (OR FIRST INSTALLED) RRH/RRU ON THE BETA SECTOR.
- 3RD SQUID INSTALLED WILL BE ALARMED TO THE LOWEST BAND (OR FIRST INSTALLED) RRH/RRU ON THE GAMMA SECTOR.

SITE ADDRESS:	2 VOLUNTEER DRIVE WINDSOR LOCKS, CT 06096
LATITUDE:	41.9277919° N 41° 55' 40.05" N
LONGITUDE:	72.6474989° W 72° 38' 50.99" W
TYPE OF SITE:	LATTICE TOWER/INDOOR EQUIPMENT
STRUCTURE HEIGHT:	195'-0"± A.G.L
RAD CENTER:	164'-0"± A.G.L
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY

DRAWING INDEX

SITE NUMBER: CT5270

SITE NAME: WINDSOR LOCKS

PROJECT: LTE 2C/3C 2018 UPGRADE

VICINITY MAP

DIRECTIONS TO SITE:

MERGE ONTO I-91 N VIA THE RAMP ON THE LEFT TOWARD HARTFORD. 20.0 MILES. TAKE EXIT 42 TOWARD CT-159 / WINDSOR LOCKS. 0.2 MILES. TURN LEFT ONTO LAWNACRE RD. 0.1 MILES. LAWNACRE RD BECOMES S MAIN ST / CT-159 N. 0.9 MILES. TURN LEFT ONTO ELM ST / CT-140. 1.0 MILES. TURN RIGHT ONTO VOLUNTEER DR. <0.1 MILES. END AT 2 VOLUNTEER DR. WINDSOR LOCKS, CT 06096

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

CALL
BEFORE YOU DIG
CALL TOLL FREE 1-800-922-4455
OR CALL 811

UNDERGROUND SERVICE ALERT

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CENTERLINE COMMUNICATIONS
95 RYAN DRIVE
RAYNHAM, MA 02767

SITE NUMBER: CT5270
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500 ENTERPRISE DRIVE, SUITE 3A
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A	02/21/18	ISSUED FOR REVIEW	GA	AT	DJC

SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: GA

DEREK J. CREASEY — No. 28356 — STATE OF CONNECTICUT — LICENSED PROFESSIONAL ENGINEER

AT&T

TITLE SHEET
(LTE 2C/3C)

SITE NUMBER	DRAWING NUMBER	REV
CT5270	T-1	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 – CENTERLINE
   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 LTE 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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CENTERLINE COMMUNICATIONS
95 RYAN DRIVE
RAYNHAM, MA 02767

SITE NUMBER: CT5270
SITE NAME: WINDSOR LOCKS
2 VOLUNTEER DRIVE
WINDSOR LOCKS, CT 06096
HARTFORD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

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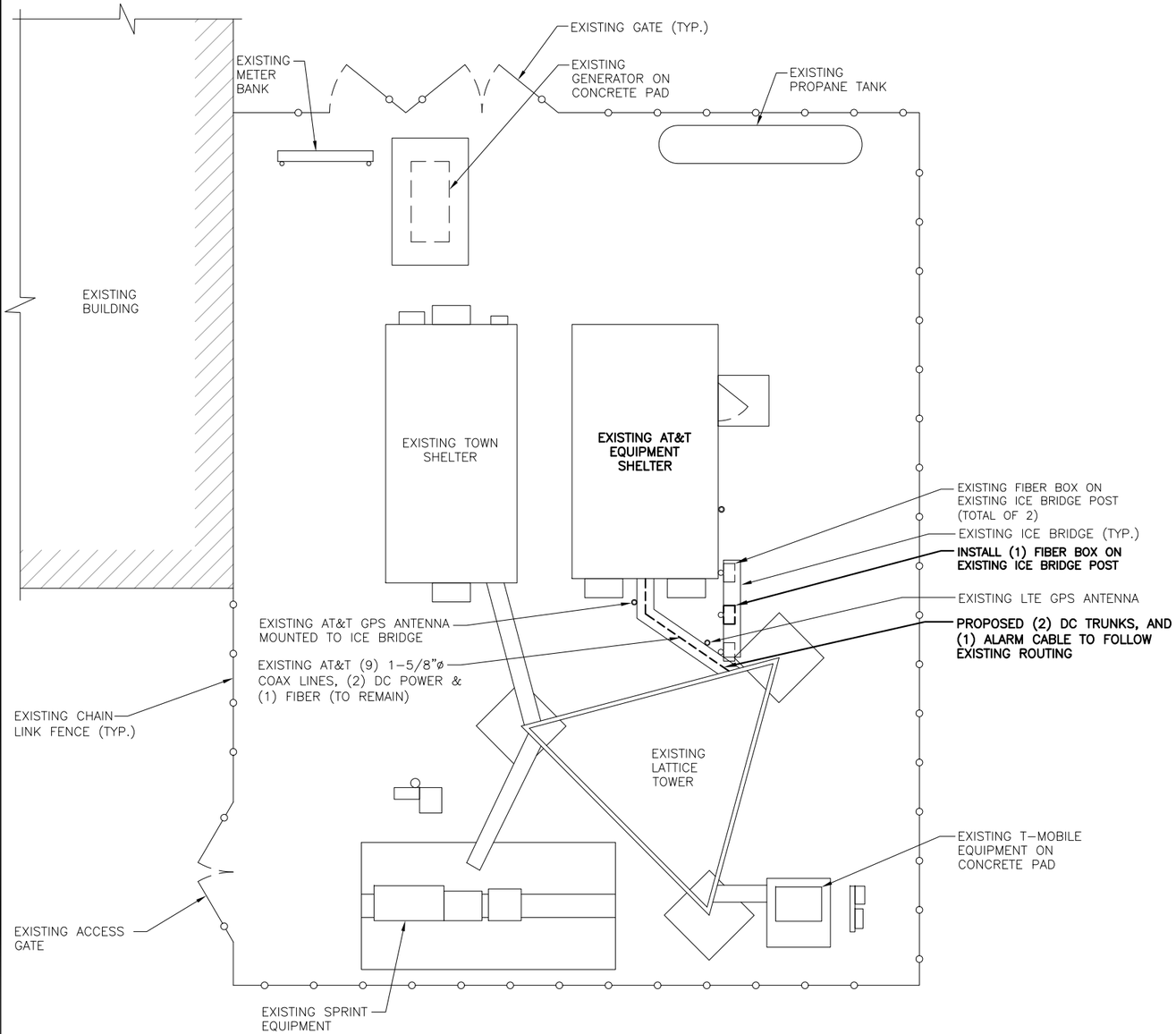
SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: GA

STATE OF CONNECTICUT · DEREK J. CREASEY · No. 25857 · LICENSED PROFESSIONAL ENGINEER

AT&T

GENERAL NOTES
(LTE 2C/3C)

SITE NUMBER	DRAWING NUMBER	REV
CT5270	GN-1	1



MAGNETIC NORTH 14°32' TRUE NORTH

COMPOUND PLAN (1 / A-1)
22x34 SCALE: 3/16"=1'-0"
11x17 SCALE: 3/32"=1'-0"

0 2'-8" 5'-4" 10'-8" 16'-0"

NOTE:

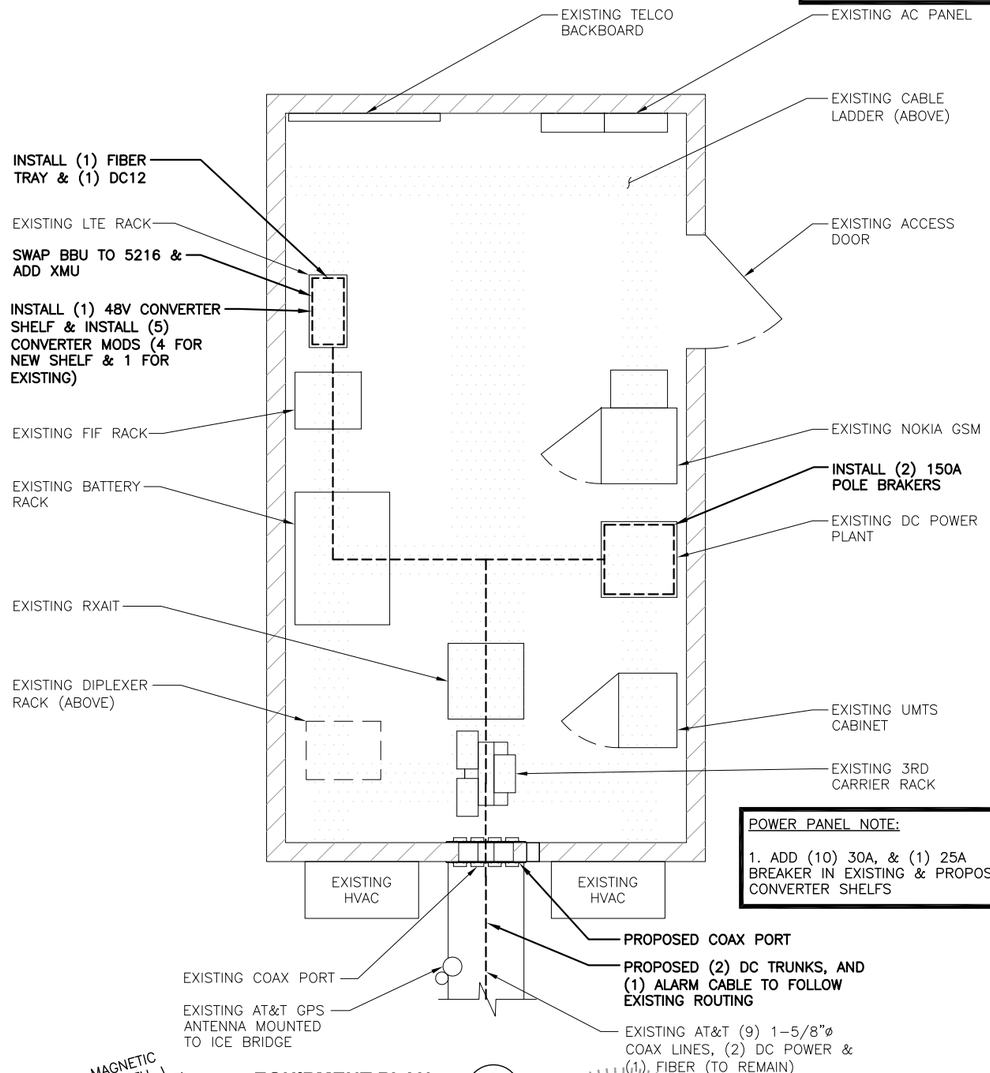
HDG RECOMMENDS THE EXISTING ANTENNA MOUNT BE MAPPED IN ITS ENTIRETY & A STRUCTURAL ANALYSIS BE PERFORMED PRIOR TO THE ANTENNA INSTALLATION.

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: MAY 18, 2018

NOTE:

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



POWER PANEL NOTE:

1. ADD (10) 30A, & (1) 25A BREAKER IN EXISTING & PROPOSED CONVERTER SHELFS

MAGNETIC NORTH 14°32' TRUE NORTH

EQUIPMENT PLAN (2 / A-1)
22x34 SCALE: 1/2"=1'-0"
11x17 SCALE: 1/4"=1'-0"

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

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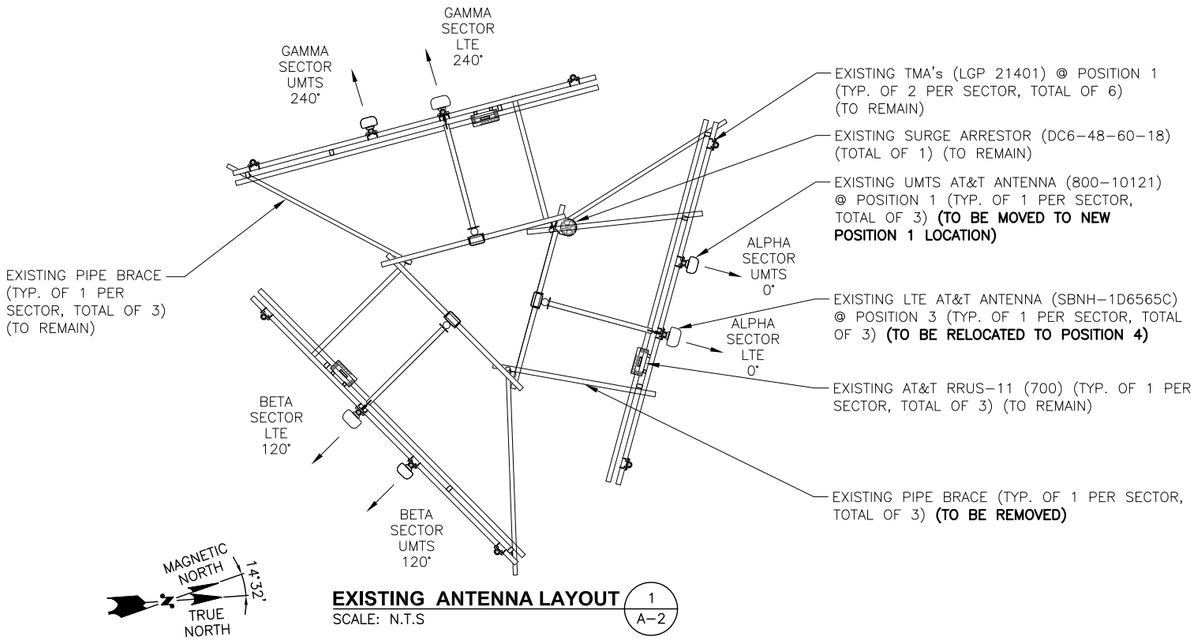
SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: GA

STATE OF CONNECTICUT — DEREK J. CREASEY — No. 29561 — LICENSED PROFESSIONAL ENGINEER

AT&T

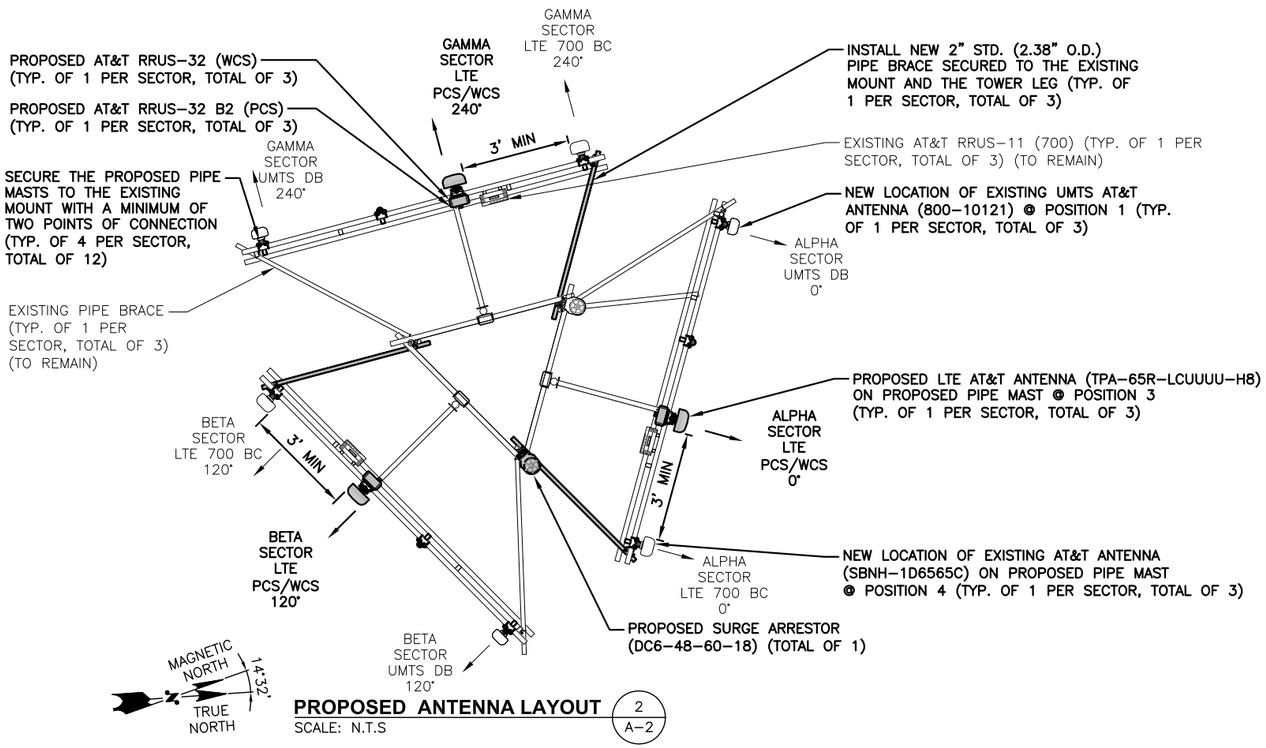
COMPOUND & EQUIPMENT PLAN (LTE 2C/3C)

SITE NUMBER	DRAWING NUMBER	REV
CT5270	A-1	1



EXISTING ANTENNA LAYOUT (1 / A-2)

SCALE: N.T.S



PROPOSED ANTENNA LAYOUT (2 / A-2)

SCALE: N.T.S

NOTE:

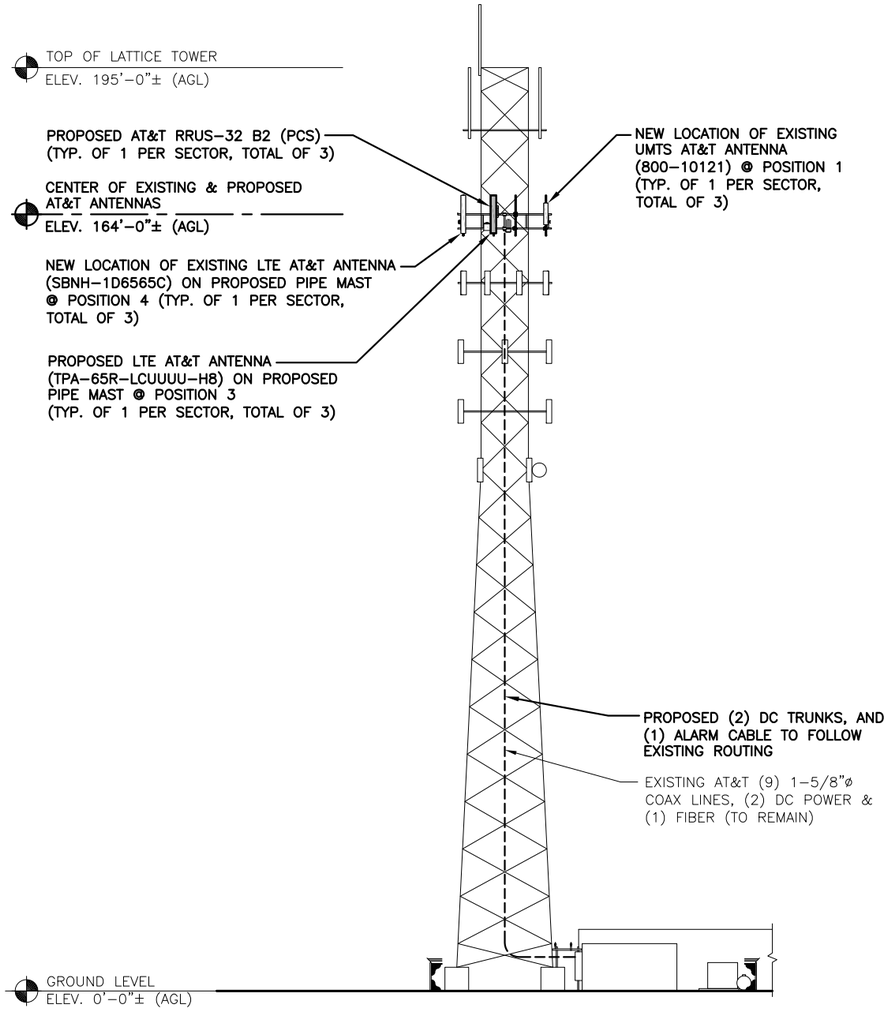
HDG RECOMMENDS THE EXISTING ANTENNA MOUNT BE MAPPED IN ITS ENTIRETY & A STRUCTURAL ANALYSIS BE PERFORMED PRIOR TO THE ANTENNA INSTALLATION.

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: MAY 18, 2018

NOTE:

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



ELEVATION (3 / A-2)

22x34 SCALE: 3/32"=1'-0"
11x17 SCALE: 3/64"=1'-0"

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

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1	05/23/18	ISSUED FOR CONSTRUCTION	MR	AT	DJC
A	02/21/18	ISSUED FOR REVIEW	GA	AT	DJC

SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: GA

STATE OF CONNECTICUT — No. 25[illegible] — LICENSED PROFESSIONAL ENGINEER

AT&T

ANTENNA LAYOUT & ELEVATION (LTE 2C/3C)

SITE NUMBER	DRAWING NUMBER	REV
CT5270	A-2	1

NOTE:

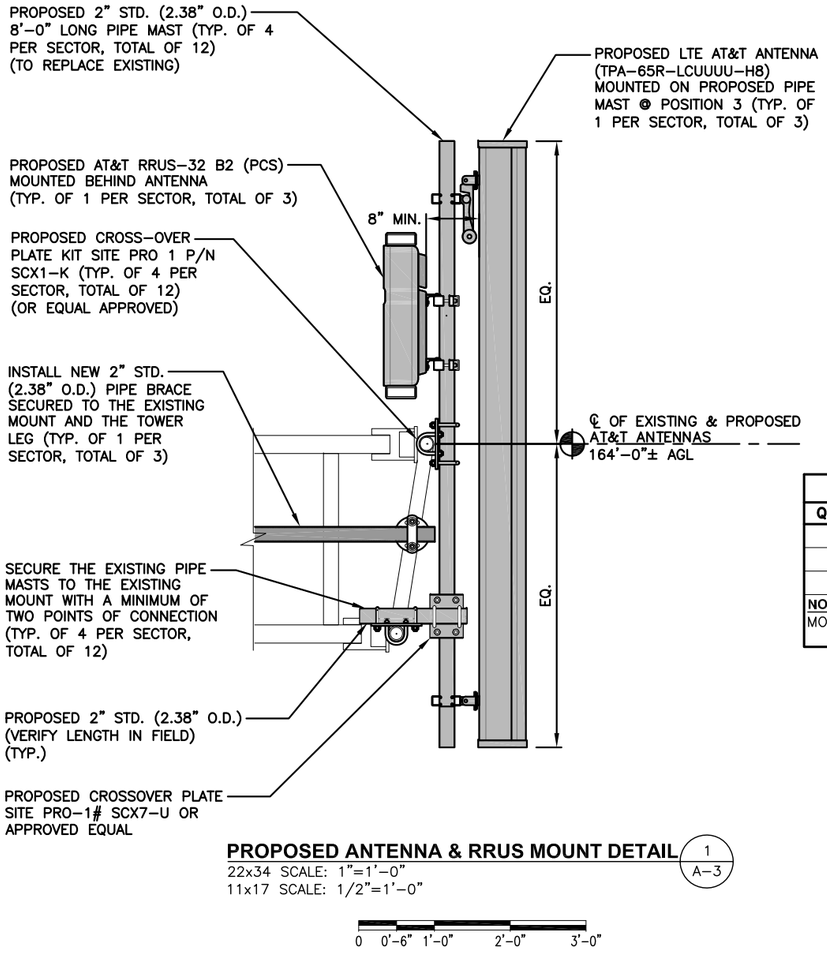
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING **ANTENNA MOUNT** TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY:
HUDSON DESIGN GROUP, LLC.
DATED: MAY 18, 2018

NOTE:

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

SECTOR	EXISTING/ PROPOSED	BAND	ANTENNA	SIZE (INCHES) (L X W X D)	RAD CENTER	AZIMUTH	TMAS	RRUS	SIZE (INCHES) (L X W X D)	COAX	RAYCAP
A1	EXISTING	UMTS DB	800-10121	54.5X10.3X5.9	164'-0"±	0°	(E)(2) LGP 21401	–	–	(2)1-5/8 COX	--
A2	–	–	–	–	–	–	–	–	–	–	(E) (1) RAYCAP DC6-48-60 -18-8C
A3	**PROPOSED**	**LTE PCS/WCS**	**TPA-65R-LCUUUU-H8**	**96X14.4X8.6**	**164'-0"±**	**0°**	–	**(P) RRUS-32 B2 (P) RRUS-32**	27.2X12.1X7.0 27.2X12.1X7.0	–	
A4	EXISTING	LTE 700 BC	SBNH-1D6565C	96.4X11.9X7.1	164'-0"±	0°	–	(E) RRUS-11	–	–	
B1	EXISTING	UMTS DB	800-10121	54.5X10.3X5.9	164'-0"±	120°	(E)(2) LGP 21401	–	–	(2)1-5/8 COAX	--
B2	–	–	–	–	–	–	–	–	–	–	(P) (1) RAYCAP DC6-48-60 -0-8C
B3	**PROPOSED**	**LTE PCS/WCS**	**TPA-65R-LCUUUU-H8**	**96X14.4X8.6**	**164'-0"±**	**120°**	–	**(P) RRUS-32 B2 (P) RRUS-32**	27.2X12.1X7.0 27.2X12.1X7.0	–	
B4	EXISTING	LTE 700 BC	SBNH-1D6565C	96.4X11.9X7.1	164'-0"±	120°	–	(E) RRUS-11	–	–	
C1	EXISTING	UMTS DB	800-10121	54.5X10.3X5.9	164'-0"±	240°	(E)(2) LGP 21401	–	–	(2)1-5/8 COAXX	--
C2	–	–	–	–	–	–	–				SHARE
C3	**PROPOSED**	**LTE PCS/WCS**	**TPA-65R-LCUUUU-H8**	**96X14.4X8.6**	**164'-0"±**	**240°**	–	**(P) RRUS-32 B2 (P) RRUS-32**	27.2X12.1X7.0 27.2X12.1X7.0	–	
C4	EXISTING	LTE 700 BC	SBNH-1D6565C	96.4X11.9X7.1	164'-0"±	240°	–	(E) RRUS-11	–	–	

FINAL ANTENNA CONFIGURATION TABLE (3 / A-3)



PROPOSED ANTENNA & RRUS MOUNT DETAIL (1 / A-3)
22x34 SCALE: 1"=1'-0"
11x17 SCALE: 1/2"=1'-0"

0 0'-6" 1'-0" 2'-0" 3'-0"

RRU CHART				
QUANTITY	MODEL	L	W	D
3(E)	RRUS-11	19.7"	17.0"	7.2"
3(P)	RRUS-32	27.2"	12.1"	7.0"
3(P)	RRUS-32 B2	27.2"	12.1"	7.0"

NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS

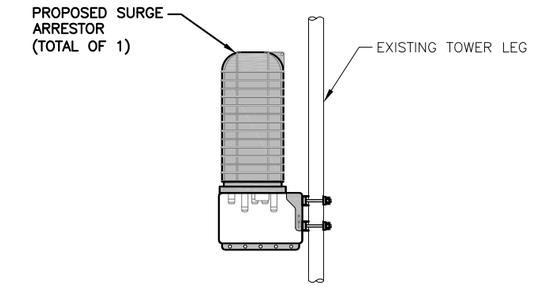
NOTE:

SEE RFDS FOR RRH FREQUENCY AND MODEL NUMBER

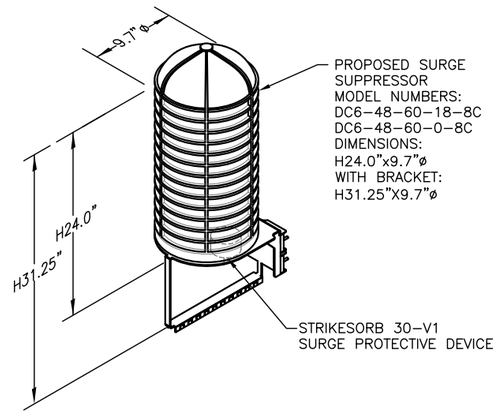
PROPOSED RRU REFER TO THE FINAL RFDS AND CHART FOR QUANTITY, MODEL AND DIMENSIONS

NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

PROPOSED RRUS DETAIL (2 / A-3)
SCALE: N.T.S



PROPOSED SURGE ARRESTOR MOUNTING DETAIL (4 / A-3)
SCALE: N.T.S



NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

DC SURGE SUPPRESSOR DETAIL (5 / A-3)
SCALE: N.T.S

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CENTERLINE COMMUNICATIONS
95 RYAN DRIVE
RAYNHAM, MA 02767

SITE NUMBER: CT5270
SITE NAME: WINDSOR LOCKS
2 VOLUNTEER DRIVE
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at&t
500 ENTERPRISE DRIVE, SUITE 3A
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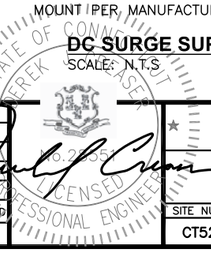

AT&T

DETAILS
(LTE 2C/3C)

SITE NUMBER	DRAWING NUMBER	REV
CT5270	A-3	1

STRUCTURAL NOTES:

1. DESIGN REQUIREMENTS ARE PER STATE BUILDING CODE AND APPLICABLE SUPPLEMENTS, INTERNATIONAL BUILDING CODE, EIA/TIA-222-G STRUCTURAL STANDARDS FOR STEEL ANTENNA, TOWERS AND ANTENNA SUPPORTING STRUCTURES.
2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. ANY UNUSUAL CONDITIONS SHALL BE REPORTED TO THE ATTENTION OF THE CONSTRUCTION MANAGER AND ENGINEER OF RECORD.
3. DESIGN AND CONSTRUCTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS".
4. STRUCTURAL STEEL SHALL CONFORM TO ASTM A992 (Fy=50 ksi), MISCELLANEOUS STEEL SHALL CONFORM TO ASTM A36 UNLESS OTHERWISE INDICATED.
5. STEEL PIPE SHALL CONFORM TO ASTM A500 "COLD-FORMED WELDED & SEAMLESS CARBON STEEL STRUCTURAL TUBING", GRADE B, OR ASTM A53 PIPE STEEL BLACK AND HOT-DIPPED ZINC-COATED WELDED AND SEAMLESS TYPE E OR S, GRADE B. PIPE SIZES INDICATED ARE NOMINAL. ACTUAL OUTSIDE DIAMETER IS LARGER.
6. STRUCTURAL CONNECTION BOLTS SHALL BE HIGH STRENGTH BOLTS (BEARING TYPE) AND CONFORM TO ASTM A325 TYPE-X "HIGH STRENGTH BOLTS FOR STRUCTURAL JOINTS, INCLUDING SUITABLE NUTS AND PLAIN HARDENED WASHERS". ALL BOLTS SHALL BE 3/4" DIA UON.
7. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS OTHERWISE NOTED.
8. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS OTHERWISE NOTED.
9. FIELD WELDS, DRILL HOLES, SAW CUTS AND ALL DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED WITH AN ORGANIC ZINC REPAIR PAINT COMPLYING WITH REQUIREMENTS OF ASTM A780. GALVANIZING REPAIR PAINT SHALL HAVE 65 PERCENT ZINC BY WEIGHT, ZIRP BY DUNCAN GALVANIZING, GALVA BRIGHT PREMIUM BY CROWN OR EQUAL. THICKNESS OF APPLIED GALVANIZING REPAIR PAINT SHALL BE NOT NOT LESS THAN 4 COATS (ALLOW TIME TO DRY BETWEEN COATS) WITH A RESULTING COATING THICKNESS REQUIRED BY ASTM A123 OR A153 AS APPLICABLE.
10. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES, APPEARANCE AND QUALITY OF WELDS, AND FOR METHODS USED IN CORRECTING WELDING. ALL WELDERS AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND DI.I. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "STEEL CONSTRUCTION MANUAL". 14TH EDITION.
11. INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON-CONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE CONSTRUCTION MANAGER PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE CONSTRUCTION MANAGER APPROVAL.
12. UNISTRUT SHALL BE FORMED STEEL CHANNEL STRUT FRAMING AS MANUFACTURED BY UNISTRUT CORP., WAYNE, MI OR EQUAL. STRUT MEMBERS SHALL BE 1 5/8"x1 5/8"x12GA, UNLESS OTHERWISE NOTED, AND SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
13. EPOXY ANCHOR ASSEMBLY SHALL CONSIST OF STAINLESS STEEL ANCHOR ROD WITH NUTS & WASHERS. AN INTERNALLY THREADED INSERT, A SCREEN TUBE AND A EPOXY ADHESIVE. THE ANCHORING SYSTEM SHALL BE THE HILTI-HIT HY-70 AND OR HY-200 SYSTEMS (AS SPECIFIED IN DWG.) OR ENGINEERS APPROVED EQUAL.
14. EXPANSION BOLTS SHALL CONFORM TO FEDERAL SPECIFICATION FF-S-325, GROUP II, TYPE 4, CLASS I, HILTI KWIK BOLT III OR APPROVED EQUAL. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
15. LUMBER SHALL COMPLY WITH THE REQUIREMENTS OF THE AMERICAN INSTITUTE OF TIMBER CONSTRUCTION AND THE NATIONAL FOREST PRODUCTS ASSOCIATION'S NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION. ALL LUMBER SHALL BE PRESSURE TREATED AND SHALL BE STRUCTURAL GRADE NO. 2 OR BETTER.
16. WHERE ROOF PENETRATIONS ARE REQUIRED, THE CONTRACTOR SHALL CONTACT AND COORDINATE RELATED WORK WITH THE BUILDING OWNER AND THE EXISTING ROOF INSTALLER. WORK SHALL BE PERFORMED IN SUCH A MANNER AS TO NOT VOID THE EXISTING ROOF WARRANTY. ROOF SHALL BE WATERTIGHT.
17. ALL FIBERGLASS MEMBERS USED ARE AS MANUFACTURED BY STRONGWELL COMPANY OF BRISTOL, VA 24203. ALL DESIGN CRITERIA FOR THESE MEMBERS IS BASED ON INFORMATION PROVIDED IN THE DESIGN MANUAL. ALL REQUIREMENTS PUBLISHED IN SAID MANUAL MUST BE STRICTLY ADHERED TO.
18. NO MATERIALS TO BE ORDERED AND NO WORK TO BE COMPLETED UNTIL SHOP DRAWINGS HAVE BEEN REVIEWED AND APPROVED IN WRITING.
19. SUBCONTRACTOR SHALL FIREPROOF ALL STEEL TO PRE-EXISTING CONDITIONS.

SPECIAL INSPECTIONS (REFERENCE IBC CHAPTER 17):

GENERAL: WHERE APPLICATION IS MADE FOR CONSTRUCTION, THE OWNER OR THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE ACTING AS THE OWNER'S AGENT SHALL EMPLOY ONE OR MORE APPROVED AGENCIES TO PERFORM INSPECTIONS DURING CONSTRUCTION ON THE TYPES OF WORK LISTED IN THE INSPECTION CHECKLIST ABOVE.

THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE AND ENGINEERS OF RECORD INVOLVED IN THE DESIGN OF THE PROJECT ARE PERMITTED TO ACT AS THE APPROVED AGENCY AND THEIR PERSONNEL ARE PERMITTED TO ACT AS THE SPECIAL INSPECTOR FOR THE WORK DESIGNED BY THEM, PROVIDED THOSE PERSONNEL MEET THE QUALIFICATION REQUIREMENTS.

STATEMENT OF SPECIAL INSPECTIONS: THE APPLICANT SHALL SUBMIT A STATEMENT OF SPECIAL INSPECTIONS PREPARED BY THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE IN ACCORDANCE WITH SECTION 107.1 AS A CONDITION FOR ISSUANCE. THIS STATEMENT SHALL BE IN ACCORDANCE WITH SECTION 1705.

REPORT REQUIREMENT: SPECIAL INSPECTORS SHALL KEEP RECORDS OF INSPECTIONS. THE SPECIAL INSPECTOR SHALL FURNISH INSPECTION REPORTS TO THE BUILDING OFFICIAL, AND TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. REPORTS SHALL INDICATE THAT WORK INSPECTED WAS OR WAS NOT COMPLETED IN CONFORMANCE TO APPROVED CONSTRUCTION DOCUMENTS. DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF THEY ARE NOT CORRECTED, THE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE BUILDING OFFICIAL AND TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. A FINAL REPORT DOCUMENTING REQUIRED SPECIAL INSPECTIONS SHALL BE SUBMITTED.

SPECIAL INSPECTION CHECKLIST	
BEFORE CONSTRUCTION	
CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD)	REPORT ITEM
N/A	ENGINEER OF RECORD APPROVED SHOP DRAWINGS [1]
N/A	MATERIAL SPECIFICATIONS REPORT [2]
N/A	FABRICATOR NDE INSPECTION
N/A	PACKING SLIPS [3]
ADDITIONAL TESTING AND INSPECTIONS:	
DURING CONSTRUCTION	
CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD)	REPORT ITEM
REQUIRED	STEEL INSPECTIONS
N/A	HIGH STRENGTH BOLT INSPECTIONS
N/A	HIGH WIND ZONE INSPECTIONS [4]
N/A	FOUNDATION INSPECTIONS
N/A	CONCRETE COMP. STRENGTH, SLUMP TESTS AND PLACEMENT
N/A	POST INSTALLED ANCHOR VERIFICATION [5]
N/A	GROUT VERIFICATION
N/A	CERTIFIED WELD INSPECTION
N/A	EARTHWORK: LIFT AND DENSITY
N/A	ON SITE COLD GALVANIZING VERIFICATION
N/A	GUY WIRE TENSION REPORT
ADDITIONAL TESTING AND INSPECTIONS:	
AFTER CONSTRUCTION	
CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD)	REPORT ITEM
REQUIRED	MODIFICATION INSPECTOR REDLINE OR RECORD DRAWINGS [6]
N/A	POST INSTALLED ANCHOR PULL-OUT TESTING
REQUIRED	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

NOTES:

1. REQUIRED FOR ANY NEW SHOP FABRICATED FRP OR STEEL.
2. PROVIDED BY MANUFACTURER, REQUIRED IF HIGH STRENGTH BOLTS OR STEEL.
3. PROVIDED BY GENERAL CONTRACTOR; PROOF OF MATERIALS.
4. HIGH WIND ZONE INSPECTION CATB 120MPH OR CAT C,D 110MPH INSPECT FRAMING OF WALLS, ANCHORING, FASTENING SCHEDULE.
5. ADHESIVE FOR REBAR AND ANCHORS SHALL HAVE BEEN TESTED IN ACCORDANCE WITH ACI 355.4 AND ICC-ES AC308 FOR CRACKED CONCRETE AND SEISMIC APPLICATIONS. DESIGN ADHESIVE BOND STRENGTH HAS BEEN BASED ON ACI 355.4 TEMPERATURE CATEGORY B WITH INSTALLATIONS INTO DRY HOLES DRILLED USING A CARBIDE BIT INTO CRACKED CONCRETE THAT HAS CURED FOR AT LEAST 21 DAYS. ADHESIVE ANCHORS REQUIRING CERTIFIED INSTALLATIONS SHALL BE INSTALLED BY A CERTIFIED ADHESIVE ANCHOR INSTALLER PER ACI 318-11 D.9.2.2. INSTALLATIONS REQUIRING CERTIFIED INSTALLERS SHALL BE INSPECTED PER ACI 318-11 D.8.2.4.
6. AS REQUIRED; FOR ANY FIELD CHANGES TO THE ITEMS IN THIS TABLE.

NOTES:

1. ALL CONNECTIONS TO BE SHOP WELDED & FIELD BOLTED USING 3/4"ø A325-X BOLTS, UNLESS OTHERWISE NOTIFIED.
2. SHOP DRAWING ENGINEER REVIEW & APPROVAL REQUIRED BEFORE ORDERING MATERIAL.
3. SHOP DRAWING ENGINEER REVIEW & APPROVAL REQUIRED PRIOR TO STEEL FABRICATION.
4. VERIFICATION OF EXISTING ROOF CONSTRUCTION IS REQUIRED PRIOR TO THE INSTALLATION OF THE ROOF PLATFORM. ENGINEER OF RECORD IS TO APPROVE EXISTING CONDITIONS IN ORDER TO MOVE FORWARD.
5. CENTERLINE OF PROPOSED STEEL PLATFORM SUPPORT COLUMNS TO BE CENTRALLY LOCATED OVER THE EXISTING BUILDING COLUMNS.
6. EXISTING BRICK MASONRY COLUMNS/BEARING TO BE REPAIRED/REPLACED AT ALL PROPOSED PLATFORM SUPPORT POINTS. ENGINEER OF RECORD TO REVIEW AND APPROVE.

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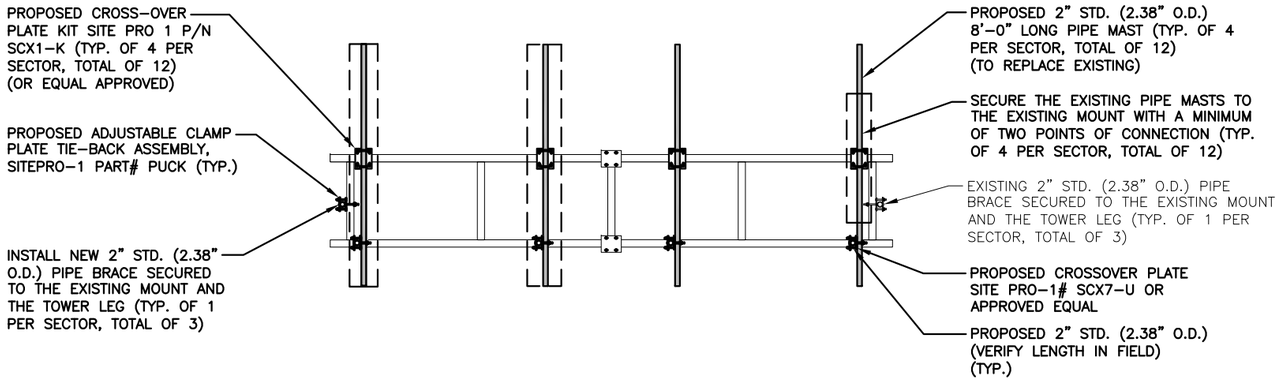
STATE OF CONNECTICUT · DEREK J. CREASER · No. 25857 · LICENSED PROFESSIONAL ENGINEER

AT&T

STRUCTURAL DETAILS
(LTE 2C/3C)

SITE NUMBER	DRAWING NUMBER	REV
CT5270	S-1	1



PROPOSED MOUNT MODIFICATIONS ELEVATION 1 / S-1

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

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

NOTE:

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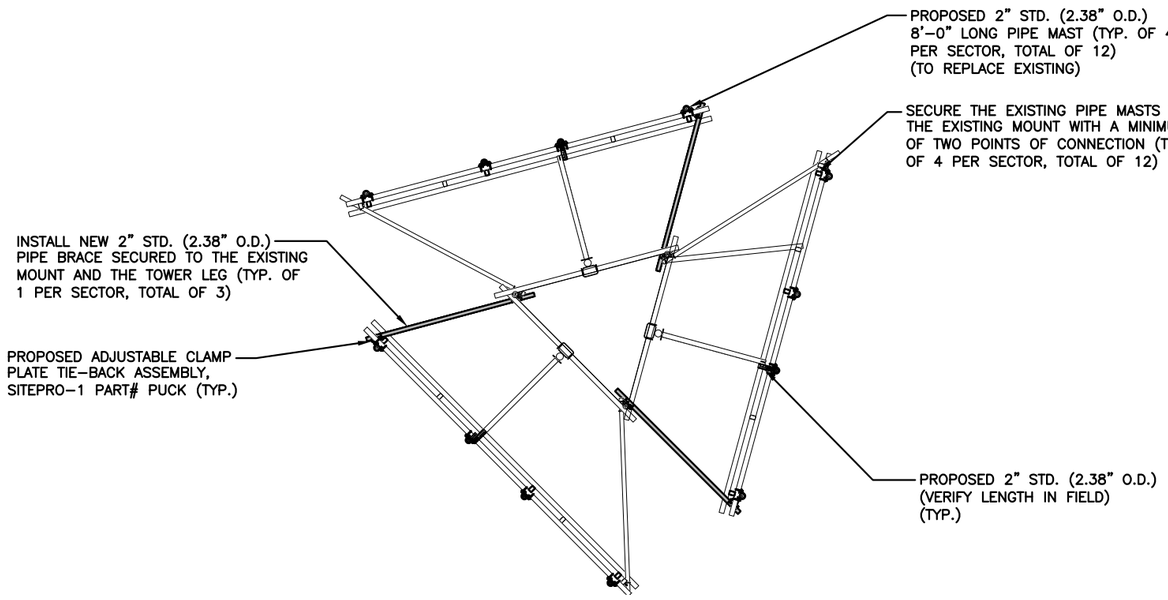
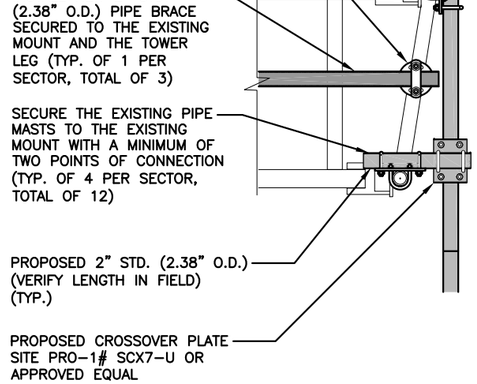


MAGNETIC NORTH 14°32' TRUE NORTH

PROPOSED MOUNT MODIFICATIONS PLAN 2 / S-1

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

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



PROPOSED MOUNT MODIFICATION DETAIL 3 / S-1

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

0 0'-6" 1'-0" 2'-0" 3'-0"

STATE OF CONNECTICUT — DEREK J. CREASEY — No. 29356 — LICENSED PROFESSIONAL ENGINEER

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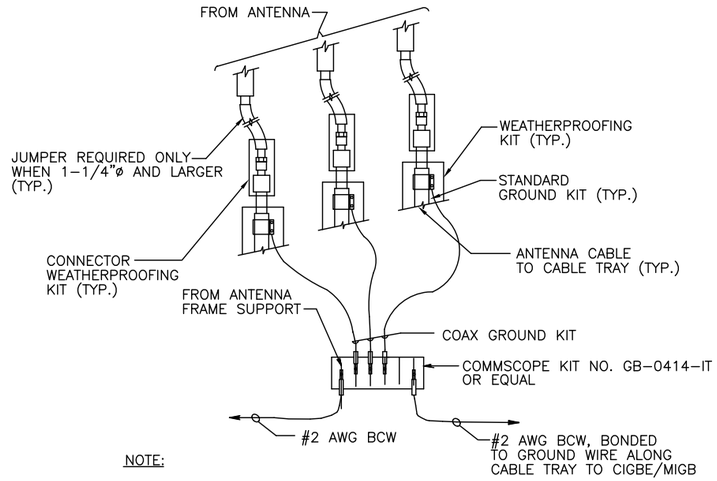


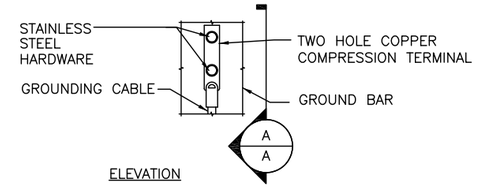
NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.

GROUND WIRE TO GROUND BAR CONNECTION DETAIL

1 / G–1

SCALE: N.T.S



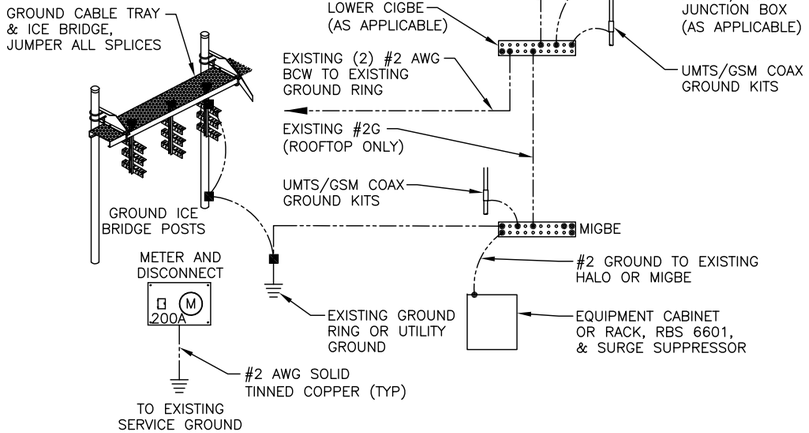
NOTE:

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

3 / G–1

SCALE: N.T.S



GROUNDING RISER DIAGRAM

2 / G–1

SCALE: N.T.S

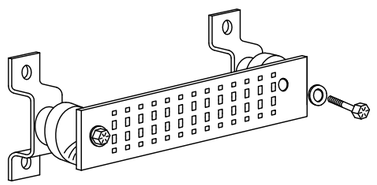
EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

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

4 / G–1

SCALE: N.T.S

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1	05/23/18	ISSUED FOR CONSTRUCTION	MR	AT	DJC
A	02/21/18	ISSUED FOR REVIEW	GA	AT	DJC

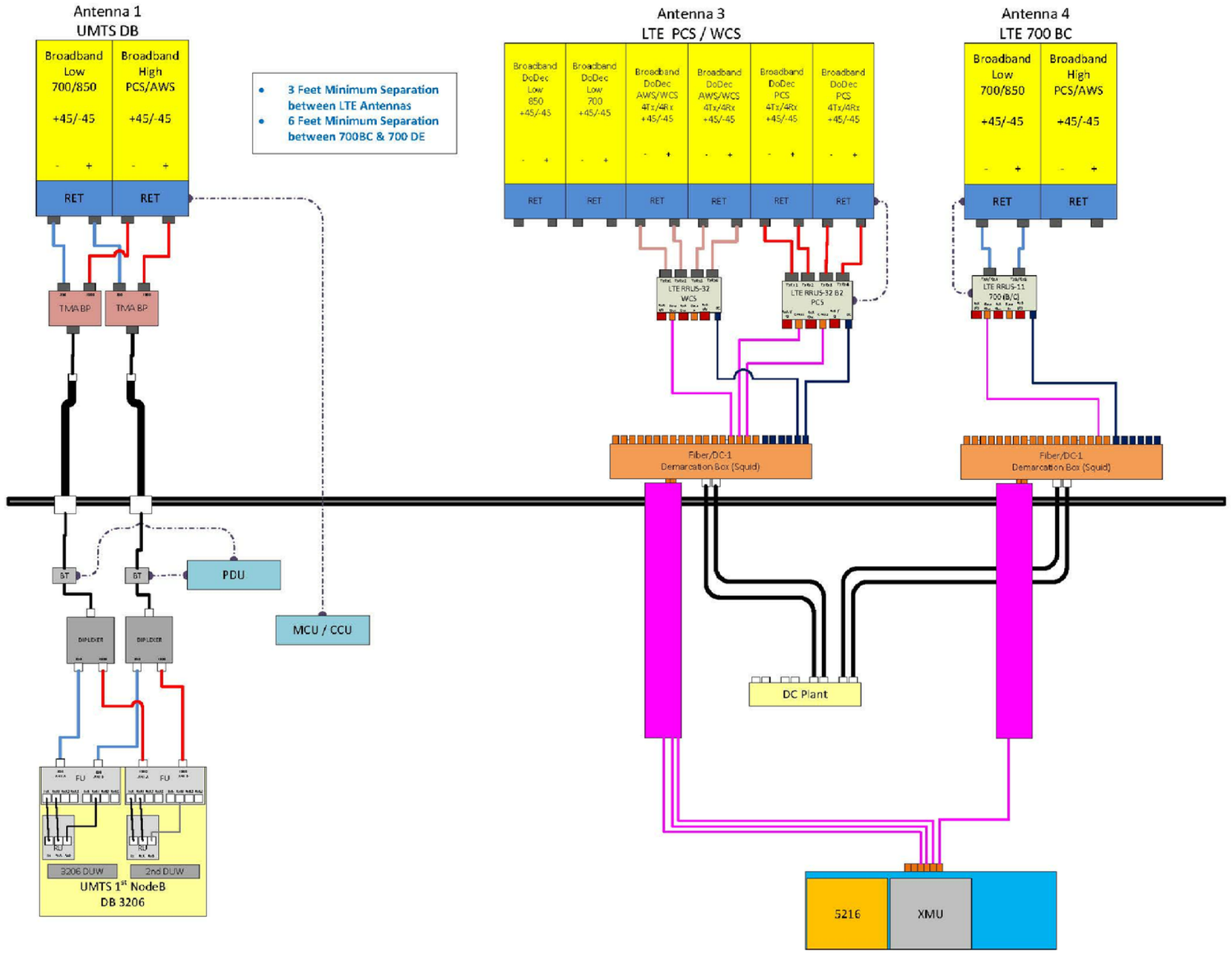
SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: GA

STATE OF CONNECTICUT · DEREK J. CREASEY · No. 25351 · LICENSED PROFESSIONAL ENGINEER

AT&T

GROUNDING DETAILS
(LTE 2C/3C)

SITE NUMBER	DRAWING NUMBER	REV
CT5270	G–1	1



RF PLUMBING DIAGRAM (1 / RF–1)
SCALE: N.T.S

NOTE:
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.

HUDSON Design Group LLC
45 BEECHWOOD DRIVE
NORTH ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

CENTERLINE COMMUNICATIONS
95 RYAN DRIVE
RAYNHAM, MA 02767

SITE NUMBER: CT5270
SITE NAME: WINDSOR LOCKS
2 VOLUNTEER DRIVE
WINDSOR LOCKS, CT 06096
HARTFORD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	05/23/18	ISSUED FOR CONSTRUCTION	MR	AT	DJC
A	02/21/18	ISSUED FOR REVIEW	GA	AT	DJC

SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: GA

STATE OF CONNECTICUT · DEREK J. CREASEY · No. 25058 · LICENSED PROFESSIONAL ENGINEER

AT&T

RF PLUMBING DIAGRAM
(LTE 2C/3C)

SITE NUMBER	DRAWING NUMBER	REV
CT5270	RF–1	1