Michael Gentile, Site Acquisition
c/o New Cingular Wireless, PCS LLC (AT&T)
Centerline Communications, LLC
95 Ryan Drive, Suite 1
Raynham, MA 02767
Mobile: (508) 844-9813
mgentile@clinellc.com

March 2, 2016

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

RE: Notice of Exempt Modification // Site Number: CT5375
1657 Wilbur Cross Highway, Kensington (Berlin), CT 06037 (Site Name: Berlin E. Central)
N 41.60621667// W 72.74968611

Dear Ms. Bachman:

New Cingular Wireless, PCS, LLC ("AT&T") currently maintains nine (9) antennas at the 170 foot level of the existing 175 foot monopole tower at 1657 Wilbur Cross Highway, Kensington (Berlin), CT 06037. The tower is owned by Berlin Volunteer Fire Department. The property is also owned by Berlin Volunteer Fire Department. AT&T now intends to replace three (3) of its existing antennas with three (3) new for its LTE upgrade. These antennas would be installed at the 170 foot level of the tower. AT&T also intends to install three (3) remote radio units and three (3) remote radio unit modules.

The current proposal involves an antenna swap only (three for three); zero antennas will be added.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Denise McNair, Town Manager for the Town of Berlin, as well as the tower owner, Berlin Volunteer Fire Department and the ground owner, also Berlin Volunteer Fire Department.

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 2/12/2016 by ComEx Consultants, a structural analysis dated 2/19/2016 by ComEx Consultants and an Emissions Analysis Report dated 2/25/2016 by EBI Consulting.

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

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

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

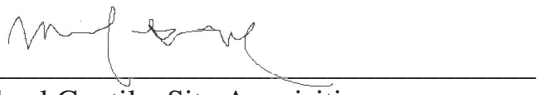
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

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

6. The existing structure and its foundation can support the proposed loading as shown in the attached structural analysis by ComEx Consultants dated 2/19/2016.

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,



Michael Gentile, Site Acquisition
c/o New Cingular Wireless, PCS LLC (AT&T)
Centerline Communications, LLC
95 Ryan Drive, Suite 1
Raynham, MA 02767
Mobile: (508) 844-9813
mgentile@centerlincommunications.com

Attachments

cc: Denise McNair, Town of Berlin Town Manager - as elected official
Berlin Volunteer Fire Department - as tower owner
Berlin Volunteer Fire Department - as property owner

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

AT&T Existing Facility

Site ID: CT5375

Berlin E. Central
1657 Wilbur Cross Highway
Kensington, CT 6037

February 25, 2016

EBI Project Number: 6216000909

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	8.51 %

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
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February 25, 2016

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

Emissions Analysis for Site: **CT5375 – Berlin E. Central**

EBI Consulting was directed to analyze the proposed AT&T facility located at **1657 Wilbur Cross Highway, Kensington, 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 public 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 public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). 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 done for the proposed AT&T Wireless antenna facility located at **1657 Wilbur Cross Highway, Kensington, 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.

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

1) 2 UMTS channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 UMTS channels (PCS Band – 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 GSM channels (PCS Band – 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 2 LTE channels (700 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (PCS Band – 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

6) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

7) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antennas used in this modeling are the **CCI HPA-65R-BUU-H6 and the Kathrein 800-10121** for transmission in the 700 MHz, 850 MHz and1900 MHz (PCS) 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.

9) The antenna mounting height centerline of the proposed antennas is **170 feet** above ground level (AGL).

10) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

AT&T Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Kathrein 800-10121	Make / Model:	Kathrein 800-10121	Make / Model:	Kathrein 800-10121
Gain:	11.45 / 14.35 dBd	Gain:	11.45 / 14.35 dBd	Gain:	11.45 / 14.35 dBd
Height (AGL):	170 feet	Height (AGL):	170 feet	Height (AGL):	170 feet
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	6	Channel Count	6	Channel Count	6
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	4,105.06	ERP (W):	4,105.06	ERP (W):	4,105.06
Antenna A1 MPE%	**0.63**	Antenna B1 MPE%	**0.63**	Antenna C1 MPE%	**0.63**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	CCI OPA-65R-BUU-H6	Make / Model:	CCI OPA-65R-BUU-H6	Make / Model:	CCI OPA-65R-BUU-H6
Gain:	11.95 / 14.75 dBd	Gain:	11.95 / 14.75 dBd	Gain:	11.95 / 14.75 dBd
Height (AGL):	170 feet	Height (AGL):	170 feet	Height (AGL):	170 feet
Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	5,462.56	ERP (W):	5,462.56	ERP (W):	5,462.56
Antenna A2 MPE%	**1.02**	Antenna B2 MPE%	**1.02**	Antenna C2 MPE%	**1.02**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**1.65 %**
Police Channel	0.04 %
Fire Main	0.06 %
Fire Intercity	0.06 %
Highway	0.04 %
Fire Ground	0.01 %
SP Hotline	0.05 %
RAFS	0.01 %
960 Link	0.01 %
Sprint	0.72 %
Clearwire	0.09 %
T-Mobile	0.72 %
Verizon Wireless	5.05 %
Site Total MPE %:	**8.51 %**

AT&T Sector 1 Total:	1.65 %
AT&T Sector 2 Total:	1.65 %
AT&T Sector 3 Total:	1.65 %
Site Total:	8.51 %

AT&T _ Max 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	170	1.12	850	567	0.20 %
AT&T 1900 MHz (PCS) UMTS	2	816.81	170	2.18	1900	1000	0.22 %
AT&T 1900 MHz (PCS) UMTS	2	816.81	170	2.18	1900	1000	0.22 %
AT&T 850 MHz LTE	2	940.05	170	2.51	700	467	0.54 %
AT&T 1900 MHz (PCS) LTE	2	1791.23	170	4.79	1900	1000	0.48 %
						Total:	1.65 %

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Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public 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 public exposure to RF Emissions are shown here:

AT&T Sector	Power Density Value (%)
Sector 1:	1.65 %
Sector 2:	1.65 %
Sector 3 :	1.65 %
AT&T Maximum Total (per sector):	1.65 %
Site Total:	8.51 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **8.51%** of the allowable FCC established general public 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

EBI Consulting
21 B Street
Burlington, MA 01803

STRUCTURAL ANALYSIS REPORT
MONOPOLE

Prepared For:

Com-Ex Consultants, LLC
115 Route 46 – Suite E39
Mountain Lakes, NJ 07046

Structure Rating:	
Monopole:	**Pass (87.0%)**
Base Plate:	**Pass (90.3%)**
Foundation:	**Pass (99.6%)**

Sincerely,
Destek Engineering, LLC

3-3-2016

STATE OF CONNECTICUT
AHMET COLAKOGLU
PEN. 27057
LICENSED
PROFESSIONAL ENGINEER

Ahmet Colakoglu, PE
Connecticut Professional Engineer
License No: 27057

AT&T Site ID: CT5375
FA Code: 10070926
Site Name: Berlin E Central
1657 Wilbur Cross Highway
Kensington, CT 06037

Destek Job No: 1629028 March 3, 2016

CONTENTS

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Ste 100, Marietta, GA 30066 -Tel: (770) 693-0835

1.0 SUBJECT AND REFERENCES

The purpose of this analysis is to evaluate the structural capacity of the existing telecommunication installation on the monopole at 1657 Wilbur Cross Highway, Kensington, CT 06037 for the additions and alterations proposed by AT&T.

The structural analysis is based on the following information provided to Destek Engineering, LLC (Destek):

- Construction Drawings prepared by Com-Ex Consultants, dated 02/12/2016.
- RFDS provided by AT&T, dated 09/15/2015.
- Structural Analysis Report by Ramaker & Associates, Inc., dated 08/05/2014.

1.1 STRUCTURE

The structure is a 175 feet tall 16-sided monopole, which is attached to the foundation with anchor bolts and a base plate. It is formed by the following sections:

ELEVATION (FT)	SECTION LENGTH (FT)	LAP SPLICE (FT)	SHAFT THICKNESS (IN)	TOP DIAMETER (IN)	BOTTOM DIAMETER (IN)	YIELD STRENGTH (KSI)
175.0 – 134.25	45.25	4.50	0.2500	21.0000	31.8000	65
134.25 – 90.87	49.13	5.75	0.3125	30.2260	41.8200	65
90.87 – 49.0	48.87	7.00	0.3750	39.8381	51.3600	65
49.0 – 0.00	49.00	0.00	0.4375	48.9596	60.5000	65

2.0 EXISTING AND PROPOSED APPURTENANCES

The analysis is based on the following proposed appurtenances:

Existing Configuration of AT&T Appurtenances:

RAD CENTER (FT)	ANTENNA & TMA	FEED LINES	MOUNT
170	(3) 800-10121 (3) AM-X-CD-16-65-00T-RET (6) 860-10025 (6) LGP 21401 (1) DC6 (3) RRUS-11	(6) 1-5/8” (1) Fiber Cable (2) DC Power Cable (Inside Shaft)	(3) T-Arms

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Proposed and Final Configuration of AT&T Appurtenances:

RAD CENTER (FT)	ANTENNA & TMA	FEED LINES	MOUNT
170	(3) 800-10121 (3) HPA-65R-BUU-H6 (6) 860-10025 (6) LGP 21401 (1) DC6 (6) RRUS-11 and (3) RRUS-A2	(6) 1-5/8” (1) Fiber Cable (2) DC Power Cable (Inside Shaft)	(3) T-Arms

Existing Appurtenances by Others:

RAD CENTER (FT) CARRIER	ANTENNA & TMA	FEED LINES	MOUNT
175 City	(3) 10’ Dipoles (2) 10’ Omnis (2) Scala MF-900B	(7) 1-5/8”*	(1) Low Profile Platform
162 City	(1) 10’ Dipoles (1) Scala MF-900B	(2) 1-5/8”*	(1) 6’ Standoff
160 T-Mobile	(6) EMS DR65-19-00DPQ (6) Andrew ETD819H-12UB (3) EMS DR65-19-00DPQ (6) Andrew ETD819H-12UB	(24) 1-5/8”*	(3) T-Arms
150 Sprint /Clearwire	(3) RFS APXVSPP18-C-A20 (3) ALU 1900MHz 4x45W RRH (3) ALU 800MHz 2x50W RRH (3) RFS APXV9TM14-ALU-I20 (3) ALU TD-RRH8x20-25 (3) Kathrein 840 10054 (3) Samsun nRRH (4) Andrew VHLP2.5-11	(4) 1-1/4”* (6) CAT5* (4) 1/2”*	(1) Low Profile Platform
130 City	(1) 10’ Dipole (1) TMA	(1) 1-5/8”*	(1) 6’ Standoff
124 Pocket	(3) Kathrein 742 213V01	(6) 1-5/8”*	(1) Face Mount
114 Verizon	(4) Antel LPA-80063-6CF-EDIN-X (2) Antel RWA-80013 (3) Andrew LNX-6514DS-T4M (1) Antel BXA-185060-12CF-EDIN-X (2) Rymsa MGD3-900TX (3) TMAs	(12) 1-5/8”* (7) 1-5/8”**	(1) Low Profile Platform
100 City	(1) 10’ Dipoles (1) TMA (1) Scala MF-900B	(2) 1-5/8”*	(1) 6’ Standoff

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75 Sprint	(1) GPS Antenna	(1) 1/2”*	(1) 2’ Standoff
60 T-Mobile /City	(1) GPS Antenna (1) Scanner Antenna	(2) 1/2”*	(2) 2’ Standoff

*Inside Shaft **Outside Shaft

3.0 CODES AND LOADING

The Monopole was analyzed per *TIA/EIA-222-F* as referenced by *2005 State Building Code with all of the adopted Supplements and Amendments*. The following wind loading was used in compliance with the standard for Hartford County:

- Basic wind speed 80 mph without ice (W)
- Basic wind speed 38 mph with 1” radial ice (W_i)

The following load combinations were used with wind blowing at 0^o, 60^o and 90^o, measured from a line normal to the face of the tower.

- D + W
- D + W_i + I

D: Dead Load
W: Wind Load, without ice
W_i: Wind Load with ice
I: Ice Gravity Load

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Ste 100, Marietta, GA 30066 -Tel: (770) 693-0835

4.0 STANDARD CONDITIONS FOR ENGINEERING SERVICES ON EXISTING STRUCTURES

The analysis is based on the information provided to Destek and is assumed to be current and correct. Unless otherwise noted, the structure is assumed to be in good condition, free of defects, and can achieve theoretical strength.

It is assumed that the structure has been maintained and shall be maintained during its service. The superstructure and the foundation system are assumed to be designed with proper engineering practice and fabricated, constructed and erected in accordance with the design documents. Destek will accept no liability which may arise due to any existing deficiency in design, material, fabrication, erection, construction, etc. or lack of maintenance.

The analysis does not include a qualification of the mounts attached on the structure or their connections. The analysis is performed to verify the capacity of the main structural members, which is the current practice in the tower industry.

The analysis results presented in this report are only applicable for the previously mentioned existing and proposed appurtenances. Any deviation of the appurtenances and appurtenance placement will require Destek to generate an additional structural analysis. Additionally, the proposed linear appurtenances should be placed per recommendations of this report.

5.0 ANALYSIS AND RESULTS

The monopole was analyzed by utilizing tnxTower, a non-linear, three-dimensional, finite element-analysis software package, a product of Tower Numerics, Inc. Software output for this analysis is provided in Appendix A of this report.

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6.0 RESULTS AND CONCLUSION

Based on analysis per TIA/EIA-222-F, the existing monopole is found to have **adequate** structural capacity for the proposed changes by AT&T. As a maximum, the monopole base plate is stressed to **90.6%** of its capacity. The monopole shaft is stressed to 87.5% of its capacity. Based on reaction comparison, the foundation is found to have **adequate** capacity for the proposed changes by AT&T.

Reaction Comparison:

Maximums	Destek Analysis	Original Design*	Comparison
Axial (kips)	49.589	49.6	99.98%
Shear (kips)	34.764	34.94	99.5%
Moment (kip-ft)	4298.666	4306.5	99.8%

*Provided in the Report prepared by Ramaker & Associates, Inc., dated 08/05/2014

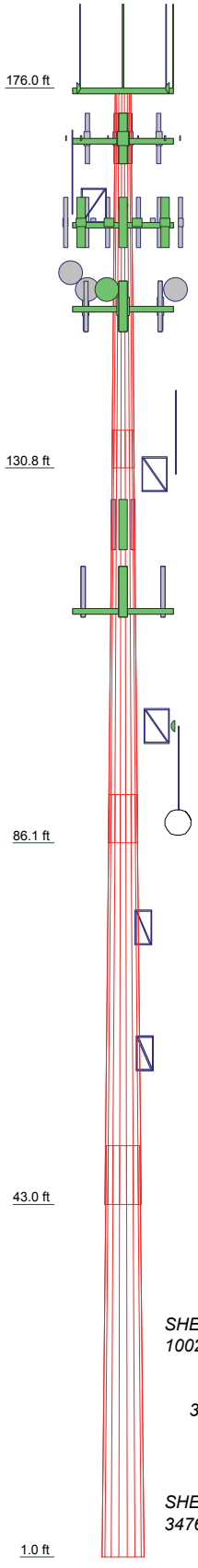
Therefore, the proposed additions and alterations by AT&T **can** be implemented as intended with the conditions outlined in this report.

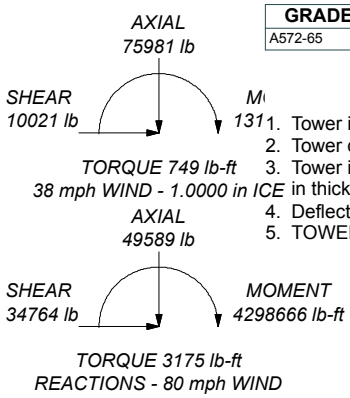
Should you have any questions about this report, please contact Ahmet Colakoglu at (770) 693-0835 or acolakoglu@destekengineering.com.

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Ste 100, Marietta, GA 30066 -Tel: (770) 693-0835

APPENDIX A
CALCULATIONS

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (lb)
1	45.25	18	0.2500	4.50	21.0000	31.8000	A572-65	3195.0
2	49.13	18	0.3125	5.75	30.2260	41.8200		5921.5
3	48.87	18	0.3750	7.00	39.8381	51.3600		8951.3
4	49.00	18	0.4375		48.9596	60.5000		12570.6
								30638.4





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
10' Dipole AF	176	TD-RRH8x20-25	150
10' Dipole AF	176	TD-RRH8x20-25	150
10' Dipole AF	176	APXVSPP18-C-A20 w/ Mount Pipe	150
2" Dia 10' Omni	176	APXVSPP18-C-A20 w/ Mount Pipe	150
2" Dia 10' Omni	176	APXVSPP18-C-A20 w/ Mount Pipe	150
Valmont 13'-5" Platform	176	1900MHz 4x45W RRH	150
MF-900B	176	1900MHz 4x45W RRH	150
MF-900B	176	1900MHz 4x45W RRH	150
800 10121 w/ Mount Pipe	170	APXV9TM14-ALU-I20 w/ Mount Pipe	150
(2) 860 10025	170	APXV9TM14-ALU-I20 w/ Mount Pipe	150
(2) 860 10025	170	TD-RRH8x20-25	150
(2) 860 10025	170	VHLP2.5-11	150
(2) LGP214nn	170	VHLP2.5-11	150
(2) LGP214nn	170	VHLP2.5-11	150
(2) LGP214nn	170	VHLP2.5-11	150
RRUS-11	170	10' Dipole AF	130
RRUS-11	170	TMA	130
RRUS-11	170	6' Standoff	130
DC6-48-60-18-8F	170	742 213V01 w/ Mount Pipe	124
T-Arm Mount [TA 602-3]	170	742 213V01 w/ Mount Pipe	124
HPA-65R-BUU-H6 w/ Mount Pipe	170	742 213V01 w/ Mount Pipe	124
HPA-65R-BUU-H6 w/ Mount Pipe	170	MGD3-900TX w/ Mount Pipe	114
HPA-65R-BUU-H6 w/ Mount Pipe	170	MGD3-900TX w/ Mount Pipe	114
RRUS 11 with A2 Module	170	TMA	114
RRUS 11 with A2 Module	170	TMA	114
RRUS 11 with A2 Module	170	TMA	114
RRUS 11	170	Platform Mount [LP 304-1]	114
RRUS 11	170	LPA-80063-6CF-EDIN-5 w/ Mount Pipe	114
RRUS 11	170	LPA-80063-6CF-EDIN-5 w/ Mount Pipe	114
800 10121 w/ Mount Pipe	170	LPA-80063-6CF-EDIN-5 w/ Mount Pipe	114
800 10121 w/ Mount Pipe	170	LPA-80063-6CF-EDIN-5 w/ Mount Pipe	114
10' Dipole AF	162	RWA-80013 w/Mount Pipe	114
6' Standoff	162	RWA-80013 w/Mount Pipe	114
MF-900B	162	LNX-6514DS-T4M w/ Mount Pipe	114
(3) DR65-19-00DPQ w/ Mount Pipe	160	LNX-6514DS-T4M w/ Mount Pipe	114
(3) DR65-19-00DPQ w/ Mount Pipe	160	LNX-6514DS-T4M w/ Mount Pipe	114
(3) DR65-19-00DPQ w/ Mount Pipe	160	BXA-185060/12CF w/ Mount Pipe	114
(4) ETD819H-12UB	160	10' Dipole AF	100
(4) ETD819H-12UB	160	TMA	100
(4) ETD819H-12UB	160	6' Standoff	100
T-Arm Mount [TA 602-3]	160	MF-900B	100
800MHZ 2X50W RRH	150	GPS	76
800MHZ 2X50W RRH	150	Side Arm Mount [SO 301-1]	76
800MHZ 2X50W RRH	150	GPS	61
840 10054 w/ Mount Pipe	150	Side Arm Mount [SO 301-1]	61
840 10054 w/ Mount Pipe	150	GPS	61
840 10054 w/ Mount Pipe	150	Side Arm Mount [SO 301-1]	61
nRRH	150		
nRRH	150		
nRRH	150		
Valmont 13'-5" Platform	150		
APXV9TM14-ALU-I20 w/ Mount Pipe	150		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 90.6%

DESTEK ENGINEERING
Destek Engineering, LLC
1281 Kennestone Circle, Suite 100
Marietta, GA 30066
Phone: (770) 693-0835
FAX:

Job: **CT5375**			
Project: ***1629028***			
Client: COMEX	Drawn by: Ahmet Colakoglu	App'd:	
Code: TIA/EIA-222-F	Date: 02/19/16	Scale: NTS	
Path: Z:\Projects\2016\29 - Com-Ex\028 - CT5375 - 15163-Emp\mxTower\Rev 2.19.16\CTV5375_rev 2.19.16.eri		Dwg No. E-1	

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
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	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Calculate Redundant Bracing Forces
¾ rd ¾ rd	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	All Leg Panels Have Same Allowable
√ Escalate Ice	√ Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Poles
Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	√ Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination	Use TIA-222-G Tension Splice Capacity Exemption	

Tapered Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Splice Length* *ft*	*Number of Sides*	*Top Diameter* *in*	*Bottom Diameter* *in*	*Wall Thickness* *in*	*Bend Radius* *in*	*Pole Grade*
L1	176.00-130.75	45.25	4.50	18	21.0000	31.8000	0.2500	1.0000	A572-65 (65 ksi)
L2	130.75-86.12	49.13	5.75	18	30.2260	41.8200	0.3125	1.2500	A572-65 (65 ksi)
L3	86.12-43.00	48.87	7.00	18	39.8381	51.3600	0.3750	1.5000	A572-65 (65 ksi)
L4	43.00-1.00	49.00		18	48.9596	60.5000	0.4375	1.7500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	21.3240	16.4651	895.6507	7.3663	10.6680	83.9568	1792.4800	8.2341	3.2560	13.024
	32.2906	25.0349	3148.3461	11.2003	16.1544	194.8909	6300.8349	12.5198	5.1568	20.627
L2	31.7706	29.6704	3354.2440	10.6193	15.3548	218.4493	6712.9015	14.8380	4.7698	15.263
	42.4651	41.1703	8961.3641	14.7352	21.2446	421.8192	17934.5198	20.5890	6.8103	21.793
L3	41.8292	46.9709	9241.6271	14.0094	20.2377	456.6531	18495.4146	23.4899	6.3515	16.937
	52.1523	60.6849	19929.7987	18.0997	26.0909	763.8607	39885.8215	30.3482	8.3794	22.345
L4	51.3890	67.3790	20042.0460	17.2254	24.8715	805.8240	40110.4639	33.6959	7.8469	17.936
	61.4333	83.4043	38013.0437	21.3222	30.7340	1236.8401	76076.1060	41.7101	9.8780	22.578

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
L1 176.00-130.75				1	1	1		
L2 130.75-86.12				1	1	1		
L3 86.12-43.00				1	1	1		
L4 43.00-1.00				1	1	1		

Monopole Base Plate Data

Base Plate Data	
Base plate is square	
Base plate is grouted	
Anchor bolt grade	A615-75
Anchor bolt size	2.2500 in
Number of bolts	18
Embedment length	24.0000 in
f'_c	4 ksi
Grout space	2.0000 in
Base plate grade	A572-60
Base plate thickness	2.0000 in
Bolt circle diameter	70.0000 in
Outer diameter	76.0000 in
Inner diameter	60.7500 in
Base plate type	Stiffened Plate
Bolts per stiffener	1
Stiffener thickness	0.5000 in
Stiffener height	12.0000 in

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
LDF7-50A(1-5/8")	C	No	Inside Pole	175.00 - 21.00	7	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF7-50A(1-5/8")	C	No	Inside Pole	170.00 - 9.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
3/8" Fiber Cable	C	No	Inside Pole	170.00 - 9.00	1	No Ice	0.00	0.50
						1/2" Ice	0.00	0.50
						1" Ice	0.00	0.50
						2" Ice	0.00	0.50
						4" Ice	0.00	0.50
DC Power Cable	C	No	Inside Pole	170.00 - 9.00	2	No Ice	0.00	2.00
						1/2" Ice	0.00	2.00
						1" Ice	0.00	2.00
						2" Ice	0.00	2.00
						4" Ice	0.00	2.00
LDF7-50A(1-5/8")	C	No	Inside Pole	162.00 - 21.00	2	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF7-50A(1-5/8")	C	No	Inside Pole	160.00 - 9.00	24	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF6-50A(1-1/4")	C	No	Inside Pole	150.00 - 9.00	3	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
LDF6-50A(1-1/4")	C	No	Inside Pole	150.00 - 9.00	1	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
7919A(17/64")	C	No	Inside Pole	150.00 - 9.00	6	No Ice	0.00	0.03
						1/2" Ice	0.00	0.03
						1" Ice	0.00	0.03
						2" Ice	0.00	0.03
						4" Ice	0.00	0.03
LDF4-50A(1/2")	C	No	Inside Pole	150.00 - 9.00	4	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
LDF7-50A(1-5/8")	C	No	Inside Pole	130.00 - 21.00	1	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF7-50A(1-5/8")	C	No	Inside Pole	124.00 - 9.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	114.00 - 21.00	2	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						2" Ice	0.60	10.54
						4" Ice	1.00	30.04
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	114.00 - 21.00	5	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
						2" Ice	0.00	10.54
						4" Ice	0.00	30.04
LDF7-50A(1-5/8")	C	No	Inside Pole	114.00 - 21.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF7-50A(1-5/8")	C	No	Inside Pole	100.00 - 21.00	2	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF4-50A(1/2")	C	No	Inside Pole	75.00 - 9.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
LDF4-50A(1/2")	C	No	Inside Pole	60.00 - 21.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
LDF4-50A(1/2")	C	No	Inside Pole	60.00 - 9.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15

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 lb
L1	176.00-130.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1316.45
L2	130.75-86.12	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	11.040	2460.22
L3	86.12-43.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	17.076	2720.42
L4	43.00-1.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	8.712	1845.70

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 lb
L1	176.00-130.75	A	1.201	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1316.45
L2	130.75-86.12	A	1.152	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	24.437	3409.68
L3	86.12-43.00	A	1.083	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	36.954	4099.41
L4	43.00-1.00	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	18.245	2484.44

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	176.00-130.75	0.0000	0.0000	0.0000	0.0000
L2	130.75-86.12	-0.3133	0.1809	-0.6020	0.3475
L3	86.12-43.00	-0.4665	0.2693	-0.8752	0.5053
L4	43.00-1.00	-0.2470	0.1426	-0.4770	0.2754

Discrete Tower Loads

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 lb
176' City									
10' Dipole AF	A	From Face	5.00 0.00 5.00	0.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.00 3.02 4.07 5.70 8.26	2.00 3.02 4.07 5.70 8.26	20.00 35.50 57.47 121.40 333.58
10' Dipole AF	B	From Face	5.00 0.00 5.00	0.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.00 3.02 4.07 5.70 8.26	2.00 3.02 4.07 5.70 8.26	20.00 35.50 57.47 121.40 333.58
10' Dipole AF	B	From Leg	6.00 0.00 5.00	0.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.00 3.02 4.07 5.70 8.26	2.00 3.02 4.07 5.70 8.26	20.00 35.50 57.47 121.40 333.58
2" Dia 10' Omni	C	From Face	5.00 0.00 5.00	0.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.00 3.03 4.06 6.12	2.00 3.03 4.06 6.12	10.00 25.00 40.00 70.00

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 lb
						4" Ice	10.24	10.24	130.00
2" Dia 10' Omni	C	From Face	5.00 0.00 5.00	0.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.00 3.03 4.06 6.12 10.24	2.00 3.03 4.06 6.12 10.24	10.00 25.00 40.00 70.00 130.00
Valmont 13'-5" Platform	C	None		0.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	18.43 22.32 26.21 33.99 49.55	18.43 22.32 26.21 33.99 49.55	1759.00 2143.00 2527.00 3295.00 4831.00
170' ATT									
800 10121 w/ Mount Pipe	A	From Face	4.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.69 6.18 6.68 7.70 9.86	4.60 5.35 6.05 7.53 10.83	66.50 114.02 167.89 297.81 675.28
800 10121 w/ Mount Pipe	B	From Face	4.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.69 6.18 6.68 7.70 9.86	4.60 5.35 6.05 7.53 10.83	66.50 114.02 167.89 297.81 675.28
800 10121 w/ Mount Pipe	C	From Face	4.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.69 6.18 6.68 7.70 9.86	4.60 5.35 6.05 7.53 10.83	66.50 114.02 167.89 297.81 675.28
(2) 860 10025	A	From Face	4.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.16 0.22 0.29 0.47 0.92	0.13 0.19 0.26 0.43 0.87	1.16 2.65 5.06 13.42 49.74
(2) 860 10025	B	From Face	4.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.16 0.22 0.29 0.47 0.92	0.13 0.19 0.26 0.43 0.87	1.16 2.65 5.06 13.42 49.74
(2) 860 10025	C	From Face	4.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.16 0.22 0.29 0.47 0.92	0.13 0.19 0.26 0.43 0.87	1.16 2.65 5.06 13.42 49.74
(2) LGP214nn	A	From Face	4.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.30 1.45 1.60 1.90 2.50	0.23 0.31 0.39 0.55 0.87	14.10 21.30 28.50 42.90 71.70
(2) LGP214nn	B	From Face	4.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.30 1.45 1.60 1.90 2.50	0.23 0.31 0.39 0.55 0.87	14.10 21.30 28.50 42.90 71.70
(2) LGP214nn	C	From Face	4.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.30 1.45 1.60 1.90 2.50	0.23 0.31 0.39 0.55 0.87	14.10 21.30 28.50 42.90 71.70

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 lb
RRUS-11	A	From Face	4.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	47.62 68.42 92.25 149.81 309.89
RRUS-11	B	From Face	4.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	47.62 68.42 92.25 149.81 309.89
RRUS-11	C	From Face	4.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	47.62 68.42 92.25 149.81 309.89
DC6-48-60-18-8F	C	None		0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.80 3.04 3.54 4.66	2.57 2.80 3.04 3.54 4.66	18.90 41.46 67.19 128.96 299.16
T-Arm Mount [TA 602-3]	C	None		0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.59 15.44 19.29 26.99 42.39	11.59 15.44 19.29 26.99 42.39	774.30 990.35 1206.41 1638.52 2502.73
162' City									
10' Dipole AF	A	From Face	6.00 0.00 4.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.00 3.02 4.07 5.70 8.26	2.00 3.02 4.07 5.70 8.26	20.00 35.50 57.47 121.40 333.58
6' Standoff	A	From Face	3.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.97 6.12 7.27 9.57 14.17	4.97 6.12 7.27 9.57 14.17	70.00 130.00 190.00 310.00 550.00
160' T-Mobile									
(3) DR65-19-00DPQ w/ Mount Pipe	A	From Face	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.64 9.29 9.91 11.18 13.83	5.20 6.36 7.24 9.03 12.81	50.55 110.82 178.86 341.91 809.90
(3) DR65-19-00DPQ w/ Mount Pipe	B	From Face	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.64 9.29 9.91 11.18 13.83	5.20 6.36 7.24 9.03 12.81	50.55 110.82 178.86 341.91 809.90
(3) DR65-19-00DPQ w/ Mount Pipe	C	From Face	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.64 9.29 9.91 11.18 13.83	5.20 6.36 7.24 9.03 12.81	50.55 110.82 178.86 341.91 809.90
(4) ETD819H-12UB	A	From Face	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.53 1.70 1.87 2.25 3.11	0.39 0.49 0.60 0.84 1.44	18.50 27.42 38.39 67.28 158.27

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 lb
(4) ETD819H-12UB	B	From Face	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.53 1.70 1.87 2.25 3.11	0.39 0.49 0.60 0.84 1.44	18.50 27.42 38.39 67.28 158.27
(4) ETD819H-12UB	C	From Face	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.53 1.70 1.87 2.25 3.11	0.39 0.49 0.60 0.84 1.44	18.50 27.42 38.39 67.28 158.27
T-Arm Mount [TA 602-3]	C	None		0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.59 15.44 19.29 26.99 42.39	11.59 15.44 19.29 26.99 42.39	774.30 990.35 1206.41 1638.52 2502.73
150' Sprint									
APXV9TM14-ALU-I20 w/ Mount Pipe	A	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	75.89 130.50 191.80 337.60 751.57
APXV9TM14-ALU-I20 w/ Mount Pipe	B	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	75.89 130.50 191.80 337.60 751.57
APXV9TM14-ALU-I20 w/ Mount Pipe	C	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	75.89 130.50 191.80 337.60 751.57
TD-RRH8x20-25	A	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	70.00 97.15 127.83 200.54 396.84
TD-RRH8x20-25	B	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	70.00 97.15 127.83 200.54 396.84
TD-RRH8x20-25	C	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	70.00 97.15 127.83 200.54 396.84
APXVSPP18-C-A20 w/ Mount Pipe	A	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	82.55 150.56 226.53 405.98 908.95
APXVSPP18-C-A20 w/ Mount Pipe	B	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	82.55 150.56 226.53 405.98 908.95
APXVSPP18-C-A20 w/	C	From Face	4.00	0.0000	150.00	No Ice	8.50	6.95	82.55

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 lb
Mount Pipe			0.00			1/2" Ice	9.15	8.13	150.56
			0.00			1" Ice	9.77	9.02	226.53
						2" Ice	11.03	10.84	405.98
						4" Ice	13.68	14.85	908.95
1900MHz 4x45W RRH	A	From Face	4.00	0.0000	150.00	No Ice	2.71	2.61	0.00
			0.00			1/2" Ice	2.95	2.84	0.00
			-2.00			1" Ice	3.19	3.07	0.00
						2" Ice	3.67	3.53	0.00
						4" Ice	4.63	4.45	0.00
1900MHz 4x45W RRH	B	From Face	4.00	0.0000	150.00	No Ice	2.71	2.61	0.00
			0.00			1/2" Ice	2.95	2.84	0.00
			-2.00			1" Ice	3.19	3.07	0.00
						2" Ice	3.67	3.53	0.00
						4" Ice	4.63	4.45	0.00
1900MHz 4x45W RRH	C	From Face	4.00	0.0000	150.00	No Ice	2.71	2.61	0.00
			0.00			1/2" Ice	2.95	2.84	0.00
			-2.00			1" Ice	3.19	3.07	0.00
						2" Ice	3.67	3.53	0.00
						4" Ice	4.63	4.45	0.00
800MHZ 2X50W RRH	A	From Face	4.00	0.0000	150.00	No Ice	2.49	2.07	53.00
			0.00			1/2" Ice	2.71	2.27	74.19
			-2.00			1" Ice	2.93	2.48	98.39
						2" Ice	3.41	2.93	156.61
						4" Ice	4.46	3.93	317.77
800MHZ 2X50W RRH	B	From Face	4.00	0.0000	150.00	No Ice	2.49	2.07	53.00
			0.00			1/2" Ice	2.71	2.27	74.19
			-2.00			1" Ice	2.93	2.48	98.39
						2" Ice	3.41	2.93	156.61
						4" Ice	4.46	3.93	317.77
800MHZ 2X50W RRH	C	From Face	4.00	0.0000	150.00	No Ice	2.49	2.07	53.00
			0.00			1/2" Ice	2.71	2.27	74.19
			-2.00			1" Ice	2.93	2.48	98.39
						2" Ice	3.41	2.93	156.61
						4" Ice	4.46	3.93	317.77
840 10054 w/ Mount Pipe	A	From Face	4.00	0.0000	150.00	No Ice	5.41	2.39	51.43
			0.00			1/2" Ice	5.83	2.92	87.55
			0.00			1" Ice	6.26	3.47	128.97
						2" Ice	7.16	4.61	230.43
						4" Ice	9.09	7.32	533.26
840 10054 w/ Mount Pipe	B	From Face	4.00	0.0000	150.00	No Ice	5.41	2.39	51.43
			0.00			1/2" Ice	5.83	2.92	87.55
			0.00			1" Ice	6.26	3.47	128.97
						2" Ice	7.16	4.61	230.43
						4" Ice	9.09	7.32	533.26
840 10054 w/ Mount Pipe	C	From Face	4.00	0.0000	150.00	No Ice	5.41	2.39	51.43
			0.00			1/2" Ice	5.83	2.92	87.55
			0.00			1" Ice	6.26	3.47	128.97
						2" Ice	7.16	4.61	230.43
						4" Ice	9.09	7.32	533.26
nRRH	A	From Face	4.00	0.0000	150.00	No Ice	2.69	0.85	45.00
			0.00			1/2" Ice	2.91	1.01	60.06
			-1.00			1" Ice	3.13	1.17	75.12
						2" Ice	3.57	1.49	105.24
						4" Ice	4.45	2.13	165.48
nRRH	B	From Face	4.00	0.0000	150.00	No Ice	2.69	0.85	45.00
			0.00			1/2" Ice	2.91	1.01	60.06
			-1.00			1" Ice	3.13	1.17	75.12

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 lb
						2" Ice	3.57	1.49	105.24
						4" Ice	4.45	2.13	165.48
nRRH	C	From Face	4.00 0.00 -1.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.69 2.91 3.13 3.57 4.45	0.85 1.01 1.17 1.49 2.13	45.00 60.06 75.12 105.24 165.48
Valmont 13'-5" Platform	C	None		0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	18.43 22.32 26.21 33.99 49.55	18.43 22.32 26.21 33.99 49.55	1759.00 2143.00 2527.00 3295.00 4831.00
130' City									
10' Dipole AF	B	From Face	6.00 0.00 5.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.00 3.02 4.07 5.70 8.26	2.00 3.02 4.07 5.70 8.26	20.00 35.50 57.47 121.40 333.58
TMA	B	From Face	2.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.40 1.56 1.72 2.04 2.68	0.70 0.82 0.94 1.18 1.66	5.00 15.34 25.68 46.36 87.72
6' Standoff	B	From Face	3.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.40 1.56 1.72 2.04 2.68	0.70 0.82 0.94 1.18 1.66	5.00 15.34 25.68 46.36 87.72
124' Pocket									
742 213V01 w/ Mount Pipe	A	From Face	0.00 0.00 0.00	0.0000	124.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.41 5.99 6.57 7.73 10.05	4.75 6.10 7.45 10.15 15.55	46.84 91.94 137.04 227.24 407.64
742 213V01 w/ Mount Pipe	B	From Face	0.00 0.00 0.00	0.0000	124.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.41 5.99 6.57 7.73 10.05	4.75 6.10 7.45 10.15 15.55	46.84 91.94 137.04 227.24 407.64
742 213V01 w/ Mount Pipe	C	From Face	0.00 0.00 0.00	0.0000	124.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.41 5.99 6.57 7.73 10.05	4.75 6.10 7.45 10.15 15.55	46.84 91.94 137.04 227.24 407.64
114' Verizon									
LPA-80063-6CF-EDIN-5 w/ Mount Pipe	A	From Face	4.00 0.00 2.00	0.0000	114.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.74 11.41 12.04 13.34 16.05	10.70 11.97 12.95 14.96 19.21	52.28 145.49 247.20 479.74 1095.02
LPA-80063-6CF-EDIN-5 w/ Mount Pipe	A	From Face	4.00 0.00 2.00	0.0000	114.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.74 11.41 12.04 13.34 16.05	10.70 11.97 12.95 14.96 19.21	52.28 145.49 247.20 479.74 1095.02
LPA-80063-6CF-EDIN-5 w/ Mount Pipe	B	From Face	4.00 0.00	0.0000	114.00	No Ice 1/2" Ice	10.74 11.41	10.70 11.97	52.28 145.49

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 lb
			2.00			1" Ice	12.04	12.95	247.20
						2" Ice	13.34	14.96	479.74
						4" Ice	16.05	19.21	1095.02
LPA-80063-6CF-EDIN-5 w/ Mount Pipe	B	From Face	4.00	0.0000	114.00	No Ice	10.74	10.70	52.28
			0.00			1/2" Ice	11.41	11.97	145.49
			2.00			1" Ice	12.04	12.95	247.20
						2" Ice	13.34	14.96	479.74
						4" Ice	16.05	19.21	1095.02
RWA-80013 w/Mount Pipe	C	From Face	4.00	0.0000	114.00	No Ice	6.14	4.66	39.85
			0.00			1/2" Ice	6.85	5.70	90.85
			2.00			1" Ice	7.43	6.50	148.20
						2" Ice	8.63	8.14	285.62
						4" Ice	11.19	11.63	685.30
RWA-80013 w/Mount Pipe	C	From Face	4.00	0.0000	114.00	No Ice	6.14	4.66	39.85
			0.00			1/2" Ice	6.85	5.70	90.85
			2.00			1" Ice	7.43	6.50	148.20
						2" Ice	8.63	8.14	285.62
						4" Ice	11.19	11.63	685.30
LNX-6514DS-T4M w/ Mount Pipe	A	From Face	4.00	0.0000	114.00	No Ice	8.57	7.00	58.15
			0.00			1/2" Ice	9.22	8.19	126.70
			2.00			1" Ice	9.84	9.08	203.21
						2" Ice	11.10	10.90	383.80
						4" Ice	13.75	14.93	889.19
LNX-6514DS-T4M w/ Mount Pipe	B	From Face	4.00	0.0000	114.00	No Ice	8.57	7.00	58.15
			0.00			1/2" Ice	9.22	8.19	126.70
			2.00			1" Ice	9.84	9.08	203.21
						2" Ice	11.10	10.90	383.80
						4" Ice	13.75	14.93	889.19
LNX-6514DS-T4M w/ Mount Pipe	C	From Face	4.00	0.0000	114.00	No Ice	8.57	7.00	58.15
			0.00			1/2" Ice	9.22	8.19	126.70
			2.00			1" Ice	9.84	9.08	203.21
						2" Ice	11.10	10.90	383.80
						4" Ice	13.75	14.93	889.19
BXA-185060/12CF w/ Mount Pipe	A	From Face	4.00	0.0000	114.00	No Ice	5.01	5.31	40.68
			0.00			1/2" Ice	5.56	6.48	86.72
			2.00			1" Ice	6.08	7.37	140.18
						2" Ice	7.15	9.17	273.08
						4" Ice	9.41	12.97	676.84
MGD3-900TX w/ Mount Pipe	B	From Face	4.00	0.0000	114.00	No Ice	5.19	5.01	45.39
			0.00			1/2" Ice	5.74	6.18	90.69
			2.00			1" Ice	6.29	7.35	135.99
						2" Ice	7.39	9.69	226.59
						4" Ice	9.59	14.37	407.79
MGD3-900TX w/ Mount Pipe	C	From Face	4.00	0.0000	114.00	No Ice	5.19	5.01	45.39
			0.00			1/2" Ice	5.74	6.18	90.69
			2.00			1" Ice	6.29	7.35	135.99
						2" Ice	7.39	9.69	226.59
						4" Ice	9.59	14.37	407.79
TMA	A	From Face	3.00	0.0000	114.00	No Ice	1.40	0.70	5.00
			0.00			1/2" Ice	1.56	0.82	15.34
			2.00			1" Ice	1.72	0.94	25.68
						2" Ice	2.04	1.18	46.36
						4" Ice	2.68	1.66	87.72
TMA	B	From Face	3.00	0.0000	114.00	No Ice	1.40	0.70	5.00
			0.00			1/2" Ice	1.56	0.82	15.34
			2.00			1" Ice	1.72	0.94	25.68
						2" Ice	2.04	1.18	46.36

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 lb
						4" Ice	2.68	1.66	87.72
TMA	C	From Face	3.00 0.00 2.00	0.0000	114.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.40 1.56 1.72 2.04 2.68	0.70 0.82 0.94 1.18 1.66	5.00 15.34 25.68 46.36 87.72
Platform Mount [LP 304-1]	C	None		0.0000	114.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	17.46 22.44 27.42 37.38 57.30	17.46 22.44 27.42 37.38 57.30	1349.00 1624.58 1900.16 2451.32 3553.64
100' City									
10' Dipole AF	B	From Face	6.00 0.00 -5.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.00 3.02 4.07 5.70 8.26	2.00 3.02 4.07 5.70 8.26	20.00 35.50 57.47 121.40 333.58
TMA	B	From Face	2.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.40 1.56 1.72 2.04 2.68	0.70 0.82 0.94 1.18 1.66	5.00 15.34 25.68 46.36 87.72
6' Standoff	B	From Face	3.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.40 1.56 1.72 2.04 2.68	0.70 0.82 0.94 1.18 1.66	5.00 15.34 25.68 46.36 87.72
76' Sprint									
GPS	A	From Face	2.00 0.00 0.00	0.0000	76.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.00 1.50 2.00 3.00 5.00	1.00 1.50 2.00 3.00 5.00	10.00 15.00 20.00 30.00 50.00
Side Arm Mount [SO 301-1]	B	From Face	1.00 0.00 0.00	0.0000	76.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.00 1.39 1.78 2.56 4.12	0.90 1.42 1.94 2.98 5.06	23.00 32.57 42.14 61.28 99.56
GPS	A	From Face	2.00 0.00 0.00	0.0000	61.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.00 1.50 2.00 3.00 5.00	1.00 1.50 2.00 3.00 5.00	10.00 15.00 20.00 30.00 50.00
Side Arm Mount [SO 301-1]	B	From Face	1.00 0.00 0.00	0.0000	61.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.00 1.39 1.78 2.56 4.12	0.90 1.42 1.94 2.98 5.06	23.00 32.57 42.14 61.28 99.56
GPS	B	From Face	2.00 0.00 0.00	0.0000	61.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.00 1.50 2.00 3.00 5.00	1.00 1.50 2.00 3.00 5.00	10.00 15.00 20.00 30.00 50.00
Side Arm Mount [SO 301-1]	B	From Face	1.00 0.00 0.00	0.0000	61.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.00 1.39 1.78 2.56	0.90 1.42 1.94 2.98	23.00 32.57 42.14 61.28

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 lb
						4" Ice	4.12	5.06	99.56
PROPOSED									
HPA-65R-BUU-H6 w/ Mount Pipe	A	From Face	0.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.60 11.27 11.91 13.21 15.93	8.11 9.30 10.21 12.17 16.35	76.55 158.03 247.79 455.80 1019.77
HPA-65R-BUU-H6 w/ Mount Pipe	B	From Face	0.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.60 11.27 11.91 13.21 15.93	8.11 9.30 10.21 12.17 16.35	76.55 158.03 247.79 455.80 1019.77
HPA-65R-BUU-H6 w/ Mount Pipe	C	From Face	0.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.60 11.27 11.91 13.21 15.93	8.11 9.30 10.21 12.17 16.35	76.55 158.03 247.79 455.80 1019.77
RRUS 11 with A2 Module	A	From Face	0.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.94 3.17 3.41 3.91 5.02	1.83 2.02 2.22 2.64 3.58	75.00 98.26 124.67 187.66 359.84
RRUS 11 with A2 Module	B	From Face	0.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.94 3.17 3.41 3.91 5.02	1.83 2.02 2.22 2.64 3.58	75.00 98.26 124.67 187.66 359.84
RRUS 11 with A2 Module	C	From Face	0.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.94 3.17 3.41 3.91 5.02	1.83 2.02 2.22 2.64 3.58	75.00 98.26 124.67 187.66 359.84
RRUS 11	A	From Face	0.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	50.70 71.50 95.33 152.89 312.97
RRUS 11	B	From Face	0.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	50.70 71.50 95.33 152.89 312.97
RRUS 11	C	From Face	0.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	50.70 71.50 95.33 152.89 312.97
***									

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 lb
MF-900B	B	Grid	From	5.00	0.0000		176.00	1.33	No Ice	2.66	13.00
			Leg	0.00					1/2" Ice	1.58	21.09
				0.00					1" Ice	0.00	29.17
									2" Ice	0.00	45.35
									4" Ice	0.00	77.70
MF-900B	C	Grid	From	5.00	0.0000		176.00	1.33	No Ice	2.66	13.00
			Leg	0.00					1/2" Ice	1.58	21.09
				0.00					1" Ice	0.00	29.17
									2" Ice	0.00	45.35
									4" Ice	0.00	77.70
MF-900B	A	Grid	From	5.00	0.0000		162.00	1.33	No Ice	2.66	13.00
			Leg	0.00					1/2" Ice	1.58	21.09
				0.00					1" Ice	0.00	29.17
									2" Ice	0.00	45.35
									4" Ice	0.00	77.70
MF-900B	B	Grid	From	5.00	0.0000		100.00	1.33	No Ice	2.66	13.00
			Leg	0.00					1/2" Ice	1.58	21.09
				0.00					1" Ice	0.00	29.17
									2" Ice	0.00	45.35
									4" Ice	0.00	77.70
***											
VHLP2.5-11	A	Paraboloid w/Shroud (HP)	From	5.00	0.0000		150.00	2.92	No Ice	6.68	47.60
			Face	-2.00					1/2" Ice	7.07	80.00
				4.00					1" Ice	7.46	120.00
									2" Ice	8.23	190.00
									4" Ice	9.78	340.00
VHLP2.5-11	A	Paraboloid w/Shroud (HP)	From	5.00	0.0000		150.00	2.92	No Ice	6.68	47.60
			Face	2.00					1/2" Ice	7.07	80.00
				2.00					1" Ice	7.46	120.00
									2" Ice	8.23	190.00
									4" Ice	9.78	340.00
VHLP2.5-11	B	Paraboloid w/Shroud (HP)	From	5.00	0.0000		150.00	2.92	No Ice	6.68	47.60
			Face	2.00					1/2" Ice	7.07	80.00
				2.00					1" Ice	7.46	120.00
									2" Ice	8.23	190.00
									4" Ice	9.78	340.00
VHLP2.5-11	C	Paraboloid w/Shroud (HP)	From	5.00	0.0000		150.00	2.92	No Ice	6.68	47.60
			Face	2.00					1/2" Ice	7.07	80.00
				2.00					1" Ice	7.46	120.00
									2" Ice	8.23	190.00
									4" Ice	9.78	340.00

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice

Comb. No.	Description
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L1	176 - 130.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-23053.42	1686.98	523.21
			Max. Mx	5	-10723.48	-445632.25	-2878.87
			Max. My	2	-10740.01	2660.20	443683.29
			Max. Vy	5	18095.43	-445632.25	-2878.87
			Max. Vx	2	-17979.11	2660.20	443683.29
			Max. Torque	3			2450.25
L2	130.75 - 86.12	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-39625.44	1695.99	1684.38
			Max. Mx	5	-20721.22	-1447241.50	-9130.95
			Max. My	2	-20729.73	6430.17	1441703.72
			Max. Vy	5	27363.84	-1447241.50	-9130.95
			Max. Vx	2	-27299.93	6430.17	1441703.72
			Max. Torque	3			3440.81
L3	86.12 - 43	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-54974.25	3863.53	552.20
			Max. Mx	5	-32428.88	-2674799.57	-14232.63
			Max. My	2	-32433.25	9450.13	2666697.88
			Max. Vy	5	31251.05	-2674799.57	-14232.63
			Max. Vx	2	-31183.19	9450.13	2666697.88
			Max. Torque	4			3179.17

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L4	43 - 1	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-75980.69	5715.96	-573.05
			Max. Mx	5	-49566.69	-4295322.19	-20051.04
			Max. My	2	-49566.79	12773.94	4284078.76
			Max. Vy	5	34781.11	-4295322.19	-20051.04
			Max. Vx	2	-34715.76	12773.94	4284078.76
			Max. Torque	4			3176.82

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	14	75980.69	-1.06	-0.42
	Max. H_x	11	49588.40	34678.59	-14.63
	Max. H_z	2	49588.40	59.79	34684.88
	Max. M_x	2	4284078.76	59.79	34684.88
	Max. M_z	5	4295322.19	-34750.15	-112.33
	Max. Torsion	4	3174.52	-30090.83	17217.99
	Min. Vert	5	49588.40	-34750.15	-112.33
	Min. H_x	5	49588.40	-34750.15	-112.33
	Min. H_z	8	49588.40	-131.11	-34660.20
	Min. M_x	8	-4279888.69	-131.11	-34660.20
	Min. M_z	11	-4285744.54	34678.59	-14.63
	Min. Torsion	10	-3108.85	30076.68	-17292.27

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	49588.58	-0.00	-0.00	-127.38	858.10	0.00
Dead+Wind 0 deg - No Ice	49588.40	-59.79	-34684.88	-4284078.76	12773.84	-569.46
Dead+Wind 30 deg - No Ice	49588.57	17270.50	-30061.59	-3713155.61	-2128765.95	-3094.46
Dead+Wind 60 deg - No Ice	49588.57	30090.83	-17217.99	-2120365.84	-3718240.76	-3174.52
Dead+Wind 90 deg - No Ice	49588.40	34750.15	112.33	20051.50	-4295322.19	-2470.28
Dead+Wind 120 deg - No Ice	49588.57	30107.58	17379.17	2149427.39	-3722699.53	-2358.83
Dead+Wind 150 deg - No Ice	49588.57	17473.40	30034.57	3710094.94	-2164554.90	-1801.77
Dead+Wind 180 deg - No Ice	49588.40	131.11	34660.20	4279888.69	-22190.01	92.24
Dead+Wind 210 deg - No Ice	49588.57	-17403.96	29984.54	3700507.14	2151962.97	2806.17
Dead+Wind 240 deg - No Ice	49588.57	-30076.68	17292.27	2131903.16	3717892.70	3108.85
Dead+Wind 270 deg - No Ice	49588.40	-34678.59	14.63	-411.05	4285744.54	2422.50
Dead+Wind 300 deg - No Ice	49588.57	-30004.66	-17319.65	-2140345.03	3708439.36	2096.02
Dead+Wind 330 deg - No Ice	49588.57	-17327.97	-30035.91	-3710328.15	2143704.16	1812.14
Dead+Ice+Temp	75980.69	1.06	0.42	573.05	5715.96	-0.27
Dead+Wind 0 deg+Ice+Temp	75980.68	-33.96	-10007.60	-1307525.27	11159.35	-6.66
Dead+Wind 30 deg+Ice+Temp	75980.68	4979.80	-8655.07	-1130290.22	-644567.95	-630.17
Dead+Wind 60 deg+Ice+Temp	75980.68	8664.60	-4963.43	-646735.77	-1127249.28	-744.42
Dead+Wind 90 deg+Ice+Temp	75980.68	10005.58	22.18	4196.80	-1302717.69	-675.61
Dead+Wind 120 deg+Ice+Temp	75980.68	8676.26	5013.51	656162.52	-1129476.39	-696.11
Dead+Wind 150 deg+Ice+Temp	75980.68	5022.06	8661.85	1132574.94	-651566.72	-578.58

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
Dead+Wind 180 deg+Ice+Temp	75980.68	37.93	9992.33	1306061.80	-414.44	-139.85
Dead+Wind 210 deg+Ice+Temp	75980.68	-4998.63	8644.02	1129552.76	659491.42	554.96
Dead+Wind 240 deg+Ice+Temp	75980.68	-8675.78	4974.02	649803.93	1140781.02	749.19
Dead+Wind 270 deg+Ice+Temp	75980.68	-9992.74	-19.88	-2899.52	1312485.71	703.76
Dead+Wind 300 deg+Ice+Temp	75980.68	-8653.13	-5000.60	-653100.88	1137441.86	627.14
Dead+Wind 330 deg+Ice+Temp	75980.68	-5013.51	-8652.13	-1129849.75	662176.77	539.75
Dead+Wind 0 deg - Service	49588.55	-23.36	-13548.71	-1675717.59	5552.53	-227.00
Dead+Wind 30 deg - Service	49588.55	6745.70	-11741.78	-1452266.28	-831975.73	-1221.80
Dead+Wind 60 deg - Service	49588.55	11753.20	-6725.19	-829345.60	-1453607.59	-1249.89
Dead+Wind 90 deg - Service	49588.55	13574.21	43.88	7749.99	-1679489.95	-970.44
Dead+Wind 120 deg - Service	49588.55	11759.74	6788.14	840534.61	-1455378.76	-927.06
Dead+Wind 150 deg - Service	49588.55	6824.95	11731.22	1450897.47	-845996.12	-708.79
Dead+Wind 180 deg - Service	49588.55	51.22	13539.07	1673887.99	-8129.85	37.31
Dead+Wind 210 deg - Service	49588.55	-6797.83	11711.68	1447126.60	842164.89	1108.11
Dead+Wind 240 deg - Service	49588.55	-11747.67	6754.20	833665.68	1454585.91	1225.35
Dead+Wind 270 deg - Service	49588.55	-13546.26	5.72	-258.42	1676834.97	952.19
Dead+Wind 300 deg - Service	49588.55	-11719.53	-6764.89	-837162.70	1450884.46	822.91
Dead+Wind 330 deg - Service	49588.55	-6768.14	-11731.74	-1451166.41	838933.32	711.97

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	lb	lb	lb	lb	lb	lb	
1	0.00	-49588.58	0.00	0.00	49588.58	0.00	0.000%
2	-59.80	-49588.58	-34687.95	59.79	49588.40	34684.88	0.005%
3	17270.59	-49588.58	-30061.75	-17270.50	49588.57	30061.59	0.000%
4	30091.00	-49588.58	-17218.07	-30090.83	49588.57	17217.99	0.000%
5	34753.23	-49588.58	112.35	-34750.15	49588.40	-112.33	0.005%
6	30107.75	-49588.58	17379.26	-30107.58	49588.57	-17379.17	0.000%
7	17473.49	-49588.58	30034.74	-17473.40	49588.57	-30034.57	0.000%
8	131.13	-49588.58	34663.27	-131.11	49588.40	-34660.20	0.005%
9	-17404.05	-49588.58	29984.70	17403.96	49588.57	-29984.54	0.000%
10	-30076.84	-49588.58	17292.36	30076.68	49588.57	-17292.27	0.000%
11	-34681.67	-49588.58	14.63	34678.59	49588.40	-14.63	0.005%
12	-30004.82	-49588.58	-17319.74	30004.66	49588.57	17319.65	0.000%
13	-17328.06	-49588.58	-30036.07	17327.97	49588.57	30035.91	0.000%
14	0.00	-75980.70	0.00	-1.06	75980.69	-0.42	0.002%
15	-33.97	-75980.70	-10008.44	33.96	75980.68	10007.60	0.001%
16	4980.21	-75980.70	-8655.79	-4979.80	75980.68	8655.07	0.001%
17	8665.32	-75980.70	-4963.84	-8664.60	75980.68	4963.43	0.001%
18	10006.41	-75980.70	22.18	-10005.58	75980.68	-22.18	0.001%
19	8676.98	-75980.70	5013.93	-8676.26	75980.68	-5013.51	0.001%
20	5022.48	-75980.70	8662.57	-5022.06	75980.68	-8661.85	0.001%
21	37.93	-75980.70	9993.16	-37.93	75980.68	-9992.33	0.001%
22	-4999.05	-75980.70	8644.74	4998.63	75980.68	-8644.02	0.001%
23	-8676.51	-75980.70	4974.43	8675.78	75980.68	-4974.02	0.001%
24	-9993.58	-75980.70	-19.88	9992.74	75980.68	19.88	0.001%
25	-8653.86	-75980.70	-5001.01	8653.13	75980.68	5000.60	0.001%
26	-5013.94	-75980.70	-8652.85	5013.51	75980.68	8652.13	0.001%
27	-23.36	-49588.58	-13549.98	23.36	49588.55	13548.71	0.002%
28	6746.33	-49588.58	-11742.87	-6745.70	49588.55	11741.78	0.002%
29	11754.30	-49588.58	-6725.81	-11753.20	49588.55	6725.19	0.002%
30	13575.48	-49588.58	43.89	-13574.21	49588.55	-43.88	0.002%
31	11760.84	-49588.58	6788.77	-11759.74	49588.55	-6788.14	0.002%
32	6825.58	-49588.58	11732.32	-6824.95	49588.55	-11731.22	0.002%
33	51.22	-49588.58	13540.34	-51.22	49588.55	-13539.07	0.002%
34	-6798.46	-49588.58	11712.77	6797.83	49588.55	-11711.68	0.002%

Load Comb.	Sum of Applied Forces PX lb	PY lb	PZ lb	Sum of Reactions PX lb	PY lb	PZ lb	% Error
35	-11748.77	-49588.58	6754.83	11747.67	49588.55	-6754.20	0.002%
36	-13547.53	-49588.58	5.71	13546.26	49588.55	-5.72	0.002%
37	-11720.63	-49588.58	-6765.52	11719.53	49588.55	6764.89	0.002%
38	-6768.77	-49588.58	-11732.84	6768.14	49588.55	11731.74	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	14	0.00006634	0.00010265
3	Yes	17	0.00000001	0.00013862
4	Yes	17	0.00000001	0.00014828
5	Yes	14	0.00006631	0.00010066
6	Yes	17	0.00000001	0.00014385
7	Yes	17	0.00000001	0.00014856
8	Yes	14	0.00006635	0.00008662
9	Yes	17	0.00000001	0.00014966
10	Yes	17	0.00000001	0.00013995
11	Yes	14	0.00006633	0.00011256
12	Yes	17	0.00000001	0.00014694
13	Yes	17	0.00000001	0.00014321
14	Yes	7	0.00000001	0.00001652
15	Yes	15	0.00007768	0.00008709
16	Yes	15	0.00007751	0.00012287
17	Yes	15	0.00007751	0.00012548
18	Yes	15	0.00007767	0.00008669
19	Yes	15	0.00007749	0.00012432
20	Yes	15	0.00007748	0.00012559
21	Yes	15	0.00007765	0.00008657
22	Yes	15	0.00007748	0.00012676
23	Yes	15	0.00007749	0.00012434
24	Yes	15	0.00007767	0.00008746
25	Yes	15	0.00007751	0.00012709
26	Yes	15	0.00007751	0.00012596
27	Yes	14	0.00007024	0.00004489
28	Yes	14	0.00006996	0.00011465
29	Yes	14	0.00006996	0.00014198
30	Yes	14	0.00007024	0.00004584
31	Yes	14	0.00006996	0.00012397
32	Yes	14	0.00006995	0.00013625
33	Yes	14	0.00007024	0.00004382
34	Yes	14	0.00006995	0.00014333
35	Yes	14	0.00006996	0.00011725
36	Yes	14	0.00007025	0.00004624
37	Yes	14	0.00006997	0.00013544
38	Yes	14	0.00006996	0.00012450

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	176 - 130.75	46.808	31	2.3846	0.0058
L2	135.25 - 86.12	27.366	31	2.0457	0.0044
L3	91.87 - 43	11.892	31	1.2968	0.0020
L4	50 - 1	3.322	31	0.6242	0.0007

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
176.00	MF-900B	31	46.808	2.3846	0.0067	28992
170.00	800 10121 w/ Mount Pipe	31	43.811	2.3485	0.0065	24160
162.00	MF-900B	31	39.846	2.2973	0.0062	10353
160.00	(3) DR65-19-00DPQ w/ Mount Pipe	31	38.865	2.2834	0.0061	9059
154.00	VHLP2.5-11	31	35.955	2.2384	0.0059	6588
152.00	VHLP2.5-11	31	34.999	2.2219	0.0058	6039
150.00	APXV9TM14-ALU-I20 w/ Mount Pipe	31	34.051	2.2047	0.0057	5574
130.00	10' Dipole AF	31	25.148	1.9727	0.0046	3530
124.00	742 213V01 w/ Mount Pipe	31	22.728	1.8795	0.0042	3502
114.00	LPA-80063-6CF-EDIN-5 w/ Mount Pipe	31	18.968	1.7071	0.0035	3457
100.00	MF-900B	31	14.290	1.4473	0.0025	3387
76.00	GPS	31	7.894	1.0216	0.0014	3310
61.00	GPS	31	4.954	0.7848	0.0010	3276

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	176 - 130.75	119.425	6	6.0925	0.0148
L2	135.25 - 86.12	69.873	6	5.2268	0.0111
L3	91.87 - 43	30.389	6	3.3145	0.0051
L4	50 - 1	8.495	6	1.5961	0.0019

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
176.00	MF-900B	6	119.425	6.0925	0.0171	11603
170.00	800 10121 w/ Mount Pipe	6	111.788	6.0004	0.0166	9669
162.00	MF-900B	6	101.684	5.8694	0.0158	4142
160.00	(3) DR65-19-00DPQ w/ Mount Pipe	6	99.183	5.8341	0.0156	3624
154.00	VHLP2.5-11	6	91.768	5.7190	0.0150	2634
152.00	VHLP2.5-11	6	89.331	5.6770	0.0147	2414
150.00	APXV9TM14-ALU-I20 w/ Mount Pipe	6	86.914	5.6330	0.0145	2228

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	10' Dipole AF	6	64.216	5.0405	0.0117	1405
124.00	742 213V01 w/ Mount Pipe	6	58.043	4.8026	0.0106	1391
114.00	LPA-80063-6CF-EDIN-5 w/ Mount Pipe	6	48.452	4.3623	0.0088	1368
100.00	MF-900B	6	36.513	3.6989	0.0065	1338
76.00	GPS	6	20.177	2.6116	0.0036	1302
61.00	GPS	6	12.666	2.0064	0.0025	1285

Base Plate Design Data

Plate Thickness in	Number of Anchor Bolts	Anchor Bolt Size in	Actual / Allowable Ratio Bolt Tension lb	Actual / Allowable Ratio Bolt Compression lb	Actual / Allowable Ratio Plate Stress ksi	Actual / Allowable Ratio Stiffener Stress ksi	Controlling Condition	Ratio
2.0000	18	2.2500	158517.13 131210.58 1.21	164024.56 217809.56 0.75	41.679 45.000 0.93	28.968 45.000 0.64	Bolt T	1.21 ✔

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
L1	176 - 130.75 (1)	TP31.8x21x0.25	45.25	0.00	0.0	39.000	24.1827	-10718.00	943125.00	0.011
L2	130.75 - 86.12 (2)	TP41.82x30.226x0.3125	49.13	0.00	0.0	39.000	39.8244	-20718.60	1553150.00	0.013
L3	86.12 - 43 (3)	TP51.36x39.8381x0.375	48.87	0.00	0.0	39.000	58.7205	-32427.80	2290100.00	0.014
L4	43 - 1 (4)	TP60.5x48.9596x0.4375	49.00	0.00	0.0	39.000	83.4043	-49566.80	3252770.00	0.015

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	176 - 130.75 (1)	TP31.8x21x0.25	446309.17	29.460	39.000	0.755	0.00	0.000	39.000	0.000
L2	130.75 - 86.12 (2)	TP41.82x30.226x0.3125	1448983.33	44.065	39.000	1.130	0.00	0.000	39.000	0.000
L3	86.12 - 43 (3)	TP51.36x39.8381x0.375	2677333.33	44.932	39.000	1.152	0.00	0.000	39.000	0.000
L4	43 - 1 (4)	TP60.5x48.9596x0.4375	4298666.67	41.706	39.000	1.069	0.00	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V lb	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T lb-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	176 - 130.75 (1)	TP31.8x21x0.25	18141.30	0.750	26.000	0.058	1276.53	0.041	26.000	0.002
L2	130.75 - 86.12 (2)	TP41.82x30.226x0.3125	27385.90	0.688	26.000	0.053	2283.65	0.034	26.000	0.001
L3	86.12 - 43 (3)	TP51.36x39.8381x0.375	31265.40	0.532	26.000	0.041	2472.96	0.020	26.000	0.001
L4	43 - 1 (4)	TP60.5x48.9596x0.4375	34794.50	0.417	26.000	0.032	2363.22	0.011	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	176 - 130.75 (1)	0.011	0.755	0.000	0.058	0.002	0.768 ✔	1.333	H1-3+VT ✔
L2	130.75 - 86.12 (2)	0.013	1.130	0.000	0.053	0.001	1.144 ✔	1.333	H1-3+VT ✔
L3	86.12 - 43 (3)	0.014	1.152	0.000	0.041	0.001	1.167 ✔	1.333	H1-3+VT ✔
L4	43 - 1 (4)	0.015	1.069	0.000	0.032	0.000	1.085 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
L1	176 - 130.75	Pole	TP31.8x21x0.25	1	-10718.00	1257185.57	57.6	Pass
L2	130.75 - 86.12	Pole	TP41.82x30.226x0.3125	2	-20718.60	2070348.86	85.8	Pass
L3	86.12 - 43	Pole	TP51.36x39.8381x0.375	3	-32427.80	3052703.17	87.5	Pass
L4	43 - 1	Pole	TP60.5x48.9596x0.4375	4	-49566.80	4335942.23	81.4	Pass
							Summary	
						Pole (L3)	87.5	Pass
						Base Plate	90.6	Pass
						RATING =	**90.6**	**Pass**

PROJECT INFORMATION

SCOPE OF WORK:
- REMOVE (1) ANTENNA PER SECTOR (TOTAL OF 3 ANTENNAS)
- INSTALL (1) ANTENNA PER SECTOR (TOTAL OF 3 NEW ANTENNAS)
- ADD (1) RRH PER SECTOR (TOTAL OF 3 NEW RRHs)
- ADD (1) A-2 MODULE PER SECTOR (TOTAL OF 3 NEW A-2 MODULES)
- UPGRADE DUL WITH NEW DUS

SITE ADDRESS:	1657 WILBUR CROSS HIGHWAY KENSINGTON, CT 06037
LATITUDE:	41.6062919 41° 36' 22.65"N
LONGITUDE:	-72.7495989 72° 44' 58.55"W
USID:	25972
TOWER OWNER:	TBD
TYPE OF SITE:	MONOPOLE/OUTDOOR EQUIPMENT
TOWER HEIGHT:	176-0"±
RAD CENTER:	170'-0"±
CURRENT USE:	UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY
PROPOSED USE:	UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY

at&t MOBILITY

FA CODE: 10070926
SITE NUMBER: CT5375
SITE NAME: BERLIN E CENTRAL

PROJECT TEAM

CLIENT REPRESENTATIVE
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-639-4908
EMAIL: dcooper@empiretelecomm.com

SITE ACQUISITION:
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-639-4908
EMAIL: dcooper@empiretelecomm.com

ZONING:
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-639-4908
EMAIL: dcooper@empiretelecomm.com

ENGINEERING:
COMPANY: COM-EX CONSULTANTS, LLC
ADDRESS: 115 ROUTE 46, SUITE E39, MOUNTAIN LAKES, NJ 07046
CONTACT: NICHOLAS D. BARILE, P.E.
PHONE: 862-209-4300
EMAIL: nbarile@comexconsultants.com

RF ENGINEER:
COMPANY: AT&T MOBILITY - NEW ENGLAND
ADDRESS: 550 COCHITUATE ROAD, SUITE 550 13 & 14, FRAMINGHAM, MA 01701
CONTACT: CAMERON SYME
PHONE: 508-596-7146
EMAIL: cs6970@att.com

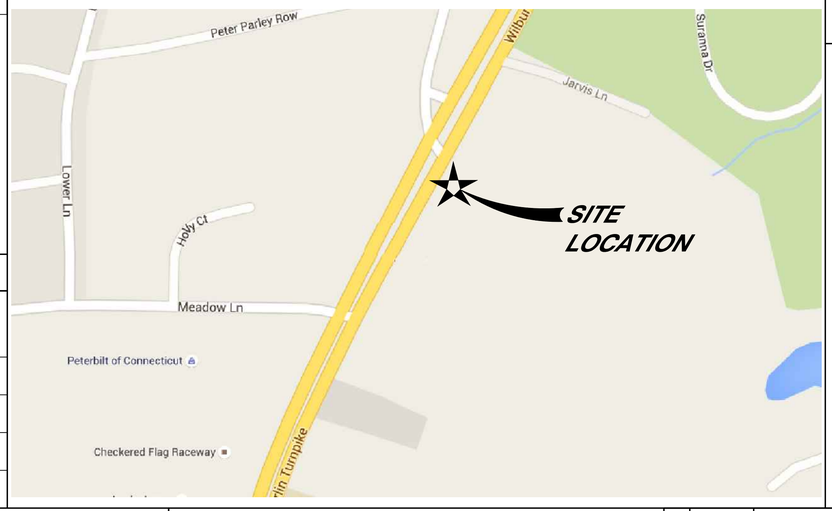
CONSTRUCTION MANAGEMENT:
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: GRZEGORZ "GREG" DORMAN
PHONE: 484-683-1750
EMAIL: gdorman@empiretelecomm.com

DRAWING INDEX

		REV.
T-1	TITLE SHEET	0
GN-1	GROUNDING & GENERAL NOTES	0
A-1	COMPOUND LAYOUTS	0
A-2	EQUIPMENT LAYOUTS	0
A-3	ANTENNA LAYOUTS & ELEVATIONS	0
A-4	DETAILS	0
A-5	ANTENNA MOUNTING DETAILS	0
G-1	GROUNDING DETAILS	0

VICINITY MAP

FROM ROCKY HILL, HEAD SOUTHWEST ON CONCRIB LN. TURN LEFT ONTO SOLO DR. TURN RIGHT ONTO GILBERT AVE. TURN RIGHT ONTO STATE HWY 411. TURN LEFT TO MERGE ONTO I-91 S. TAKE EXIT 22N TO MERGE ONTO CT-9 N. TAKE EXIT 21 FOR CT-372. TURN LEFT ONTO CT-372 E. TURN RIGHT ONTO MIDDLETOWN RD. TURN LEFT ONTO US-5 S. SLIGHT RIGHT ONTO ORCHARD RD. TURN LEFT TO STAY ON ORCHARD RD. TURN LEFT ONTO US-5 N. SITE WILL BE ON RIGHT.



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 REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

APPROVALS

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE SUBCONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN, ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AMD MAY IMPOSE CHANGES OR SITE MODIFICATIONS.

DISCIPLINE:	NAME:	DATE:
SITE ACQUISITION:		
CONSTRUCTION MANAGER:		
AT&T PROJECT MANAGER:		

CONNECTICUT ONE CALL SYSTEM, INC. 1-800-922-4455 STOP - CALL BEFORE YOU DIG!

CONNECTICUT LAW REQUIRES TWO WORKING DAYS NOTICE PRIOR TO ANY EARTH MOVING ACTIVITIES BY CALLING 800-922-4455 OR DIAL 811

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
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SITE NUMBER: CTV5375
SITE NAME: BERLIN E CENTRAL
1657 WILBUR CROSS HIGHWAY
KENSINGTON, CT 06037
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	02/12/16	ISSUED AS FINAL	KCD	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: JW | DRAWN BY: JW

SEAL: STATE OF CONNECTICUT, DOUGLAS D. BARILE, 28643, PROFESSIONAL ENGINEER, CT

AT&T

DRAWING TITLE: TITLE SHEET

JOB NUMBER	DRAWING NUMBER	REV
15163-EMP	T-1	0

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. TESTS SHALL BE PERFORMED IN ACCORDANCE WITH 25471-000-3PS-EG00-0001, DESIGN & TESTING OF FACILITY GROUNDING FOR CELL SITES.

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 WITH STAINLESS STEEL HARDWARE TO THE BRIDGE AND THE TOWER 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 AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

12. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.

13. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF ANSI/TIA 222. FOR TOWERS BEING BUILT TO REV-G OF THE STANDARD, THE WIRE SIZE OF THE BURIED GROUND RING AND CONNECTIONS BETWEEN THE TOWER AND THE BURIED GROUND RING SHALL BE CHANGED FROM 2 AWG TO 2/0 AWG. IN ADDITION, THE MINIMUM LENGTH OF THE GROUND RODS SHALL BE INCREASED FROM EIGHT FEET (8') TO TEN FEET (10').

14. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE ½" OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID TINNED COPPER GROUND WIRE, PER NEC 250.50.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR – EMPIRE TELECOM
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – AT&T MOBILITY
   OEM – ORIGINAL EQUIPMENT MANUFACTURER

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. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

7. 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.

8. 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. ROUTING OF TRENCHING SHALL BE APPROVED BY CONTRACTOR

9. 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.

10. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OFF 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.

11. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

12. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

13. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS UNLESS OTHERWISE SPECIFIED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

14. 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). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCH UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

15. CONSTRUCTION SHALL COMPLY WITH SPECIFICATION 25741-000-3APS-A00Z-00002, "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."

16. 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.

17. 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 MAY NEED TO BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

18. SINCE THE CELL SITE MAY BE 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 REQUIRED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

19. 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.
   - INTERNATIONAL BUILDING CODE: IBC 2009 WITH LOCAL & COUNTY AMENDMENTS
   - NATIONAL ELECTRICAL CODE: NEC 2011 WITH LOCAL & COUNTY AMENDMENTS
   - FIRE/LIFE SAFETY CODE: NFPA-101 2009 WITH LOCAL & COUNTY AMENDMENTS

20. 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, THIRTEENTH EDITION
   - AMERICAN SOCIETY OF TESTING OF MATERIALS, ASTM
   - TELECOMMUNICATIONS INDUSTRY ASSOCIATION (ANSI/TIA-222-G-1), STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:
   - TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS
   - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, OSHA
   - INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVELY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT
   - TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS

21. 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.

23. INFORMATION SHOWN ON THIS SET OF PLANS TAKEN FROM DRAWINGS PREPARED BY HUDSON DESIGN GROUP FOR A RECENT UPGRADE DATED 08/15/2012. CONTRACTOR TO NOTIFY DESIGN ENGINEER OF ANY DISCREPANCIES PRIOR TO COMMENCEMENT OF CONSTRUCTION.

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CTV5375

SITE NAME: BERLIN E CENTRAL

1657 WILBUR CROSS HIGHWAY
KENSINGTON, CT 06037
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	02/12/16	ISSUED AS FINAL	KCD	NDB	NDB

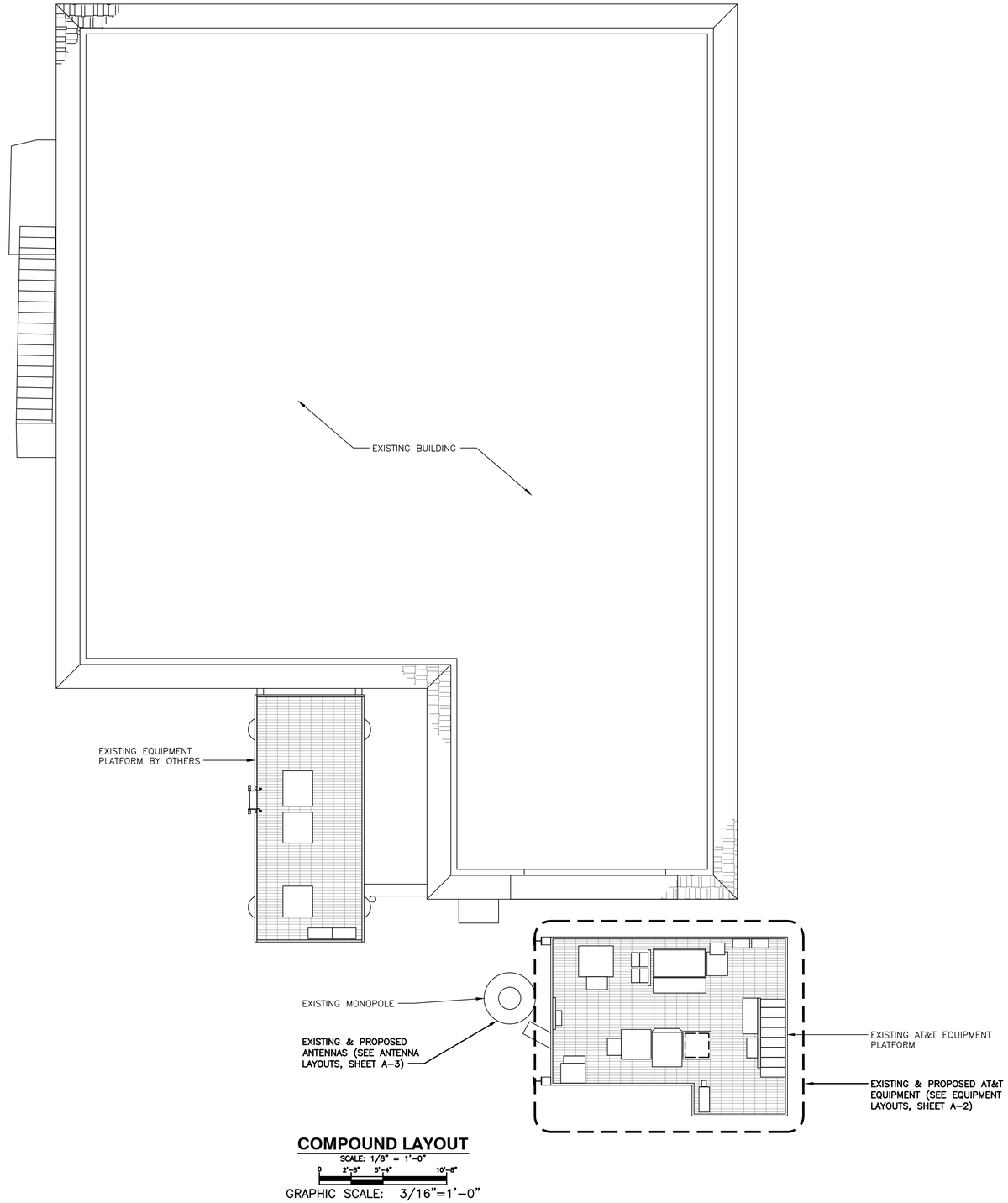
SCALE: AS SHOWN | DESIGNED BY: JW | DRAWN BY: JW

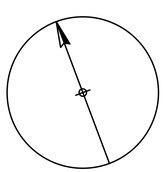
SEAL:
STATE OF CONNECTICUT
DOUGLAS G. BALL
LICENSE NUMBER
PROFESSIONAL ENGINEER
CT 20643

AT&T

DRAWING TITLE:
GROUNDING NOTES & GENERAL NOTES

JOB NUMBER	DRAWING NUMBER	REV
15163-EMP	GN-1	0





NORTH

COMPOUND LAYOUT

SCALE: 1/8" = 1'-0"

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

GRAPHIC SCALE: 3/16"=1'-0"

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

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NO.	DATE	REVISIONS	BY	CHK	APP'D
0	02/12/16	ISSUED AS FINAL	KCD	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: JW | DRAWN BY: JW

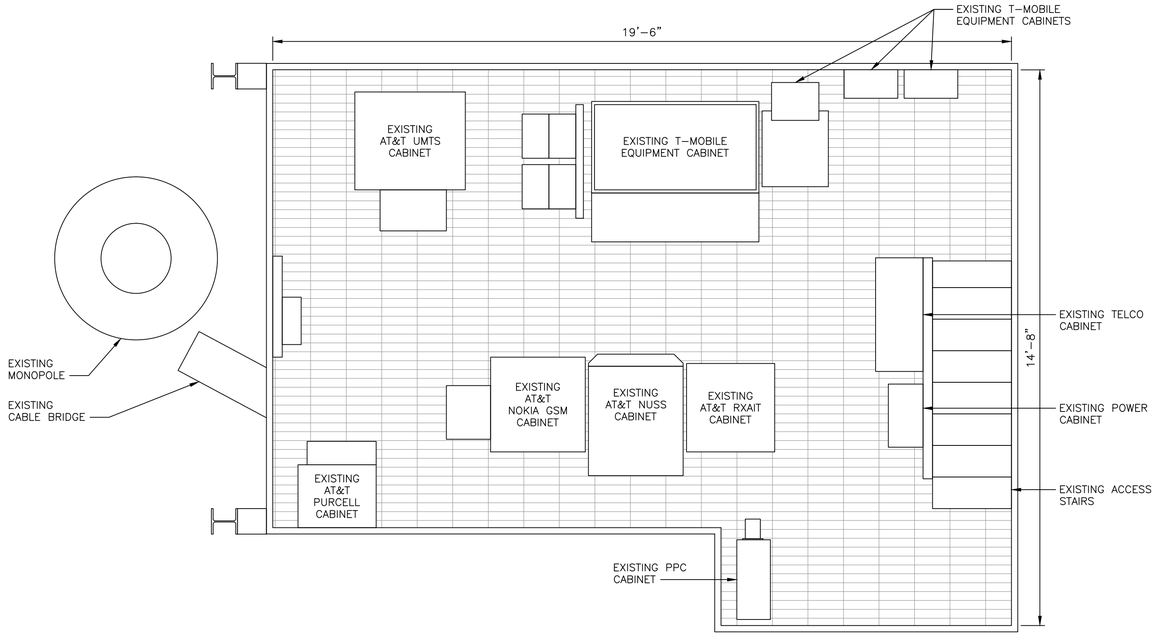
SEAL:

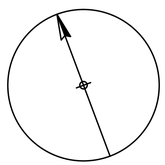
STATE OF CONNECTICUT
THOMAS B. BASSETT
No. 28643
REGISTERED
PROFESSIONAL ENGINEER
THOMAS B. BASSETT
PROFESSIONAL ENGINEER
CT LICENSE NO. 28643

AT&T

DRAWING TITLE: COMPOUND LAYOUT

JOB NUMBER	DRAWING NUMBER	REV
15163-EMP	A-1	0



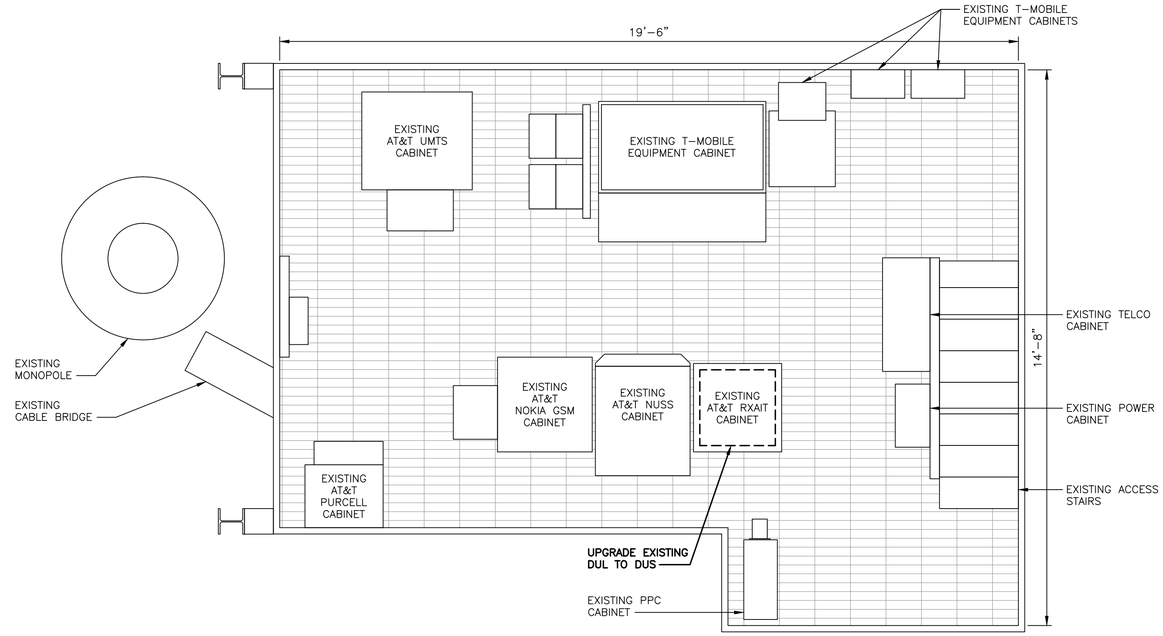


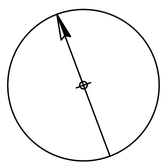
EXISTING EQUIPMENT LAYOUT

SCALE: 1/2" = 2'-0"

0 1 2 4

GRAPHIC SCALE: 1/2"=1'-0"





PROPOSED EQUIPMENT LAYOUT

SCALE: 1/2" = 2'-0"

0 1 2 4

GRAPHIC SCALE: 1/2"=1'-0"

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CTV5375

SITE NAME: BERLIN E CENTRAL

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HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
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NO.	DATE	REVISIONS	BY	CHK	APP'D
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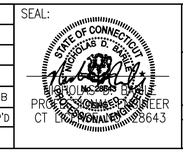
SCALE: AS SHOWN | DESIGNED BY: JW | DRAWN BY: JW

SEAL:

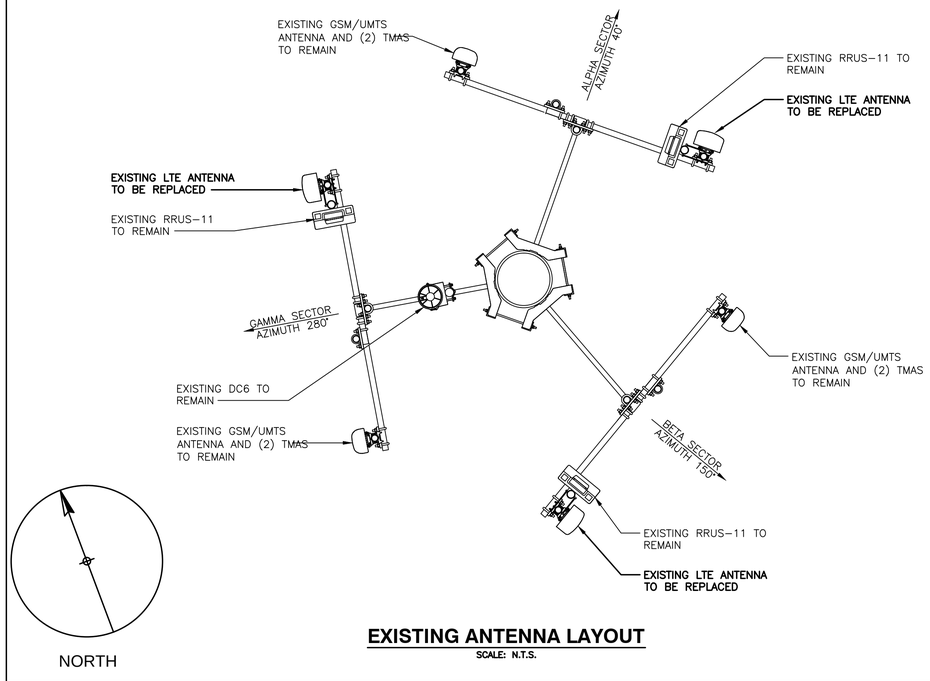


PROFESSIONAL ENGINEER
CT LICENSE NO. 28643

AT&T

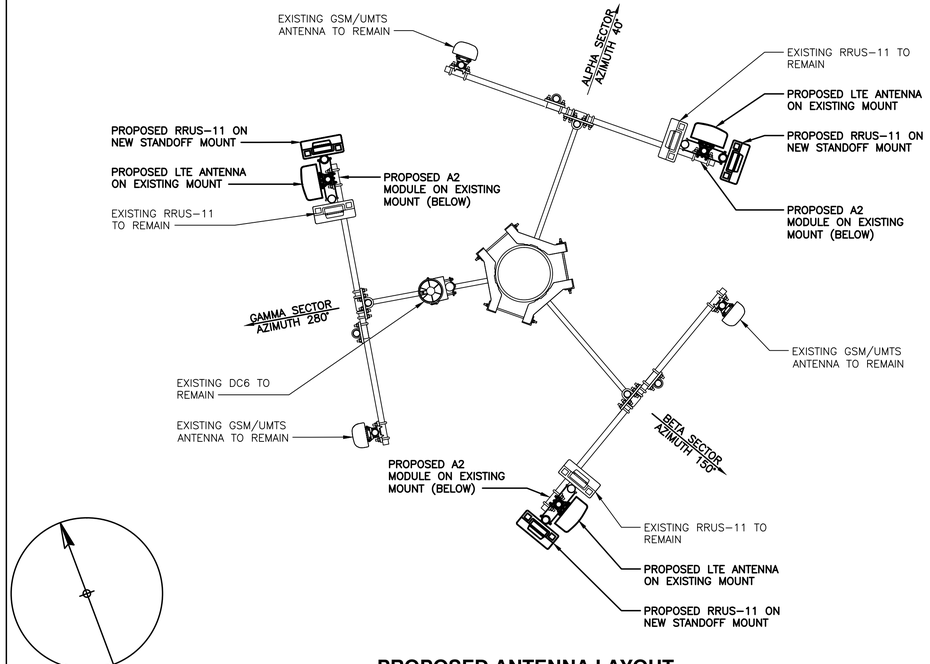
DRAWING TITLE:
EQUIPMENT LAYOUTS

JOB NUMBER	DRAWING NUMBER	REV
15163-EMP	A-2	0



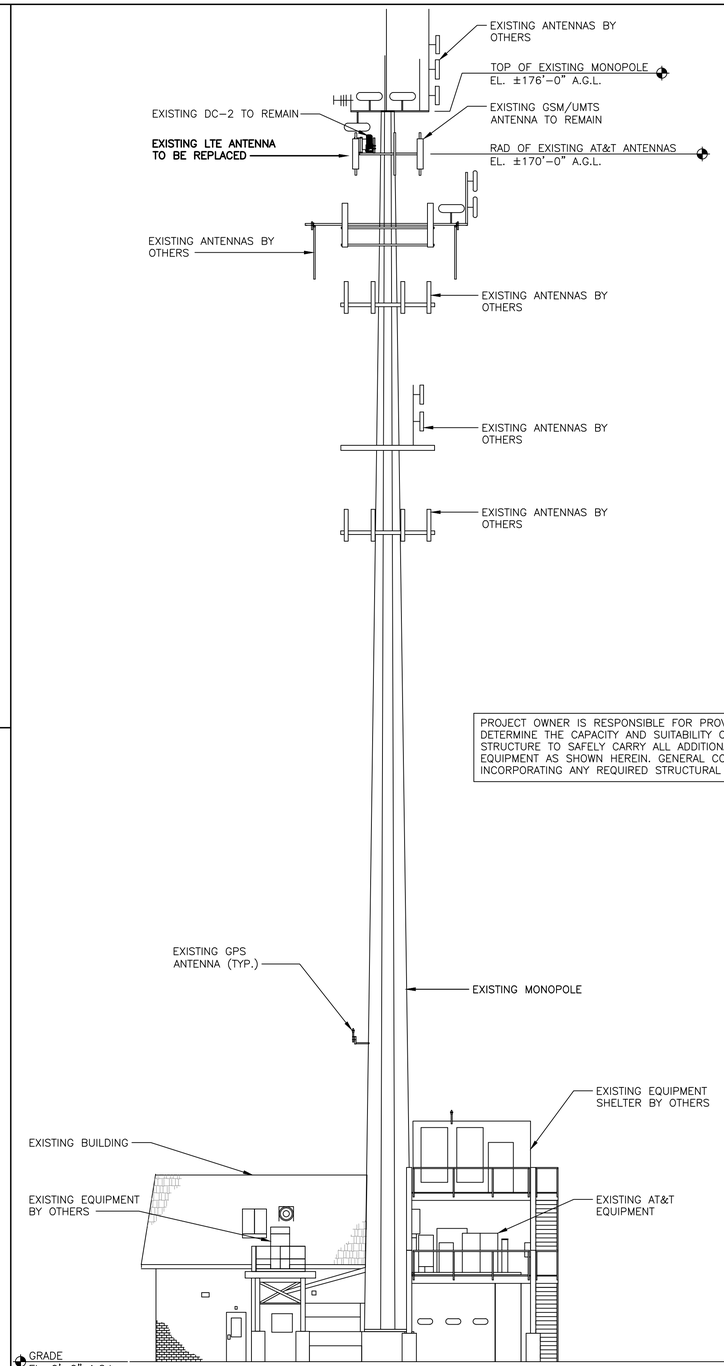
EXISTING ANTENNA LAYOUT

SCALE: N.T.S.



PROPOSED ANTENNA LAYOUT

SCALE: N.T.S.

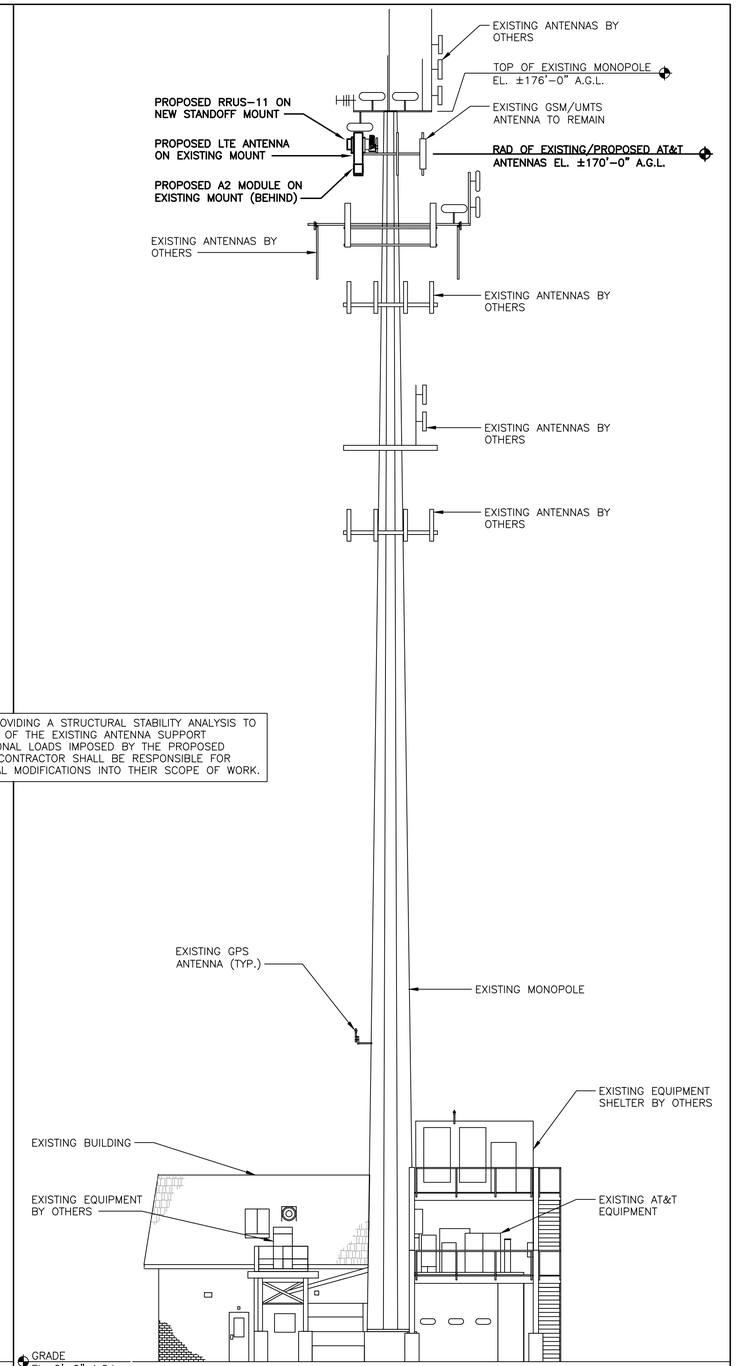


EXISTING TOWER ELEVATION

SCALE: 3/32" = 1'-0"

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

GRAPHIC SCALE: 3/32"=1'-0"



PROPOSED TOWER ELEVATION

SCALE: 3/32" = 1'-0"

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

GRAPHIC SCALE: 3/32"=1'-0"

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SCALE: AS SHOWN | DESIGNED BY: JW | DRAWN BY: JW

SEAL:

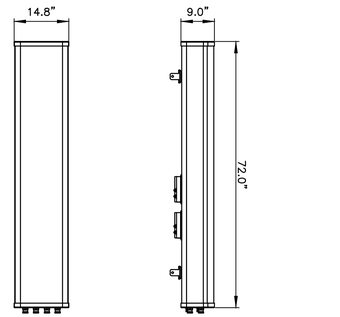
STATE OF CONNECTICUT — NICHOLAS B. BASILE — No. 28643 — REGISTERED PROFESSIONAL ENGINEER

PROFESSIONAL ENGINEER
CT LICENSE NO. 28643

AT&T

DRAWING TITLE:
ANTENNA LAYOUTS & ELEVATIONS

JOB NUMBER	DRAWING NUMBER	REV
15163-EMP	A-3	0



FRONT VIEW

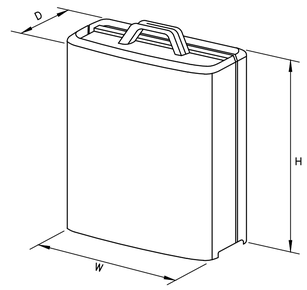
SIDE VIEW

BOTTOM VIEW

MANUFACTURER	CCI
MODEL	HPA-65R-BUU-H6
WEIGHT	42.9 LBS

LTE ANTENNA DETAIL

SCALE: N.T.S.



MODEL	L x W x H	WEIGHT
* RRUS-11	19.69" x 16.97" x 7.17"	50.7 LBS

* DENOTES EXISTING

RRUS DETAIL

SCALE: N.T.S.

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SEAL:

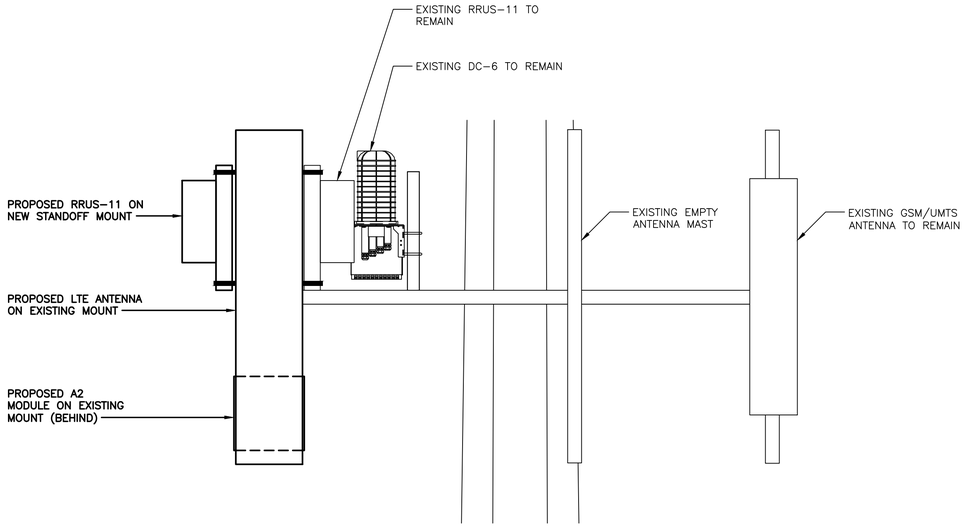
PROFESSIONAL ENGINEER
CT LICENSE NO. 28643

AT&T

DRAWING TITLE:

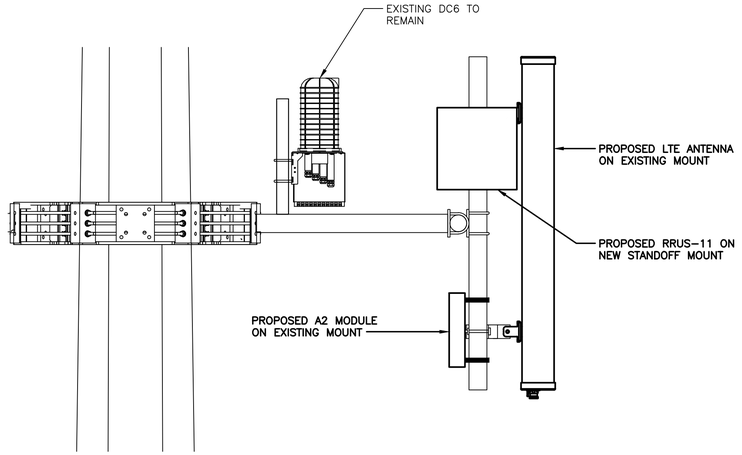
DETAILS

JOB NUMBER	DRAWING NUMBER	REV
15163-EMP	A-4	0



PROPOSED ANTENNA MOUNTING DETAIL (FRONT VIEW)

SCALE: N.T.S.



PROPOSED ANTENNA MOUNTING DETAIL (SIDE VIEW)

SCALE: N.T.S.

EXISTING ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	KATHREIN	800–10121	54.5”x10.3”x5.9”
	A2	–	–	–
	A3	KMW	AM–X–CD–65–00T–RET	72”x11.8”x5.9”
BETA	B1	KATHREIN	800–10121	54.5”x10.3”x5.9”
	B2	–	–	–
	B3	KMW	AM–X–CD–65–00T–RET	72”x11.8”x5.9”
GAMMA	C1	KATHREIN	800–10121	54.5”x10.3”x5.9”
	C2	–	–	–
	C3	KMW	AM–X–CD–65–00T–RET	72”x11.8”x5.9”

FINAL ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	KATHREIN	800–10121	54.5”x10.3”x5.9”
	A2	–	–	–
	A3	**CCI**	**HPA–65R–BUU–H6**	**72.3”x14.8”x9”**
BETA	B1	KATHREIN	800–10121	54.5”x10.3”x5.9”
	B2	–	–	–
	B3	**CCI**	**HPA–65R–BUU–H6**	**72.3”x14.8”x9”**
GAMMA	C1	KATHREIN	800–10121	54.5”x10.3”x5.9”
	C2	–	–	–
	C3	**CCI**	**HPA–65R–BUU–H6**	**72.3”x14.8”x9”**

PROPOSED RRU SCHEDULE

SECTOR	MAKE	MODEL	SIZE (INCHES)	ADDITIONAL COMPONENT	SIZE (INCHES)
ALPHA	ERICSSON	RRUS–11 (EXISTING)	19.7”x16.9”x7.2”		
	ERICSSON	**RRUS–11**	**19.7”x16.9”x7.2”**	**ERICSSON A2 MODULE**	**16.4”x15.2”x3.4”**
BETA	ERICSSON	RRUS–11 (EXISTING)	19.7”x16.9”x7.2”		
	ERICSSON	**RRUS–11**	**19.7”x16.9”x7.2”**	**ERICSSON A2 MODULE**	**16.4”x15.2”x3.4”**
GAMMA	ERICSSON	RRUS–11 (EXISTING)	19.7”x16.9”x7.2”		
	ERICSSON	**RRUS–11**	**19.7”x16.9”x7.2”**	**ERICSSON A2 MODULE**	**16.4”x15.2”x3.4”**

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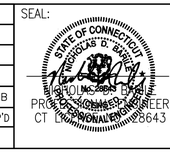
SCALE: AS SHOWN | DESIGNED BY: JW | DRAWN BY: JW

SEAL:



AT&T

DRAWING TITLE:
ANTENNA MOUNTING DETAILS

JOB NUMBER	DRAWING NUMBER	REV
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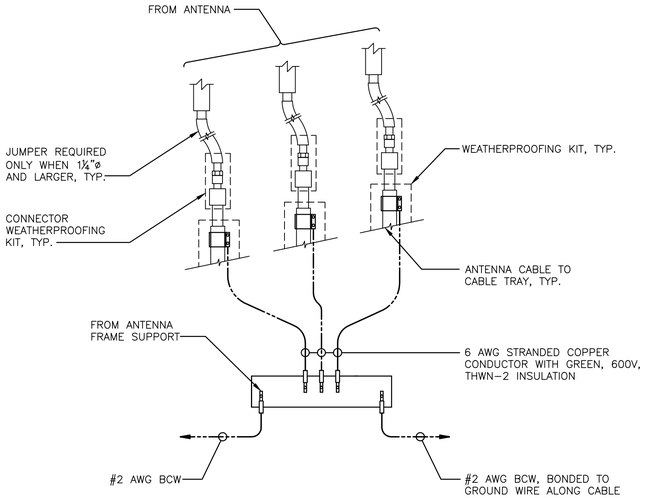
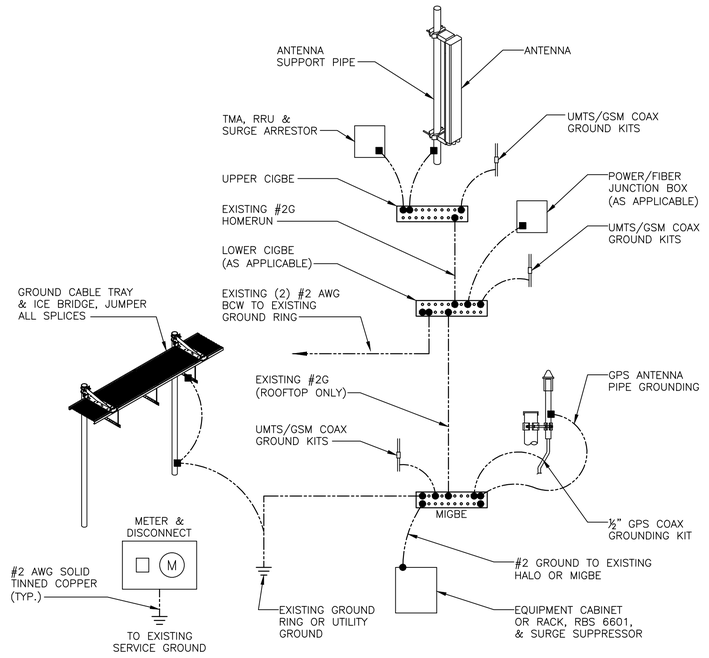


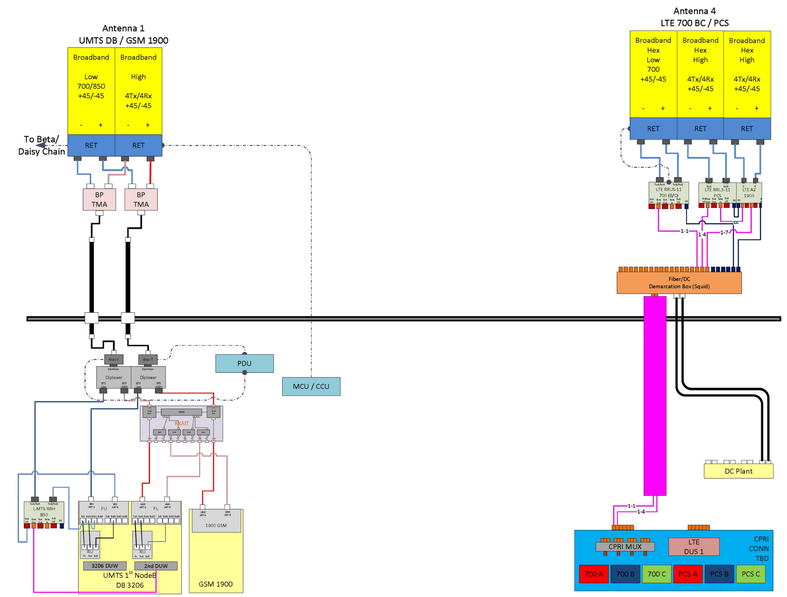
GROUND WIRE TO GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.



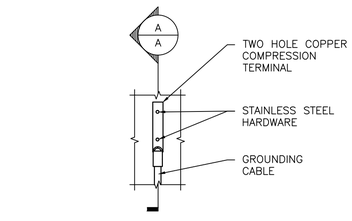
GROUNDING RISER DIAGRAM

SCALE: N.T.S.

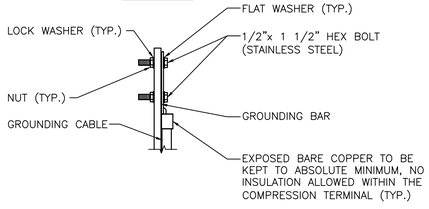


TYPICAL PLUMBING DIAGRAM (PER SECTOR)

SCALE: N.T.S.



ELEVATION



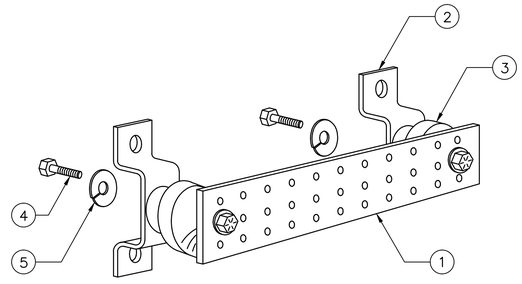
SECTION "A–A"

NOTE:

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

TYPICAL GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.



ITEM NO.	QTY.	DESCRIPTION
1	1	SOLID GROUND BAR (20"x 4"x ¼")
2	2	WALL MOUNTING BRACKET
3	2	INSULATORS
4	4	⅝"–11x1" H.H.C.S.
5	4	⅝" LOCK WASHER

NOTES:

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

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

SECTION "A" – SURGE ABSORBERS
- INTERIOR GROUND RING (#2)
- EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
- METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
- BUILDING STEEL (IF AVAILABLE) (#2)

GROUND BAR DETAIL

SCALE: N.T.S.

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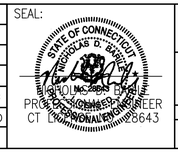

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DRAWING TITLE:

GROUNDING DETAILS

JOB NUMBER	DRAWING NUMBER	REV
15163–EMP	G–1	0