Centek Engineering, Inc.
3-2 North Branford Road
Branford, Connecticut 06405
Phone: (203) 488-0580
Fax: (203) 488-8587

Steven L. Levine
Real Estate Consultant

HAND DELIVERED

July 20, 2015

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

Re: Resubmittal: EM-CING-130-140508 – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 1432 Old Waterbury Road, Southbury, Connecticut.

Dear Ms. Bachman:

In order to accommodate technological changes, implement Uniform Mobile Telecommunications System ("UMTS") and/or Long Term Evolution ("LTE") capabilities, and enhance system performance in the State of Connecticut, New Cingular Wireless PCS, LLC ("AT&T") plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, copies of this letter are being sent to the chief elected official of the municipality in which the affected cell site is located, the property owner of record, and the tower owner or operator.

UMTS technology offers services to mobile computer and phone users anywhere in the world. Based on the Global System for Mobile ("GSM") communication standard, UMTS is the planned worldwide standard for mobile users. UMTS, fully implemented, gives computer and phone users high-speed access to the Internet as they travel. They have the same capabilities even when they roam, through both terrestrial wireless and satellite transmissions.

LTE is a high-performance air interface for cellular mobile communications. It is designed to increase the capacity and speed of mobile telephone networks.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in AT&T's operations at the site. Also included is documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration.

The changes to the facility do not constitute modifications as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical and environmental characteristics of the site will not be significantly changed or altered. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. The height of the overall structure will not increase.

2. The proposed changes will not extend the site boundaries.

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

4. The changes will not add radio frequency sending or receiving capability which increases the total radio frequency electromagnetic radiation power density measured at the site boundary to or above the standards adopted by the Federal Communications Commission pursuant to Section 704 of the Telecommunications Act of 1996, as amended, and the State Department of Energy and Environmental Protection, pursuant to Section 22a-162 of the Connecticut General Statutes.

5. The proposed changes will not impair the structural integrity of the facility, as determined in a certification provided by a professional engineer licensed in Connecticut.

For the foregoing reasons, AT&T respectfully submits that the proposed changes at the referenced site constitute exempt modifications under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me at (860) 830-0380 with questions concerning this matter. Thank you for your consideration.

Sincerely,

Steven L. Levine
Real Estate Consultant

cc: TownCEO – 1st Selectman Ed Edelson, Town of Southbury
Land Owners of Record – Crown Castle (by email); Richard & Adele Dilley;
Nancy Knapp; Verizon Wireless (by email);
LMB Holdings LLC; PQ Operations LLC;
Volpe Builders INC
Tower Owner / Operator – Crown Castle (by email)

Attachments

NEW CINGULAR WIRELESS PCS, LLC
Equipment Modification

1432 Old Waterbury Road, Southbury, CT
Site Number 2087
Prior Decisions: D88; EM's 6/99, 8/02, 3/03, 8/03, 7/07, 5/12

Background Note: **Resubmittal: EM-CING-130-140508**

New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 1432 Old Waterbury Road, Southbury, Connecticut.

The original May 8, 2014 submission was placed on hold on May 20, 2014 pending re-design of the proposed equipment modification. This re-submittal removes the Notice from hold status.

Tower Owner/Manager: Crown Castle

Land Owner of Record: Industrial condominium consisting of seven entities. See cover letter cc's for details.

Lease Area: The Council approved an overall lease area of 50 ft x 70 ft for the Southbury site in Docket 88. The existing fenced compound, the tower, and all existing cellular equipment lie within the approved limits. Since all proposed equipment modifications will occur either on the existing tower structure or within AT&T's existing equipment shelter, the proposed modifications will not extend either AT&T's lease area or the overall site boundaries. (See the attached excerpt from the Docket 88 D&M Plan.)

Equipment configuration: Monopole

Current and/or approved:
Antenna mounting platform at 193 ft agl
Six KMW AM-X-CD-16-65-00T-RET antennas @ 195 ft c.l.
Three Kathrein 80010121 antennas @ 195 ft c.l.
Six CCI DTMABP7819VG12A TMA's @ 195 ft
One Raycap DC6-48-60-18-8F surge arrestor @ 195 ft
Six RRUS-11 remote radio heads @ 195 ft
Twelve lines 1¼ inch coax
One fiber cable and two DC control cables
Equipment shelter

Proposed modifications:
Replace missing threaded rod on existing ring mount.
Remove three KMW AM-X-CD-16-65-00T-RET antennas.
Install three CCI OPA-65R-LCUU-H6 antennas @ 195 ft c.l.
Install three RRUS-12 remote radio heads and three A2 modules @ 195 ft.
Remove abandoned SNET mount and equipment @ 185 ft.
Remove abandonded Nextel mount and equipment @ 220 ft.

Power Density:

Calculations for AT&T's current operations at the site indicate a radio frequency electromagnetic radiation power density, measured at the tower base, of approximately 25 % of the standard adopted by the FCC. As depicted in the second table below, the total radio frequency electromagnetic radiation power density for AT&T's planned operations would be approximately 18.7 % of the standard.

Existing

Company	Centerline Ht (feet)	Frequency (MHz)	Number of Channels	Power Per Channel (Watts)	Power Density (mW/cm^2)	Standard Limits (mW/cm^2)	Percent of Limit
Other Users *							14.59
AT&T UMTS *	195	880 - 894	2	565	0.0107	0.5867	1.82
AT&T UMTS *	195	1900 Band	2	1077	0.0204	1.0000	2.04
AT&T GSM *	195	880 - 894	1	491	0.0046	0.5867	0.79
AT&T GSM *	195	1900 Band	4	813	0.0308	1.0000	3.08
AT&T LTE *	195	700 Band	1	1313	0.0124	0.4667	2.66
Total							**25.0%**

***** Per CSC records

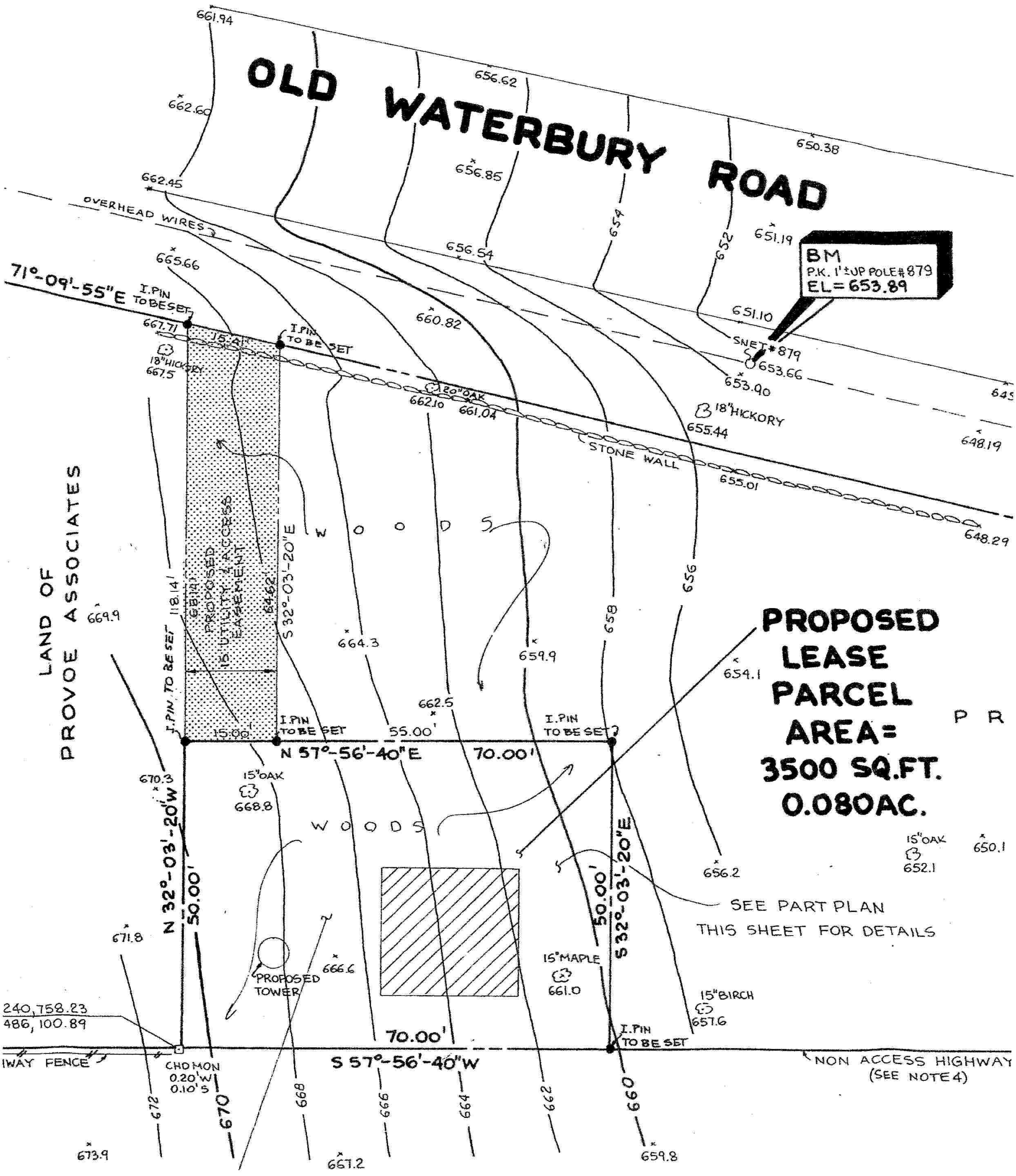
Proposed

Company	Centerline Ht (feet)	Frequency (MHz)	Number of Channels	Power Per Channel (Watts)	Power Density (mW/cm^2)	Standard Limits (mW/cm^2)	Percent of Limit
Other Users *							14.59
AT&T LTE	195	700 Band	1	500	0.0047	0.4667	1.01
AT&T LTE	195	1900 Band	1	500	0.0047	1.0000	0.47
AT&T UMTS	195	880 - 894	1	500	0.0047	0.5867	0.81
AT&T UMTS	195	1900 Band	2	500	0.0095	1.0000	0.95
AT&T GSM	195	880 - 894	1	296	0.0028	0.5867	0.48
AT&T GSM	195	1900 Band	1	427	0.0040	1.0000	0.40
Total							**18.7%**

***** Per CSC records

Structural information:

The attached structural analysis demonstrates that the tower has sufficient structural capacity to accommodate the proposed equipment modifications. (AeroSolutions LLC, 7/14/15)



OLD WATERBURY ROAD
OVERHEAD WIRES
BM
P.K. 1'±UP POLE#879
EL=653.89
SNET #879
71°-09'-55"E
I.PIN TO BE SET
18"HICKORY
20"OAK
STONE WALL
WOODS
LAND OF PROVOE ASSOCIATES
PROPOSED 15' UTILITY & ACCESS EASEMENT
S 32°-03'-20"E
N 57°-56'-40"E
70.00'
55.00'
15.00'
15.41'
118.14'
68.14'
64.62'
PROPOSED LEASE PARCEL AREA= 3500 SQ.FT. 0.080AC.
15"OAK
N 32°-03'-20"W
50.00'
PROPOSED TOWER
15"MAPLE
15"BIRCH
SEE PART PLAN THIS SHEET FOR DETAILS
240,758.23
486,100.89
CHD MON 0.20'W 0.10'S
S 57°-56'-40"W
IWAY FENCE
NON ACCESS HIGHWAY (SEE NOTE 4)

SITE NAME: PRESTON HILL
SITE NUMBER: CT2087
1432 OLD WATERBURY ROAD
SOUTHBURY, CT 06488
NEW HAVEN COUNTY

FROM ROCKY HILL, CT:

HEAD NORTHEAST ON ENTERPRISE DRIVE TOWARD CAPITAL BOULEVARD. TURN LEFT ONTO CAPITAL BOULEVARD. TURN LEFT ONTO WEST STREET. TURN LEFT TO MERGE ONTO I-91 SOUTH. MERGE ONTO I-91 SOUTH. TAKE EXIT 18 TO MERGE ONTO I691 WEST TOWARD WATERBURY/DANBURY. MERGE ONTO I-84. TAKE EXIT 16 FOR CT-188 TOWARD SOUTHBURY. TURN RIGHT ONTO CT-188 NORTH/STRONGTOWN ROAD. TAKE THE FIRST LEFT ONTO OLD WATERBURY ROAD. DESTINATION WILL BE ON LEFT.

SITE COORDINATES:
LATITUDE: 41° 29' 36.9" N (NAD83)
LONGITUDE: 73° 09' 55.0" W (NADB3)
*AS PER GOOGLE EARTH

ELEVATION DATA
GRADE ELEVATION AT TOWER = 640'± A.M.S.L
*AS PER GOOGLE EARTH

ANTENNA ELEVATION (TO C.L. OF ANTENNA)
ALPHA SECTOR: 196'-0"± A.G.L.
BETA SECTOR: 196'-0"± A.G.L.
GAMMA SECTOR: 196'-0"± A.G.L.

SITE INFORMATION

- REMOVE (1) PANEL ANTENNA AND REPLACE WITH (1) PANEL ANTENNA PER SECTOR FOR A TOTAL OF (3) NEW PANEL ANTENNAS, (9) TOTAL ON EXISTING MOUNT.
- ADD (1) RRUS-12 WITH A2 MODULE PER SECTOR FOR A TOTAL OF (3) NEW RRU'S.

PROJECT DESCRIPTION

SITE NAME:
PRESTON HILL

SITE NUMBER:
CT2087

LOCATION:
1432 OLD WATERBURY ROAD, SOUTHBURY
NEW HAVEN COUNTY, CT 06488

APPLICANT/LESSEE:
AT&T MOBILITY
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CONNECTICUT 06067

PROJECT INFORMATION

THIS DOCUMENT WAS DEVELOPED TO REFLECT A SPECIFIC SITE AND ITS SITE CONDITIONS AND IS NOT TO BE USED FOR ANOTHER SITE OR WHEN OTHER CONDITIONS PERTAIN. REUSE OF THIS DOCUMENT IS AT THE SOLE RISK OF THE USER.

A.D.A. COMPLIANCE:
FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION.

SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
G-1	GENERAL NOTES
C-1	SITE PLAN & EQUIPMENT PLANS
C-2	ANTENNAS LAYOUTS & ELEVATIONS
C-3	CONSTRUCTION DETAILS
E-1	GROUNDING DETAILS

SHEET INDEX

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

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

CT2087 PRESTON HILL
CROWN BU#806358
NHV 109 943107

CONSTRUCTION DRAWINGS

3	07/14/15	ISSUED AS FINAL
2	06/22/15	ISSUED AS FINAL
1	04/28/14	ISSUED AS FINAL
0	03/10/14	PRELIMINARY SUBMISSION

Dewberry®
Dewberry Engineers Inc.
600 PARSIPPANY ROAD
SUITE 301
PARSIPPANY, NJ 07054
PHONE: 973.739.9400
FAX: 973.739.9710

STATE OF CONNECTICUT
JIANG YU
26222
LICENSED PROFESSIONAL ENGINEER
JIANG YU
CT LICENSE NO. PEN.0026222

DRAWN BY: MLS
REVIEWED BY: PD
CHECKED BY: GHN
PROJECT NUMBER: 50055106
JOB NUMBER: 50065862
SITE ADDRESS:

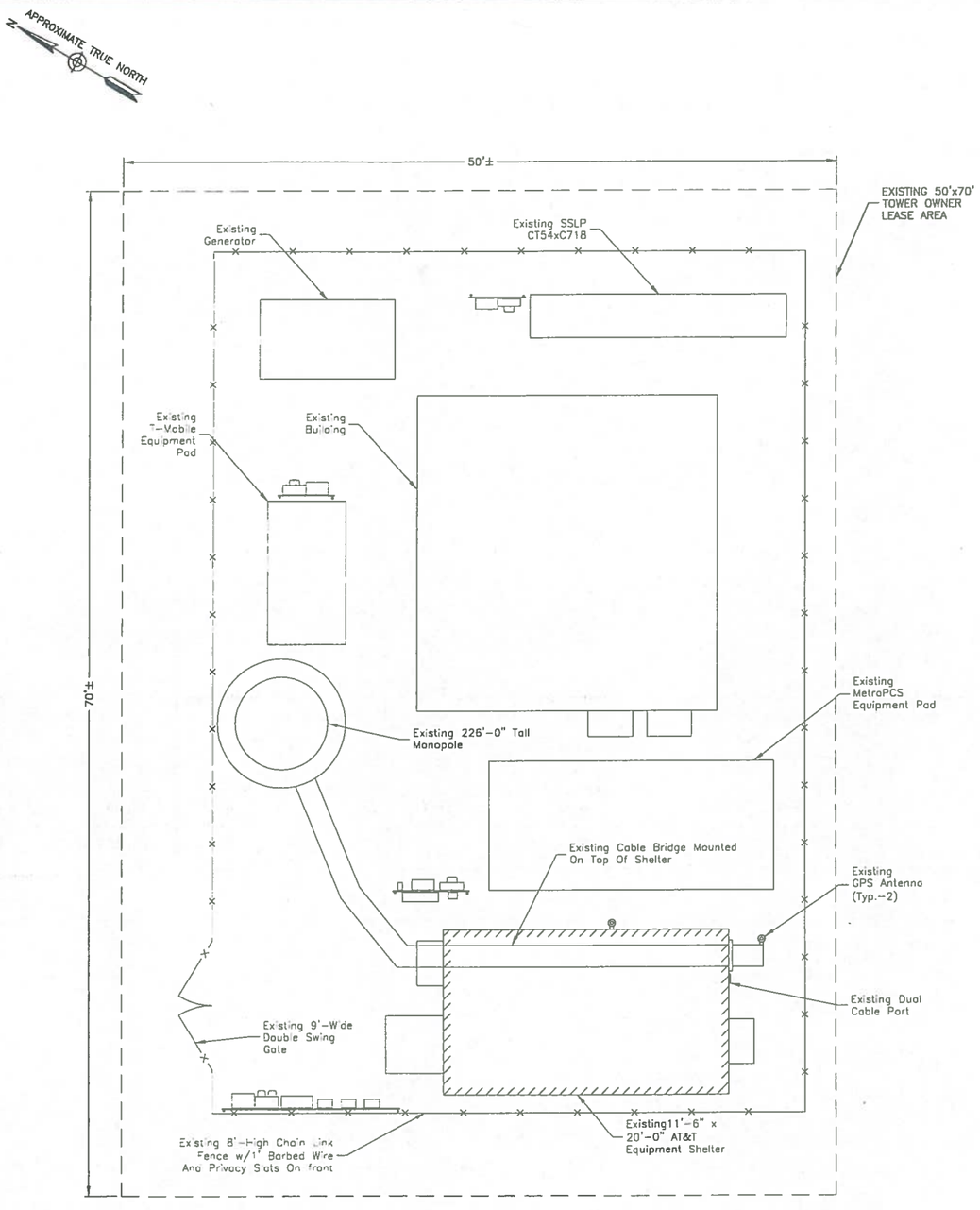
1432 OLD
WATERBURY ROAD
SOUTHBURY, CT 06488
NEW HAVEN COUNTY

SHEET TITLE

TITLE SHEET

SHEET NUMBER

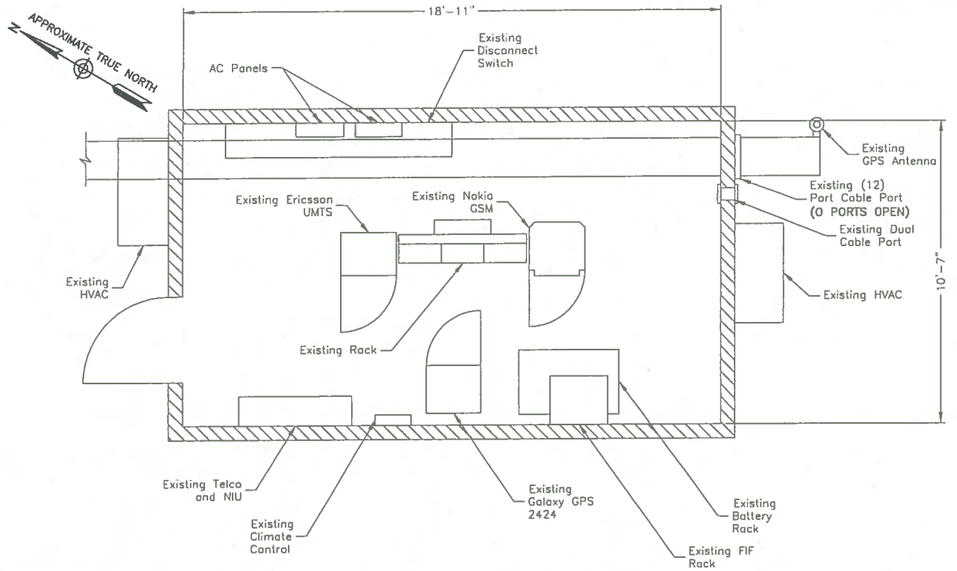
T-1



PROPOSED SITE PLAN (1)

SCALE: 1"=10' FOR 11"x17"
1"=5' FOR 22"x34"

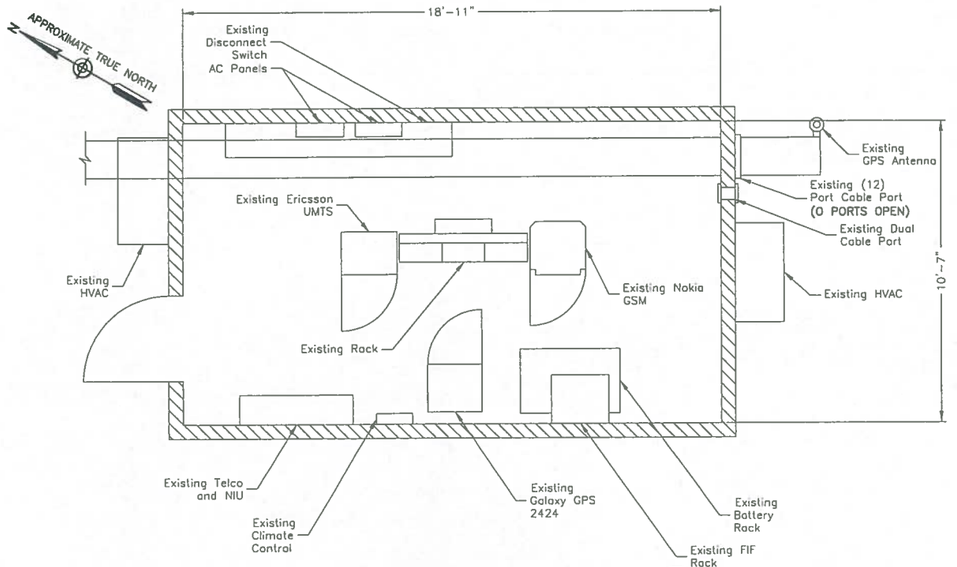
0' 5' 10'



EXISTING ROOM PLAN (2)

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

0' 2' 4' 6'



PROPOSED ROOM PLAN (3)

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

0' 2' 4' 6'

A.G.L. = ABOVE GRADE LEVEL
C.L. = CENTER LINE

NOTES:

1. NORTH ARROW SHOWN AS APPROXIMATE.
2. SOME EXISTING & PROPOSED INFORMATION NOT SHOWN FOR CLARITY.
3. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE AND FINAL AT&T RF DATA SHEET.

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

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

CT2087 PRESTON HILL
CROWN BU#806358
NHV 109 943107

CONSTRUCTION DRAWINGS

3	07/14/15	ISSUED AS FINAL
2	06/22/15	ISSUED AS FINAL
1	04/28/14	ISSUED AS FINAL
0	03/10/14	PRELIMINARY SUBMISSION

Dewberry®
Dewberry Engineers Inc.
600 PARSIPPANY ROAD
SUITE 301
PARSIPPANY, NJ 07054
PHONE: 973.739.9400
FAX: 973.739.9710

STATE OF CONNECTICUT
JIANG YU
23222
LICENSED
PROFESSIONAL ENGINEER
CT LICENSING NUMBER 0023222

DRAWN BY:	MLS
REVIEWED BY:	PD
CHECKED BY:	GHN
PROJECT NUMBER:	50055106
JOB NUMBER:	50065662
SITE ADDRESS:	

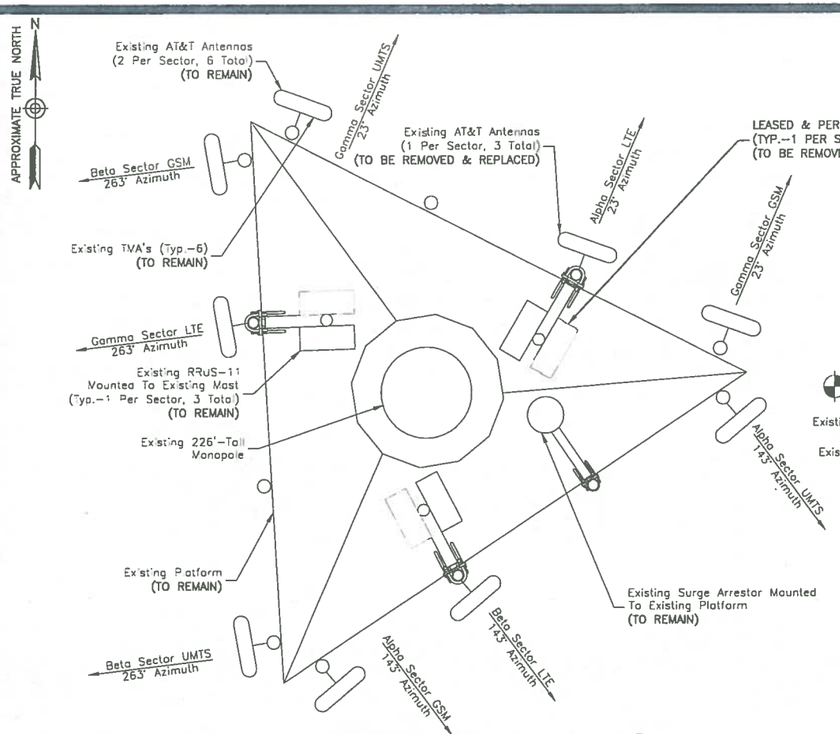
1432 OLD WATERBURY ROAD
SOUTHBURY, CT 06488
NEW HAVEN COUNTY

SHEET TITLE

SITE PLAN & EQUIPMENT PLANS

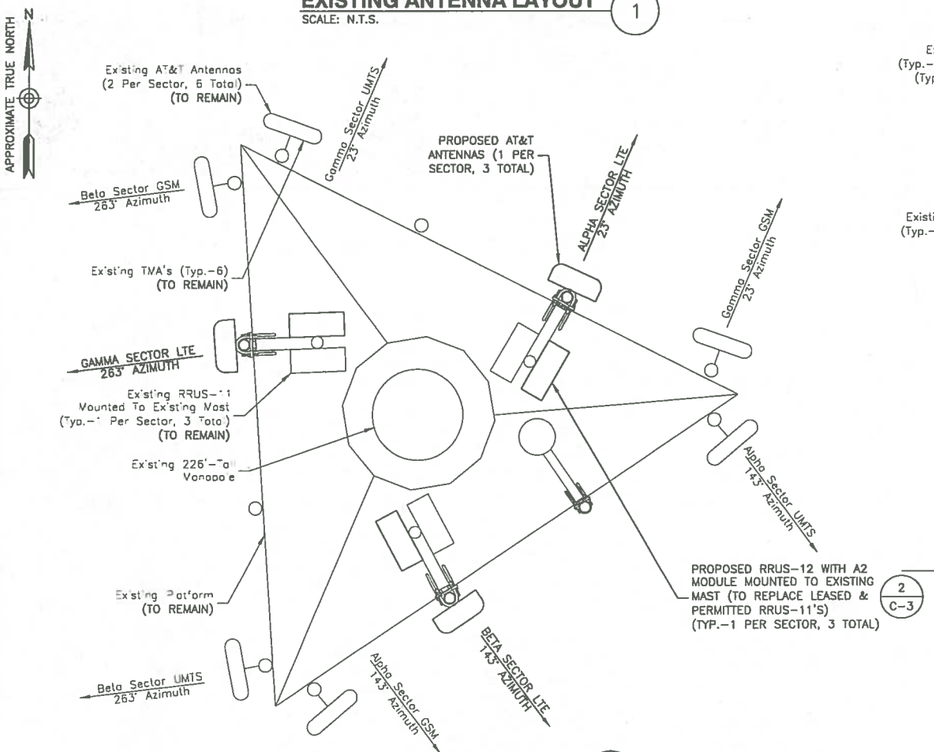
SHEET NUMBER

C-1



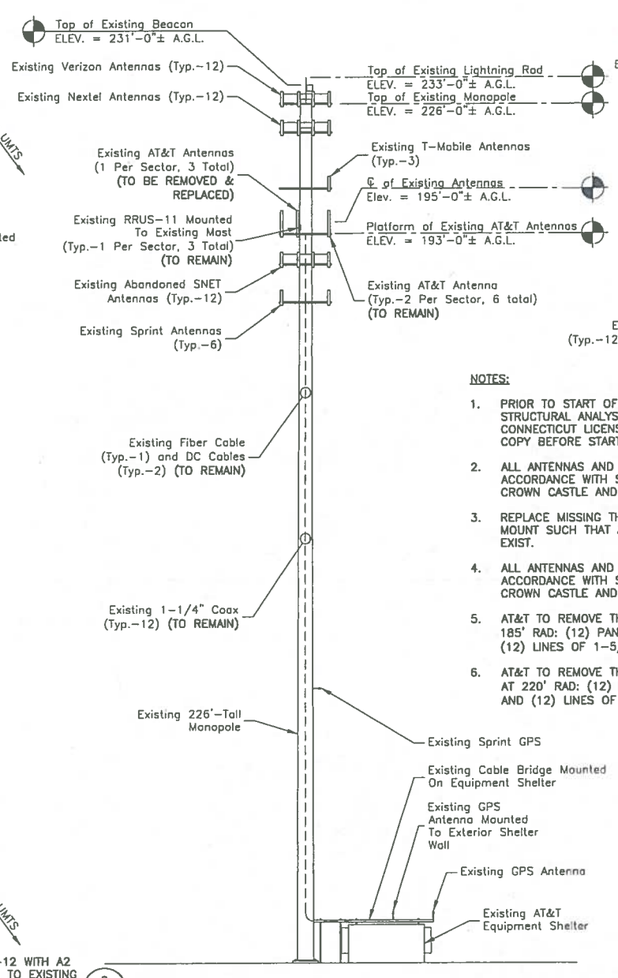
EXISTING ANTENNA LAYOUT (1)

SCALE: N.T.S.



PROPOSED ANTENNA LAYOUT (2)

SCALE: N.T.S.



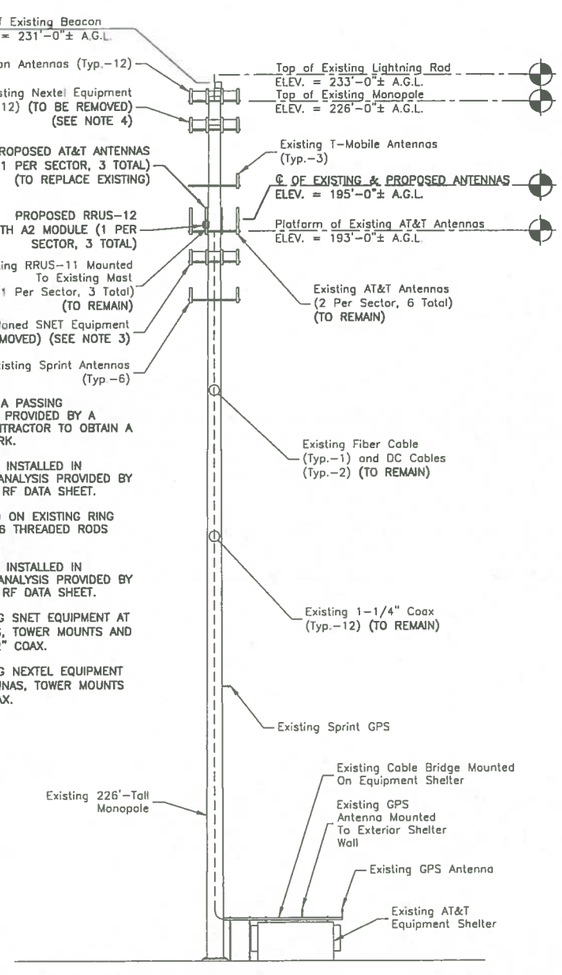
EXISTING ELEVATION (3)

SCALE: 1"=40' FOR 11"x17"
1"=20' FOR 22"x34"

0' 20' 40'

NOTES:

1. PRIOR TO START OF ANY WORK, A PASSING STRUCTURAL ANALYSIS SHALL BE PROVIDED BY A CONNECTICUT LICENSED P.E. CONTRACTOR TO OBTAIN A COPY BEFORE STARTING ANY WORK.
2. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE AND FINAL AT&T RF DATA SHEET.
3. REPLACE MISSING THREADED ROD ON EXISTING RING MOUNT SUCH THAT A TOTAL OF 6 THREADED RODS EXIST.
4. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE AND FINAL AT&T RF DATA SHEET.
5. AT&T TO REMOVE THE FOLLOWING SNET EQUIPMENT AT 185' RAD: (12) PANEL ANTENNAS, TOWER MOUNTS AND (12) LINES OF 1-5/8" AND 1/2" COAX.
6. AT&T TO REMOVE THE FOLLOWING NEXTEL EQUIPMENT AT 220' RAD: (12) PANEL ANTENNAS, TOWER MOUNTS AND (12) LINES OF 1-5/8" COAX.



PROPOSED ELEVATION (4)

SCALE: 1"=40' FOR 11"x17"
1"=20' FOR 22"x34"

0' 20' 40'

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

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

CT2087 PRESTON HILL
CROWN BU#806358
NHV 109 943107

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Dewberry
Dewberry Engineers Inc.
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PARSIPPANY, NJ 07054
PHONE: 973.739.9400
FAX: 973.739.9710

STATE OF CONNECTICUT
JIANG HU
12/31/2022
LICENSED PROFESSIONAL ENGINEER

JIANG HU, P.E.
CT LICENSE No. PEN.0023222

DRAWN BY:	MLS
REVIEWED BY:	PD
CHECKED BY:	GHN
PROJECT NUMBER:	50055106
JOB NUMBER:	50065662
SITE ADDRESS:	

1432 OLD
WATERBURY ROAD
SOUTHBURY, CT 06488
NEW HAVEN COUNTY

SHEET TITLE

ANTENNA LAYOUTS
& ELEVATIONS

SHEET NUMBER

C-2

Date: **July 14, 2015**

Sean Dempsey
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Aero Solutions, LLC.
5555 Central Avenue, Suite 100
Boulder, CO.80301
(720)-304-6882

Subject: Structural Analysis Report

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT2087
	Carrier Site Name:	Preston Hill
Crown Castle Designation:	**Crown Castle BU Number:**	806358
	Crown Castle Site Name:	NHV 109 943107
	Crown Castle JDE Job Number:	339112
	Crown Castle Work Order Number:	1084023
	Crown Castle Application Number:	301508 Rev. 2
Engineering Firm Designation:	**Aero Solutions, LLC. Project Number:**	003-15-0523
Site Data:	**1432 Old Waterbury Road, SOUTHBURY, New Haven County, CT** **Latitude *41° 29' 36.92"*, Longitude *-73° 9' 54.98"*** **226 Foot - Monopole Tower**	

Dear Sean Dempsey,

Aero Solutions, LLC. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 804961, in accordance with application 301508, revision 2.

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

LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading, respectively.

This analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 85 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *Aero Solutions, LLC.* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by: Rudolf Oplatka, E.I.

Respectfully submitted by:

Shraddha Dharia, P.E.
Structural Engineer
CT PE#: PEN0028187
Expires: 1/31/2016

7.15.2015

1) INTRODUCTION

This tower is a 226 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. in July of 1999. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

The tower has been modified per reinforcement drawings prepared by VS, in January of 2007. Reinforcement consists of addition of base plate stiffeners. The tower was later reinforced per reinforcement drawings prepared by B&T, in November of 2012. Reinforcement consists of addition of shaft reinforcement members between 124' and 134'.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
193.0	195.0	3	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe			
		3	ericsson	RRUS 12-B2			
		3	ericsson	RRUS A2 MODULE			

Table 2 - Existing Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
228.0	228.0	6	antel	LPA-80080/6CF w/ Mount Pipe	12	1-5/8"	1
		3	powerwave technologies	P65.16.XL.2 w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
		3	rymsa wireless	MG D3-800Tx w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 713-1]			
		1	tower mounts	Side Arm Mount [SO 202-3]			
220.0	221.0	2	decibel	DB846F65ZAXY w/ Mount Pipe	12	1-5/8"	1
		10	decibel	DB846G90A-XY w/ Mount Pipe			
	220.0	1	tower mounts	Platform Mount [LP 712-1]			
205.0	207.0	3	ems wireless	RR65-18-02DP w/ Mount Pipe	6	1-5/8"	1
		6	nokia	CS72993.07			
	205.0	1	tower mounts	Platform Mount [LP 712-1]			
193.0	195.0	3	communication components inc.	DTMABP7819VG12A			1

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		3	communication components inc.	DTMABP7819VG12A			2
		3	ericsson	RRUS 11			1
		3	kathrein	800 10121 w/ Mount Pipe			
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			2
		3	powerwave technologies	7020.00			
		1	raycap	DC6-48-60-18-8F	1 2 12	3/8" 5/8" 1-1/4"	1
	193.0	3	communication components inc.	DTMABP7819VG12A			
		6	kathrein	860 10025			
		1	tower mounts	Platform Mount [LP 712-1]			
185.0	187.0	3	decibel	978QNB120E-M w/ Mount Pipe	1 12	1/2" 1-5/8"	1
		6	ems wireless	FV90-16-02DP w/ Mount Pipe			
		3	nokia	CS72993.07			
		3	rfs celwave	APXV18-206517S-C w/ Mount Pipe			
	185.0	1	tower mounts	Platform Mount [LP 712-1]			
176.0	177.0	3	alcatel lucent	TME-800MHZ RRH			1
	176.0	1	tower mounts	Side Arm Mount [SO 102-3]			
	173.0	3	alcatel lucent	TME-1900MHz RRH (65MHz)			
175.0	175.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER	3	1-1/4"	1
		9	rfs celwave	ACU-A20-N			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 1201-1]			
72.0	73.0	1	gps	GPS_A	1	1/2"	1
	72.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Equipment to be Removed

Table 3 - Design Antenna and Cable Information

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

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
230	230	12	swedcom	ALP 9212		
220	220	12	swedcom	ALP 9212		
205	205	12	ems wireless	RR65-18-02		
195	195	12	swedcom	ALP 9212		
185	185	9	decibel	DB980		
175	175	12	allgon	7184.05		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	East Coast Drilling & Boring	217688	CCISITES
4-POST-MODIFICATION INSPECTION	VS	1863184	CCISITES
4-POST-MODIFICATION INSPECTION	TEP	4062849	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI	821496	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI	821494	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.4.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) The tower was reinforced per the referenced drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Aero Solutions, LLC. should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	226 - 197.961	Pole	TP28.6437x21.5x0.1875	1	-5.77	848.23	70.0	Pass
L2	197.961 - 162.932	Pole	TP37.108x27.229x0.375	2	-18.03	2192.64	82.1	Pass
L3	162.932 - 132	Pole	TP44.1835x35.0602x0.4375	3	-28.24	3158.04	97.0	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L4	132 - 120.305	Pole	TP47.1416x44.1835x0.5755	4	-30.09	3443.19	94.0	Pass
L5	120.305 - 79.2108	Pole	TP56.6581x44.6496x0.5	5	-45.65	4475.01	96.2	Pass
L6	79.2108 - 39.1405	Pole	TP65.7875x53.7404x0.5625	6	-57.00	5440.61	89.5	Pass
L7	39.1405 - 0	Pole	TP74.5x62.457x0.5625	7	-72.22	5948.55	92.3	Pass
							Summary	
						Pole (L3)	97.0	Pass
						Rating =	97.0	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	95.3	Pass
1	Base Plate	0	63.2	Pass
1	Base Foundation	0	96.5	Pass
1	Base Foundation Soil Interaction	0	36.0	Pass

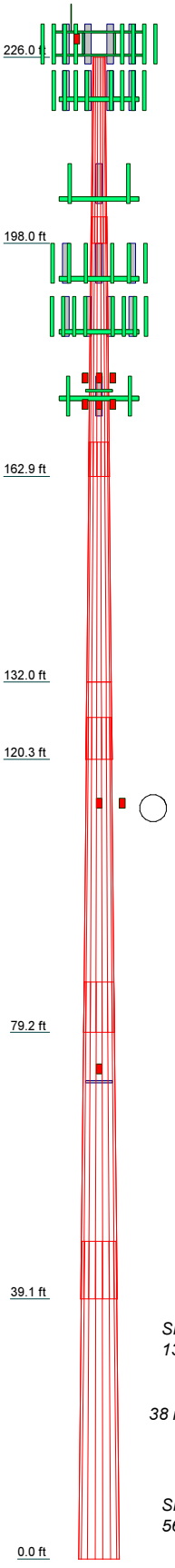
Structure Rating (max from all components) =	97%

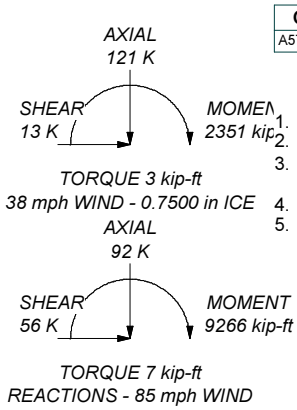
Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity.

4.1) Recommendations

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

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	28.04	18	0.1875	4.08	21.5000	28.6437	A572-65	1.4
2	39.11	18	0.3750	5.14	27.2290	37.1080	A572-65	5.0
3	36.07	18	0.4375	6.39	35.0602	44.1835	A572-65	6.7
4	11.70	18	0.5755	6.39	44.1835	47.1416	A572-65	3.2
5	47.49	18	0.5000	7.58	44.6496	56.6581	52.435572ksi	12.9
6	47.65	18	0.5625	8.72	53.7404	65.7875	A572-65	17.1
7	47.86	18	0.5625		62.4570	74.5000	A572-65	19.7
								66.1





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) LPA-80080/6CF w/ Mount Pipe	228	RRUS 11	193
(2) LPA-80080/6CF w/ Mount Pipe	228	OPA-65R-LCUU-H6 w/ Mount Pipe	193
(2) LPA-80080/6CF w/ Mount Pipe	228	OPA-65R-LCUU-H6 w/ Mount Pipe	193
MG D3-800Tx w/ Mount Pipe	228	OPA-65R-LCUU-H6 w/ Mount Pipe	193
MG D3-800Tx w/ Mount Pipe	228	RRUS A2 MODULE	193
MG D3-800Tx w/ Mount Pipe	228	RRUS A2 MODULE	193
P65.16.XL.2 w/ Mount Pipe	228	RRUS A2 MODULE	193
P65.16.XL.2 w/ Mount Pipe	228	RRUS 12-B2	193
P65.16.XL.2 w/ Mount Pipe	228	RRUS 12-B2	193
(2) FD9R6004/2C-3L	228	RRUS 12-B2	193
(2) FD9R6004/2C-3L	228	Transition Ladder	193
(2) FD9R6004/2C-3L	228	Platform Mount [LP 712-1]	193
Transition Ladder	228	APXV18-206517S-C w/ Mount Pipe	185
Side Arm Mount [SO 202-3]	228	APXV18-206517S-C w/ Mount Pipe	185
Platform Mount [LP 713-1]	228	APXV18-206517S-C w/ Mount Pipe	185
Lightning Rod 5/8x4'	226	978QNB120E-M w/ Mount Pipe	185
Flash Beacon Lighting	226	978QNB120E-M w/ Mount Pipe	185
(4) DB846G90A-XY w/ Mount Pipe	220	978QNB120E-M w/ Mount Pipe	185
(3) DB846G90A-XY w/ Mount Pipe	220	(2) FV90-16-02DP w/ Mount Pipe	185
(3) DB846G90A-XY w/ Mount Pipe	220	(2) FV90-16-02DP w/ Mount Pipe	185
DB846F65ZAXY w/ Mount Pipe	220	(2) FV90-16-02DP w/ Mount Pipe	185
DB846F65ZAXY w/ Mount Pipe	220	CS72993.07	185
Transition Ladder	220	CS72993.07	185
Platform Mount [LP 712-1]	220	CS72993.07	185
(2) CS72993.07	205	Transition Ladder	185
(2) CS72993.07	205	Platform Mount [LP 712-1]	185
(2) CS72993.07	205	TME-1900MHz RRH (65MHz)	176
RR65-18-02DP w/ Mount Pipe	205	TME-1900MHz RRH (65MHz)	176
RR65-18-02DP w/ Mount Pipe	205	TME-1900MHz RRH (65MHz)	176
RR65-18-02DP w/ Mount Pipe	205	TME-800MHZ RRH	176
Transition Ladder	205	TME-800MHZ RRH	176
Platform Mount [LP 712-1]	205	TME-800MHZ RRH	176
AM-X-CD-16-65-00T-RET w/ Mount Pipe	193	6' x 2" Mount Pipe	176
		6' x 2" Mount Pipe	176
AM-X-CD-16-65-00T-RET w/ Mount Pipe	193	6' x 2" Mount Pipe	176
		Side Arm Mount [SO 102-3]	176
AM-X-CD-16-65-00T-RET w/ Mount Pipe	193	APXVSPP18-C-A20 w/ Mount Pipe	175
		APXVSPP18-C-A20 w/ Mount Pipe	175
800 10121 w/ Mount Pipe	193	APXVSPP18-C-A20 w/ Mount Pipe	175
800 10121 w/ Mount Pipe	193	800 EXTERNAL NOTCH FILTER	175
800 10121 w/ Mount Pipe	193	800 EXTERNAL NOTCH FILTER	175
DTMABP7819VG12A	193	800 EXTERNAL NOTCH FILTER	175
DTMABP7819VG12A	193	(3) ACU-A20-N	175
DTMABP7819VG12A	193	(3) ACU-A20-N	175
DTMABP7819VG12A	193	(3) ACU-A20-N	175
DTMABP7819VG12A	193	(2) 6' x 2" Mount Pipe	175
DTMABP7819VG12A	193	(2) 6' x 2" Mount Pipe	175
DC6-48-60-18-8F	193	(2) 6' x 2" Mount Pipe	175
(2) 860 10025	193	Platform Mount [LP 1201-1]	175
(2) 860 10025	193	Honeywill Side-Light	113
(2) 860 10025	193	Honeywill Side-Light	113
RRUS 11	193	GPS_A	72
RRUS 11	193	Side Arm Mount [SO 701-1]	72

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	52.435572ksi	52 ksi	67 ksi

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 97%

Aero Solutions, LLC.
5555 Central Avenue, Suite 100
Boulder, CO.80301
Phone: (720)-304-6882
FAX: (720)-304-6883

Job: ***BU#806358 NHV 109 943107***			
Project: ***Existing 226 ft. Monopole***			
Client: Crown Castle	Drawn by: roplatka	App'd:	
Code: TIA/EIA-222-F	Date: 07/14/15	Scale: NTS	
Path: P:\004_CCI_SITES\806358 NHV 109 943107\003-15-0523\Engineering\Aero Calculations\Working RISA\806358 NHV 109 943107.eri		Dwg No. E-1	

Centek Engineering, Inc.
3-2 North Branford Road
Branford, Connecticut 06405
Phone: (203) 488-0580
Fax: (203) 488-8587

Steven L. Levine
Real Estate Consultant

July 20, 2015

Honorable Ed Edelson
1st Selectman, Town of Southbury
Town Hall, 501 Main Street South
Southbury, CT 06488

Re: Resubmittal: EM-CING-130-140508 – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 1432 Old Waterbury Road, Southbury, Connecticut.

Dear Mr. Edelson:

In order to accommodate technological changes, implement Uniform Mobile Telecommunications System ("UMTS") and Long Term Evolution ("LTE") capabilities, and enhance system performance in the State of Connecticut, New Cingular Wireless PCS, LLC ("AT&T") will be changing its equipment configuration at certain cell sites.

As required by Regulations of Connecticut State Agencies ("R.C.S.A.") Section 16-50j-73, the Connecticut Siting Council has been notified of the changes and will review AT&T's proposal. Please accept this letter as notification under Section 16-50j-73 of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2).

The enclosed Notice fully sets forth the AT&T proposal. However, if you have any questions or require any further information on the plans for the site or the Siting Council's procedures, please contact the undersigned at 860-830-0380 or Ms. Melanie Bachman, Acting Executive Director, Connecticut Siting Council at (860) 827-2935.

Sincerely,

Steven L. Levine
Real Estate Consultant

Enclosure

Centek Engineering, Inc.
3-2 North Branford Road
Branford, Connecticut 06405
Phone: (203) 488-0580
Fax: (203) 488-8587

Steven L. Levine
Real Estate Consultant

July 20, 2015

Re: <u>Resubmittal</u>: <u>EM-CING-130-140508</u> – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 1432 Old Waterbury Road, Southbury, Connecticut.

<u>Notice to the Land Owners of Record, 1432 Old Waterbury Road, Southbury, CT:</u>

Richard & Adele Dilley; Nancy Knapp; Volpe Builders INC; LMB Holdings LLC; PQ Operations LLC; Crown Castle (by email); Verizon Wireless (by email)

In order to accommodate technological changes, implement Uniform Mobile Telecommunications System ("UMTS") and Long Term Evolution ("LTE") capabilities, and enhance system performance in the State of Connecticut, New Cingular Wireless PCS, LLC ("AT&T") will be changing its equipment configuration at certain cell sites.

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Sincerely,

Steven L. Levine
Real Estate Consultant

Enclosure

Date: **July 14, 2015**

Sean Dempsey
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Aero Solutions, LLC.
5555 Central Avenue, Suite 100
Boulder, CO.80301
(720)-304-6882

Subject: Structural Analysis Report

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT2087
	Carrier Site Name:	Preston Hill
Crown Castle Designation:	**Crown Castle BU Number:**	806358
	Crown Castle Site Name:	NHV 109 943107
	Crown Castle JDE Job Number:	339112
	Crown Castle Work Order Number:	1084023
	Crown Castle Application Number:	301508 Rev. 2
Engineering Firm Designation:	**Aero Solutions, LLC. Project Number:**	003-15-0523
Site Data:	**1432 Old Waterbury Road, SOUTHBURY, New Haven County, CT** **Latitude *41° 29' 36.92"*, Longitude *-73° 9' 54.98"*** **226 Foot - Monopole Tower**	

Dear Sean Dempsey,

Aero Solutions, LLC. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 804961, in accordance with application 301508, revision 2.

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

LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading, respectively.

This analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 85 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *Aero Solutions, LLC.* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by: Rudolf Oplatka, E.I.

Respectfully submitted by:

Shraddha Dharia, P.E.
Structural Engineer
CT PE#: PEN0028187
Expires: 1/31/2016

7.15.2015

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 226 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. in July of 1999. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

The tower has been modified per reinforcement drawings prepared by VS, in January of 2007. Reinforcement consists of addition of base plate stiffeners. The tower was later reinforced per reinforcement drawings prepared by B&T, in November of 2012. Reinforcement consists of addition of shaft reinforcement members between 124' and 134'.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
193.0	195.0	3	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe			
		3	ericsson	RRUS 12-B2			
		3	ericsson	RRUS A2 MODULE			

Table 2 - Existing Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
228.0	228.0	6	antel	LPA-80080/6CF w/ Mount Pipe	12	1-5/8"	1
		3	powerwave technologies	P65.16.XL.2 w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
		3	rymsa wireless	MG D3-800Tx w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 713-1]			
		1	tower mounts	Side Arm Mount [SO 202-3]			
220.0	221.0	2	decibel	DB846F65ZAXY w/ Mount Pipe	12	1-5/8"	1
		10	decibel	DB846G90A-XY w/ Mount Pipe			
	220.0	1	tower mounts	Platform Mount [LP 712-1]			
205.0	207.0	3	ems wireless	RR65-18-02DP w/ Mount Pipe	6	1-5/8"	1
		6	nokia	CS72993.07			
	205.0	1	tower mounts	Platform Mount [LP 712-1]			
193.0	195.0	3	communication components inc.	DTMABP7819VG12A			1

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		3	communication components inc.	DTMABP7819VG12A			2
		3	ericsson	RRUS 11			1
		3	kathrein	800 10121 w/ Mount Pipe			
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			2
		3	powerwave technologies	7020.00			
		1	raycap	DC6-48-60-18-8F	1 2 12	3/8" 5/8" 1-1/4"	1
	193.0	3	communication components inc.	DTMABP7819VG12A			
		6	kathrein	860 10025			
		1	tower mounts	Platform Mount [LP 712-1]			
185.0	187.0	3	decibel	978QNB120E-M w/ Mount Pipe	1 12	1/2" 1-5/8"	1
		6	ems wireless	FV90-16-02DP w/ Mount Pipe			
		3	nokia	CS72993.07			
		3	rfs celwave	APXV18-206517S-C w/ Mount Pipe			
	185.0	1	tower mounts	Platform Mount [LP 712-1]			
176.0	177.0	3	alcatel lucent	TME-800MHZ RRH			1
	176.0	1	tower mounts	Side Arm Mount [SO 102-3]			
	173.0	3	alcatel lucent	TME-1900MHz RRH (65MHz)			
175.0	175.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER	3	1-1/4"	1
		9	rfs celwave	ACU-A20-N			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 1201-1]			
72.0	73.0	1	gps	GPS_A	1	1/2"	1
	72.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Equipment to be Removed

Table 3 - Design Antenna and Cable Information

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

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
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220	220	12	swedcom	ALP 9212		
205	205	12	ems wireless	RR65-18-02		
195	195	12	swedcom	ALP 9212		
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3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
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4-POST-MODIFICATION INSPECTION	VS	1863184	CCISITES
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4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI	821496	CCISITES
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3.1) Analysis Method

tnxTower (version 6.1.4.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) The tower was reinforced per the referenced drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Aero Solutions, LLC. should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	226 - 197.961	Pole	TP28.6437x21.5x0.1875	1	-5.77	848.23	70.0	Pass
L2	197.961 - 162.932	Pole	TP37.108x27.229x0.375	2	-18.03	2192.64	82.1	Pass
L3	162.932 - 132	Pole	TP44.1835x35.0602x0.4375	3	-28.24	3158.04	97.0	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L4	132 - 120.305	Pole	TP47.1416x44.1835x0.5755	4	-30.09	3443.19	94.0	Pass
L5	120.305 - 79.2108	Pole	TP56.6581x44.6496x0.5	5	-45.65	4475.01	96.2	Pass
L6	79.2108 - 39.1405	Pole	TP65.7875x53.7404x0.5625	6	-57.00	5440.61	89.5	Pass
L7	39.1405 - 0	Pole	TP74.5x62.457x0.5625	7	-72.22	5948.55	92.3	Pass
							Summary	
						Pole (L3)	97.0	Pass
						Rating =	97.0	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	95.3	Pass
1	Base Plate	0	63.2	Pass
1	Base Foundation	0	96.5	Pass
1	Base Foundation Soil Interaction	0	36.0	Pass

Structure Rating (max from all components) =	97%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity.

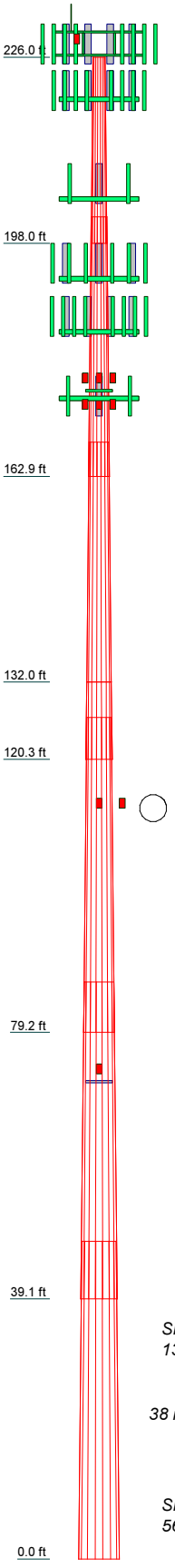
4.1) Recommendations

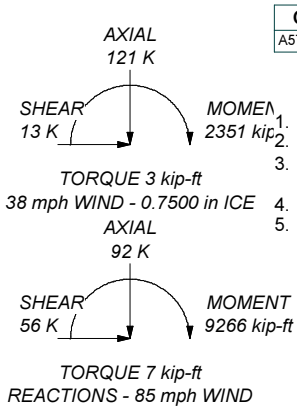
The tower and its foundation have sufficient capacity to carry the existing and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	28.04	18	0.1875	4.08	21.5000	28.6437	A572-65	1.4
2	39.11	18	0.3750	5.14	27.2290	37.1080	A572-65	5.0
3	36.07	18	0.4375	6.39	35.0602	44.1835	A572-65	6.7
4	11.70	18	0.5755	6.39	44.1835	47.1416	A572-65	3.2
5	47.49	18	0.5000	7.58	44.6496	56.6581	52.435572ksi	12.9
6	47.65	18	0.5625	8.72	53.7404	65.7875	A572-65	17.1
7	47.86	18	0.5625		62.4570	74.5000	A572-65	19.7
								66.1





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) LPA-80080/6CF w/ Mount Pipe	228	RRUS 11	193
(2) LPA-80080/6CF w/ Mount Pipe	228	OPA-65R-LCUU-H6 w/ Mount Pipe	193
(2) LPA-80080/6CF w/ Mount Pipe	228	OPA-65R-LCUU-H6 w/ Mount Pipe	193
MG D3-800Tx w/ Mount Pipe	228	OPA-65R-LCUU-H6 w/ Mount Pipe	193
MG D3-800Tx w/ Mount Pipe	228	RRUS A2 MODULE	193
MG D3-800Tx w/ Mount Pipe	228	RRUS A2 MODULE	193
P65.16.XL.2 w/ Mount Pipe	228	RRUS A2 MODULE	193
P65.16.XL.2 w/ Mount Pipe	228	RRUS 12-B2	193
P65.16.XL.2 w/ Mount Pipe	228	RRUS 12-B2	193
(2) FD9R6004/2C-3L	228	RRUS 12-B2	193
(2) FD9R6004/2C-3L	228	Transition Ladder	193
(2) FD9R6004/2C-3L	228	Platform Mount [LP 712-1]	193
Transition Ladder	228	APXV18-206517S-C w/ Mount Pipe	185
Side Arm Mount [SO 202-3]	228	APXV18-206517S-C w/ Mount Pipe	185
Platform Mount [LP 713-1]	228	APXV18-206517S-C w/ Mount Pipe	185
Lightning Rod 5/8x4'	226	978QNB120E-M w/ Mount Pipe	185
Flash Beacon Lighting	226	978QNB120E-M w/ Mount Pipe	185
(4) DB846G90A-XY w/ Mount Pipe	220	978QNB120E-M w/ Mount Pipe	185
(3) DB846G90A-XY w/ Mount Pipe	220	(2) FV90-16-02DP w/ Mount Pipe	185
(3) DB846G90A-XY w/ Mount Pipe	220	(2) FV90-16-02DP w/ Mount Pipe	185
DB846F65ZAXY w/ Mount Pipe	220	(2) FV90-16-02DP w/ Mount Pipe	185
DB846F65ZAXY w/ Mount Pipe	220	CS72993.07	185
Transition Ladder	220	CS72993.07	185
Platform Mount [LP 712-1]	220	CS72993.07	185
(2) CS72993.07	205	Transition Ladder	185
(2) CS72993.07	205	Platform Mount [LP 712-1]	185
(2) CS72993.07	205	TME-1900MHz RRH (65MHz)	176
RR65-18-02DP w/ Mount Pipe	205	TME-1900MHz RRH (65MHz)	176
RR65-18-02DP w/ Mount Pipe	205	TME-1900MHz RRH (65MHz)	176
RR65-18-02DP w/ Mount Pipe	205	TME-800MHZ RRH	176
Transition Ladder	205	TME-800MHZ RRH	176
Platform Mount [LP 712-1]	205	TME-800MHZ RRH	176
AM-X-CD-16-65-00T-RET w/ Mount Pipe	193	6' x 2" Mount Pipe	176
		6' x 2" Mount Pipe	176
AM-X-CD-16-65-00T-RET w/ Mount Pipe	193	6' x 2" Mount Pipe	176
		Side Arm Mount [SO 102-3]	176
AM-X-CD-16-65-00T-RET w/ Mount Pipe	193	APXVSPP18-C-A20 w/ Mount Pipe	175
		APXVSPP18-C-A20 w/ Mount Pipe	175
800 10121 w/ Mount Pipe	193	APXVSPP18-C-A20 w/ Mount Pipe	175
800 10121 w/ Mount Pipe	193	800 EXTERNAL NOTCH FILTER	175
800 10121 w/ Mount Pipe	193	800 EXTERNAL NOTCH FILTER	175
DTMABP7819VG12A	193	800 EXTERNAL NOTCH FILTER	175
DTMABP7819VG12A	193	(3) ACU-A20-N	175
DTMABP7819VG12A	193	(3) ACU-A20-N	175
DTMABP7819VG12A	193	(3) ACU-A20-N	175
DTMABP7819VG12A	193	(2) 6' x 2" Mount Pipe	175
DTMABP7819VG12A	193	(2) 6' x 2" Mount Pipe	175
DC6-48-60-18-8F	193	(2) 6' x 2" Mount Pipe	175
(2) 860 10025	193	Platform Mount [LP 1201-1]	175
(2) 860 10025	193	Honeywill Side-Light	113
(2) 860 10025	193	Honeywill Side-Light	113
RRUS 11	193	GPS_A	72
RRUS 11	193	Side Arm Mount [SO 701-1]	72

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	52.435572ksi	52 ksi	67 ksi

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 97%

Aero Solutions, LLC.
5555 Central Avenue, Suite 100
Boulder, CO.80301
Phone: (720)-304-6882
FAX: (720)-304-6883

Job: ***BU#806358 NHV 109 943107***			
Project: ***Existing 226 ft. Monopole***			
Client: Crown Castle	Drawn by: roplatka	App'd:	
Code: TIA/EIA-222-F	Date: 07/14/15	Scale: NTS	
Path: P:\004_CCI_SITES\806358 NHV 109 943107\003-15-0523\Engineering\Aero Calculations\Working RISA\806358 NHV 109 943107.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:

3) Tower is located in New Haven County, Connecticut.
4) Basic wind speed of 85 mph.
5) Nominal ice thickness of 0.7500 in.
6) Ice thickness is considered to increase with height.
7) Ice density of 56 pcf.
8) A wind speed of 38 mph is used in combination with ice.
9) Temperature drop of 50 °F.
10) Deflections calculated using a wind speed of 50 mph.
11) A non-linear (P-delta) analysis was used.
12) Pressures are calculated at each section.
13) Stress ratio used in pole design is 1.333.
14) 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
	Use Moment Magnification	√	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*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	226.00-197.96	28.04	4.08	18	21.5000	28.6437	0.1875	0.7500	A572-65 (65 ksi)
L2	197.96-162.93	39.11	5.14	18	27.2290	37.1080	0.3750	1.5000	A572-65 (65 ksi)
L3	162.93-132.00	36.07	0.00	18	35.0602	44.1835	0.4375	1.7500	A572-65 (65 ksi)
L4	132.00-120.30	11.70	6.39	18	44.1835	47.1416	0.5755	2.3019	52.435572ksi (52 ksi)
L5	120.30-79.21	47.49	7.58	18	44.6496	56.6581	0.5000	2.0000	A572-65 (65 ksi)
L6	79.21-39.14	47.65	8.72	18	53.7404	65.7875	0.5625	2.2500	A572-65 (65 ksi)
L7	39.14-0.00	47.86		18	62.4570	74.5000	0.5625	2.2500	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	21.8317	12.6836	727.8616	7.5659	10.9220	66.6418	1456.6810	6.3430	3.4540	18.421
	29.0856	16.9350	1732.5124	10.1020	14.5510	119.0648	3467.3045	8.4691	4.7113	25.127
L2	28.6958	31.9630	2912.0863	9.5332	13.8323	210.5272	5828.0044	15.9845	4.1323	11.019
	37.6805	43.7215	7453.2354	13.0402	18.8509	395.3790	14916.2779	21.8649	5.8710	15.656
L3	36.9206	48.0779	7281.2065	12.2910	17.8106	408.8141	14571.9937	24.0435	5.4006	12.344
	44.8651	60.7467	14687.1069	15.5298	22.4452	654.3541	29393.5394	30.3791	7.0063	16.014
L4	44.8651	79.6525	19136.7800	15.4808	22.4452	852.6002	38298.7406	39.8338	6.7635	11.753
	47.8688	85.0557	23301.3527	16.5310	23.9479	973.0006	46633.3659	42.5359	7.2841	12.658
L5	46.9800	70.0653	17254.1420	15.6731	22.6820	760.6984	34530.9875	35.0393	6.9783	13.957
	57.5321	89.1229	35510.0754	19.9361	28.7823	1233.7463	71066.8759	44.5699	9.0918	18.184
L6	56.5161	94.9425	33920.4171	18.8782	27.3001	1242.4998	67885.4675	47.4803	8.4683	15.055
	66.8024	116.4511	62590.6069	23.1549	33.4201	1872.8460	125263.5722	58.2366	10.5886	18.824
L7	65.6494	110.5049	53483.9762	21.9726	31.7282	1685.6937	107038.3279	55.2630	10.0024	17.782
	75.6493	132.0062	91171.9378	26.2478	37.8460	2409.0244	182463.8419	66.0156	12.1220	21.55

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 226.00-197.96				1	1	1		
L2 197.96-162.93				1	1	1		
L3 162.93-132.00				1	1	1		
L4 132.00-120.30				1	1	0.982348		
L5 120.30-79.21				1	1	1		
L6 79.21-39.14				1	1	1		
L7 39.14-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
**										

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

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
**								
561(1-5/8")	B	No	Inside Pole	226.00 - 8.00	12	No Ice	0.00	1.35
						1/2" Ice	0.00	1.35
						1" Ice	0.00	1.35
						2" Ice	0.00	1.35
						4" Ice	0.00	1.35
**								
LDF7-50A(1-5/8")	B	No	Inside Pole	220.00 - 3.00	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")	B	No	Inside Pole	205.00 - 3.00	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
**								
LDF6-50A(1-1/4")	C	No	Inside Pole	193.00 - 8.00	9	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	CaAa (Out Of Face)	193.00 - 185.00	2	No Ice	0.00	0.66
						1/2" Ice	0.00	1.91
						1" Ice	0.00	3.78
						2" Ice	0.00	9.33
						4" Ice	0.00	27.78
LDF6-50A(1-1/4")	C	No	CaAa (Out Of Face)	193.00 - 185.00	1	No Ice	0.16	0.66
						1/2" Ice	0.25	1.91
						1" Ice	0.35	3.78
						2" Ice	0.55	9.33
						4" Ice	0.95	27.78
FB-L98-002-XXX(3/8)	C	No	Inside Pole	193.00 - 8.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
WR-VG82ST-BRDA(5/8")	C	No	Inside Pole	193.00 - 8.00	2	No Ice	0.00	0.31
						1/2" Ice	0.00	0.31
						1" Ice	0.00	0.31
						2" Ice	0.00	0.31
						4" Ice	0.00	0.31
LDF6-50A(1-1/4")	C	No	CaAa (Out Of Face)	185.00 - 8.00	3	No Ice	0.00	0.66
						1/2" Ice	0.00	1.91
						1" Ice	0.00	3.78
						2" Ice	0.00	9.33
						4" Ice	0.00	27.78
2" Rigid Conduit	C	No	Inside Pole	193.00 - 8.00	1	No Ice	0.00	2.80
						1/2" Ice	0.00	2.80
						1" Ice	0.00	2.80
						2" Ice	0.00	2.80
						4" Ice	0.00	2.80
**								
LDF4-50A(1/2")	C	No	CaAa (Out Of Face)	185.00 - 8.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.84
						1" Ice	0.00	2.14
						2" Ice	0.00	6.58
						4" Ice	0.00	22.78
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	185.00 - 8.00	1	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
						2" Ice	0.60	10.55
						4" Ice	1.00	30.04
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	185.00 - 8.00	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

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						4" Ice	0.00	30.04
LDF7-50A(1-5/8")	C	No	Inside Pole	185.00 - 8.00	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
**								
HB114-1-0813U4-M5J(1 1/4")	A	No	Inside Pole	175.00 - 8.00	3	No Ice	0.00	1.20
						1/2" Ice	0.00	1.20
						1" Ice	0.00	1.20
						2" Ice	0.00	1.20
						4" Ice	0.00	1.20
**								
LDF4-50A(1/2")	A	No	Inside Pole	72.00 - 8.00	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
**								
MS600	A	No	CaAa (Out Of Face)	134.00 - 124.00	1	No Ice	0.17	0.00
						1/2" Ice	0.17	0.00
						1" Ice	0.17	0.00
						2" Ice	0.17	0.00
						4" Ice	0.17	0.00
**								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	226.00-197.96	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.71
		C	0.000	0.000	0.000	0.000	0.00
L2	197.96-162.93	A	0.000	0.000	0.000	0.000	0.04
		B	0.000	0.000	0.000	0.000	1.08
		C	0.000	0.000	0.000	5.609	0.56
L3	162.93-132.00	A	0.000	0.000	0.000	0.333	0.11
		B	0.000	0.000	0.000	0.000	0.96
		C	0.000	0.000	0.000	6.125	0.66
L4	132.00-120.30	A	0.000	0.000	0.000	1.334	0.04
		B	0.000	0.000	0.000	0.000	0.36
		C	0.000	0.000	0.000	2.316	0.25
L5	120.30-79.21	A	0.000	0.000	0.000	0.000	0.15
		B	0.000	0.000	0.000	0.000	1.27
		C	0.000	0.000	0.000	8.137	0.88
L6	79.21-39.14	A	0.000	0.000	0.000	0.000	0.15
		B	0.000	0.000	0.000	0.000	1.24
		C	0.000	0.000	0.000	7.934	0.86
L7	39.14-0.00	A	0.000	0.000	0.000	0.000	0.12
		B	0.000	0.000	0.000	0.000	1.04
		C	0.000	0.000	0.000	6.166	0.67

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	226.00-197.96	A	0.937	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.71
		C		0.000	0.000	0.000	0.000	0.00
L2	197.96-162.93	A	0.919	0.000	0.000	0.000	0.000	0.04
		B		0.000	0.000	0.000	0.000	1.08

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	11.245	1.31
L3	162.93-132.00	A	0.897	0.000	0.000	0.000	0.333	0.11
		B		0.000	0.000	0.000	0.000	0.96
		C		0.000	0.000	0.000	11.811	1.59
L4	132.00-120.30	A	0.881	0.000	0.000	0.000	1.334	0.04
		B		0.000	0.000	0.000	0.000	0.36
		C		0.000	0.000	0.000	4.376	0.58
L5	120.30-79.21	A	0.856	0.000	0.000	0.000	0.000	0.15
		B		0.000	0.000	0.000	0.000	1.27
		C		0.000	0.000	0.000	15.376	2.05
L6	79.21-39.14	A	0.804	0.000	0.000	0.000	0.000	0.15
		B		0.000	0.000	0.000	0.000	1.24
		C		0.000	0.000	0.000	14.795	1.96
L7	39.14-0.00	A	0.750	0.000	0.000	0.000	0.000	0.12
		B		0.000	0.000	0.000	0.000	1.04
		C		0.000	0.000	0.000	11.175	1.46

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	226.00-197.96	0.0000	0.0000	0.0000	0.0000
L2	197.96-162.93	-0.2013	0.1162	-0.3626	0.2093
L3	162.93-132.00	-0.2421	0.1232	-0.4266	0.2311
L4	132.00-120.30	-0.2377	-0.0192	-0.4166	0.0954
L5	120.30-79.21	-0.2459	0.1419	-0.4334	0.2502
L6	79.21-39.14	-0.2475	0.1429	-0.4356	0.2515
L7	39.14-0.00	-0.1963	0.1134	-0.3409	0.1968

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 K
**									
Flash Beacon Lighting	C	From Leg	3.00 0.00 2.00	0.0000	226.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.70 3.10 3.50 4.30 5.90	2.70 3.10 3.50 4.30 5.90	0.05 0.07 0.09 0.13 0.21
Lightning Rod 5/8x4'	C	From Leg	4.00 0.00 6.00	0.0000	226.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.25 0.66 0.97 1.49 2.68	0.25 0.66 0.97 1.49 2.68	0.03 0.03 0.04 0.06 0.14
**									
(2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	6.00 0.00 0.00	30.0000	228.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.56 5.11 5.61 6.65 8.83	10.73 11.99 12.97 14.98 19.22	0.05 0.11 0.19 0.36 0.86
(2) LPA-80080/6CF w/ Mount Pipe	B	From Leg	6.00 0.00	30.0000	228.00	No Ice 1/2"	4.56 5.11	10.73 11.99	0.05 0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	5.61	12.97	0.19
						1" Ice	6.65	14.98	0.36
						2" Ice	8.83	19.22	0.86
						4" Ice			
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	6.00 0.00 0.00	30.0000	228.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.56 5.11 5.61 6.65 8.83	10.73 11.99 12.97 14.98 19.22	0.05 0.11 0.19 0.36 0.86
MG D3-800Tx w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	30.0000	228.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.57 3.98 4.39 5.33 7.34	3.42 4.12 4.78 6.16 9.18	0.03 0.07 0.11 0.21 0.52
MG D3-800Tx w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	30.0000	228.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.57 3.98 4.39 5.33 7.34	3.42 4.12 4.78 6.16 9.18	0.03 0.07 0.11 0.21 0.52
MG D3-800Tx w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	30.0000	228.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.57 3.98 4.39 5.33 7.34	3.42 4.12 4.78 6.16 9.18	0.03 0.07 0.11 0.21 0.52
P65.16.XL.2 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	30.0000	228.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.64 9.29 9.91 11.18 13.83	5.78 6.95 7.83 9.63 13.44	0.06 0.12 0.19 0.36 0.84
P65.16.XL.2 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	30.0000	228.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.64 9.29 9.91 11.18 13.83	5.78 6.95 7.83 9.63 13.44	0.06 0.12 0.19 0.36 0.84
P65.16.XL.2 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	30.0000	228.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.64 9.29 9.91 11.18 13.83	5.78 6.95 7.83 9.63 13.44	0.06 0.12 0.19 0.36 0.84
(2) FD9R6004/2C-3L	A	From Leg	4.00 0.00 0.00	30.0000	228.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
(2) FD9R6004/2C-3L	B	From Leg	4.00 0.00 0.00	30.0000	228.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
(2) FD9R6004/2C-3L	C	From Leg	4.00 0.00 0.00	30.0000	228.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
Transition Ladder	C	From Leg	2.00	0.0000	228.00	No Ice	6.00	6.00	0.16

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 -4.00			1/2" Ice 1" Ice 2" Ice 4" Ice	8.00 10.00 14.00 22.00 22.00	8.00 10.00 14.00 22.00 22.00	0.24 0.32 0.48 0.80
Side Arm Mount [SO 202-3]	C	From Leg	4.00 0.00 0.00	0.0000	228.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.18 8.56 10.94 15.70 25.22	6.18 8.56 10.94 15.70 25.22	0.33 0.40 0.47 0.61 0.90
Platform Mount [LP 713-1]	C	None		0.0000	228.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	31.27 39.68 48.09 64.91 98.55	31.27 39.68 48.09 64.91 98.55	1.51 1.93 2.35 3.19 4.86
**									
(4) DB846G90A-XY w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	220.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.23 5.78 6.30 7.37 9.69	7.53 8.72 9.62 11.45 15.60	0.04 0.10 0.16 0.32 0.77
(3) DB846G90A-XY w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	220.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.23 5.78 6.30 7.37 9.69	7.53 8.72 9.62 11.45 15.60	0.04 0.10 0.16 0.32 0.77
(3) DB846G90A-XY w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	220.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.23 5.78 6.30 7.37 9.69	7.53 8.72 9.62 11.45 15.60	0.04 0.10 0.16 0.32 0.77
DB846F65ZAXY w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	220.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.27 7.88 8.48 9.72 12.33	7.82 9.01 9.91 11.81 15.98	0.05 0.11 0.19 0.37 0.87
DB846F65ZAXY w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	220.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.27 7.88 8.48 9.72 12.33	7.82 9.01 9.91 11.81 15.98	0.05 0.11 0.19 0.37 0.87
Transition Ladder	C	From Leg	2.00 0.00 -4.00	0.0000	220.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.00 8.00 10.00 14.00 22.00	6.00 8.00 10.00 14.00 22.00	0.16 0.24 0.32 0.48 0.80
Platform Mount [LP 712-1]	C	None		0.0000	220.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.53 29.94 35.35 46.17 67.81	24.53 29.94 35.35 46.17 67.81	1.34 1.65 1.96 2.58 3.82
**									
(2) CS72993.07	A	From Leg	4.00 0.00 2.00	0.0000	205.00	No Ice 1/2" Ice 1" Ice	1.43 1.59 1.76 2.13	0.42 0.54 0.66 0.93	0.02 0.03 0.04 0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice 4" Ice	2.98	1.59	0.15
(2) CS72993.07	B	From Leg	4.00 0.00 2.00	0.0000	205.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.59 1.76 2.13 2.98	0.42 0.54 0.66 0.93 1.59	0.02 0.03 0.04 0.06 0.15
(2) CS72993.07	C	From Leg	4.00 0.00 2.00	0.0000	205.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.59 1.76 2.13 2.98	0.42 0.54 0.66 0.93 1.59	0.02 0.03 0.04 0.06 0.15
RR65-18-02DP w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	205.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	0.03 0.07 0.12 0.22 0.56
RR65-18-02DP w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	205.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	0.03 0.07 0.12 0.22 0.56
RR65-18-02DP w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	205.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	0.03 0.07 0.12 0.22 0.56
Transition Ladder	C	From Leg	2.00 0.00 -4.00	0.0000	205.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.00 8.00 10.00 14.00 22.00	6.00 8.00 10.00 14.00 22.00	0.16 0.24 0.32 0.48 0.80
Platform Mount [LP 712-1]	C	None		0.0000	205.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.53 29.94 35.35 46.17 67.81	24.53 29.94 35.35 46.17 67.81	1.34 1.65 1.96 2.58 3.82
**									
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	23.0000	193.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.30 7.48 8.37 10.18 14.02	0.07 0.14 0.21 0.38 0.87
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	23.0000	193.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.30 7.48 8.37 10.18 14.02	0.07 0.14 0.21 0.38 0.87
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	23.0000	193.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.30 7.48 8.37 10.18 14.02	0.07 0.14 0.21 0.38 0.87
800 10121 w/ Mount Pipe	A	From Leg	4.00 0.00	23.0000	193.00	No Ice 1/2"	5.69 6.18	4.60 5.35	0.07 0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			2.00			Ice	6.68	6.05	0.17
						1" Ice	7.70	7.53	0.30
						2" Ice	9.86	10.83	0.68
						4" Ice			
800 10121 w/ Mount Pipe	B	From Leg	4.00	23.0000	193.00	No Ice	5.69	4.60	0.07
			0.00			1/2"	6.18	5.35	0.11
			2.00			Ice	6.68	6.05	0.17
						1" Ice	7.70	7.53	0.30
						2" Ice	9.86	10.83	0.68
						4" Ice			
800 10121 w/ Mount Pipe	C	From Leg	4.00	23.0000	193.00	No Ice	5.69	4.60	0.07
			0.00			1/2"	6.18	5.35	0.11
			2.00			Ice	6.68	6.05	0.17
						1" Ice	7.70	7.53	0.30
						2" Ice	9.86	10.83	0.68
						4" Ice			
DTMABP7819VG12A	A	From Leg	4.00	23.0000	193.00	No Ice	1.14	0.39	0.02
			0.00			1/2"	1.28	0.49	0.03
			0.00			Ice	1.44	0.59	0.04
						1" Ice	1.77	0.83	0.06
						2" Ice	2.54	1.41	0.14
						4" Ice			
DTMABP7819VG12A	A	From Leg	4.00	23.0000	193.00	No Ice	1.14	0.39	0.02
			0.00			1/2"	1.28	0.49	0.03
			2.00			Ice	1.44	0.59	0.04
						1" Ice	1.77	0.83	0.06
						2" Ice	2.54	1.41	0.14
						4" Ice			
DTMABP7819VG12A	B	From Leg	4.00	23.0000	193.00	No Ice	1.14	0.39	0.02
			0.00			1/2"	1.28	0.49	0.03
			0.00			Ice	1.44	0.59	0.04
						1" Ice	1.77	0.83	0.06
						2" Ice	2.54	1.41	0.14
						4" Ice			
DTMABP7819VG12A	B	From Leg	4.00	23.0000	193.00	No Ice	1.14	0.39	0.02
			0.00			1/2"	1.28	0.49	0.03
			2.00			Ice	1.44	0.59	0.04
						1" Ice	1.77	0.83	0.06
						2" Ice	2.54	1.41	0.14
						4" Ice			
DTMABP7819VG12A	C	From Leg	4.00	23.0000	193.00	No Ice	1.14	0.39	0.02
			0.00			1/2"	1.28	0.49	0.03
			0.00			Ice	1.44	0.59	0.04
						1" Ice	1.77	0.83	0.06
						2" Ice	2.54	1.41	0.14
						4" Ice			
DTMABP7819VG12A	C	From Leg	4.00	23.0000	193.00	No Ice	1.14	0.39	0.02
			0.00			1/2"	1.28	0.49	0.03
			2.00			Ice	1.44	0.59	0.04
						1" Ice	1.77	0.83	0.06
						2" Ice	2.54	1.41	0.14
						4" Ice			
DC6-48-60-18-8F	B	From Leg	4.00	23.0000	193.00	No Ice	2.57	2.57	0.02
			0.00			1/2"	2.80	2.80	0.04
			2.00			Ice	3.04	3.04	0.07
						1" Ice	3.54	3.54	0.13
						2" Ice	4.66	4.66	0.30
						4" Ice			
(2) 860 10025	A	From Leg	4.00	23.0000	193.00	No Ice	0.16	0.13	0.00
			0.00			1/2"	0.22	0.19	0.00
			0.00			Ice	0.29	0.26	0.01
						1" Ice	0.47	0.43	0.01
						2" Ice	0.92	0.87	0.05
						4" Ice			
(2) 860 10025	B	From Leg	4.00	23.0000	193.00	No Ice	0.16	0.13	0.00

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* K
			0.00			1/2"	0.22	0.19	0.00
			0.00			Ice	0.29	0.26	0.01
						1" Ice	0.47	0.43	0.01
						2" Ice	0.92	0.87	0.05
						4" Ice			
(2) 860 10025	C	From Leg	4.00	23.0000	193.00	No Ice	0.16	0.13	0.00
			0.00			1/2"	0.22	0.19	0.00
			0.00			Ice	0.29	0.26	0.01
						1" Ice	0.47	0.43	0.01
						2" Ice	0.92	0.87	0.05
						4" Ice			
RRUS 11	A	From Leg	4.00	23.0000	193.00	No Ice	3.25	1.37	0.05
			0.00			1/2"	3.49	1.55	0.07
			2.00			Ice	3.74	1.74	0.10
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
RRUS 11	B	From Leg	4.00	23.0000	193.00	No Ice	3.25	1.37	0.05
			0.00			1/2"	3.49	1.55	0.07
			2.00			Ice	3.74	1.74	0.10
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
RRUS 11	C	From Leg	4.00	23.0000	193.00	No Ice	3.25	1.37	0.05
			0.00			1/2"	3.49	1.55	0.07
			2.00			Ice	3.74	1.74	0.10
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
OPA-65R-LCUU-H6 w/ Mount Pipe	A	From Leg	4.00	23.0000	193.00	No Ice	10.60	7.18	0.10
			0.00			1/2"	11.27	8.36	0.18
			2.00			Ice	11.91	9.26	0.26
						1" Ice	13.21	11.09	0.46
						2" Ice	15.93	15.15	1.00
						4" Ice			
OPA-65R-LCUU-H6 w/ Mount Pipe	B	From Leg	4.00	23.0000	193.00	No Ice	10.60	7.18	0.10
			0.00			1/2"	11.27	8.36	0.18
			2.00			Ice	11.91	9.26	0.26
						1" Ice	13.21	11.09	0.46
						2" Ice	15.93	15.15	1.00
						4" Ice			
OPA-65R-LCUU-H6 w/ Mount Pipe	C	From Leg	4.00	23.0000	193.00	No Ice	10.60	7.18	0.10
			0.00			1/2"	11.27	8.36	0.18
			2.00			Ice	11.91	9.26	0.26
						1" Ice	13.21	11.09	0.46
						2" Ice	15.93	15.15	1.00
						4" Ice			
RRUS A2 MODULE	A	From Leg	4.00	23.0000	193.00	No Ice	1.87	0.42	0.02
			0.00			1/2"	2.05	0.53	0.03
			2.00			Ice	2.24	0.65	0.04
						1" Ice	2.66	0.91	0.08
						2" Ice	3.58	1.54	0.18
						4" Ice			
RRUS A2 MODULE	B	From Leg	4.00	23.0000	193.00	No Ice	1.87	0.42	0.02
			0.00			1/2"	2.05	0.53	0.03
			2.00			Ice	2.24	0.65	0.04
						1" Ice	2.66	0.91	0.08
						2" Ice	3.58	1.54	0.18
						4" Ice			
RRUS A2 MODULE	C	From Leg	4.00	23.0000	193.00	No Ice	1.87	0.42	0.02
			0.00			1/2"	2.05	0.53	0.03
			2.00			Ice	2.24	0.65	0.04
						1" Ice	2.66	0.91	0.08
						2" Ice	3.58	1.54	0.18
						4" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RRUS 12-B2	A	From Leg	4.00 0.00 2.00	23.0000	193.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.67 3.92 4.19 4.74 5.96	1.48 1.67 1.86 2.27 3.20	0.06 0.08 0.11 0.17 0.34
RRUS 12-B2	B	From Leg	4.00 0.00 2.00	23.0000	193.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.67 3.92 4.19 4.74 5.96	1.48 1.67 1.86 2.27 3.20	0.06 0.08 0.11 0.17 0.34
RRUS 12-B2	C	From Leg	4.00 0.00 2.00	23.0000	193.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.67 3.92 4.19 4.74 5.96	1.48 1.67 1.86 2.27 3.20	0.06 0.08 0.11 0.17 0.34
Transition Ladder	C	From Leg	2.00 0.00 -4.00	0.0000	193.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.00 8.00 10.00 14.00 22.00	6.00 8.00 10.00 14.00 22.00	0.16 0.24 0.32 0.48 0.80
Platform Mount [LP 712-1]	C	None		0.0000	193.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.53 29.94 35.35 46.17 67.81	24.53 29.94 35.35 46.17 67.81	1.34 1.65 1.96 2.58 3.82
**									
APXV18-206517S-C w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.96 6.48 7.55 9.92	4.70 5.86 6.73 8.51 12.28	0.05 0.10 0.15 0.28 0.68
APXV18-206517S-C w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.96 6.48 7.55 9.92	4.70 5.86 6.73 8.51 12.28	0.05 0.10 0.15 0.28 0.68
APXV18-206517S-C w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.96 6.48 7.55 9.92	4.70 5.86 6.73 8.51 12.28	0.05 0.10 0.15 0.28 0.68
978QNB120E-M w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.79 9.33 9.87 10.97 13.29	5.15 5.92 6.65 8.22 11.58	0.06 0.12 0.19 0.35 0.80
978QNB120E-M w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.79 9.33 9.87 10.97 13.29	5.15 5.92 6.65 8.22 11.58	0.06 0.12 0.19 0.35 0.80
978QNB120E-M w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	8.79 9.33 9.87 10.97	5.15 5.92 6.65 8.22	0.06 0.12 0.19 0.35

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	13.29	11.58	0.80
						4" Ice			
(2) FV90-16-02DP w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	23.0000	185.00	No Ice	4.59	3.32	0.04
						1/2" Ice	5.09	4.09	0.08
						1" Ice	5.58	4.78	0.12
						2" Ice	6.59	6.23	0.23
						4" Ice	8.73	9.31	0.56
(2) FV90-16-02DP w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	23.0000	185.00	No Ice	4.59	3.32	0.04
						1/2" Ice	5.09	4.09	0.08
						1" Ice	5.58	4.78	0.12
						2" Ice	6.59	6.23	0.23
						4" Ice	8.73	9.31	0.56
(2) FV90-16-02DP w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	23.0000	185.00	No Ice	4.59	3.32	0.04
						1/2" Ice	5.09	4.09	0.08
						1" Ice	5.58	4.78	0.12
						2" Ice	6.59	6.23	0.23
						4" Ice	8.73	9.31	0.56
CS72993.07	A	From Leg	4.00 0.00 2.00	23.0000	185.00	No Ice	1.43	0.42	0.02
						1/2" Ice	1.59	0.54	0.03
						1" Ice	1.76	0.66	0.04
						2" Ice	2.13	0.93	0.06
						4" Ice	2.98	1.59	0.15
CS72993.07	B	From Leg	4.00 0.00 2.00	23.0000	185.00	No Ice	1.43	0.42	0.02
						1/2" Ice	1.59	0.54	0.03
						1" Ice	1.76	0.66	0.04
						2" Ice	2.13	0.93	0.06
						4" Ice	2.98	1.59	0.15
CS72993.07	C	From Leg	4.00 0.00 2.00	23.0000	185.00	No Ice	1.43	0.42	0.02
						1/2" Ice	1.59	0.54	0.03
						1" Ice	1.76	0.66	0.04
						2" Ice	2.13	0.93	0.06
						4" Ice	2.98	1.59	0.15
Transition Ladder	C	From Leg	2.00 0.00 -4.00	0.0000	185.00	No Ice	6.00	6.00	0.16
						1/2" Ice	8.00	8.00	0.24
						1" Ice	10.00	10.00	0.32
						2" Ice	14.00	14.00	0.48
						4" Ice	22.00	22.00	0.80
Platform Mount [LP 712-1]	C	None		0.0000	185.00	No Ice	24.53	24.53	1.34
						1/2" Ice	29.94	29.94	1.65
						1" Ice	35.35	35.35	1.96
						2" Ice	46.17	46.17	2.58
						4" Ice	67.81	67.81	3.82
**									
TME-1900MHz RRH (65MHz)	A	From Leg	1.00 0.00 -3.00	20.0000	176.00	No Ice	2.70	2.77	0.06
						1/2" Ice	2.94	3.01	0.08
						1" Ice	3.18	3.26	0.11
						2" Ice	3.70	3.78	0.18
						4" Ice	4.85	4.93	0.35
TME-1900MHz RRH (65MHz)	B	From Leg	1.00 0.00 -3.00	10.0000	176.00	No Ice	2.70	2.77	0.06
						1/2" Ice	2.94	3.01	0.08
						1" Ice	3.18	3.26	0.11
						2" Ice	3.70	3.78	0.18
						4" Ice	4.85	4.93	0.35
TME-1900MHz RRH (65MHz)	C	From Leg	1.00 0.00	20.0000	176.00	No Ice	2.70	2.77	0.06
						1/2" Ice	2.94	3.01	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			-3.00			Ice	3.18	3.26	0.11
						1" Ice	3.70	3.78	0.18
						2" Ice	4.85	4.93	0.35
						4" Ice			
TME-800MHZ RRH	A	From Leg	1.00	20.0000	176.00	No Ice	2.49	2.07	0.05
			0.00			1/2"	2.71	2.27	0.07
			1.00			Ice	2.93	2.48	0.10
						1" Ice	3.41	2.93	0.16
						2" Ice	4.46	3.93	0.32
						4" Ice			
TME-800MHZ RRH	B	From Leg	1.00	10.0000	176.00	No Ice	2.49	2.07	0.05
			0.00			1/2"	2.71	2.27	0.07
			1.00			Ice	2.93	2.48	0.10
						1" Ice	3.41	2.93	0.16
						2" Ice	4.46	3.93	0.32
						4" Ice			
TME-800MHZ RRH	C	From Leg	1.00	20.0000	176.00	No Ice	2.49	2.07	0.05
			0.00			1/2"	2.71	2.27	0.07
			1.00			Ice	2.93	2.48	0.10
						1" Ice	3.41	2.93	0.16
						2" Ice	4.46	3.93	0.32
						4" Ice			
6' x 2" Mount Pipe	A	From Leg	1.00	0.0000	176.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice	4.70	4.70	0.23
						4" Ice			
6' x 2" Mount Pipe	B	From Leg	1.00	0.0000	176.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice	4.70	4.70	0.23
						4" Ice			
6' x 2" Mount Pipe	C	From Leg	1.00	0.0000	176.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice	4.70	4.70	0.23
						4" Ice			
Side Arm Mount [SO 102-3]	C	None		0.0000	176.00	No Ice	3.00	3.00	0.08
						1/2"	3.48	3.48	0.11
						Ice	3.96	3.96	0.14
						1" Ice	4.92	4.92	0.20
						2" Ice	6.84	6.84	0.32
						4" Ice			
**									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00	20.0000	175.00	No Ice	8.50	6.95	0.08
			0.00			1/2"	9.15	8.13	0.15
			0.00			Ice	9.77	9.02	0.23
						1" Ice	11.03	10.84	0.41
						2" Ice	13.68	14.85	0.91
						4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00	10.0000	175.00	No Ice	8.50	6.95	0.08
			0.00			1/2"	9.15	8.13	0.15
			0.00			Ice	9.77	9.02	0.23
						1" Ice	11.03	10.84	0.41
						2" Ice	13.68	14.85	0.91
						4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00	20.0000	175.00	No Ice	8.50	6.95	0.08
			0.00			1/2"	9.15	8.13	0.15
			0.00			Ice	9.77	9.02	0.23
						1" Ice	11.03	10.84	0.41
						2" Ice	13.68	14.85	0.91
						4" Ice			

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* ft ft ft	*Azimuth Adjustment* °	*Placement* ft		*C_AA_A Front* ft^2	*C_AA_A Side* ft^2	*Weight* K
800 EXTERNAL NOTCH FILTER	A	From Leg	4.00 0.00 0.00	20.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	0.01 0.02 0.02 0.04 0.11
800 EXTERNAL NOTCH FILTER	B	From Leg	4.00 0.00 0.00	10.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	0.01 0.02 0.02 0.04 0.11
800 EXTERNAL NOTCH FILTER	C	From Leg	4.00 0.00 0.00	20.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	0.01 0.02 0.02 0.04 0.11
(3) ACU-A20-N	A	From Leg	4.00 0.00 0.00	20.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.00 0.00 0.00 0.01 0.04
(3) ACU-A20-N	B	From Leg	4.00 0.00 0.00	10.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.00 0.00 0.00 0.01 0.04
(3) ACU-A20-N	C	From Leg	4.00 0.00 0.00	20.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.00 0.00 0.00 0.01 0.04
(2) 6' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
(2) 6' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
(2) 6' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
Platform Mount [LP 1201-1]	C	None		0.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	23.10 26.80 30.50 37.90 52.70	23.10 26.80 30.50 37.90 52.70	2.10 2.50 2.90 3.70 5.30
**									
Honeywill Side-Light	A	From Leg	2.00 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice	0.28 0.36 0.46 0.69	0.28 0.36 0.46 0.69	0.00 0.01 0.01 0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	1.27	1.27	0.08
						4" Ice			
Honeywill Side-Light	B	From Leg	2.00	0.0000	113.00	No Ice	0.28	0.28	0.00
			0.00			1/2"	0.36	0.36	0.01
			0.00			Ice	0.46	0.46	0.01
						1" Ice	0.69	0.69	0.03
						2" Ice	1.27	1.27	0.08
						4" Ice			
**									
GPS_A	A	From Leg	2.00	0.0000	72.00	No Ice	0.30	0.30	0.00
			0.00			1/2"	0.37	0.37	0.00
			1.00			Ice	0.46	0.46	0.01
						1" Ice	0.65	0.65	0.02
						2" Ice	1.15	1.15	0.08
						4" Ice			
Side Arm Mount [SO 701-1]	A	From Leg	1.00	0.0000	72.00	No Ice	0.85	1.67	0.07
			0.00			1/2"	1.14	2.34	0.08
			0.00			Ice	1.43	3.01	0.09
						1" Ice	2.01	4.35	0.12
						2" Ice	3.17	7.03	0.18
						4" Ice			
**									

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
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

Comb. No.	Description
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 K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	226 - 197.961	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-14.60	5.02	-3.03
			Max. Mx	11	-5.77	330.79	-1.50
			Max. My	8	-5.80	2.51	-327.78
			Max. Vy	11	-17.93	330.79	-1.50
			Max. Vx	8	17.83	2.51	-327.78
			Max. Torque	7			-5.45
L2	197.961 - 162.932	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-36.46	7.82	-5.00
			Max. Mx	11	-18.03	1293.67	-2.24
			Max. My	8	-18.06	3.70	-1286.68
			Max. Vy	11	-37.49	1293.67	-2.24
			Max. Vx	8	37.35	3.70	-1286.68
			Max. Torque	7			-7.28
L3	162.932 - 132	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-48.74	10.09	-6.33
			Max. Mx	11	-28.24	2723.56	-2.62
			Max. My	8	-28.26	4.32	-2711.39
			Max. Vy	11	-41.74	2723.56	-2.62
			Max. Vx	8	41.60	4.32	-2711.39
			Max. Torque	7			-7.34
L4	132 - 120.305	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-50.89	10.46	-6.54
			Max. Mx	11	-30.09	2946.62	-2.68
			Max. My	8	-30.11	4.42	-2933.69
			Max. Vy	11	-42.41	2946.62	-2.68
			Max. Vx	8	42.27	4.42	-2933.69
			Max. Torque	7			-7.34
L5	120.305 - 79.2108	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-69.20	13.38	-8.24
			Max. Mx	11	-45.65	4741.39	-3.08
			Max. My	8	-45.67	5.09	-4722.66
			Max. Vy	11	-47.31	4741.39	-3.08
			Max. Vx	8	47.17	5.09	-4722.66
			Max. Torque	7			-7.38
L6	79.2108 - 39.1405	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-91.36	16.40	-9.64
			Max. Mx	11	-64.82	6676.14	-3.26
			Max. My	8	-64.83	5.77	-6650.77
			Max. Vy	11	-51.81	6676.14	-3.26
			Max. Vx	8	51.64	5.77	-6650.77
			Max. Torque	7			-7.42
L7	39.1405 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-121.50	19.57	-11.47
			Max. Mx	11	-91.51	9266.41	-3.66
			Max. My	8	-91.51	6.46	-9232.77
			Max. Vy	11	-56.18	9266.41	-3.66
			Max. Vx	8	56.02	6.46	-9232.77
			Max. Torque	7			-7.46

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	24	121.50	13.30	-0.00
	Max. H_x	11	91.54	56.13	-0.00
	Max. H_z	2	91.54	0.00	55.97
	Max. M_x	2	9225.41	0.00	55.97
	Max. M_z	5	9253.44	-56.13	-0.00
	Max. Torsion	13	7.45	28.07	48.47
	Min. Vert	1	91.54	0.00	-0.00
	Min. H_x	5	91.54	-56.13	-0.00
	Min. H_z	8	91.54	0.00	-55.97
	Min. M_x	8	-9232.77	0.00	-55.97
	Min. M_z	11	-9266.41	56.13	-0.00
	Min. Torsion	7	-7.46	-28.07	-48.47

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	91.54	-0.00	0.00	3.60	6.35	0.00
Dead+Wind 0 deg - No Ice	91.54	-0.00	-55.97	-9225.41	6.46	-6.26
Dead+Wind 30 deg - No Ice	91.54	28.07	-48.47	-7988.91	-4623.55	-3.38
Dead+Wind 60 deg - No Ice	91.54	48.61	-27.98	-4610.81	-8012.88	0.40
Dead+Wind 90 deg - No Ice	91.54	56.13	0.00	3.66	-9253.44	4.08
Dead+Wind 120 deg - No Ice	91.54	48.61	27.98	4618.14	-8012.90	6.67
Dead+Wind 150 deg - No Ice	91.54	28.07	48.47	7996.26	-4623.57	7.46
Dead+Wind 180 deg - No Ice	91.54	-0.00	55.97	9232.77	6.46	6.26
Dead+Wind 210 deg - No Ice	91.54	-28.07	48.47	7996.28	4636.51	3.37
Dead+Wind 240 deg - No Ice	91.54	-48.61	27.98	4618.15	8025.86	-0.41
Dead+Wind 270 deg - No Ice	91.54	-56.13	0.00	3.66	9266.41	-4.08
Dead+Wind 300 deg - No Ice	91.54	-48.61	-27.98	-4610.83	8025.84	-6.66
Dead+Wind 330 deg - No Ice	91.54	-28.07	-48.47	-7988.93	4636.49	-7.45
Dead+Ice+Temp	121.50	-0.00	0.00	11.47	19.57	-0.00
Dead+Wind 0 deg+Ice+Temp	121.50	-0.00	-13.26	-2311.43	19.82	-2.14
Dead+Wind 30 deg+Ice+Temp	121.50	6.65	-11.48	-2000.21	-1144.93	-1.19
Dead+Wind 60 deg+Ice+Temp	121.50	11.51	-6.63	-1149.91	-1997.59	0.08
Dead+Wind 90 deg+Ice+Temp	121.50	13.30	0.00	11.62	-2309.68	1.33
Dead+Wind 120 deg+Ice+Temp	121.50	11.51	6.63	1173.15	-1997.60	2.22
Dead+Wind 150 deg+Ice+Temp	121.50	6.65	11.48	2023.46	-1144.94	2.52
Dead+Wind 180 deg+Ice+Temp	121.50	-0.00	13.26	2334.68	19.82	2.14
Dead+Wind 210 deg+Ice+Temp	121.50	-6.65	11.48	2023.46	1184.58	1.19
Dead+Wind 240 deg+Ice+Temp	121.50	-11.51	6.63	1173.16	2037.25	-0.08
Dead+Wind 270 deg+Ice+Temp	121.50	-13.30	0.00	11.62	2349.33	-1.33
Dead+Wind 300 deg+Ice+Temp	121.50	-11.51	-6.63	-1149.91	2037.24	-2.22
Dead+Wind 330	121.50	-6.65	-11.48	-2000.21	1184.58	-2.52

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
deg+Ice+Temp						
Dead+Wind 0 deg - Service	91.54	-0.00	-19.37	-3196.79	6.56	-2.21
Dead+Wind 30 deg - Service	91.54	9.71	-16.77	-2768.00	-1599.07	-1.19
Dead+Wind 60 deg - Service	91.54	16.82	-9.68	-1596.53	-2774.48	0.14
Dead+Wind 90 deg - Service	91.54	19.42	0.00	3.72	-3204.68	1.44
Dead+Wind 120 deg - Service	91.54	16.82	9.68	1603.98	-2774.48	2.36
Dead+Wind 150 deg - Service	91.54	9.71	16.77	2775.45	-1599.07	2.64
Dead+Wind 180 deg - Service	91.54	-0.00	19.37	3204.24	6.56	2.21
Dead+Wind 210 deg - Service	91.54	-9.71	16.77	2775.46	1612.20	1.19
Dead+Wind 240 deg - Service	91.54	-16.82	9.68	1603.98	2787.61	-0.15
Dead+Wind 270 deg - Service	91.54	-19.42	0.00	3.72	3217.81	-1.44
Dead+Wind 300 deg - Service	91.54	-16.82	-9.68	-1596.53	2787.60	-2.36
Dead+Wind 330 deg - Service	91.54	-9.71	-16.77	-2768.00	1612.20	-2.64

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-91.54	0.00	0.00	91.54	-0.00	0.000%
2	0.00	-91.54	-55.97	0.00	91.54	55.97	0.000%
3	28.07	-91.54	-48.47	-28.07	91.54	48.47	0.000%
4	48.61	-91.54	-27.98	-48.61	91.54	27.98	0.000%
5	56.13	-91.54	0.00	-56.13	91.54	-0.00	0.000%
6	48.61	-91.54	27.98	-48.61	91.54	-27.98	0.000%
7	28.07	-91.54	48.47	-28.07	91.54	-48.47	0.000%
8	0.00	-91.54	55.97	0.00	91.54	-55.97	0.000%
9	-28.07	-91.54	48.47	28.07	91.54	-48.47	0.000%
10	-48.61	-91.54	27.98	48.61	91.54	-27.98	0.000%
11	-56.13	-91.54	0.00	56.13	91.54	-0.00	0.000%
12	-48.61	-91.54	-27.98	48.61	91.54	27.98	0.000%
13	-28.07	-91.54	-48.47	28.07	91.54	48.47	0.000%
14	0.00	-121.50	0.00	0.00	121.50	-0.00	0.000%
15	0.00	-121.50	-13.26	0.00	121.50	13.26	0.000%
16	6.65	-121.50	-11.48	-6.65	121.50	11.48	0.000%
17	11.51	-121.50	-6.63	-11.51	121.50	6.63	0.000%
18	13.30	-121.50	0.00	-13.30	121.50	-0.00	0.000%
19	11.51	-121.50	6.63	-11.51	121.50	-6.63	0.000%
20	6.65	-121.50	11.48	-6.65	121.50	-11.48	0.000%
21	0.00	-121.50	13.26	0.00	121.50	-13.26	0.000%
22	-6.65	-121.50	11.48	6.65	121.50	-11.48	0.000%
23	-11.51	-121.50	6.63	11.51	121.50	-6.63	0.000%
24	-13.30	-121.50	0.00	13.30	121.50	-0.00	0.000%
25	-11.51	-121.50	-6.63	11.51	121.50	6.63	0.000%
26	-6.65	-121.50	-11.48	6.65	121.50	11.48	0.000%
27	0.00	-91.54	-19.37	0.00	91.54	19.37	0.000%
28	9.71	-91.54	-16.77	-9.71	91.54	16.77	0.000%
29	16.82	-91.54	-9.68	-16.82	91.54	9.68	0.000%
30	19.42	-91.54	0.00	-19.42	91.54	-0.00	0.000%
31	16.82	-91.54	9.68	-16.82	91.54	-9.68	0.000%
32	9.71	-91.54	16.77	-9.71	91.54	-16.77	0.000%
33	0.00	-91.54	19.37	0.00	91.54	-19.37	0.000%
34	-9.71	-91.54	16.77	9.71	91.54	-16.77	0.000%
35	-16.82	-91.54	9.68	16.82	91.54	-9.68	0.000%
36	-19.42	-91.54	0.00	19.42	91.54	-0.00	0.000%
37	-16.82	-91.54	-9.68	16.82	91.54	9.68	0.000%
38	-9.71	-91.54	-16.77	9.71	91.54	16.77	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00029183
3	Yes	6	0.00000001	0.00020639
4	Yes	6	0.00000001	0.00020993
5	Yes	5	0.00000001	0.00019895
6	Yes	6	0.00000001	0.00022074
7	Yes	6	0.00000001	0.00020151
8	Yes	5	0.00000001	0.00029191
9	Yes	6	0.00000001	0.00021606
10	Yes	6	0.00000001	0.00021243
11	Yes	5	0.00000001	0.00019905
12	Yes	6	0.00000001	0.00020256
13	Yes	6	0.00000001	0.00022190
14	Yes	4	0.00000001	0.00014408
15	Yes	5	0.00000001	0.00083365
16	Yes	6	0.00000001	0.00010579
17	Yes	6	0.00000001	0.00010679
18	Yes	5	0.00000001	0.00082535
19	Yes	6	0.00000001	0.00011181
20	Yes	6	0.00000001	0.00010683
21	Yes	5	0.00000001	0.00084660
22	Yes	6	0.00000001	0.00011350
23	Yes	6	0.00000001	0.00011233
24	Yes	5	0.00000001	0.00084626
25	Yes	6	0.00000001	0.00010827
26	Yes	6	0.00000001	0.00011342
27	Yes	5	0.00000001	0.00006373
28	Yes	5	0.00000001	0.00037144
29	Yes	5	0.00000001	0.00038343
30	Yes	4	0.00000001	0.00081264
31	Yes	5	0.00000001	0.00042489
32	Yes	5	0.00000001	0.00035982
33	Yes	5	0.00000001	0.00006403
34	Yes	5	0.00000001	0.00041147
35	Yes	5	0.00000001	0.00039899
36	Yes	4	0.00000001	0.00081927
37	Yes	5	0.00000001	0.00036485
38	Yes	5	0.00000001	0.00043051

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	226 - 197.961	66.975	36	3.0216	0.0234
L2	202.042 - 162.932	52.403	36	2.7114	0.0117
L3	168.07 - 132	34.731	36	2.1969	0.0060
L4	132 - 120.305	20.338	36	1.5728	0.0030
L5	126.698 - 79.2108	18.633	36	1.4984	0.0028
L6	86.7941 - 39.1405	8.364	36	0.9248	0.0013
L7	47.8645 - 0	2.533	36	0.4790	0.0006

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
228.00	(2) LPA-80080/6CF w/ Mount Pipe	36	66.975	3.0216	0.0234	16030
226.00	Flash Beacon Lighting	36	66.975	3.0216	0.0234	16030
220.00	(4) DB846G90A-XY w/ Mount Pipe	36	63.245	2.9454	0.0201	13358
205.00	(2) CS72993.07	36	54.133	2.7510	0.0128	3826
193.00	AM-X-CD-16-65-00T-RET w/ Mount Pipe	36	47.309	2.5865	0.0091	3422
185.00	APXV18-206517S-C w/ Mount Pipe	36	43.042	2.4697	0.0077	3494
176.00	TME-1900MHz RRH (65MHz)	36	38.504	2.3295	0.0067	3579
175.00	APXVSPP18-C-A20 w/ Mount Pipe	36	38.016	2.3133	0.0066	3589
113.00	Honeywill Side-Light	36	14.610	1.3006	0.0022	4306
72.00	GPS_A	36	5.663	0.7411	0.0010	4422

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	226 - 197.961	191.829	11	8.6190	0.0670
L2	202.042 - 162.932	150.290	11	7.7658	0.0334
L3	168.07 - 132	99.741	11	6.3047	0.0169
L4	132 - 120.305	58.468	11	4.5197	0.0085
L5	126.698 - 79.2108	53.573	11	4.3063	0.0078
L6	86.7941 - 39.1405	24.067	11	2.6603	0.0038
L7	47.8645 - 0	7.291	11	1.3787	0.0017

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
228.00	(2) LPA-80080/6CF w/ Mount Pipe	11	191.829	8.6190	0.0670	5948
226.00	Flash Beacon Lighting	11	191.829	8.6190	0.0670	5948
220.00	(4) DB846G90A-XY w/ Mount Pipe	11	181.202	8.4110	0.0575	4956
205.00	(2) CS72993.07	11	155.225	7.8761	0.0366	1416
193.00	AM-X-CD-16-65-00T-RET w/ Mount Pipe	11	135.741	7.4145	0.0260	1254
185.00	APXV18-206517S-C w/ Mount Pipe	11	123.537	7.0830	0.0219	1269
176.00	TME-1900MHz RRH (65MHz)	11	110.547	6.6834	0.0189	1288
175.00	APXVSPP18-C-A20 w/ Mount Pipe	11	109.152	6.6371	0.0186	1290
113.00	Honeywill Side-Light	11	42.018	3.7392	0.0062	1512
72.00	GPS_A	11	16.297	2.1324	0.0028	1543

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 K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	226 - 197.961 (1)	TP28.6437x21.5x0.1875	28.04	0.00	0.0	39.000	16.3163	-5.77	636.33	0.009
L2	197.961 - 162.932 (2)	TP37.108x27.229x0.375	39.11	0.00	0.0	39.000	42.1767	-18.03	1644.89	0.011
L3	162.932 - 132 (3)	TP44.1835x35.0602x0.4375	36.07	0.00	0.0	39.000	60.7467	-28.24	2369.12	0.012
L4	132 - 120.305 (4)	TP47.1416x44.1835x0.5755	11.70	0.00	0.0	31.461	82.1021	-30.09	2583.04	0.012
L5	120.305 - 79.2108 (5)	TP56.6581x44.6496x0.5	47.49	0.00	0.0	39.000	86.0796	-45.65	3357.10	0.014
L6	79.2108 - 39.1405 (6)	TP65.7875x53.7404x0.5625	47.65	0.00	0.0	39.000	104.6530	-57.00	4081.48	0.014
L7	39.1405 - 0 (7)	TP74.5x62.457x0.5625	47.86	0.00	0.0	39.000	114.4240	-72.22	4462.53	0.016

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	226 - 197.961 (1)	TP28.6437x21.5x0.1875	330.79	35.925	39.000	0.921	0.00	0.000	39.000	0.000
L2	197.961 - 162.932 (2)	TP37.108x27.229x0.375	1293.67	42.208	39.000	1.082	0.00	0.000	39.000	0.000
L3	162.932 - 132 (3)	TP44.1835x35.0602x0.4375	2723.56	49.947	39.000	1.281	0.00	0.000	39.000	0.000
L4	132 - 120.305 (4)	TP47.1416x44.1835x0.5755	2946.63	39.020	31.461	1.240	0.00	0.000	31.461	0.000
L5	120.305 - 79.2108 (5)	TP56.6581x44.6496x0.5	4741.40	49.451	39.000	1.268	0.00	0.000	39.000	0.000
L6	79.2108 - 39.1405 (6)	TP65.7875x53.7404x0.5625	5789.77	45.977	39.000	1.179	0.00	0.000	39.000	0.000
L7	39.1405 - 0 (7)	TP74.5x62.457x0.5625	7132.87	47.344	39.000	1.214	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	226 - 197.961 (1)	TP28.6437x21.5x0.1875	17.93	1.099	26.000	0.085	2.78	0.148	26.000	0.006
L2	197.961 - 162.932 (2)	TP37.108x27.229x0.375	37.49	0.889	26.000	0.068	4.22	0.067	26.000	0.003
L3	162.932 - 132 (3)	TP44.1835x35.0602x0.4375	41.74	0.687	26.000	0.053	4.24	0.038	26.000	0.001
L4	132 - 120.305 (4)	TP47.1416x44.1835x0.5755	42.41	0.517	20.974	0.049	4.24	0.027	20.974	0.001
L5	120.305 - 79.2108 (5)	TP56.6581x44.6496x0.5	47.31	0.550	26.000	0.042	4.25	0.022	26.000	0.001
L6	79.2108 - 39.1405 (6)	TP65.7875x53.7404x0.5625	50.19	0.480	26.000	0.037	4.01	0.015	26.000	0.001
L7	39.1405 - 0 (7)	TP74.5x62.457x0.5625	53.10	0.464	26.000	0.035	4.04	0.013	26.000	0.001

Pole Interaction Design Data

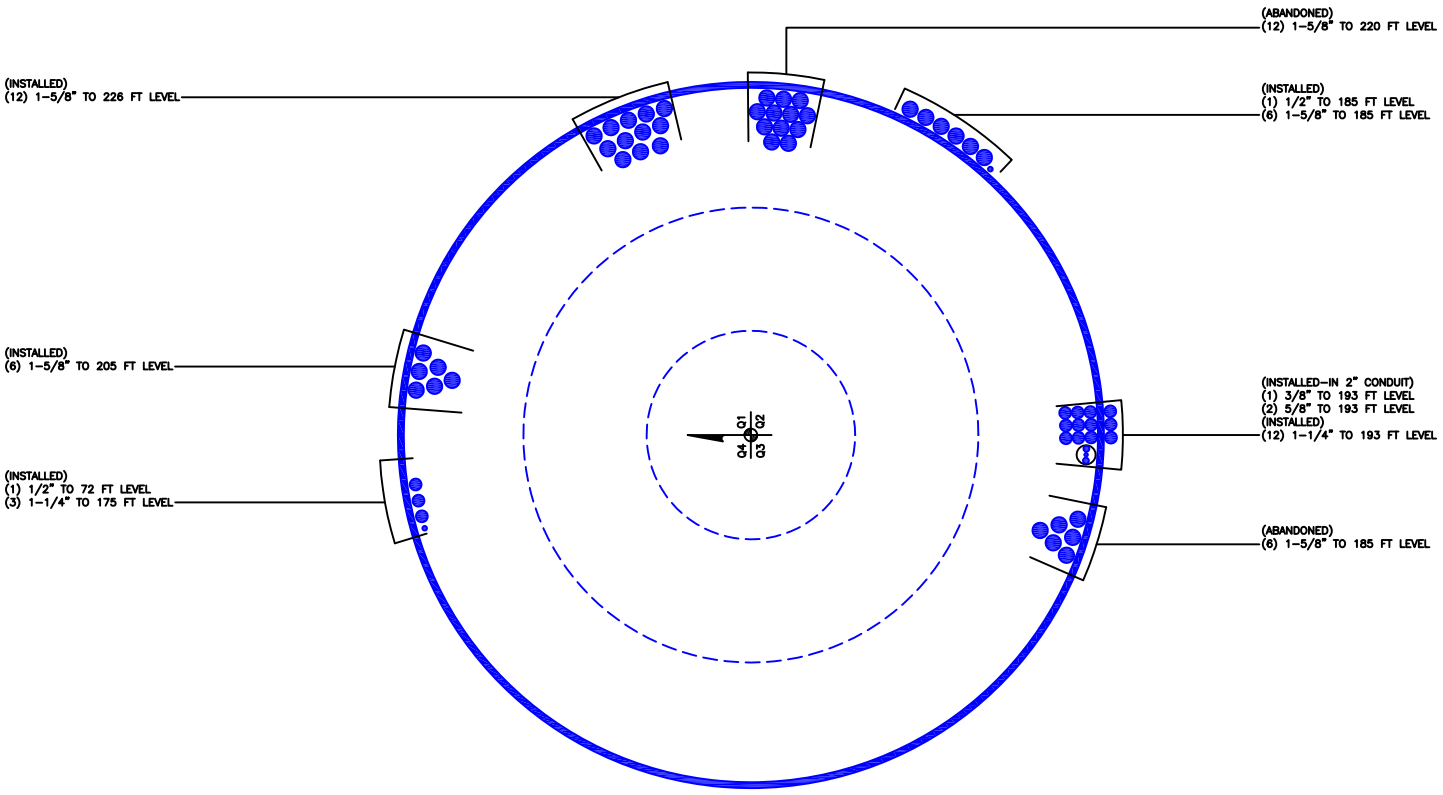
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	226 - 197.961 (1)	0.009	0.921	0.000	0.085	0.006	0.933 ✔	1.333	H1-3+VT ✔
L2	197.961 - 162.932 (2)	0.011	1.082	0.000	0.068	0.003	1.095 ✔	1.333	H1-3+VT ✔
L3	162.932 - 132 (3)	0.012	1.281	0.000	0.053	0.001	1.293 ✔	1.333	H1-3+VT ✔
L4	132 - 120.305 (4)	0.012	1.240	0.000	0.049	0.001	1.253 ✔	1.333	H1-3+VT ✔
L5	120.305 - 79.2108 (5)	0.014	1.268	0.000	0.042	0.001	1.282 ✔	1.333	H1-3+VT ✔
L6	79.2108 - 39.1405 (6)	0.014	1.179	0.000	0.037	0.001	1.193 ✔	1.333	H1-3+VT ✔
L7	39.1405 - 0 (7)	0.016	1.214	0.000	0.035	0.001	1.230 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	226 - 197.961	Pole	TP28.6437x21.5x0.1875	1	-5.77	848.23	70.0	Pass
L2	197.961 - 162.932	Pole	TP37.108x27.229x0.375	2	-18.03	2192.64	82.1	Pass
L3	162.932 - 132	Pole	TP44.1835x35.0602x0.4375	3	-28.24	3158.04	97.0	Pass
L4	132 - 120.305	Pole	TP47.1416x44.1835x0.5755	4	-30.09	3443.19	94.0	Pass
L5	120.305 - 79.2108	Pole	TP56.6581x44.6496x0.5	5	-45.65	4475.01	96.2	Pass
L6	79.2108 - 39.1405	Pole	TP65.7875x53.7404x0.5625	6	-57.00	5440.61	89.5	Pass
L7	39.1405 - 0	Pole	TP74.5x62.457x0.5625	7	-72.22	5948.55	92.3	Pass
							Summary	
						Pole (L3)	97.0	Pass
						RATING =	**97.0**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(ABANDONED)
(12) 1-5/8" TO 220 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 226 FT LEVEL
(INSTALLED)
(1) 1/2" TO 185 FT LEVEL
(6) 1-5/8" TO 185 FT LEVEL
(INSTALLED)
(6) 1-5/8" TO 205 FT LEVEL
(INSTALLED-IN 2" CONDUIT)
(1) 3/8" TO 193 FT LEVEL
(2) 5/8" TO 193 FT LEVEL
(INSTALLED)
(12) 1-1/4" TO 193 FT LEVEL
(INSTALLED)
(1) 1/2" TO 72 FT LEVEL
(3) 1-1/4" TO 175 FT LEVEL
(ABANDONED)
(6) 1-5/8" TO 185 FT LEVEL
Q1
Q2
Q3
Q4

APPENDIX C

ADDITIONAL CALCULATIONS

Reinforcement Capacity

AeroSolutions LLC
Optimizing Your Tower Infrastructure

5500 Flatirons Parkway, Suite 100
Boulder, CO 80301
720-304-6882

Dimensions and Properties														Compression				Axial				
																		ASD-9			LRFD	
Model	Weight (lb/ft)	Area (in^2)	Moment of Inertia (in^4)	Moment of Inertia (in^4)	Centroid from Mating Edge (in)	Centroid from Bolt Hole Center (in)	Web Thickness (in)	Width (in)	Flange Width (in)	Flange Thickness (in)	Hole Diameter (in)	Yield Stress (ksi)	Ultimate Stress (ksi)	Slender. Ratio Coefficient	Unbraced Length (in)	Slender. Ratio Coefficient	Unbraced Length (in)	Allowable Axial (kip)	Allowable Axial w/ increase (kip)	Governing Axial	Design Axial Strength (kip)	Governing Axial
MS-600	20.4	6.00	0.50	18.00	0.5	0	1	6	0	0	1.21875	65	80	0.80	16.375	1.00	16.375	187.8	250.4	Compress.	283.1	Rupture

Rein1

Bottom	Top	Qty	Model	Position	T or T&C
126	132	3	MS-600	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Flats (Used for relative orientation only. Actual flat numbers may vary.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1						1						1					

Rein2

Bottom	Top	Qty	Model	Position	T or T&C
0				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Rein3

Bottom	Top	Qty	Model	Position	T or T&C
0				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Reinforced Pole Stress and Effective Thickness Check

AeroSolutions LLC
Optimizing Your Tower Infrastructure
5500 Flatirons Parkway, Suite 100
Boulder, CO 80301
720-304-6882

Section		Loads				Pole																	Unreinforced Pole - Rev. F					Reinforced Pole					Rev. F	Reinforcement 1								Composite							
Section	Elevation (ft)	Moment (ft-kip)	Compression (kip)	Shear (kip)	Torsion (kip-ft)	Number of Sides	OD (in)	Thickness (in)	Yield Strength (ksi)	Flat Width (in)	Area (in^2)	Moment of Inertia (in^4)	Percent of Composite Moment of Inertia	Angle Offset to Pole Flat	Distance to Extreme Fiber (in)	Section Modulus (in^3)	Torsion Constant (in^4)	Polygonal Compact Criterion	Allowable Bending Stress (ksi)	Allowable Bending Moment Strength (ft-kip)	Allowable Axial Stress (ksi)	Allowable Shear Stress (ksi)	Bending Stress (ksi)	Axial Stress (ksi)	Shear Stress (ksi)	Torsion Shear Stress (ksi)	**Stress Ratio**	Moment in Pole when Reinforced	Bending Stress (ksi)	Axial Stress (ksi)	Shear Stress (ksi)	Torsion Shear Stress (ksi)	**Reinforced Pole Stress Ratio**	Qty	Model	Position (F-Flat, C-Corner)	Gap Between Pole and Back of Rein. (in)	Tension only or Tension & Comp.	Total Moment of Inertia (in^4)	Axial Force (kip)	**Stress Ratio**	Centroid Offset (in)	Area (in^2)	Moment of Inertia (in^4)	**Controlling Stress Ratio**	**Thickness (in)**	**Weight Multiplier**	**Derated Yield Stress (ksi)**	**% Error in Derated Yield Stress**
Section	*Elevation*	*Moment*	*Compression*	*Shear*	*Torsion*	*PoleSides*	*PoleOD*	*PoleT*	*PoleFy*	*PoleW*	*PoleA*	*PoleI*	*PolePer*	*PoleCPoint*	*PoleC*	*PoleS*	*PoleJ*	*PoleWTf*	*PoleFb*	*PoleMall*	*PoleFa*	*PoleFv*	*PoleFbAct*	*PoleFaAct*	*PoleFvAct*	*PoleFvtAct*	***PoleSR***	*PoleMomentR*	*PoleFbAct*	*PoleFaAct*	*PoleFvAct*	*PoleFvtAct*	***RPoleSR***	*Rein1Qty*	***Rein1Model***	*Rein1Pos*	*Rein1Gap*	*Rein1TC*	*Rein1ITotal*	*Rein1P*	***Rein1SR***	*CompYBar*	*CompA*	*CompI*	***CompSR***	***EPoleT***	***EPoleWM***	***EDPoleFy***	***EDPoleSRCheck***
1	226	14.8	2.7	6.8	0.0	18	21.5000	0.1875	65	3.46	12.7	727	100%	TRUE	10.90	67	1441	149	52.0	288.9	52.0	34.7	2.7	0.21	0.00	0.00	**0.055**	14.8	2.7	0.21	0.00	0.00	**0.055**								0.000	12.7	727	**0.055**	**0.1875**	**1.00**	**65.0**	**19.2%**
2	202.0416	330.8	5.8	17.9	0.1	18	27.6040	0.1875	65	4.54	16.3	1548	100%	TRUE	14.00	111	3068	195	52.0	479.0	52.0	34.7	35.9	0.35	0.00	0.00	**0.697**	330.8	35.9	0.35	0.00	0.00	**0.697**								0.000	16.3	1548	**0.697**	**0.1875**	**1.00**	**65.0**	**0.6%**
3	197.9609	404.8	6.6	18.3	2.8	18	28.6437	0.5625	65	4.06	50.0	4984	100%	TRUE	14.50	344	9895	58	52.0	1489.1	52.0	34.7	14.1	0.13	0.00	0.05	**0.274**	404.8	14.1	0.13	0.00	0.00	**0.274**								0.000	50.0	4984	**0.274**	**0.5625**	**1.00**	**65.0**	**0.5%**
4	168.0702	1293.7	18.0	37.5	4.2	18	35.8102	0.3750	65	5.65	42.1	6682	100%	TRUE	18.15	368	13250	122	52.0	1594.7	52.0	34.7	42.2	0.43	0.00	0.07	**0.819**	1293.7	42.2	0.43	0.00	0.01	**0.819**								0.000	42.1	6682	**0.819**	**0.3750**	**1.00**	**65.0**	**0.3%**
5	162.9322	1488.0	20.0	38.2	4.2	18	37.1080	0.8125	65	5.11	93.4	15541	100%	TRUE	18.78	828	30864	51	52.0	3585.6	52.0	34.7	21.6	0.21	0.00	0.03	**0.419**	1488.0	21.6	0.21	0.00	0.00	**0.419**								0.000	93.4	15541	**0.419**	**0.8125**	**1.00**	**65.0**	**0.4%**
6	132	2723.6	28.2	41.7	4.2	18	44.1835	0.4375	65	7.02	60.7	14668	100%	TRUE	22.40	655	29084	129	52.0	2837.0	52.0	34.7	49.9	0.47	0.00	0.04	**0.969**	2723.6	49.9	0.47	0.00	0.00	**0.969**								0.000	60.7	14668	**0.969**	**0.4375**	**1.00**	**65.0**	**0.2%**
7	126.6978	2946.7	30.1	42.4	4.2	18	45.5246	0.4375	65	7.26	62.6	16059	77%	0	22.76	706	31841	134	52.0	3056.5	52.0	34.7	50.1	0.48	0.00	0.04	**0.973**	2258.0	38.4	0.48	0.00	0.00	**0.748**	**3**	**MS-600**	**F**	0	T&C	4898	235.5	**0.941**	0.000	80.6	20957	**0.941**	**0.5755**	**0.98**	**51.0**	**2.6%**
8	126	2976.3	30.4	42.5	4.2	18	45.7011	0.9375	65	6.41	132.9	33644	87%	TRUE	23.13	1455	66803	55	52.0	6301.3	52.0	34.7	24.6	0.23	0.00	0.02	**0.477**	2595.6	21.4	0.23	0.00	0.00	**0.416**	**3**	**MS-600**	**F**	0	T&C	4935	129.7	**0.518**	0.000	150.9	38579	**0.518**	**1.0831**	**0.99**	**51.7**	**1.4%**
9	120.3046	3220.8	33.9	43.4	4.2	18	47.1416	0.9375	65	6.66	137.2	37000	100%	TRUE	23.86	1551	73461	57	52.0	6717.4	52.0	34.7	24.9	0.25	0.00	0.02	**0.484**	3220.8	24.9	0.25	0.00	0.00	**0.484**								0.000	137.2	37000	**0.484**	**0.9375**	**1.00**	**65.0**	**0.2%**
10	86.7941	4741.2	45.6	47.3	4.2	18	54.7404	0.5000	65	8.77	86.0	31956	100%	TRUE	27.75	1151	63354	141	52.0	4988.2	52.0	34.7	49.4	0.53	0.00	0.02	**0.961**	4741.2	49.4	0.53	0.00	0.00	**0.961**								0.000	86.0	31956	**0.961**	**0.5000**	**1.00**	**65.0**	**0.1%**
11	79.2108	5104.2	51.0	48.4	4.3	18	56.6581	1.0625	65	8.12	187.2	73060	100%	TRUE	28.68	2547	145038	62	52.0	11034.5	52.0	34.7	24.0	0.27	0.00	0.01	**0.468**	5104.2	24.0	0.27	0.00	0.00	**0.468**								0.000	187.2	73060	**0.468**	**1.0625**	**1.00**	**65.0**	**0.2%**
12	47.8645	6675.9	64.8	51.8	4.0	18	63.5820	0.5625	65	10.22	112.4	56386	100%	TRUE	32.24	1749	111783	146	52.0	7577.3	52.0	34.7	45.8	0.58	0.00	0.01	**0.892**	6675.9	45.8	0.58	0.00	0.00	**0.892**								0.000	112.4	56386	**0.892**	**0.5625**	**1.00**	**65.0**	**0.1%**
13	39.1405	7132.9	72.2	52.8	4.0	18	65.7875	1.1250	65	9.62	230.5	121732	100%	TRUE	33.31	3654	241611	69	52.0	15830.2	52.0	34.7	23.4	0.31	0.00	0.01	**0.457**	7132.9	23.4	0.31	0.00	0.00	**0.457**								0.000	230.5	121732	**0.457**	**1.1250**	**1.00**	**65.0**	**0.2%**
14	0	9266.4	91.5	56.2	4.1	18	74.5000	0.5625	65	12.14	131.9	91073	100%	TRUE	37.78	2411	180513	174	52.0	10443.1	52.0	34.7	46.1	0.69	0.00	0.01	**0.901**	9266.4	46.1	0.69	0.00	0.00	**0.901**								0.000	131.9	91073	**0.901**	**0.5625**	**1.00**	**65.0**	**0.1%**
																											0.973						**0.969**							**0.941**				**0.969**				

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

TIA Rev F

Site Data

BU#:	*806358*
Site Name:	*NHV 109 943107*
App #:	*301508 R2*
Pole Manufacturer:	*Other*

Reactions		
Moment:	9266.4122	ft-kips
Axial:	91.5061	kips
Shear:	56.1797	kips

Anchor Rod Data		
Qty:	28	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	84	in

Plate Data		
Diam:	90	in
Thick:	2.5	in
Grade:	60	ksi
Single-Rod B-eff:	8.44	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Both	
Groove Depth:	0.5	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.5	in
Fillet V. Weld:	0.5	in
Width:	6	in
Height:	18	in
Thick:	1	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	74.5	in
Thick:	0.5625	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

If No stiffeners, Criteria: AISC ASD <-Only Applcable to Unstiffened Cases

Anchor Rod Results

			Stiffened
Maximum Rod Tension:	185.8	Kips	Service, ASD
Allowable Tension:	195.0	Kips	Fty*ASIF
Anchor Rod Stress Ratio:	95.3%	**Pass**	

Base Plate Results

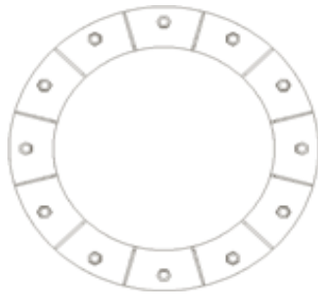
	Flexural Check		Stiffened
Base Plate Stress:	37.9	ksi	Service, ASD
Allowable Plate Stress:	60.0	ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	63.2%	**Pass**	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	58.6%	**Pass**
Vertical Weld:	37.7%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	14.9%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	59.1%	**Pass**
Plate Comp. (AISC Bracket):	59.9%	**Pass**

Pole Results

Pole Punching Shear Check:	9.1%	**Pass**



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

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

AeroSolutions LLC
Optimizing Your Tower Infrastructure

Site Number	806358
Site Name	NHV 109 943107

Caisson Analysis

Pier Properties		
Moment	9266	kip-ft
Shear	56	kip
Pier Diameter	9.0	ft
Height Above Grade	1.00	ft
Depth Below Grade	36.00	ft
Donut Diameter		ft
Donut Depth		ft

Analysis Properties		
TIA Code	F	
Soil Safety Factor	2.00	
Water Table Depth	99.0	ft
Ignored Soil Depth	4.5	ft
Cohesion Based on	PLS Caisson	
Max Soil Capacity	100%	

Soil Properties

Layer	Top of Soil Layer (ft)	Layer Thickness (ft)	Bottom of Soil Layer (ft)	Soil Unit Weight (pcf)	Cohesion (psf)	Friction Angle (degrees)
Soil.Layer	*Soil.Top*	*Soil.Thick*	*Soil.Bottom*	*Soil.Weight*	*Soil.Cohesion*	*Soil.Phi*
1	0.00	4	4.00	100	0	28
2	4.00	5	9.00	110	0	35
3	9.00	5	14.00	120	0	40
4	14.00	5	19.00	125	0	40
5	19.00	20	39.00	130	0	40
6						
7						
8						
9						
10						

Critical Depths Below Grade		
Rotation Axis	26.54	ft
Zero Shear	8.97	ft

Results		
Soil Capacity	36.0%	**OK**
Max Pier Moment	9716	kip-ft

Moment At User Defined Depths Below Grade			
	kip-ft		kip-ft
	kip-ft		kip-ft

V1.0

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: *806358*
Site Name: *NHV 109 943107*
App #: *301508 R2*

Enter Load Factors Below:		
For M (WL)	1.3	<---- Enter Factor
For P (DL)	1.3	<---- Enter Factor

Maximum Shaft Superimposed Forces		
TIA Revision:	F	
Max. Service Shaft M:	9715.545	ft-kips **(* Note)**
Max. Service Shaft P:	91.5061	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Load Factor	Shaft Factored Loads		
1.30	Mu:	12630.21	ft-kips
1.30	Pu:	118.9579	kips

Pier Properties		
Concrete:		
Pier Diameter =	9.0	ft
Concrete Area =	9160.9	in^2
Reinforcement:		
Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	8.11	ft
Vert. Cage Diameter =	97.34	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	40	
As Total=	62.4	in^2
A s/ Aconc, Rho:	0.0068	0.68%

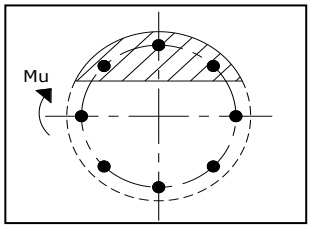
Material Properties		
Concrete Comp. strength, f'c =	4000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	
ACI 318 Code		
Select Analysis ACI Code=	2005	
Seismic Properties		
Seismic Design Category =	C	
Seismic Risk =	**Moderate**	

Solve (Run) <-- Press Upon Completing All Input

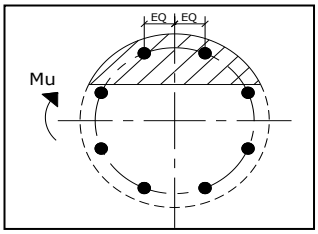
ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:
(3)*(Sqrt(f'c)/Fy: 0.0032
200 / Fy: 0.0033

Results:

Governing Orientation Case: **1**



Case 1



Case 2

Dist. From Edge to Neutral Axis: **16.43** in
Extreme Steel Strain, ϵt: **0.0157**
ϵt > 0.0050, Tension Controlled
Reduction Factor,φ: **0.900**

Minimum Rho Check:
Actual Req'd Min. Rho: 0.33% Flexural
Provided Rho: 0.68% **OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	18033.00	kips
at Mu=(ϕ=0.65)Mn=	14169.12	ft-kips
Max Tu, (φ=0.9) Tn =	3369.6	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	118.96	kips
Drilled Shaft Moment Capacity, φMn:	**13084.32**	ft-kips
Drilled Shaft Superimposed Mu:	**12630.21**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**96.5%**