STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

June 22, 2012

Steven Levine
Real Estate Consultant
New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, CT 06067

RE: **EM-CING-034-120608** – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 48 Newtown Road, Danbury, Connecticut.

Dear Mr. Levine:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- The coax lines be reconfigured in accordance with the recommendations made in the Structural Analysis prepared by CHA dated June 1, 2012 and stamped by Thomas O'Brien; and
- Following the installation of the proposed equipment, AT&T shall provide documentation certifying that the installation complied with the engineer's recommendation.
- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not less than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated June 7, 2012. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

CSC
CONNECTICUT SITING COUNCIL

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Linda Roberts

Linda Roberts
Executive Director

LR/CDM/cm

c: The Honorable Mark D. Boughton, Mayor, City of Danbury
Dennis Elpern, City Planner, City of Danbury
Wireless Capital Partners

Martin, David C.

From:	Steve Levine <Steve.Levine@SAI-Comm.com>
Sent:	Tuesday, June 26, 2012 3:27 PM
To:	Martin, David C.
Subject:	Satisfaction of Approval Conditions in EM-CING-034-120608 (Newtown Rd, Danbury, AT&T CT2157)
Attachments:	CT2157 LTE Structural Analysis 6.26.12.pdf

Dave,

This email and the attached structural analysis are submitted in satisfaction of two approval conditions for EM-CING-034-120608.

The Siting Council's approval letter dated 6/26/2012 contains, among others, the following approval conditions:

- **The coax lines be reconfigured in accordance with the recommendations made in the Structural Analysis prepared by CHA dated June 1, 2012 and stamped by Thomas O'Brien; and**
- **Following the installation of the proposed equipment, AT&T shall provide documentation certifying that the installation complied with the engineer's recommendation.**

These two conditions were most likely based on an erroneous statement in CHA's stamped cover letter to the 6/1/12 structural. The statement was an unintentional carry-over from an earlier version of the analysis, and the portion referring to a coax retrofit should have been deleted for the 6/1/12 version. There is, in fact, no need to reconfigure or retrofit the coax in any manner.

In addition, there is a table on page 3 of the RISA Tower analysis section that could be interpreted to mean that 10 of each carrier's coax would be moved from the tower exterior to inside the tower, and that only 2 for each can remain on the outside. Paul Lusitani at CHA explained this to me as a modeling solution for the computerized structural analysis. Recall that the 6/1/12 structural analysis was based on the engineer's conclusion that only 2 of each carrier's exterior coax actually contribute additional wind area, i.e., additional wind loading. To model this condition, the computer analysis had to be set up in such a way that the other exterior coax lines did not contribute to wind loading. The way to do this was to "conceal" them inside the tower, thereby isolating them from the wind. Thus, placing the coax lines inside the tower for this table does not reflect an actual proposed condition or requirement, but was done instead to appropriately model the tower loading for the computer analysis.

<u>Documentation in Satisfaction of the Approval Conditions</u>

The attached structural analysis dated 6/26/12 was provided by CHA to correct the 6/1/12 version.

- The new analysis is preceded by a cover letter from CHA stating that the reference to coax reconfiguration in the 6/1/12 version was erroneous, and that there is no need to reconfigure the coax cables.

- The 6/26/12 analysis omits the reference to reconfiguration from the stamped portion of the analysis report. Instead, the analysis concludes that the tower has adequate structural capacity to support the additional equipment loading without coax reconfiguration.
- The executive summary of the 6/26/12 analysis contains notes referring to the computerized modeling solution. They clearly state that all existing exterior coax can remain on the exterior of the tower.

Please accept this email and the attached structural analysis dated 6/26/12 as satisfaction of the first two approval conditions. That is, the reference to retrofit or reconfiguration in the 6/1/12 analysis cover letter was included in error, and the engineer does not actually recommend reconfiguring the coax in the analysis report itself. Rather, his conclusion is that the coax may remain on the tower exterior. Therefore, the plan to leave them outside the tower is "in accordance with the recommendations made in the Structural Analysis prepared by CHA dated June 1, 2012 and stamped by Thomas O'Brien", and "the installation complie[s] with the engineer's recommendation."

If you accept this email and the attached structural analysis as satisfaction of the first two approval conditions in EM-CING-034-120608, please so acknowledge by return email.

Please feel free to call or email to discuss the matter further.

Thank you.

AT&T Mobility / New Cingular Wireless PCS, LLC / SAI Communications

Steve Levine 500 Enterprise Drive, 3rd Fl., Rocky Hill, CT 06067
Real Estate Consultant Office 860-513-7636 Mobile 203-556-1655 Fax 860-513-7190

June 26, 2012

Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Cover Letter for Structural Analysis of the Danbury-East Monopole
CT2157
Located in Fairfield County, CT
CHA Project No. 22702.1013.28000

To Whom It May Concern:

CHA's previous revision of the structural analysis report, dated June 1, 2012, contained a typo on page three. The third paragraph above the signature and stamp contained the following statement: "The analysis indicates that the existing tower is capable of supporting the existing and proposed loads under TIA/EIA-222-F, upon completion of the proposed retrofit. The retrofit consists of reconfiguring the coaxial cables as shown in this report". The portion of this statement regarding the retrofit should have been omitted from the report because the results of our most current analysis indicate the retrofit, which consisted of reconfiguring the coaxial cables, is not required. This statement has been revised as follows: "The analysis indicates that the existing tower is capable of supporting the existing and proposed loads under TIA/EIA-222-F." Please refer to the revised structural analysis report dated June 26, 2012.

If you have any questions, or if we can be of further assistance, please do not hesitate to call.

Very truly yours,

Paul Lusitani

Paul Lusitani
Project Engineer

2139 Silas Deane Highway, Suite 212, Rocky Hill, CT 06067-2336
T 860.257.4557 • F 860.257.7514 • www.chacompanies.com

Danbury-East Monopole

CT2157

Fairfield County, Connecticut

Prepared for:

New Cingular Wireless PCS, LLC

500 Enterprise Drive

Rocky Hill, CT 06067

June 26, 2012

CHA

2139 Silas Deane Highway

Suite 212

Rocky Hill, CT 06067-2336

Tel: (860) 257-4557

CHA Project No. 22702.1013.28000 R4

June 26, 2012

New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, CT 06067

RE: Structural Analysis of the Danbury-East Monopole
CT2157
Located in Fairfield County, CT
CHA Project No. 22702.1013.28000 R3

To Whom It May Concern:

CHA has performed a structural analysis under the provisions of TIA-EIA-222-F of the referenced monopole for the purpose of evaluating its ability to support the existing equipment loads in addition to the new equipment proposed by New Cingular Wireless PCS, LLC. In summary, our analysis indicates that the tower ***is*** structurally capable of supporting the existing and proposed equipment.

Our analysis and design is based on the following information:

- Monopole member sizes and configuration, as well as foundation information obtained from a previous structural analysis report by Centek Engineering, prepared for Verizon Wireless, dated October 25, 2010.
- Monopole retrofit information obtained from a previous structural analysis report by Structural Components, LLC, dated March 4, 2010.
- Proposed equipment information, including antenna models and elevations, provided by New Cingular Wireless PCS, LLC.
- A previous structural analysis report by CHA, dated June 27, 2011.

Our analysis includes data for the following proposed antennas and cables:

New Cingular Wireless:

- (2) KMW AM-X-CD-14-65-00T-RET and (1) AM-X-CD-16-65-00T-RET panel antennas mounted on existing mount pipes, supported on the existing platform at an antenna centerline elevation of 100' with (2) #8 DC power cables and (1) 5/8" fiber cable within a 3" innerduct mounted on the outside of the monopole.

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- (6) Remote Radio Units mounted to a proposed 3" Std. steel pipe, supported by a SitePro LWRM universal ring mount, at an antenna centerline elevation of 100' AGL.
- (1) Raycap DC6-48-60-18-8F surge arrester mounted to a proposed 3" Std. steel pipe, supported by a SitePro LWRM universal ring mount, at an antenna centerline elevation of 100' AGL.
- (3) Powerwave TT19-08BP111-001 TMA's attached to existing GSM antenna, to replace (6) existing Powerwave LGP21901 diplexers, at an antenna centerline elevation of 100' AGL.

The existing and proposed antenna elevations and coaxial cable sizes have been listed in the attached Executive Summary.

With this information, TIA/EIA-222-F, *Structural Standards for Steel Antenna Towers and Antenna Supporting Structures,* and the Connecticut State Building Code the analysis was performed to determine the structural integrity of the tower. Based on the data provided, section properties, member strengths, and projected areas, applicable loads were calculated. Knowing the projected area of the tower and all of its appurtenances, 85 mph wind loads were calculated with and without radial ice loads of 1/2". These wind and ice loads were then reduced to member forces in the tower components through RISA Tower structural analysis software. The member forces were then compared to the maximum allowable stress for each member type.

The analysis indicates that the existing tower ***is*** capable of supporting the existing and proposed loads under TIA/EIA-222-F.

Reactions at the base of the monopole due to the existing and proposed loads are less than the original design reactions. The foundation information is based on a foundation analysis by Structural Components, LLC dated March 4, 2010. Based on this information, it can be concluded that the tower foundation is adequate for supporting the existing and proposed loads provided that the foundation was built per the design documents and applicable codes.

As requested, we have included a copy of the governing structural analysis calculations referenced above for your review and use. If you have any questions, or if we can be of further assistance, please do not hesitate to call.

Very truly yours,

Thomas L. O'Brien, P.E.
Partner

STATE OF CONNECTICUT
THOMAS L. O'BRIEN
No. 18210
LICENSED
PROFESSIONAL ENGINEER

CHA

EXECUTIVE SUMMARY

Danbury-East Monopole
CT2157

June 26, 2012

Tower Information:

Tower Owner:	Unknown
Tower Manufacturer:	Engineering Endeavors, Inc.
Tower Height:	110 feet
Tower Type:	Monopole

Proposed Antenna Data:

New Cingular Wireless:

- (2) KMW AM-X-CD-14-65-00T-RET and (1) AM-X-CD-16-65-00T-RET panel antennas mounted on existing mount pipes, supported on the existing platform at an antenna centerline elevation of 100' AGL with (2) #8 DC power cables and (1) 5/8" fiber cable inside a 3" innerduct mounted to the outside of the monopole.
- (6) Remote Radio Units mounted to a proposed 3" Std. steel pipe, supported by a SitePro LWRM universal ring mount, at an antenna centerline elevation of 100' AGL.
- (1) Raycap DC6-48-60-18-8F surge arrester mounted to a proposed 3" Std. steel pipe, supported by a SitePro LWRM universal ring mount, at an antenna centerline elevation of 100' AGL.
- (3) Powerwave TT19-08BP111-001 TMA's attached to existing GSM antenna, to replace (6) existing Powerwave LGP21901 diplexers, at an antenna centerline elevation of 100' AGL.

Existing Antenna and Appurtenance Data:

AT&T:

- (6) Six Powerwave 7770.00A panel antennas, (6) Powerwave LGP21401 TMA's and (6) Powerwave LGP21901 diplexers mounted on an EEI platform at a centerline elevation of 100' AGL, with (12) twelve 1-5/8" coaxial cables running on the outside of the monopole stacked in a 2x6 configuration.

  Note: 1. Diplexers will be removed prior to installation of proposed TMA's.

  Note: Only (2) two of the (12) twelve coaxial cables on the tower exterior actually contribute to additional wind area. Therefore, the tower analysis calculations were completed with (2) two cables on the exterior and (10) ten cables on the interior to establish the appropriate amount of wind area for modeling purposes only. In reality, all cables will remain on the tower exterior.

Nextel:

- (12) Twelve 4 ft panel antennas mounted on an EEI standard platform at an antenna centerline elevation of 78' AGL, with (12) twelve 1-5/8" coaxial cables running on the outside of the monopole in a 2x6 configuration

  Note: Only (2) two of the (12) twelve coaxial cables on the tower exterior actually contribute to additional wind area. Therefore, the tower analysis calculations were completed with (2) two cables on the exterior

and (10) ten cables on the interior to establish the appropriate amount of wind area for modeling purposes only. In reality, all cables will remain on the tower exterior.

Verizon:

- (2) Two Powerwave P65-16-XL-2, (1) one Antel BXA-70063-4CF, (3) three RYMSA MG D3-800T0, (4) four Decibel DB846H80E-SX and (2) two Decibel DB844G65ZAXY panel antennas mounted on an existing EEI standard platform at an antenna centerline elevation of 90' AGL with (12) twelve 1-5/8" coaxial cables running inside the monopole.
- (6) Six RFS FD9R6004/2C-3L diplexers mounted on an existing EEI standard platform at a centerline elevation of 90' AGL.

Future Antenna and Appurtenance Data:

Metro PCS:

- (3) Three Kathrein 800-10504 and (3) three Kathrein 742-351 panel antennas mounted on (3) three T-Arms at an antenna centerline elevation of 108' AGL, with (12) twelve 1-5/8" coaxial cables running on the outside of the monopole in a 2x6 configuration.

  Note: Only (2) two of the (12) twelve coaxial cables on the tower exterior actually contribute to additional wind area. Therefore, the tower analysis calculations were completed with (2) two cables on the exterior and (10) ten cables on the interior to establish the appropriate amount of wind area for modeling purposes only. In reality, all cables will remain on the tower exterior.

Code Data:

Applicable Code:
- TIA/EIA-222-F, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures
- Connecticut State Building Code

Load Cases:

(1) Weight of Tower, Antennas, and Appurtenances plus Wind Load without radial ice at a wind speed of 85 mph.
(2) Weight of Tower, Antennas, and Appurtenances plus Wind Load on iced tower plus weight of 1/2" radial ice in conjunction with a wind speed of 74 mph.

Monopole Shaft Members: (A572 Gr. 65 ksi steel & A36 Steel top section)

Tower Section	Length	Base Diameter	Top Diameter	Wall Thickness	Splice Length
1	20'	37.00"	33.39"	0.3890"	0'
2	30'	33.39"	26.64"	0.3125"	4'
3	50'	27.98"	17.50"	0.2500"	0'
4	14'	17.50"	14.50"	0.3750"	0'

Foundation Reactions: (Existing and Proposed Equipment)

Base Reactions	Original Design	Current Analysis	Stress Ratio (%)
Vertical (Axial) (k)	31.5	25.5	81.0
Shear (k)	28.7	19.0	66.2
Overturning Moment (k-ft)	2281.0	1442.0	63.2

Tower Superstructure:

The tower sections are stressed at the following governing capacities for the load cases 1, & 2:

	Stress Ratio (%)
Section 1 (96'-110')	20.9
*Section 2 (46'-96')	99.4
Section 3 (20'-46')	95.9
Section 4 (0'-20')	84.0

*The governing tower member is stressed at 99.4%.

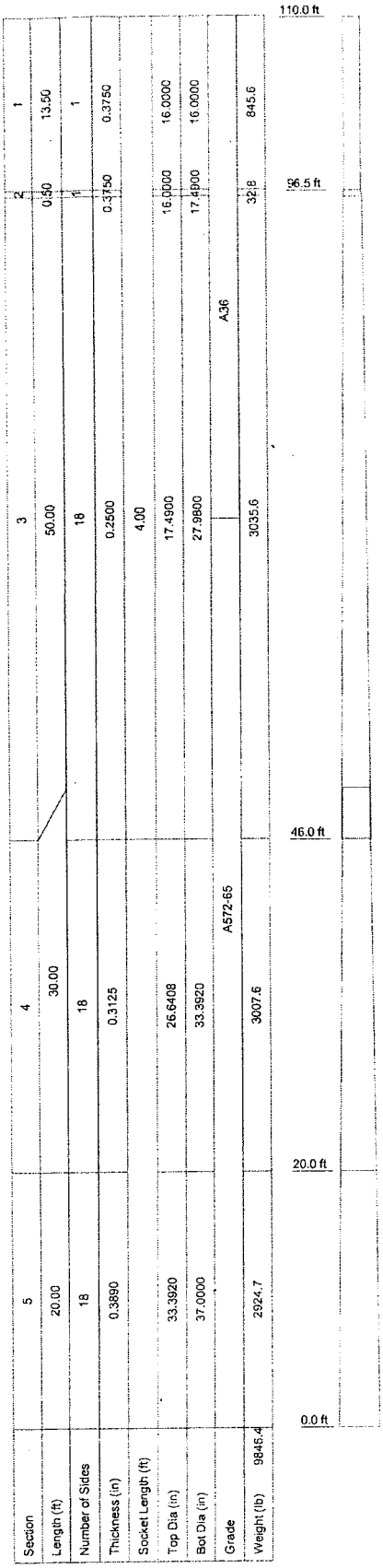
Section Capacity Table

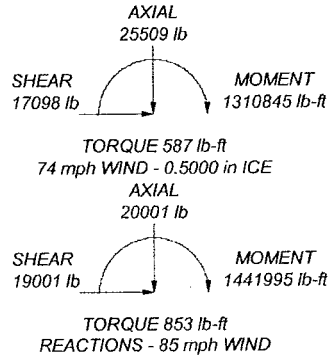
Section No.	*Elevation ft*	*Component Type*	*Size*	*Critical Element*	*P lb*	*SF*P_{allow} lb*	*% Capacity*	*Pass Fail*
L1	110 - 96.5	Pole	TP16x16x0.375	1	-4623.50	64340.04	20.9	Pass
L2	96.5 - 96	Pole	TP17.49x16x0.375	2	-4624.23	64340.04	20.9	Pass
L3	96 - 46	Pole	TP27.98x17.49x0.25	3	-11237.40	222151.11	99.4	Pass
L4	46 - 20	Pole	TP33.392x26.6408x0.3125	4	-16238.50	516920.05	95.9	Pass
L5	20 - 0	Pole	TP37x33.392x0.389	5	-19992.00	872331.16	84.0	Pass
							Summary	
						Pole (L3)	99.4	Pass
						RATING =	**99.4**	**Pass**

Conclusion:

The analysis indicates that the existing tower *is* structurally capable of supporting the existing and proposed loads.

TOWER ELEVATION





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
800 10504 (Metro PCS)	108	TT19-08BP111-001 (SAI)	98
800 10504 (Metro PCS)	108	(2) LGP21401 (ATI)	98
800 10504 (Metro PCS)	108	MGD3-800T0 (VERIZON)	88
742-351 (Metro PCS)	108	MGD3-800T0 (VERIZON)	88
742-351 (Metro PCS)	108	(2) FD9R6004/2C-3L (VERIZON)	88
742-351 (Metro PCS)	108	(2) FD9R6004/2C-3L (VERIZON)	88
2' Standoff T-Arm (10' face width) (Metro PCS)	108	(2) FD9R6004/2C-3L (VERIZON)	88
2' Standoff T-Arm (10' face width) (Metro PCS)	108	PiROD 13' Platform w/handrails (Monopole) (VERIZON)	88
2' Standoff T-Arm (10' face width) (Metro PCS)	108	P65-16-XL-2 (VERIZON)	88
(2) 7770.00 (ATI)	98	P65-16-XL-2 (VERIZON)	88
(2) 7770.00 (ATI)	98	BXA-70063/4CF (VERIZON)	88
(2) 7770.00 (ATI)	98	(2) DB846H80E-SX w/Mount Pipe (VERIZON)	88
PiROD 13' Low Profile Platform (Monopole) (ATI)	98	(2) DB846H80E-SX w/Mount Pipe (VERIZON)	88
(2) LGP21401 (ATI)	98	(2) DB844G65ZAXY w/Mount Pipe (VERIZON)	88
(2) LGP21401 (ATI)	98	MGD3-800T0 (VERIZON)	88
AM-X-CD-14-65-00T-RET (SAI)	98	PiROD 13' Low Profile Platform (Monopole) (NEXTEL)	78
AM-X-CD-14-65-00T-RET (SAI)	98	(4) 4' x 6" Panel w/ Mounting Pipe (NEXTEL)	78
AM-X-CD-16-65-00T-RET (SAI)	98	(4) 4' x 6" Panel w/ Mounting Pipe (NEXTEL)	78
(2) Remote Radio Heads (SAI)	98	(4) 4' x 6" Panel w/ Mounting Pipe (NEXTEL)	78
(2) Remote Radio Heads (SAI)	98		
(2) Remote Radio Heads (SAI)	98		
DC6-48-60-18 (SAI)	98		
TT19-08BP111-001 (SAI)	98		
TT19-08BP111-001 (SAI)	98		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36	36 ksi	58 ksi	A572-65	65 ksi	80 ksi

TOWER DESIGN NOTES

1. Tower is located in Fairfield 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 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 60 mph wind.
5. Weld together tower sections have flange connections.
6. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
7. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
8. Welds are fabricated with ER-70S-6 electrodes.

CHA Inc.
III Winners Circle
Albany, NY 12205
Phone: (518) 453-4500
FAX:

Job: CT2157-Danbury East			
Project: 22702-1013-28000-R2			
Client: SAI	Drawn by: 1948	App'd:	
Code: TIA/EIA-222-F	Date: 06/01/12	Scale: NTS	
Path:		Dwg No. E-1	

ANALYSIS SUMMARY
PER TIA/EIA-222-F
(Existing and Proposed Equipment)

Tower Input Data

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

Tower is located in Fairfield County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Weld together tower sections have flange connections..
Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline 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				

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	110.00-96.50	13.50	0.00	Round	16.0000	16.0000	0.3750		A36 (36 ksi)
L2	96.50-96.00	0.50	0.00	Round	16.0000	17.4900	0.3750		A36 (36 ksi)
L3	96.00-46.00	50.00	4.00	18	17.4900	27.9800	0.2500	1.0000	A572-65

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L4	46.00-20.00	30.00	0.00	18	26.6408	33.3920	0.3125	1.2500	(65 ksi) A572-65
L5	20.00-0.00	20.00		18	33.3920	37.0000	0.3890	1.5560	(65 ksi) 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	16.0000	18.4078	562.1910	5.5313	8.0000	70.2739	1122.8505	9.1984	0.0000	0
	16.0000	18.4078	562.1910	5.5313	8.0000	70.2739	1122.8505	9.1984	0.0000	0
L2	16.0000	18.4078	562.1910	5.5313	8.0000	70.2739	1122.8505	9.1984	0.0000	0
	17.4900	20.1631	738.8470	6.0587	8.7450	84.4879	1475.6812	10.0755	0.0000	0
L3	17.7598	13.6799	513.6842	6.1202	8.8849	57.8153	1028.0442	6.8413	2.6382	10.553
	28.4116	22.0038	2137.6372	9.8442	14.2138	150.3912	4278.0871	11.0040	4.4845	17.938
L4	27.9658	26.1144	2286.9825	9.3465	13.5335	168.9864	4576.9743	13.0597	4.1388	13.244
	33.9071	32.8107	4535.9808	11.7432	16.9631	267.4023	9077.9301	16.4085	5.3270	17.046
L5	33.9071	40.7483	5607.3057	11.7161	16.9631	330.5583	11221.9896	20.3780	5.1924	13.348
	37.5708	45.2031	7654.7101	12.9969	18.7960	407.2521	15319.4925	22.6058	5.8274	14.98

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 110.00-96.50				1	1	1		
L2 96.50-96.00				1	1	1		
L3 96.00-46.00				1	1	1		
L4 46.00-20.00				1	1	1		
L5 20.00-0.00				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
re-run per Struct Comp										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A (1-5/8 FOAM) (Metro PCS)	C	No	CaAa (Out Of Face)	108.00 - 8.00	2	No Ice 1/2" Ice	0.20 0.30	0.82 2.33

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A (1-5/8 FOAM) (AT&T)	B	No	CaAa (Out Of Face)	98.00 - 8.00	2	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
LDF6-50A (1-1/4 FOAM) (NEXTEL)	C	No	CaAa (Out Of Face)	78.00 - 8.00	2	No Ice	0.16	0.66
						1/2" Ice	0.25	1.91
LDF6-50A (1-1/4 FOAM) (NEXTEL)	B	No	Inside Pole	78.00 - 8.00	10	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
LDF7-50A (1-5/8 FOAM) (VERIZON) ***SAI***	C	No	Inside Pole	88.00 - 8.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
3" Rigid Conduit (SAI)	C	No	CaAa (Out Of Face)	98.00 - 8.00	1	No Ice	0.00	3.50
						1/2" Ice	0.00	0.00
LDF7-50A (1-5/8 FOAM) (Metro PCS)	C	No	Inside Pole	108.00 - 8.00	10	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM) (AT&T)	B	No	Inside Pole	98.00 - 8.00	10	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	110.00-96.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.594	14.76
		C	0.000	0.000	0.000	4.554	118.41
L2	96.50-96.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.198	4.92
		C	0.000	0.000	0.000	0.198	6.67
L3	96.00-46.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	19.800	703.20
		C	0.000	0.000	0.000	29.720	1122.52
L4	46.00-20.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	10.296	427.44
		C	0.000	0.000	0.000	18.356	637.00
L5	20.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	4.752	197.28
		C	0.000	0.000	0.000	8.472	294.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	110.00-96.50	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.894	19.30
		C		0.000	0.000	0.000	6.854	148.00
L2	96.50-96.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.298	6.43
		C		0.000	0.000	0.000	0.298	6.43
L3	96.00-46.00	A	0.500	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
		B		0.000	0.000	0.000	29.800	854.69
		C		0.000	0.000	0.000	46.120	1179.16
L4	46.00-20.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	15.496	506.22
		C		0.000	0.000	0.000	28.756	689.90
L5	20.00-0.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	7.152	233.64
		C		0.000	0.000	0.000	13.272	318.41

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	110.00-96.50	-0.2963	0.2224	-0.3841	0.2883
L2	96.50-96.00	0.0000	0.3789	0.0000	0.4671
L3	96.00-46.00	-0.1833	0.4959	-0.2488	0.6281
L4	46.00-20.00	-0.2808	0.5763	-0.3890	0.7495
L5	20.00-0.00	-0.1931	0.3964	-0.2828	0.5450

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
800 10504 (Metro PCS)	A	From Face	2.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice	3.35 3.70	1.87 2.20	17.64 35.71
800 10504 (Metro PCS)	B	From Face	2.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice	3.35 3.70	1.87 2.20	17.64 35.71
800 10504 (Metro PCS)	C	From Face	2.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice	3.35 3.70	1.87 2.20	17.64 35.71
742-351 (Metro PCS)	A	From Face	2.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice	5.89 6.30	1.73 2.04	29.80 57.10
742-351 (Metro PCS)	B	From Face	2.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice	5.89 6.30	1.73 2.04	29.80 57.10
742-351 (Metro PCS)	C	From Face	2.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice	5.89 6.30	1.73 2.04	29.80 57.10
2' Standoff T-Arm (10' face width) (Metro PCS)	A	None		0.0000	108.00	No Ice 1/2" Ice	5.50 6.90	5.50 6.90	129.00 170.00
2' Standoff T-Arm (10' face width)	B	None		0.0000	108.00	No Ice 1/2" Ice	5.50 6.90	5.50 6.90	129.00 170.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(Metro PCS)										
2' Standoff T-Arm (10' face width)	C	None			0.0000	108.00	No Ice	5.50	5.50	129.00
(Metro PCS)							1/2" Ice	6.90	6.90	170.00
****AT&T****										
(2) 7770.00	A	From Face	4.00		0.0000	98.00	No Ice	5.88	3.98	51.73
(AT&T)			0.00				1/2" Ice	6.31	4.60	94.70
			0.00							
(2) 7770.00	B	From Face	4.00		0.0000	98.00	No Ice	5.88	3.98	51.73
(AT&T)			0.00				1/2" Ice	6.31	4.60	94.70
			0.00							
(2) 7770.00	C	From Face	4.00		0.0000	98.00	No Ice	5.88	3.98	51.73
(AT&T)			0.00				1/2" Ice	6.31	4.60	94.70
			0.00							
PiROD 13' Low Profile Platform (Monopole)	C	None			0.0000	98.00	No Ice	15.70	15.70	1300.00
(AT&T)							1/2" Ice	20.10	20.10	1765.00
(2) LGP21401	A	From Face	0.00		0.0000	98.00	No Ice	0.00	0.00	0.00
(AT&T)			0.00				1/2" Ice	0.00	0.00	26.16
			0.00							
(2) LGP21401	B	From Face	0.00		0.0000	98.00	No Ice	0.00	0.00	0.00
(AT&T)			0.00				1/2" Ice	0.00	0.00	26.16
			0.00							
NEXTEL										
(4) 4' x 6" Panel w/ Mounting Pipe	A	From Face	4.00		0.0000	78.00	No Ice	2.87	3.06	43.16
			0.00				1/2" Ice	3.18	3.61	72.70
(NEXTEL)			0.00							
(4) 4' x 6" Panel w/ Mounting Pipe	B	From Face	4.00		0.0000	78.00	No Ice	2.87	3.06	43.16
			0.00				1/2" Ice	3.18	3.61	72.70
(NEXTEL)			0.00							
(4) 4' x 6" Panel w/ Mounting Pipe	C	From Face	4.00		0.0000	78.00	No Ice	2.87	3.06	43.16
			0.00				1/2" Ice	3.18	3.61	72.70
(NEXTEL)			0.00							
PiROD 13' Low Profile Platform (Monopole)	A	None			0.0000	78.00	No Ice	15.70	15.70	1300.00
(NEXTEL)							1/2" Ice	20.10	20.10	1765.00
VERIZON										
P65-16-XL-2	A	From Face	4.00		0.0000	88.00	No Ice	8.40	4.12	44.00
(VERIZON)			0.00				1/2" Ice	8.95	4.56	88.53
			0.00							
P65-16-XL-2	B	From Face	4.00		0.0000	88.00	No Ice	8.40	4.12	44.00
(VERIZON)			0.00				1/2" Ice	8.95	4.56	88.53
			0.00							
BXA-70063/4CF	C	From Face	4.00		0.0000	88.00	No Ice	5.16	2.44	9.00
(VERIZON)			0.00				1/2" Ice	5.55	2.74	37.79
			0.00							
(2) DB846H80E-SX w/Mount Pipe	A	From Face	4.00		0.0000	88.00	No Ice	5.32	7.73	40.55
(VERIZON)			0.00				1/2" Ice	5.87	8.92	95.74
			0.00							
(2) DB846H80E-SX w/Mount Pipe	B	From Face	4.00		0.0000	88.00	No Ice	5.32	7.73	40.55
(VERIZON)			0.00				1/2" Ice	5.87	8.92	95.74
			0.00							
(2) DB844G65ZAXY w/Mount Pipe	C	From Face	4.00		0.0000	88.00	No Ice	5.38	5.40	41.55
(VERIZON)			0.00				1/2" Ice	6.07	6.49	89.98
			0.00							
MGD3-800T0	A	From Face	4.00		0.0000	88.00	No Ice	3.66	2.37	17.00
(VERIZON)			0.00				1/2" Ice	4.00	2.70	38.91

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00						
MGD3-800T0	B	From Face	4.00	0.0000	88.00	No Ice	3.66	2.37	17.00
(VERIZON)			0.00			1/2" Ice	4.00	2.70	38.91
			0.00						
MGD3-800T0	C	From Face	4.00	0.0000	88.00	No Ice	3.66	2.37	17.00
(VERIZON)			0.00			1/2" Ice	4.00	2.70	38.91
			0.00						
(2) FD9R6004/2C-3L	A	From Face	4.00	0.0000	88.00	No Ice	0.00	0.00	3.10
(VERIZON)			0.00			1/2" Ice	0.00	0.00	5.38
			0.00						
(2) FD9R6004/2C-3L	B	From Face	4.00	0.0000	88.00	No Ice	0.00	0.00	3.10
(VERIZON)			0.00			1/2" Ice	0.00	0.00	5.38
			0.00						
(2) FD9R6004/2C-3L	C	From Face	4.00	0.0000	88.00	No Ice	0.00	0.00	3.10
(VERIZON)			0.00			1/2" Ice	0.00	0.00	5.38
			0.00						
PiROD 13' Platform	C	None		0.0000	88.00	No Ice	31.30	31.30	1822.00
w/handrails (Monopole)						1/2" Ice	40.20	40.20	2452.00
(VERIZON)									
SAI									
AM-X-CD-14-65-00T-RET	A	From Leg	4.00	0.0000	98.00	No Ice	5.51	2.83	36.40
(SAI)			0.00			1/2" Ice	5.90	3.14	68.35
			0.00						
AM-X-CD-14-65-00T-RET	B	From Leg	4.00	0.0000	98.00	No Ice	5.51	2.83	36.40
(SAI)			0.00			1/2" Ice	5.90	3.14	68.35
			0.00						
AM-X-CD-16-65-00T-RET	C	From Leg	4.00	0.0000	98.00	No Ice	6.62	4.13	33.00
(SAI)			0.00			1/2" Ice	7.05	4.54	74.48
			0.00						
(2) Remote Radio Heads	A	From Leg	0.00	0.0000	98.00	No Ice	0.00	0.00	33.00
(SAI)			0.00			1/2" Ice	0.00	0.00	44.97
			0.00						
(2) Remote Radio Heads	B	From Leg	0.00	0.0000	98.00	No Ice	0.00	0.00	33.00
(SAI)			0.00			1/2" Ice	0.00	0.00	44.97
			0.00						
(2) Remote Radio Heads	C	From Leg	0.00	0.0000	98.00	No Ice	0.00	0.00	33.00
(SAI)			0.00			1/2" Ice	0.00	0.00	44.97
			0.00						
DC6-48-60-18	C	From Leg	0.00	0.0000	98.00	No Ice	2.59	1.08	20.00
(SAI)			0.00			1/2" Ice	2.81	1.24	36.69
			0.00						
TT19-08BP111-001	A	From Leg	0.00	0.0000	98.00	No Ice	0.00	0.52	25.00
(SAI)			0.00			1/2" Ice	0.00	0.62	30.80
			0.00						
TT19-08BP111-001	B	From Leg	0.00	0.0000	98.00	No Ice	0.00	0.52	25.00
(SAI)			0.00			1/2" Ice	0.00	0.62	30.80
			0.00						
TT19-08BP111-001	C	From Leg	0.00	0.0000	98.00	No Ice	0.00	0.52	25.00
(SAI)			0.00			1/2" Ice	0.00	0.62	30.80
			0.00						
exist									
(2) LGP21401	C	From Face	0.00	0.0000	98.00	No Ice	0.00	0.00	19.00
(AT&T)			0.00			1/2" Ice	0.00	0.00	26.16
			0.00						

Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 110.00-96.50	103.25	1.385	26	18.000	A	0.000	18.000	18.000	100.00	0.000	0.000
					B	0.000	18.000		100.00	0.000	0.594
					C	0.000	18.000		100.00	0.000	4.554
L2 96.50-96.00	96.25	1.358	25	0.698	A	0.000	0.698	0.698	100.00	0.000	0.000
					B	0.000	0.698		100.00	0.000	0.198
					C	0.000	0.698		100.00	0.000	0.198
L3 96.00-46.00	69.71	1.238	23	94.729	A	0.000	94.729	94.729	100.00	0.000	0.000
					B	0.000	94.729		100.00	0.000	19.800
					C	0.000	94.729		100.00	0.000	29.720
L4 46.00-20.00	32.58	1	18	66.011	A	0.000	66.011	66.011	100.00	0.000	0.000
					B	0.000	66.011		100.00	0.000	10.296
					C	0.000	66.011		100.00	0.000	18.356
L5 20.00-0.00	9.83	1	18	58.660	A	0.000	58.660	58.660	100.00	0.000	0.000
					B	0.000	58.660		100.00	0.000	4.752
					C	0.000	58.660		100.00	0.000	8.472

Tower Pressure - With Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 110.00-96.50	103.25	1.385	19	0.5000	19.125	A	0.000	19.125	19.125	100.00	0.000	0.000
						B	0.000	19.125		100.00	0.000	0.894
						C	0.000	19.125		100.00	0.000	6.854
L2 96.50-96.00	96.25	1.358	19	0.5000	0.739	A	0.000	0.739	0.739	100.00	0.000	0.000
						B	0.000	0.739		100.00	0.000	0.298
						C	0.000	0.739		100.00	0.000	0.298
L3 96.00-46.00	69.71	1.238	17	0.5000	98.896	A	0.000	98.896	98.896	100.00	0.000	0.000
						B	0.000	98.896		100.00	0.000	29.800
						C	0.000	98.896		100.00	0.000	46.120
L4 46.00-20.00	32.58	1	14	0.5000	68.177	A	0.000	68.177	68.177	100.00	0.000	0.000
						B	0.000	68.177		100.00	0.000	15.496
						C	0.000	68.177		100.00	0.000	28.756
L5 20.00-0.00	9.83	1	14	0.5000	60.327	A	0.000	60.327	60.327	100.00	0.000	0.000
						B	0.000	60.327		100.00	0.000	7.152
						C	0.000	60.327		100.00	0.000	13.272

Tower Pressure - Service

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	103.25	1.385	13	18.000	A	0.000	18.000	18.000	100.00	0.000	0.000
110.00-96.50					B	0.000	18.000		100.00	0.000	0.594
					C	0.000	18.000		100.00	0.000	4.554
L2 96.50-96.00	96.25	1.358	13	0.698	A	0.000	0.698	0.698	100.00	0.000	0.000
					B	0.000	0.698		100.00	0.000	0.198
					C	0.000	0.698		100.00	0.000	0.198
L3 96.00-46.00	69.71	1.238	11	94.729	A	0.000	94.729	94.729	100.00	0.000	0.000
					B	0.000	94.729		100.00	0.000	19.800
					C	0.000	94.729		100.00	0.000	29.720
L4 46.00-20.00	32.58	1	9	66.011	A	0.000	66.011	66.011	100.00	0.000	0.000
					B	0.000	66.011		100.00	0.000	10.296
					C	0.000	66.011		100.00	0.000	18.356
L5 20.00-0.00	9.83	1	9	58.660	A	0.000	58.660	58.660	100.00	0.000	0.000
					B	0.000	58.660		100.00	0.000	4.752
					C	0.000	58.660		100.00	0.000	8.472

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1	133.17	845.61	A	1	0.59	1	1	1	18.000	682.77	50.58	C
110.00-96.50			B	1	0.59	1	1	1	18.000			
			C	1	0.59	1	1	1	18.000			
L2	11.59	32.81	A	1	0.59	1	1	1	0.698	34.28	68.55	C
96.50-96.00			B	1	0.59	1	1	1	0.698			
			C	1	0.59	1	1	1	0.698			
L3	1825.72	3035.60	A	1	0.65	1	1	1	94.729	4274.78	85.50	C
96.00-46.00			B	1	0.65	1	1	1	94.729			
			C	1	0.65	1	1	1	94.729			
L4	1064.44	3007.65	A	1	0.65	1	1	1	66.011	2236.81	86.03	C
46.00-20.00			B	1	0.65	1	1	1	66.011			
			C	1	0.65	1	1	1	66.011			
L5 20.00-0.00	491.28	2924.75	A	1	0.65	1	1	1	58.660	1605.21	80.26	C
			B	1	0.65	1	1	1	58.660			
			C	1	0.65	1	1	1	58.660			
Sum Weight:	3526.20	9846.42						OTM	460436.73 lb-ft	8833.86		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1	133.17	845.61	A	1	0.59	1	1	1	18.000	682.77	50.58	C
110.00-96.50			B	1	0.59	1	1	1	18.000			
			C	1	0.59	1	1	1	18.000			
L2	11.59	32.81	A	1	0.59	1	1	1	0.698	34.28	68.55	C
96.50-96.00			B	1	0.59	1	1	1	0.698			
			C	1	0.59	1	1	1	0.698			
L3	1825.72	3035.60	A	1	0.65	1	1	1	94.729	4274.78	85.50	C

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
96.00-46.00			B	1	0.65	1	1	1	94.729			
			C	1	0.65	1	1	1	94.729			
L4	1064.44	3007.65	A	1	0.65	1	1	1	66.011	2236.81	86.03	C
46.00-20.00			B	1	0.65	1	1	1	66.011			
			C	1	0.65	1	1	1	66.011			
L5 20.00-0.00	491.28	2924.75	A	1	0.65	1	1	1	58.660	1605.21	80.26	C
			B	1	0.65	1	1	1	58.660			
			C	1	0.65	1	1	1	58.660			
Sum Weight:	3526.20	9846.42						OTM	460436.73 lb-ft	8833.86		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1	133.17	845.61	A	1	0.59	1	1	1	18.000	682.77	50.58	C
110.00-96.50			B	1	0.59	1	1	1	18.000			
			C	1	0.59	1	1	1	18.000			
L2	11.59	32.81	A	1	0.59	1	1	1	0.698	34.28	68.55	C
96.50-96.00			B	1	0.59	1	1	1	0.698			
			C	1	0.59	1	1	1	0.698			
L3	1825.72	3035.60	A	1	0.65	1	1	1	94.729	4274.78	85.50	C
96.00-46.00			B	1	0.65	1	1	1	94.729			
			C	1	0.65	1	1	1	94.729			
L4	1064.44	3007.65	A	1	0.65	1	1	1	66.011	2236.81	86.03	C
46.00-20.00			B	1	0.65	1	1	1	66.011			
			C	1	0.65	1	1	1	66.011			
L5 20.00-0.00	491.28	2924.75	A	1	0.65	1	1	1	58.660	1605.21	80.26	C
			B	1	0.65	1	1	1	58.660			
			C	1	0.65	1	1	1	58.660			
Sum Weight:	3526.20	9846.42						OTM	460436.73 lb-ft	8833.86		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1	167.31	981.68	A	1	0.59	1	1	1	19.125	618.07	45.78	C
110.00-96.50			B	1	0.59	1	1	1	19.125			
			C	1	0.59	1	1	1	19.125			
L2	12.87	38.08	A	1	0.59	1	1	1	0.739	32.86	65.71	C
96.50-96.00			B	1	0.59	1	1	1	0.739			
			C	1	0.59	1	1	1	0.739			
L3	2033.85	3752.60	A	1	0.65	1	1	1	98.896	4046.10	80.92	C
96.00-46.00			B	1	0.65	1	1	1	98.896			
			C	1	0.65	1	1	1	98.896			
L4	1196.11	3504.55	A	1	0.65	1	1	1	68.177	2076.34	79.86	C

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
46.00-20.00			B	1	0.65	1	1	1	68.177			
			C	1	0.65	1	1	1	68.177			
L5 20.00-0.00	552.05	3365.36	A	1	0.65	1	1	1	60.327	1398.09	69.90	C
			B	1	0.65	1	1	1	60.327			
			C	1	0.65	1	1	1	60.327			
Sum Weight:	3962.20	11642.26						OTM	430414.24 lb-ft	8171.46		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1	167.31	981.68	A	1	0.59	1	1	1	19.125	618.07	45.78	C
110.00-96.50			B	1	0.59	1	1	1	19.125			
			C	1	0.59	1	1	1	19.125			
L2	12.87	38.08	A	1	0.59	1	1	1	0.739	32.86	65.71	C
96.50-96.00			B	1	0.59	1	1	1	0.739			
			C	1	0.59	1	1	1	0.739			
L3	2033.85	3752.60	A	1	0.65	1	1	1	98.896	4046.10	80.92	C
96.00-46.00			B	1	0.65	1	1	1	98.896			
			C	1	0.65	1	1	1	98.896			
L4	1196.11	3504.55	A	1	0.65	1	1	1	68.177	2076.34	79.86	C
46.00-20.00			B	1	0.65	1	1	1	68.177			
			C	1	0.65	1	1	1	68.177			
L5 20.00-0.00	552.05	3365.36	A	1	0.65	1	1	1	60.327	1398.09	69.90	C
			B	1	0.65	1	1	1	60.327			
			C	1	0.65	1	1	1	60.327			
Sum Weight:	3962.20	11642.26						OTM	430414.24 lb-ft	8171.46		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1	167.31	981.68	A	1	0.59	1	1	1	19.125	618.07	45.78	C
110.00-96.50			B	1	0.59	1	1	1	19.125			
			C	1	0.59	1	1	1	19.125			
L2	12.87	38.08	A	1	0.59	1	1	1	0.739	32.86	65.71	C
96.50-96.00			B	1	0.59	1	1	1	0.739			
			C	1	0.59	1	1	1	0.739			
L3	2033.85	3752.60	A	1	0.65	1	1	1	98.896	4046.10	80.92	C
96.00-46.00			B	1	0.65	1	1	1	98.896			
			C	1	0.65	1	1	1	98.896			
L4	1196.11	3504.55	A	1	0.65	1	1	1	68.177	2076.34	79.86	C
46.00-20.00			B	1	0.65	1	1	1	68.177			
			C	1	0.65	1	1	1	68.177			
L5 20.00-0.00	552.05	3365.36	A	1	0.65	1	1	1	60.327	1398.09	69.90	C

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
			B	1	0.65	1	1	1	60.327			
			C	1	0.65	1	1	1	60.327			
Sum Weight:	3962.20	11642.26						OTM	430414.24 lb-ft	8171.46		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1	133.17	845.61	A	1	0.59	1	1	1	18.000	340.21	25.20	C
110.00-96.50			B	1	0.59	1	1	1	18.000			
			C	1	0.59	1	1	1	18.000			
L2	11.59	32.81	A	1	0.59	1	1	1	0.698	17.08	34.16	C
96.50-96.00			B	1	0.59	1	1	1	0.698			
			C	1	0.59	1	1	1	0.698			
L3	1825.72	3035.60	A	1	0.65	1	1	1	94.729	2130.00	42.60	C
96.00-46.00			B	1	0.65	1	1	1	94.729			
			C	1	0.65	1	1	1	94.729			
L4	1064.44	3007.65	A	1	0.65	1	1	1	66.011	1114.54	42.87	C
46.00-20.00			B	1	0.65	1	1	1	66.011			
			C	1	0.65	1	1	1	66.011			
L5 20.00-0.00	491.28	2924.75	A	1	0.65	1	1	1	58.660	799.83	39.99	C
			B	1	0.65	1	1	1	58.660			
			C	1	0.65	1	1	1	58.660			
Sum Weight:	3526.20	9846.42						OTM	229421.76 lb-ft	4401.65		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1	133.17	845.61	A	1	0.59	1	1	1	18.000	340.21	25.20	C
110.00-96.50			B	1	0.59	1	1	1	18.000			
			C	1	0.59	1	1	1	18.000			
L2	11.59	32.81	A	1	0.59	1	1	1	0.698	17.08	34.16	C
96.50-96.00			B	1	0.59	1	1	1	0.698			
			C	1	0.59	1	1	1	0.698			
L3	1825.72	3035.60	A	1	0.65	1	1	1	94.729	2130.00	42.60	C
96.00-46.00			B	1	0.65	1	1	1	94.729			
			C	1	0.65	1	1	1	94.729			
L4	1064.44	3007.65	A	1	0.65	1	1	1	66.011	1114.54	42.87	C
46.00-20.00			B	1	0.65	1	1	1	66.011			
			C	1	0.65	1	1	1	66.011			
L5 20.00-0.00	491.28	2924.75	A	1	0.65	1	1	1	58.660	799.83	39.99	C
			B	1	0.65	1	1	1	58.660			
			C	1	0.65	1	1	1	58.660			
Sum Weight:	3526.20	9846.42						OTM	229421.76	4401.65		

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
									lb-ft			

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1	133.17	845.61	A	1	0.59	1	1	1	18.000	340.21	25.20	C
110.00-96.50			B	1	0.59	1	1	1	18.000			
			C	1	0.59	1	1	1	18.000			
L2	11.59	32.81	A	1	0.59	1	1	1	0.698	17.08	34.16	C
96.50-96.00			B	1	0.59	1	1	1	0.698			
			C	1	0.59	1	1	1	0.698			
L3	1825.72	3035.60	A	1	0.65	1	1	1	94.729	2130.00	42.60	C
96.00-46.00			B	1	0.65	1	1	1	94.729			
			C	1	0.65	1	1	1	94.729			
L4	1064.44	3007.65	A	1	0.65	1	1	1	66.011	1114.54	42.87	C
46.00-20.00			B	1	0.65	1	1	1	66.011			
			C	1	0.65	1	1	1	66.011			
L5 20.00-0.00	491.28	2924.75	A	1	0.65	1	1	1	58.660	799.83	39.99	C
			B	1	0.65	1	1	1	58.660			
			C	1	0.65	1	1	1	58.660			
Sum Weight:	3526.20	9846.42						OTM	229421.76 lb-ft	4401.65		

Discrete Appurtenance Pressures - No Ice $G_H = 1.690$

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft²	C_AA_C Side ft²
800 10504	300.0000	17.64	-2.31	-1.33	108.00	1.403	26	3.35	1.87
800 10504	60.0000	17.64	2.31	-1.33	108.00	1.403	26	3.35	1.87
800 10504	180.0000	17.64	0.00	2.67	108.00	1.403	26	3.35	1.87
742-351	300.0000	29.80	-2.31	-1.33	108.00	1.403	26	5.89	1.73
742-351	60.0000	29.80	2.31	-1.33	108.00	1.403	26	5.89	1.73
742-351	180.0000	29.80	0.00	2.67	108.00	1.403	26	5.89	1.73
2' Standoff T-Arm (10' face width)	0.0000	129.00	0.00	0.00	108.00	1.403	26	5.50	5.50
2' Standoff T-Arm (10' face width)	0.0000	129.00	0.00	0.00	108.00	1.403	26	5.50	5.50
2' Standoff T-Arm (10' face width)	0.0000	129.00	0.00	0.00	108.00	1.403	26	5.50	5.50
7770.00	300.0000	103.46	-4.04	-2.33	98.00	1.365	25	11.76	7.96
7770.00	60.0000	103.46	4.04	-2.33	98.00	1.365	25	11.76	7.96
7770.00	180.0000	103.46	0.00	4.67	98.00	1.365	25	11.76	7.96
PiROD 13' Low Profile Platform (Monopole)	0.0000	1300.00	0.00	0.00	98.00	1.365	25	15.70	15.70
LGP21401	300.0000	0.00	-0.58	-0.33	98.00	1.365	25	0.00	0.00
LGP21401	60.0000	0.00	0.58	-0.33	98.00	1.365	25	0.00	0.00
4' x 6" Panel w/	300.0000	172.64	-4.23	-2.44	78.00	1.279	24	11.47	12.25

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2
Mounting Pipe									
4' x 6" Panel w/ Mounting Pipe	60.0000	172.64	4.23	-2.44	78.00	1.279	24	11.47	12.25
4' x 6" Panel w/ Mounting Pipe	180.0000	172.64	0.00	4.89	78.00	1.279	24	11.47	12.25
PiROD 13' Low Profile Platform (Monopole)	0.0000	1300.00	0.00	0.00	78.00	1.279	24	15.70	15.70
P65-16-XL-2	300.0000	44.00	-4.16	-2.40	88.00	1.323	24	8.40	4.12
P65-16-XL-2	60.0000	44.00	4.16	-2.40	88.00	1.323	24	8.40	4.12
BXA-70063/4CF	180.0000	9.00	0.00	4.80	88.00	1.323	24	5.16	2.44
DB846H80E-SX w/Mount Pipe	300.0000	81.10	-4.16	-2.40	88.00	1.323	24	10.64	15.45
DB846H80E-SX w/Mount Pipe	60.0000	81.10	4.16	-2.40	88.00	1.323	24	10.64	15.45
DB844G65ZAXY w/Mount Pipe	180.0000	83.10	0.00	4.80	88.00	1.323	24	10.76	10.79
MGD3-800T0	300.0000	17.00	-4.16	-2.40	88.00	1.323	24	3.66	2.37
MGD3-800T0	60.0000	17.00	4.16	-2.40	88.00	1.323	24	3.66	2.37
MGD3-800T0	180.0000	17.00	0.00	4.80	88.00	1.323	24	3.66	2.37
FD9R6004/2C-3L	300.0000	6.20	-4.16	-2.40	88.00	1.323	24	0.00	0.00
FD9R6004/2C-3L	60.0000	6.20	4.16	-2.40	88.00	1.323	24	0.00	0.00
FD9R6004/2C-3L	180.0000	6.20	0.00	4.80	88.00	1.323	24	0.00	0.00
PiROD 13' Platform w/handrails (Monopole)	0.0000	1822.00	0.00	0.00	88.00	1.323	24	31.30	31.30
AM-X-CD-14-65-00T-RET	0.0000	36.40	0.00	-4.67	98.00	1.365	25	5.51	2.83
AM-X-CD-14-65-00T-RET	120.0000	36.40	4.04	2.33	98.00	1.365	25	5.51	2.83
AM-X-CD-16-65-00T-RET	240.0000	33.00	-4.04	2.33	98.00	1.365	25	6.62	4.13
Remote Radio Heads	0.0000	66.00	0.00	-0.67	98.00	1.365	25	0.00	0.00
Remote Radio Heads	120.0000	66.00	0.58	0.33	98.00	1.365	25	0.00	0.00
Remote Radio Heads	240.0000	66.00	-0.58	0.33	98.00	1.365	25	0.00	0.00
DC6-48-60-18	240.0000	20.00	-0.58	0.33	98.00	1.365	25	2.59	1.08
TT19-08BP111-001	0.0000	25.00	0.00	-0.67	98.00	1.365	25	0.00	0.52
TT19-08BP111-001	120.0000	25.00	0.58	0.33	98.00	1.365	25	0.00	0.52
TT19-08BP111-001	240.0000	25.00	-0.58	0.33	98.00	1.365	25	0.00	0.52
LGP21401	180.0000	38.00	0.00	0.67	98.00	1.365	25	0.00	0.00
	Sum Weight:	6628.32							

Discrete Appurtenance Pressures - With Ice $G_H = 1.690$

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2	t_z in
800 10504	300.0000	35.71	-2.31	-1.33	108.00	1.403	19	3.70	2.20	0.5000
800 10504	60.0000	35.71	2.31	-1.33	108.00	1.403	19	3.70	2.20	0.5000
800 10504	180.0000	35.71	0.00	2.67	108.00	1.403	19	3.70	2.20	0.5000
742-351	300.0000	57.10	-2.31	-1.33	108.00	1.403	19	6.30	2.04	0.5000
742-351	60.0000	57.10	2.31	-1.33	108.00	1.403	19	6.30	2.04	0.5000
742-351	180.0000	57.10	0.00	2.67	108.00	1.403	19	6.30	2.04	0.5000
2' Standoff T-Arm (10' face width)	0.0000	170.00	0.00	0.00	108.00	1.403	19	6.90	6.90	0.5000
2' Standoff T-Arm (10' face width)	0.0000	170.00	0.00	0.00	108.00	1.403	19	6.90	6.90	0.5000
2' Standoff T-Arm (10' face width)	0.0000	170.00	0.00	0.00	108.00	1.403	19	6.90	6.90	0.5000

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2	t_z in
7770.00	300.0000	189.40	-4.04	-2.33	98.00	1.365	19	12.63	9.21	0.5000
7770.00	60.0000	189.40	4.04	-2.33	98.00	1.365	19	12.63	9.21	0.5000
7770.00	180.0000	189.40	0.00	4.67	98.00	1.365	19	12.63	9.21	0.5000
PiROD 13' Low Profile Platform (Monopole)	0.0000	1765.00	0.00	0.00	98.00	1.365	19	20.10	20.10	0.5000
LGP21401	300.0000	52.33	-0.58	-0.33	98.00	1.365	19	0.00	0.00	0.5000
LGP21401	60.0000	52.33	0.58	-0.33	98.00	1.365	19	0.00	0.00	0.5000
4' x 6" Panel w/ Mounting Pipe	300.0000	290.82	-4.23	-2.44	78.00	1.279	18	12.71	14.43	0.5000
4' x 6" Panel w/ Mounting Pipe	60.0000	290.82	4.23	-2.44	78.00	1.279	18	12.71	14.43	0.5000
4' x 6" Panel w/ Mounting Pipe	180.0000	290.82	0.00	4.89	78.00	1.279	18	12.71	14.43	0.5000
PiROD 13' Low Profile Platform (Monopole)	0.0000	1765.00	0.00	0.00	78.00	1.279	18	20.10	20.10	0.5000
P65-16-XL-2	300.0000	88.53	-4.16	-2.40	88.00	1.323	18	8.95	4.56	0.5000
P65-16-XL-2	60.0000	88.53	4.16	-2.40	88.00	1.323	18	8.95	4.56	0.5000
BXA-70063/4CF	180.0000	37.79	0.00	4.80	88.00	1.323	18	5.55	2.74	0.5000
DB846H80E-SX w/Mount Pipe	300.0000	191.47	-4.16	-2.40	88.00	1.323	18	11.75	17.83	0.5000
DB846H80E-SX w/Mount Pipe	60.0000	191.47	4.16	-2.40	88.00	1.323	18	11.75	17.83	0.5000
DB844G65ZAXY w/Mount Pipe	180.0000	179.96	0.00	4.80	88.00	1.323	18	12.14	12.98	0.5000
MGD3-800T0	300.0000	38.91	-4.16	-2.40	88.00	1.323	18	4.00	2.70	0.5000
MGD3-800T0	60.0000	38.91	4.16	-2.40	88.00	1.323	18	4.00	2.70	0.5000
MGD3-800T0	180.0000	38.91	0.00	4.80	88.00	1.323	18	4.00	2.70	0.5000
FD9R6004/2C-3L	300.0000	10.76	-4.16	-2.40	88.00	1.323	18	0.00	0.00	0.5000
FD9R6004/2C-3L	60.0000	10.76	4.16	-2.40	88.00	1.323	18	0.00	0.00	0.5000
FD9R6004/2C-3L	180.0000	10.76	0.00	4.80	88.00	1.323	18	0.00	0.00	0.5000
PiROD 13' Platform w/handrails (Monopole)	0.0000	2452.00	0.00	0.00	88.00	1.323	18	40.20	40.20	0.5000
AM-X-CD-14-65-00T-RET	0.0000	68.35	0.00	-4.67	98.00	1.365	19	5.90	3.14	0.5000
AM-X-CD-14-65-00T-RET	120.0000	68.35	4.04	2.33	98.00	1.365	19	5.90	3.14	0.5000
AM-X-CD-16-65-00T-RET	240.0000	74.48	-4.04	2.33	98.00	1.365	19	7.05	4.54	0.5000
Remote Radio Heads	0.0000	89.93	0.00	-0.67	98.00	1.365	19	0.00	0.00	0.5000
Remote Radio Heads	120.0000	89.93	0.58	0.33	98.00	1.365	19	0.00	0.00	0.5000
Remote Radio Heads	240.0000	89.93	-0.58	0.33	98.00	1.365	19	0.00	0.00	0.5000
DC6-48-60-18	240.0000	36.69	-0.58	0.33	98.00	1.365	19	2.81	1.24	0.5000
TT19-08BP111-001	0.0000	30.80	0.00	-0.67	98.00	1.365	19	0.00	0.62	0.5000
TT19-08BP111-001	120.0000	30.80	0.58	0.33	98.00	1.365	19	0.00	0.62	0.5000
TT19-08BP111-001	240.0000	30.80	-0.58	0.33	98.00	1.365	19	0.00	0.62	0.5000
LGP21401	180.0000	52.33	0.00	0.67	98.00	1.365	19	0.00	0.00	0.5000
	Sum Weight:	9904.89								

Discrete Appurtenance Pressures - Service $G_H = 1.690$

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2
800 10504	300.0000	17.64	-2.31	-1.33	108.00	1.403	13	3.35	1.87
800 10504	60.0000	17.64	2.31	-1.33	108.00	1.403	13	3.35	1.87
800 10504	180.0000	17.64	0.00	2.67	108.00	1.403	13	3.35	1.87
742-351	300.0000	29.80	-2.31	-1.33	108.00	1.403	13	5.89	1.73

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2
742-351	60.0000	29.80	2.31	-1.33	108.00	1.403	13	5.89	1.73
742-351	180.0000	29.80	0.00	2.67	108.00	1.403	13	5.89	1.73
2' Standoff T-Arm (10' face width)	0.0000	129.00	0.00	0.00	108.00	1.403	13	5.50	5.50
2' Standoff T-Arm (10' face width)	0.0000	129.00	0.00	0.00	108.00	1.403	13	5.50	5.50
2' Standoff T-Arm (10' face width)	0.0000	129.00	0.00	0.00	108.00	1.403	13	5.50	5.50
7770.00	300.0000	103.46	-4.04	-2.33	98.00	1.365	13	11.76	7.96
7770.00	60.0000	103.46	4.04	-2.33	98.00	1.365	13	11.76	7.96
7770.00	180.0000	103.46	0.00	4.67	98.00	1.365	13	11.76	7.96
PiROD 13' Low Profile Platform (Monopole)	0.0000	1300.00	0.00	0.00	98.00	1.365	13	15.70	15.70
LGP21401	300.0000	0.00	-0.58	-0.33	98.00	1.365	13	0.00	0.00
LGP21401	60.0000	0.00	0.58	-0.33	98.00	1.365	13	0.00	0.00
4' x 6" Panel w/ Mounting Pipe	300.0000	172.64	-4.23	-2.44	78.00	1.279	12	11.47	12.25
4' x 6" Panel w/ Mounting Pipe	60.0000	172.64	4.23	-2.44	78.00	1.279	12	11.47	12.25
4' x 6" Panel w/ Mounting Pipe	180.0000	172.64	0.00	4.89	78.00	1.279	12	11.47	12.25
PiROD 13' Low Profile Platform (Monopole)	0.0000	1300.00	0.00	0.00	78.00	1.279	12	15.70	15.70
P65-16-XL-2	300.0000	44.00	-4.16	-2.40	88.00	1.323	12	8.40	4.12
P65-16-XL-2	60.0000	44.00	4.16	-2.40	88.00	1.323	12	8.40	4.12
BXA-70063/4CF	180.0000	9.00	0.00	4.80	88.00	1.323	12	5.16	2.44
DB846H80E-SX w/Mount Pipe	300.0000	81.10	-4.16	-2.40	88.00	1.323	12	10.64	15.45
DB846H80E-SX w/Mount Pipe	60.0000	81.10	4.16	-2.40	88.00	1.323	12	10.64	15.45
DB844G65ZAXY w/Mount Pipe	180.0000	83.10	0.00	4.80	88.00	1.323	12	10.76	10.79
MGD3-800T0	300.0000	17.00	-4.16	-2.40	88.00	1.323	12	3.66	2.37
MGD3-800T0	60.0000	17.00	4.16	-2.40	88.00	1.323	12	3.66	2.37
MGD3-800T0	180.0000	17.00	0.00	4.80	88.00	1.323	12	3.66	2.37
FD9R6004/2C-3L	300.0000	6.20	-4.16	-2.40	88.00	1.323	12	0.00	0.00
FD9R6004/2C-3L	60.0000	6.20	4.16	-2.40	88.00	1.323	12	0.00	0.00
FD9R6004/2C-3L	180.0000	6.20	0.00	4.80	88.00	1.323	12	0.00	0.00
PiROD 13' Platform w/handrails (Monopole)	0.0000	1822.00	0.00	0.00	88.00	1.323	12	31.30	31.30
AM-X-CD-14-65-00T-RET	0.0000	36.40	0.00	-4.67	98.00	1.365	13	5.51	2.83
AM-X-CD-14-65-00T-RET	120.0000	36.40	4.04	2.33	98.00	1.365	13	5.51	2.83
AM-X-CD-16-65-00T-RET	240.0000	33.00	-4.04	2.33	98.00	1.365	13	6.62	4.13
Remote Radio Heads	0.0000	66.00	0.00	-0.67	98.00	1.365	13	0.00	0.00
Remote Radio Heads	120.0000	66.00	0.58	0.33	98.00	1.365	13	0.00	0.00
Remote Radio Heads	240.0000	66.00	-0.58	0.33	98.00	1.365	13	0.00	0.00
DC6-48-60-18	240.0000	20.00	-0.58	0.33	98.00	1.365	13	2.59	1.08
TT19-08BP111-001	0.0000	25.00	0.00	-0.67	98.00	1.365	13	0.00	0.52
TT19-08BP111-001	120.0000	25.00	0.58	0.33	98.00	1.365	13	0.00	0.52
TT19-08BP111-001	240.0000	25.00	-0.58	0.33	98.00	1.365	13	0.00	0.52
LGP21401	180.0000	38.00	0.00	0.67	98.00	1.365	13	0.00	0.00
	Sum Weight:	6628.32							

Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Leg Weight	9846.42					
Bracing Weight	0.00					
Total Member Self-Weight	9846.42			261.47	402.18	
Total Weight	20000.94			261.47	402.18	
Wind 0 deg - No Ice		24.20	-19000.92	-1391894.12	-1969.48	-411.85
Wind 30 deg - No Ice		9468.94	-16467.38	-1206566.47	-693251.18	-737.45
Wind 60 deg - No Ice		16376.49	-9521.42	-697870.25	-1198669.02	-865.44
Wind 90 deg - No Ice		18895.96	-24.20	-2110.20	-1382796.70	-761.54
Wind 120 deg - No Ice		16352.28	9479.50	694285.34	-1196297.36	-453.59
Wind 150 deg - No Ice		9427.02	16443.18	1204717.74	-689143.34	-24.10
Wind 180 deg - No Ice		-24.20	19000.92	1392417.05	2773.85	411.85
Wind 210 deg - No Ice		-9468.94	16467.38	1207089.40	694055.55	737.45
Wind 240 deg - No Ice		-16376.49	9521.42	698393.18	1199473.39	865.44
Wind 270 deg - No Ice		-18895.96	24.20	2633.13	1383601.07	761.54
Wind 300 deg - No Ice		-16352.28	-9479.50	-693762.41	1197101.73	453.59
Wind 330 deg - No Ice		-9427.02	-16443.18	-1204194.81	689947.71	24.10
Member Ice	1795.84					
Total Weight Ice	25509.35			364.39	348.07	
Wind 0 deg - Ice		18.23	-17098.07	-1247526.09	-1438.49	-407.89
Wind 30 deg - Ice		8518.62	-14816.48	-1081233.75	-621183.54	-580.02
Wind 60 deg - Ice		14736.45	-8564.82	-625128.06	-1074389.70	-596.74
Wind 90 deg - Ice		17005.66	-18.23	-1422.17	-1239620.74	-453.56
Wind 120 deg - Ice		14718.22	8533.25	622762.42	-1072603.14	-188.85
Wind 150 deg - Ice		8487.04	14798.25	1080175.96	-618089.13	126.47
Wind 180 deg - Ice		-18.23	17098.07	1248254.86	2134.63	407.89
Wind 210 deg - Ice		-8518.62	14816.48	1081962.52	621879.68	580.02
Wind 240 deg - Ice		-14736.45	8564.82	625856.83	1075085.84	596.74
Wind 270 deg - Ice		-17005.66	18.23	2150.94	1240316.88	453.56
Wind 300 deg - Ice		-14718.22	-8533.25	-622033.65	1073299.28	188.85
Wind 330 deg - Ice		-8487.04	-14798.25	-1079447.19	618785.27	-126.47
Total Weight	20000.94			261.47	402.18	
Wind 0 deg - Service		12.06	-9467.59	-693803.51	-1183.92	-205.21
Wind 30 deg - Service		4718.09	-8205.20	-601460.32	-345628.78	-367.45
Wind 60 deg - Service		8159.91	-4744.24	-347992.31	-597463.28	-431.22
Wind 90 deg - Service		9415.29	-12.06	-1316.02	-689208.56	-379.45
Wind 120 deg - Service		8147.85	4723.35	345676.91	-596281.55	-226.01
Wind 150 deg - Service		4697.20	8193.14	600010.01	-343581.97	-12.01
Wind 180 deg - Service		-12.06	9467.59	693534.93	1179.53	205.21
Wind 210 deg - Service		-4718.09	8205.20	601191.74	345624.39	367.45
Wind 240 deg - Service		-8159.91	4744.24	347723.73	597458.89	431.22
Wind 270 deg - Service		-9415.29	12.06	1047.44	689204.17	379.45
Wind 300 deg - Service		-8147.85	-4723.35	-345945.49	596277.16	226.01
Wind 330 deg - Service		-4697.20	-8193.14	-600278.59	343577.58	12.01

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	IBC .6 Dead+Wind 0 deg - No Ice
4	Dead+Wind 30 deg - No Ice
5	IBC .6 Dead+Wind 30 deg - No Ice
6	Dead+Wind 60 deg - No Ice
7	IBC .6 Dead+Wind 60 deg - No Ice

Comb. No.	Description
8	Dead+Wind 90 deg - No Ice
9	IBC .6 Dead+Wind 90 deg - No Ice
10	Dead+Wind 120 deg - No Ice
11	IBC .6 Dead+Wind 120 deg - No Ice
12	Dead+Wind 150 deg - No Ice
13	IBC .6 Dead+Wind 150 deg - No Ice
14	Dead+Wind 180 deg - No Ice
15	IBC .6 Dead+Wind 180 deg - No Ice
16	Dead+Wind 210 deg - No Ice
17	IBC .6 Dead+Wind 210 deg - No Ice
18	Dead+Wind 240 deg - No Ice
19	IBC .6 Dead+Wind 240 deg - No Ice
20	Dead+Wind 270 deg - No Ice
21	IBC .6 Dead+Wind 270 deg - No Ice
22	Dead+Wind 300 deg - No Ice
23	IBC .6 Dead+Wind 300 deg - No Ice
24	Dead+Wind 330 deg - No Ice
25	IBC .6 Dead+Wind 330 deg - No Ice
26	Dead+Ice+Temp
27	Dead+Wind 0 deg+Ice+Temp
28	IBC .6 Dead+Wind 0 deg+.6 Ice+Temp
29	Dead+Wind 30 deg+Ice+Temp
30	IBC .6 Dead+Wind 30 deg+.6 Ice+Temp
31	Dead+Wind 60 deg+Ice+Temp
32	IBC .6 Dead+Wind 60 deg+.6 Ice+Temp
33	Dead+Wind 90 deg+Ice+Temp
34	IBC .6 Dead+Wind 90 deg+.6 Ice+Temp
35	Dead+Wind 120 deg+Ice+Temp
36	IBC .6 Dead+Wind 120 deg+.6 Ice+Temp
37	Dead+Wind 150 deg+Ice+Temp
38	IBC .6 Dead+Wind 150 deg+.6 Ice+Temp
39	Dead+Wind 180 deg+Ice+Temp
40	IBC .6 Dead+Wind 180 deg+.6 Ice+Temp
41	Dead+Wind 210 deg+Ice+Temp
42	IBC .6 Dead+Wind 210 deg+.6 Ice+Temp
43	Dead+Wind 240 deg+Ice+Temp
44	IBC .6 Dead+Wind 240 deg+.6 Ice+Temp
45	Dead+Wind 270 deg+Ice+Temp
46	IBC .6 Dead+Wind 270 deg+.6 Ice+Temp
47	Dead+Wind 300 deg+Ice+Temp
48	IBC .6 Dead+Wind 300 deg+.6 Ice+Temp
49	Dead+Wind 330 deg+Ice+Temp
50	IBC .6 Dead+Wind 330 deg+.6 Ice+Temp
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 60 deg - Service
54	Dead+Wind 90 deg - Service
55	Dead+Wind 120 deg - Service
56	Dead+Wind 150 deg - Service
57	Dead+Wind 180 deg - Service
58	Dead+Wind 210 deg - Service
59	Dead+Wind 240 deg - Service
60	Dead+Wind 270 deg - Service
61	Dead+Wind 300 deg - Service
62	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L1	110 - 96.5	Pole	Max Tension	51	0.01	-0.24	-0.00
			Max. Compression	26	-5037.67	72.92	-46.77
			Max. Mx	20	-3045.68	28074.54	-49.68
			Max. My	14	-3045.58	26.21	-28062.54
			Max. Vy	20	-5225.76	28074.54	-49.68
			Max. Vx	14	5199.64	26.21	-28062.54
			Max. Torque	25			309.59
L2	96.5 - 96	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-5088.62	72.92	-48.40
			Max. Mx	20	-3087.30	30697.72	-62.45
			Max. My	14	-3087.18	40.12	-30672.79
			Max. Vy	20	-5263.83	30697.72	-62.45
			Max. Vx	14	5237.73	40.12	-30672.79
			Max. Torque	25			310.13
L3	96 - 46	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-16364.33	172.96	-10.96
			Max. Mx	20	-11248.48	573650.38	-1291.57
			Max. My	14	-11237.18	1408.49	-577395.91
			Max. Vy	20	-15303.83	573650.38	-1291.57
			Max. Vx	14	15412.66	1408.49	-577395.91
			Max. Torque	9			1062.35
L4	46 - 20	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-21591.94	290.98	-250.93
			Max. Mx	20	-16242.71	1067927.98	-2183.76
			Max. My	14	-16238.41	2321.93	-1074912.20
			Max. Vy	20	-17612.62	1067927.98	-2183.76
			Max. Vx	14	17719.61	2321.93	-1074912.20
			Max. Torque	19			-955.11
L5	20 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-25509.35	348.07	-364.39
			Max. Mx	20	-19992.13	1432890.40	-2745.40
			Max. My	14	-19992.03	2883.55	-1441992.52
			Max. Vy	20	-18905.29	1432890.40	-2745.40
			Max. Vx	14	19010.30	2883.55	-1441992.52
			Max. Torque	19			-886.31

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	39	25509.35	18.23	-17098.10
	Max. H_x	20	20000.94	18895.96	-24.20
	Max. H_z	3	12000.56	-24.20	19000.92
	Max. M_x	2	1441457.42	-24.20	19000.92
	Max. M_z	8	1432057.02	-18895.96	24.20
	Max. Torsion	7	851.33	-16376.49	9521.42
	Min. Vert	19	12000.56	16376.49	-9521.42
	Min. H_x	8	20000.94	-18895.96	24.20
	Min. H_z	15	12000.56	24.20	-19000.92
	Min. M_x	14	-1441992.52	24.20	-19000.92
	Min. M_z	20	-1432890.40	18895.96	-24.20
	Min. Torsion	19	-852.97	16376.49	-9521.42

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	20000.94	0.00	0.00	261.47	402.18	0.00
Dead+Wind 0 deg - No Ice	20000.94	24.20	-19000.92	-1441457.42	-2053.79	-407.22
IBC .6 Dead+Wind 0 deg - No Ice	12000.56	24.20	-19000.92	-1420342.48	-2182.06	-407.37
Dead+Wind 30 deg - No Ice	20000.94	9468.94	-16467.38	-1249533.68	-717948.35	-725.19
IBC .6 Dead+Wind 30 deg - No Ice	12000.56	9468.94	-16467.38	-1231242.91	-707538.42	-726.20
Dead+Wind 60 deg - No Ice	20000.94	16376.49	-9521.42	-722732.39	-1241367.44	-849.76
IBC .6 Dead+Wind 60 deg - No Ice	12000.56	16376.49	-9521.42	-712196.03	-1223254.78	-851.33
Dead+Wind 90 deg - No Ice	20000.94	18895.96	-24.20	-2191.92	-1432057.02	-747.27
IBC .6 Dead+Wind 90 deg - No Ice	12000.56	18895.96	-24.20	-2262.76	-1411141.27	-748.96
Dead+Wind 120 deg - No Ice	20000.94	16352.28	9479.50	719013.64	-1238904.78	-444.26
IBC .6 Dead+Wind 120 deg - No Ice	12000.56	16352.28	9479.50	708325.79	-1220836.24	-445.63
Dead+Wind 150 deg - No Ice	20000.94	9427.02	16443.18	1247618.93	-713672.58	-21.37
IBC .6 Dead+Wind 150 deg - No Ice	12000.56	9427.02	16443.18	1229149.63	-703337.74	-22.08
Dead+Wind 180 deg - No Ice	20000.94	-24.20	19000.92	1441992.52	2883.50	407.79
IBC .6 Dead+Wind 180 deg - No Ice	12000.56	-24.20	19000.92	1420660.36	2671.81	407.93
Dead+Wind 210 deg - No Ice	20000.94	-9468.94	16467.38	1250074.99	718770.90	727.45
IBC .6 Dead+Wind 210 deg - No Ice	12000.56	-9468.94	16467.38	1231564.36	708024.07	728.40
Dead+Wind 240 deg - No Ice	20000.94	-16376.49	9521.42	723282.93	1242191.83	851.43
IBC .6 Dead+Wind 240 deg - No Ice	12000.56	-16376.49	9521.42	712522.78	1223741.51	852.97
Dead+Wind 270 deg - No Ice	20000.94	-18895.96	24.20	2745.50	1432890.40	746.69
IBC .6 Dead+Wind 270 deg - No Ice	12000.56	-18895.96	24.20	2591.23	1411633.17	748.41
Dead+Wind 300 deg - No Ice	20000.94	-16352.28	-9479.50	-718466.26	1239745.31	442.00
IBC .6 Dead+Wind 300 deg - No Ice	12000.56	-16352.28	-9479.50	-708000.90	1221332.22	443.45
Dead+Wind 330 deg - No Ice	20000.94	-9427.02	-16443.18	-1247080.80	714511.27	19.68
IBC .6 Dead+Wind 330 deg - No Ice	12000.56	-9427.02	-16443.18	-1228830.04	703832.64	20.43
Dead+Ice+Temp	25509.35	0.00	0.00	364.39	348.07	0.00
Dead+Wind 0 deg+Ice+Temp	25509.35	18.23	-17098.10	-1310097.62	-1524.47	-402.28
IBC .6 Dead+Wind 0 deg+.6 Ice+Temp	15305.61	18.23	-17098.07	-1283597.31	-1631.95	-403.33
Dead+Wind 30 deg+Ice+Temp	25509.35	8518.62	-14816.48	-1135471.08	-652345.61	-568.14
IBC .6 Dead+Wind 30 deg+.6 Ice+Temp	15305.61	8518.62	-14816.48	-1112519.76	-639218.18	-570.50
Dead+Wind 60 deg+Ice+Temp	25509.35	14736.45	-8564.82	-656498.63	-1128279.60	-582.45
IBC .6 Dead+Wind 60 deg+.6 Ice+Temp	15305.61	14736.45	-8564.82	-643287.78	-1105475.96	-585.45
Dead+Wind 90 deg+Ice+Temp	25509.35	17005.69	-18.23	-1509.40	-1301795.69	-441.17
IBC .6 Dead+Wind 90 deg+.6 Ice+Temp	15305.61	17005.66	-18.23	-1619.79	-1275468.24	-443.99
Dead+Wind 120 deg+Ice+Temp	25509.35	14718.22	8533.25	653987.59	-1126391.25	-181.48

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
IBC .6 Dead+Wind 120 deg+.6 Ice+Temp	15305.61	14718.22	8533.25	640545.30	-1103634.11	-183.39
Dead+Wind 150 deg+Ice+Temp	25509.35	8487.04	14798.25	1134339.59	-649069.64	127.45
IBC .6 Dead+Wind 150 deg+.6 Ice+Temp	15305.61	8487.04	14798.25	1111127.53	-636021.54	126.96
Dead+Wind 180 deg+Ice+Temp	25509.35	-18.23	17098.10	1310843.20	2256.11	402.67
IBC .6 Dead+Wind 180 deg+.6 Ice+Temp	15305.61	-18.23	17098.07	1284040.54	2060.00	403.70
Dead+Wind 210 deg+Ice+Temp	25509.35	-8518.62	14816.48	1136223.03	653071.45	569.84
IBC .6 Dead+Wind 210 deg+.6 Ice+Temp	15305.61	-8518.62	14816.48	1112966.62	639642.97	572.14
Dead+Wind 240 deg+Ice+Temp	25509.35	-14736.45	8564.82	657258.73	1129008.10	583.74
IBC .6 Dead+Wind 240 deg+.6 Ice+Temp	15305.61	-14736.45	8564.82	643739.24	1105902.29	586.71
Dead+Wind 270 deg+Ice+Temp	25509.35	-17005.69	18.23	2271.27	1302532.65	440.77
IBC .6 Dead+Wind 270 deg+.6 Ice+Temp	15305.61	-17005.66	18.23	2072.23	1275899.37	443.62
Dead+Wind 300 deg+Ice+Temp	25509.35	-14718.22	-8533.25	-653232.07	1127134.00	179.79
IBC .6 Dead+Wind 300 deg+.6 Ice+Temp	15305.61	-14718.22	-8533.25	-640096.48	1104068.49	181.75
Dead+Wind 330 deg+Ice+Temp	25509.35	-8487.04	-14798.25	-1133592.23	649809.73	-128.76
IBC .6 Dead+Wind 330 deg+.6 Ice+Temp	15305.61	-8487.04	-14798.25	-1110683.33	636454.38	-128.22
Dead+Wind 0 deg - Service	20000.94	12.06	-9467.59	-718973.48	-813.93	-204.66
Dead+Wind 30 deg - Service	20000.94	4718.09	-8205.20	-623230.96	-357956.83	-365.28
Dead+Wind 60 deg - Service	20000.94	8159.91	-4744.24	-360420.05	-619074.19	-428.24
Dead+Wind 90 deg - Service	20000.94	9415.29	-12.06	-961.73	-714199.42	-376.60
Dead+Wind 120 deg - Service	20000.94	8147.85	4723.35	358826.55	-617842.00	-224.00
Dead+Wind 150 deg - Service	20000.94	4697.20	8193.14	622537.73	-355822.06	-11.18
Dead+Wind 180 deg - Service	20000.94	-12.06	9467.59	719509.24	1649.90	204.78
Dead+Wind 210 deg - Service	20000.94	-4718.09	8205.20	623768.28	358790.99	365.83
Dead+Wind 240 deg - Service	20000.94	-8159.91	4744.24	360959.68	619908.82	428.65
Dead+Wind 270 deg - Service	20000.94	-9415.29	12.06	1502.13	715036.30	376.47
Dead+Wind 300 deg - Service	20000.94	-8147.85	-4723.35	-358287.71	618680.67	223.46
Dead+Wind 330 deg - Service	20000.94	-4697.20	-8193.14	-622001.21	356660.28	10.76

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	lb	lb	lb	lb	lb	lb	
1	0.00	-20000.94	0.00	0.00	20000.94	0.00	0.000%
2	24.20	-20000.94	-19000.92	-24.20	20000.94	19000.92	0.000%
3	24.20	-12000.56	-19000.92	-24.20	12000.56	19000.92	0.000%
4	9468.94	-20000.94	-16467.38	-9468.94	20000.94	16467.38	0.000%
5	9468.94	-12000.56	-16467.38	-9468.94	12000.56	16467.38	0.000%
6	16376.49	-20000.94	-9521.42	-16376.49	20000.94	9521.42	0.000%
7	16376.49	-12000.56	-9521.42	-16376.49	12000.56	9521.42	0.000%
8	18895.96	-20000.94	-24.20	-18895.96	20000.94	24.20	0.000%
9	18895.96	-12000.56	-24.20	-18895.96	12000.56	24.20	0.000%
10	16352.28	-20000.94	9479.50	-16352.28	20000.94	-9479.50	0.000%
11	16352.28	-12000.56	9479.50	-16352.28	12000.56	-9479.50	0.000%
12	9427.02	-20000.94	16443.18	-9427.02	20000.94	-16443.18	0.000%
13	9427.02	-12000.56	16443.18	-9427.02	12000.56	-16443.18	0.000%
14	-24.20	-20000.94	19000.92	24.20	20000.94	-19000.92	0.000%
15	-24.20	-12000.56	19000.92	24.20	12000.56	-19000.92	0.000%
16	-9468.94	-20000.94	16467.38	9468.94	20000.94	-16467.38	0.000%
17	-9468.94	-12000.56	16467.38	9468.94	12000.56	-16467.38	0.000%

Load Comb.	Sum of Applied Forces PX lb	PY lb	PZ lb	Sum of Reactions PX lb	PY lb	PZ lb	% Error
18	-16376.49	-20000.94	9521.42	16376.49	20000.94	-9521.42	0.000%
19	-16376.49	-12000.56	9521.42	16376.49	12000.56	-9521.42	0.000%
20	-18895.96	-20000.94	24.20	18895.96	20000.94	-24.20	0.000%
21	-18895.96	-12000.56	24.20	18895.96	12000.56	-24.20	0.000%
22	-16352.28	-20000.94	-9479.50	16352.28	20000.94	9479.50	0.000%
23	-16352.28	-12000.56	-9479.50	16352.28	12000.56	9479.50	0.000%
24	-9427.02	-20000.94	-16443.18	9427.02	20000.94	16443.18	0.000%
25	-9427.02	-12000.56	-16443.18	9427.02	12000.56	16443.18	0.000%
26	0.00	-25509.35	0.00	0.00	25509.35	0.00	0.000%
27	18.23	-25509.35	-17098.07	-18.23	25509.35	17098.10	0.000%
28	18.23	-15305.61	-17098.07	-18.23	15305.61	17098.07	0.000%
29	8518.62	-25509.35	-14816.48	-8518.62	25509.35	14816.48	0.000%
30	8518.62	-15305.61	-14816.48	-8518.62	15305.61	14816.48	0.000%
31	14736.45	-25509.35	-8564.82	-14736.45	25509.35	8564.82	0.000%
32	14736.45	-15305.61	-8564.82	-14736.45	15305.61	8564.82	0.000%
33	17005.66	-25509.35	-18.23	-17005.69	25509.35	18.23	0.000%
34	17005.66	-15305.61	-18.23	-17005.66	15305.61	18.23	0.000%
35	14718.22	-25509.35	8533.25	-14718.22	25509.35	-8533.25	0.000%
36	14718.22	-15305.61	8533.25	-14718.22	15305.61	-8533.25	0.000%
37	8487.04	-25509.35	14798.25	-8487.04	25509.35	-14798.25	0.000%
38	8487.04	-15305.61	14798.25	-8487.04	15305.61	-14798.25	0.000%
39	-18.23	-25509.35	17098.07	18.23	25509.35	-17098.10	0.000%
40	-18.23	-15305.61	17098.07	18.23	15305.61	-17098.07	0.000%
41	-8518.62	-25509.35	14816.48	8518.62	25509.35	-14816.48	0.000%
42	-8518.62	-15305.61	14816.48	8518.62	15305.61	-14816.48	0.000%
43	-14736.45	-25509.35	8564.82	14736.45	25509.35	-8564.82	0.000%
44	-14736.45	-15305.61	8564.82	14736.45	15305.61	-8564.82	0.000%
45	-17005.66	-25509.35	18.23	17005.69	25509.35	-18.23	0.000%
46	-17005.66	-15305.61	18.23	17005.66	15305.61	-18.23	0.000%
47	-14718.22	-25509.35	-8533.25	14718.22	25509.35	8533.25	0.000%
48	-14718.22	-15305.61	-8533.25	14718.22	15305.61	8533.25	0.000%
49	-8487.04	-25509.35	-14798.25	8487.04	25509.35	14798.25	0.000%
50	-8487.04	-15305.61	-14798.25	8487.04	15305.61	14798.25	0.000%
51	12.06	-20000.94	-9467.59	-12.06	20000.94	9467.59	0.000%
52	4718.09	-20000.94	-8205.20	-4718.09	20000.94	8205.20	0.000%
53	8159.91	-20000.94	-4744.24	-8159.91	20000.94	4744.24	0.000%
54	9415.29	-20000.94	-12.06	-9415.29	20000.94	12.06	0.000%
55	8147.85	-20000.94	4723.35	-8147.85	20000.94	-4723.35	0.000%
56	4697.20	-20000.94	8193.14	-4697.20	20000.94	-8193.14	0.000%
57	-12.06	-20000.94	9467.59	12.06	20000.94	-9467.59	0.000%
58	-4718.09	-20000.94	8205.20	4718.09	20000.94	-8205.20	0.000%
59	-8159.91	-20000.94	4744.24	8159.91	20000.94	-4744.24	0.000%
60	-9415.29	-20000.94	12.06	9415.29	20000.94	-12.06	0.000%
61	-8147.85	-20000.94	-4723.35	8147.85	20000.94	4723.35	0.000%
62	-4697.20	-20000.94	-8193.14	4697.20	20000.94	8193.14	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	0.00005270
3	Yes	4	0.00000001	0.00046572
4	Yes	6	0.00000001	0.00008494
5	Yes	5	0.00000001	0.00037518
6	Yes	6	0.00000001	0.00009267

7	Yes	5	0.00000001	0.00041659
8	Yes	5	0.00000001	0.00014974
9	Yes	5	0.00000001	0.00003330
10	Yes	6	0.00000001	0.00008527
11	Yes	5	0.00000001	0.00037825
12	Yes	6	0.00000001	0.00008819
13	Yes	5	0.00000001	0.00039366
14	Yes	5	0.00000001	0.00007406
15	Yes	4	0.00000001	0.00064613
16	Yes	6	0.00000001	0.00009196
17	Yes	5	0.00000001	0.00041214
18	Yes	6	0.00000001	0.00008440
19	Yes	5	0.00000001	0.00037214
20	Yes	5	0.00000001	0.00012844
21	Yes	5	0.00000001	0.00002876
22	Yes	6	0.00000001	0.00009037
23	Yes	5	0.00000001	0.00040536
24	Yes	6	0.00000001	0.00008728
25	Yes	5	0.00000001	0.00038854
26	Yes	4	0.00000001	0.00000001
27	Yes	5	0.00000001	0.00053448
28	Yes	5	0.00000001	0.00013925
29	Yes	6	0.00000001	0.00027329
30	Yes	6	0.00000001	0.00003576
31	Yes	6	0.00000001	0.00028919
32	Yes	6	0.00000001	0.00003839
33	Yes	5	0.00000001	0.00057576
34	Yes	5	0.00000001	0.00015060
35	Yes	6	0.00000001	0.00027388
36	Yes	6	0.00000001	0.00003604
37	Yes	6	0.00000001	0.00027853
38	Yes	6	0.00000001	0.00003676
39	Yes	5	0.00000001	0.00054258
40	Yes	5	0.00000001	0.00014121
41	Yes	6	0.00000001	0.00028847
42	Yes	6	0.00000001	0.00003818
43	Yes	6	0.00000001	0.00027262
44	Yes	6	0.00000001	0.00003566
45	Yes	5	0.00000001	0.00056275
46	Yes	5	0.00000001	0.00014735
47	Yes	6	0.00000001	0.00028313
48	Yes	6	0.00000001	0.00003752
49	Yes	6	0.00000001	0.00027840
50	Yes	6	0.00000001	0.00003669
51	Yes	4	0.00000001	0.00048989
52	Yes	5	0.00000001	0.00041900
53	Yes	5	0.00000001	0.00047410
54	Yes	5	0.00000001	0.00005643
55	Yes	5	0.00000001	0.00041937
56	Yes	5	0.00000001	0.00044018
57	Yes	4	0.00000001	0.00056917
58	Yes	5	0.00000001	0.00047019
59	Yes	5	0.00000001	0.00041585
60	Yes	5	0.00000001	0.00005237
61	Yes	5	0.00000001	0.00045614
62	Yes	5	0.00000001	0.00043450

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	110 - 96.5	38.944	58	2.9288	0.0082
L2	96.5 - 96	30.696	58	2.8949	0.0082
L3	96 - 46	30.393	58	2.8921	0.0082
L4	50 - 20	7.782	58	1.5308	0.0020
L5	20 - 0	1.130	58	0.5412	0.0005

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
108.00	800 10504	58	37.717	2.9266	0.0083	29326
98.00	(2) 7770.00	58	31.606	2.9023	0.0083	8327
88.00	P65-16-XL-2	58	25.668	2.7933	0.0079	2900
78.00	(4) 4' x 6" Panel w/ Mounting Pipe	58	20.143	2.5509	0.0066	2309

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	110 - 96.5	77.896	14	5.8621	0.0163
L2	96.5 - 96	61.412	14	5.7944	0.0164
L3	96 - 46	60.807	14	5.7888	0.0164
L4	50 - 20	15.585	14	3.0658	0.0039
L5	20 - 0	2.264	14	1.0843	0.0010

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
108.00	800 10504	14	75.444	5.8578	0.0166	14910
98.00	(2) 7770.00	14	63.231	5.8093	0.0166	4235
88.00	P65-16-XL-2	14	51.363	5.5913	0.0158	1472
78.00	(4) 4' x 6" Panel w/ Mounting Pipe	14	40.315	5.1066	0.0132	1168

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
L1	110 - 96.5 (1)	TP16x16x0.375	13.50	110.00	238.6	2.622	18.4078	-4623.50	48267.10	0.096
L2	96.5 - 96 (2)	TP17.49x16x0.375	0.50	110.00	238.6	2.622	18.4078	-4624.23	48267.10	0.096
L3	96 - 46 (3)	TP27.98x17.49x0.25	50.00	110.00	138.3	7.810	21.3379	-11237.40	166655.00	0.067
L4	46 - 20 (4)	TP33.392x26.6408x0.3125	30.00	110.00	112.4	11.819	32.8107	-16238.50	387787.00	0.042
L5	20 - 0 (5)	TP37x33.392x0.389	20.00	110.00	101.6	14.477	45.2031	-19992.00	654412.00	0.031

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	110 - 96.5 (1)	TP16x16x0.375	25468.92	-4.349	23.760	0.183	0.00	0.000	23.760	0.000
L2	96.5 - 96 (2)	TP17.49x16x0.375	25468.08	-4.349	23.760	0.183	0.00	0.000	23.760	0.000
L3	96 - 46 (3)	TP27.98x17.49x0.25	577566.67	-49.020	39.000	1.257	0.00	0.000	39.000	0.000
L4	46 - 20 (4)	TP33.392x26.6408x0.3125	1074983.33	-48.241	39.000	1.237	0.00	0.000	39.000	0.000
L5	20 - 0 (5)	TP37x33.392x0.389	1441991.67	-42.490	39.000	1.089	0.00	0.000	39.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	110 - 96.5 (1)	TP16x16x0.375	0.096	0.183	0.000	0.279 ✔	1.333	H1-3 ✔
L2	96.5 - 96 (2)	TP17.49x16x0.375	0.096	0.183	0.000	0.279 ✔	1.333	H1-3 ✔
L3	96 - 46 (3)	TP27.98x17.49x0.25	0.067	1.257	0.000	1.324 ✔	1.333	H1-3 ✔
L4	46 - 20 (4)	TP33.392x26.6408x0.3125	0.042	1.237	0.000	1.279 ✔	1.333	H1-3 ✔
L5	20 - 0 (5)	TP37x33.392x0.389	0.031	1.089	0.000	1.120 ✔	1.333	H1-3 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
L1	110 - 96.5	Pole	TP16x16x0.375	1	-4623.50	64340.04	20.9	Pass
L2	96.5 - 96	Pole	TP17.49x16x0.375	2	-4624.23	64340.04	20.9	Pass
L3	96 - 46	Pole	TP27.98x17.49x0.25	3	-11237.40	222151.11	99.4	Pass
L4	46 - 20	Pole	TP33.392x26.6408x0.3125	4	-16238.50	516920.05	95.9	Pass
L5	20 - 0	Pole	TP37x33.392x0.389	5	-19992.00	872331.16	84.0	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
							Summary	
						Pole (L3)	99.4	Pass
						RATING =	**99.4**	**Pass**

EM-CING-034-120608

New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, Connecticut 06067-3900
Phone: (860) 513-7636
Fax: (860) 513-7190

Steven L. Levine
Real Estate Consultant

HAND DELIVERED

June 7, 2012

Ms. Linda Roberts
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

Re: New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 48 Newtown Road, Danbury (owner, Wireless Capital Partners / Bert Bertram)

Dear Ms. Roberts:

On September 16, 2011, the Council approved EM-CING-034-110830, which concerned a proposal by New Cingular Wireless PCS, LLC to install LTE equipment on the tower. Council approval was conditioned upon implementing the structural engineers' recommendation to relocate existing exterior lines of coaxial cable to the inside of the tower.

When work crews arrived on-site to move the coax and install the LTE equipment, they found insufficient space remaining inside the tower to relocate the coaxial cables as required. Accordingly, AT&T requested the structural engineers to re-evaluate the structure with coaxial cables remaining on the exterior. They were to design structural modifications as needed.

The structural engineers, however, noted that the earlier structural analysis had used conservative generic wind area values to evaluate the effects of the existing coax mounted on the exterior of the tower. Their new analysis dated 6/1/12 has instead incorporated more realistic wind area values based on actual placement and configuration of the existing exterior coax. (See CHA cover letter and structural analysis attached hereto.) The new analysis allows the coax to remain on the monopole's exterior *without structural modifications to the tower.*

Accordingly, AT&T is submitting this exempt modification with revised plans. The coaxial cables presently on the outside of the monopole will remain where they are, rather than being relocated to the interior of the tower.

Attached is a summary of the planned equipment 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 and coaxial cable 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 characteristics of the facility 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 be unaffected.

2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound other than some enlarged equipment pads as may be noted in the attachments.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more.

4. Radio frequency power density may increase due to use of one or more GSM channel for UMTS transmissions. Moreover, LTE will utilize additional radio frequencies newly-licensed by the FCC for cellular mobile communications. However, the changes will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

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) 513-7636 with questions concerning this matter. Thank you for your consideration.

Sincerely,

Steven L. Levine
Real Estate Consultant

Attachments

NEW CINGULAR WIRELESS PCS, LLC
Equipment Modification

48 Newtown Road, Danbury, CT
Site Number CT2157
Prior CSC Decisions 12/99, 7/01, 8/02, 9/02, 3/03, 7/07, 9/11

Tower Owner/Manager: Wireless Capital Partners / Bert Bertram

Equipment configuration: Monopole

Current and/or approved:
Six Powerwave 7770 antennas at 100 ft c.l.
Six Powerwave LGP21401 TMA's @ 100 ft
Six diplexers @ 100 ft
Twelve runs 1 5/8 inch coax on exterior of monopole
Equipment room in existing building

Planned Modifications:
Remove existing diplexers
Install two KMW AM-X-CD-14-65-00T- RET antennas (or equivalent) at 100 ft c.l.
Install one KMW AM-X-CD-16-65-00T- RET antenna (or equivalent) at 100 ft
Install three Powerwave TT19-08BP111-001 TMA's (or equivalent) @ 100 ft
Install six Ericsson RRUS-11 remote radio heads @ 100 ft
Install one Raycap DC6-48-60-18-8F surge arrestor @ 100 ft
Install one fiber and two DC power cables to 100 ft

Power Density:

Worst-case calculations for existing wireless operations at the site indicate a radio frequency electromagnetic radiation power density, measured at ground level beside the tower, of approximately 75.4 % of the standard adopted by the FCC. As depicted in the second table below, the total radio frequency electromagnetic radiation power density following proposed modifications would be approximately 79.1 % 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 *							59.95
AT&T UMTS	100	880 - 894	1	500	0.0180	0.5867	3.06
AT&T GSM	100	880 - 894	6	296	0.0639	0.5867	10.88
AT&T GSM	100	1900 Band	1	427	0.0154	1.0000	1.54
Total							**75.4%**

* 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 *							59.95
AT&T GSM	100	880 - 894	6	296	0.0639	0.5867	10.88
AT&T GSM	100	1900 Band	1	427	0.0154	1.0000	1.54
AT&T UMTS	100	880 - 894	1	500	0.0180	0.5867	3.06
AT&T LTE	100	740 - 746	1	500	0.0180	0.4933	3.64
Total							**79.1%**

* Per CSC Records

Structural information:

The attached structural analysis (CHA, 6/1/12) indicates that the existing monopole is structurally adequate to support the proposed equipment modifications.[1]

[1] This analysis permits existing coax to remain on the exterior of the monopole. The structural analysis submitted with EM-CING-034-110830 (CHA 8/1/11) required relocation of the existing exterior coax lines to the *inside* of the tower. There is, however, no space remaining inside the monopole to implement this requirement. The earlier analysis used conservative generic wind area values to evaluate the effects of the existing coax mounted on the exterior of the tower. The 6/1/12 analysis used *more realistic wind area values* based on actual placement and configuration of the existing exterior coax, and its *results allow the coax to remain on the monopole's exterior.*

NEW CINGULAR WIRELESS PCS, LLC
WIRELESS COMMUNICATIONS FACILITY CT2157
DANBURY - EAST

48 NEWTOWN ROAD
DANBURY, CONNECTICUT

PROJECT SUMMARY

SITE NUMBER:	CT2157
SITE NAME:	DANBURY – EAST
SITE ADDRESS:	48 NEWTOWN ROAD DANBURY, CT 06810
STRUCTURE OWNER:	WIRELESS CAPITAL PARTNERS
APPLICANT:	NEW CINGULAR WIRELESS PCS, LLC 500 ENTERPRISE DRIVE ROCKY HILL, CT 06067
CONTACT:	MICHAEL D. FOLEY (203) 414-1184
COORDINATES:	41° 24' 12.27"N 73° 25' 27.99"W
HORIZONTAL DATUM:	NAD 83
ENGINEER:	CHA, INC. 2139 SILAS DEANE HIGHWAY SUITE 212 ROCKY HILL, CT 06067
CONTACT:	PAUL LUSITANI (860) 257-4557

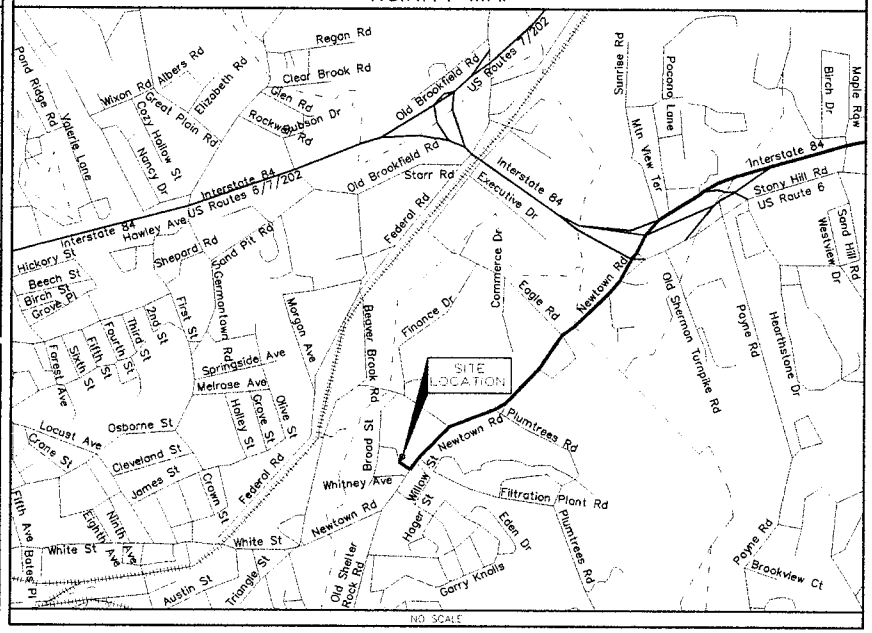
DRIVING DIRECTIONS

FROM HARTFORD:
1. TAKE I-84W
2. TAKE EXIT 8 AND MERGE ONTO NEWTOWN ROAD TOWARDS BETHEL
3. CONTINUE ABOUT 1.5 MILES TO 48 NEWTOWN ROAD. SITE WILL BE ON RIGHT, AND THE TOWER CAN BE ACCESSED OFF OF GALLAGHER LANE

PROJECT DESCRIPTION

THIS PROJECT ADDS THREE ANTENNAS, SIX RRH, SURGE ARRESTORS, AND A RADIO CABINET TO AN EXISTING TELECOMMUNICATIONS SITE

VICINITY MAP



NO SCALE

JUNE 06, 2012

SHEET INDEX

SHEET NO:	SHEET TITLE	REVISION HISTORY NO:	REVISION HISTORY DATE
T01	TITLE SHEET	4	06 / 06 / 12
C01	COMPOUND PLAN	4	06 / 06 / 12
C02	SHELTER PLAN	4	06 / 06 / 12
C03	ELEVATION AND ANTENNA PLAN	4	06 / 06 / 12
C04	STRUCTURAL DETAILS	4	06 / 06 / 12
E01	GROUND DETAILS & PLUMBING DIAGRAM	4	06 / 06 / 12
GN01	GENERAL NOTES	4	06 / 06 / 12

DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY ALL PLANS & EXISTING DIMENSIONS & CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME

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CHA
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CHA PROJECT NO.
22702 – 1013 – 43000

NO.	SUBMITTAL		
0	03/10/11	ISSUED FOR REVIEW	
	BY: JBM	CHK: PAL	APPR'D: SPL
1	04/06/11	REVISED FOR CONSTRUCTION	
	BY: PAL	CHK: PAL	APPR'D: JPS
2	08/29/11	REVISED CABLE LAYOUT	
	BY: PAL	CHK: PAL	APPR'D: JPS
3	10/27/11	REVISED SHACK LOCATION	
	BY: PAL	CHK: PAL	APPR'D: JPS
4	06/06/12	REVISED PER NEW ANALYSIS	
	BY: PAL	CHK: PAL	APPR'D: JPS

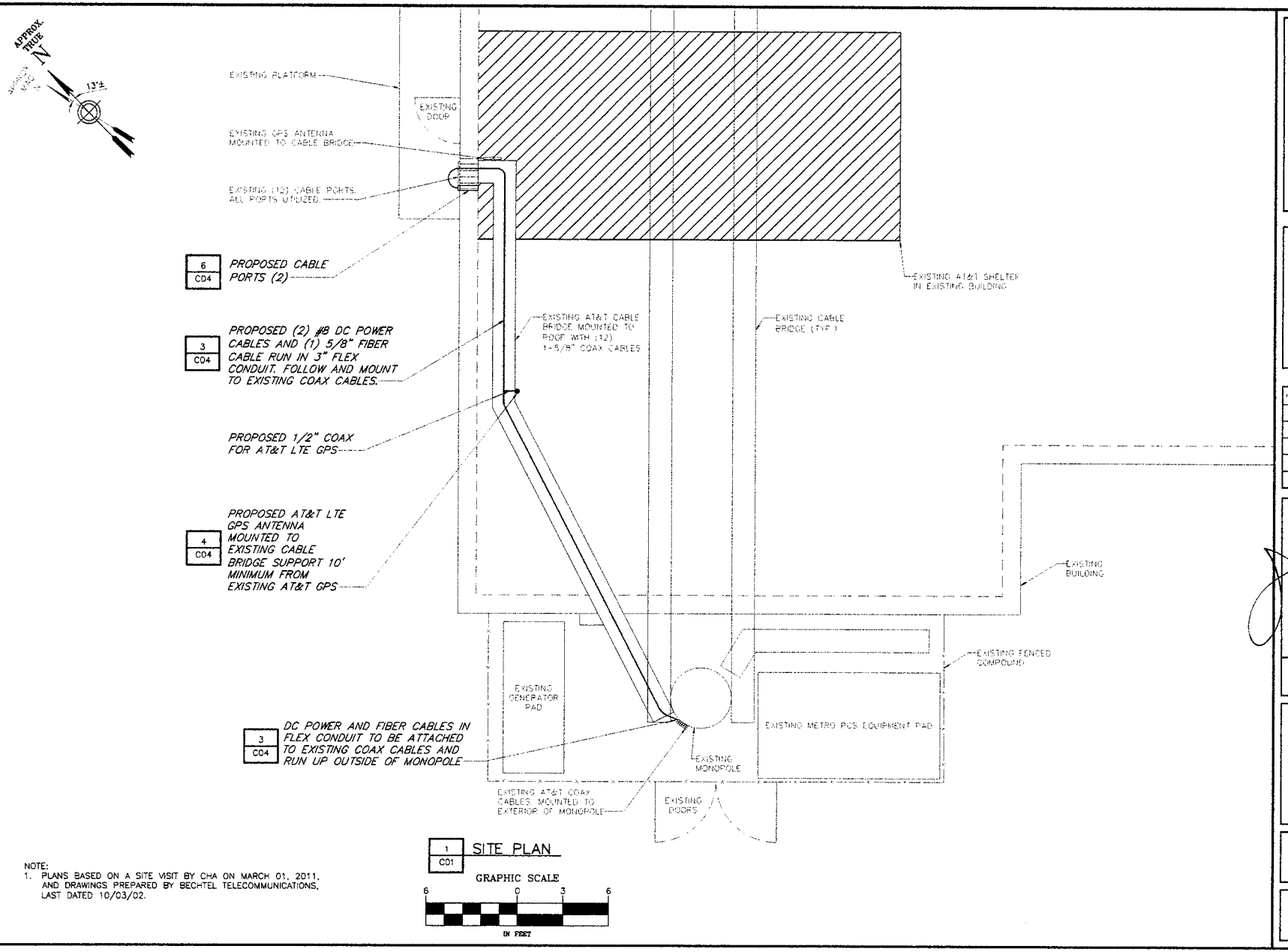
STATE OF CONNECTICUT
JOHN P. SOBRICK
No. 17827
LICENSED PROFESSIONAL ENGINEER

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT

SITE ID:
CT2157
SITE NAME:
DANBURY – EAST
SITE ADDRESS:
48 NEWTOWN ROAD
DANBURY, CT
06810
FAIRFIELD COUNTY

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T01



NOTE:
1. PLANS BASED ON A SITE VISIT BY CHA ON MARCH 01, 2011, AND DRAWINGS PREPARED BY BECHTEL TELECOMMUNICATIONS, LAST DATED 10/03/02.

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CHA PROJECT NO.
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NO.	SUBMITTAL		
5	03/10/11	ISSUED FOR REVIEW	
	BY: JDM	CHK: PAL	APP'D: JPS
3	04/05/11	ISSUED FOR CONSTRUCTION	
	BY: PAL	CHK: PAL	APP'D: JPS
2	08/29/11	REVISED - AREA DAVIDIT	
	BY: PAL	CHK: PAL	APP'D: JPS
1	10/21/11	REVISED SURVEY LOCATION	
	BY: PAL	CHK: PAL	APP'D: JPS
4	06/06/12	REVISED PER NEW ANALYSIS	
	BY: PAL	CHK: PAL	APP'D: JPS

STATE OF CONNECTICUT
JOHN P. SOBOLEWSKI
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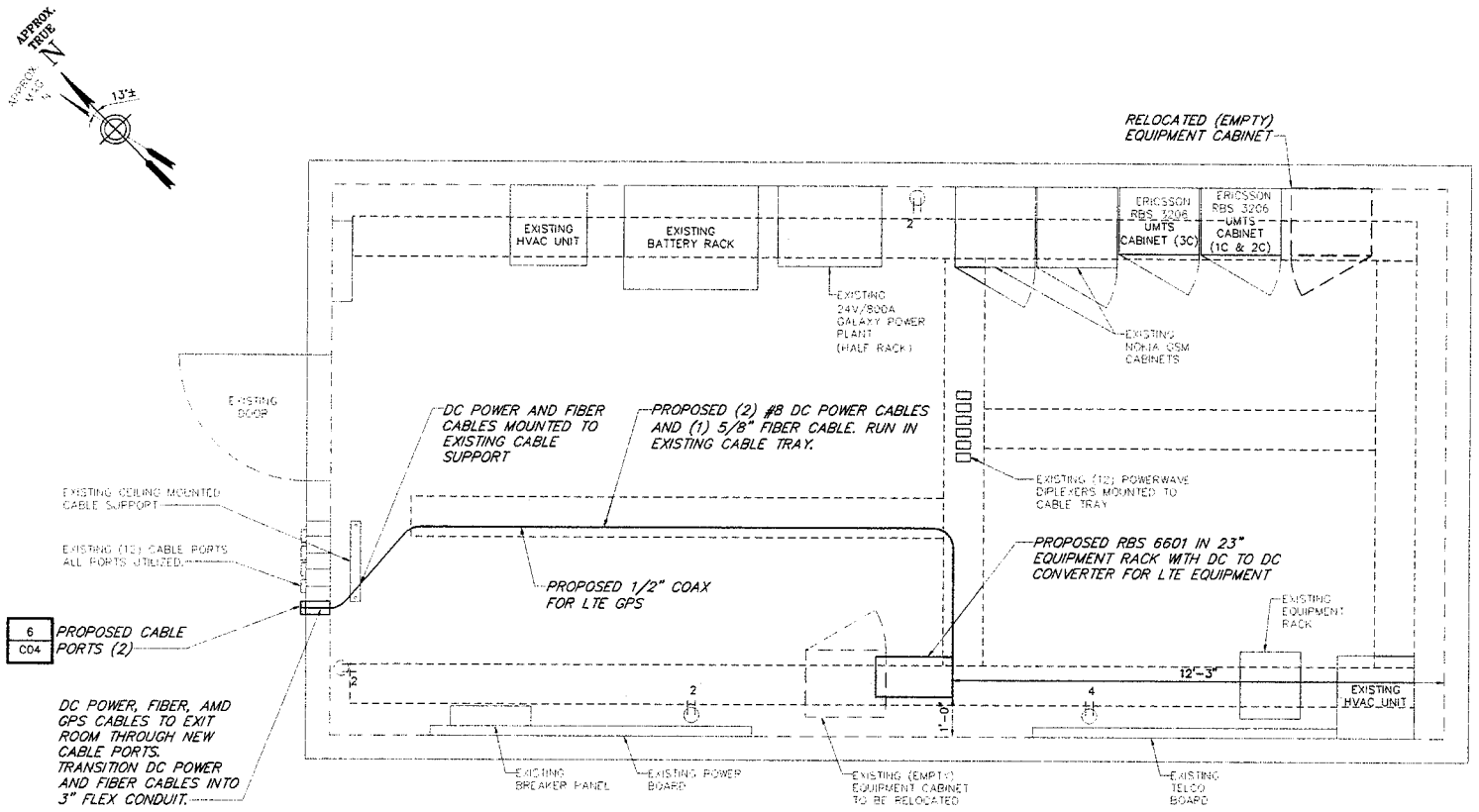
48 NEWTOWN ROAD
DANBURY, CT
06810
FAIRFIELD COUNTY

SHEET TITLE
COMPOUND PLAN

SHEET NUMBER
C01



LEGEND

- EXISTING DUPLEX OUTLET
- EXISTING FOURPLEX OUTLET
- EXISTING CABLE BRIDGE

1 / C02 SHELTER PLAN

GRAPHIC SCALE

3 0 1.5 3

IN FEET

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CHA PROJECT NO.
22702 – 1013 – 43000

NO.	SUBMITTAL	
3	10/21/11 BY: JDM	ISSUED FOR REVIEW CHK: PAL APP'D: JPS
2	04/05/11 BY: PAL	ISSUED FOR CONSTRUCTION CHK: PAL APP'D: JPS
1	08/09/11 BY: PAL	REVISED CABLE LAYOUT CHK: PAL APP'D: JPS
3	10/21/11 BY: PAL	REVISED EQUIP. LOCATION CHK: PAL APP'D: JPS
4	05/06/12 BY: PAL	REVISED PER NEW ANALYSIS CHK: PAL APP'D: JPS

STATE OF CONNECTICUT
JOHN P. SOBRICK
No. 17827
LICENSED PROFESSIONAL ENGINEER

SITE ID:
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SITE NAME:
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SITE ADDRESS:
48 NEWTOWN ROAD
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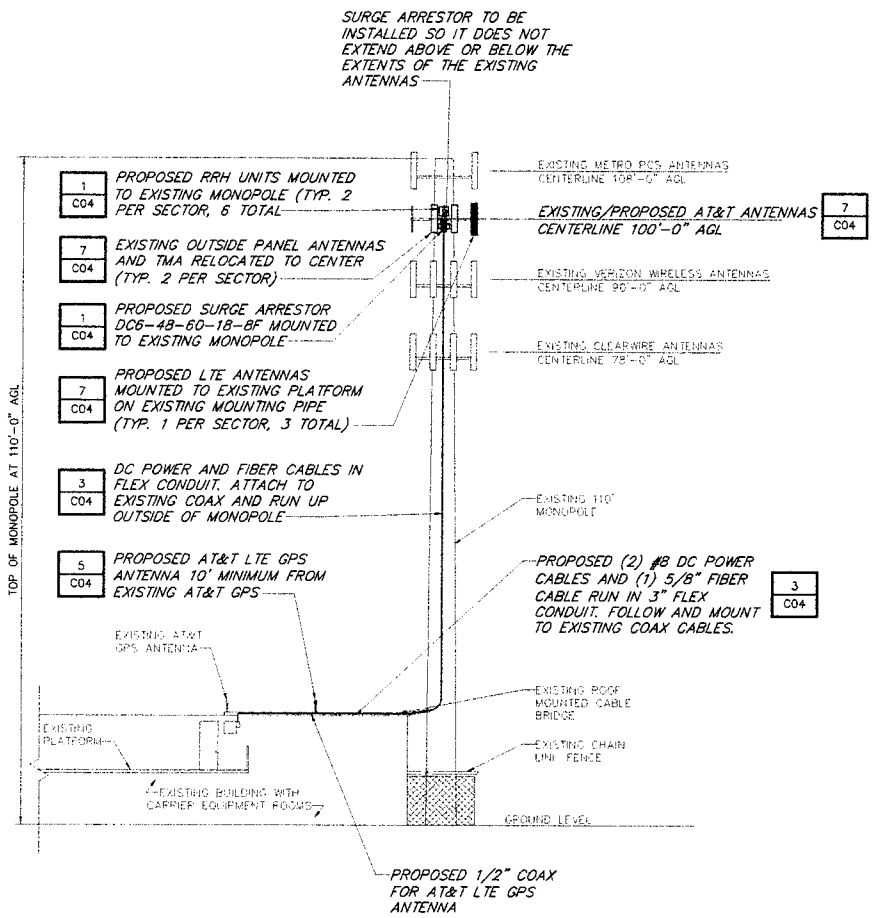
FAIRFIELD COUNTY

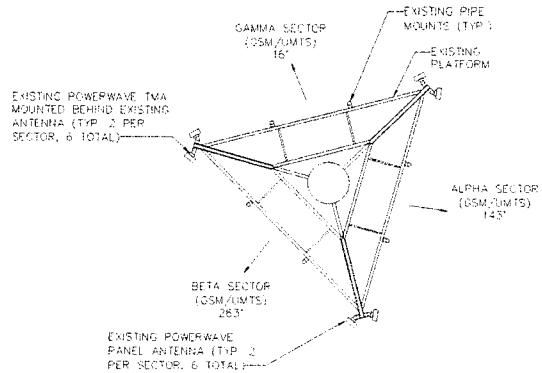
SHEET TITLE
SHELTER PLAN

SHEET NUMBER
C02

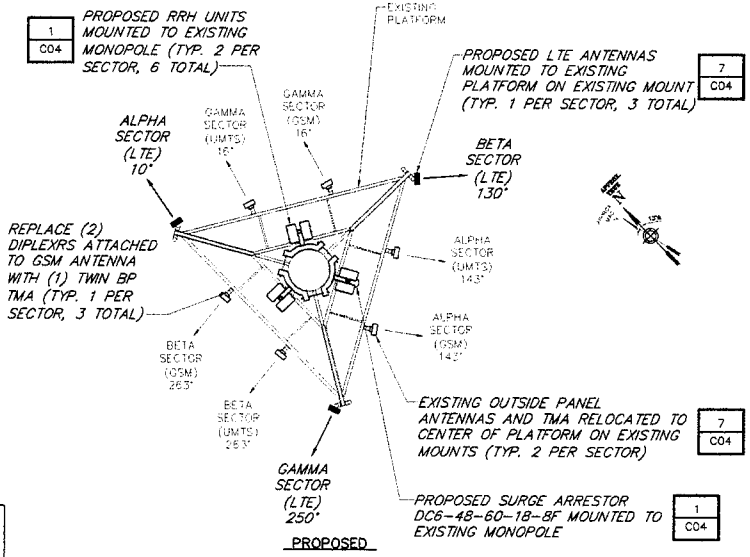


1 C03 TOWER ELEVATION
SCALE: 1" = 15' FULL SIZE
1" = 30' 11 X 17
GRAPHIC SCALE
30 0 15 30
IN FEET

NOTE:
A STRUCTURAL ANALYSIS OF THE EXISTING TOWER HAS BEEN PERFORMED BY CHA. THE STRUCTURE IS CAPABLE OF SUPPORTING THE EXISTING AND PROPOSED LOADS.



EXISTING



PROPOSED

2 C03 ANTENNA PLANS
SCALE: N.T.S.

NOTE:
REFER TO FINAL RFDS FOR FINAL SECTOR CONFIGURATIONS.

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6	03/16/12	ISSUED FOR REVIEW	
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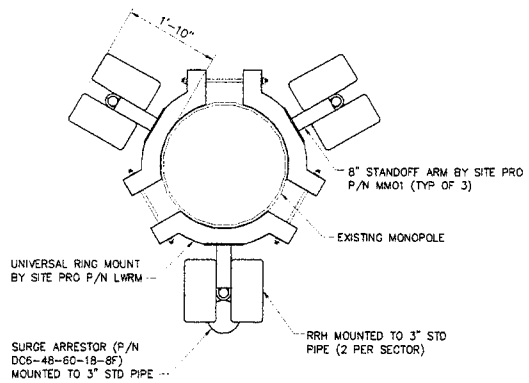
5	04/06/12	ISSUED FOR CONSTRUCTION	
	BY: PAL	CHK: PAL	APP'D: JPS
4	09/25/11	REVISED CABLE LAYOUT	
	BY: PAL	CHK: PAL	APP'D: JPS
3	09/21/11	REVISED SURGE LOCATION	
	BY: PAL	CHK: PAL	APP'D: JPS
2	08/08/11	REVISED PER NEW ANALYSIS	
	BY: PAL	CHK: PAL	APP'D: JPS

STATE OF CONNECTICUT
JOHN P. SORSON
No. 17827
LICENSED PROFESSIONAL ENGINEER

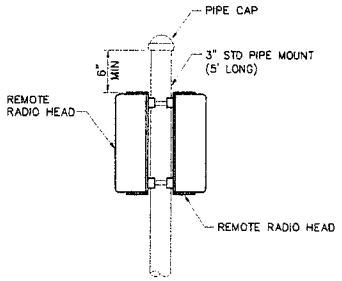
SITE ID:
CT2157
SITE NAME:
DANBURY - EAST
SITE ADDRESS:
48 NEWTOWN ROAD
DANBURY, CT
06810
FAIRFIELD COUNTY

SHEET TITLE
ELEVATION AND ANTENNA PLAN

SHEET NUMBER
C03

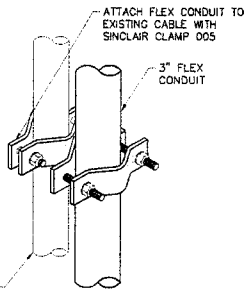


PLAN

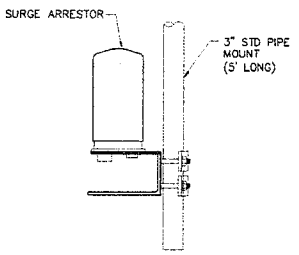


NOTE:
REMOTE RADIO HEAD MOUNTING BRACKET AND HARDWARE TO BE PROVIDED BY MANUFACTURER.

2 C04 RRH MOUNTING DETAIL
SCALE: NTS

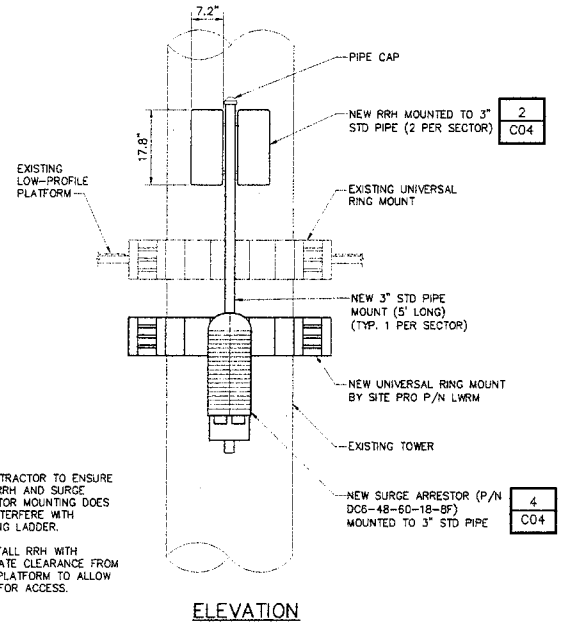


3 C04 FLEX CONDUIT DETAIL
SCALE: NTS



NOTE:
SURGE ARRESTOR MOUNTING BRACKET AND HARDWARE TO BE PROVIDED BY MANUFACTURER.

4 C04 SURGE ARRESTOR MOUNTING
SCALE: NTS

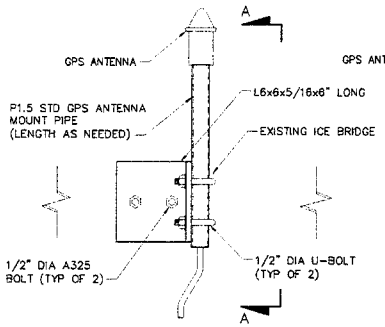


NOTE:
1. CONTRACTOR TO ENSURE THAT RRH AND SURGE ARRESTOR MOUNTING DOES NOT INTERFERE WITH CLIMBING LADDER.

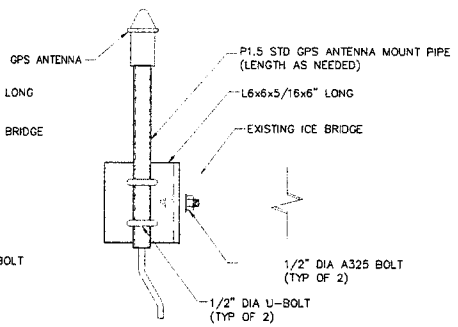
2. INSTALL RRH WITH ADEQUATE CLEARANCE FROM AT&T PLATFORM TO ALLOW ROOM FOR ACCESS.

ELEVATION

1 C04 RRH/SURGE ARRESTOR MOUNTING DETAIL
SCALE: NTS



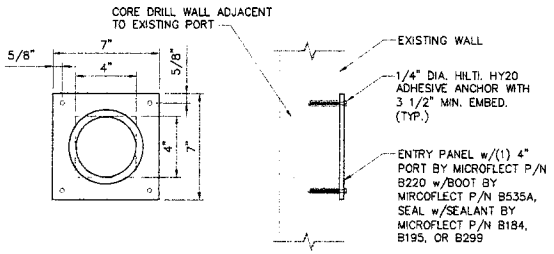
ELEVATION



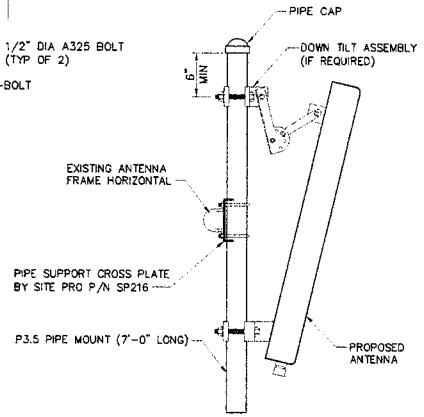
SECTION A-A

5 C04 GPS MOUNTING DETAIL
SCALE: NTS

NOTE:
1. THE WEIGHT OF THE ANTENNA MOUNT IS 6.5 LBS.



6 C04 PORT PANEL DETAIL
SCALE: NTS



NOTE:
1. MOUNT ANTENNA IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDED PROCEDURE.

2. USE EXISTING PIPE MOUNT IF AVAILABLE.

7 C04 TYPICAL ANTENNA MOUNTING DETAIL
SCALE: NTS

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CHA PROJECT NO.
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NO.	SUBMITTAL	
0	03/10/11	ISSUED FOR REVIEW
	BY: JDM	CHK: PAL / APP'D: JPS
1	04/05/11	ISSUED FOR CONSTRUCTION
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	BY: PAL	CHK: PAL / APP'D: JPS
4	06/06/12	REVISED PER NEW ANALYSIS
	BY: PAL	CHK: PAL / APP'D: JPS

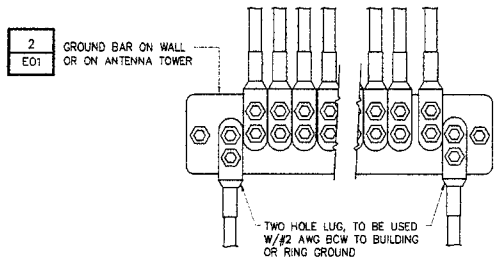
STATE OF CONNECTICUT
JOHN P. SOBRICK
No. 17827
LICENSED PROFESSIONAL ENGINEER

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SITE ID:
CT2157
SITE NAME:
DANBURY - EAST
SITE ADDRESS:
48 NEWTOWN ROAD
DANBURY, CT
06810
FAIRFIELD COUNTY

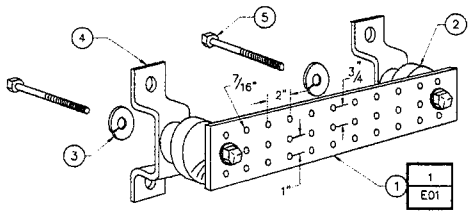
SHEET TITLE
STRUCTURAL DETAILS

SHEET NUMBER
C04



1 E01 GROUND WIRE INSTALLATION TO GROUND BAR

NO SCALE

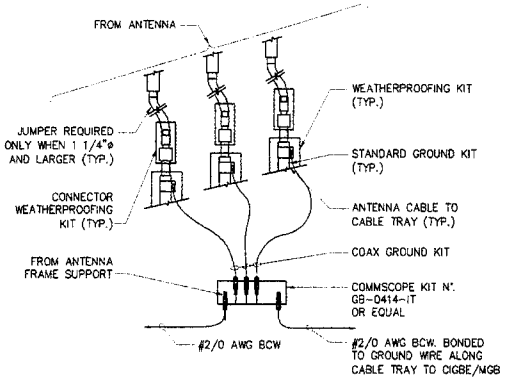


LEGEND

1 – COPPER GROUND BAR. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION.
2 – INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4. (NOT TO BE USED ON BARS PHYSICALLY ATTACHED TO TOWER.)
3 – 5/8" LOCKWASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8
4 – WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056
5 – 5/8-11 X 1" H.H.C.S.BOLTS, NEWTON INSTRUMENT CO. CAT NO. 3012-1

2 E01 GROUND BAR

NO SCALE



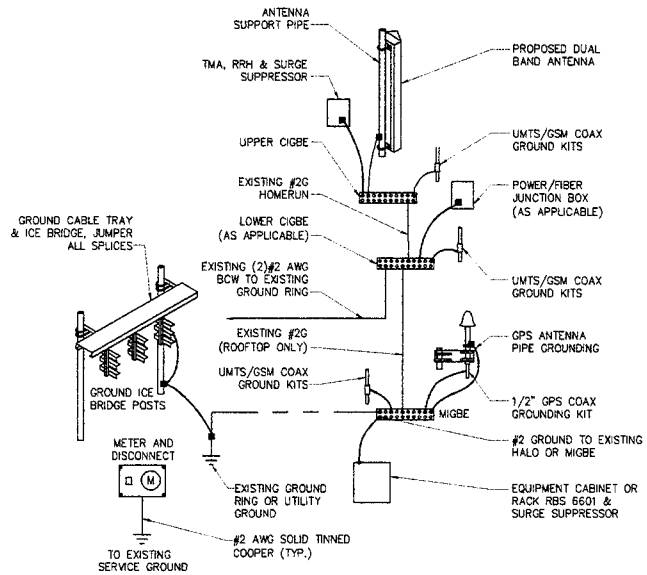
NOTE:

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

GROUND WIRE TO GROUND BAR CONNECTION DETAIL

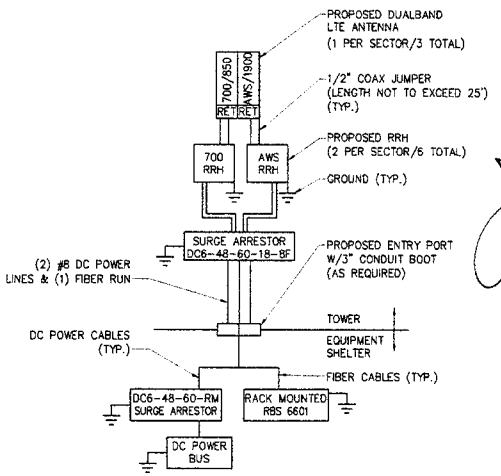
3 E01

NO SCALE



4 E01 GROUNDING RISER DIAGRAM

NO SCALE



NOTES:

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

5 E01 PLUMBING DIAGRAM

NO SCALE

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FAIRFIELD COUNTY

SHEET TITLE
GROUNDING DETAILS & PLUMBING DIAGRAM

SHEET NUMBER
E01

GROUNDING SYSTEM NOTES:

1. CONDUCTOR USED FOR CELLULAR GROUNDING SYSTEM
   EGR – #2 AWG ANNEALED SOLID TINNED BARE COPPER.
   INTER-BUS EXTENSION (FROM IGR TO EGR) – #2 AWG ANNEALED SOLID TINNED BARE COPPER.
   EXTERNAL BOND CONNECTIONS TO EGR – #2 AWG ANNEALED SOLID TINNED BARE COPPER.
   TOWER BOND CONNECTION TO EGR – #2 AWG SOLID COPPER.

2. MINIMUM BENDING RADIUS
   EGR #2: 2'-0" NOMINAL AND 8" MINIMUM.
   CELLULAR GROUNDING CONDUCTOR SHALL BE AS STRAIGHT AS POSSIBLE WITH MINIMUM 8" RADIUS.

3. CONNECTIONS (MECHANICAL)
   COMPRESSION LUG CONNECTOR – 15 TON COMPRESSION, 2 HOLE, LONG BARREL, ELECTRO TINNED PLATED, HIGH CONDUCTIVITY COPPER, 600V RATED. USE 1/4" DIA. BOLT, 3/4" SPACING LUGS TO BOND OBJECTS PROM IGR.
   CONNECTOR SHALL BE BURNDY "HYLUG SERIES" OR EQUAL.

   EXOTHERMIC WELD LUG CONNECTOR – 2 HOLE OFFSET, ELECTRO TINNED PLATED, HIGH CONDUCTIVITY COPPER. 600V. USE ½" DIA. BOLT, 1-3/4" SPACING LUGS. CONNECTOR SHALL BE CADWELD CONNECTION STYLE (CABLE TO SURFACE) TYPE "1A". EXOTHERMIC WELD TO LUG AS REQUIRED.

   "C" TAP COMPRESSION CONNECTOR – HIGH CONDUCTIVITY COPPER FOR MAIN-BRANCH TAPPING. CONNECTOR SHALL BE BURNDY "HYTAP" SERIES OR EQUAL.

   USE MATCHING MANUFACTURER TOOL AND DIE FOR COMPRESSION CONNECTION. APPLY ANTI-OXIDANT CONDUCTIVITY ENHANCER COMPOUND ON SURFACES THAT ARE COMPRESSED. SURFACES INTENDED TO BE CONNECTED WITH MECHANICAL CONNECTORS SHALL BE BARE METAL TO BARE METAL. PRIME AND PAINT OVER BONDED AREA TO PREVENT CORROSION.

4. CONNECTIONS BELOW GRADE (EXOTHERMIC)
   PROVIDE CADWELD CONNECTIONS – STYLE AND TYPE AS REQUIRED.

5. WHEN BONDING #2 TO #2
   EXTERIOR OF SHELTER – USE EXOTHERMIC WELD CONNECTION.

6. WHEN BONDING #2 TO FENCE POST
   USE EXOTHERMIC WELD "CADWELD TYPE VS" CONNECTION TO FENCE POST STEEL SURFACE. TEST WELD FOR POSSIBLE BURN THROUGH. PATCH WELDED AREA WITH GALVANIZED COATING AS REQUIRED FOR PROPER WELDED PERMANENT BOND. REFER TO MANUFACTURER'S REQUIREMENTS FOR DETAILS.

SECTION 16050 GROUNDING

1.01 ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL SYSTEM AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.

1.02 GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND LOCAL INSPECTOR HAVING JURISDICTION.

1.03 ELECTRICAL AC SERVICE GROUNDED SYSTEM – GROUNDING AT MAIN SERVICE OVERCURRENT PROTECTION DEVICE.

   A. THE GROUNDED CONDUCTOR (NEUTRAL) OF THE INCOMING SERVICE FEEDERS (LINE SIDE OF THE METER SOCKET) SHALL TERMINATE INTO THE MAIN OVERCURRENT DEVICE ENCLOSURE SOLID NEUTRAL BAR WHICH IS INSULATED FROM THE ENCLOSURE.

   B. THE GROUNDING ELECTRODE CONDUCTOR SHALL EXTEND CONTINUOUSLY WITHOUT SPLICES OR JOINTS FROM THE MAIN OVERCURRENT DEVICES SOLID NEUTRAL BAR TO THE MAIN SWITCHBOARD GROUND TERMINAL.

   C. THE MAIN SERVICE OVERCURRENT PROTECTION DEVICE ENCLOSURE'S EQUIPMENT GROUND BAR KIT SHALL BE LUGGED TO THE ENCLOSURE WITH THE SURFACES BETWEEN THEM BARE METAL TO BARE METAL. PROVIDE BONDING JUMPER BETWEEN EQUIPMENT GROUND BAR AND SOLID NEUTRAL. BONDING JUMPER CONDUCTOR SIZE SHALL BE THE SAME AS THE GROUNDING ELECTRODE CONDUCTOR. CONDUITS TERMINATING INTO THE MAIN OVERCURRENT DEVICE ENCLOSURE SHALL HAVE GROUNDING TYPE BUSHINGS. THE BUSHINGS SHALL BE BONDED TOGETHER WITH #10 AWG BARE COPPER WHICH IN TURN IS TERMINATED INTO THE EQUIPMENT GROUND BAR KIT.

1.04 CELLULAR GROUNDING SYSTEM:

   PROVIDE THE CELLULAR GROUNDING SYSTEM AS SPECIFIED ON DRAWINGS. INCLUDING BUT NOT LIMITED TO:

   -GROUND BARS
   -EXTERIOR GROUNDING RING
   -ANTENNA GROUND CONNECTIONS AND PLATES

1.05 CONTRACTOR, AFTER COMPLETION OF THE COMPLETE GROUNDING SYSTEM BUT PRIOR TO CONCEALMENT/BURIAL OF SAME, SHALL NOTIFY THE AT&T CONSTRUCTION REPRESENTATIVE AND LOCAL AUTHORITY HAVING JURISDICTION WHO WILL MAKE A VISUAL INSPECTION OF THE GROUNDING GRID, RODS AND CONNECTIONS OF THE EXTERIOR GROUNDING SYSTEMS.

SECTION 16120 CONDUCTORS

1.01 ALL CONDUCTORS SHALL BE THE TYPE THWN (INTERIOR) AND XHHW (EXTERIOR), 75 DEGREES C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING SOLDERLESS PRESSURE CONNECTORS, ACCEPTABLE. #12 AWG SHALL BE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZES. CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION:

   120 / 240 VAC – 1 PHASE, 3 WIRE SYSTEM

PHASE:	COLOR:
A	BLACK
B	RED
N	CONTINUOUS WHITE
G	CONTINUOUS GREEN

1.02 MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.

SECTION 16130 RACEWAY

1.01 CONDUIT MATERIAL SHALL BE AS FOLLOWS:

   (1) GALVANIZED RIGID CONDUIT (GRC) – FEEDERS EXPOSED TO EXTERIOR & UNDERGROUND CONDUIT SWEEPS.

   (2) PVC CONDUIT – SERVICE CONDUITS AND WHERE SHOWN ON GROUNDING DETAILS.

GENERAL NOTES:

1. ALL DIMENSIONS TO, OF, AND IN EXISTING STRUCTURES SHALL BE VERIFIED IN FIELD BY CONTRACTOR WITH ALL DISCREPANCIES REPORTED TO THE ENGINEER.
2. DO NOT CHANGE THE SIZE NOR SPACING OF STRUCTURAL ELEMENTS WITHOUT THE APPROVAL OF THE ENGINEER.
3. DETAILS SHOWN ARE TYPICAL AND APPLY TO SIMILAR CONDITIONS UNLESS NOTED OTHERWISE.
4. THESE DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY.
5. BRACE STRUCTURES AS REQUIRED FOR CONSTRUCTION AND WIND LOADS UNTIL ALL STRUCTURAL ELEMENTS NEEDED FOR STABILITY ARE INSTALLED. THESE ELEMENTS ARE AS FOLLOWS: (LATERAL BRACING MEMBERS, ANCHOR BOLTS, ETC.)
6. THE DESIGN IS BASED ON THE 2005 CONNECTICUT STATE BUILDING CODE (IBC 2003), 2005 CONNECTICUT SUPPLEMENT AND THE 2009 AMENDMENT TO THE 2005 CONNECTICUT SUPPLEMENT AND TIA/EIA-222-F.
7. CONTRACTOR SHALL DETERMINE EXACT LOCATION OF EXISTING UTILITIES BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE UNDERGROUND UTILITIES.
8. INCORRECTLY FABRICATED, DAMAGED, OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE OWNER PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER'S APPROVAL.
9. EACH CONTRACTOR SHALL COOPERATE WITH THE OWNER'S REPRESENTATIVE AND COORDINATE HIS WORK WITH THE WORK OF OTHERS.
10. VERIFY SIZE AND LOCATION OF OPENINGS PRIOR TO BEGINNING WORK. FOR DIMENSIONS NOT SHOWN, SEE CIVIL DRAWINGS.
11. VERIFY SIZE AND LOCATION OF EQUIPMENT PADS WITH MECHANICAL AND/OR ELECTRICAL CONTRACTOR AND EQUIPMENT MANUFACTURER.
12. CONTRACTOR TO FOLLOW ALL STATE, LOCAL AND NATIONAL CODES AS APPLICABLE.

APPURTENANCE SUPPORT BRACKET NOTES:

1. DESIGN RESPONSIBILITY OF APPURTENANCE MOUNTING BRACKETS AND POLES AND ALL COMPONENTS THERE OF AND ATTACHMENT THERE TO SHALL BE THE RESPONSIBILITY OF THE MANUFACTURER. MANUFACTURER SHALL PROVIDE TO THE ENGINEER FOR APPROVAL, DRAWINGS DETAILING ALL COMPONENTS OF THE ASSEMBLY, INCLUDING CONNECTIONS, DESIGN LOADS, AND ALL OTHER PERTINENT DATA. ALL SUBMISSIONS SHALL BEAR THE STAMP AND SIGNATURE OF A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF CONNECTICUT.
2. BRACKETS SHALL BE DESIGNED TO SUPPORT CURRENT AND FUTURE PANEL ANTENNAS, REMOTE RADIO HEADS, SURGE ARRESTORS, AND COAXIAL CABLES AS SHOWN.

STEEL NOTES:

1. STRUCTURAL STEEL FABRICATION AND ERECTION SHALL CONFORM TO THE LATEST EDITION OF THE AISC STEEL CONSTRUCTION MANUAL.
2. STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING:
   A. WIDE FLANGE AND CHANNEL SHAPES – A992 GR 50 (50 KSI) UNLESS OTHERWISE NOTED
   B. ANGLES AND PLATES – ASTM A36 (36 KSI)
   C. STEEL PIPE – ASTM A53, GRADE B A500 GRADE B (35 KSI)
3. ALL EXTERIOR STEEL WORK SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM SPECIFICATION A123 UNLESS OTHERWISE NOTED. GALVANIZING SHALL BE PERFORMED AFTER SHOP FABRICATION TO THE GREATEST EXTENT POSSIBLE. ALL DINGS, SCRAPES, MARS AND WELDS IN THE GALVANIZED AREAS SHALL BE REPAIRED BY FIELD TOUCHUP PRIOR TO COMPLETION OF THE WORK USING ZRC COLD GALVANIZING COMPOUND OR APPROVED EQUAL.
4. CONNECTIONS:
   A. ALL BOLTS, NUTS AND WASHERS USED IN EXTERIOR APPLICATIONS SHALL BE GALVANIZED.

DESIGN LOADS:

THE FOLLOWING DESIGN LOADS WERE USED FOR THIS BUILDING BASED ON THE 2005 CONNECTICUT STATE BUILDING CODE (IBC 2003), 2005 CONNECTICUT SUPPLEMENT AND THE 2009 AMENDMENT TO THE 2005 CONNECTICUT SUPPLEMENT AND TIA/EIA-222-F:

ICE LOAD:
½" RADIAL ON ALL COMPONENTS AND CABLE

WIND DESIGN DATA:
BASIC WIND SPEED (3 SECOND GUST): 85 MPH
WIND IMPORTANCE FACTOR = 1.0
WIND EXPOSURE CATEGORY: B

EARTHQUAKE DESIGN DATA:
SEISMIC IMPORTANCE FACTOR, I: 1.0
MAPPED SPECTRAL RESPONSE ACCELERATIONS: SS=0.286 S1=0.066
SITE CLASS: D
SEISMIC DESIGN CATEGORY: B

at&t
Your world. Delivered.

NEW CINGULAR WIRELESS PCS, LLC
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067

CHA
2139 Silas Deane Highway, Suite 212 · Rocky Hill, CT 06067-2336
Main: (860) 257-4057 · www.chacompanies.com

CHA PROJECT NO:
22702 – 1013 – 43000

NO.	SUBMITTAL		
	03/10/11	ISSUED FOR REVIEW	
0	BY: JDM	CHK: PAL	APP'D: JPS
1	04/05/11	ISSUED FOR CONSTRUCTION	
	BY: PAL	CHK: PAL	APP'D: JPS
2	08/24/11	REVISED CABLE LAYOUT	
	BY: PAL	CHK: PAL	APP'D: JPS
3	10/21/11	REVISED CHARGE LOCATION	
	BY: PAL	CHK: PAL	APP'D: JPS
4	05/09/12	REVISED PER NEW ANALYSIS	
	BY: PAL	CHK: PAL	APP'D: JPS

STATE OF CONNECTICUT
JOHN P. SOPOCY
No. 17827
LICENSED PROFESSIONAL ENGINEER

SITE ID:
CT2157
SITE NAME:
DANBURY – EAST
SITE ADDRESS:
48 NEWTOWN ROAD
DANBURY, CT
06810
FAIRFIELD COUNTY

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
GN01

New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, Connecticut 06067-3900
Phone: (860) 513-7636
Fax: (860) 513-7190

Steven L. Levine
Real Estate Consultant

June 7, 2012

Honorable Mark D. Boughton
Mayor, City of Danbury
City Hall 155 Deer Hill Avenue
Danbury, CT 06810

Re: Telecommunications Facility – 48 Newtown Road, Danbury

Dear Mayor Boughton:

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 accompanying letter to the Siting Council fully describes AT&T's proposal for the referenced cell site. However, if you have any questions or require any further information on our plans or the Siting Council's procedures, please call me at (860) 513-7636 or Ms. Linda Roberts, Executive Director, Connecticut Siting Council at (860) 827-2935.

Sincerely,

Steven L. Levine
Real Estate Consultant

Enclosure

June 1, 2012

New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, CT 06067

RE: Cover Letter for Structural Analysis of the Danbury-East Monopole
CT2157
Located in Fairfield County, CT
CHA Project No. 22702.1013.28000

To Whom It May Concern:

CHA has performed an additional structural analysis under the provisions of TIA-EIA-222-F of the referenced monopole for the purpose of evaluating its ability to support the existing equipment loads in addition to the new equipment proposed by New Cingular Wireless PCS, LLC. The previous revision of the analysis performed by CHA had stated to relocate the existing coaxial cables on the outside of the monopole to the inside of the monopole. The calculations that CHA had done indicated that there would be enough space inside the pole to run the coaxial cables on the inside, but the contractor performing the work said that the existing coaxial cables on the inside were not installed correctly and therefore were taking up the entire space inside the pole. CHA performed another analysis on the pole as it exists in the field with the existing and proposed coaxial cables on the outside of the pole. During the evaluation CHA carefully examined the photographs of the existing coaxial cable routing and adjusted the amount of wind area being added to the surface of the monopole. During this investigation CHA discovered the original analysis used conservative wind area values on the outside of the monopole due to lack of information and photos of the coaxial cable placement. Once more information and photos on the existing coaxial cable information was received CHA used engineering judgment to determine the amount of wind area being added to the pole. CHA determined that no more than two coaxial cables from each carrier would add wind area to the pole. The results of this analysis are presented in the structural analysis report dated June 1, 2012.

If you have any questions, or if we can be of further assistance, please do not hesitate to call.

Very truly yours,

Thomas L. O'Brien, P.E.
Partner

2139 Silas Deane Highway, Suite 212, Rocky Hill, CT 06067-2336
T 860.257.4557 • F 860.257.7514 • www.chacompanies.com

June 1, 2012

New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, CT 06067

RE: Structural Analysis of the Danbury-East Monopole
CT2157
Located in Fairfield County, CT
CHA Project No. 22702.1013.28000 R3

To Whom It May Concern:

CHA has performed a structural analysis under the provisions of TIA-EIA-222-F of the referenced monopole for the purpose of evaluating its ability to support the existing equipment loads in addition to the new equipment proposed by New Cingular Wireless PCS, LLC. In summary, our analysis indicates that the tower ***is*** structurally capable of supporting the existing and proposed equipment.

Our analysis and design is based on the following information:

- Monopole member sizes and configuration, as well as foundation information obtained from a previous structural analysis report by Centek Engineering, prepared for Verizon Wireless, dated October 25, 2010.
- Monopole retrofit information obtained from a previous structural analysis report by Structural Components, LLC, dated March 4, 2010.
- Proposed equipment information, including antenna models and elevations, provided by New Cingular Wireless PCS, LLC.
- A previous structural analysis report by CHA, dated June 27, 2011.

Our analysis includes data for the following proposed antennas and cables:

New Cingular Wireless:

- (2) KMW AM-X-CD-14-65-00T-RET and (1) AM-X-CD-16-65-00T-RET panel antennas mounted on existing mount pipes, supported on the existing platform at an antenna centerline elevation of 100' with (2) #8 DC power cables and (1) 5/8" fiber cable within a 3" innerduct mounted on the outside of the monopole.

- (6) Remote Radio Units mounted to a proposed 3" Std. steel pipe, supported by a SitePro LWRM universal ring mount, at an antenna centerline elevation of 100' AGL.
- (1) Raycap DC6-48-60-18-8F surge arrester mounted to a proposed 3" Std. steel pipe, supported by a SitePro LWRM universal ring mount, at an antenna centerline elevation of 100' AGL.
- (3) Powerwave TT19-08BP111-001 TMA's attached to existing GSM antenna, to replace (6) existing Powerwave LGP21901 diplexers, at an antenna centerline elevation of 100' AGL.

The existing and proposed antenna elevations and coaxial cable sizes have been listed in the attached Executive Summary.

With this information, TIA/EIA-222-F, *Structural Standards for Steel Antenna Towers and Antenna Supporting Structures,* and the Connecticut State Building Code the analysis was performed to determine the structural integrity of the tower. Based on the data provided, section properties, member strengths, and projected areas, applicable loads were calculated. Knowing the projected area of the tower and all of its appurtenances, 85 mph wind loads were calculated with and without radial ice loads of 1/2". These wind and ice loads were then reduced to member forces in the tower components through RISA Tower structural analysis software. The member forces were then compared to the maximum allowable stress for each member type.

The analysis indicates that the existing tower ***is*** capable of supporting the existing and proposed loads under TIA/EIA-222-F, upon completion of the proposed retrofit. The retrofit consists of reconfiguring the coaxial cable as shown within this report.

Reactions at the base of the monopole due to the existing and proposed loads are less than the original design reactions. The foundation information is based on a foundation analysis by Structural Components, LLC dated March 4, 2010. Based on this information, it can be concluded that the tower foundation is adequate for supporting the existing and proposed loads provided that the foundation was built per the design documents and applicable codes.

As requested, we have included a copy of the governing structural analysis calculations referenced above for your review and use. If you have any questions, or if we can be of further assistance, please do not hesitate to call.

Very truly yours,

STATE OF CONNECTICUT
THOMAS L. O'BRIEN
No. 18210
LICENSED
PROFESSIONAL ENGINEER

Thomas L. O'Brien, P.E.
Partner

CHA

EXECUTIVE SUMMARY

Danbury-East Monopole
CT2157

June 1, 2012

Tower Information:

Tower Owner:	Unknown
Tower Manufacturer:	Engineering Endeavors, Inc.
Tower Height:	110 feet
Tower Type:	Monopole

Proposed Antenna Data:

New Cingular Wireless:

- (2) KMW AM-X-CD-14-65-00T-RET and (1) AM-X-CD-16-65-00T-RET panel antennas mounted on existing mount pipes, supported on the existing platform at an antenna centerline elevation of 100' AGL with (2) #8 DC power cables and (1) 5/8" fiber cable inside a 3" innerduct mounted to the outside of the monopole.
- (6) Remote Radio Units mounted to a proposed 3" Std. steel pipe, supported by a SitePro LWRM universal ring mount, at an antenna centerline elevation of 100' AGL.
- (1) Raycap DC6-48-60-18-8F surge arrester mounted to a proposed 3" Std. steel pipe, supported by a SitePro LWRM universal ring mount, at an antenna centerline elevation of 100' AGL.
- (3) Powerwave TT19-08BP111-001 TMA's attached to existing GSM antenna, to replace (6) existing Powerwave LGP21901 diplexers, at an antenna centerline elevation of 100' AGL.

Existing Antenna and Appurtenance Data:

AT&T:

- (6) Six Powerwave 7770.00A panel antennas, (6) Powerwave LGP21401 TMA's and (6) Powerwave LGP21901 diplexers mounted on an EEI platform at a centerline elevation of 100' AGL, with (12) twelve 1-5/8" coaxial cables running on the outside of the monopole stacked in a 2x6 configuration.

Note: 1. Diplexers will be removed prior to installation of proposed TMA's.

Nextel:

- (12) Twelve 4 ft panel antennas mounted on an EEI standard platform at an antenna centerline elevation of 78' AGL, with (12) twelve 1-5/8" coaxial cables running on the outside of the monopole in a 2x6 configuration

Verizon:

- (2) Two Powerwave P65-16-XL-2, (1) one Antel BXA-70063-4CF, (3) three RYMSA MG D3-800T0, (4) four Decibel DB846H80E-SX and (2) two Decibel DB844G65ZAXY panel antennas mounted on an existing EEI standard platform at an antenna centerline elevation of 90' AGL with (12) twelve 1-5/8" coaxial cables running inside the monopole.

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- (6) Six RFS FD9R6004/2C-3L diplexers mounted on an existing EEI standard platform at a centerline elevation of 90' AGL.

Future Antenna and Appurtenance Data:

Metro PCS:

- (3) Three Kathrein 800-10504 and (3) three Kathrein 742-351 panel antennas mounted on (3) three T-Arms at an antenna centerline elevation of 108' AGL, with (12) twelve 1-5/8" coaxial cables running on the outside of the monopole in a 2x6 configuration.

Code Data:

Applicable Code:
- TIA/EIA-222-F, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures
- Connecticut State Building Code

Load Cases:

(1) Weight of Tower, Antennas, and Appurtenances plus Wind Load without radial ice at a wind speed of 85 mph.

(2) Weight of Tower, Antennas, and Appurtenances plus Wind Load on iced tower plus weight of 1/2" radial ice in conjunction with a wind speed of 74 mph.

Monopole Shaft Members: (A572 Gr. 65 ksi steel & A36 Steel top section)

Tower Section	Length	Base Diameter	Top Diameter	Wall Thickness	Splice Length
1	20'	37.00"	33.39"	0.3890"	0'
2	30'	33.39"	26.64"	0.3125"	4'
3	50'	27.98"	17.50"	0.2500"	0'
4	14'	17.50"	14.50"	0.3750"	0'

Foundation Reactions: (Existing and Proposed Equipment)

Base Reactions	Original Design	Current Analysis	Stress Ratio (%)
Vertical (Axial) (k)	31.5	25.5	81.0
Shear (k)	28.7	19.0	66.2
Overturning Moment (k-ft)	2281.0	1442.0	63.2

Tower Superstructure:

The tower sections are stressed at the following governing capacities for the load cases 1, & 2:

	Stress Ratio (%)
Section 1 (96'-110')	20.9
*Section 2 (46'-96')	99.4
Section 3 (20'-46')	95.9
Section 4 (0'-20')	84.0

*The governing tower member is stressed at 99.4%.

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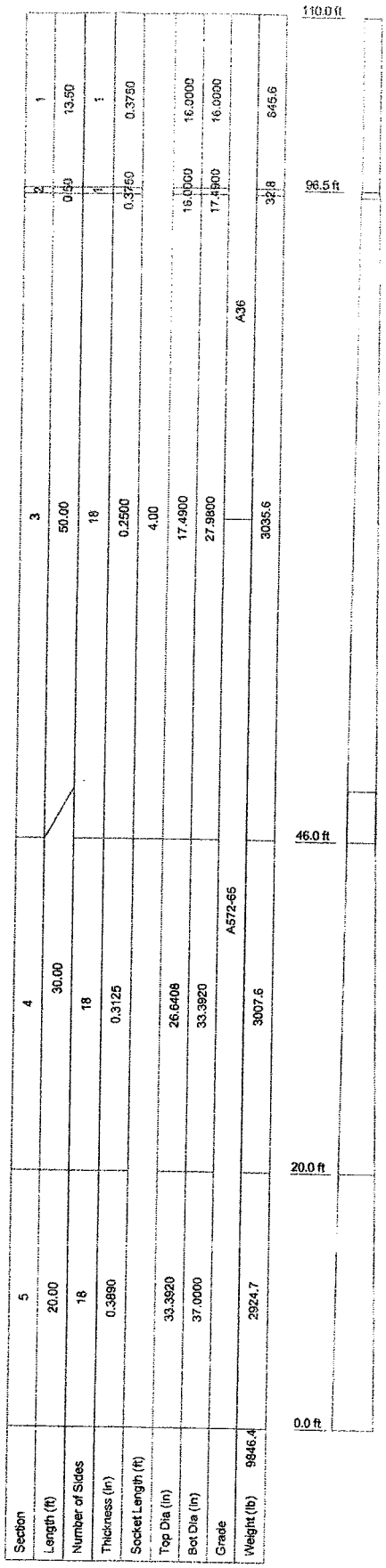
Section Capacity Table

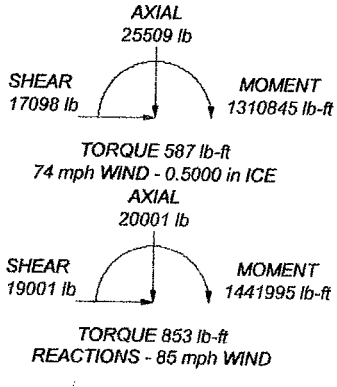
Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
L1	110 - 96.5	Pole	TP16x16x0.375	1	-4623.50	64340.04	20.9	Pass
L2	96.5 - 96	Pole	TP17.49x16x0.375	2	-4624.23	64340.04	20.9	Pass
L3	96 - 46	Pole	TP27.98x17.49x0.25	3	-11237.40	222151.11	99.4	Pass
L4	46 - 20	Pole	TP33.392x26.6408x0.3125	4	-16238.50	516920.05	95.9	Pass
L5	20 - 0	Pole	TP37x33.392x0.389	5	-19992.00	872331.16	84.0	Pass
							Summary	
						Pole (L3)	99.4	Pass
						RATING =	**99.4**	**Pass**

Conclusion:

The analysis indicates that the existing tower *is* structurally capable of supporting the existing and proposed loads.

TOWER ELEVATION





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
800 10504 (Metro PCS)	108	TT19-08BP111-001 (SAI)	98
800 10504 (Metro PCS)	108	(2) LGP21401 (ATI)	98
800 10504 (Metro PCS)	108	MGD3-800T0 (VERIZON)	88
742-351 (Metro PCS)	108	MGD3-800T0 (VERIZON)	88
742-351 (Metro PCS)	108	(2) FD9R6004/2C-3L (VERIZON)	88
742-351 (Metro PCS)	108	(2) FD9R6004/2C-3L (VERIZON)	88
2' Standoff T-Arm (10' face width) (Metro PCS)	108	(2) FD9R6004/2C-3L (VERIZON)	88
2' Standoff T-Arm (10' face width) (Metro PCS)	108	PiROD 13' Platform w/handrails (Monopole) (VERIZON)	88
2' Standoff T-Arm (10' face width) (Metro PCS)	108	P65-16-XL-2 (VERIZON)	88
(2) 7770.00 (ATI)	98	P65-16-XL-2 (VERIZON)	88
(2) 7770.00 (ATI)	98	BXA-70063/4CF (VERIZON)	88
(2) 7770.00 (ATI)	98	(2) DB846H80E-SX w/Mount Pipe (VERIZON)	88
PiROD 13' Low Profile Platform (Monopole) (ATI)	98	(2) DB846H80E-SX w/Mount Pipe (VERIZON)	88
(2) LGP21401 (ATI)	98	(2) DB844G65ZAXY w/Mount Pipe (VERIZON)	88
(2) LGP21401 (ATI)	98	MGD3-800T0 (VERIZON)	88
AM-X-CD-14-65-00T-RET (SAI)	98	PiROD 13' Low Profile Platform (Monopole) (NEXTEL)	78
AM-X-CD-14-65-00T-RET (SAI)	98	(4) 4' x 6" Panel w/ Mounting Pipe (NEXTEL)	78
AM-X-CD-16-65-00T-RET (SAI)	98	(4) 4' x 6" Panel w/ Mounting Pipe (NEXTEL)	78
(2) Remote Radio Heads (SAI)	98	(4) 4' x 6" Panel w/ Mounting Pipe (NEXTEL)	78
(2) Remote Radio Heads (SAI)	98		
(2) Remote Radio Heads (SAI)	98		
DC6-48-60-18 (SAI)	98		
TT19-08BP111-001 (SAI)	98		
TT19-08BP111-001 (SAI)	98		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36	36 ksi	58 ksi	A572-65	65 ksi	80 ksi

TOWER DESIGN NOTES

1. Tower is located in Fairfield 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 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 60 mph wind.
5. Weld together tower sections have flange connections.
6. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
7. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
8. Welds are fabricated with ER-70S-6 electrodes.

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FAX:

Job: CT2157-Danbury East			
Project: 22702-1013-28000-R2			
Client: SAI	Drawn by: 1948	App'd:	
Code: TIA/EIA-222-F	Date: 06/01/12	Scale: NTS	
Path:		Dwg No. E-1	