EMPIRE telecom

August 19, 2015

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

Regarding:	Notice of Exempt Modification – Addition of 3 radio heads previously approved
Property Address:	6 Progress Avenue, Seymour, CT (the "Property")
Applicant:	AT&T Mobility ("AT&T")

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 280 foot self-supporting lattice tower ("tower") location on the Property. AT&T's facility consists of six (6) wireless telecommunications antennas at 160 feet. The tower is controlled by EMAC Communications, LLC. The Council approved the previous application on July 6, 2012, reference number EM-CING-124-120621. This application (attached) granted AT&T the use of 6 radio heads at this location. The approval expired one year from the issue date. During that time AT&T made the changes to the site per the approval but only installed three (3) of the six (6) radio heads that they received approval. AT&T would now like to install the additional three (3) radio heads that were originally approved under EM-CING-124-120621.

Please accept this application as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72 (b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the First Selectman and Zoning Enforcement Officer for the Town of Seymour. A copy of this letter is also being sent to EMAC Communications, LLC, the owner of the structure that AT&T is located.

The planned modifications to AT&T's facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The planned modifications will not result in an increase in the height of the existing structure. AT&T's additional, previously approved 3 radio heads will be installed at 160 foot level of the 280 foot tall self-supporting lattice tower.
2. The proposed modifications will not involve any changes to ground-mounted equipment and, therefore will not require an extension of the site boundary.
3. The proposed modification will not increase the noise level at the facility by six decibel or more, or to levels that exceed state and local criteria.
4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety

EMPIRE telecom

standard. An RF emissions calculation (attached) for AT&T's modified facility was provided in the application which led to the July 6, 2012 Decision.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support AT&T's proposed modifications. (Please see attached Structural analysis completed by Centeck Engineering dated March 4, 2015).

For the foregoing reasons AT&T respectfully requests that the proposed addition of 3 radio heads previously approved be allowed within the exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

David P. Cooper

David P. Cooper
Director of Site Acquisition
Empire Telecom

CC: The Honorable W. Kurt Miller, First Selectman, Town of Seymour, CT
Bill Paecht, Zoning Enforcement Officer, Town of Seymour, CT
EMAC Communications, LLC

16 Esquire Road, Billerica, MA 01862 Mobile 617-639-4908 Email: Dcooper@empiretelecomm.com

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

CT5633

July 6, 2012

Douglas Talmadge
New Cingular Wireless PCS, LLC
147 Austin Ryer Lane
Branford, CT 06405

RE: **EM-CING-124-120621** – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 6 Progress Avenue, Seymour, Connecticut.

Dear Mr. Talmadge:

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:

- 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 15, 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.

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

CSC
CONNECTICUT SITING COUNCIL

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 LMB

Linda Roberts
Executive Director

LR/CDM/cm

c: The Honorable W. Kurt Miller, First Selectman, Town of Seymour
James Baldwin, Sr., Zoning Enforcement Officer, Town of Seymour

EM-CING-124-120621

ORIGINAL

at&t Your world. Delivered.

cingular

New Cingular Wireless PCS, LLC
147 Austin Ryer ln
Branford, CT 06405
Phone: (203)-410-4531
Douglas Talmadge
Real Estate Consultant

June 15, 2012

Hand Delivered

RECEIVED
JUN 21 2012
CONNECTICUT
SITING COUNCIL

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

RE: New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 6 Progress Ave, Seymour, CT 06483.

Dear Ms. Roberts:

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

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

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

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

The changes to the facility do not constitute modification as defined Connecticut General Statues ("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 the R.C.S.A. Section 16-50j-72(b)(2).

1. The height of the overall structure will not be affected.
2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound as all proposed equipment will be located on the existing AT&T concrete pad.
3. The proposed changes will not increase the noise level at the existing facility by 6 decibels or more.
4. Radio Frequency power density may increase due to the use of one or more GSM channels 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 New Cingular Wireless PCS, LLC 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 (203)-410-4531 or email DTalmadge@Transcendwireless.com with questions concerning this matter. Thank you for your consideration.

Sincerely,

Douglas Talmadge
Real Estate Consultant

C Squared Systems, LLC
65 Dartmouth Drive, Unit A3
Auburn, NH 03032
(603) 644-2800
support@csquaredsystems.com

Calculated Radio Frequency Emissions

CT5633

(AWE - Seymour East)

6 Progress Ave, Seymour, CT 06483

April 27, 2012

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modifications to the existing AT&T antenna arrays mounted on the lattice tower located at 6 Progress Ave in Seymour, CT. The coordinates of the tower are 41-23-30.30 N, 73-3-10.19 W.

AT&T is proposing the following modifications:

1) Install three 700 MHz LTE antennas (one per sector);

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left(\frac{1.6^2 \times EIRP}{4\pi \times R^2} \right) \text{x Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance = $\sqrt{(H^2 + V^2)}$

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and power, and that all channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not take into account actual terrain elevations which could attenuate the signal. As a result, the predicted signal levels reported below are much higher than the actual signal levels will be from the finished modifications.

4. Calculation Results

Table 1 below outlines the power density information for the site. Because the proposed AT&T antennas are directional in nature, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the tower. Please refer to Attachment C for the vertical pattern of the proposed AT&T antennas. The calculated results for AT&T in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antennas.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm^2)	Limit	%MPE
Cingular UMTS	*160*	*880*	*1*	*500*	*0.0070*	*0.5867*	*1.20%*
Cingular GSM	*160*	*1900*	*3*	*611*	*0.0257*	*1.0000*	*2.57%*
Mike Gardella	280	1980	12	110	0.0061	1.0000	0.61%
Town	235	155	12	80	0.0063	0.2000	3.13%
Verizon	140	1970	3	362	0.0199	1.0000	1.99%
Verizon	140	869	9	384	0.0634	0.5793	10.94%
Verizon	140	757	1	666	0.0122	0.5047	2.42%
Pocket	150	2130	3	631	0.0303	1.0000	3.03%
VoiceStream	250	1930	8	100	0.0046	1.0000	0.46%
Sprint	170	1962	11	500	0.0684	1.0000	6.84%
AT&T UMTS	160	880	2	565	0.0016	0.5867	0.27%
AT&T UMTS	160	1900	2	1077	0.0030	1.0000	0.30%
AT&T LTE	160	734	1	1313	0.0018	0.4893	0.38%
AT&T GSM	160	880	1	283	0.0004	0.5867	0.07%
AT&T GSM	160	1900	4	646	0.0036	1.0000	0.36%
						Total	**30.80%**

Table 1: Carrier Information[1,2]

[1] The existing CSC filing for Cingular should be removed and replaced with the updated AT&T technologies and values provided in Table 1. The power density information for carriers other than AT&T was taken directly from the CSC database dated 3/29/2012. Please note that %MPE values listed are rounded to two decimal points. The total %MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not identically match the total value reflected in the table.

[2] In the case where antenna models are not uniform across all 3 sectors for the same frequency band, the antenna model with the highest gain was used for the calculations to present a worse-case scenario.

5. Conclusion

The above analysis verifies that emissions from the existing site will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at ground level is **30.80% of the FCC limit**.

As noted previously, obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the finished modifications.

6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.

Daniel L. Goulet
C Squared Systems, LLC

April 27, 2012
Date

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz. IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave. IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure[3]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f^2)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(B) Limits for General Population/Uncontrolled Exposure[4]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f^2)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz * Plane-wave equivalent power density

Table 2: FCC Limits for Maximum Permissible Exposure (MPE)

[3] Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure

[4] General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure

EM-CING-124-120621

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New Cingular Wireless PCS, LLC
147 Austin Ryer ln
Branford, CT 06405
Phone: (203)-410-4531
Douglas Talmadge
Real Estate Consultant

June 15, 2012

Hand Delivered

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

RECEIVED
JUN 21 2012
CONNECTICUT
SITING COUNCIL

RE: New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 6 Progress Ave, Seymour, CT 06483.

Dear Ms. Roberts:

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

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

The changes to the facility do not constitute modification as defined Connecticut General Statues ("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 the R.C.S.A. Section 16-50j-72(b)(2).

1. The height of the overall structure will not be affected.
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3. The proposed changes will not increase the noise level at the existing facility by 6 decibels or more.
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For the foregoing reasons New Cingular Wireless PCS, LLC 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 (203)-410-4531 or email DTalmadge@Transcendwireless.com with questions concerning this matter. Thank you for your consideration.

Sincerely,

Douglas Talmadge
Real Estate Consultant

C Squared Systems, LLC
65 Dartmouth Drive, Unit A3
Auburn, NH 03032
(603) 644-2800
support@csquaredsystems.com

Calculated Radio Frequency Emissions

CT5633

(AWE - Seymour East)

6 Progress Ave, Seymour, CT 06483

April 27, 2012

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1. Introduction

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The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

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Where:

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H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and power, and that all channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not take into account actual terrain elevations which could attenuate the signal. As a result, the predicted signal levels reported below are much higher than the actual signal levels will be from the finished modifications.

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Table 1 below outlines the power density information for the site. Because the proposed AT&T antennas are directional in nature, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the tower. Please refer to Attachment C for the vertical pattern of the proposed AT&T antennas. The calculated results for AT&T in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antennas.

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Verizon	140	1970	3	362	0.0199	1.0000	1.99%
Verizon	140	869	9	384	0.0634	0.5793	10.94%
Verizon	140	757	1	666	0.0122	0.5047	2.42%
Pocket	150	2130	3	631	0.0303	1.0000	3.03%
VoiceStream	250	1930	8	100	0.0046	1.0000	0.46%
Sprint	170	1962	11	500	0.0684	1.0000	6.84%
AT&T UMTS	160	880	2	565	0.0016	0.5867	0.27%
AT&T UMTS	160	1900	2	1077	0.0030	1.0000	0.30%
AT&T LTE	160	734	1	1313	0.0018	0.4893	0.38%
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5. Conclusion

The above analysis verifies that emissions from the existing site will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at ground level is **30.80% of the FCC limit.**

As noted previously, obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the finished modifications.

6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.

Daniel L. Goulet
C Squared Systems, LLC

April 27, 2012
Date

Attachment A: References

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ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz. IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave. IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure[3]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(B) Limits for General Population/Uncontrolled Exposure[4]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz * Plane-wave equivalent power density

Table 2: FCC Limits for Maximum Permissible Exposure (MPE)

[3] Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure

[4] General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure

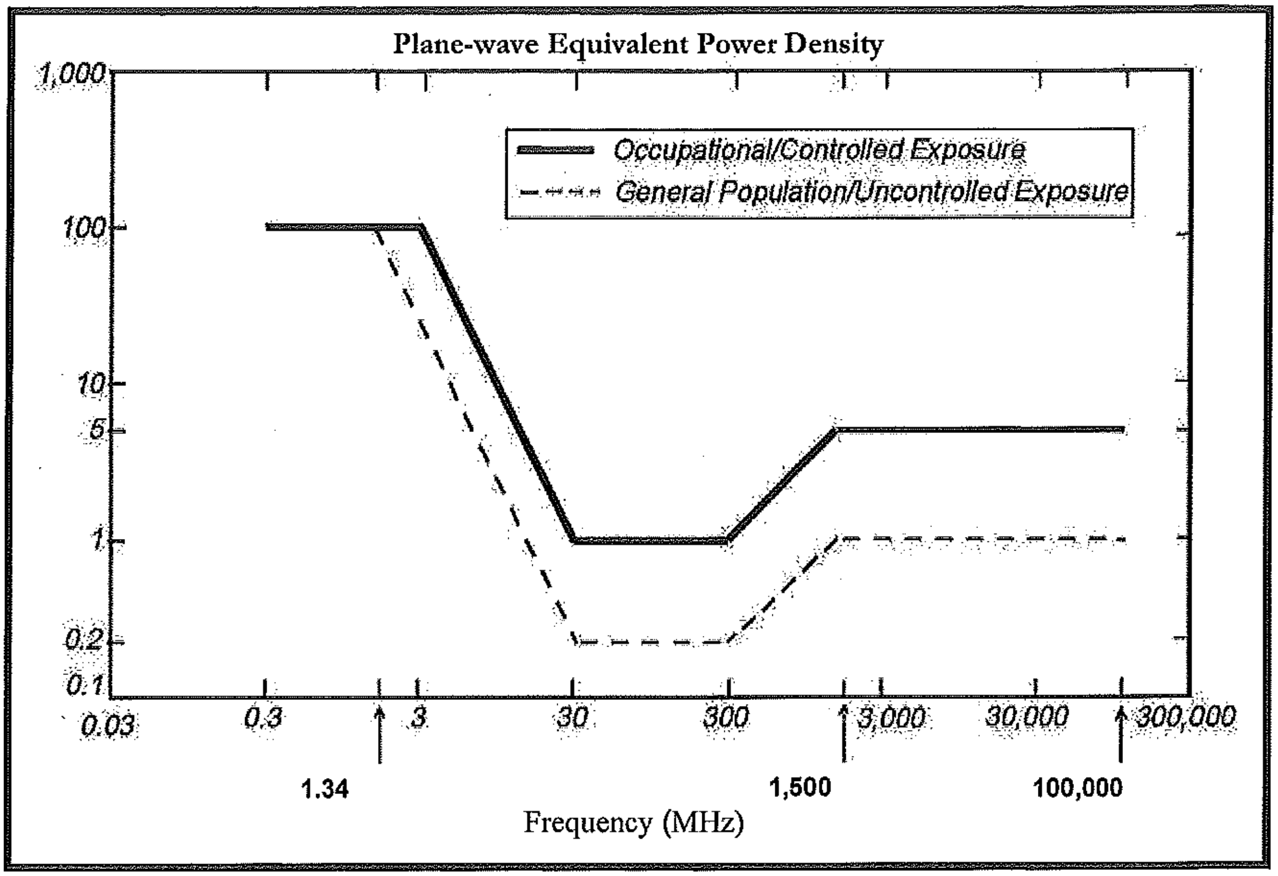
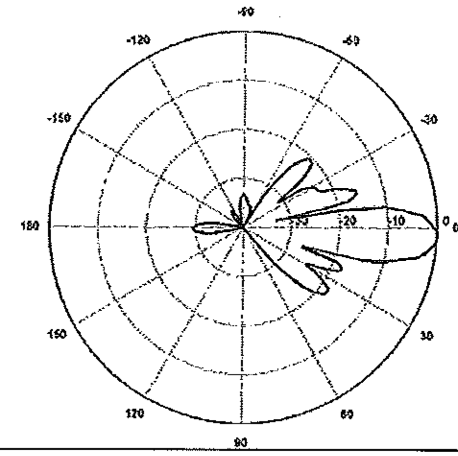


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: AT&T Antenna Data Sheets and Electrical Patterns

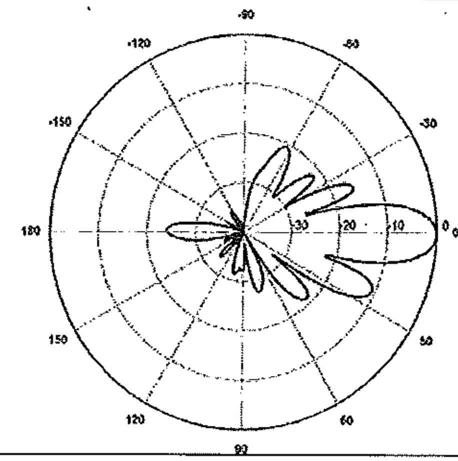
700 MHz

Manufacturer:	KMW Communications
Model #:	AM-X-CD-16-65-00T
Frequency Band:	698-806 MHz
Gain:	13.4 dBd
Vertical Beamwidth:	12.3°
Horizontal Beamwidth:	65°
Polarization:	Dual Slant ± 45°
Size L x W x D:	72.0" x 11.8" x 5.9"



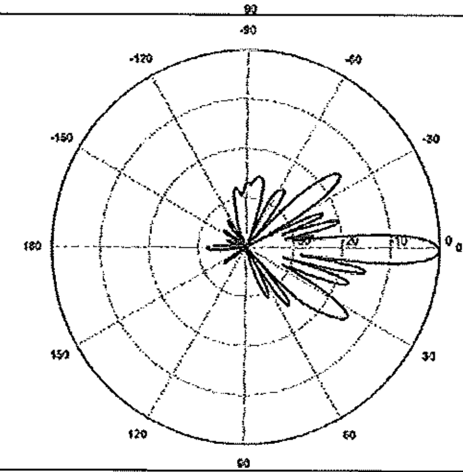
850 MHz

Manufacturer:	Kathrein-Scala
Model #:	80010121
Frequency Band:	824-896 MHz
Gain:	11.5 dBd
Vertical Beamwidth:	14.5°
Horizontal Beamwidth:	86°
Polarization:	±45°
Size L x W x D:	54.5" x 10.3" x 5.9"



1900 MHz

Manufacturer:	Kathrein-Scala
Model #:	80010121
Frequency Band:	1850-1990 MHz
Gain:	14.3 dBd
Vertical Beamwidth:	6.6°
Horizontal Beamwidth:	85°
Polarization:	±45°
Size L x W x D:	54.5" x 10.3" x 5.9"



Tower Reanalysis Report

Proposal 185135-1-1
June 5, 2012

U-28 x 280' Tower
Seymour, CT

PiRod Engineering File A-116966

Prepared for
Transcend Wireless
Attn: Chris Bisson
18 Industrial Ave
Mahwah NJ 07430

Authorization Provided by
EMAC Communications LLC
Edward MacConnie
2702 Forest View Lane
Kissimmee FL 34744

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http://vo/sites/plymouth/Reanalysis/Report/116/116966 185135-1-1.docx

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Description **Page No.**

1.0 EXECUTIVE SUMMARY

This reanalysis was performed by PiRod to determine if the structure is capable of accommodating loading that is different than previous design specifications. This engineering report gives details how the loading changes affect the tower, specifies feasible modifications, and proposes modification materials. **PiRod's engineering study concludes that the tower complies without modifications.** See section 6.0 for details.

2.0 ASSUMPTIONS

This engineering study is based on the theoretical capacity of the structure. It is not a condition assessment of the tower. This report is being provided by PiRod without the benefit of an inspection by PiRod personnel and is based on information supplied by the customer to PiRod. PiRod has made no independent determination, nor is required to, of the accuracy of the information provided. Therefore, unless specifically informed to the contrary by the customer in writing, PiRod assumes the following:

1. The subsoil characteristics exist as stated on the tower drawing or stated elsewhere in this report;
2. The tower is erected and maintained in accordance with the manufacturer's plans and specifications and is plumb;
3. There is no damage, natural or manmade, to the structure, either gradual or sudden;
4. All connections and guy cables are properly installed;
5. The information concerning the components, existing and proposed, is accurate; and
6. There are no modifications to the tower itself, except as may be disclosed elsewhere in this report.

PiRod recommends that qualified personnel assess the physical condition of the tower, preferably under the direction of a licensed professional engineer. Following is a list of the general areas that PiRod recommends to be inspected.

Tower Structure	Guyed Towers	Foundations	Appurtenances
Tower Sections	Guy Cables	Cracking	Antennas
Bolted Connections	Turnbuckles	Drainage	Mounts
Welded Connections	Preforms	Spalling	Transmission Lines
Plumbness	Guy Lugs	Anchor Bolts	Line Brackets
Corrosion	Thimbles	Settling	Cable Hangers
Linearity	Torque Arms	Grounding	Lighting
Galvanization	Ice Clips	Grout	
Paint	Guy Tensions	Subsoil	
	Anchor Rods	Characteristics	
	Shackles	Erosion	
	Insulators		

3.0 TOWER HISTORY

Date of Origination: 4/2000
PiRod Model: U-28 x 280' Tower
Sold to: EMAC Communications

ORIGINAL DESIGN CRITERIA				
Code/Standard	**Wind Loading**	**Radial Ice**	**Wind Load Reduction Used**	**Allowable Stress Increase Used**
TIA/EIA-222- F	90 mph fastest mile	no	none	yes
TIA/EIA-222-F	90 mph fastest mile	½" solid	25%	yes

For the structural analysis, the tower and foundation are assumed to exist as shown on the enclosed tower drawing, which is PiRod's latest revision.

4.0 CURRENT WIND LOAD REQUIREMENT

The TIA/EIA Standard is currently at version F for New Haven County. We have taken the opportunity to reanalyze this structure using the following wind speed and ice load conditions:

Code/Standard	Wind Loading	Radial Ice	Wind Load Reduction Used (1)	Allowable Stress Increase Used (2)
TIA/EIA-222-F	85 mph fastest mile	no	none	yes
TIA/EIA-222-F	85 mph fastest mile	0.5"	25%	yes

(1) The wind load reduction is permitted by the TIA/EIA-222-F Standard section 2.3.16 and most other codes to account for the minimal chance that the maximum wind speed will occur simultaneously with the ice load.

(2) The allowable stress increase is permitted by the TIA/EIA-222-F Standard and most other codes in accordance with the AISC-ASD Manual of Steel Construction.

Note: Some localities stipulate wind load requirements that are different from that required by the TIA/EIA Standard. Please check with your local building department and verify the required wind load.

5.0 ANTENNA LOADING

The tower analysis uses the following antenna loading, which was provided on 5/29.

HEIGHT (FT)	ANTENNAS #	ANTENNAS MODEL	ASSUMED CAAC (SQ.FT.)	MOUNTS #	MOUNTS MODEL	LINES #	LINES SIZE	LINES BRACKET
Existing Loading								
Top	1 1	Beacon Lightning Rod Ext				1	1"	
280	1 1	DB420 DB586-XC		1	9-arm Halo	2	1-5/8"	Expandable T
250	12	RR90-17-02DP		3 12	15' T-frame 2" x 84" Antenna Pipe	12	1-5/8"	"
245	1	DB420				1	1-5/8"	"
235	1	DB225-2-F		1	9-arm Halo	1	1-5/8"	"
200	9	DB980H120A-M		3 9	10' Lt T-frames 2" x 60" Antenna Pipe	9	1-5/8"	"
190	9	DB980H120A-M		3 9	10' Lt T-frames 2" x 60" Antenna Pipe	9	1-5/8"	"
180	9	DB980H120A-M		3 9	10' Lt T-frames 2" x 60" Antenna Pipe	9	1-5/8"	"
170	6	DB980F65T2E		3 9	15' T-frame 2" x " Antenna Pipe	6	1-5/8"	"
160	6 4 6	7770.00 LGP 21401 TMA 7020.00 RET Unit		3 6	15' T-frame 2" x " Antenna Pipe	6	1-5/8"	"
150	3	APXV18-206517S0C-ACU				3	1-5/8"	"
140	3 6 3	LNX-6514DS-T4M DB846F65ZAXY BXA-185063/12CF	Verizon	3 9	12' V-frames 2" x 72" Pipe mounts	12	1-5/8"	SE leg Ext. Double T
Proposed Additional Loading								
160	3 6 1	KMW AM-X-CD-16-65-00T-RET Ericsson RUS11 Racap DC6-48-60-18-8F		 3	Existing T-frames 2"x72" Pipe mounts	1 2	Fiber DC	

These antennas, mounts, and lines represent our understanding of the antenna loading required. Please contact us if any discrepancies are evident. If different antennas, mounts, or lines are installed on this structure, this analysis is invalid. If the lines are mounted on PiRod Double-T, Extended Double-T or Expandable Double-T, they are assumed to be mounted inside the tower and the transmission lines are mounted in a back to back configuration. If any of these brackets cannot be placed inside concerning physical fit, alternatively they can be installed outside the tower, but all the brackets need to be swung back as close as possible to one of the tower faces, to minimize the torque.

* An asterisk indicates that we were not provided with a value for the effective projected area (C_AA_C), and that the area has been assumed based on any information that was made available. The actual effective projected area for each antenna must be confirmed to be equal to the assumed area listed above. If it is determined that the area is different than that stated for any of the above items, this analysis is invalid.

6.0 RESULTS

With the antennas listed in section 5.0, the following modifications are required for the tower to comply with the indicated code and TIA/EIA Standard listed in section 4.0.

6.1 Tower Results - The tower complies without modifications.

- Tower capacity 67.8%

6.2 Foundation Results – The foundation complies without modifications.

The foundation analysis is based on the soil report by AET, Inc., dated 3/31/2000, file #42GT2K.

7.0 LIST OF APPENDICES

Tower elevation drawing

8.0 DISCLAIMER

1. The information and conclusions contained in this Report were determined by the application of the then current "state of the art" engineering and analysis procedures and formulae, and Valmont Structures [(1)] assumes no obligation to revise any of the information or conclusions contained in this Report in the event such engineering and analysis procedures and formulae are hereafter modified or revised.

2. In no event shall Valmont Structures be liable for any incidental, consequential, indirect, special or punitive damages (including without limitation lost profits) arising out of any claim associated with the use of this report (whether for breach of contract, tort, negligence or other form of action), irrespective of whether Valmont Structures has been advised of the possibility of any such loss or damage. In no event shall Valmont Structures' total, cumulative liability to the customer exceed the amount paid by customer for the preparation of this report.

3. Valmont Structures shall have no liability whatsoever to Customer or to others for any work or services performed by any persons other than Valmont Structures personnel, including but not limited to, any services rendered by riggers, erectors or other subcontractors . Customer acknowledges and agrees that any riggers, erectors or subcontractors retained or employed by Customer shall be solely responsible to Customer for the quality of work performed by them

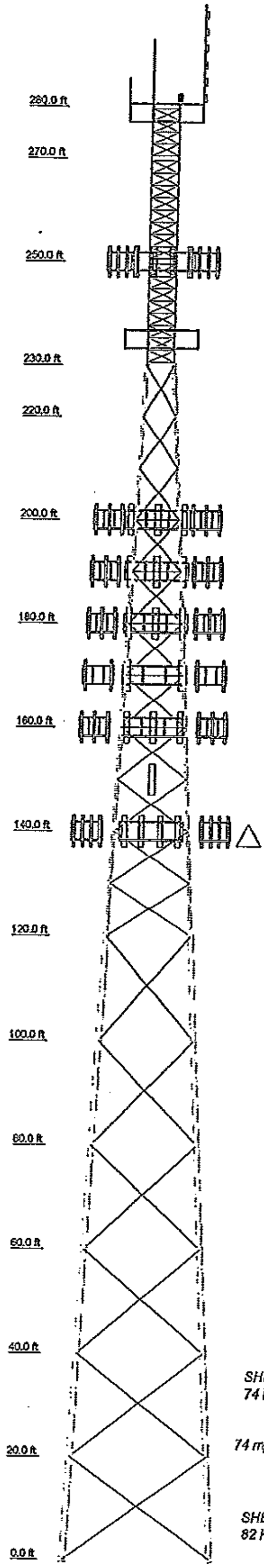
4. Valmont Structures makes no warranties, expressed or implied, in connection with this Report as to any other matter whatsoever, and in particular, any and all warranties of merchantability or fitness for a particular purpose are hereby expressly disclaimed. Valmont Structures further expressly disclaims any liability arising from material, fabrication, and erection deficiencies. This Report is being provided by Valmont Structures without the benefit of an inspection by Valmont Structures personnel and is based solely on information supplied by the Customer to Valmont Structures. Valmont Structures has made no independent determination, nor is it required to do so, of the accuracy of the information provided by Customer. Therefore, unless specifically informed to the contrary by the Customer in writing, the following assumptions apply to the Report:

   A. The subsoil characteristics exist as stated on the tower drawing or stated elsewhere in this report;
   B. The tower is erected and maintained in accordance with the manufacturer's plans and specifications and is plumb;
   C. There is no damage, natural or manmade, to the structure, either gradual or sudden;
   D. All connections are properly installed;
   E. The information concerning the components, existing and proposed, is accurate; and
   F. There are no modifications to the tower itself, except as may be disclosed elsewhere in this report. Examples include but are not limited to replacement or strengthening of bracing members, reinforcing vertical members in any manner, adding additional bracing, or extending tower.

6. All representations and recommendations and conclusions are based upon the information contained and set forth herein. If Customer is aware of any information which is contrary to that which is contained herein, or if Customer is aware of any defects arising from the original design, material, fabrication, and erection deficiencies Customer must disregard this Report and immediately contact Valmont Structures.

[(1)] Valmont Structures is the Structures Division of Valmont Industries, Inc., and performs engineering services under the engineering corporation name PiRod, Inc.

Section	T15	T14	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	D	C	#18 - 2.75" (Pirod 112744)		#18 - 2.50" (Pirod 112743)		#12 - 2.25" - 1.25" conn. (Pirod 105220)		B	#12 - 1.75" - 1.00" conn. (Pirod 105218)		A	SR 2 1/2	SR 2	SR 1 3/4
Leg Grade	A572-50														
Diagonals	2L3 1/2x3 1/2x5/16				L3 1/2x3 1/2x5/16				L3x3x5/16	L3x3x3/16		E	SR 1	SR 7/8	
Diagonal Grade	A36						A572-50								
Top Girts	N.A.							L3 1/2x3 1/2x5/16	L4x4x1/4	L3x3x3/16	N.A.		SR 1 1/4	SR 1	
Mid Girts	N.A.								L4x4x1/4	L3x3x3/16	N.A.			SR 1	
Bottom Girts	N.A.												SR 1 1/4	SR 1	
Horizontals	N.A.												SR 7/8		
Face Width (ft) 28	26	24	22	20	18	16	14	12	10	8	6				5
# Panels @ (ft)	6 @ 20								11 @ 10				16 @ 2.375		4 @ 2.25
Weight (K) 77.5	9.4	6.5	6.5	6.5	7.7	7.5	5.9	5.2	4.5	3.1	2.8	1.4	2.0	1.4	0.7



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Beacon	280	15' Universal T- Frame	170
15' LRE (arm=5.31') 606011	280	15' Universal T- Frame	170
DB420-A	280	15' Universal T- Frame	170
DB586-XC	280	(2) 7700.00	160
2" x 84" Sch. 40	280	(2) 7700.00	160
2" x 84" Sch. 40	280	(2) 7700.00	160
8-Arm Halo Mount	250	(4) Powerwave LGP214nn	160
(4) RR90-17-XXDP	250	(4) Powerwave LGP214nn	160
(4) RR90-17-XXDP	250	(4) Powerwave LGP214nn	160
(4) RR90-17-XXDP	250	(2) Powerwave 7020.00 DualBand RET	160
(4) 2" x 84" Sch. 40	250	(2) Powerwave 7020.00 DualBand RET	160
(4) 2" x 84" Sch. 40	250	(2) Powerwave 7020.00 DualBand RET	160
(4) 2" x 84" Sch. 40	250	(2) 2" x 60" Sch. 40	160
15' Universal T- Frame	250	(2) 2" x 60" Sch. 40	160
15' Universal T- Frame	250	(2) 2" x 60" Sch. 40	160
15' Universal T- Frame	250	15' Universal T- Frame	160
DB420-A	245	15' Universal T- Frame	160
DB225-74	235	15' Universal T- Frame	160
2" x 84" Sch. 40	235	Panel Antenna (72"x11.8"x5.9") (Proposed)	160
8-Arm Halo Mount	235	Panel Antenna (72"x11.8"x5.9") (Proposed)	160
(3) DB980H120E-M ,EKL	200	Panel Antenna (72"x11.8"x5.9") (Proposed)	160
(3) DB980H120E-M ,EKL	200	2" x 72" Sch. 40 (Proposed)	160
(3) DB980H120E-M ,EKL	200	2" x 72" Sch. 40 (Proposed)	160
(3) 2" x 60" Sch. 40	200	2" x 72" Sch. 40 (Proposed)	160
(3) 2" x 60" Sch. 40	200	(2) Ericsson RRH700 (17.6"x17.3" x7.2") (Proposed)	160
(3) 2" x 60" Sch. 40	200	(2) Ericsson RRH700 (17.6"x17.3" x7.2") (Proposed)	160
10' Lightweight T-Frame	200	(2) Ericsson RRH700 (17.6"x17.3" x7.2") (Proposed)	160
10' Lightweight T-Frame	200	Raycap DC6-48-60-18-8F (Proposed)	160
10' Lightweight T-Frame	200	APXV18-206517S-C	150
(3) DB980H120E-M ,EKL	190	APXV18-206517S-C	150
(3) DB980H120E-M ,EKL	190	APXV18-206517S-C	150
(3) DB980H120E-M ,EKL	190	BXA-185063/12CF	140
(3) 2" x 60" Sch. 40	190	BXA-185063/12CF	140
(3) 2" x 60" Sch. 40	190	(3) 2" x 72" Sch. 40	140
(3) 2" x 60" Sch. 40	190	(3) 2" x 72" Sch. 40	140
10' Lightweight T-Frame	190	(3) 2" x 72" Sch. 40	140
10' Lightweight T-Frame	190	12' V Frame	140
10' Lightweight T-Frame	190	12' V Frame	140
(3) DB980H120E-M ,EKL	180	12' V Frame	140
(3) DB980H120E-M ,EKL	180	(2) DB846F65ZAXY (Verizon)	140
(3) DB980H120E-M ,EKL	180	(2) DB846F65ZAXY	140
(3) 2" x 60" Sch. 40	180	BXA-185063/12CF	140
(3) 2" x 60" Sch. 40	180	LNX-6514DS-VTM (Verizon)	140
(3) 2" x 60" Sch. 40	180	LNX-6514DS-VTM (Verizon)	140
10' Lightweight T-Frame	180	LNX-6514DS-VTM (Verizon)	140
10' Lightweight T-Frame	180	2" x 72" Sch. 40 (Verizon)	140
10' Lightweight T-Frame	180	2" x 72" Sch. 40 (Verizon)	140
(2) DB980F65	170	2" x 72" Sch. 40 (Verizon)	140
(2) DB980F65	170	(2) DB846F65ZAXY (Verizon)	140
(2) DB980F65	170		
(2) 2" x 60" Sch. 40	170		
(2) 2" x 60" Sch. 40	170		
(2) 2" x 60" Sch. 40	170		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	#12ZG - 1.50" - 1.00" conn. (Pirod 105245-RAO)	D	#18 - 3.00" (Pirod 112740) BASE ONLY
B	#12 - 2.00" - 1.25" conn. (Pirod 105219)	E	L2 1/2x2 1/2x3/16
C	#18 - 3.00" (Pirod 112745)		

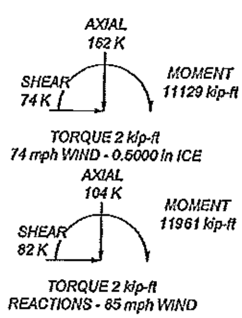
MATERIAL STRENGTH

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

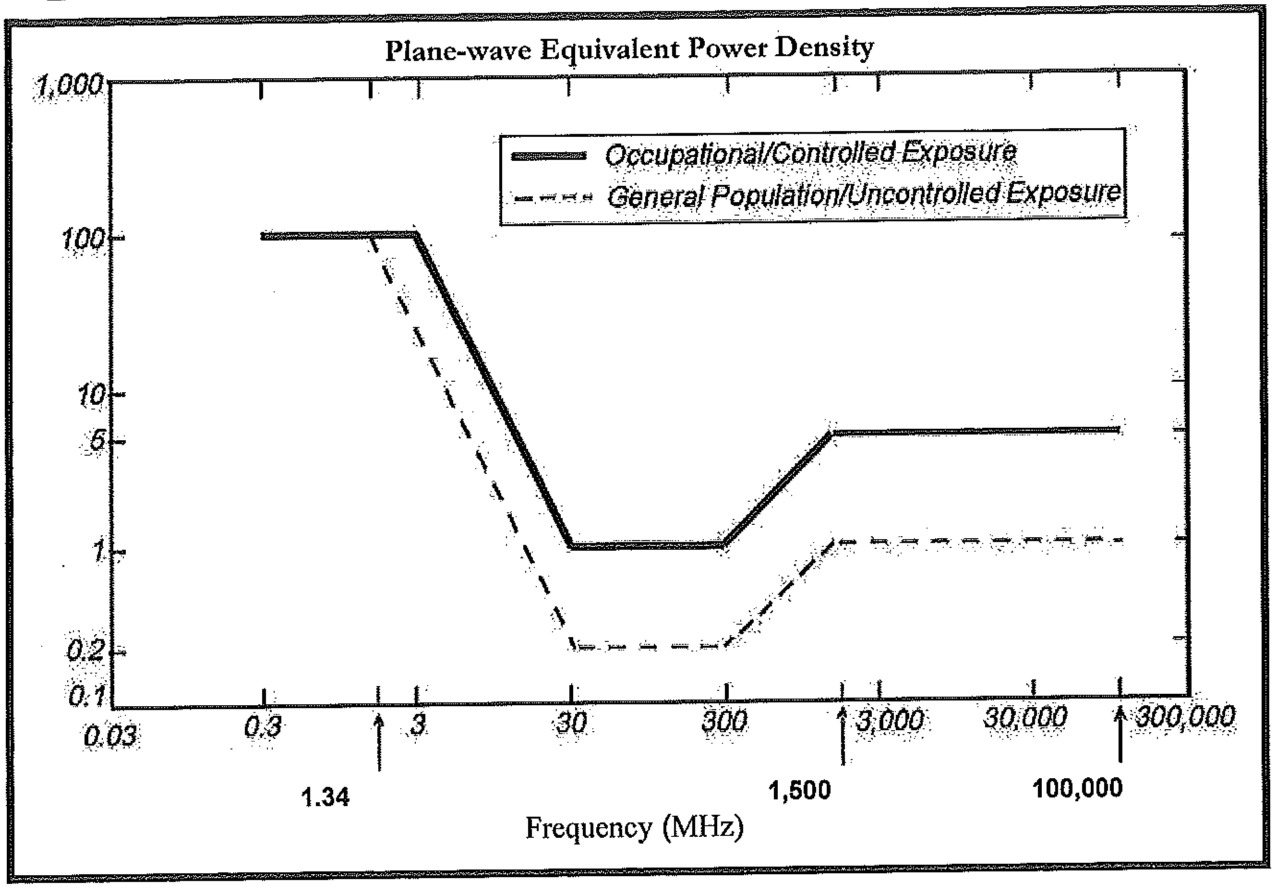
TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 67.8%

MAX. CORNER REACTIONS AT BASE:
DOWN: 528 K
UPLIFT: -450 K
SHEAR: 55 K



valmont STRUCTURES Valmont Industries - Specialty Structures Group	Valmont Structures 1545 Pidco Drive Plymouth, IN 46563 Phone: (574) 936-4221 FAX: (574) 936-6458	Job: A-116966 (Reanalysis 185135-1-1) Project: U-28.0 x 280' - Seymour, CT Client: Transcend Wireless — Drawn by: CRF1 — App'd: Code: TIA/EIA-222-F — Date: 05/31/12 — Scale: NTS Path: — Dwg No. E-1



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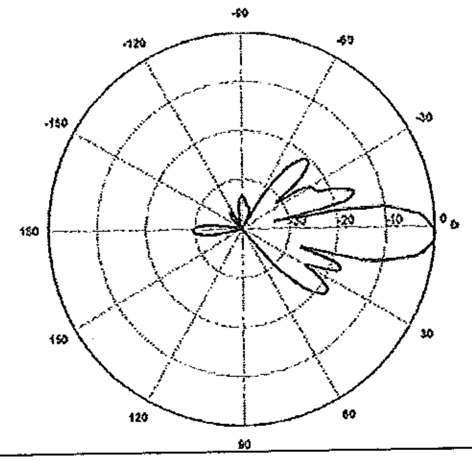

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Manufacturer:	Kathrein-Scala
Model #:	80010121
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Polarization:	±45°
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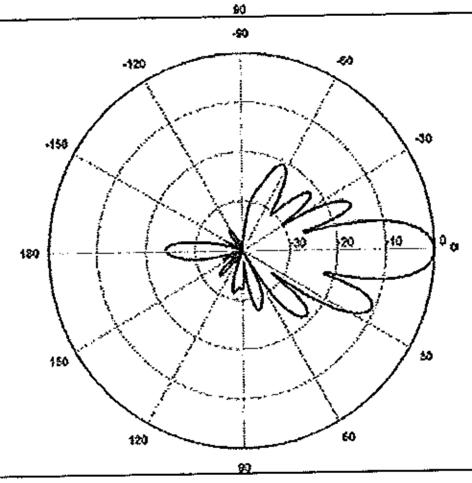
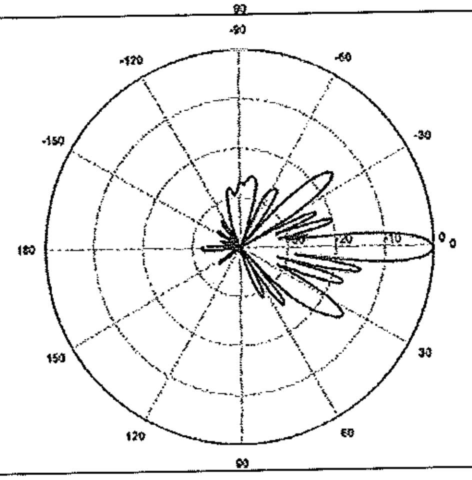


1900 MHz

Manufacturer:	Kathrein-Scala
Model #:	80010121
Frequency Band:	1850-1990 MHz
Gain:	14.3 dBd
Vertical Beamwidth:	6.6°
Horizontal Beamwidth:	85°
Polarization:	±45°
Size L x W x D:	54.5" x 10.3" x 5.9"



Original

154 General Patton Dr.
Naugatuck CT 06770

Tower Reanalysis Report

Proposal 185135-1-1
June 5, 2012

U-28 x 280' Tower
Seymour, CT

PiRod Engineering File A-116966

Prepared for
Transcend Wireless
Attn: Chris Bisson
18 Industrial Ave
Mahwah NJ 07430

Authorization Provided by
EMAC Communications LLC
Edward MacConnie
2702 Forest View Lane
Kissimmee FL 34744

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http://vo/sites/plymouth/Reanalysis/Report/116/116966 185135-1-1.docx

June 5, 2012
116966 185135-1-1.docx

Tower Reanalysis Report
Proposal 185135-1-1

Model: U-28 x 280' Tower
Site: Seymour, CT
PiRod Engineering File A-116966

Tower Contact Person:

Carol Fehrer
Product Specialist
e-mail: carol.fehrer@valmont.com
telephone extension: 5220

Completed under the Supervision and Approval by
William R. Heiden III, P.E.
Engineering Group Leader
e-mail: William.Heiden@valmont.com
telephone extension: 5243

STATE OF CONNECTICUT
WILLIAM HEIDEN III
No. 23038
LICENSED
PROFESSIONAL ENGINEER

6-5-12

William R. Heiden III, CT Professional Engineer # 23038

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Description **Page No.**

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This reanalysis was performed by PiRod to determine if the structure is capable of accommodating loading that is different than previous design specifications. This engineering report gives details how the loading changes affect the tower, specifies feasible modifications, and proposes modification materials. **PiRod's engineering study concludes that the tower complies without modifications.** See section 6.0 for details.

2.0 ASSUMPTIONS

This engineering study is based on the theoretical capacity of the structure. It is not a condition assessment of the tower. This report is being provided by PiRod without the benefit of an inspection by PiRod personnel and is based on information supplied by the customer to PiRod. PiRod has made no independent determination, nor is required to, of the accuracy of the information provided. Therefore, unless specifically informed to the contrary by the customer in writing, PiRod assumes the following:

1. The subsoil characteristics exist as stated on the tower drawing or stated elsewhere in this report;
2. The tower is erected and maintained in accordance with the manufacturer's plans and specifications and is plumb;
3. There is no damage, natural or manmade, to the structure, either gradual or sudden;
4. All connections and guy cables are properly installed;
5. The information concerning the components, existing and proposed, is accurate; and
6. There are no modifications to the tower itself, except as may be disclosed elsewhere in this report.

PiRod recommends that qualified personnel assess the physical condition of the tower, preferably under the direction of a licensed professional engineer. Following is a list of the general areas that PiRod recommends to be inspected.

Tower Structure	Guyed Towers	Foundations	Appurtenances
Tower Sections	Guy Cables	Cracking	Antennas
Bolted Connections	Turnbuckles	Drainage	Mounts
Welded Connections	Preforms	Spalling	Transmission Lines
Plumbness	Guy Lugs	Anchor Bolts	Line Brackets
Corrosion	Thimbles	Settling	Cable Hangers
Linearity	Torque Arms	Grounding	Lighting
Galvanization	Ice Clips	Grout	
Paint	Guy Tensions	Subsoil Characteristics	
	Anchor Rods	Erosion	
	Shackles		
	Insulators		

3.0 TOWER HISTORY

Date of Origination: 4/2000
PiRod Model: U-28 x 280' Tower
Sold to: EMAC Communications

ORIGINAL DESIGN CRITERIA				
Code/Standard	**Wind Loading**	**Radial Ice**	**Wind Load Reduction Used**	**Allowable Stress Increase Used**
TIA/EIA-222- F	90 mph fastest mile	no	none	yes
TIA/EIA-222-F	90 mph fastest mile	½" solid	25%	yes

For the structural analysis, the tower and foundation are assumed to exist as shown on the enclosed tower drawing, which is PiRod's latest revision.

4.0 CURRENT WIND LOAD REQUIREMENT

The TIA/EIA Standard is currently at version F for New Haven County. We have taken the opportunity to reanalyze this structure using the following wind speed and ice load conditions:

Code/Standard	**Wind Loading**	**Radial Ice**	**Wind Load Reduction Used (1)**	**Allowable Stress Increase Used (2)**
TIA/EIA-222-F	85 mph fastest mile	no	none	yes
TIA/EIA-222-F	85 mph fastest mile	0.5"	25%	yes

(1) The wind load reduction is permitted by the TIA/EIA-222-F Standard section 2.3.16 and most other codes to account for the minimal chance that the maximum wind speed will occur simultaneously with the ice load.

(2) The allowable stress increase is permitted by the TIA/EIA-222-F Standard and most other codes in accordance with the AISC-ASD Manual of Steel Construction.

Note: Some localities stipulate wind load requirements that are different from that required by the TIA/EIA Standard. Please check with your local building department and verify the required wind load.

5.0 ANTENNA LOADING

The tower analysis uses the following antenna loading, which was provided on 5/29.

Height (ft)	Antennas		Assumed CaAc (sq.ft.)	Mounts		Lines		
	#	Model		#	Model	#	Size	Bracket
Existing Loading								
Top	1 1	Beacon Lightning Rod Ext				1	1"	
280	1 1	DB420 DB586-XC		1	9-arm Halo	2	1-5/8"	Expandable T
250	12	RR90-17-02DP		3 12	15' T-frame 2" x 84" Antenna Pipe	12	1-5/8"	"
245	1	DB420				1	1-5/8"	"
235	1	DB225-2-F		1	9-arm Halo	1	1-5/8"	"
200	9	DB980H120A-M		3 9	10' Lt T-frames 2" x 60" Antenna Pipe	9	1-5/8"	"
190	9	DB980H120A-M		3 9	10' Lt T-frames 2" x 60" Antenna Pipe	9	1-5/8"	"
180	9	DB980H120A-M		3 9	10' Lt T-frames 2" x 60" Antenna Pipe	9	1-5/8"	"
170	6	DB980F65T2E		3 9	15' T-frame 2" x " Antenna Pipe	6	1-5/8"	"
160	6 4 6	7770.00 LGP 21401 TMA 7020.00 RET Unit		3 6	15' T-frame 2" x " Antenna Pipe	6	1-5/8"	"
150	3	APXV18-206517S0C-ACU				3	1-5/8"	"
140	3 6 3	LNX-6514DS-T4M DB846F65ZAXY BXA-185063/12CF	Verizon	3 9	12' V-frames 2" x 72" Pipe mounts	12	1-5/8"	SE leg Ext. Double T
Proposed Additional Loading								
160	3 6 1	KMW AM-X-CD-16-65-00T-RET Ericsson RUS11 Racap DC6-48-60-18-8F		 3	Existing T-frames 2"x72" Pipe mounts	1 2	Fiber DC	

These antennas, mounts, and lines represent our understanding of the antenna loading required. Please contact us if any discrepancies are evident. If different antennas, mounts, or lines are installed on this structure, this analysis is invalid. If the lines are mounted on PiRod Double-T, Extended Double-T or Expandable Double-T, they are assumed to be mounted inside the tower and the transmission lines are mounted in a back to back configuration. If any of these brackets cannot be placed inside concerning physical fit, alternatively they can be installed outside the tower, but all the brackets need to be swung back as close as possible to one of the tower faces, to minimize the torque.

* An asterisk indicates that we were not provided with a value for the effective projected area (C_AA_C), and that the area has been assumed based on any information that was made available. The actual effective projected area for each antenna must be confirmed to be equal to the assumed area listed above. If it is determined that the area is different than that stated for any of the above items, this analysis is invalid.

6.0 RESULTS

With the antennas listed in section 5.0, the following modifications are required for the tower to comply with the indicated code and TIA/EIA Standard listed in section 4.0.

6.1 Tower Results - The tower complies without modifications.

- Tower capacity 67.8%

6.2 Foundation Results – The foundation complies without modifications.

The foundation analysis is based on the soil report by AET, Inc., dated 3/31/2000, file #42GT2K.

7.0 LIST OF APPENDICES

Tower elevation drawing

8.0 DISCLAIMER

1. The information and conclusions contained in this Report were determined by the application of the then current "state of the art" engineering and analysis procedures and formulae, and Valmont Structures [1] assumes no obligation to revise any of the information or conclusions contained in this Report in the event such engineering and analysis procedures and formulae are hereafter modified or revised.

2. In no event shall Valmont Structures be liable for any incidental, consequential, indirect, special or punitive damages (including without limitation lost profits) arising out of any claim associated with the use of this report (whether for breach of contract, tort, negligence or other form of action), irrespective of whether Valmont Structures has been advised of the possibility of any such loss or damage. In no event shall Valmont Structures' total, cumulative liability to the customer exceed the amount paid by customer for the preparation of this report.

3. Valmont Structures shall have no liability whatsoever to Customer or to others for any work or services performed by any persons other than Valmont Structures personnel, including but not limited to, any services rendered by riggers, erectors or other subcontractors . Customer acknowledges and agrees that any riggers, erectors or subcontractors retained or employed by Customer shall be solely responsible to Customer for the quality of work performed by them

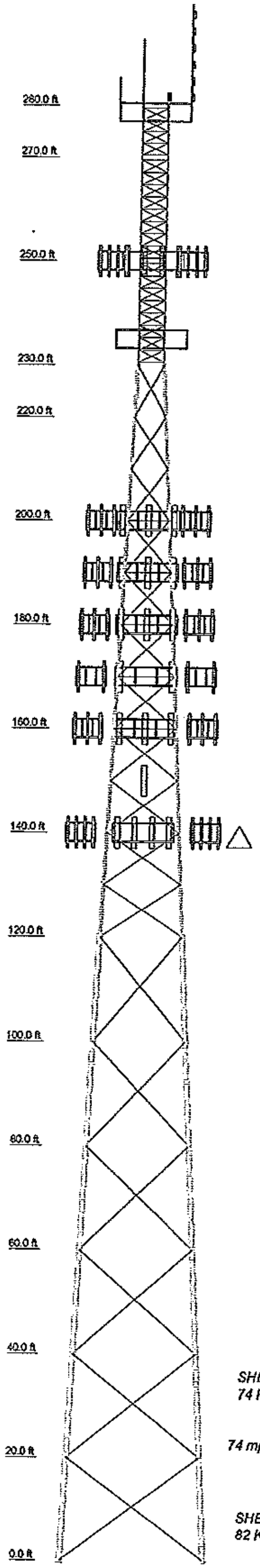
4. Valmont Structures makes no warranties, expressed or implied, in connection with this Report as to any other matter whatsoever, and in particular, any and all warranties of merchantability or fitness for a particular purpose are hereby expressly disclaimed. Valmont Structures further expressly disclaims any liability arising from material, fabrication, and erection deficiencies. This Report is being provided by Valmont Structures without the benefit of an inspection by Valmont Structures personnel and is based solely on information supplied by the Customer to Valmont Structures. Valmont Structures has made no independent determination, nor is it required to do so, of the accuracy of the information provided by Customer. Therefore, unless specifically informed to the contrary by the Customer in writing, the following assumptions apply to the Report:

   A. The subsoil characteristics exist as stated on the tower drawing or stated elsewhere in this report;
   B. The tower is erected and maintained in accordance with the manufacturer's plans and specifications and is plumb;
   C. There is no damage, natural or manmade, to the structure, either gradual or sudden;
   D. All connections are properly installed;
   E. The information concerning the components, existing and proposed, is accurate; and
   F. There are no modifications to the tower itself, except as may be disclosed elsewhere in this report. Examples include but are not limited to replacement or strengthening of bracing members, reinforcing vertical members in any manner, adding additional bracing, or extending tower.

6. All representations and recommendations and conclusions are based upon the information contained and set forth herein. If Customer is aware of any information which is contrary to that which is contained herein, or if Customer is aware of any defects arising from the original design, material, fabrication, and erection deficiencies Customer must disregard this Report and immediately contact Valmont Structures.

[1] Valmont Structures is the Structures Division of Valmont Industries, Inc., and performs engineering services under the engineering corporation name PiRod, Inc.

Section	T15	T14	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	D	C	#18 - 2.75" (Pirod 112744)		#18 - 2.50" (Pirod 112743)		#12 - 2.25" - 1.25" conn. (Pirod 105220)		B	#12 - 1.75" - 1.00" conn. (Pirod 105218)		A	SR 2 1/2	SR 2	SR 1 3/4
Leg Grade	A572-50														
Diagonals	2L3 1/2x3 1/2x5/16						L3 1/2x3 1/2x5/16		L3x3x5/16	L3x3x3/16		E	SR 1	SR 7/8	
Diagonal Grade	A36												A572-50		
Top Girts	N.A.							L3 1/2x3 1/2x5/16	L4x4x1/4	L3x3x3/16	N.A.		SR 1 1/4	SR 1	
Mid Girts	N.A.								L4x4x1/4	L3x3x3/16	N.A.		SR 1		
Bottom Girts	N.A.												SR 1 1/4	SR 1	
Horizontals	N.A.												SR 7/8		
Face Width (ft)	28	26	24	22	20	18	16	14	12	10	8	6			5
# Panels @ (ft)	6 @ 20				11 @ 10							16 @ 2.375			4 @ 2.25
Weight (K) 77.0	8.6	9.0	8.8	6.0	7.7	7.8	8.0	8.2	4.9	3.1	2.9	1.4	2.0	1.4	0.7



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Beacon	280	15' Universal T-Frame	170
15' LRE (arm=5.31') 806011	280	15' Universal T-Frame	170
DB420-A	280	15' Universal T-Frame	170
DB588-XC	280	(2) 7700.00	160
2" x 84" Sch. 40	280	(2) 7700.00	160
2" x 84" Sch. 40	280	(2) 7700.00	160
9-Arm Halo Mount	280	(4) Powerwave LGP214nn	160
(4) RR90-17-XXDP	250	(4) Powerwave LGP214nn	160
(4) RR90-17-XXDP	250	(4) Powerwave LGP214nn	160
(4) RR90-17-XXDP	250	(2) Powerwave 7020.00 DualBand RET	160
(4) 2" x 84" Sch. 40	250	(2) Powerwave 7020.00 DualBand RET	160
(4) 2" x 84" Sch. 40	250	(2) Powerwave 7020.00 DualBand RET	160
(4) 2" x 84" Sch. 40	250	(2) 2" x 60" Sch. 40	160
15' Universal T-Frame	250	(2) 2" x 60" Sch. 40	160
15' Universal T-Frame	250	(2) 2" x 60" Sch. 40	160
15' Universal T-Frame	250	15' Universal T-Frame	160
DB420-A	245	15' Universal T-Frame	160
DB225-74	235	15' Universal T-Frame	160
2" x 84" Sch. 40	235	Panel Antenna (72"x11.8"x5.9") (Proposed)	160
9-Arm Halo Mount	235	Panel Antenna (72"x11.8"x5.9") (Proposed)	160
(3) DB980H120E-M_EXL	200	Panel Antenna (72"x11.8"x5.9") (Proposed)	160
(3) DB980H120E-M_EXL	200	2" x 72" Sch. 40 (Proposed)	160
(3) DB980H120E-M_EXL	200	2" x 72" Sch. 40 (Proposed)	160
(3) 2" x 60" Sch. 40	200	2" x 72" Sch. 40 (Proposed)	160
(3) 2" x 60" Sch. 40	200	(2) Ericsson RRH700 (17.8"x17.3" x7.2") (Proposed)	160
(3) 2" x 60" Sch. 40	200		
10' Lightweight T-Frame	200	(2) Ericsson RRH700 (17.8"x17.3" x7.2") (Proposed)	160
10' Lightweight T-Frame	200		
10' Lightweight T-Frame	200	(2) Ericsson RRH700 (17.8"x17.3" x7.2") (Proposed)	160
(3) DB980H120E-M_EXL	190		
(3) DB980H120E-M_EXL	190	Raycap DC6-48-60-18-8F (Proposed)	160
(3) DB980H120E-M_EXL	190	APXV18-206517S-C	150
(3) 2" x 60" Sch. 40	190	APXV18-206517S-C	150
(3) 2" x 60" Sch. 40	190	APXV18-206517S-C	150
(3) 2" x 60" Sch. 40	190	BXA-185063/12CF	140
10' Lightweight T-Frame	190	BXA-185063/12CF	140
10' Lightweight T-Frame	190	(3) 2" x 72" Sch. 40	140
10' Lightweight T-Frame	190	(3) 2" x 72" Sch. 40	140
(3) DB980H120E-M_EXL	180	(3) 2" x 72" Sch. 40	140
(3) DB980H120E-M_EXL	180	12' V Frame	140
(3) DB980H120E-M_EXL	180	12' V Frame	140
(3) 2" x 60" Sch. 40	180	12' V Frame	140
(3) 2" x 60" Sch. 40	180	(2) DB846F65ZAXY (Verizon)	140
(3) 2" x 60" Sch. 40	180	(2) DB846F65ZAXY	140
10' Lightweight T-Frame	180	BXA-185063/12CF	140
10' Lightweight T-Frame	180	LNX-6514DS-VTM (Verizon)	140
10' Lightweight T-Frame	180	LNX-6514DS-VTM (Verizon)	140
(2) DB980F65	170	LNX-6514DS-VTM (Verizon)	140
(2) DB980F65	170	2" x 72" Sch. 40 (Verizon)	140
(2) DB980F65	170	2" x 72" Sch. 40 (Verizon)	140
(2) 2" x 60" Sch. 40	170	2" x 72" Sch. 40 (Verizon)	140
(2) 2" x 60" Sch. 40	170	(2) DB846F65ZAXY (Verizon)	140
(2) 2" x 60" Sch. 40	170		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	#12ZG - 1.50" - 1.00" conn. (Pirod 105245-RAO)	D	#18 - 3.00" (Pirod 112740) BASE ONLY
B	#12 - 2.00" - 1.25" conn. (Pirod 105219)	E	L2 1/2x2 1/2x3/16
C	#18 - 3.00" (Pirod 112745)		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 67.8%

MAX. CORNER REACTIONS AT BASE:
DOWN: 528 K
UPLIFT: -450 K
SHEAR: 55 K

AXIAL 162 K
SHEAR 74 K
MOMENT 11129 kip-ft
TORQUE 2 kip-ft
74 mph WIND - 0.5000 in ICE

AXIAL 104 K
SHEAR 82 K
MOMENT 11961 kip-ft
TORQUE 2 kip-ft
REACTIONS - 85 mph WIND

valmont STRUCTURES — Valmont Industries - Specialty Structures Group	*Valmont Structures* 1545 Pidco Drive Plymouth, IN 46563 Phone: (574) 936-4221 FAX: (574) 936-6458	Job: *A-116966 (Reanalysis 185135-1-1)*		
		Project: *U-28.0 x 280' - Seymour, CT*		
		Client: Transcend Wireless	Drawn by: CRF1	App'd:
		Code: TIA/EIA-222-F	Date: 05/31/12	Scale: NTS
		Path:		Dwg No. E-1

CT5633

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

280' Existing PiROD Lattice Tower

Proposed Verizon Wireless
Antenna Upgrade

Verizon Site Ref: Woodbridge North

6 Progress Lane
Seymour, CT

CENTEK Project No. 15001.024

Date: March 4, 2015

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

Prepared for:

Verizon Wireless
99 East River Road, 9th Floor
East Hartford, CT 06108

Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by Verizon Wireless on the existing lattice tower located in Seymour, Connecticut.

The host tower is a 280-ft, three legged, lattice tower originally designed and manufactured by PiROD eng. file no. A-116966 dated 4/21/200. The tower geometry, structure member sizes and foundation information were taken from the original design documents. Reinforcement information was obtained from the tower reanalysis report prepared by PiROD dated June 20, 2002.

Antenna and appurtenance inventory were taken from a previous structural analysis report prepared by PiROD job no. 185135-2-1 dated October 23, 2013, a previous structural analysis report prepared by Atlantis Group dated September 8, 2014, visual verification from grade by Centek personnel on March 4, 2015 and a Verizon RF data sheet.

The tower consists of fifteen (15) vertical sections consisting of steel truss legs conforming to ASTM A572 Gr. 50 and lateral bracing conforming to ASTM A36. The vertical tower sections are connected by bolted flange plates with the diagonal and horizontal bracing to pipe legs consisting of bolted connections. The width of the tower face is 5-ft at the top and 28-ft at the bottom.

Verizon Wireless proposes the removal of nine (9) panel antennas and the installation of nine (9) panel antennas, six (6) remote radio heads and one (1) distribution box mounted on the existing T-Frames. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

The existing tower supports several communication antennas. The existing and proposed loads considered in the analysis consist of the following:

- EMAC (Existing):
  Antenna: One (1) DB420-A dipole antenna and one (1) DB586-XC omni-directional whip antenna mounted on a 9-arm halo with an elevation of ±280-ft above grade level.
  Coax Cable: Two (2) 1-5/8" ∅ coax cables running on a leg of the existing tower as specified in Section 3 of this report.
- T-Mobile (Existing/Reserved):
  Antenna: Three (3) EMS RR90-17-02DP panel antennas, three (3) Andrew LNX-6515DS panel antennas and three (3) TMA's mounted on three (3) 15-ft T-Frames with a RAD center elevation of ±250-ft above grade level.
  Coax Cable: Twelve (12) 1-5/8" ∅ coax cables running on a leg of the existing tower as specified in Section 3 of this report.
- EMAC (Existing):
  Antenna: One (1) DB420-A dipole antenna and one (1) DB225-2-F dipole antenna mounted on a 9-arm halo with an elevation of ±235-ft above grade level.
  Coax Cable: Two (2) 1-5/8" ∅ coax cables running on a leg of the existing tower as specified in Section 3 of this report.

- Future Carrier (Reserved):
  Antenna: Nine (9) Decibel DB980H120E-M panel antennas mounted on three (3) 10-ft T-Frames with a RAD center elevation of ±200-ft above grade level.
  Coax Cable: Nine (9) 1-5/8" Ø coax cables running on a leg of the existing tower as specified in Section 3 of this report.

- Future Carrier (Reserved):
  Antenna: Nine (9) Decibel DB980H120E-M panel antennas mounted on three (3) 10-ft T-Frames with a RAD center elevation of ±190-ft above grade level.
  Coax Cable: Nine (9) 1-5/8" Ø coax cables running on a leg of the existing tower as specified in Section 3 of this report.

- Future Carrier (Reserved):
  Antenna: Nine (9) Decibel DB980H120E-M panel antennas mounted on three (3) 10-ft T-Frames with a RAD center elevation of ±180-ft above grade level.
  Coax Cable: Nine (9) 1-5/8" Ø coax cables running on a leg of the existing tower as specified in Section 3 of this report.

- Sprint (Existing):
  Antenna: Three (3) RFS APXVSPP18 panel antennas, three (3) RFS APXVTM14 panel antennas, three (3) 800 MHZ RRH's, three (3) 1900 MHZ RRH's and three (3) TD-RRH8x20-25 RRH's mounted on three (3) 15-ft T-Frames with a RAD center elevation of ±170-ft above grade level.
  Coax Cable: Three (3) 1-5/8" Ø coax cables and one (1) 1-/4" Ø fiber cable running on a leg of the existing tower as specified in Section 3 of this report.

- AT&T (Existing/Reserved):
  Antenna: Six (6) Powerwave 7770 panel antennas, three (3) KMW AM-X-CD-16-65-00T panel antennas, twelve (12) Powerwave LGP21401TMA's and six (6) Powerwave 7020 RETs mounted on three (3) 15-ft T-Frames with a RAD center elevation of ±160-ft above grade level.
  Coax Cable: Six (6) 1-5/8" Ø coax cables running on a leg of the existing tower as specified in Section 3 of this report.

- AT&T (Existing):
  Antennas: Six (6) Ericsson RRUS-11 and one (1) Raycap DC6-48-60-18-8F surge arrestor mounted with an elevation of 160-ft above grade level.
  Coax Cables: One (1) fiber cable and two (2) dc control cables running leg of the existing tower as specified in Section 3 of this report.

- MetroPCS (Reserved):
  Antenna: Three (3) RFS APX18-206517DS panel antennas leg mounted with a RAD center elevation of ±150-ft above grade level.
  Coax Cable: Six (6) 1-5/8" Ø coax cables running on a leg of the existing tower as specified in Section 3 of this report.

- VERIZON (Existing to Remain):
  Antennas: Three (3) Andrew LNX-6514DS panel antennas and six (6) RFS FD9R6004/2C-3L diplexers mounted on three (3) 12-ft T-Frames with a RAD center elevation of ±140-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" Ø coax cables running on a leg of the existing tower as specified in Section 3 of this report.

- VERIZON (Existing to Remove):
  Antennas: Six (6) Antel LPA-80063-6CF and three (3) Antel BXA-171063-12BF panel antennas mounted on three (3) 12-ft T-Frames with a RAD center elevation of ±140-ft above grade level.

- **VERIZON (Proposed):**
  Antennas: Three (3) Andrew LNX-6514DS panel antennas, six (6) Andrew HBXX-6517DS panel antennas, three (3) Alcatel-Lucent RRH2x60-AWS remote radio heads, three (3) Alcatel-Lucent RRH2x60-PCS remote radio heads and one (1) RFS DB-T1-6Z-8AB-0Z main distribution box mounted on three (3) 12-ft T-Frames with a RAD center elevation of ±140-ft above grade level.
  Coax Cables: One (1) 1-5/8" Ø fiber cable running on a leg of the existing tower as specified in Section 3 of this report.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All coax cables should be routed as specified in section 3 of this report.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower shaft, and the model assumes that the shaft members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (fastest mile) with no ice and a 75% reduction of wind force with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix K of the CSBC[1] and the wind speed data available in the TIA/EIA-222-F-96 Standard. The higher of the two wind speeds is utilized in preparation of the tower analysis.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice on the tower structure and its components.

Basic Wind Speed:	New Haven; v = 85 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	Seymour; v = 105 mph (3 second gust) equivalent to v = 85 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	TIA/EIA-222-F and Appendix-K wind speeds are equal.	
Load Cases:	Load Case 1; 85 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 2; 74 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 74 mph wind speed velocity represents 75% of the wind pressure generated by the 85 mph wind speed.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

[1] The 2005 Connecticut State Building Code as amended by the 2009 CT State Supplement. (CSBC)

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

- Calculated stresses were found to be within allowable limits. In Load Case 2, per tnxTower "Section Capacity Table", this tower was found to be at **77.5%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T13)	40'-0"-60'-0"	74.8%	**PASS**
Diagonal (T6)	180'-0"-200'-0"	77.5%	**PASS**
Mid Girt (T6)	180'-0"-200'-0"	46.9%	**PASS**

Foundation and Anchors

The existing foundation consists of three (3) 5-ft square x 3.25-ft long reinforced concrete piers on a 38.5-ft square x 3.25-ft thick reinforced concrete pad bearing directly on existing sub grade. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned PiROD design documents. Tower legs are connected to the foundation by means of (6) 2"∅, ASTM A687 anchor bolts per leg, embedded into the concrete foundation structure.

- The tower reactions developed from the governing Load Case 2 were used in the verification of the foundation:

Reactions	Vector	Proposed Base Reactions
Base	Shear	**84 kips**
	Compression	**168 kips**
	Moment	**12593 kip-ft**
Leg	Shear	**56 kips**
	Uplift	**456 kips**
	Compression	**575 kips**

- The anchor bolts were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	35.4%	**PASS**

- The foundation was found to be within allowable limits.

Foundation	Design Limit	IBC 2003/2005 CT State Building Code Section 3108.4.2 (FS)(1)	Proposed Loading (FS)(1)	Result
Reinforced Concrete Mat	OM(2)	2.0	2.06	**PASS**

Note 1: FS denotes Factor of Safety
Note 2: OM denotes Overturning Moment.

Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration.

The analysis is based, in part, on the information provided to this office by Verizon Wireless. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

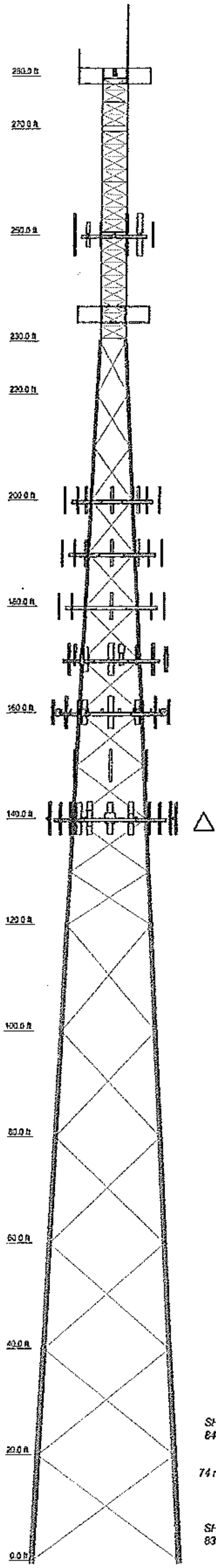
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

TnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, TnxTower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

TnxTower Features:

- TnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- TnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

Section	T15	T14	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	Pirod 112740	Pirod 112745	Pirod 112744		Pirod 112743		Pirod 105220		Pirod 105219	Pirod 105218		Pirod 105246	SR 2 1/2	SR 2	SR 1 3/4
Leg Grade	A572-50														
Diagonals	2L3 1/2x3 1/2x5/16						L3 1/2x3 1/2x5/16		L3x3x5/16	L3x3x3/16		A	SR 1	SR 7/8	
Diagonal Grade	A36												A572-50		
Top Girts	N.A.							L3 1/2x3 1/2x5/16	L4x4x1/4	L3x3x3/16	N.A.		SR 1 1/4	SR 1	
Mid Girts	N.A.								L4x4x1/4	L3x3x3/16	N.A.			SR 1	
Bottom Girts	N.A.												SR 1 1/4	SR 1	
Horizontals	N.A.												SR 7/8		
Face Width (ft) 28	26	24	22	20	18	16	14	12	10	8	6	5			
# Panels @ (ft)	6 @ 20						11 @ 10						18 @ 2.375		4 @ 2.25
Weight (K) 76.2	9.3	9.2	8.3	8.1	7.6	7.3	6.2	6.3	4.8	2.5	3.0	1.2	1.9	1.4	0.7



MAX. CORNER REACTIONS AT BASE:
DOWN: 575 K
UPLIFT: -456 K
SHEAR: 58 K

AXIAL 163 K
SHEAR 84 K
MOMENT 12593 kip-ft
TORQUE 13 kip-ft
74 mph WIND - 0.5000 in ICE

AXIAL 110 K
SHEAR 83 K
MOMENT 12233 kip-ft
TORQUE 11 kip-ft
REACTIONS - 85 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Flash Beacon Lighting (EMAC)	280	Pirod 15' T-Frame Sector Mount (1) (Sprint Existing)	170
15' Lighting Rod (EMAC)	280	Pirod 15' T-Frame Sector Mount (1) (Sprint Existing)	170
DB420-A (EMAC)	280	7770.00 (AT&T Existing)	160
DB586-XC (EMAC)	280	AM-X-CD-16-65-00T-RET(72") (AT&T Existing)	160
9 Arm Halo Mount (EMAC)	280	7770.00 (AT&T Reserved)	160
RR90-17-02DP (T-Mobile Existing)	250	(4) LPG21401 TMA (AT&T Existing)	160
LNX-6515DS (T-Mobile Existing)	250	(2) 7020 Dual Band RET (AT&T Existing)	160
RR90-17-02DP (T-Mobile Existing)	250	7770.00 (AT&T Existing)	160
LNX-6515DS (T-Mobile Existing)	250	AM-X-CD-16-65-00T-RET(72") (AT&T Existing)	160
RR90-17-02DP (T-Mobile Existing)	250	7770.00 (AT&T Reserved)	160
LNX-6515DS (T-Mobile Existing)	250	(4) LPG21401 TMA (AT&T Existing)	160
TMA 10"x5"x3" (T-Mobile Existing)	250	(2) 7020 Dual Band RET (AT&T Existing)	160
TMA 10"x5"x3" (T-Mobile Existing)	250	7770.00 (AT&T Existing)	160
TMA 10"x5"x3" (T-Mobile Existing)	250	AM-X-CD-16-65-00T-RET(72") (AT&T Existing)	160
Pirod 15' T-Frame Sector Mount (1) (T-Mobile Existing)	250	7770.00 (AT&T Reserved)	160
Pirod 15' T-Frame Sector Mount (1) (T-Mobile Existing)	250	(4) LPG21401 TMA (AT&T Existing)	160
Pirod 15' T-Frame Sector Mount (1) (T-Mobile Existing)	250	(2) 7020 Dual Band RET (AT&T Existing)	160
		(2) RRUS-11 (AT&T Existing)	160
DB420-A (EMAC)	245	(2) RRUS-11 (AT&T Existing)	160
DB225-2-F (EMAC)	235	(2) RRUS-11 (AT&T Existing)	160
9 Arm Halo Mount (EMAC)	235	DC6-48-60-18-8F Surge Arrestor (AT&T Existing)	160
(3) DB980H120E-M (Future)	200	Pirod 15' T-Frame Sector Mount (1) (AT&T Existing)	160
(3) DB980H120E-M (Future)	200	Pirod 15' T-Frame Sector Mount (1) (AT&T Existing)	160
(3) DB980H120E-M (Future)	200	Pirod 15' T-Frame Sector Mount (1) (AT&T Existing)	160
10-ft T-Frame (Future)	200	APXV18-206517S (MetroPCS Reserved)	150
10-ft T-Frame (Future)	200	APXV18-206517S (MetroPCS Reserved)	150
10-ft T-Frame (Future)	200	APXV18-206517S (MetroPCS Reserved)	150
(3) DB980H120E-M (Future)	190	LNX-6514DS-VTM (Verizon Proposed)	140
(3) DB980H120E-M (Future)	190	HBXX-6517DS (Verizon Proposed)	140
(3) DB980H120E-M (Future)	190	LNX-6514DS-VTM (Verizon Existing)	140
10-ft T-Frame (Future)	190	HBXX-6517DS (Verizon Proposed)	140
10-ft T-Frame (Future)	190	LNX-6514DS-VTM (Verizon Proposed)	140
10-ft T-Frame (Future)	190	HBXX-6517DS (Verizon Proposed)	140
(3) DB980H120E-M (Future)	180	LNX-6514DS-VTM (Verizon Existing)	140
(3) DB980H120E-M (Future)	180	HBXX-6517DS (Verizon Proposed)	140
(3) DB980H120E-M (Future)	180	LNX-6514DS-VTM (Verizon Proposed)	140
10-ft T-Frame (Future)	180	HBXX-6517DS (Verizon Proposed)	140
10-ft T-Frame (Future)	180	LNX-6514DS-VTM (Verizon Existing)	140
10-ft T-Frame (Future)	180	HBXX-6517DS (Verizon Proposed)	140
APXVSPP18-C-A20 (Sprint Existing)	170	(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	140
APXVTM14 (Sprint Existing)	170	(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	140
APXVSPP18-C-A20 (Sprint Existing)	170	(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	140
APXVTM14 (Sprint Existing)	170	RRH2x60-AWS (Verizon Proposed)	140
APXVSPP18-C-A20 (Sprint Existing)	170	RRH2x60-AWS (Verizon Proposed)	140
APXVTM14 (Sprint Existing)	170	RRH2x60-AWS (Verizon Proposed)	140
FD-RRH 2x50 800 (Sprint Existing)	170	RRH2x60-PCS (Verizon Proposed)	140
FD-RRH 2x50 800 (Sprint Existing)	170	RRH2x60-PCS (Verizon Proposed)	140
FD-RRH 2x50 800 (Sprint Existing)	170	RRH2x60-PCS (Verizon Proposed)	140
FD-RRH 4x40 1900 (Sprint Existing)	170	DB-T1-6Z-8AB-0Z (Verizon Proposed)	140
FD-RRH 4x40 1900 (Sprint Existing)	170	Pirod 12' T-Frame Sector Mount (1) (Verizon Existing)	140
FD-RRH 4x40 1900 (Sprint Existing)	170		
TD-RRH8x20-25 (Sprint Existing)	170	Pirod 12' T-Frame Sector Mount (1) (Verizon Existing)	140
TD-RRH8x20-25 (Sprint Existing)	170		
TD-RRH8x20-25 (Sprint Existing)	170	Pirod 12' T-Frame Sector Mount (1) (Verizon Existing)	140
Pirod 15' T-Frame Sector Mount (1) (Sprint Existing)	170		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L2 1/2x2 1/2x3/16		

MATERIAL STRENGTH

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

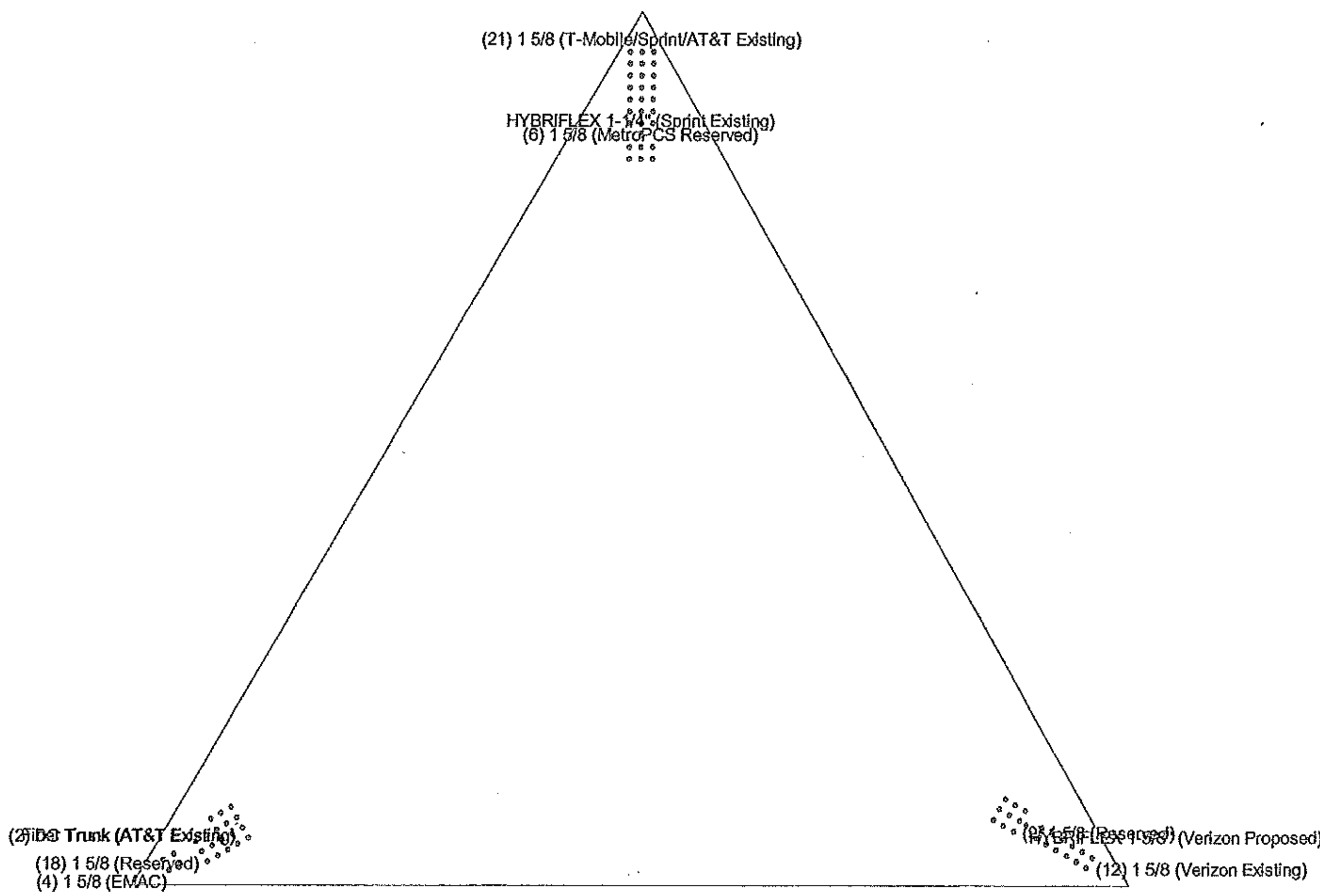
TOWER DESIGN NOTES

1. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. TOWER RATING: 77.5%

Centek Engineering Inc.	Job: 15001.024 - Woodbridge North		
63-2 North Branford Rd.	Project: 280' PiROD Lattice Tower - 6 Progress Lane, Seymour, CT		
Branford, CT 06405	Client: Verizon Wireless	Drawn by: T.A.	App'd:
Phone: (203) 488-0580	Code: TIA/EIA-222-F	Date: 03/04/15	Scale: NTS
FAX: (203) 488-8587	Path:		Dwg No. E-1

Feedline Plan

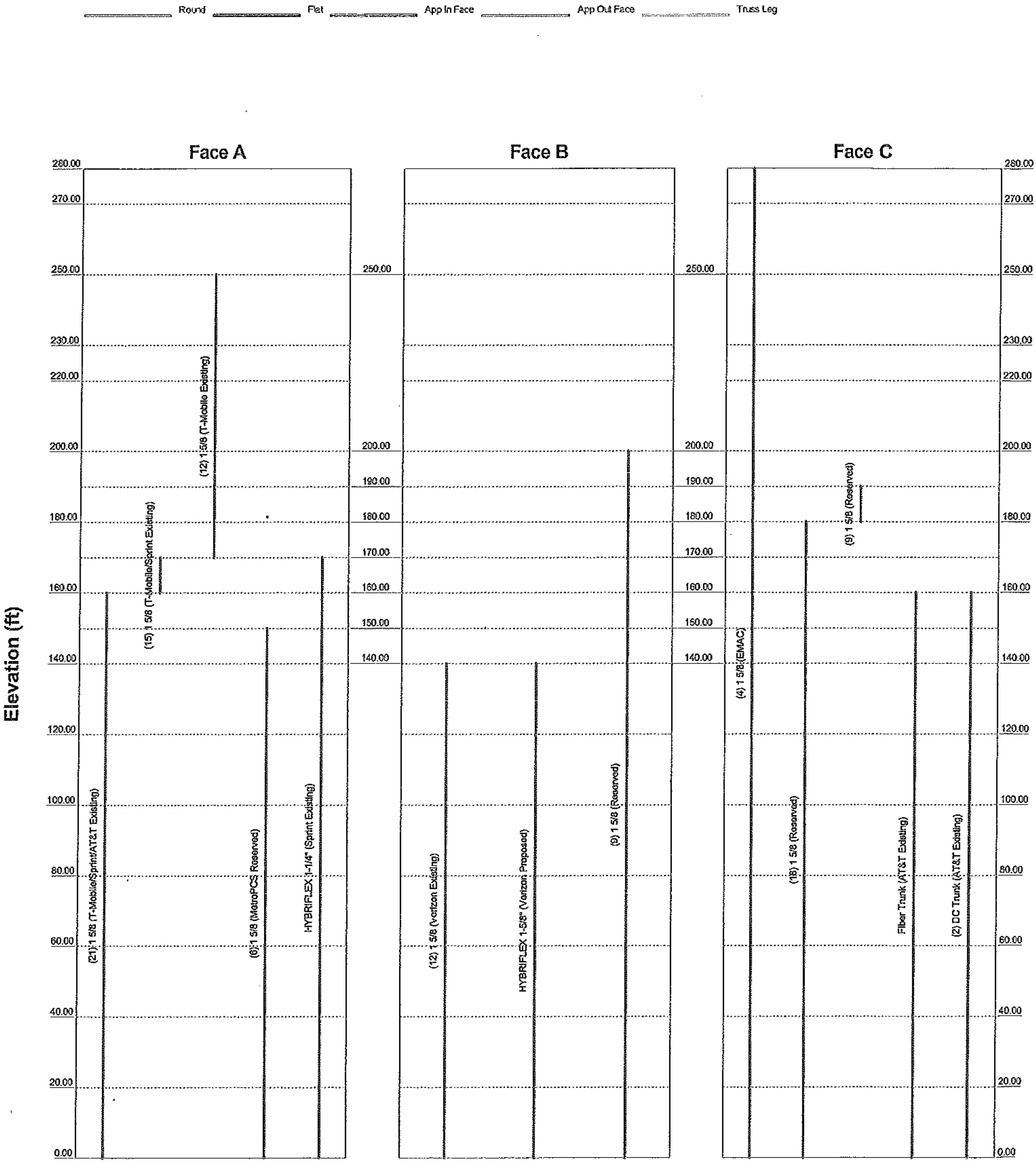
Round Flat App In Face App Out Face Truss-Leg



Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: ***15001.024 - Woodbridge North***		
	Project: ***280' PIROD Lattice Tower - 6 Progress Lane, Seymour, CT***		
	Client: Verizon Wireless	Drawn by: TJL	App'd:
	Code: TIA/EIA-222-F	Date: 03/04/15	Scale: NTS
	Path:		Dwg No. E-7

Feedline Distribution Chart

0' - 280'



Centek Engineering Inc.	Job: ***15001.024 - Woodbridge North***		
63-2 North Branford Rd.	Project: ***280' PiROD Lattice Tower - 6 Progress Lane, Seymour, CT***		
Branford, CT 06405	Client: Verizon Wireless	Drawn by: TJL	App'd:
Phone: (203) 488-0580	Code: TIA/EIA-222-F	Date: 03/04/15	Scale: NTS
FAX: (203) 488-8587	Path:		Dwg No. E-7

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 280.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 5.00 ft at the top and 28.00 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

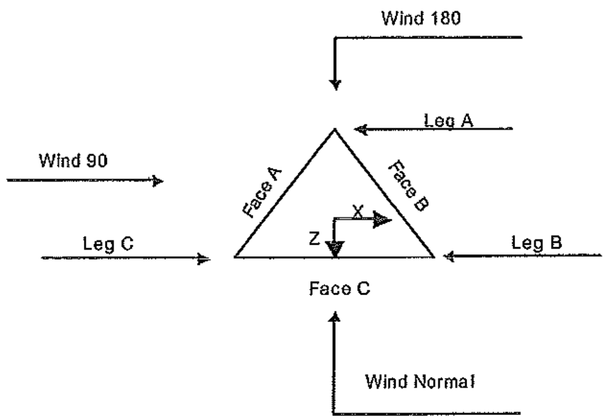
- Basic wind speed of 85 mph.
- Nominal ice thickness of 0.5000 in.
- Ice density of 56 pcf.
- A wind speed of 74 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 50 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in tower member design is 1.333.
- Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs
Consider Moments - Horizontals
Consider Moments - Diagonals
Use Moment Magnification
√ Use Code Stress Ratios
√ Use Code Safety Factors - Guys
Escalate Ice
Always Use Max Kz
Use Special Wind Profile
√ Include Bolts In Member Capacity
Leg Bolts Are At Top Of Section
Secondary Horizontal Braces Leg
Use Diamond Inner Bracing (4 Sided)
Add IBC .6D+W Combination

Distribute Leg Loads As Uniform
Assume Legs Pinned
√ Assume Rigid Index Plate
√ Use Clear Spans For Wind Area
√ Use Clear Spans For KL/r
Retension Guys To Initial Tension
Bypass Mast Stability Checks
√ Use Azimuth Dish Coefficients
√ Project Wind Area of Appurt.
Autocalc Torque Arm Areas
√ SR Members Have Cut Ends
√ Sort Capacity Reports By Component
Triangulate Diamond Inner Bracing

Treat Feedline Bundles As Cylinder
Use ASCE 10 X-Brace Ly Rules
√ Calculate Redundant Bracing Forces
Ignore Redundant Members in FEA
√ SR Leg Bolts Resist Compression
√ All Leg Panels Have Same Allowable
Offset Girt At Foundation
√ Consider Feedline Torque
√ Include Angle Block Shear Check
Poles
Include Shear-Torsion Interaction
Always Use Sub-Critical Flow
Use Top Mounted Sockets



Triangular Tower

Tower Section Geometry

Tower Section	*Tower Elevation* (*ft*)	*Assembly Database*	*Description*	*Section Width* (*ft*)	*Number of Sections*	*Section Length* (*ft*)
T1	280.00-270.00			5.00	1	10.00
T2	270.00-250.00			5.00	1	20.00
T3	250.00-230.00			5.00	1	20.00
T4	230.00-220.00			5.00	1	10.00
T5	220.00-200.00			6.00	1	20.00
T6	200.00-180.00			8.00	1	20.00
T7	180.00-160.00			10.00	1	20.00
T8	160.00-140.00			12.00	1	20.00
T9	140.00-120.00			14.00	1	20.00
T10	120.00-100.00			16.00	1	20.00
T11	100.00-80.00			18.00	1	20.00
T12	80.00-60.00			20.00	1	20.00
T13	60.00-40.00			22.00	1	20.00
T14	40.00-20.00			24.00	1	20.00
T15	20.00-0.00			26.00	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	*Tower Elevation* (*ft*)	*Diagonal Spacing* (*ft*)	*Bracing Type*	*Has K Brace End Panels*	*Has Horizontals*	*Top Girt Offset* (*in*)	*Bottom Girt Offset* (*in*)

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	280.00-270.00	2.25	X Brace	No	Steps	5.5000	6.5000
T2	270.00-250.00	2.38	X Brace	No	Steps	5.5000	6.5000
T3	250.00-230.00	2.38	X Brace	No	Steps	5.5000	6.5000
T4	230.00-220.00	10.00	X Brace	No	No	0.0000	0.0000
T5	220.00-200.00	10.00	X Brace	No	No	0.0000	0.0000
T6	200.00-180.00	10.00	X Brace	No	No	0.0000	0.0000
T7	180.00-160.00	10.00	X Brace	No	No	0.0000	0.0000
T8	160.00-140.00	10.00	X Brace	No	No	0.0000	0.0000
T9	140.00-120.00	10.00	X Brace	No	No	0.0000	0.0000
T10	120.00-100.00	20.00	X Brace	No	No	0.0000	0.0000
T11	100.00-80.00	20.00	X Brace	No	No	0.0000	0.0000
T12	80.00-60.00	20.00	X Brace	No	No	0.0000	0.0000
T13	60.00-40.00	20.00	X Brace	No	No	0.0000	0.0000
T14	40.00-20.00	20.00	X Brace	No	No	0.0000	0.0000
T15	20.00-0.00	20.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 280.00-270.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T2 270.00-250.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T3 250.00-230.00	Solid Round	2 1/2	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T4 230.00-220.00	Truss Leg	Pirod 105245	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 220.00-200.00	Truss Leg	Pirod 105218	A572-50 (50 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T6 200.00-180.00	Truss Leg	Pirod 105218	A572-50 (50 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T7 180.00-160.00	Truss Leg	Pirod 105219	A572-50 (50 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T8 160.00-140.00	Truss Leg	Pirod 105220	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T9 140.00-120.00	Truss Leg	Pirod 105220	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T10 120.00-100.00	Truss Leg	Pirod 112743	A572-50 (50 ksi)	Double Angle	2L3 1/2x3 1/2x5/16	A36 (36 ksi)
T11 100.00-80.00	Truss Leg	Pirod 112743	A572-50 (50 ksi)	Double Angle	2L3 1/2x3 1/2x5/16	A36 (36 ksi)
T12 80.00-60.00	Truss Leg	Pirod 112744	A572-50 (50 ksi)	Double Angle	2L3 1/2x3 1/2x5/16	A36 (36 ksi)
T13 60.00-40.00	Truss Leg	Pirod 112744	A572-50 (50 ksi)	Double Angle	2L3 1/2x3 1/2x5/16	A36 (36 ksi)
T14 40.00-20.00	Truss Leg	Pirod 112745	A572-50 (50 ksi)	Double Angle	2L3 1/2x3 1/2x5/16	A36 (36 ksi)
T15 20.00-0.00	Truss Leg	Pirod 112740	A572-50 (50 ksi)	Double Angle	2L3 1/2x3 1/2x5/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation *ft*	*Top Girt Type*	*Top Girt Size*	*Top Girt Grade*	*Bottom Girt Type*	*Bottom Girt Size*	*Bottom Girt Grade*
T1 280.00-270.00	Solid Round	1	A570-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T2 270.00-250.00	Solid Round	1	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T3 250.00-230.00	Solid Round	1 1/4	A572-50 (50 ksi)	Solid Round	1 1/4	A572-50 (50 ksi)
T6 200.00-180.00	Single Angle	L3x3x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T7 180.00-160.00	Single Angle	L4x4x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T8 160.00-140.00	Single Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation *ft*	*No. of Mid Girts*	*Mid Girt Type*	*Mid Girt Size*	*Mid Girt Grade*	*Horizontal Type*	*Horizontal Size*	*Horizontal Grade*
T1 280.00-270.00	1	Solid Round	1	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T2 270.00-250.00	1	Solid Round	1	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T3 250.00-230.00	None	Single Angle		A36 (36 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T6 200.00-180.00	1	Single Angle	L3x3x3/16	A36 (36 ksi)	Pipe		A572-50 (50 ksi)
T7 180.00-160.00	1	Single Angle	L4x4x1/4	A36 (36 ksi)	Pipe		A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation *ft*	*Gusset Area (per face)* ft^2	*Gusset Thickness* *in*	*Gusset Grade*	*Adjust. Factor* A_f	*Adjust. Factor* A_r	*Weight Mult.*	*Double Angle Stitch Bolt Spacing Diagonals* *in*	*Double Angle Stitch Bolt Spacing Horizontals* *in*
T1 280.00-270.00	0.00	0.0000	A36 (36 ksi)	1	1	1	30.0000	30.0000
T2 270.00-250.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 250.00-230.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 230.00-220.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 220.00-200.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6	0.00	0.0000	A36	1	1	1	36.0000	36.0000

Tower Elevation *ft*	*Gusset Area (per face)* *ft²*	*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*
200.00-180.00			(36 ksi)					
T7 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T8 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T9 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T10 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T11 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T12 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T13 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T14 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T15 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation *ft*	*Calc K Single Angles*	*Calc K Solid Rounds*	*K Factors[1]* *Legs*	*X Brace Diags* *X / Y*	*K Brace Diags* *X / Y*	*Single Diags* *X / Y*	*Girts* *X / Y*	*Horiz.* *X / Y*	*Sec. Horiz.* *X / Y*	*Inner Brace* *X / Y*
T1	Yes	Yes	1	1	1	1	1	1	1	1
280.00-270.00				1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1
270.00-250.00				1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1
250.00-230.00				1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1
230.00-220.00				1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1
220.00-200.00				1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1
200.00-180.00				1	1	1	1	1	1	1
T7	Yes	Yes	1	1	1	1	1	1	1	1
180.00-160.00				1	1	1	1	1	1	1
T8	Yes	Yes	1	1	1	1	1	1	1	1
160.00-140.00				1	1	1	1	1	1	1
T9	Yes	Yes	1	1	1	1	1	1	1	1
140.00-120.00				1	1	1	1	1	1	1
T10	Yes	Yes	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1
T11	Yes	Yes	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T12	Yes	Yes	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T13	Yes	Yes	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T14	Yes	Yes	1	1	1	1	1	1	1	1

			K Factors[1]							
Tower Elevation ft	*Calc K Single Angles*	*Calc K Solid Rounds*	*Legs*	*X Brace Diags X Y*	*K Brace Diags X Y*	*Single Diags X Y*	*Girts X Y*	*Horiz. X Y*	*Sec. Horiz. X Y*	*Inner Brace X Y*
T15 40.00-20.00 20.00-0.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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

Tower Section Geometry *(cont'd)*

	Truss-Leg K Factors					
	Truss-Legs Used As Leg Members			Truss-Legs Used As Inner Members		
Tower Elevation ft	*Leg Panels*	*X Brace Diagonals*	*Z Brace Diagonals*	*Leg Panels*	*X Brace Diagonals*	*Z Brace Diagonals*
T4 230.00-220.00	1	1	1	1	0.5	0.85
T5 220.00-200.00	1	1	1	1	0.5	0.85
T6 200.00-180.00	1	1	1	1	0.5	0.85
T7 180.00-160.00	1	1	1	1	0.5	0.85
T8 160.00-140.00	1	1	1	1	0.5	0.85
T9 140.00-120.00	1	1	1	1	0.5	0.85
T10 120.00-100.00	1	1	1	1	0.5	0.85
T11 100.00-80.00	1	1	1	1	0.5	0.85
T12 80.00-60.00	1	1	1	1	0.5	0.85
T13 60.00-40.00	1	1	1	1	0.5	0.85
T14 40.00-20.00	1	1	1	1	0.5	0.85
T15 20.00-0.00	1	1	1	1	0.5	0.85

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*Leg*		*Diagonal*		*Top Girt*		*Bottom Girt*		*Mid Girt*		*Long Horizontal*		*Short Horizontal*	
	Net Width Deduct in	*U*	*Net Width Deduct* in	*U*	*Net Width Deduct* in	*U*	*Net Width Deduct* in	*U*	*Net Width Deduct* in	*U*	*Net Width Deduct* in	*U*	*Net Width Deduct* in	*U*
T1 280.00-270.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75

Tower Elevation ft	*Leg*		*Diagonal*		*Top Girt*		*Bottom Girt*		*Mid Girt*		*Long Horizontal*		*Short Horizontal*	
	Net Width Deduct in	*U*	*Net Width Deduct* in	*U*	*Net Width Deduct* in	*U*	*Net Width Deduct* in	*U*	*Net Width Deduct* in	*U*	*Net Width Deduct* in	*U*	*Net Width Deduct* in	*U*
T2 270.00-250.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T3 250.00-230.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T4 230.00-220.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T5 220.00-200.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T6 200.00-180.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T7 180.00-160.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T8 160.00-140.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T9 140.00-120.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T10 120.00-100.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T11 100.00-80.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T12 80.00-60.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T13 60.00-40.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T14 40.00-20.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T15 20.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*Leg Connection Type*	*Leg*		*Diagonal*		*Top Girt*		*Bottom Girt*		*Mid Girt*		*Long Horizontal*		*Short Horizontal*	
		Bolt Size in	*No.*	*Bolt Size* in	*No.*	*Bolt Size* in	*No.*	*Bolt Size* in	*No.*	*Bolt Size* in	*No.*	*Bolt Size* in	*No.*	*Bolt Size* in	*No.*
T1 280.00-270.00	Sleeve DS	0.6250 A325N	5	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 270.00-250.00	Sleeve DS	0.7500 A325N	5	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 250.00-230.00	Flange	1.0000 A325N	6	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 230.00-220.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 220.00-200.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 200.00-180.00	Flange	1.0000 A325N	6	1.0000 A325N	1	1.0000 A325N	1	0.6250 A325N	0	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0
T7 180.00-160.00	Flange	1.2500 A325N	6	1.2500 A325N	1	1.2500 A325N	1	0.6250 A325N	0	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0
T8 160.00-140.00	Flange	1.2500 A325N	6	1.2500 A325N	1	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T9 140.00-120.00	Flange	1.2500 A325N	6	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T10 120.00-100.00	Flange	1.2500 A325N	12	1.0000 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T11 100.00-80.00	Flange	1.2500 A325N	12	1.0000 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T12 80.00-60.00	Flange	1.2500 A325N	12	1.0000 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T13 60.00-40.00	Flange	1.2500 A325N	12	1.0000 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T14 40.00-20.00	Flange	1.2500 A325N	12	1.0000 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T15 20.00-0.00	Flange	2.0000 A687	6	1.0000 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 (Verizon Existing)	B	No	Ar (Leg)	140.00 - 0.00	0.0000	0.075	12	6	1.9800	1.9800		1.04
1 5/8 (EMAC)	C	No	Ar (Leg)	280.00 - 0.00	0.0000	0.045	4	2	1.9800	1.9800		1.04
HYBRIFLEX 1-5/8" (Verizon Proposed)	B	No	Ar (Leg)	140.00 - 0.00	0.0000	0.12	1	1	1.9800	1.9800		1.90
1 5/8 (Reserved)	C	No	Ar (Leg)	180.00 - 0.00	0.0000	0.1	18	5	1.9800	1.9800		1.04
1 5/8 (Reserved)	C	No	Ar (Leg)	190.00 - 180.00	0.0000	0.1	9	5	1.9800	1.9800		1.04
1 5/8 (Reserved)	B	No	Ar (Leg)	200.00 - 0.00	0.0000	0.14	9	3	1.9800	1.9800		1.04
1 5/8 (T-Mobile/Sprint/AT&T Existing)	A	No	Ar (Leg)	160.00 - 0.00	0.0000	0.075	21	7	1.9800	1.9800		1.04
1 5/8 (T-Mobile/Sprint Existing)	A	No	Ar (Leg)	170.00 - 160.00	0.0000	0.1	15	8	1.9800	1.9800		1.04
1 5/8 (T-Mobile Existing)	A	No	Ar (Leg)	250.00 - 170.00	0.0000	0.12	12	8	1.9800	1.9800		1.04
1 5/8 (MetroPCS Reserved)	A	No	Ar (Leg)	150.00 - 0.00	0.0000	0.14	6	2	1.9800	1.9800		1.04
HYBRIFLEX 1-1/4" (Sprint Existing)	A	No	Ar (Leg)	170.00 - 0.00	0.0000	0.12	1	1	1.5400	1.5400		1.30
Fiber Trunk (AT&T	C	No	Ar (Leg)	160.00 - 0.00	0.0000	0.12	1	1	0.4000	0.4000		1.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Existing)												
DC Trunk (AT&T Existing)	C	No	Ar (Leg)	160.00 - 0.00	0.0000	0.12	2	2	0.4000	0.4000		0.11

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
T1	280.00-270.00	A	3.300	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	3.300	0.000	0.000	0.000	0.04
T2	270.00-250.00	A	6.600	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	6.600	0.000	0.000	0.000	0.08
T3	250.00-230.00	A	33.000	0.000	0.000	0.000	0.25
		B	26.400	0.000	0.000	0.000	0.00
		C	6.600	0.000	0.000	0.000	0.08
T4	230.00-220.00	A	16.500	0.000	0.000	0.000	0.12
		B	13.200	0.000	0.000	0.000	0.00
		C	3.300	0.000	0.000	0.000	0.04
T5	220.00-200.00	A	33.000	0.000	0.000	0.000	0.25
		B	26.400	0.000	0.000	0.000	0.00
		C	6.600	0.000	0.000	0.000	0.08
T6	200.00-180.00	A	41.250	0.000	0.000	0.000	0.25
		B	36.300	0.000	0.000	0.000	0.19
		C	24.750	0.000	0.000	0.000	0.18
T7	180.00-160.00	A	50.783	0.000	0.000	0.000	0.29
		B	37.583	0.000	0.000	0.000	0.19
		C	33.000	0.000	0.000	0.000	0.46
T8	160.00-140.00	A	54.067	0.000	0.000	0.000	0.53
		B	38.867	0.000	0.000	0.000	0.19
		C	35.000	0.000	0.000	0.000	0.48
T9	140.00-120.00	A	57.367	0.000	0.000	0.000	0.59
		B	65.267	0.000	0.000	0.000	0.47
		C	58.100	0.000	0.000	0.000	0.48
T10	120.00-100.00	A	57.367	0.000	0.000	0.000	0.59
		B	65.267	0.000	0.000	0.000	0.47
		C	58.100	0.000	0.000	0.000	0.48
T11	100.00-80.00	A	57.367	0.000	0.000	0.000	0.59
		B	65.267	0.000	0.000	0.000	0.47
		C	58.100	0.000	0.000	0.000	0.48
T12	80.00-60.00	A	57.367	0.000	0.000	0.000	0.59
		B	65.267	0.000	0.000	0.000	0.47
		C	58.100	0.000	0.000	0.000	0.48
T13	60.00-40.00	A	57.367	0.000	0.000	0.000	0.59
		B	65.267	0.000	0.000	0.000	0.47
		C	58.100	0.000	0.000	0.000	0.48
T14	40.00-20.00	A	57.367	0.000	0.000	0.000	0.59
		B	65.267	0.000	0.000	0.000	0.47
		C	58.100	0.000	0.000	0.000	0.48
T15	20.00-0.00	A	57.367	0.000	0.000	0.000	0.59
		B	65.267	0.000	0.000	0.000	0.47
		C	58.100	0.000	0.000	0.000	0.48

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
T1	280.00-270.00	A	0.500	4.967	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		4.967	0.000	0.000	0.000	0.10
T2	270.00-250.00	A	0.500	9.933	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		9.933	0.000	0.000	0.000	0.20
T3	250.00-230.00	A	0.500	49.667	0.000	0.000	0.000	0.61
		B		39.733	0.000	0.000	0.000	0.00
		C		9.933	0.000	0.000	0.000	0.20
T4	230.00-220.00	A	0.500	24.833	0.000	0.000	0.000	0.31
		B		19.867	0.000	0.000	0.000	0.00
		C		4.967	0.000	0.000	0.000	0.10
T5	220.00-200.00	A	0.500	49.667	0.000	0.000	0.000	0.61
		B		39.733	0.000	0.000	0.000	0.00
		C		9.933	0.000	0.000	0.000	0.20
T6	200.00-180.00	A	0.500	62.083	0.000	0.000	0.000	0.61
		B		54.633	0.000	0.000	0.000	0.46
		C		37.250	0.000	0.000	0.000	0.43
T7	180.00-160.00	A	0.500	76.617	0.000	0.000	0.000	0.72
		B		56.750	0.000	0.000	0.000	0.46
		C		49.667	0.000	0.000	0.000	1.12
T8	160.00-140.00	A	0.500	83.400	1.333	0.000	0.000	1.28
		B		58.867	0.000	0.000	0.000	0.46
		C		54.333	1.333	0.000	0.000	1.18
T9	140.00-120.00	A	0.500	88.367	1.333	0.000	0.000	1.43
		B		98.600	0.000	0.000	0.000	1.14
		C		89.100	1.333	0.000	0.000	1.18
T10	120.00-100.00	A	0.500	88.367	1.333	0.000	0.000	1.43
		B		98.600	0.000	0.000	0.000	1.14
		C		89.100	1.333	0.000	0.000	1.18
T11	100.00-80.00	A	0.500	88.367	1.333	0.000	0.000	1.43
		B		98.600	0.000	0.000	0.000	1.14
		C		89.100	1.333	0.000	0.000	1.18
T12	80.00-60.00	A	0.500	88.367	1.333	0.000	0.000	1.43
		B		98.600	0.000	0.000	0.000	1.14
		C		89.100	1.333	0.000	0.000	1.18
T13	60.00-40.00	A	0.500	88.367	1.333	0.000	0.000	1.43
		B		98.600	0.000	0.000	0.000	1.14
		C		89.100	1.333	0.000	0.000	1.18
T14	40.00-20.00	A	0.500	88.367	1.333	0.000	0.000	1.43
		B		98.600	0.000	0.000	0.000	1.14
		C		89.100	1.333	0.000	0.000	1.18
T15	20.00-0.00	A	0.500	88.367	1.333	0.000	0.000	1.43
		B		98.600	0.000	0.000	0.000	1.14
		C		89.100	1.333	0.000	0.000	1.18

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	280.00-270.00	-3.1462	1.8165	-2.6197	1.5125

Section	*Elevation* *ft*	*CPX* *in*	*CPZ* *in*	*CPX Ice* *in*	*CPZ Ice* *in*
T2	270.00-250.00	-3.1659	1.8278	-2.6997	1.5587
T3	250.00-230.00	-1.5517	-5.2613	-1.4662	-4.9715
T4	230.00-220.00	-1.2007	-4.0713	-1.1575	-3.9249
T5	220.00-200.00	-1.4063	-4.7683	-1.4111	-4.7847
T6	200.00-180.00	-1.3364	-2.8058	-1.3504	-2.8352
T7	180.00-160.00	-2.9750	-2.4834	-3.0266	-2.5556
T8	160.00-140.00	-3.7712	-3.2543	-3.8900	-3.2819
T9	140.00-120.00	1.6210	-0.8709	1.5338	-0.8810
T10	120.00-100.00	1.8025	-0.9684	1.7170	-0.9863
T11	100.00-80.00	2.0034	-1.0763	1.9098	-1.0970
T12	80.00-60.00	2.1687	-1.1651	2.0729	-1.1907
T13	60.00-40.00	2.3568	-1.2662	2.2550	-1.2953
T14	40.00-20.00	2.4973	-1.3417	2.3944	-1.3754
T15	20.00-0.00	2.6759	-1.4376	2.5683	-1.4753

Discrete Tower Loads

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft ft ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		C_AA_A *Front* *ft²*	C_AA_A *Side* *ft²*	*Weight* *K*
Flash Beacon Lighting (EMAC)	B	None		0.0000	280.00	No Ice 1/2" Ice	2.70 3.10	2.70 3.10	0.05 0.07
15' Lighting Rod (EMAC)	B	From Leg	0.00 0.00 6.00	0.0000	280.00	No Ice 1/2" Ice	4.50 6.03	4.50 6.03	0.05 0.08
DB420-A (EMAC)	B	From Centroid-Face	8.00 0.00 9.50	0.0000	280.00	No Ice 1/2" Ice	3.33 5.99	3.33 5.99	0.03 0.04
DB586-XC (EMAC)	A	From Centroid-Face	8.00 0.00 3.00	0.0000	280.00	No Ice 1/2" Ice	1.01 1.28	1.01 1.28	0.01 0.02
9 Arm Halo Mount (EMAC)	A	None		0.0000	280.00	No Ice 1/2" Ice	62.60 80.40	62.60 80.40	3.60 4.80
RR90-17-02DP (T-Mobile Existing)	A	From Leg	3.00 -5.00 0.00	0.0000	250.00	No Ice 1/2" Ice	4.36 4.77	1.97 2.31	0.02 0.04
LNX-6515DS (T-Mobile Existing)	A	From Leg	3.00 5.00 0.00	0.0000	250.00	No Ice 1/2" Ice	11.45 12.06	7.70 8.29	0.06 0.12
RR90-17-02DP (T-Mobile Existing)	B	From Leg	3.00 -5.00 0.00	0.0000	250.00	No Ice 1/2" Ice	4.36 4.77	1.97 2.31	0.02 0.04
LNX-6515DS (T-Mobile Existing)	B	From Leg	3.00 5.00 0.00	0.0000	250.00	No Ice 1/2" Ice	11.45 12.06	7.70 8.29	0.06 0.12
RR90-17-02DP (T-Mobile Existing)	C	From Leg	3.00 -5.00 0.00	0.0000	250.00	No Ice 1/2" Ice	4.36 4.77	1.97 2.31	0.02 0.04
LNX-6515DS (T-Mobile Existing)	C	From Leg	3.00 5.00 0.00	0.0000	250.00	No Ice 1/2" Ice	11.45 12.06	7.70 8.29	0.06 0.12
TMA 10"x8"x3"	A	From Leg	3.00	0.0000	250.00	No Ice	0.78	0.29	0.02

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* °	*Placement* *ft*		C_AA_A *Front* *ft²*	C_AA_A *Side* *ft²*	*Weight* *K*
(T-Mobile Existing)			0.00			1/2" Ice	0.90	0.38	0.02
			0.00						
TMA 10"x8"x3"	B	From Leg	3.00	0.0000	250.00	No Ice	0.78	0.29	0.02
(T-Mobile Existing)			0.00			1/2" Ice	0.90	0.38	0.02
			0.00						
TMA 10"x8"x3"	C	From Leg	3.00	0.0000	250.00	No Ice	0.78	0.29	0.02
(T-Mobile Existing)			0.00			1/2" Ice	0.90	0.38	0.02
			0.00						
Pirod 15' T-Frame Sector	A	From Leg	1.00	0.0000	250.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(T-Mobile Existing)			0.00						
Pirod 15' T-Frame Sector	B	From Leg	1.00	0.0000	250.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(T-Mobile Existing)			0.00						
Pirod 15' T-Frame Sector	C	From Leg	1.00	0.0000	250.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(T-Mobile Existing)			0.00						
DB420-A	B	From	8.00	0.0000	245.00	No Ice	3.33	3.33	0.03
(EMAC)		Centroid-Fa	0.00			1/2" Ice	5.99	5.99	0.04
		ce	9.00						
DB225-2-F	A	From	8.00	0.0000	235.00	No Ice	1.36	1.36	0.05
(EMAC)		Centroid-Fa	0.00			1/2" Ice	2.45	2.45	0.07
		ce	0.00						
9 Arm Halo Mount	A	None		0.0000	235.00	No Ice	62.60	62.60	3.60
(EMAC)						1/2" Ice	80.40	80.40	4.80
(3) DB980H120E-M	A	From Leg	3.00	0.0000	200.00	No Ice	3.75	2.17	0.01
(Future)			0.00			1/2" Ice	4.13	2.53	0.03
			0.00						
(3) DB980H120E-M	B	From Leg	3.00	0.0000	200.00	No Ice	3.75	2.17	0.01
(Future)			0.00			1/2" Ice	4.13	2.53	0.03
			0.00						
(3) DB980H120E-M	C	From Leg	3.00	0.0000	200.00	No Ice	3.75	2.17	0.01
(Future)			0.00			1/2" Ice	4.13	2.53	0.03
			0.00						
10-ft T-Frame	A	From Leg	1.00	0.0000	200.00	No Ice	13.60	13.60	0.38
(Future)			0.00			1/2" Ice	17.50	17.50	0.53
			0.00						
10-ft T-Frame	B	From Leg	1.00	0.0000	200.00	No Ice	13.60	13.60	0.38
(Future)			0.00			1/2" Ice	17.50	17.50	0.53
			0.00						
10-ft T-Frame	C	From Leg	1.00	0.0000	200.00	No Ice	13.60	13.60	0.38
(Future)			0.00			1/2" Ice	17.50	17.50	0.53
			0.00						
(3) DB980H120E-M	A	From Leg	3.00	0.0000	190.00	No Ice	3.75	2.17	0.01
(Future)			0.00			1/2" Ice	4.13	2.53	0.03
			0.00						
(3) DB980H120E-M	B	From Leg	3.00	0.0000	190.00	No Ice	3.75	2.17	0.01
(Future)			0.00			1/2" Ice	4.13	2.53	0.03
			0.00						
(3) DB980H120E-M	C	From Leg	3.00	0.0000	190.00	No Ice	3.75	2.17	0.01
(Future)			0.00			1/2" Ice	4.13	2.53	0.03
			0.00						
10-ft T-Frame	A	From Leg	1.00	0.0000	190.00	No Ice	13.60	13.60	0.38
(Future)			0.00			1/2" Ice	17.50	17.50	0.53
			0.00						
10-ft T-Frame	B	From Leg	1.00	0.0000	190.00	No Ice	13.60	13.60	0.38
(Future)			0.00			1/2" Ice	17.50	17.50	0.53

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert*	*Azimuth Adjustment*	*Placement*		*C_AA_A Front*	*C_AA_A Side*	*Weight*
			ft *ft* *ft*	*°*	*ft*		*ft²*	*ft²*	*K*
			0.00						
10-ft T-Frame (Future)	C	From Leg	1.00 0.00 0.00	0.0000	190.00	No Ice 1/2" Ice	13.60 17.50	13.60 17.50	0.38 0.53
(3) DB980H120E-M (Future)	A	From Leg	3.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	3.75 4.13	2.17 2.53	0.01 0.03
(3) DB980H120E-M (Future)	B	From Leg	3.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	3.75 4.13	2.17 2.53	0.01 0.03
(3) DB980H120E-M (Future)	C	From Leg	3.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	3.75 4.13	2.17 2.53	0.01 0.03
10-ft T-Frame (Future)	A	From Leg	1.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	13.60 17.50	13.60 17.50	0.38 0.53
10-ft T-Frame (Future)	B	From Leg	1.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	13.60 17.50	13.60 17.50	0.38 0.53
10-ft T-Frame (Future)	C	From Leg	1.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	13.60 17.50	13.60 17.50	0.38 0.53
APXVSPP18-C-A20 (Sprint Existing)	A	From Leg	3.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	8.26 8.81	5.28 5.74	0.06 0.11
APXVTM14 (Sprint Existing)	A	From Leg	3.00 -5.00 0.00	0.0000	170.00	No Ice 1/2" Ice	6.90 7.35	3.61 3.97	0.06 0.10
APXVSPP18-C-A20 (Sprint Existing)	B	From Leg	3.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	8.26 8.81	5.28 5.74	0.06 0.11
APXVTM14 (Sprint Existing)	B	From Leg	3.00 -5.00 0.00	0.0000	170.00	No Ice 1/2" Ice	6.90 7.35	3.61 3.97	0.06 0.10
APXVSPP18-C-A20 (Sprint Existing)	C	From Leg	3.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	8.26 8.81	5.28 5.74	0.06 0.11
APXVTM14 (Sprint Existing)	C	From Leg	3.00 -5.00 0.00	0.0000	170.00	No Ice 1/2" Ice	6.90 7.35	3.61 3.97	0.06 0.10
FD-RRH 2x50 800 (Sprint Existing)	A	From Leg	0.50 2.00 2.00	0.0000	170.00	No Ice 1/2" Ice	2.40 2.61	2.25 2.46	0.06 0.09
FD-RRH 2x50 800 (Sprint Existing)	B	From Leg	0.50 2.00 2.00	0.0000	170.00	No Ice 1/2" Ice	2.40 2.61	2.25 2.46	0.06 0.09
FD-RRH 2x50 800 (Sprint Existing)	C	From Leg	0.50 2.00 2.00	0.0000	170.00	No Ice 1/2" Ice	2.40 2.61	2.25 2.46	0.06 0.09
FD-RRH 4x40 1900 (Sprint Existing)	A	From Leg	0.50 2.00 0.00	0.0000	170.00	No Ice 1/2" Ice	2.61 2.84	2.71 2.95	0.06 0.08
FD-RRH 4x40 1900 (Sprint Existing)	B	From Leg	0.50 2.00 0.00	0.0000	170.00	No Ice 1/2" Ice	2.61 2.84	2.71 2.95	0.06 0.08
FD-RRH 4x40 1900 (Sprint Existing)	C	From Leg	0.50 2.00	0.0000	170.00	No Ice 1/2" Ice	2.61 2.84	2.71 2.95	0.06 0.08

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft ft ft*	*Azimuth Adjustment* °	*Placement* *ft*		*C_AA_A Front* *ft^2*	*C_AA_A Side* *ft^2*	*Weight* *K*
			0.00						
TD-RRH8x20-25 (Sprint Existing)	A	From Leg	3.00 -5.00 0.00	0.0000	170.00	No Ice 1/2" Ice	4.72 5.01	1.70 1.92	0.07 0.10
TD-RRH8x20-25 (Sprint Existing)	B	From Leg	3.00 -5.00 0.00	0.0000	170.00	No Ice 1/2" Ice	4.72 5.01	1.70 1.92	0.07 0.10
TD-RRH8x20-25 (Sprint Existing)	C	From Leg	3.00 -5.00 0.00	0.0000	170.00	No Ice 1/2" Ice	4.72 5.01	1.70 1.92	0.07 0.10
Pirod 15' T-Frame Sector Mount (1) (Sprint Existing)	A	From Leg	1.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	15.00 20.60	15.00 20.60	0.50 0.65
Pirod 15' T-Frame Sector Mount (1) (Sprint Existing)	B	From Leg	1.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	15.00 20.60	15.00 20.60	0.50 0.65
Pirod 15' T-Frame Sector Mount (1) (Sprint Existing)	C	From Leg	1.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	15.00 20.60	15.00 20.60	0.50 0.65
7770.00 (AT&T Existing)	A	From Leg	3.00 -5.00 0.00	0.0000	160.00	No Ice 1/2" Ice	5.88 6.31	2.93 3.27	0.04 0.07
AM-X-CD-16-65-00T-RET(7 2") (AT&T Existing)	A	From Leg	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	8.26 8.81	4.64 5.09	0.05 0.10
7770.00 (AT&T Reserved)	A	From Leg	3.00 5.00 0.00	0.0000	160.00	No Ice 1/2" Ice	5.88 6.31	2.93 3.27	0.04 0.07
(4) LPG21401 TMA (AT&T Existing)	A	From Leg	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	0.95 1.09	0.37 0.48	0.02 0.02
(2) 7020 Dual Band RET (AT&T Existing)	A	From Leg	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	0.40 0.49	0.20 0.27	0.00 0.01
7770.00 (AT&T Existing)	B	From Leg	3.00 -5.00 0.00	0.0000	160.00	No Ice 1/2" Ice	5.88 6.31	2.93 3.27	0.04 0.07
AM-X-CD-16-65-00T-RET(7 2") (AT&T Existing)	B	From Leg	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	8.26 8.81	4.64 5.09	0.05 0.10
7770.00 (AT&T Reserved)	B	From Leg	3.00 5.00 0.00	0.0000	160.00	No Ice 1/2" Ice	5.88 6.31	2.93 3.27	0.04 0.07
(4) LPG21401 TMA (AT&T Existing)	B	From Leg	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	0.95 1.09	0.37 0.48	0.02 0.02
(2) 7020 Dual Band RET (AT&T Existing)	B	From Leg	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	0.40 0.49	0.20 0.27	0.00 0.01
7770.00 (AT&T Existing)	C	From Leg	3.00 -5.00 0.00	0.0000	160.00	No Ice 1/2" Ice	5.88 6.31	2.93 3.27	0.04 0.07
AM-X-CD-16-65-00T-RET(7 2") (AT&T Existing)	C	From Leg	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	8.26 8.81	4.64 5.09	0.05 0.10
7770.00 (AT&T Reserved)	C	From Leg	3.00 5.00	0.0000	160.00	No Ice 1/2" Ice	5.88 6.31	2.93 3.27	0.04 0.07

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* °	*Placement* *ft*		*C_AA_A Front* *ft²*	*C_AA_A Side* *ft²*	*Weight* *K*
			0.00						
(4) LPG21401 TMA (AT&T Existing)	C	From Leg	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	0.95 1.09	0.37 0.48	0.02 0.02
(2) 7020 Dual Band RET (AT&T Existing)	C	From Leg	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	0.40 0.49	0.20 0.27	0.00 0.01
(2) RRUS-11 (AT&T Existing)	A	From Leg	2.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	2.99 3.23	1.25 1.41	0.05 0.07
(2) RRUS-11 (AT&T Existing)	B	From Leg	2.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	2.99 3.23	1.25 1.41	0.05 0.07
(2) RRUS-11 (AT&T Existing)	C	From Leg	2.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	2.99 3.23	1.25 1.41	0.05 0.07
DC6-48-60-18-8F Surge Arrestor (AT&T Existing)	A	From Leg	2.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	2.23 2.45	2.23 2.45	0.02 0.04
Pirod 15' T-Frame Sector Mount (1) (AT&T Existing)	A	From Leg	1.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	15.00 20.60	15.00 20.60	0.50 0.65
Pirod 15' T-Frame Sector Mount (1) (AT&T Existing)	B	From Leg	1.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	15.00 20.60	15.00 20.60	0.50 0.65
Pirod 15' T-Frame Sector Mount (1) (AT&T Existing)	C	From Leg	1.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	15.00 20.60	15.00 20.60	0.50 0.65
APXV18-206517S (MetroPCS Reserved)	A	From Leg	0.50 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	5.17 5.62	3.04 3.47	0.03 0.05
APXV18-206517S (MetroPCS Reserved)	B	From Leg	0.50 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	5.17 5.62	3.04 3.47	0.03 0.05
APXV18-206517S (MetroPCS Reserved)	C	From Leg	0.50 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	5.17 5.62	3.04 3.47	0.03 0.05
LNX-6514DS-VTM (Verizon Proposed)	A	From Leg	3.00 -6.00 0.00	0.0000	140.00	No Ice 1/2" Ice	8.41 8.96	5.41 5.86	0.04 0.09
HBXX-6517DS (Verizon Proposed)	A	From Leg	3.00 -4.00 0.00	0.0000	140.00	No Ice 1/2" Ice	8.74 9.31	5.24 5.71	0.05 0.10
LNX-6514DS-VTM (Verizon Existing)	A	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	8.41 8.96	5.41 5.86	0.04 0.09
HBXX-6517DS (Verizon Proposed)	A	From Leg	3.00 4.00 0.00	0.0000	140.00	No Ice 1/2" Ice	8.74 9.31	5.24 5.71	0.05 0.10
LNX-6514DS-VTM (Verizon Proposed)	B	From Leg	3.00 -6.00 0.00	0.0000	140.00	No Ice 1/2" Ice	8.41 8.96	5.41 5.86	0.04 0.09
HBXX-6517DS (Verizon Proposed)	B	From Leg	3.00 -4.00 0.00	0.0000	140.00	No Ice 1/2" Ice	8.74 9.31	5.24 5.71	0.05 0.10
LNX-6514DS-VTM (Verizon Existing)	B	From Leg	3.00 0.00	0.0000	140.00	No Ice 1/2" Ice	8.41 8.96	5.41 5.86	0.04 0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
HBXX-6517DS (Verizon Proposed)	B	From Leg	3.00 4.00 0.00	0.0000	140.00	No Ice 1/2" Ice	8.74 9.31	5.24 5.71	0.05 0.10
LNX-6514DS-VTM (Verizon Proposed)	C	From Leg	3.00 -6.00 0.00	0.0000	140.00	No Ice 1/2" Ice	8.41 8.96	5.41 5.86	0.04 0.09
HBXX-6517DS (Verizon Proposed)	C	From Leg	3.00 -4.00 0.00	0.0000	140.00	No Ice 1/2" Ice	8.74 9.31	5.24 5.71	0.05 0.10
LNX-6514DS-VTM (Verizon Existing)	C	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	8.41 8.96	5.41 5.86	0.04 0.09
HBXX-6517DS (Verizon Proposed)	C	From Leg	3.00 4.00 0.00	0.0000	140.00	No Ice 1/2" Ice	8.74 9.31	5.24 5.71	0.05 0.10
(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	A	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	0.37 0.45	0.08 0.14	0.00 0.01
(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	B	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	0.37 0.45	0.08 0.14	0.00 0.01
(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	C	From Leg	3.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	0.37 0.45	0.08 0.14	0.00 0.01
RRH2x60-AWS (Verizon Proposed)	A	From Leg	3.00 -4.00 0.00	0.0000	140.00	No Ice 1/2" Ice	3.78 4.09	2.07 2.35	0.06 0.08
RRH2x60-AWS (Verizon Proposed)	B	From Leg	3.00 -4.00 0.00	0.0000	140.00	No Ice 1/2" Ice	3.78 4.09	2.07 2.35	0.06 0.08
RRH2x60-AWS (Verizon Proposed)	C	From Leg	3.00 -4.00 0.00	0.0000	140.00	No Ice 1/2" Ice	3.78 4.09	2.07 2.35	0.06 0.08
RRH2x60-PCS (Verizon Proposed)	A	From Leg	3.00 4.00 0.00	0.0000	140.00	No Ice 1/2" Ice	2.51 2.73	1.55 1.74	0.06 0.07
RRH2x60-PCS (Verizon Proposed)	B	From Leg	3.00 4.00 0.00	0.0000	140.00	No Ice 1/2" Ice	2.51 2.73	1.55 1.74	0.06 0.07
RRH2x60-PCS (Verizon Proposed)	C	From Leg	3.00 4.00 0.00	0.0000	140.00	No Ice 1/2" Ice	2.51 2.73	1.55 1.74	0.06 0.07
DB-T1-6Z-8AB-0Z (Verizon Proposed)	A	From Leg	1.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	5.60 5.92	2.33 2.56	0.04 0.08
Pirod 12' T-Frame Sector Mount (1) (Verizon Existing)	A	From Leg	1.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	13.60 18.40	13.60 18.40	0.47 0.60
Pirod 12' T-Frame Sector Mount (1) (Verizon Existing)	B	From Leg	1.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	13.60 18.40	13.60 18.40	0.47 0.60
Pirod 12' T-Frame Sector Mount (1) (Verizon Existing)	C	From Leg	1.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	13.60 18.40	13.60 18.40	0.47 0.60

Truss-Leg Properties

Section Designation	Area in²	Area Ice in²	Self Weight K	Ice Weight K	Equiv. Diameter in	Equiv. Diameter Ice in	Leg Area in²
Pirod 105245	1090.3344	1814.3549	0.64	0.22	7.5718	12.5997	5.3014
Pirod 105218	2425.3141	3778.2146	0.69	0.45	8.4212	13.1188	7.2158
Pirod 105218	2425.3141	3778.2146	0.69	0.45	8.4212	13.1188	7.2158
Pirod 105219	2597.9095	4038.9458	1.03	0.48	9.0205	14.0241	9.4248
Pirod 105220	2735.0688	4240.4956	1.20	0.50	9.4968	14.7239	11.9282
Pirod 105220	2735.0688	4240.4956	1.20	0.50	9.4968	14.7239	11.9282
Pirod 112743	3389.3479	5023.2440	1.68	0.67	11.7686	17.4418	14.7262
Pirod 112743	3389.3479	5023.2440	1.68	0.67	11.7686	17.4418	14.7262
Pirod 112744	3520.4700	5193.9136	1.88	0.69	12.2239	18.0344	17.8187
Pirod 112744	3520.4700	5193.9136	1.88	0.69	12.2239	18.0344	17.8187
Pirod 112745	3701.5410	5446.9486	2.15	0.71	12.8526	18.9130	21.2058
Pirod 112740	3701.5410	5446.9486	2.15	0.71	12.8526	18.9130	21.2058

Tower Pressures - No Ice

$G_H = 1.092$

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
T1 280.00-270.00	275.00	1.833	34	51.458	A	0.000	10.535	2.917	27.68	0.000	0.000
					B	0.000	7.235		40.31	0.000	0.000
					C	0.000	11.243		25.94	0.000	0.000
T2 270.00-250.00	260.00	1.804	33	103.333	A	0.000	20.718	6.667	32.18	0.000	0.000
					B	0.000	14.118		47.22	0.000	0.000
					C	0.000	22.832		29.20	0.000	0.000
T3 250.00-230.00	240.00	1.763	33	104.167	A	0.000	49.405	8.333	16.87	0.000	0.000
					B	0.000	42.805		19.47	0.000	0.000
					C	0.000	25.450		32.74	0.000	0.000
T4 230.00-220.00	225.00	1.731	32	66.264	A	4.235	29.141	12.641	37.87	0.000	0.000
					B	4.235	25.841		42.03	0.000	0.000
					C	4.235	15.941		62.65	0.000	0.000
T5 220.00-200.00	210.00	1.697	31	162.945	A	10.467	61.118	28.118	39.28	0.000	0.000
					B	10.467	54.518		43.27	0.000	0.000
					C	10.467	34.718		62.23	0.000	0.000
T6 200.00-180.00	190.00	1.649	30	202.945	A	15.714	69.368	28.118	33.05	0.000	0.000
					B	15.714	64.418		35.09	0.000	0.000
					C	15.714	52.868		41.00	0.000	0.000
T7 180.00-160.00	170.00	1.597	30	243.362	A	19.853	80.902	30.118	29.89	0.000	0.000
					B	19.853	67.702		34.40	0.000	0.000
					C	19.853	63.118		36.30	0.000	0.000
T8 160.00-140.00	150.00	1.541	29	283.780	A	20.877	85.775	31.709	29.73	0.000	0.000
					B	20.877	70.575		34.67	0.000	0.000
					C	20.877	66.709		36.20	0.000	0.000
T9 140.00-120.00	130.00	1.48	27	323.780	A	19.635	89.075	31.709	29.17	0.000	0.000
					B	19.635	96.975		27.19	0.000	0.000
					C	19.635	89.809		28.97	0.000	0.000
T10	110.00	1.411	26	374.209	A	14.190	96.661	39.294	35.45	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
120.00-100.00					B	14.190	104.561		33.09	0.000	0.000
					C	14.190	97.394		35.21	0.000	0.000
T11 100.00-80.00	90.00	1.332	25	414.209	A	14.825	96.661	39.294	35.25	0.000	0.000
					B	14.825	104.561		32.91	0.000	0.000
					C	14.825	97.394		35.02	0.000	0.000
T12 80.00-60.00	70.00	1.24	23	454.627	A	15.712	98.181	40.814	35.84	0.000	0.000
					B	15.712	106.081		33.51	0.000	0.000
					C	15.712	98.914		35.61	0.000	0.000
T13 60.00-40.00	50.00	1.126	21	494.627	A	16.624	98.181	40.814	35.55	0.000	0.000
					B	16.624	106.081		33.26	0.000	0.000
					C	16.624	98.914		35.33	0.000	0.000
T14 40.00-20.00	30.00	1	18	535.044	A	17.558	100.280	42.913	36.42	0.000	0.000
					B	17.558	108.180		34.13	0.000	0.000
					C	17.558	101.013		36.19	0.000	0.000
T15 20.00-0.00	10.00	1	18	575.044	A	18.514	100.280	42.913	36.12	0.000	0.000
					B	18.514	108.180		33.87	0.000	0.000
					C	18.514	101.013		35.90	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.092$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1 280.00-270.00	275.00	1.833	25	0.5000	52.292	A	0.000	18.631	4.583	24.60	0.000	0.000
						B	0.000	13.664		33.54	0.000	0.000
						C	0.000	20.148		22.75	0.000	0.000
T2 270.00-250.00	260.00	1.804	25	0.5000	105.000	A	0.000	35.727	10.000	27.99	0.000	0.000
						B	0.000	25.794		38.77	0.000	0.000
						C	0.000	40.258		24.84	0.000	0.000
T3 250.00-230.00	240.00	1.763	24	0.5000	105.833	A	0.000	77.276	11.667	15.10	0.000	0.000
						B	0.000	67.343		17.32	0.000	0.000
						C	0.000	42.784		27.27	0.000	0.000
T4 230.00-220.00	225.00	1.731	24	0.5000	67.098	A	4.235	47.562	21.034	40.61	0.000	0.000
						B	4.235	42.595		44.92	0.000	0.000
						C	4.235	27.695		65.88	0.000	0.000
T5 220.00-200.00	210.00	1.697	24	0.5000	164.614	A	10.467	96.958	43.802	40.77	0.000	0.000
						B	10.467	87.025		44.93	0.000	0.000
						C	10.467	57.225		64.71	0.000	0.000
T6 200.00-180.00	190.00	1.649	23	0.5000	204.614	A	15.714	111.124	43.802	34.53	0.000	0.000
						B	15.714	103.674		36.69	0.000	0.000
						C	15.714	86.290		42.94	0.000	0.000
T7 180.00-160.00	170.00	1.597	22	0.5000	245.031	A	19.853	129.532	46.825	31.35	0.000	0.000
						B	19.853	109.665		36.15	0.000	0.000
						C	19.853	102.582		38.24	0.000	0.000
T8 160.00-140.00	150.00	1.541	21	0.5000	285.448	A	22.210	138.526	49.162	30.59	0.000	0.000
						B	20.877	113.993		36.45	0.000	0.000
						C	22.210	109.460		37.34	0.000	0.000
T9 140.00-120.00	130.00	1.48	21	0.5000	325.448	A	20.968	143.138	49.162	29.96	0.000	0.000
						B	19.635	153.371		28.42	0.000	0.000
						C	20.968	143.871		29.82	0.000	0.000
T10 120.00-100.00	110.00	1.411	20	0.5000	375.878	A	15.523	150.657	58.236	35.04	0.000	0.000
						B	14.190	160.891		33.26	0.000	0.000
						C	15.523	151.391		34.89	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T11 100.00-80.00	90.00	1.332	18	0.5000	415.878	A	16.159	150.839	58.236	34.87	0.000	0.000
						B	14.825	161.072		33.11	0.000	0.000
						C	16.159	151.572		34.72	0.000	0.000
T12 80.00-60.00	70.00	1.24	17	0.5000	456.295	A	17.045	153.071	60.215	35.40	0.000	0.000
						B	15.712	163.304		33.64	0.000	0.000
						C	17.045	153.804		35.24	0.000	0.000
T13 60.00-40.00	50.00	1.126	16	0.5000	496.295	A	17.957	153.331	60.215	35.15	0.000	0.000
						B	16.624	163.564		33.42	0.000	0.000
						C	17.957	154.064		35.00	0.000	0.000
T14 40.00-20.00	30.00	1	14	0.5000	536.712	A	18.892	156.532	63.148	36.00	0.000	0.000
						B	17.558	166.765		34.26	0.000	0.000
						C	18.892	157.265		35.85	0.000	0.000
T15 20.00-0.00	10.00	1	14	0.5000	576.712	A	19.848	156.805	63.148	35.75	0.000	0.000
						B	18.514	167.038		34.03	0.000	0.000
						C	19.848	157.538		35.60	0.000	0.000

Tower Pressure - Service

$G_H = 1.092$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1 280.00-270.00	275.00	1.833	12	51.458	A	0.000	10.535	2.917	27.68	0.000	0.000
					B	0.000	7.235		40.31	0.000	0.000
					C	0.000	11.243		25.94	0.000	0.000
T2 270.00-250.00	260.00	1.804	12	103.333	A	0.000	20.718	6.667	32.18	0.000	0.000
					B	0.000	14.118		47.22	0.000	0.000
					C	0.000	22.832		29.20	0.000	0.000
T3 250.00-230.00	240.00	1.763	11	104.167	A	0.000	49.405	8.333	16.87	0.000	0.000
					B	0.000	42.805		19.47	0.000	0.000
					C	0.000	25.450		32.74	0.000	0.000
T4 230.00-220.00	225.00	1.731	11	66.264	A	4.235	29.141	12.641	37.87	0.000	0.000
					B	4.235	25.841		42.03	0.000	0.000
					C	4.235	15.941		62.65	0.000	0.000
T5 220.00-200.00	210.00	1.697	11	162.945	A	10.467	61.118	28.118	39.28	0.000	0.000
					B	10.467	54.518		43.27	0.000	0.000
					C	10.467	34.718		62.23	0.000	0.000
T6 200.00-180.00	190.00	1.649	11	202.945	A	15.714	69.368	28.118	33.05	0.000	0.000
					B	15.714	64.418		35.09	0.000	0.000
					C	15.714	52.868		41.00	0.000	0.000
T7 180.00-160.00	170.00	1.597	10	243.362	A	19.853	80.902	30.118	29.89	0.000	0.000
					B	19.853	67.702		34.40	0.000	0.000
					C	19.853	63.118		36.30	0.000	0.000
T8 160.00-140.00	150.00	1.541	10	283.780	A	20.877	85.775	31.709	29.73	0.000	0.000
					B	20.877	70.575		34.67	0.000	0.000
					C	20.877	66.709		36.20	0.000	0.000
T9 140.00-120.00	130.00	1.48	9	323.780	A	19.635	89.075	31.709	29.17	0.000	0.000
					B	19.635	96.975		27.19	0.000	0.000
					C	19.635	89.809		28.97	0.000	0.000
T10 120.00-100.00	110.00	1.411	9	374.209	A	14.190	96.661	39.294	35.45	0.000	0.000
					B	14.190	104.561		33.09	0.000	0.000
					C	14.190	97.394		35.21	0.000	0.000
T11	90.00	1.332	9	414.209	A	14.825	96.661	39.294	35.25	0.000	0.000

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
100.00-80.00					B	14.825	104.561		32.91	0.000	0.000
					C	14.825	97.394		35.02	0.000	0.000
T12 80.00-60.00	70.00	1.24	8	454.627	A	15.712	98.181	40.814	35.84	0.000	0.000
					B	15.712	106.081		33.51	0.000	0.000
					C	15.712	98.914		35.61	0.000	0.000
T13 60.00-40.00	50.00	1.126	7	494.627	A	16.624	98.181	40.814	35.55	0.000	0.000
					B	16.624	106.081		33.26	0.000	0.000
					C	16.624	98.914		35.33	0.000	0.000
T14 40.00-20.00	30.00	1	6	535.044	A	17.558	100.280	42.913	36.42	0.000	0.000
					B	17.558	108.180		34.13	0.000	0.000
					C	17.558	101.013		36.19	0.000	0.000
T15 20.00-0.00	10.00	1	6	575.044	A	18.514	100.280	42.913	36.12	0.000	0.000
					B	18.514	108.180		33.87	0.000	0.000
					C	18.514	101.013		35.90	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 280.00-270.00	0.04	0.66	A	0.205	2.58	0.591	1	1	6.230	0.63	62.72	C
			B	0.141	2.806	0.58	1	1	4.197			
			C	0.218	2.535	0.594	1	1	6.682			
T2 270.00-250.00	0.08	1.37	A	0.2	2.594	0.591	1	1	12.234	1.25	62.53	C
			B	0.137	2.821	0.58	1	1	8.181			
			C	0.221	2.527	0.595	1	1	13.583			
T3 250.00-230.00	0.33	1.91	A	0.474	1.936	0.685	1	1	33.828	2.33	116.58	A
			B	0.411	2.043	0.656	1	1	28.085			
			C	0.244	2.455	0.6	1	1	15.282			
T4 230.00-220.00	0.17	1.18	A	0.504	1.895	0.699	1	1	24.615	1.63	163.08	A
			B	0.454	1.967	0.675	1	1	21.679			
			C	0.304	2.284	0.617	1	1	14.075			
T5 220.00-200.00	0.33	2.61	A	0.439	1.991	0.668	1	1	51.320	3.50	175.13	A
			B	0.399	2.066	0.651	1	1	45.964			
			C	0.277	2.358	0.609	1	1	31.618			
T6 200.00-180.00	0.61	2.85	A	0.419	2.027	0.66	1	1	61.472	4.15	207.53	A
			B	0.395	2.074	0.65	1	1	57.554			
			C	0.338	2.2	0.628	1	1	48.928			
T7 180.00-160.00	0.94	4.60	A	0.414	2.037	0.657	1	1	73.039	4.80	240.02	A
			B	0.36	2.149	0.636	1	1	62.912			
			C	0.341	2.193	0.629	1	1	59.572			
T8 160.00-140.00	1.19	5.27	A	0.376	2.114	0.642	1	1	75.947	5.00	249.90	A
			B	0.322	2.238	0.623	1	1	64.842			
			C	0.309	2.273	0.619	1	1	62.141			
T9 140.00-120.00	1.54	5.15	A	0.336	2.205	0.627	1	1	75.529	5.22	261.06	B
			B	0.36	2.148	0.636	1	1	81.326			
			C	0.338	2.2	0.628	1	1	76.059			
T10 120.00-100.00	1.54	7.28	A	0.296	2.306	0.615	1	1	73.612	5.08	253.84	B
			B	0.317	2.251	0.621	1	1	79.160			
			C	0.298	2.301	0.615	1	1	74.121			
T11 100.00-80.00	1.54	7.40	A	0.269	2.381	0.607	1	1	73.493	4.94	246.92	B
			B	0.288	2.328	0.612	1	1	78.855			
			C	0.271	2.376	0.607	1	1	73.986			
T12 80.00-60.00	1.54	8.13	A	0.251	2.436	0.602	1	1	74.817	4.78	239.05	B
			B	0.268	2.385	0.607	1	1	80.061			
			C	0.252	2.431	0.602	1	1	75.300			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T13 60.00-40.00	1.54	8.26	A	0.232	2.492	0.597	1	1	75.284	4.47	223.45	B
			B	0.248	2.443	0.601	1	1	80.419			
			C	0.234	2.488	0.598	1	1	75.757			
T14 40.00-20.00	1.54	9.20	A	0.22	2.53	0.595	1	1	77.199	4.13	206.32	B
			B	0.235	2.483	0.598	1	1	82.268			
			C	0.222	2.525	0.595	1	1	77.666			
T15 20.00-0.00	1.54	9.34	A	0.207	2.574	0.592	1	1	77.857	4.23	211.67	B
			B	0.22	2.53	0.595	1	1	82.855			
			C	0.208	2.57	0.592	1	1	78.318			
Sum Weight:	14.51	75.22						OTM	6919.97 kip-ft	56.14		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 280.00-270.00	0.04	0.66	A	0.205	2.58	0.591	0.825	1	6.230	0.63	62.72	C
			B	0.141	2.806	0.58	0.825	1	4.197			
			C	0.218	2.535	0.594	0.825	1	6.682			
T2 270.00-250.00	0.08	1.37	A	0.2	2.594	0.591	0.825	1	12.234	1.25	62.53	C
			B	0.137	2.821	0.58	0.825	1	8.181			
			C	0.221	2.527	0.595	0.825	1	13.583			
T3 250.00-230.00	0.33	1.91	A	0.474	1.936	0.685	0.825	1	33.828	2.33	116.58	A
			B	0.411	2.043	0.656	0.825	1	28.085			
			C	0.244	2.455	0.6	0.825	1	15.282			
T4 230.00-220.00	0.17	1.18	A	0.504	1.895	0.699	0.825	1	23.874	1.58	158.17	A
			B	0.454	1.967	0.675	0.825	1	20.938			
			C	0.304	2.284	0.617	0.825	1	13.334			
T5 220.00-200.00	0.33	2.61	A	0.439	1.991	0.668	0.825	1	49.488	3.38	168.88	A
			B	0.399	2.066	0.651	0.825	1	44.133			
			C	0.277	2.358	0.609	0.825	1	29.786			
T6 200.00-180.00	0.61	2.85	A	0.419	2.027	0.66	0.825	1	58.722	3.96	198.24	A
			B	0.395	2.074	0.65	0.825	1	54.804			
			C	0.338	2.2	0.628	0.825	1	46.178			
T7 180.00-160.00	0.94	4.60	A	0.414	2.037	0.657	0.825	1	69.565	4.57	228.60	A
			B	0.36	2.149	0.636	0.825	1	59.438			
			C	0.341	2.193	0.629	0.825	1	56.098			
T8 160.00-140.00	1.19	5.27	A	0.376	2.114	0.642	0.825	1	72.294	4.76	237.88	A
			B	0.322	2.238	0.623	0.825	1	61.189			
			C	0.309	2.273	0.619	0.825	1	58.488			
T9 140.00-120.00	1.54	5.15	A	0.336	2.205	0.627	0.825	1	72.093	5.00	250.03	B
			B	0.36	2.148	0.636	0.825	1	77.890			
			C	0.338	2.2	0.628	0.825	1	72.623			
T10 120.00-100.00	1.54	7.28	A	0.296	2.306	0.615	0.825	1	71.129	4.92	245.87	B
			B	0.317	2.251	0.621	0.825	1	76.676			
			C	0.298	2.301	0.615	0.825	1	71.638			
T11 100.00-80.00	1.54	7.40	A	0.269	2.381	0.607	0.825	1	70.899	4.78	238.80	B
			B	0.288	2.328	0.612	0.825	1	76.260			
			C	0.271	2.376	0.607	0.825	1	71.391			
T12 80.00-60.00	1.54	8.13	A	0.251	2.436	0.602	0.825	1	72.068	4.62	230.84	B
			B	0.268	2.385	0.607	0.825	1	77.311			
			C	0.252	2.431	0.602	0.825	1	72.550			
T13 60.00-40.00	1.54	8.26	A	0.232	2.492	0.597	0.825	1	72.375	4.31	215.37	B
			B	0.248	2.443	0.601	0.825	1	77.510			

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Section Elevation *ft*	*Add Weight* *K*	*Self Weight* *K*	*Face*	*e*	C_F	R_R	D_F	D_R	A_E ft^2	*F* *K*	*w* *plf*	*Ctrl. Face*
			C	0.234	2.488	0.598	0.825	1	72.848			
T14 40.00-20.00	1.54	9.20	A	0.22	2.53	0.595	0.825	1	74.126	3.97	198.62	B
			B	0.235	2.483	0.598	0.825	1	79.195			
			C	0.222	2.525	0.595	0.825	1	74.593			
T15 20.00-0.00	1.54	9.34	A	0.207	2.574	0.592	0.825	1	74.617	4.07	203.39	B
			B	0.22	2.53	0.595	0.825	1	79.615			
			C	0.208	2.57	0.592	0.825	1	75.078			
Sum Weight:	14.51	75.22						OTM	6685.84 kip-ft	54.12		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation *ft*	*Add Weight* *K*	*Self Weight* *K*	*Face*	*e*	C_F	R_R	D_F	D_R	A_E ft^2	*F* *K*	*w* *plf*	*Ctrl. Face*
T1 280.00-270.00	0.04	0.66	A	0.205	2.58	0.591	0.8	1	6.230	0.63	62.72	C
			B	0.141	2.806	0.58	0.8	1	4.197			
			C	0.218	2.535	0.594	0.8	1	6.682			
T2 270.00-250.00	0.08	1.37	A	0.2	2.594	0.591	0.8	1	12.234	1.25	62.53	C
			B	0.137	2.821	0.58	0.8	1	8.181			
			C	0.221	2.527	0.595	0.8	1	13.583			
T3 250.00-230.00	0.33	1.91	A	0.474	1.936	0.685	0.8	1	33.828	2.33	116.58	A
			B	0.411	2.043	0.656	0.8	1	28.085			
			C	0.244	2.455	0.6	0.8	1	15.282			
T4 230.00-220.00	0.17	1.18	A	0.504	1.895	0.699	0.8	1	23.768	1.57	157.47	A
			B	0.454	1.967	0.675	0.8	1	20.832			
			C	0.304	2.284	0.617	0.8	1	13.228			
T5 220.00-200.00	0.33	2.61	A	0.439	1.991	0.668	0.8	1	49.226	3.36	167.99	A
			B	0.399	2.066	0.651	0.8	1	43.871			
			C	0.277	2.358	0.609	0.8	1	29.524			
T6 200.00-180.00	0.61	2.85	A	0.419	2.027	0.66	0.8	1	58.329	3.94	196.92	A
			B	0.395	2.074	0.65	0.8	1	54.411			
			C	0.338	2.2	0.628	0.8	1	45.785			
T7 180.00-160.00	0.94	4.60	A	0.414	2.037	0.657	0.8	1	69.069	4.54	226.97	A
			B	0.36	2.149	0.636	0.8	1	58.942			
			C	0.341	2.193	0.629	0.8	1	55.602			
T8 160.00-140.00	1.19	5.27	A	0.376	2.114	0.642	0.8	1	71.772	4.72	236.16	A
			B	0.322	2.238	0.623	0.8	1	60.667			
			C	0.309	2.273	0.619	0.8	1	57.966			
T9 140.00-120.00	1.54	5.15	A	0.336	2.205	0.627	0.8	1	71.602	4.97	248.46	B
			B	0.36	2.148	0.636	0.8	1	77.399			
			C	0.338	2.2	0.628	0.8	1	72.132			
T10 120.00-100.00	1.54	7.28	A	0.296	2.306	0.615	0.8	1	70.774	4.89	244.73	B
			B	0.317	2.251	0.621	0.8	1	76.322			
			C	0.298	2.301	0.615	0.8	1	71.283			
T11 100.00-80.00	1.54	7.40	A	0.269	2.381	0.607	0.8	1	70.528	4.75	237.64	B
			B	0.288	2.328	0.612	0.8	1	75.890			
			C	0.271	2.376	0.607	0.8	1	71.021			
T12 80.00-60.00	1.54	8.13	A	0.251	2.436	0.602	0.8	1	71.675	4.59	229.67	B
			B	0.268	2.385	0.607	0.8	1	76.918			
			C	0.252	2.431	0.602	0.8	1	72.157			
T13 60.00-40.00	1.54	8.26	A	0.232	2.492	0.597	0.8	1	71.959	4.28	214.22	B
			B	0.248	2.443	0.601	0.8	1	77.094			
			C	0.234	2.488	0.598	0.8	1	72.432			
T14	1.54	9.20	A	0.22	2.53	0.595	0.8	1	73.687	3.95	197.52	B

Section Elevation *ft*	*Add Weight* *K*	*Self Weight* *K*	*F a c e*	*e*	C_F	R_R	D_F	D_R	A_E *ft²*	*F* *K*	*w* *plf*	*Ctrl. Face*
40.00-20.00			B	0.235	2.483	0.598	0.8	1	78.756			
			C	0.222	2.525	0.595	0.8	1	74.154			
T15	1.54	9.34	A	0.207	2.574	0.592	0.8	1	74.154	4.04	202.21	B
20.00-0.00			B	0.22	2.53	0.595	0.8	1	79.152			
			C	0.208	2.57	0.592	0.8	1	74.615			
Sum Weight:	14.51	75.22						OTM	6652.39 kip-ft	53.83		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation *ft*	*Add Weight* *K*	*Self Weight* *K*	*F a c e*	*e*	C_F	R_R	D_F	D_R	A_E *ft²*	*F* *K*	*w* *plf*	*Ctrl. Face*
T1	0.04	0.66	A	0.205	2.58	0.591	0.85	1	6.230	0.63	62.72	C
280.00-270.00			B	0.141	2.806	0.58	0.85	1	4.197			
			C	0.218	2.535	0.594	0.85	1	6.682			
T2	0.08	1.37	A	0.2	2.594	0.591	0.85	1	12.234	1.25	62.53	C
270.00-250.00			B	0.137	2.821	0.58	0.85	1	8.181			
			C	0.221	2.527	0.595	0.85	1	13.583			
T3	0.33	1.91	A	0.474	1.936	0.685	0.85	1	33.828	2.33	116.58	A
250.00-230.00			B	0.411	2.043	0.656	0.85	1	28.085			
			C	0.244	2.455	0.6	0.85	1	15.282			
T4	0.17	1.18	A	0.504	1.895	0.699	0.85	1	23.980	1.59	158.87	A
230.00-220.00			B	0.454	1.967	0.675	0.85	1	21.044			
			C	0.304	2.284	0.617	0.85	1	13.440			
T5	0.33	2.61	A	0.439	1.991	0.668	0.85	1	49.750	3.40	169.78	A
220.00-200.00			B	0.399	2.066	0.651	0.85	1	44.394			
			C	0.277	2.358	0.609	0.85	1	30.048			
T6	0.61	2.85	A	0.419	2.027	0.66	0.85	1	59.115	3.99	199.57	A
200.00-180.00			B	0.395	2.074	0.65	0.85	1	55.197			
			C	0.338	2.2	0.628	0.85	1	46.571			
T7	0.94	4.60	A	0.414	2.037	0.657	0.85	1	70.061	4.60	230.23	A
180.00-160.00			B	0.36	2.149	0.636	0.85	1	59.934			
			C	0.341	2.193	0.629	0.85	1	56.594			
T8	1.19	5.27	A	0.376	2.114	0.642	0.85	1	72.816	4.79	239.59	A
160.00-140.00			B	0.322	2.238	0.623	0.85	1	61.711			
			C	0.309	2.273	0.619	0.85	1	59.010			
T9	1.54	5.15	A	0.336	2.205	0.627	0.85	1	72.584	5.03	251.61	B
140.00-120.00			B	0.36	2.148	0.636	0.85	1	78.381			
			C	0.338	2.2	0.628	0.85	1	73.114			
T10	1.54	7.28	A	0.296	2.306	0.615	0.85	1	71.484	4.94	247.01	B
120.00-100.00			B	0.317	2.251	0.621	0.85	1	77.031			
			C	0.298	2.301	0.615	0.85	1	71.993			
T11	1.54	7.40	A	0.269	2.381	0.607	0.85	1	71.269	4.80	239.96	B
100.00-80.00			B	0.288	2.328	0.612	0.85	1	76.631			
			C	0.271	2.376	0.607	0.85	1	71.762			
T12	1.54	8.13	A	0.251	2.436	0.602	0.85	1	72.461	4.64	232.02	B
80.00-60.00			B	0.268	2.385	0.607	0.85	1	77.704			
			C	0.252	2.431	0.602	0.85	1	72.943			
T13	1.54	8.26	A	0.232	2.492	0.597	0.85	1	72.790	4.33	216.53	B
60.00-40.00			B	0.248	2.443	0.601	0.85	1	77.925			
			C	0.234	2.488	0.598	0.85	1	73.263			
T14	1.54	9.20	A	0.22	2.53	0.595	0.85	1	74.565	3.99	199.72	B
40.00-20.00			B	0.235	2.483	0.598	0.85	1	79.634			
			C	0.222	2.525	0.595	0.85	1	75.032			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T15 20.00-0.00	1.54	9.34	A	0.207	2.574	0.592	0.85	1	75.079	4.09	204.57	B
			B	0.22	2.53	0.595	0.85	1	80.078			
			C	0.208	2.57	0.592	0.85	1	75.541			
Sum Weight:	14.51	75.22						OTM	6719.28 kip-ft	54.41		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 280.00-270.00	0.10	0.86	A	0.356	2.157	0.635	1	1	11.826	0.76	75.63	C
			B	0.261	2.404	0.605	1	1	8.264			
			C	0.385	2.094	0.646	1	1	13.010			
T2 270.00-250.00	0.20	1.75	A	0.34	2.194	0.629	1	1	22.474	1.49	74.41	C
			B	0.246	2.451	0.601	1	1	15.496			
			C	0.383	2.098	0.645	1	1	25.966			
T3 250.00-230.00	0.82	2.32	A	0.73	1.781	0.842	1	1	65.059	3.09	154.71	A
			B	0.636	1.786	0.776	1	1	52.291			
			C	0.404	2.056	0.653	1	1	27.953			
T4 230.00-220.00	0.41	1.67	A	0.772	1.798	0.874	1	1	45.800	2.16	215.88	A
			B	0.698	1.776	0.818	1	1	39.096			
			C	0.476	1.933	0.685	1	1	23.220			
T5 220.00-200.00	0.82	4.36	A	0.653	1.781	0.787	1	1	86.792	3.97	198.65	A
			B	0.592	1.809	0.749	1	1	75.638			
			C	0.411	2.042	0.656	1	1	48.020			
T6 200.00-180.00	1.51	4.78	A	0.62	1.793	0.766	1	1	100.832	4.52	225.81	A
			B	0.583	1.815	0.744	1	1	92.809			
			C	0.499	1.902	0.697	1	1	75.837			
T7 180.00-160.00	2.30	6.76	A	0.61	1.798	0.76	1	1	118.240	5.15	257.28	A
			B	0.529	1.866	0.712	1	1	97.988			
			C	0.5	1.9	0.697	1	1	91.386			
T8 160.00-140.00	2.92	7.49	A	0.563	1.832	0.732	1	1	123.571	5.28	264.22	A
			B	0.472	1.938	0.684	1	1	98.831			
			C	0.461	1.955	0.679	1	1	96.480			
T9 140.00-120.00	3.75	7.33	A	0.504	1.895	0.7	1	1	121.118	5.39	269.57	B
			B	0.532	1.862	0.714	1	1	129.161			
			C	0.507	1.892	0.701	1	1	121.799			
T10 120.00-100.00	3.75	10.03	A	0.442	1.987	0.67	1	1	116.416	5.15	257.52	B
			B	0.466	1.948	0.681	1	1	123.700			
			C	0.444	1.983	0.671	1	1	117.041			
T11 100.00-80.00	3.75	10.18	A	0.402	2.061	0.652	1	1	114.541	4.95	247.32	B
			B	0.423	2.02	0.661	1	1	121.332			
			C	0.403	2.057	0.653	1	1	115.129			
T12 80.00-60.00	3.75	10.99	A	0.373	2.12	0.641	1	1	115.146	4.75	237.46	B
			B	0.392	2.079	0.648	1	1	121.614			
			C	0.374	2.117	0.641	1	1	115.710			
T13 60.00-40.00	3.75	11.16	A	0.345	2.183	0.631	1	1	114.670	4.42	220.77	B
			B	0.363	2.142	0.637	1	1	120.851			
			C	0.347	2.179	0.631	1	1	115.213			
T14 40.00-20.00	3.75	12.22	A	0.327	2.227	0.624	1	1	116.643	4.06	203.16	B
			B	0.343	2.187	0.63	1	1	122.646			
			C	0.328	2.224	0.625	1	1	117.173			
T15 20.00-0.00	3.75	12.40	A	0.306	2.279	0.618	1	1	116.730	4.16	207.90	B
			B	0.322	2.24	0.623	1	1	122.545			

Section Elevation *ft*	Add Weight *K*	Self Weight *K*	Face	e	C_F	R_R	D_F	D_R	A_E *ft²*	F *K*	w *plf*	Ctrl. Face
			C	0.308	2.276	0.618	1	1	117.246			
Sum Weight:	35.32	104.30						OTM	7612.34 kip-ft	59.29		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation *ft*	Add Weight *K*	Self Weight *K*	Face	e	C_F	R_R	D_F	D_R	A_E *ft²*	F *K*	w *plf*	Ctrl. Face
T1 280.00-270.00	0.10	0.86	A	0.356	2.157	0.635	0.825	1	11.826	0.76	75.63	C
			B	0.261	2.404	0.605	0.825	1	8.264			
			C	0.385	2.094	0.646	0.825	1	13.010			
T2 270.00-250.00	0.20	1.75	A	0.34	2.194	0.629	0.825	1	22.474	1.49	74.41	C
			B	0.246	2.451	0.601	0.825	1	15.496			
			C	0.383	2.098	0.645	0.825	1	25.966			
T3 250.00-230.00	0.82	2.32	A	0.73	1.781	0.842	0.825	1	65.059	3.09	154.71	A
			B	0.636	1.786	0.776	0.825	1	52.291			
			C	0.404	2.056	0.653	0.825	1	27.953			
T4 230.00-220.00	0.41	1.67	A	0.772	1.798	0.874	0.825	1	45.059	2.12	212.39	A
			B	0.698	1.776	0.818	0.825	1	38.355			
			C	0.476	1.933	0.685	0.825	1	22.479			
T5 220.00-200.00	0.82	4.36	A	0.653	1.781	0.787	0.825	1	84.960	3.89	194.45	A
			B	0.592	1.809	0.749	0.825	1	73.807			
			C	0.411	2.042	0.656	0.825	1	46.188			
T6 200.00-180.00	1.51	4.78	A	0.62	1.793	0.766	0.825	1	98.082	4.39	219.66	A
			B	0.583	1.815	0.744	0.825	1	90.059			
			C	0.499	1.902	0.697	0.825	1	73.087			
T7 180.00-160.00	2.30	6.76	A	0.61	1.798	0.76	0.825	1	114.765	4.99	249.72	A
			B	0.529	1.866	0.712	0.825	1	94.514			
			C	0.5	1.9	0.697	0.825	1	87.912			
T8 160.00-140.00	2.92	7.49	A	0.563	1.832	0.732	0.825	1	119.684	5.12	255.91	A
			B	0.472	1.938	0.684	0.825	1	95.177			
			C	0.461	1.955	0.679	0.825	1	92.593			
T9 140.00-120.00	3.75	7.33	A	0.504	1.895	0.7	0.825	1	117.449	5.25	262.40	B
			B	0.532	1.862	0.714	0.825	1	125.725			
			C	0.507	1.892	0.701	0.825	1	118.129			
T10 120.00-100.00	3.75	10.03	A	0.442	1.987	0.67	0.825	1	113.700	5.05	252.35	B
			B	0.466	1.948	0.681	0.825	1	121.217			
			C	0.444	1.983	0.671	0.825	1	114.324			
T11 100.00-80.00	3.75	10.18	A	0.402	2.061	0.652	0.825	1	111.713	4.84	242.03	B
			B	0.423	2.02	0.661	0.825	1	118.737			
			C	0.403	2.057	0.653	0.825	1	112.301			
T12 80.00-60.00	3.75	10.99	A	0.373	2.12	0.641	0.825	1	112.163	4.64	232.09	B
			B	0.392	2.079	0.648	0.825	1	118.865			
			C	0.374	2.117	0.641	0.825	1	112.728			
T13 60.00-40.00	3.75	11.16	A	0.345	2.183	0.631	0.825	1	111.528	4.31	215.46	B
			B	0.363	2.142	0.637	0.825	1	117.942			
			C	0.347	2.179	0.631	0.825	1	112.071			
T14 40.00-20.00	3.75	12.22	A	0.327	2.227	0.624	0.825	1	113.337	3.96	198.07	B
			B	0.343	2.187	0.63	0.825	1	119.573			
			C	0.328	2.224	0.625	0.825	1	113.867			
T15 20.00-0.00	3.75	12.40	A	0.306	2.279	0.618	0.825	1	113.256	4.05	202.40	B
			B	0.322	2.24	0.623	0.825	1	119.305			
			C	0.308	2.276	0.618	0.825	1	113.772			

tnxTower	Job 15001.024 - Woodbridge North	
Centek Engineering Inc. *63-2 North Branford Rd.* *Branford, CT 06405* *Phone: (203) 488-0580* *FAX: (203) 488-8587*	Project 280' PiROD Lattice Tower - 6 Progress Lane, Seymour, CT	Date 17:40:50 03/04/15
	Client Verizon Wireless	Designed by TJL

Section Elevation *ft*	*Add Weight* *K*	*Self Weight* *K*	*Face*	*e*	C_F	R_R	D_F	D_R	A_E *ft²*	*F* *K*	*w* *plf*	*Ctrl. Face*
Sum Weight:	35.32	104.30						OTM	7456.31 kip-ft	57.95		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation *ft*	*Add Weight* *K*	*Self Weight* *K*	*Face*	*e*	C_F	R_R	D_F	D_R	A_E *ft²*	*F* *K*	*w* *plf*	*Ctrl. Face*
T1 280.00-270.00	0.10	0.86	A	0.356	2.157	0.635	0.8	1	11.826	0.76	75.63	C
			B	0.261	2.404	0.605	0.8	1	8.264			
			C	0.385	2.094	0.646	0.8	1	13.010			
T2 270.00-250.00	0.20	1.75	A	0.34	2.194	0.629	0.8	1	22.474	1.49	74.41	C
			B	0.246	2.451	0.601	0.8	1	15.496			
			C	0.383	2.098	0.645	0.8	1	25.966			
T3 250.00-230.00	0.82	2.32	A	0.73	1.781	0.842	0.8	1	65.059	3.09	154.71	A
			B	0.636	1.786	0.776	0.8	1	52.291			
			C	0.404	2.056	0.653	0.8	1	27.953			
T4 230.00-220.00	0.41	1.67	A	0.772	1.798	0.874	0.8	1	44.953	2.12	211.89	A
			B	0.698	1.776	0.818	0.8	1	38.249			
			C	0.476	1.933	0.685	0.8	1	22.373			
T5 220.00-200.00	0.82	4.36	A	0.653	1.781	0.787	0.8	1	84.698	3.88	193.86	A
			B	0.592	1.809	0.749	0.8	1	73.545			
			C	0.411	2.042	0.656	0.8	1	45.927			
T6 200.00-180.00	1.51	4.78	A	0.62	1.793	0.766	0.8	1	97.689	4.38	218.78	A
			B	0.583	1.815	0.744	0.8	1	89.666			
			C	0.499	1.902	0.697	0.8	1	72.694			
T7 180.00-160.00	2.30	6.76	A	0.61	1.798	0.76	0.8	1	114.269	4.97	248.64	A
			B	0.529	1.866	0.712	0.8	1	94.018			
			C	0.5	1.9	0.697	0.8	1	87.416			
T8 160.00-140.00	2.92	7.49	A	0.563	1.832	0.732	0.8	1	119.129	5.09	254.72	A
			B	0.472	1.938	0.684	0.8	1	94.656			
			C	0.461	1.955	0.679	0.8	1	92.038			
T9 140.00-120.00	3.75	7.33	A	0.504	1.895	0.7	0.8	1	116.925	5.23	261.37	B
			B	0.532	1.862	0.714	0.8	1	125.234			
			C	0.507	1.892	0.701	0.8	1	117.605			
T10 120.00-100.00	3.75	10.03	A	0.442	1.987	0.67	0.8	1	113.312	5.03	251.61	B
			B	0.466	1.948	0.681	0.8	1	120.862			
			C	0.444	1.983	0.671	0.8	1	113.936			
T11 100.00-80.00	3.75	10.18	A	0.402	2.061	0.652	0.8	1	111.309	4.83	241.27	B
			B	0.423	2.02	0.661	0.8	1	118.367			
			C	0.403	2.057	0.653	0.8	1	111.897			
T12 80.00-60.00	3.75	10.99	A	0.373	2.12	0.641	0.8	1	111.737	4.63	231.32	B
			B	0.392	2.079	0.648	0.8	1	118.472			
			C	0.374	2.117	0.641	0.8	1	112.301			
T13 60.00-40.00	3.75	11.16	A	0.345	2.183	0.631	0.8	1	111.079	4.29	214.70	B
			B	0.363	2.142	0.637	0.8	1	117.526			
			C	0.347	2.179	0.631	0.8	1	111.622			
T14 40.00-20.00	3.75	12.22	A	0.327	2.227	0.624	0.8	1	112.865	3.95	197.34	B
			B	0.343	2.187	0.63	0.8	1	119.134			
			C	0.328	2.224	0.625	0.8	1	113.395			
T15 20.00-0.00	3.75	12.40	A	0.306	2.279	0.618	0.8	1	112.760	4.03	201.62	B
			B	0.322	2.24	0.623	0.8	1	118.842			
			C	0.308	2.276	0.618	0.8	1	113.276			
Sum Weight:	35.32	104.30						OTM	7434.02	57.76		

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
									kip-ft			

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 280.00-270.00	0.10	0.86	A	0.356	2.157	0.635	0.85	1	11.826	0.76	75.63	C
			B	0.261	2.404	0.605	0.85	1	8.264			
			C	0.385	2.094	0.646	0.85	1	13.010			
T2 270.00-250.00	0.20	1.75	A	0.34	2.194	0.629	0.85	1	22.474	1.49	74.41	C
			B	0.246	2.451	0.601	0.85	1	15.496			
			C	0.383	2.098	0.645	0.85	1	25.966			
T3 250.00-230.00	0.82	2.32	A	0.73	1.781	0.842	0.85	1	65.059	3.09	154.71	A
			B	0.636	1.786	0.776	0.85	1	52.291			
			C	0.404	2.056	0.653	0.85	1	27.953			
T4 230.00-220.00	0.41	1.67	A	0.772	1.798	0.874	0.85	1	45.165	2.13	212.89	A
			B	0.698	1.776	0.818	0.85	1	38.461			
			C	0.476	1.933	0.685	0.85	1	22.584			
T5 220.00-200.00	0.82	4.36	A	0.653	1.781	0.787	0.85	1	85.222	3.90	195.05	A
			B	0.592	1.809	0.749	0.85	1	74.068			
			C	0.411	2.042	0.656	0.85	1	46.450			
T6 200.00-180.00	1.51	4.78	A	0.62	1.793	0.766	0.85	1	98.475	4.41	220.54	A
			B	0.583	1.815	0.744	0.85	1	90.452			
			C	0.499	1.902	0.697	0.85	1	73.480			
T7 180.00-160.00	2.30	6.76	A	0.61	1.798	0.76	0.85	1	115.262	5.02	250.80	A
			B	0.529	1.866	0.712	0.85	1	95.010			
			C	0.5	1.9	0.697	0.85	1	88.409			
T8 160.00-140.00	2.92	7.49	A	0.563	1.832	0.732	0.85	1	120.240	5.14	257.10	A
			B	0.472	1.938	0.684	0.85	1	95.699			
			C	0.461	1.955	0.679	0.85	1	93.148			
T9 140.00-120.00	3.75	7.33	A	0.504	1.895	0.7	0.85	1	117.973	5.27	263.42	B
			B	0.532	1.862	0.714	0.85	1	126.216			
			C	0.507	1.892	0.701	0.85	1	118.653			
T10 120.00-100.00	3.75	10.03	A	0.442	1.987	0.67	0.85	1	114.088	5.06	253.09	B
			B	0.466	1.948	0.681	0.85	1	121.572			
			C	0.444	1.983	0.671	0.85	1	114.713			
T11 100.00-80.00	3.75	10.18	A	0.402	2.061	0.652	0.85	1	112.117	4.86	242.78	B
			B	0.423	2.02	0.661	0.85	1	119.108			
			C	0.403	2.057	0.653	0.85	1	112.705			
T12 80.00-60.00	3.75	10.99	A	0.373	2.12	0.641	0.85	1	112.589	4.66	232.86	B
			B	0.392	2.079	0.648	0.85	1	119.257			
			C	0.374	2.117	0.641	0.85	1	113.154			
T13 60.00-40.00	3.75	11.16	A	0.345	2.183	0.631	0.85	1	111.977	4.32	216.22	B
			B	0.363	2.142	0.637	0.85	1	118.358			
			C	0.347	2.179	0.631	0.85	1	112.520			
T14 40.00-20.00	3.75	12.22	A	0.327	2.227	0.624	0.85	1	113.809	3.98	198.80	B
			B	0.343	2.187	0.63	0.85	1	120.012			
			C	0.328	2.224	0.625	0.85	1	114.339			
T15 20.00-0.00	3.75	12.40	A	0.306	2.279	0.618	0.85	1	113.753	4.06	203.19	B
			B	0.322	2.24	0.623	0.85	1	119.768			
			C	0.308	2.276	0.618	0.85	1	114.268			
Sum Weight:	35.32	104.30						OTM	7478.60 kip-ft	58.14		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 280.00-270.00	0.04	0.66	A	0.205	2.58	0.591	1	1	6.230	0.22	21.70	C
			B	0.141	2.806	0.58	1	1	4.197			
			C	0.218	2.535	0.594	1	1	6.682			
T2 270.00-250.00	0.08	1.37	A	0.2	2.594	0.591	1	1	12.234	0.43	21.64	C
			B	0.137	2.821	0.58	1	1	8.181			
			C	0.221	2.527	0.595	1	1	13.583			
T3 250.00-230.00	0.33	1.91	A	0.474	1.936	0.685	1	1	33.828	0.81	40.34	A
			B	0.411	2.043	0.656	1	1	28.085			
			C	0.244	2.455	0.6	1	1	15.282			
T4 230.00-220.00	0.17	1.18	A	0.504	1.895	0.699	1	1	24.615	0.56	56.43	A
			B	0.454	1.967	0.675	1	1	21.679			
			C	0.304	2.284	0.617	1	1	14.075			
T5 220.00-200.00	0.33	2.61	A	0.439	1.991	0.668	1	1	51.320	1.21	60.60	A
			B	0.399	2.066	0.651	1	1	45.964			
			C	0.277	2.358	0.609	1	1	31.618			
T6 200.00-180.00	0.61	2.85	A	0.419	2.027	0.66	1	1	61.472	1.44	71.81	A
			B	0.395	2.074	0.65	1	1	57.554			
			C	0.338	2.2	0.628	1	1	48.928			
T7 180.00-160.00	0.94	4.60	A	0.414	2.037	0.657	1	1	73.039	1.66	83.05	A
			B	0.36	2.149	0.636	1	1	62.912			
			C	0.341	2.193	0.629	1	1	59.572			
T8 160.00-140.00	1.19	5.27	A	0.376	2.114	0.642	1	1	75.947	1.73	86.47	A
			B	0.322	2.238	0.623	1	1	64.842			
			C	0.309	2.273	0.619	1	1	62.141			
T9 140.00-120.00	1.54	5.15	A	0.336	2.205	0.627	1	1	75.529	1.81	90.33	B
			B	0.36	2.148	0.636	1	1	81.326			
			C	0.338	2.2	0.628	1	1	76.059			
T10 120.00-100.00	1.54	7.28	A	0.296	2.306	0.615	1	1	73.612	1.76	87.83	B
			B	0.317	2.251	0.621	1	1	79.160			
			C	0.298	2.301	0.615	1	1	74.121			
T11 100.00-80.00	1.54	7.40	A	0.269	2.381	0.607	1	1	73.493	1.71	85.44	B
			B	0.288	2.328	0.612	1	1	78.855			
			C	0.271	2.376	0.607	1	1	73.986			
T12 80.00-60.00	1.54	8.13	A	0.251	2.436	0.602	1	1	74.817	1.65	82.72	B
			B	0.268	2.385	0.607	1	1	80.061			
			C	0.252	2.431	0.602	1	1	75.300			
T13 60.00-40.00	1.54	8.26	A	0.232	2.492	0.597	1	1	75.284	1.55	77.32	B
			B	0.248	2.443	0.601	1	1	80.419			
			C	0.234	2.488	0.598	1	1	75.757			
T14 40.00-20.00	1.54	9.20	A	0.22	2.53	0.595	1	1	77.199	1.43	71.39	B
			B	0.235	2.483	0.598	1	1	82.268			
			C	0.222	2.525	0.595	1	1	77.666			
T15 20.00-0.00	1.54	9.34	A	0.207	2.574	0.592	1	1	77.857	1.46	73.24	B
			B	0.22	2.53	0.595	1	1	82.855			
			C	0.208	2.57	0.592	1	1	78.318			
Sum Weight:	14.51	75.22						OTM	2394.45 kip-ft	19.42		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.04	0.66	A	0.205	2.58	0.591	0.825	1	6.230	0.22	21.70	C
280.00-270.00			B	0.141	2.806	0.58	0.825	1	4.197			
			C	0.218	2.535	0.594	0.825	1	6.682			
T2	0.08	1.37	A	0.2	2.594	0.591	0.825	1	12.234	0.43	21.64	C
270.00-250.00			B	0.137	2.821	0.58	0.825	1	8.181			
			C	0.221	2.527	0.595	0.825	1	13.583			
T3	0.33	1.91	A	0.474	1.936	0.685	0.825	1	33.828	0.81	40.34	A
250.00-230.00			B	0.411	2.043	0.656	0.825	1	28.085			
			C	0.244	2.455	0.6	0.825	1	15.282			
T4	0.17	1.18	A	0.504	1.895	0.699	0.825	1	23.874	0.55	54.73	A
230.00-220.00			B	0.454	1.967	0.675	0.825	1	20.938			
			C	0.304	2.284	0.617	0.825	1	13.334			
T5	0.33	2.61	A	0.439	1.991	0.668	0.825	1	49.488	1.17	58.44	A
220.00-200.00			B	0.399	2.066	0.651	0.825	1	44.133			
			C	0.277	2.358	0.609	0.825	1	29.786			
T6	0.61	2.85	A	0.419	2.027	0.66	0.825	1	58.722	1.37	68.60	A
200.00-180.00			B	0.395	2.074	0.65	0.825	1	54.804			
			C	0.338	2.2	0.628	0.825	1	46.178			
T7	0.94	4.60	A	0.414	2.037	0.657	0.825	1	69.565	1.58	79.10	A
180.00-160.00			B	0.36	2.149	0.636	0.825	1	59.438			
			C	0.341	2.193	0.629	0.825	1	56.098			
T8	1.19	5.27	A	0.376	2.114	0.642	0.825	1	72.294	1.65	82.31	A
160.00-140.00			B	0.322	2.238	0.623	0.825	1	61.189			
			C	0.309	2.273	0.619	0.825	1	58.488			
T9	1.54	5.15	A	0.336	2.205	0.627	0.825	1	72.093	1.73	86.52	B
140.00-120.00			B	0.36	2.148	0.636	0.825	1	77.890			
			C	0.338	2.2	0.628	0.825	1	72.623			
T10	1.54	7.28	A	0.296	2.306	0.615	0.825	1	71.129	1.70	85.08	B
120.00-100.00			B	0.317	2.251	0.621	0.825	1	76.676			
			C	0.298	2.301	0.615	0.825	1	71.638			
T11	1.54	7.40	A	0.269	2.381	0.607	0.825	1	70.899	1.65	82.63	B
100.00-80.00			B	0.288	2.328	0.612	0.825	1	76.260			
			C	0.271	2.376	0.607	0.825	1	71.391			
T12	1.54	8.13	A	0.251	2.436	0.602	0.825	1	72.068	1.60	79.88	B
80.00-60.00			B	0.268	2.385	0.607	0.825	1	77.311			
			C	0.252	2.431	0.602	0.825	1	72.550			
T13	1.54	8.26	A	0.232	2.492	0.597	0.825	1	72.375	1.49	74.52	B
60.00-40.00			B	0.248	2.443	0.601	0.825	1	77.510			
			C	0.234	2.488	0.598	0.825	1	72.848			
T14	1.54	9.20	A	0.22	2.53	0.595	0.825	1	74.126	1.37	68.73	B
40.00-20.00			B	0.235	2.483	0.598	0.825	1	79.195			
			C	0.222	2.525	0.595	0.825	1	74.593			
T15	1.54	9.34	A	0.207	2.574	0.592	0.825	1	74.617	1.41	70.38	B
20.00-0.00			B	0.22	2.53	0.595	0.825	1	79.615			
			C	0.208	2.57	0.592	0.825	1	75.078			
Sum Weight:	14.51	75.22						OTM	2313.44 kip-ft	18.73		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.04	0.66	A	0.205	2.58	0.591	0.8	1	6.230	0.22	21.70	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
280.00-270.00			B	0.141	2.806	0.58	0.8	1	4.197			
			C	0.218	2.535	0.594	0.8	1	6.682			
T2 270.00-250.00	0.08	1.37	A	0.2	2.594	0.591	0.8	1	12.234	0.43	21.64	C
			B	0.137	2.821	0.58	0.8	1	8.181			
			C	0.221	2.527	0.595	0.8	1	13.583			
T3 250.00-230.00	0.33	1.91	A	0.474	1.936	0.685	0.8	1	33.828	0.81	40.34	A
			B	0.411	2.043	0.656	0.8	1	28.085			
			C	0.244	2.455	0.6	0.8	1	15.282			
T4 230.00-220.00	0.17	1.18	A	0.504	1.895	0.699	0.8	1	23.768	0.54	54.49	A
			B	0.454	1.967	0.675	0.8	1	20.832			
			C	0.304	2.284	0.617	0.8	1	13.228			
T5 220.00-200.00	0.33	2.61	A	0.439	1.991	0.668	0.8	1	49.226	1.16	58.13	A
			B	0.399	2.066	0.651	0.8	1	43.871			
			C	0.277	2.358	0.609	0.8	1	29.524			
T6 200.00-180.00	0.61	2.85	A	0.419	2.027	0.66	0.8	1	58.329	1.36	68.14	A
			B	0.395	2.074	0.65	0.8	1	54.411			
			C	0.338	2.2	0.628	0.8	1	45.785			
T7 180.00-160.00	0.94	4.60	A	0.414	2.037	0.657	0.8	1	69.069	1.57	78.54	A
			B	0.36	2.149	0.636	0.8	1	58.942			
			C	0.341	2.193	0.629	0.8	1	55.602			
T8 160.00-140.00	1.19	5.27	A	0.376	2.114	0.642	0.8	1	71.772	1.63	81.72	A
			B	0.322	2.238	0.623	0.8	1	60.667			
			C	0.309	2.273	0.619	0.8	1	57.966			
T9 140.00-120.00	1.54	5.15	A	0.336	2.205	0.627	0.8	1	71.602	1.72	85.97	B
			B	0.36	2.148	0.636	0.8	1	77.399			
			C	0.338	2.2	0.628	0.8	1	72.132			
T10 120.00-100.00	1.54	7.28	A	0.296	2.306	0.615	0.8	1	70.774	1.69	84.68	B
			B	0.317	2.251	0.621	0.8	1	76.322			
			C	0.298	2.301	0.615	0.8	1	71.283			
T11 100.00-80.00	1.54	7.40	A	0.269	2.381	0.607	0.8	1	70.528	1.64	82.23	B
			B	0.288	2.328	0.612	0.8	1	75.890			
			C	0.271	2.376	0.607	0.8	1	71.021			
T12 80.00-60.00	1.54	8.13	A	0.251	2.436	0.602	0.8	1	71.675	1.59	79.47	B
			B	0.268	2.385	0.607	0.8	1	76.918			
			C	0.252	2.431	0.602	0.8	1	72.157			
T13 60.00-40.00	1.54	8.26	A	0.232	2.492	0.597	0.8	1	71.959	1.48	74.12	B
			B	0.248	2.443	0.601	0.8	1	77.094			
			C	0.234	2.488	0.598	0.8	1	72.432			
T14 40.00-20.00	1.54	9.20	A	0.22	2.53	0.595	0.8	1	73.687	1.37	68.34	B
			B	0.235	2.483	0.598	0.8	1	78.756			
			C	0.222	2.525	0.595	0.8	1	74.154			
T15 20.00-0.00	1.54	9.34	A	0.207	2.574	0.592	0.8	1	74.154	1.40	69.97	B
			B	0.22	2.53	0.595	0.8	1	79.152			
			C	0.208	2.57	0.592	0.8	1	74.615			
Sum Weight:	14.51	75.22						OTM	2301.86 kip-ft	18.63		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 280.00-270.00	0.04	0.66	A	0.205	2.58	0.591	0.85	1	6.230	0.22	21.70	C
			B	0.141	2.806	0.58	0.85	1	4.197			
			C	0.218	2.535	0.594	0.85	1	6.682			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T2 270.00-250.00	0.08	1.37	A	0.2	2.594	0.591	0.85	1	12.234	0.43	21.64	C
			B	0.137	2.821	0.58	0.85	1	8.181			
			C	0.221	2.527	0.595	0.85	1	13.583			
T3 250.00-230.00	0.33	1.91	A	0.474	1.936	0.685	0.85	1	33.828	0.81	40.34	A
			B	0.411	2.043	0.656	0.85	1	28.085			
			C	0.244	2.455	0.6	0.85	1	15.282			
T4 230.00-220.00	0.17	1.18	A	0.504	1.895	0.699	0.85	1	23.980	0.55	54.97	A
			B	0.454	1.967	0.675	0.85	1	21.044			
			C	0.304	2.284	0.617	0.85	1	13.440			
T5 220.00-200.00	0.33	2.61	A	0.439	1.991	0.668	0.85	1	49.750	1.17	58.75	A
			B	0.399	2.066	0.651	0.85	1	44.394			
			C	0.277	2.358	0.609	0.85	1	30.048			
T6 200.00-180.00	0.61	2.85	A	0.419	2.027	0.66	0.85	1	59.115	1.38	69.06	A
			B	0.395	2.074	0.65	0.85	1	55.197			
			C	0.338	2.2	0.628	0.85	1	46.571			
T7 180.00-160.00	0.94	4.60	A	0.414	2.037	0.657	0.85	1	70.061	1.59	79.66	A
			B	0.36	2.149	0.636	0.85	1	59.934			
			C	0.341	2.193	0.629	0.85	1	56.594			
T8 160.00-140.00	1.19	5.27	A	0.376	2.114	0.642	0.85	1	72.816	1.66	82.90	A
			B	0.322	2.238	0.623	0.85	1	61.711			
			C	0.309	2.273	0.619	0.85	1	59.010			
T9 140.00-120.00	1.54	5.15	A	0.336	2.205	0.627	0.85	1	72.584	1.74	87.06	B
			B	0.36	2.148	0.636	0.85	1	78.381			
			C	0.338	2.2	0.628	0.85	1	73.114			
T10 120.00-100.00	1.54	7.28	A	0.296	2.306	0.615	0.85	1	71.484	1.71	85.47	B
			B	0.317	2.251	0.621	0.85	1	77.031			
			C	0.298	2.301	0.615	0.85	1	71.993			
T11 100.00-80.00	1.54	7.40	A	0.269	2.381	0.607	0.85	1	71.269	1.66	83.03	B
			B	0.288	2.328	0.612	0.85	1	76.631			
			C	0.271	2.376	0.607	0.85	1	71.762			
T12 80.00-60.00	1.54	8.13	A	0.251	2.436	0.602	0.85	1	72.461	1.61	80.28	B
			B	0.268	2.385	0.607	0.85	1	77.704			
			C	0.252	2.431	0.602	0.85	1	72.943			
T13 60.00-40.00	1.54	8.26	A	0.232	2.492	0.597	0.85	1	72.790	1.50	74.92	B
			B	0.248	2.443	0.601	0.85	1	77.925			
			C	0.234	2.488	0.598	0.85	1	73.263			
T14 40.00-20.00	1.54	9.20	A	0.22	2.53	0.595	0.85	1	74.565	1.38	69.11	B
			B	0.235	2.483	0.598	0.85	1	79.634			
			C	0.222	2.525	0.595	0.85	1	75.032			
T15 20.00-0.00	1.54	9.34	A	0.207	2.574	0.592	0.85	1	75.079	1.42	70.79	B
			B	0.22	2.53	0.595	0.85	1	80.078			
			C	0.208	2.57	0.592	0.85	1	75.541			
Sum Weight:	14.51	75.22						OTM	2325.01 kip-ft	18.83		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	51.67					
Bracing Weight	23.55					
Total Member Self-Weight	75.22			-11.90	5.04	
Total Weight	109.93			-11.90	5.04	
Wind 0 deg - No Ice		0.00	-82.99	-12161.84	5.04	2.77

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 30 deg - No Ice		40.58	-70.37	-10360.26	-5962.61	-3.23
Wind 45 deg - No Ice		57.18	-57.25	-8437.65	-8410.84	-5.96
Wind 60 deg - No Ice		69.79	-40.34	-5953.08	-10273.29	-8.26
Wind 90 deg - No Ice		81.16	0.00	-11.90	-11930.25	-11.21
Wind 120 deg - No Ice		71.78	41.49	6063.07	-10505.03	-11.34
Wind 135 deg - No Ice		57.18	57.25	8413.84	-8410.84	-9.83
Wind 150 deg - No Ice		40.58	70.37	10336.45	-5962.61	-7.98
Wind 180 deg - No Ice		0.00	80.68	11870.45	5.04	-2.73
Wind 210 deg - No Ice		-40.58	70.37	10336.45	5972.68	3.23
Wind 225 deg - No Ice		-57.18	57.25	8413.84	8420.91	5.96
Wind 240 deg - No Ice		-71.78	41.49	6063.07	10515.10	8.57
Wind 270 deg - No Ice		-81.16	0.00	-11.90	11940.33	11.21
Wind 300 deg - No Ice		-69.79	-40.34	-5953.08	10283.37	10.99
Wind 315 deg - No Ice		-57.18	-57.25	-8437.65	8420.91	9.83
Wind 330 deg - No Ice		-40.58	-70.37	-10360.26	5972.68	7.98
Member Ice	29.08					
Total Weight Ice	168.01			-28.54	13.65	
Wind 0 deg - Ice		0.00	-83.95	-12485.63	13.65	2.51
Wind 30 deg - Ice		41.36	-71.71	-10700.88	-6142.65	-4.05
Wind 45 deg - Ice		58.36	-58.42	-8726.70	-8676.91	-7.00
Wind 60 deg - Ice		71.31	-41.21	-6167.93	-10610.76	-9.46
Wind 90 deg - Ice		82.73	0.00	-28.54	-12298.94	-12.43
Wind 120 deg - Ice		72.64	41.98	6200.00	-10765.19	-12.19
Wind 135 deg - Ice		58.36	58.42	8669.62	-8676.91	-10.53
Wind 150 deg - Ice		41.36	71.71	10643.79	-6142.65	-8.38
Wind 180 deg - Ice		0.00	82.42	12250.23	13.65	-2.50
Wind 210 deg - Ice		-41.36	71.71	10643.79	6169.94	4.05
Wind 225 deg - Ice		-58.36	58.42	8669.62	8704.20	7.00
Wind 240 deg - Ice		-72.64	41.98	6200.00	10792.49	9.68
Wind 270 deg - Ice		-82.73	0.00	-28.54	12326.24	12.43
Wind 300 deg - Ice		-71.31	-41.21	-6167.93	10638.06	11.96
Wind 315 deg - Ice		-58.36	-58.42	-8726.70	8704.20	10.53
Wind 330 deg - Ice		-41.36	-71.71	-10700.88	6169.94	8.38
Total Weight	109.93			-11.90	5.04	
Wind 0 deg - Service		0.00	-28.72	-4205.12	-0.16	0.96
Wind 30 deg - Service		14.04	-24.35	-3581.74	-2065.09	-1.12
Wind 45 deg - Service		19.79	-19.81	-2916.47	-2912.23	-2.06
Wind 60 deg - Service		24.15	-13.96	-2056.76	-3556.68	-2.86
Wind 90 deg - Service		28.08	0.00	-0.99	-4130.02	-3.88
Wind 120 deg - Service		24.84	14.36	2101.08	-3636.87	-3.92
Wind 135 deg - Service		19.79	19.81	2914.49	-2912.23	-3.40
Wind 150 deg - Service		14.04	24.35	3579.75	-2065.09	-2.76
Wind 180 deg - Service		0.00	27.92	4110.55	-0.16	-0.94
Wind 210 deg - Service		-14.04	24.35	3579.75	2064.76	1.12
Wind 225 deg - Service		-19.79	19.81	2914.49	2911.90	2.06
Wind 240 deg - Service		-24.84	14.36	2101.08	3636.54	2.97
Wind 270 deg - Service		-28.08	0.00	-0.99	4129.69	3.88
Wind 300 deg - Service		-24.15	-13.96	-2056.76	3556.35	3.80
Wind 315 deg - Service		-19.79	-19.81	-2916.47	2911.90	3.40
Wind 330 deg - Service		-14.04	-24.35	-3581.74	2064.76	2.76

Load Combinations

Comb. No.	Description
1	Dead Only

Comb. No.	Description
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	280 - 270	Leg	Max Tension	5	6.33	0.44	-0.25
			Max. Compression	24	-9.93	-0.15	-0.11
			Max. Mx	31	-8.79	-0.49	0.05
			Max. My	19	1.97	0.00	-0.52

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	31	-1.23	0.17	-0.03
			Max. Vx	19	-1.31	0.02	0.19
		Diagonal	Max Tension	34	1.79	0.00	0.00
			Max. Compression	34	-1.79	0.00	0.00
			Max. Mx	30	0.03	-0.00	0.00
			Max. My	32	-1.34	-0.00	0.00
			Max. Vy	29	-0.00	-0.00	0.00
			Max. Vx	32	0.00	0.00	0.00
		Horizontal	Max Tension	27	0.27	0.00	0.00
			Max. Compression	2	-0.16	0.00	0.00
			Max. Mx	18	0.07	0.01	0.00
			Max. My	32	-0.04	0.00	-0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	32	0.00	0.00	0.00
		Top Girt	Max Tension	13	0.67	0.00	0.00
			Max. Compression	5	-0.69	0.00	0.00
			Max. Mx	18	-0.01	0.01	0.00
			Max. My	25	-0.17	0.00	0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	25	-0.00	0.00	0.00
		Bottom Girt	Max Tension	27	0.73	0.00	0.00
			Max. Compression	30	-0.70	0.00	0.00
			Max. Mx	18	0.01	0.01	0.00
			Max. My	25	0.22	0.00	0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	25	0.00	0.00	0.00
		Mid Girt	Max Tension	27	0.11	0.00	0.00
			Max. Compression	2	-0.01	0.00	0.00
			Max. Mx	18	0.01	0.01	0.00
			Max. My	25	0.01	0.00	0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	25	0.00	0.00	0.00
T2	270 - 250	Leg	Max Tension	27	25.53	0.03	0.74
			Max. Compression	30	-30.74	0.28	-0.17
			Max. Mx	31	-8.81	0.74	-0.09
			Max. My	19	-9.89	0.08	0.79
			Max. Vy	31	-1.85	0.29	-0.07
			Max. Vx	19	-2.00	0.02	0.33
		Diagonal	Max Tension	34	2.40	0.00	0.00
			Max. Compression	34	-2.40	0.00	0.00
			Max. Mx	28	1.33	-0.00	0.00
			Max. My	33	-1.94	-0.00	0.00
			Max. Vy	28	-0.01	-0.00	0.00
			Max. Vx	32	0.00	0.00	0.00
		Horizontal	Max Tension	27	0.44	0.00	0.00
			Max. Compression	2	-0.32	0.00	0.00
			Max. Mx	18	0.08	0.01	0.00
			Max. My	31	0.06	0.00	-0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	31	0.00	0.00	0.00
		Top Girt	Max Tension	30	0.81	0.00	0.00
			Max. Compression	32	-0.81	0.00	0.00
			Max. Mx	18	-0.00	0.01	0.00
			Max. My	25	-0.22	0.00	0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	25	0.00	0.00	0.00
		Bottom Girt	Max Tension	27	1.02	0.00	0.00
			Max. Compression	19	-0.95	0.00	0.00
			Max. Mx	18	0.02	0.01	0.00
			Max. My	31	0.11	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00

Section No.	*Elevation ft*	*Component Type*	*Condition*	*Gov. Load Comb.*	*Force K*	*Major Axis Moment kip-ft*	*Minor Axis Moment kip-ft*
			Max. Vx	31	0.00	0.00	0.00
		Mid Girt	Max Tension	27	0.29	0.00	0.00
			Max. Compression	2	-0.18	0.00	0.00
			Max. Mx	18	0.02	0.01	0.00
			Max. My	31	0.06	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	31	0.00	0.00	0.00
T3	250 - 230	Leg	Max Tension	32	68.82	-0.42	-0.27
			Max. Compression	19	-80.87	0.05	2.99
			Max. Mx	30	-80.72	2.53	-1.58
			Max. My	19	-80.87	0.05	2.99
			Max. Vy	30	-5.46	2.53	-1.58
			Max. Vx	19	-6.40	0.05	2.99
		Diagonal	Max Tension	34	5.51	0.00	0.00
			Max. Compression	26	-5.60	0.00	0.00
			Max. Mx	19	4.28	-0.01	-0.00
			Max. My	33	-3.89	-0.00	0.00
			Max. Vy	19	0.01	-0.01	-0.00
			Max. Vx	33	0.00	0.00	0.00
		Horizontal	Max Tension	27	0.77	0.00	0.00
			Max. Compression	2	-0.61	0.00	0.00
			Max. Mx	18	0.13	0.01	0.00
			Max. My	31	0.08	0.00	-0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	31	0.00	0.00	0.00
		Top Girt	Max Tension	24	1.55	0.00	0.00
			Max. Compression	22	-1.51	0.00	0.00
			Max. Mx	18	0.01	0.02	0.00
			Max. My	31	-0.02	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	31	-0.00	0.00	0.00
		Bottom Girt	Max Tension	27	1.10	0.00	0.00
			Max. Compression	19	-0.95	0.00	0.00
			Max. Mx	18	0.04	0.02	0.00
			Max. My	31	0.03	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	31	-0.00	0.00	0.00
T4	230 - 220	Leg	Max Tension	32	73.67	-2.84	-0.14
			Max. Compression	19	-85.14	4.05	-0.05
			Max. Mx	32	73.37	-4.56	-0.12
			Max. My	31	-6.44	-0.24	-6.87
			Max. Vy	27	0.33	-4.54	0.02
			Max. Vx	31	0.74	-0.24	-6.87
		Diagonal	Max Tension	32	5.72	0.00	0.00
			Max. Compression	24	-6.60	0.00	0.00
			Max. Mx	32	4.43	0.06	-0.00
			Max. My	25	-6.25	-0.04	0.03
			Max. Vy	32	0.02	0.06	-0.00
			Max. Vx	33	0.01	0.00	0.00
T5	220 - 200	Leg	Max Tension	32	102.83	-4.04	-0.04
			Max. Compression	19	-118.42	5.10	-0.01
			Max. Mx	19	-118.42	5.10	-0.01
			Max. My	31	-7.65	-0.24	-6.87
			Max. Vy	24	-0.25	5.07	0.03
			Max. Vx	31	-0.53	-0.09	-5.70
		Diagonal	Max Tension	25	5.88	0.00	0.00
			Max. Compression	25	-6.27	0.00	0.00
			Max. Mx	19	4.88	0.09	-0.00
			Max. My	31	-4.92	-0.03	-0.02
			Max. Vy	19	-0.03	0.09	-0.01
			Max. Vx	31	0.00	-0.03	-0.02

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T6	200 - 180	Leg	Max Tension	32	131.09	-3.64	-0.02
			Max. Compression	19	-152.02	5.66	0.00
			Max. Mx	19	-152.02	5.66	0.00
			Max. My	31	-11.30	0.06	-4.91
			Max. Vy	10	-1.02	-4.34	-0.00
			Max. Vx	14	-0.86	-0.08	-4.30
		Diagonal	Max Tension	32	7.86	0.00	0.00
			Max. Compression	24	-9.18	0.00	0.00
			Max. Mx	29	5.49	0.08	0.00
			Max. My	32	-4.33	-0.01	-0.01
			Max. Vy	33	0.03	0.08	0.00
			Max. Vx	32	0.00	0.00	0.00
		Top Girt	Max Tension	32	3.81	0.00	0.00
			Max. Compression	19	-2.88	0.00	0.00
			Max. Mx	18	0.47	-0.05	0.00
			Max. My	31	0.38	0.00	0.00
			Max. Vy	18	0.03	0.00	0.00
			Max. Vx	31	0.00	0.00	0.00
		Mid Girt	Max Tension	32	4.76	0.00	0.00
			Max. Compression	19	-3.40	0.00	0.00
			Max. Mx	18	0.66	-0.07	0.00
			Max. My	23	0.55	0.00	0.00
			Max. Vy	18	0.03	0.00	0.00
			Max. Vx	23	0.00	0.00	0.00
T7	180 - 160	Leg	Max Tension	32	166.27	-3.80	0.01
			Max. Compression	19	-195.79	5.93	0.01
			Max. Mx	19	-195.79	5.93	0.01
			Max. My	31	-11.79	0.06	-4.91
			Max. Vy	5	-1.15	-3.40	0.01
			Max. Vx	14	-1.46	-0.10	-4.40
		Diagonal	Max Tension	22	10.25	0.00	0.00
			Max. Compression	30	-12.04	0.00	0.00
			Max. Mx	30	4.70	0.11	-0.01
			Max. My	22	-6.01	0.00	0.01
			Max. Vy	32	0.04	0.11	-0.01
			Max. Vx	22	-0.00	0.00	0.00
		Top Girt	Max Tension	32	6.15	0.00	0.00
			Max. Compression	19	-4.45	0.00	0.00
			Max. Mx	18	0.83	-0.13	0.00
			Max. My	22	-1.90	0.00	0.00
			Max. Vy	18	0.05	0.00	0.00
			Max. Vx	22	0.00	0.00	0.00
		Mid Girt	Max Tension	32	6.53	0.00	0.00
			Max. Compression	19	-4.60	0.00	0.00
			Max. Mx	18	0.96	-0.15	0.00
			Max. My	22	-1.88	0.00	0.00
			Max. Vy	18	0.06	0.00	0.00
			Max. Vx	22	-0.00	0.00	0.00
T8	160 - 140	Leg	Max Tension	32	208.37	-4.29	-0.01
			Max. Compression	19	-250.76	4.74	-0.01
			Max. Mx	19	-221.83	5.93	0.01
			Max. My	34	-19.06	-0.31	7.26
			Max. Vy	10	-1.53	-5.07	-0.02
			Max. Vx	6	0.96	0.16	2.52
		Diagonal	Max Tension	28	11.52	0.00	0.00
			Max. Compression	29	-11.62	0.00	0.00
			Max. Mx	30	9.32	0.16	-0.01
			Max. My	21	-10.67	0.00	0.03
			Max. Vy	30	-0.05	0.16	-0.01
			Max. Vx	21	-0.01	0.00	0.00
		Top Girt	Max Tension	32	5.17	0.00	0.00

Section No.	*Elevation ft*	*Component Type*	*Condition*	*Gov. Load Comb.*	*Force K*	*Major Axis Moment kip-ft*	*Minor Axis Moment kip-ft*
			Max. Compression	19	-3.69	0.00	0.00
			Max. Mx	18	0.74	-0.18	0.00
			Max. My	22	-1.52	0.00	0.01
			Max. Vy	18	-0.06	0.00	0.00
			Max. Vx	22	0.00	0.00	0.00
T9	140 - 120	Leg	Max Tension	32	251.50	-4.62	0.00
			Max. Compression	19	-304.48	10.02	-0.00
			Max. Mx	32	250.72	-10.73	-0.11
			Max. My	31	-26.68	-0.38	-9.96
			Max. Vy	10	-1.67	-4.52	-0.01
			Max. Vx	14	-1.83	-0.05	-4.09
		Diagonal	Max Tension	28	12.74	0.00	0.00
			Max. Compression	28	-13.46	0.00	0.00
			Max. Mx	33	6.94	0.18	-0.01
			Max. My	21	-11.98	0.03	0.04
			Max. Vy	33	0.06	0.18	-0.01
			Max. Vx	21	-0.01	0.00	0.00
T10	120 - 100	Leg	Max Tension	32	279.28	-10.73	-0.11
			Max. Compression	19	-336.47	11.40	-0.08
			Max. Mx	15	270.59	-11.59	-0.04
			Max. My	20	-27.65	-0.06	-19.00
			Max. Vy	10	0.41	-11.59	0.02
			Max. Vx	20	0.76	-0.06	-19.00
		Diagonal	Max Tension	4	16.39	0.00	0.00
			Max. Compression	29	-18.20	0.00	0.00
			Max. Mx	32	14.36	-0.47	0.03
			Max. My	20	-17.46	-0.08	-0.12
			Max. Vy	32	-0.12	-0.47	0.03
			Max. Vx	21	0.01	0.00	0.00
T11	100 - 80	Leg	Max Tension	32	317.97	-11.30	-0.05
			Max. Compression	19	-388.30	12.17	-0.04
			Max. Mx	32	315.76	-16.14	-0.05
			Max. My	20	-31.53	-0.06	-19.00
			Max. Vy	27	0.59	-16.10	0.01
			Max. Vx	20	-0.81	-0.06	-19.00
		Diagonal	Max Tension	28	17.18	0.00	0.00
			Max. Compression	11	-17.19	0.00	0.00
			Max. Mx	32	13.79	-0.49	0.07
			Max. My	21	11.32	-0.48	-0.07
			Max. Vy	33	-0.13	-0.49	-0.06
			Max. Vx	20	0.01	0.00	0.00
T12	80 - 60	Leg	Max Tension	32	354.20	-16.14	-0.05
			Max. Compression	19	-431.64	16.58	-0.05
			Max. Mx	19	-431.64	16.58	-0.05
			Max. My	31	-39.02	4.64	-16.44
			Max. Vy	27	-0.80	-16.10	0.01
			Max. Vx	20	0.68	4.61	-16.44
		Diagonal	Max Tension	11	15.84	0.00	0.00
			Max. Compression	28	-17.64	0.00	0.00
			Max. Mx	32	12.18	-0.53	0.06
			Max. My	31	-9.13	-0.38	0.07
			Max. Vy	32	-0.14	-0.53	0.06
			Max. Vx	31	-0.01	0.00	0.00
T13	60 - 40	Leg	Max Tension	32	382.31	-6.99	-0.05
			Max. Compression	19	-476.46	4.59	-0.03
			Max. Mx	32	379.88	-23.46	-0.04
			Max. My	31	-44.24	4.64	-16.44
			Max. Vy	27	1.14	-23.43	0.01
			Max. Vx	31	-0.75	4.64	-16.44
		Diagonal	Max Tension	26	17.77	0.00	0.00
			Max. Compression	9	-17.02	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	32	15.51	-0.55	0.06
			Max. My	32	15.51	-0.55	0.06
			Max. Vy	32	-0.15	-0.55	0.06
			Max. Vx	33	0.01	0.00	0.00
T14	40 - 20	Leg	Max Tension	32	419.87	-23.46	-0.04
			Max. Compression	19	-515.23	24.64	-0.05
			Max. Mx	19	-515.23	24.64	-0.05
			Max. My	20	-45.00	12.04	-24.61
			Max. Vy	27	-1.48	-23.43	0.01
			Max. Vx	20	1.14	12.04	-24.61
		Diagonal	Max Tension	8	15.71	0.00	0.00
			Max. Compression	33	-18.99	0.00	0.00
			Max. Mx	32	8.61	-0.65	0.09
			Max. My	32	-17.38	-0.37	0.12
			Max. Vy	32	-0.16	-0.65	0.09
			Max. Vx	32	-0.01	0.00	0.00
T15	20 - 0	Leg	Max Tension	15	440.57	-13.19	-0.05
			Max. Compression	19	-557.96	-0.00	0.00
			Max. Mx	19	-554.90	24.64	-0.05
			Max. My	20	-54.80	12.04	-24.61
			Max. Vy	24	1.38	24.61	0.00
			Max. Vx	20	-1.46	12.04	-24.61
		Diagonal	Max Tension	33	21.19	0.00	0.00
			Max. Compression	8	-18.76	0.00	0.00
			Max. Mx	34	19.80	-0.59	-0.07
			Max. My	33	2.32	-0.52	0.09
			Max. Vy	34	-0.17	-0.59	-0.07
			Max. Vx	33	-0.01	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	30	573.74	44.70	-26.07
	Max. H_x	13	540.16	47.93	-27.89
	Max. H_z	22	-454.52	-46.79	27.22
	Min. Vert	5	-455.91	-41.61	24.21
	Min. H_x	22	-454.52	-46.79	27.22
	Min. H_z	13	540.16	47.93	-27.89
Leg B	Max. Vert	24	572.75	-44.66	-26.09
	Max. H_x	32	-455.51	46.78	27.28
	Max. H_z	32	-455.51	46.78	27.28
	Min. Vert	15	-456.28	41.58	24.27
	Min. H_x	7	539.80	-47.90	-27.93
	Min. H_z	7	539.80	-47.90	-27.93
Leg A	Max. Vert	19	575.34	0.04	51.81
	Max. H_x	14	37.13	2.90	3.00
	Max. H_z	2	541.14	0.05	55.51
	Min. Vert	10	-455.80	-0.06	-48.17
	Min. H_x	6	37.13	-2.91	3.00
	Min. H_z	27	-453.59	-0.06	-54.14

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	109.93	0.00	0.00	-11.68	5.04	-0.00
Dead+Wind 0 deg - No Ice	109.93	0.00	-82.99	-12233.38	5.08	2.73
Dead+Wind 30 deg - No Ice	109.93	40.58	-70.37	-10421.45	-5997.97	-3.26
Dead+Wind 45 deg - No Ice	109.93	57.18	-57.25	-8487.52	-8460.76	-6.01
Dead+Wind 60 deg - No Ice	109.93	69.79	-40.34	-5988.27	-10334.30	-8.35
Dead+Wind 90 deg - No Ice	109.93	81.16	-0.00	-11.87	-12000.99	-11.33
Dead+Wind 120 deg - No Ice	109.93	71.78	41.49	6099.02	-10567.04	-11.38
Dead+Wind 135 deg - No Ice	109.93	57.18	57.25	8463.92	-8460.69	-9.82
Dead+Wind 150 deg - No Ice	109.93	40.58	70.37	10397.97	-5997.93	-7.92
Dead+Wind 180 deg - No Ice	109.93	-0.00	80.68	11941.19	5.09	-2.67
Dead+Wind 210 deg - No Ice	109.93	-40.58	70.37	10397.97	6008.10	3.26
Dead+Wind 225 deg - No Ice	109.93	-57.18	57.25	8463.92	8470.86	6.02
Dead+Wind 240 deg - No Ice	109.93	-71.78	41.49	6099.02	10577.21	8.66
Dead+Wind 270 deg - No Ice	109.93	-81.16	-0.00	-11.86	12011.16	11.33
Dead+Wind 300 deg - No Ice	109.93	-69.79	-40.34	-5988.26	10344.47	11.03
Dead+Wind 315 deg - No Ice	109.93	-57.18	-57.25	-8487.51	8470.92	9.80
Dead+Wind 330 deg - No Ice	109.93	-40.58	-70.37	-10421.44	6008.14	7.92
Dead+Ice+Temp	168.01	0.00	0.00	-28.25	13.67	-0.00
Dead+Wind 0 deg+Ice+Temp	168.01	-0.00	-83.95	-12593.28	13.83	2.39
Dead+Wind 30 deg+Ice+Temp	168.01	41.36	-71.71	-10793.39	-6195.92	-4.16
Dead+Wind 45 deg+Ice+Temp	168.01	58.36	-58.42	-8802.17	-8752.23	-7.16
Dead+Wind 60 deg+Ice+Temp	168.01	71.31	-41.21	-6221.27	-10702.90	-9.67
Dead+Wind 90 deg+Ice+Temp	168.01	82.73	-0.00	-28.62	-12405.61	-12.69
Dead+Wind 120 deg+Ice+Temp	168.01	72.64	41.97	6253.88	-10858.26	-12.27
Dead+Wind 135 deg+Ice+Temp	168.01	58.36	58.42	8745.16	-8752.11	-10.51
Dead+Wind 150 deg+Ice+Temp	168.01	41.36	71.71	10736.48	-6195.85	-8.27
Dead+Wind 180 deg+Ice+Temp	168.01	-0.00	82.42	12357.02	13.85	-2.35
Dead+Wind 210 deg+Ice+Temp	168.01	-41.36	71.71	10736.48	6223.52	4.17
Dead+Wind 225 deg+Ice+Temp	168.01	-58.36	58.42	8745.16	8779.78	7.16
Dead+Wind 240 deg+Ice+Temp	168.01	-72.64	41.97	6253.89	10885.93	9.89
Dead+Wind 270 deg+Ice+Temp	168.01	-82.73	-0.00	-28.60	12433.27	12.69
Dead+Wind 300 deg+Ice+Temp	168.01	-71.31	-41.21	-6221.26	10730.56	12.04
Dead+Wind 315 deg+Ice+Temp	168.01	-58.36	-58.42	-8802.16	8779.89	10.51
Dead+Wind 330 deg+Ice+Temp	168.01	-41.36	-71.71	-10793.37	6223.58	8.27
Dead+Wind 0 deg - Service	109.93	0.00	-28.72	-4240.82	5.08	0.94
Dead+Wind 30 deg - Service	109.93	14.04	-24.35	-3613.82	-2072.15	-1.14
Dead+Wind 45 deg - Service	109.93	19.79	-19.81	-2944.61	-2924.34	-2.09
Dead+Wind 60 deg - Service	109.93	24.15	-13.96	-2079.79	-3572.64	-2.89
Dead+Wind 90 deg - Service	109.93	28.08	-0.00	-11.77	-4149.37	-3.91
Dead+Wind 120 deg - Service	109.93	24.84	14.36	2102.78	-3653.20	-3.94
Dead+Wind 135 deg - Service	109.93	19.79	19.81	2921.10	-2924.33	-3.40
Dead+Wind 150 deg - Service	109.93	14.04	24.35	3590.31	-2072.14	-2.76
Dead+Wind 180 deg - Service	109.93	0.00	27.92	4124.30	5.09	-0.93
Dead+Wind 210 deg - Service	109.93	-14.04	24.35	3590.31	2082.31	1.14
Dead+Wind 225 deg - Service	109.93	-19.79	19.81	2921.10	2934.50	2.09
Dead+Wind 240 deg - Service	109.93	-24.84	14.36	2102.78	3663.36	3.00
Dead+Wind 270 deg - Service	109.93	-28.08	-0.00	-11.77	4159.54	3.91
Dead+Wind 300 deg - Service	109.93	-24.15	-13.96	-2079.79	3582.81	3.82
Dead+Wind 315 deg - Service	109.93	-19.79	-19.81	-2944.61	2934.51	3.40
Dead+Wind 330 deg - Service	109.93	-14.04	-24.35	-3613.82	2082.31	2.76

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-109.93	0.00	0.00	109.93	0.00	0.000%
2	0.00	-109.93	-82.99	-0.00	109.93	82.99	0.000%
3	40.58	-109.93	-70.37	-40.58	109.93	70.37	0.000%
4	57.18	-109.93	-57.25	-57.18	109.93	57.25	0.000%
5	69.79	-109.93	-40.34	-69.79	109.93	40.34	0.000%
6	81.16	-109.93	-0.00	-81.16	109.93	0.00	0.000%
7	71.78	-109.93	41.49	-71.78	109.93	-41.49	0.000%
8	57.18	-109.93	57.25	-57.18	109.93	-57.25	0.000%
9	40.58	-109.93	70.37	-40.58	109.93	-70.37	0.000%
10	0.00	-109.93	80.68	0.00	109.93	-80.68	0.000%
11	-40.58	-109.93	70.37	40.58	109.93	-70.37	0.000%
12	-57.18	-109.93	57.25	57.18	109.93	-57.25	0.000%
13	-71.78	-109.93	41.49	71.78	109.93	-41.49	0.000%
14	-81.16	-109.93	-0.00	81.16	109.93	0.00	0.000%
15	-69.79	-109.93	-40.34	69.79	109.93	40.34	0.000%
16	-57.18	-109.93	-57.25	57.18	109.93	57.25	0.000%
17	-40.58	-109.93	-70.37	40.58	109.93	70.37	0.000%
18	0.00	-168.01	0.00	-0.00	168.01	-0.00	0.000%
19	0.00	-168.01	-83.95	0.00	168.01	83.95	0.000%
20	41.36	-168.01	-71.71	-41.36	168.01	71.71	0.000%
21	58.36	-168.01	-58.42	-58.36	168.01	58.42	0.000%
22	71.31	-168.01	-41.21	-71.31	168.01	41.21	0.000%
23	82.73	-168.01	0.00	-82.73	168.01	0.00	0.000%
24	72.64	-168.01	41.98	-72.64	168.01	-41.97	0.000%
25	58.36	-168.01	58.42	-58.36	168.01	-58.42	0.000%
26	41.36	-168.01	71.71	-41.36	168.01	-71.71	0.000%
27	0.00	-168.01	82.42	0.00	168.01	-82.42	0.000%
28	-41.36	-168.01	71.71	41.36	168.01	-71.71	0.000%
29	-58.36	-168.01	58.42	58.36	168.01	-58.42	0.000%
30	-72.64	-168.01	41.98	72.64	168.01	-41.97	0.000%
31	-82.73	-168.01	0.00	82.73	168.01	0.00	0.000%
32	-71.31	-168.01	-41.21	71.31	168.01	41.21	0.000%
33	-58.36	-168.01	-58.42	58.36	168.01	58.42	0.000%
34	-41.36	-168.01	-71.71	41.36	168.01	71.71	0.000%
35	0.00	-109.93	-28.72	0.00	109.93	28.72	0.000%
36	14.04	-109.93	-24.35	-14.04	109.93	24.35	0.000%
37	19.79	-109.93	-19.81	-19.79	109.93	19.81	0.000%
38	24.15	-109.93	-13.96	-24.15	109.93	13.96	0.000%
39	28.08	-109.93	0.00	-28.08	109.93	0.00	0.000%
40	24.84	-109.93	14.36	-24.84	109.93	-14.36	0.000%
41	19.79	-109.93	19.81	-19.79	109.93	-19.81	0.000%
42	14.04	-109.93	24.35	-14.04	109.93	-24.35	0.000%
43	0.00	-109.93	27.92	0.00	109.93	-27.92	0.000%
44	-14.04	-109.93	24.35	14.04	109.93	-24.35	0.000%
45	-19.79	-109.93	19.81	19.79	109.93	-19.81	0.000%
46	-24.84	-109.93	14.36	24.84	109.93	-14.36	0.000%
47	-28.08	-109.93	0.00	28.08	109.93	0.00	0.000%
48	-24.15	-109.93	-13.96	24.15	109.93	13.96	0.000%
49	-19.79	-109.93	-19.81	19.79	109.93	19.81	0.000%
50	-14.04	-109.93	-24.35	14.04	109.93	24.35	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	4	0.00000001	0.00000096
3	Yes	4	0.00000001	0.00000144
4	Yes	4	0.00000001	0.00000148
5	Yes	4	0.00000001	0.00000142
6	Yes	4	0.00000001	0.00000152
7	Yes	4	0.00000001	0.00000098
8	Yes	4	0.00000001	0.00000149
9	Yes	4	0.00000001	0.00000147
10	Yes	4	0.00000001	0.00000142
11	Yes	4	0.00000001	0.00000144
12	Yes	4	0.00000001	0.00000146
13	Yes	4	0.00000001	0.00000098
14	Yes	4	0.00000001	0.00000152
15	Yes	4	0.00000001	0.00000142
16	Yes	4	0.00000001	0.00000150
17	Yes	4	0.00000001	0.00000147
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000331
20	Yes	4	0.00000001	0.00000426
21	Yes	4	0.00000001	0.00000410
22	Yes	4	0.00000001	0.00000419
23	Yes	4	0.00000001	0.00000444
24	Yes	4	0.00000001	0.00000333
25	Yes	4	0.00000001	0.00000354
26	Yes	4	0.00000001	0.00000428
27	Yes	4	0.00000001	0.00000418
28	Yes	4	0.00000001	0.00000426
29	Yes	4	0.00000001	0.00000350
30	Yes	4	0.00000001	0.00000333
31	Yes	4	0.00000001	0.00000443
32	Yes	4	0.00000001	0.00000418
33	Yes	4	0.00000001	0.00000412
34	Yes	4	0.00000001	0.00000427
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000147
38	Yes	4	0.00000001	0.00000150
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000149
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000143
48	Yes	4	0.00000001	0.00000150
49	Yes	4	0.00000001	0.00000148
50	Yes	4	0.00000001	0.00000143

Maximum Tower Deflections - Service Wind

Section No.	*Elevation* *ft*	*Horz. Deflection* *in*	*Gov. Load Comb.*	*Tilt* °	*Twist* °
T1	280 - 270	11.795	35	0.4322	0.0344
T2	270 - 250	10.868	35	0.4281	0.0297
T3	250 - 230	9.082	35	0.4028	0.0262
T4	230 - 220	7.434	35	0.3570	0.0218
T5	220 - 200	6.700	35	0.3273	0.0166

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T6	200 - 180	5.401	35	0.2836	0.0108
T7	180 - 160	4.273	35	0.2404	0.0069
T8	160 - 140	3.313	35	0.2053	0.0051
T9	140 - 120	2.485	35	0.1751	0.0037
T10	120 - 100	1.780	35	0.1427	0.0024
T11	100 - 80	1.213	35	0.1151	0.0018
T12	80 - 60	0.773	35	0.0869	0.0013
T13	60 - 40	0.437	35	0.0633	0.0009
T14	40 - 20	0.202	35	0.0396	0.0006
T15	20 - 0	0.055	35	0.0196	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
280.00	Flash Beacon Lighting	35	11.795	0.4322	0.0344	93612
250.00	RR90-17-02DP	35	9.082	0.4028	0.0262	40821
245.00	DB420-A	35	8.653	0.3934	0.0258	31299
235.00	DB225-2-F	35	7.826	0.3707	0.0238	19957
200.00	(3) DB980H120E-M	35	5.401	0.2836	0.0108	30854
190.00	(3) DB980H120E-M	35	4.816	0.2619	0.0087	28782
180.00	(3) DB980H120E-M	35	4.273	0.2404	0.0069	26783
170.00	APXVSPP18-C-A20	35	3.774	0.2216	0.0058	31422
160.00	7770.00	35	3.313	0.2053	0.0051	38470
150.00	APXV18-206517S	35	2.884	0.1903	0.0044	39877
140.00	LNX-6514DS-VTM	35	2.485	0.1751	0.0037	40128

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	280 - 270	35.763	19	1.3172	0.1363
T2	270 - 250	32.940	19	1.3053	0.1174
T3	250 - 230	27.496	19	1.2293	0.0993
T4	230 - 220	22.465	19	1.0904	0.0804
T5	220 - 200	20.221	19	0.9997	0.0599
T6	200 - 180	16.251	19	0.8648	0.0376
T7	180 - 160	12.819	19	0.7295	0.0233
T8	160 - 140	9.912	19	0.6202	0.0169
T9	140 - 120	7.417	19	0.5270	0.0121
T10	120 - 100	5.304	19	0.4280	0.0079
T11	100 - 80	3.609	19	0.3447	0.0058
T12	80 - 60	2.294	19	0.2597	0.0042
T13	60 - 40	1.296	19	0.1888	0.0029
T14	40 - 20	0.598	19	0.1180	0.0018
T15	20 - 0	0.161	19	0.0582	0.0009

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
280.00	Flash Beacon Lighting	19	35.763	1.3172	0.1363	32672
250.00	RR90-17-02DP	19	27.496	1.2293	0.0993	13449
245.00	DB420-A	19	26.187	1.2008	0.0965	10315
235.00	DB225-2-F	19	23.663	1.1320	0.0881	6648
200.00	(3) DB980H120E-M	19	16.251	0.8648	0.0376	9745
190.00	(3) DB980H120E-M	19	14.469	0.7970	0.0298	9121
180.00	(3) DB980H120E-M	19	12.819	0.7295	0.0233	8531
170.00	APXVSPP18-C-A20	19	11.306	0.6709	0.0194	10046
160.00	7770.00	19	9.912	0.6202	0.0169	12358
150.00	APXV18-206517S	19	8.618	0.5738	0.0145	12811
140.00	LNX-6514DS-VTM	19	7.417	0.5270	0.0121	12909

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	280	Leg	A325N	0.6250	5	1.99	12.89	0.154 ✔	1.333	Bolt DS
T2	270	Leg	A325N	0.7500	5	6.15	18.56	0.331 ✔	1.333	Bolt DS
T3	250	Leg	A325N	1.0000	6	11.47	34.49	0.333 ✔	1.333	Bolt Tension
T4	230	Leg	A325N	1.0000	6	12.28	34.56	0.355 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	5.72	6.93	0.826 ✔	1.333	Member Block Shear
T5	220	Leg	A325N	1.0000	6	17.14	34.56	0.496 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	5.88	7.61	0.773 ✔	1.333	Member Block Shear
T6	200	Leg	A325N	1.0000	6	21.75	34.56	0.629 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	7.86	7.61	1.033 ✔	1.333	Member Block Shear
		Top Girt	A325N	1.0000	1	3.81	7.61	0.501 ✔	1.333	Member Block Shear
		Mid Girt	A325N	1.0000	1	4.76	7.61	0.625 ✔	1.333	Member Block Shear
T7	180	Leg	A325N	1.2500	6	27.54	54.00	0.510 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.2500	1	10.25	13.59	0.754 ✔	1.333	Member Block Shear
		Top Girt	A325N	1.2500	1	6.15	12.69	0.485 ✔	1.333	Member Block Shear
		Mid Girt	A325N	1.2500	1	6.53	12.69	0.514 ✔	1.333	Member Block Shear
T8	160	Leg	A325N	1.2500	6	34.72	54.00	0.643 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.2500	1	11.52	15.86	0.726 ✔	1.333	Member Block Shear
		Top Girt	A325N	1.2500	1	5.17	15.86	0.326 ✔	1.333	Member Block Shear
T9	140	Leg	A325N	1.2500	6	41.92	54.00	0.776 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.2500	1	12.74	15.86	0.803 ✔	1.333	Member Block Shear

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T10	120	Leg	A325N	1.2500	12	23.27	54.00	0.431 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	2	8.20	25.15	0.326 ✓	1.333	Member Block Shear
T11	100	Leg	A325N	1.2500	12	26.50	54.00	0.491 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	2	8.59	25.15	0.342 ✓	1.333	Member Block Shear
T12	80	Leg	A325N	1.2500	12	29.52	54.00	0.547 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	2	7.92	25.15	0.315 ✓	1.333	Member Block Shear
T13	60	Leg	A325N	1.2500	12	31.86	54.00	0.590 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	2	8.89	25.15	0.353 ✓	1.333	Member Block Shear
T14	40	Leg	A325N	1.2500	12	34.99	54.00	0.648 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	2	7.85	25.15	0.312 ✓	1.333	Member Block Shear
T15	20	Leg	A687	2.0000	6	73.43	155.51	0.472 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	2	10.59	25.15	0.421 ✓	1.333	Member Block Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	280 - 270	1 3/4	10.00	2.25	61.7 K=1.00	22.423	2.4053	-9.93	53.93	0.184 ✓
T2	270 - 250	2	20.00	2.38	57.0 K=1.00	23.223	3.1416	-30.74	72.96	0.421 ✓
T3	250 - 230	2 1/2	20.00	2.38	45.6 K=1.00	25.022	4.9087	-80.87	122.83	0.658 ✓
T4	230 - 220	Pirod 105245	10.02	10.02	37.8 K=1.00	26.132	5.3014	-85.14	138.54	0.615 ✓
T5	220 - 200	Pirod 105218	20.03	10.02	32.4 K=1.00	26.848	7.2158	-118.42	193.73	0.611 ✓
T6	200 - 180	Pirod 105218	20.03	10.02	32.4 K=1.00	26.848	7.2158	-152.03	193.73	0.785 ✓
T7	180 - 160	Pirod 105219	20.03	10.02	28.4 K=1.00	27.351	9.4248	-195.79	257.78	0.760 ✓
T8	160 - 140	Pirod 105220	20.03	10.02	25.2 K=1.00	27.723	11.9282	-250.76	330.69	0.758 ✓
T9	140 - 120	Pirod 105220	20.03	10.02	25.2 K=1.00	27.723	11.9282	-304.48	330.69	0.921 ✓
T10	120 - 100	Pirod 112743	20.03	20.03	32.6 K=1.00	26.826	14.7262	-336.47	395.05	0.852 ✓

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T11	100 - 80	Pirod 112743	20.03	20.03	32.6 K=1.00	26.826	14.7262	-388.30	395.05	0.983 ✓
T12	80 - 60	Pirod 112744	20.03	20.03	32.6 K=1.00	26.829	17.8187	-431.64	478.06	0.903 ✓
T13	60 - 40	Pirod 112744	20.03	20.03	32.6 K=1.00	26.829	17.8187	-476.46	478.06	0.997 ✓
T14	40 - 20	Pirod 112745	20.03	20.03	32.5 K=1.00	26.833	21.2057	-515.23	569.01	0.905 ✓
T15	20 - 0	Pirod 112740	20.03	20.03	32.5 K=1.00	26.833	21.2057	-557.96	569.01	0.981 ✓

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V K	Allow. V_a K	Stress Ratio
T4	230 - 220	0.5	1.47	141.2	7.490	0.1963	0.74	1.65	0.447 ✓
T5	220 - 200	0.5	1.46	140.0	7.617	0.1963	0.53	1.67	0.315 ✓
T6	200 - 180	0.5	1.46	140.0	7.617	0.1963	1.02	1.67	0.607 ✓
T7	180 - 160	0.625	1.45	111.1	11.525	0.3068	1.06	3.96	0.269 ✓
T8	160 - 140	0.625	1.43	110.2	11.648	0.3068	1.53	4.00	0.383 ✓
T9	140 - 120	0.625	1.43	110.2	11.648	0.3068	1.83	4.00	0.459 ✓
T10	120 - 100	0.75	1.73	110.5	12.229	0.4418	0.76	7.44	0.102 ✓
T11	100 - 80	0.75	1.73	110.5	12.229	0.4418	0.83	7.44	0.112 ✓
T12	80 - 60	0.75	1.71	109.5	12.452	0.4418	0.84	7.58	0.111 ✓
T13	60 - 40	0.75	1.71	109.5	12.452	0.4418	1.16	7.58	0.153 ✓
T14	40 - 20	0.875	1.70	93.0	16.281	0.6013	1.64	13.48	0.122 ✓
T15	20 - 0	0.875	1.70	93.0	16.281	0.6013	1.62	13.48	0.120 ✓

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	280 - 270	7/8	5.48	2.66	109.5	12.454	0.6013	-1.79	7.49	0.238

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
					K=0.75					
T2	270 - 250	7/8	5.54	2.68	110.1 K=0.75	12.325	0.6013	-2.40	7.41	0.324
T3	250 - 230	1	5.54	2.65	95.5 K=0.75	15.734	0.7854	-5.60	12.36	0.453
T4	230 - 220	L2 1/2x2 1/2x3/16	11.42	5.00	121.3 K=1.00	10.097	0.9020	-6.60	9.11	0.725
T5	220 - 200	L3x3x3/16	12.50	5.65	115.3 K=1.01	10.840	1.0900	-6.27	11.82	0.530
T6	200 - 180	L3x3x3/16	13.80	6.35	127.8 K=1.00	9.141	1.0900	-9.18	9.96	0.922
T7	180 - 160	L3x3x5/16	15.24	7.06	143.9 K=1.00	7.216	1.7800	-12.04	12.84	0.937
T8	160 - 140	L3 1/2x3 1/2x5/16	16.80	7.86	136.7 K=1.00	7.989	2.0900	-11.50	16.70	0.689
T9	140 - 120	L3 1/2x3 1/2x5/16	17.62	8.29	144.1 K=1.00	7.188	2.0900	-13.46	15.02	0.896
T10	120 - 100	2L3 1/2x3 1/2x5/16	26.26	12.43	133.8 K=0.97	8.337	4.1800	-18.20	34.85	0.522
T11	100 - 80	2L3 1/2x3 1/2x5/16	27.59	13.12	139.7 K=0.96	7.653	4.1800	-17.19	31.99	0.537
T12	80 - 60	2L3 1/2x3 1/2x5/16	29.01	13.85	145.8 K=0.95	7.022	4.1800	-17.64	29.35	0.601
T13	60 - 40	2L3 1/2x3 1/2x5/16	30.49	14.60	152.2 K=0.94	6.446	4.1800	-17.02	26.94	0.632
T14	40 - 20	2L3 1/2x3 1/2x5/16	32.02	15.38	158.8 K=0.93	5.922	4.1800	-18.99	24.75	0.767
T15	20 - 0	2L3 1/2x3 1/2x5/16	33.61	16.18	165.6 K=0.92	5.446	4.1800	-18.76	22.77	0.824

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	280 - 270	7/8	5.00	4.85	186.4 K=0.70	4.298	0.6013	-0.16	2.58	0.063
T2	270 - 250	7/8	5.00	4.83	185.6 K=0.70	4.335	0.6013	-0.32	2.61	0.123
T3	250 - 230	7/8	5.00	4.79	184.0 K=0.70	4.411	0.6013	-0.61	2.65	0.230

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	280 - 270	1	5.00	4.85	163.1 K=0.70	5.614	0.7854	-0.69	4.41	0.156
T2	270 - 250	1	5.00	4.83	162.4 K=0.70	5.662	0.7854	-0.81	4.45	0.181
T3	250 - 230	1 1/4	5.00	4.79	128.8 K=0.70	9.002	1.2272	-1.51	11.05	0.137
T6	200 - 180	L3x3x3/16	8.00	6.63	133.4 K=1.00	8.393	1.0900	-2.88	9.15	0.314
T7	180 - 160	L4x4x1/4	10.00	8.54	128.9 K=1.00	8.983	1.9400	-4.45	17.43	0.255
T8	160 - 140	L3 1/2x3 1/2x5/16	12.00	10.54	183.3 K=1.00	4.443	2.0900	-3.69	9.29	0.397

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	280 - 270	1	5.00	4.85	163.1 K=0.70	5.614	0.7854	-0.70	4.41	0.158
T2	270 - 250	1	5.00	4.83	162.4 K=0.70	5.662	0.7854	-0.95	4.45	0.214
T3	250 - 230	1 1/4	5.00	4.79	128.8 K=0.70	9.002	1.2272	-0.95	11.05	0.086

Mid Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	280 - 270	1	5.00	4.85	163.1 K=0.70	5.614	0.7854	-0.01	4.41	0.002
T2	270 - 250	1	5.00	4.83	162.4 K=0.70	5.662	0.7854	-0.18	4.45	0.040
T6	200 - 180	L3x3x3/16	9.00	7.63	153.5 K=1.00	6.336	1.0900	-3.40	6.91	0.492
T7	180 - 160	L4x4x1/4	11.00	9.54	144.0 K=1.00	7.199	1.9400	-4.60	13.97	0.329

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	280 - 270	1 3/4	10.00	2.25	61.7	32.500	1.2339	6.33	40.10	0.158 ✓
T2	270 - 250	2	20.00	2.38	57.0	32.500	1.5625	25.53	50.78	0.503 ✓
T3	250 - 230	2 1/2	20.00	2.38	45.6	30.000	4.9087	68.82	147.26	0.467 ✓
T4	230 - 220	Pirod 105245	10.02	10.02	37.8	30.000	5.3014	73.67	159.04	0.463 ✓
T5	220 - 200	Pirod 105218	20.03	10.02	32.4	30.000	7.2158	102.83	216.47	0.475 ✓
T6	200 - 180	Pirod 105218	20.03	10.02	32.4	30.000	7.2158	130.52	216.47	0.603 ✓
T7	180 - 160	Pirod 105219	20.03	10.02	28.4	30.000	9.4248	165.27	282.74	0.585 ✓
T8	160 - 140	Pirod 105220	20.03	10.02	25.2	30.000	11.9282	208.33	357.85	0.582 ✓
T9	140 - 120	Pirod 105220	20.03	10.02	25.2	30.000	11.9282	251.50	357.85	0.703 ✓
T10	120 - 100	Pirod 112743	20.03	20.03	32.6	30.000	14.7262	279.28	441.79	0.632 ✓
T11	100 - 80	Pirod 112743	20.03	20.03	32.6	30.000	14.7262	317.97	441.79	0.720 ✓
T12	80 - 60	Pirod 112744	20.03	20.03	32.6	30.000	17.8187	354.20	534.56	0.663 ✓
T13	60 - 40	Pirod 112744	20.03	20.03	32.6	30.000	17.8187	382.31	534.56	0.715 ✓
T14	40 - 20	Pirod 112745	20.03	20.03	32.5	30.000	21.2057	419.87	636.17	0.660 ✓
T15	20 - 0	Pirod 112740	20.03	20.03	32.5	30.000	21.2057	440.57	636.17	0.693 ✓

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V K	Allow. V_a K	Stress Ratio
T4	230 - 220	0.5	1.47	141.2	7.490	0.1963	0.74	1.65	0.447 ✓
T5	220 - 200	0.5	1.46	140.0	7.617	0.1963	0.53	1.67	0.315 ✓
T6	200 - 180	0.5	1.46	140.0	7.617	0.1963	1.02	1.67	0.607 ✓
T7	180 - 160	0.625	1.45	111.1	11.525	0.3068	1.06	3.96	0.269 ✓
T8	160 - 140	0.625	1.43	110.2	11.648	0.3068	1.53	4.00	0.383 ✓
T9	140 - 120	0.625	1.43	110.2	11.648	0.3068	1.83	4.00	0.459 ✓
T10	120 - 100	0.75	1.73	110.5	12.229	0.4418	0.76	7.44	0.102 ✓

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V K	Allow. V_a K	Stress Ratio
T11	100 - 80	0.75	1.73	110.5	12.229	0.4418	0.83	7.44	0.112 ✓
T12	80 - 60	0.75	1.71	109.5	12.452	0.4418	0.84	7.58	0.111 ✓
T13	60 - 40	0.75	1.71	109.5	12.452	0.4418	1.16	7.58	0.153 ✓
T14	40 - 20	0.875	1.70	93.0	16.281	0.6013	1.64	13.48	0.122 ✓
T15	20 - 0	0.875	1.70	93.0	16.281	0.6013	1.62	13.48	0.120 ✓

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	280 - 270	7/8	5.48	2.66	146.0	30.000	0.6013	1.79	18.04	0.099 ✓
T2	270 - 250	7/8	5.54	2.68	146.8	30.000	0.6013	2.40	18.04	0.133 ✓
T3	250 - 230	1	5.54	2.65	127.3	30.000	0.7854	5.51	23.56	0.234 ✓
T4	230 - 220	L2 1/2x2 1/2x3/16	11.42	5.00	80.1	21.600	0.9020	5.72	19.48	0.294 ✓
T5	220 - 200	L3x3x3/16	11.93	5.40	71.5	21.600	1.0900	5.88	23.54	0.250 ✓
T6	200 - 180	L3x3x3/16	13.80	6.35	83.5	21.600	1.0900	7.86	23.54	0.334 ✓
T7	180 - 160	L3x3x5/16	15.24	7.06	94.9	21.600	1.7800	10.25	38.45	0.267 ✓
T8	160 - 140	L3 1/2x3 1/2x5/16	16.80	7.86	89.9	21.600	2.0900	11.52	45.14	0.255 ✓
T9	140 - 120	L3 1/2x3 1/2x5/16	17.62	8.29	94.6	21.600	2.0900	12.74	45.14	0.282 ✓
T10	120 - 100	2L3 1/2x3 1/2x5/16	26.26	12.43	141.6	21.600	4.1800	16.39	90.29	0.182 ✓
T11	100 - 80	2L3 1/2x3 1/2x5/16	27.59	13.12	149.3	21.600	4.1800	17.18	90.29	0.190 ✓
T12	80 - 60	2L3 1/2x3 1/2x5/16	29.01	13.85	157.3	21.600	4.1800	15.84	90.29	0.175 ✓
T13	60 - 40	2L3 1/2x3 1/2x5/16	30.49	14.60	165.7	21.600	4.1800	17.77	90.29	0.197 ✓
T14	40 - 20	2L3 1/2x3 1/2x5/16	32.02	15.38	174.3	21.600	4.1800	15.71	90.29	0.174 ✓
T15	20 - 0	2L3 1/2x3 1/2x5/16	33.61	16.18	183.2	21.600	4.1800	21.19	90.29	0.235 ✓

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	280 - 270	7/8	5.00	4.85	266.3	30.000	0.6013	0.27	18.04	0.015
T2	270 - 250	7/8	5.00	4.83	265.1	30.000	0.6013	0.44	18.04	0.024
T3	250 - 230	7/8	5.00	4.79	262.9	30.000	0.6013	0.77	18.04	0.043

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	280 - 270	1	5.00	4.85	233.0	30.000	0.7854	0.67	23.56	0.028
T2	270 - 250	1	5.00	4.83	232.0	30.000	0.7854	0.81	23.56	0.034
T3	250 - 230	1 1/4	5.00	4.79	184.0	30.000	1.2272	1.55	36.82	0.042
T6	200 - 180	L3x3x3/16	8.00	6.63	89.5	21.600	1.0900	3.81	23.54	0.162
T7	180 - 160	L4x4x1/4	10.00	8.54	86.4	21.600	1.9400	6.15	41.90	0.147
T8	160 - 140	L3 1/2x3 1/2x5/16	12.00	10.54	122.2	21.600	2.0900	5.17	45.14	0.114

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	280 - 270	1	5.00	4.85	233.0	30.000	0.7854	0.73	23.56	0.031
T2	270 - 250	1	5.00	4.83	232.0	30.000	0.7854	1.02	23.56	0.043
T3	250 - 230	1 1/4	5.00	4.79	184.0	30.000	1.2272	1.10	36.82	0.030

Mid Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	280 - 270	1	5.00	4.85	233.0	30.000	0.7854	0.11	23.56	0.005 ✓
T2	270 - 250	1	5.00	4.83	232.0	30.000	0.7854	0.29	23.56	0.012 ✓
T6	200 - 180	L3x3x3/16	9.00	7.63	102.2	21.600	1.0900	4.76	23.54	0.202 ✓
T7	180 - 160	L4x4x1/4	11.00	9.54	96.0	21.600	1.9400	6.53	41.90	0.156 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P_{allow} K	% Capacity	Pass Fail
T1	280 - 270	Leg	1 3/4	2	-9.93	71.89	13.8	Pass
T2	270 - 250	Leg	2	41	25.53	67.69	37.7	Pass
T3	250 - 230	Leg	2 1/2	107	-80.87	163.73	49.4	Pass
T4	230 - 220	Leg	Pirod 105245	171	-85.14	184.67	46.1	Pass
T5	220 - 200	Leg	Pirod 105218	180	-118.42	258.24	45.9	Pass
T6	200 - 180	Leg	Pirod 105218	195	-152.03	258.24	58.9	Pass
T7	180 - 160	Leg	Pirod 105219	216	-195.79	343.62	57.0	Pass
T8	160 - 140	Leg	Pirod 105220	237	-250.76	440.81	56.9	Pass
T9	140 - 120	Leg	Pirod 105220	255	-304.48	440.81	69.1	Pass
T10	120 - 100	Leg	Pirod 112743	270	-336.47	526.59	63.9	Pass
T11	100 - 80	Leg	Pirod 112743	279	-388.30	526.59	73.7	Pass
T12	80 - 60	Leg	Pirod 112744	288	-431.64	637.26	67.7	Pass
T13	60 - 40	Leg	Pirod 112744	297	-476.46	637.26	74.8	Pass
T14	40 - 20	Leg	Pirod 112745	306	-515.23	758.48	67.9	Pass
T15	20 - 0	Leg	Pirod 112740	315	-557.96	758.48	73.6	Pass
T1	280 - 270	Diagonal	7/8	16	-1.79	9.98	17.9	Pass
T2	270 - 250	Diagonal	7/8	54	-2.40	9.88	24.3	Pass
T3	250 - 230	Diagonal	1	116	-5.60	16.47	34.0	Pass
T4	230 - 220	Diagonal	L2 1/2x2 1/2x3/16	174	-6.60	12.14	54.4 61.9 (b)	Pass
T5	220 - 200	Diagonal	L3x3x3/16	183	-6.27	15.75	39.8 58.0 (b)	Pass
T6	200 - 180	Diagonal	L3x3x3/16	204	-9.18	13.28	69.2 77.5 (b)	Pass
T7	180 - 160	Diagonal	L3x3x5/16	228	-12.04	17.12	70.3	Pass
T8	160 - 140	Diagonal	L3 1/2x3 1/2x5/16	246	-11.50	22.26	51.7 54.5 (b)	Pass
T9	140 - 120	Diagonal	L3 1/2x3 1/2x5/16	267	-13.46	20.03	67.2	Pass
T10	120 - 100	Diagonal	2L3 1/2x3 1/2x5/16	276	-18.20	46.45	39.2	Pass
T11	100 - 80	Diagonal	2L3 1/2x3 1/2x5/16	285	-17.19	42.64	40.3	Pass
T12	80 - 60	Diagonal	2L3 1/2x3 1/2x5/16	294	-17.64	39.13	45.1	Pass
T13	60 - 40	Diagonal	2L3 1/2x3 1/2x5/16	300	-17.02	35.92	47.4	Pass
T14	40 - 20	Diagonal	2L3 1/2x3 1/2x5/16	310	-18.99	33.00	57.6	Pass
T15	20 - 0	Diagonal	2L3 1/2x3 1/2x5/16	318	-18.76	30.35	61.8	Pass
T1	280 - 270	Horizontal	7/8	32	-0.16	3.45	4.7	Pass
T2	270 - 250	Horizontal	7/8	98	-0.32	3.47	9.2	Pass
T3	250 - 230	Horizontal	7/8	162	-0.61	3.54	17.3	Pass
T1	280 - 270	Top Girt	1	5	-0.69	5.88	11.7	Pass
T2	270 - 250	Top Girt	1	44	-0.81	5.93	13.6	Pass
T3	250 - 230	Top Girt	1 1/4	109	-1.51	14.73	10.3	Pass
T6	200 - 180	Top Girt	L3x3x3/16	196	-2.88	12.19	23.6 37.6 (b)	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T7	180 - 160	Top Girt	L4x4x1/4	217	-4.45	23.23	19.1 36.4 (b)	Pass
T8	160 - 140	Top Girt	L3 1/2x3 1/2x5/16	238	-3.69	12.38	29.8	Pass
T1	280 - 270	Bottom Girt	1	8	-0.70	5.88	11.9	Pass
T2	270 - 250	Bottom Girt	1	45	-0.95	5.93	16.0	Pass
T3	250 - 230	Bottom Girt	1 1/4	111	-0.95	14.73	6.5	Pass
T1	280 - 270	Mid Girt	1	10	0.11	31.41	0.3	Pass
T2	270 - 250	Mid Girt	1	48	-0.18	5.93	3.0	Pass
T6	200 - 180	Mid Girt	L3x3x3/16	199	-3.40	9.21	36.9 46.9 (b)	Pass
T7	180 - 160	Mid Girt	L4x4x1/4	220	-4.60	18.62	24.7 38.6 (b)	Pass
							Summary	
						Leg (T13)	74.8	Pass
						Diagonal (T6)	77.5	Pass
						Horizontal (T3)	17.3	Pass
						Top Girt (T6)	37.6	Pass
						Bottom Girt (T2)	16.0	Pass
						Mid Girt (T6)	46.9	Pass
						Bolt Checks	77.5	Pass
						RATING =	**77.5**	**Pass**

Mat Foundation Analysis:

Input Data:

Tower Data

Overturning Moment =	$OM := 12593 \cdot ft \cdot kips$	(User Input from tnxTower)
Shear Force =	$S_t := 84 \cdot kip$	(User Input from tnxTower)
Axial Force =	$WT_t := 168 \cdot kip$	(User Input from tnxTower)
Max Compression Force =	$C_t := 575 \cdot kip$	(User Input from tnxTower)
Max Uplift Force =	$U_t := 456 \cdot kip$	(User Input from tnxTower)
Tower Height =	$H_t := 280 \cdot ft$	(User Input)
Tower Width =	$W_t := 28 \cdot ft$	(User Input)
Tower Position on Foundation (1=offset, 2=centered) =	$Pos_t := 1$	(User Input)

Footing Data:

Overall Depth of Footing =	$D_f := 6.0 \cdot ft$	(User Input)
Thickness of Footing =	$T_f := 3.25 \cdot ft$	(User Input)
Width of Footing =	$W_f := 38.5 \cdot ft$	(User Input)
Length of Pier =	$L_p := 3.25 \cdot ft$	(User Input)
Extension of Pier Above Grade =	$L_{pag} := 0.5 \cdot ft$	(User Input)
Diameter of Pier =	$d_p := 5.0 \cdot ft$	(User Input)

Material Properties:

Concrete Compressive Strength =	$f_c := 4000 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 30 \cdot deg$	(User Input)	
Allowable Soil Bearing Capacity =	$q_s := 5000 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 120 \cdot pcf$	(User Input)	
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Foundation Bouyancy =	$Bouyancy := 0$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	$Z := 2$	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	

Pier Reinforcement:

Bar Size =	$BS_{pier} := 9$	(User Input)	
Bar Diameter =	$d_{bpier} := 1.128 \cdot in$	(User Input)	
Number of Bars =	$NB_{pier} := 23$	(User Input)	
Clear Cover of Reinforcement =	$Cvr_{pier} := 3.0 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Diameter of Tie =	$d_{Tie} := 3 \cdot in$	(User Input)	

Pad Reinforcement:

Bar Size =	$BS_{top} := 11$	(User Input)	(Top of Pad)
Bar Diameter =	$d_{btop} := 1.41 \cdot in$	(User Input)	(Top of Pad)
Number of Bars =	$NB_{top} := 60$	(User Input)	(Top of Pad)
Bar Size =	$BS_{bot} := 11$	(User Input)	(Bottom of Pad)
Bar Diameter =	$d_{bbot} := 1.41 \cdot in$	(User Input)	(Bottom of Pad)
Number of Bars =	$NB_{bot} := 60$	(User Input)	(Bottom of Pad)
Clear Cover of Reinforcement =	$Cvr_{pad} := 3.0 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)

Calculated Factors:

Pier Reinforcement Bar Area = $$A_{bpier} := \frac{\pi \cdot d_{bpier}^2}{4} = 0.999 \cdot in^2$$

Pad Top Reinforcement Bar Area = $$A_{btop} := \frac{\pi \cdot d_{btop}^2}{4} = 1.561 \cdot in^2$$

Pad Bottom Reinforcement Bar Area = $$A_{bbot} := \frac{\pi \cdot d_{bbot}^2}{4} = 1.561 \cdot in^2$$

Coefficient of Lateral Soil Pressure = $$K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3$$

Load Factor = $$LF := \begin{cases} 1.333 & \text{if } H_t \le 700 \cdot ft \\ 1.7 & \text{if } H_t \ge 1200 \cdot ft \\ 1.333 + \left(\frac{H_t - 700ft}{1200ft - 700ft}\right) \cdot 0.4 & \text{otherwise} \end{cases} = 1.333$$

Stability of Footing:

Adjusted Concrete Unit Weight = $\gamma_c := \text{if}(\text{Bouyancy} = 1, \gamma_{conc} - 62.4\text{pcf}, \gamma_{conc}) = 150\cdot\text{pcf}$

Adjusted Soil Unit Weight = $\gamma_s := \text{if}(\text{Bouyancy} = 1, \gamma_{soil} - 62.4\text{pcf}, \gamma_{soil}) = 120\cdot\text{pcf}$

Passive Pressure = $P_{pn} := K_p\cdot\gamma_s\cdot n + c\cdot 2\cdot\sqrt{K_p} = 0\cdot\text{ksf}$

$P_{pt} := K_p\cdot\gamma_s\cdot(D_f - T_f) + c\cdot 2\cdot\sqrt{K_p} = 0.99\cdot\text{ksf}$

$P_{top} := \text{if}[n < (D_f - T_f), P_{pt}, P_{pn}] = 0.99\cdot\text{ksf}$

$P_{bot} := K_p\cdot\gamma_s\cdot D_f + c\cdot 2\cdot\sqrt{K_p} = 2.16\cdot\text{ksf}$

$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 1.575\cdot\text{ksf}$

$T_p := \text{if}[n < (D_f - T_f), T_f, (D_f - n)] = 3.25$

$A_p := W_f\cdot T_p = 125.125$

Ultimate Shear = $S_u := P_{ave}\cdot A_p = 197.072\cdot\text{kip}$

Weight of Concrete Pad = $WT_{pad} := (W_f^2\cdot T_f)\cdot\gamma_c = 722.597\cdot\text{kip}$

Weight of Concrete Piers = $WT_{pier} := 3\cdot\left[(L_p\cdot d_p^2)\cdot\gamma_c\right] = 36.563\cdot\text{kip}$

Total Weight of Concrete = $WT_c := WT_{pad} + WT_{pier} = 759\cdot\text{kip}$

Weight of Soil Above Footing = $WT_{s1} := (W_f^2 - 3\cdot d_p^2)\cdot(L_p - L_{pag})\cdot\gamma_s = 464\cdot\text{kip}$

Tower Offset = $X_{t1} := \left[\frac{W_f}{2} - \frac{(W_t\cdot\cos(30\cdot\text{deg}))}{2}\right]$ $\quad X_{t2} := \frac{W_f}{2} - \frac{(W_t\cdot\cos(30\cdot\text{deg}))}{3}$

$X_t := \text{if}(Pos_t, X_{t1}, X_{t2}) = 7.126$

$X_{off} := \frac{W_f}{2} - \left[\frac{(W_t\cdot\cos(30\cdot\text{deg}))}{3} + X_t\right] = 4.041$

Resisting Moment = $M_r := (WT_c + WT_{s1} + WT_t)\cdot\frac{W_f}{2} + S_u\cdot\frac{T_f}{3} = 27001\cdot\text{kip}\cdot\text{ft}$

Overturning Moment = $M_{ot} := OM + S_t\cdot(L_p + T_f) = 13139\cdot\text{kip}\cdot\text{ft}$

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 2.06$

Factor of Safety Required = $FS_{req} := 2$

OverTurning_Moment_Check := if(FS ≥ FS_{req}, "Okay", "No Good")

OverTurning_Moment_Check = "Okay"

Bearing Pressure Caused by Footing:

Total Load = $Load_{tot} := WT_c + WT_{s1} + WT_t = 1392 \cdot kip$

Area of the Mat = $A_{mat} := W_f^2 = 1.482 \times 10^3$

Section Modulus of Mat = $S := \frac{W_f^3}{6} = 9511.1 \cdot ft^3$

Maximum Pressure in Mat = $P_{max} := \frac{Load_{tot}}{A_{mat}} + \frac{M_{ot}}{S} = 2.32 \cdot ksf$

Max_Pressure_Check := if$\left(P_{max} < q_s, \text{"Okay"}, \text{"No Good"}\right)$

Max_Pressure_Check = "Okay"

Minimum Pressure in Mat = $P_{min} := \frac{Load_{tot}}{A_{mat}} - \frac{M_{ot}}{S} = -0.443 \cdot ksf$

Min_Pressure_Check := if$\left[\left(P_{min} \geq 0\right) \cdot \left(P_{min} < q_s\right), \text{"Okay"}, \text{"No Good"}\right]$

Min_Pressure_Check = "No Good"

Distance to Resultant of Pressure Distribution = $X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3} = 10.777$

Distance to Kern = $X_k := \frac{W_f}{6} = 6.417$

Eccentricity = $e := \frac{M_{ot}}{Load_{tot}} = 9.442$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot Load_{tot}}{3 \cdot W_f \left(\frac{W_f}{2} - e\right)} = 2.457 \cdot ksf$

$q_{adj} :=$ if$\left(P_{min} < 0, P_a, P_{max}\right) = 2.457 \cdot ksf$

Pressure_Check := if$\left(q_{adj} < q_s, \text{"Okay"}, \text{"No Good"}\right)$

Pressure_Check = "Okay"

Concrete Bearing Capacity:

Strength Reduction Factor = $\Phi_c := 0.65$ (ACI-2008 9.3.2.2)

Bearing Strength Between Pier and Pad = $P_b := \Phi_c \cdot 0.85 \cdot f_c \cdot \frac{\pi \cdot d_p^2}{4} = 6249 \cdot kips$ (ACI-2008 10.14)

Bearing_Check := if$\left(P_b > LF \cdot C_t, \text{"Okay"}, \text{"No Good"}\right)$

Bearing_Check = "Okay"

Shear Strength of Concrete:

<u>Beam Shear:</u>

(Critical section located at a distance d from the face of Pier) (ACI 11.3.1.1)

$\phi_c := 0.75$ (ACI 9.3.2.3)

$d := T_f - Cvr_{pad} - \frac{d_{bbot}}{2} = 35.295 \cdot in$

$FL := \frac{C_t}{W_f^{\,2}} = 0.3879 \cdot ksf$

$V_{req} := LF \cdot FL \cdot \left(X_t - 0.5 \cdot d_p - d\right) \cdot W_f = 33.534 \cdot kip$

$V_{Avail} := \phi_c \cdot 2 \cdot \sqrt{f_c \cdot psi} \cdot W_f \cdot d = 1547 \cdot kip$ (ACI-2008 11.2.1.1)

Beam_Shear_Check := if($V_{req} < V_{Avail}$, "Okay", "No Good")

Beam_Shear_Check = "Okay"

<u>Punching Shear:</u>

(Critical Section Located at a distance of d/2 from the face of pier) (ACI 11.11.1.2)

Critical Perimeter of Punching Shear = $b_o := \left(d_p + d\right) \cdot 4 = 31.8$

Required Shear Strength = $V_{req} := LF \cdot FL \cdot \left[W_f^{\,2} - \left(d_p + d\right)^2\right] = 733.9 \cdot kips$

Available Shear Strength = $V_{Avail} := \phi_c \cdot 4 \cdot \sqrt{f_c \cdot psi} \cdot b_o \cdot d = 2552.7 \cdot kip$ (ACI-2008 11.11.2.1)

Punching_Shear_Check := if($V_{req} < V_{Avail}$, "Okay", "No Good")

Punching_Shear_Check = "Okay"

Steel Reinforcement in Pad:

Required Reinforcement for Bending:

Strength Reduction Factor = $\phi_m := .90$ (ACI-2008 9.3.2.1)

$M_{max} := 2125 \cdot kip \cdot ft$

Design Moment = $M_n := \frac{LF \cdot M_{max}}{\phi_m} = 3147 \cdot kip \cdot ft$

$$\beta := \begin{cases} 0.85 & \text{if } 2500 \cdot psi \le f_c \le 4000 \cdot psi \\ 0.65 & \text{if } f_c > 8000 \cdot psi \\ \left[0.85 - \left[\frac{\left(\frac{f_c}{psi} - 4000\right)}{1000}\right] \cdot 0.5\right] & \text{otherwise} \end{cases} = 0.85$$

(ACI-200810.2.7.3)

$d := T_f - Cvr_{pad} - d_{bbot} = 34.59 \cdot in$

$A_s := \frac{M_n}{(f_y \cdot d)} = 18.198 \cdot in^2$

$a := \frac{A_s \cdot f_y}{\beta \cdot f_c \cdot W_f} = 0.695 \cdot in$

$A_s := \frac{M_n}{f_y \left(d - \frac{a}{2}\right)} = 18.383 \cdot in^2$

$\rho := \frac{A_s}{W_f \cdot d} = 0.00115$

Required Reinforcement for Temperature and Shrinkage:

$$\rho_{sh} := \begin{cases} .0018 & \text{if } f_y \geq 60000 \cdot psi \\ .0020 & \text{otherwise} \end{cases} = 0.0018$$ (ACI -2008 7.12.2.1)

Check Bottom Bars:

$$As := \begin{cases} (\rho \cdot W_f \cdot d) & \text{if } (\rho \cdot W_f \cdot d) > \rho_{sh} \cdot \frac{W_f}{2} \cdot d \\ \rho_{sh} \cdot \frac{W_f}{2} \cdot d & \text{otherwise} \end{cases} = 18.383 \cdot in^2$$

$$As_{prov} := A_{bbot} \cdot NB_{bot} = 93.7 \cdot in^2$$

Pad_Reinforcement_Bot := if(As_{prov} > As, "Okay", "No Good")

Pad_Reinforcement_Bot = "Okay"

Check top Bars:

$$As := if\left(\rho \geq \rho_{sh}, A_s, \rho_{sh} \cdot \frac{W_f}{2} \cdot d\right) = 14.4 \cdot in^2$$

$$As_{prov} := A_{btop} \cdot NB_{top} = 93.7 \cdot in^2$$

Pad_Reinforcement_Top := if(As_{prov} > As, "Okay", "No Good")

Pad_Reinforcement_Top = "Okay"

Developement Length Pad Reinforcement:

Bar Spacing = $$B_{sPad} := \frac{W_f - 2 \cdot Cvr_{pad} - NB_{bot} \cdot d_{bbot}}{NB_{bot} - 1} = 6.29 \cdot in$$

Spacing or Cover Dimension = $$c := if\left(Cvr_{pad} < \frac{B_{sPad}}{2}, Cvr_{pad}, \frac{B_{sPad}}{2}\right) = 3 \cdot in$$

Transverse Reinforcement Index = $k_{tr} := 0$ (ACI-2008 12.2.3)

$$L_{dbt} := \frac{3 \cdot f_y \cdot \alpha_{pad} \cdot \beta_{pad} \cdot \gamma_{pad} \cdot \lambda_{pad}}{40 \cdot \sqrt{f_c \cdot psi} \cdot \frac{c + k_{tr}}{d_{bbot}}} \cdot d_{bbot} = 47.2 \cdot in$$

Minimum Development Length = $L_{dbmin} := 12 \cdot in$ (ACI-2008 12.2.1)

$L_{dbtCheck}$:= if($L_{dbt} \geq L_{dbmin}$, "Use L.dbt", "Use L.dbmin") = "Use L.dbt"

Available Length in Pad = $$L_{Pad} := \frac{W_f}{2} - \frac{W_t}{2} - Cvr_{pad} = 60 \cdot in$$

Lpad_Check := if($L_{Pad} > L_{dbt}$, "Okay", "No Good")

Lpad_Check = "Okay"

Steel Reinforcement in Pier:

Area of Pier = $A_p := \frac{\pi \cdot d_p^2}{4} = 2827.43 \cdot in^2$

$A_{smin} := 0.01 \cdot 0.5 \cdot A_p = 14.14 \cdot in^2$ (ACI-2008 10.8.4 & 10.9.1)

$A_{sprov} := NB_{pier} \cdot A_{bpier} = 22.98 \cdot in^2$

Steel_Area_Check := if($A_{sprov} > A_{smin}$, "Okay", "No Good")

Steel_Area_Check = "Okay"

Bar Spacing In Pier = $B_{sPier} := \frac{d_p \cdot \pi}{NB_{pier}} - d_{bpier} = 7.067 \cdot in$

Diameter of Reinforcement Cage = $Diam_{cage} := d_p - 2 \cdot Cvr_{pier} = 54 \cdot in$

Maximum Moment in Pier = $M_p := \left[S_t \cdot \left(L_p + \frac{A_{BP}}{2} \right) \right] \cdot LF = 5038.7 \cdot in \cdot kips$

Pier Check evaluated from outside program and results are listed below;

$$\begin{pmatrix} D & N & n & P_u & M_{xu} \end{pmatrix} := \begin{pmatrix} d_p \cdot 12 & NB_{pier} & BS_{pier} & \frac{C_t \cdot 1.333}{kips} & \frac{M_p}{in \cdot kips} \end{pmatrix}$$

$$\begin{pmatrix} D & N & n & P_u & M_{xu} \end{pmatrix} = \begin{pmatrix} 60 & 23 & 9 & 766.5 & 5038.7 \end{pmatrix}$$

$$\begin{pmatrix} \phi P_n & \phi M_{xn} & f_{sp} & \rho \end{pmatrix} := \begin{pmatrix} 0 & 0 & 0 & 0 \end{pmatrix}$$

$$\begin{pmatrix} \phi P_n & \phi M_{xn} & f_{sp} & \rho \end{pmatrix} := \phi P'_n(D, N, n, P_u, M_{xu})^T$$

$$\begin{pmatrix} \phi P_n & \phi M_{xn} & f_{sp} & \rho \end{pmatrix} = \begin{pmatrix} 4474 & 29411.5 & -21.4 & 0 \end{pmatrix}$$

Axial_Load_Check := if($\phi P_n \ge P_u$, "Okay", "No Good")

Axial_Load_Check = "Okay"

Bending_Check := if($\phi M_{xn} \ge M_{xu}$, "Okay", "No Good")

Bending_Check = "Okay"

Development Length Pier Reinforcement:

Available Length In Foundation:

$L_{pier} := L_p - Cvr_{pier} = 36 \cdot in$

$L_{pad} := T_f - Cvr_{pad} = 36 \cdot in$

Tension: (ACI-2008 12.2.3)

Spacing or Cover Dimension = $c := if\left(Cvr_{pier} < \frac{B_{sPier}}{2}, Cvr_{pier}, \frac{B_{sPier}}{2}\right) = 3 \cdot in$

Transverse Reinforcement = $k_{tr} := 0$ (ACI-2008 12.2.3)

$$L_{dbt} := \frac{3 \cdot f_y \cdot \alpha_{pier} \cdot \beta_{pier} \cdot \gamma_{pier} \cdot \lambda_{pier}}{40 \cdot \sqrt{f_c \cdot psi} \cdot \left(\frac{c + k_{tr}}{d_{bpier}}\right)} \cdot d_{bpier} = 30.18 \cdot in$$

Minimum Development Length = $L_{dh} := \frac{1200 \cdot d_{bpier}}{\sqrt{\frac{f_c}{psi}}} \cdot .7 = 14.982 \cdot in$ (ACI 12.2.1)

Pier reinforcement bars are standard 90 degree hooks and therefore developement in the pad is computed as follows:

$L_{db} := max(L_{dbt}, L_{dbmin})$

$L_{tension\_Check} := if(L_{pier} + L_{pad} > L_{dbt}, \text{"Okay"}, \text{"No Good"})$

$L_{tension\_Check} = \text{"Okay"}$

Compression: (ACI-2008 12.3.2)

$$L_{dbc1} := \frac{.02 \cdot d_{bpier} \cdot f_y}{\sqrt{f_c \cdot psi}} = 21.402 \cdot in$$

$$L_{dbmin} := 0.0003 \cdot \frac{in^2}{lb} \cdot (d_{bpier} \cdot f_y) = 20.304 \cdot in$$

$L_{dbc} := if(L_{dbc1} \geq L_{dbmin}, L_{dbc1}, L_{dbmin}) = 21.402 \cdot in$

$L_{compression\_Check} := if(L_{pier} + L_{pad} > L_{dbc}, \text{"Okay"}, \text{"No Good"})$

$L_{compression\_Check} = \text{"Okay"}$

at&t

WIRELESS COMMUNICATIONS FACILITY

CT5633

SEYMOUR EAST

6 PROGRESS AVENUE

SEYMOUR, CT 06483

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2005 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2009 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "F" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES," 2005 CONNECTICUT FIRE SAFETY CODE AND 2009 AMENDMENTS, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. THE COMPOUND, TOWER, PRIMARY GROUND RING, ELECTRICAL SERVICE TO THE METER BANK AND TELEPHONE SERVICE TO THE DEMARCATION POINT ARE PROVIDED BY SITE OWNER. AS BUILT FIELD CONDITIONS REGARDING THESE ITEMS SHALL BE CONFIRMED BY THE CONTRACTOR. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.
3. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
4. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
5. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
6. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
7. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
8. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING BUILDING'S/PROPERTY'S OPERATIONS, COORDINATE WORK WITH BUILDING/PROPERTY OWNER.
10. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
11. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
12. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
13. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED' ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE AT&T CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
15. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
16. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
17. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
18. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
19. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
20. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED PRIOR TO ANY EXCAVATION WORK. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
21. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

FROM: 500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT

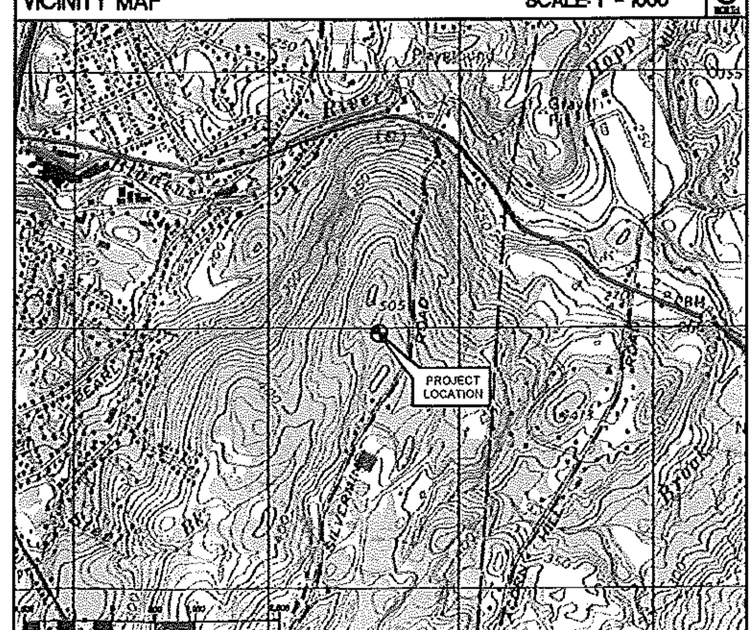
TO: 6 PROGRESS AVENUE
SEYMOUR, CT 06483

1.	Take ramp left for I-91 South	9.1 mi
2.	At exit 18, take ramp right for I-691 West toward Meriden / Waterbury	7.9 mi
3.	At exit 1, take ramp left for I-84 West toward Waterbury / Danbury	8.6 mi
4.	At exit 19, take ramp left for CT-8 South toward Bridgeport / Naugatuck	11.2 mi
5.	At exit 22, take ramp right for CT-67 toward Seymour / Bank St	0.2 mi
6.	Turn left onto CT-67 / New Haven Rd	1.3 mi
7.	Turn right onto Cogwheel Ln	0.5 mi
8.	Turn right onto Progress Ave	375 ft

Arrive at 6 Progress Ave, Seymour, CT 06483

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK GENERALLY CONSISTS OF THE INSTALLATION OF ONE (1) LTE ANTENNA PER SECTOR FOR A TOTAL OF (3) LTE ANTENNAS TO THE EXISTING AT&T ANTENNA ARRAY. AN LTE RADIO EQUIPMENT CABINET AND REPLACEMENT POWER CABINET WILL BE INSTALLED ON THE EXISTING CONCRETE EQUIPMENT PAD.
2. ADDITIONALLY, (2) REMOTE RADIO UNITS (RRUs) PER SECTOR WILL BE INSTALLED. SURGE ARRESTORS WILL BE INSTALLED AT BOTH AT&T RRU AND EQUIPMENT LOCATIONS. REFER TO THESE ACCOMPANYING DRAWINGS FOR FURTHER INFORMATION.

PROJECT INFORMATION

AT&T SITE NUMBER:	CT5633
AT&T SITE NAME:	SEYMOUR EAST
SITE ADDRESS:	6 PROGRESS AVENUE SEYMOUR, CT 06483
LESSEE/APPLICANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
ENGINEER:	CENTEX ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT. 06405
PROJECT COORDINATES:	LATITUDE: 41°-23'-30"N LONGITUDE: 73°-03'-12"W GROUND ELEVATION: ±480'AMSL

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	1
N-1	NOTES AND SPECIFICATIONS	1
C-1	PLANS AND DETAIL	1
C-2	LTE EQUIPMENT DETAILS	1
E-1	ELECTRICAL DETAILS AND NOTES	1
E-2	ELECTRICAL DETAILS	1

DESIGNED BY:	DEB
DRAWN BY:	FLO
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	
1	6/19/12	DEB	CFC	CONSTRUCTION
0	05/30/12	DMD	DEB	CONSTRUCTION - CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT
LICENSED PROFESSIONAL ENGINEER

at&t

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WIRELESS COMMUNICATIONS FACILITY LTE UPGRADE

CT5633

SEYMOUR EAST

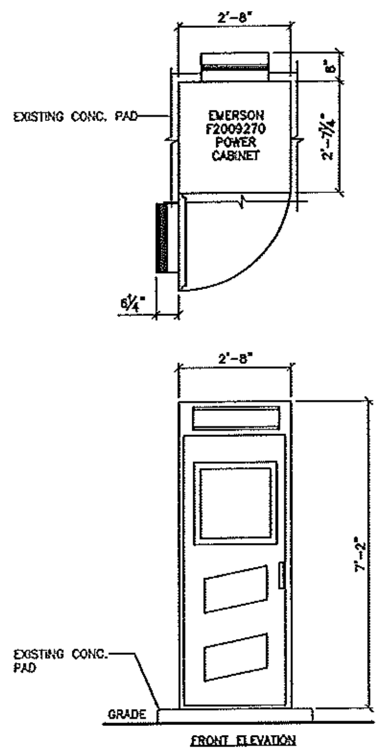
6 PROGRESS AVENUE
SEYMOUR, CT 06483

DATE:	05/30/12
SCALE:	AS NOTED
JOB NO.	11118.0058

TITLE SHEET

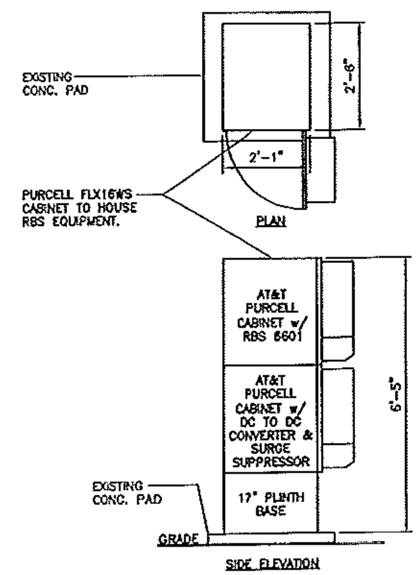
T-1

Sheet No. 1 of 6



NOTE:
FASTEN TO CONCRETE PAD PER MANUFACTURER's REQUIREMENTS.

1 / N-1 EMERSON POWER CABINET DETAIL
NOT TO SCALE



NOTE:
FASTEN TO CONCRETE PAD PER MANUFACTURER's REQUIREMENTS.

2 / N-1 PURCELL CABINET MOUNTING DETAIL
NOT TO SCALE

STRUCTURAL SPECIFICATIONS

DESIGN BASIS

GOVERNING CODE: 2003 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2005 CONNECTICUT STATE BUILDING CODE AND 2009 AMENDMENTS.

1. DESIGN CRITERIA:
   - WIND LOAD: PER EIA/TIA 222 F-96 (ANTENNA MOUNTS): 85 MPH (FASTEST MILE), EQUIVALENT TO 105 MPH (3 SECOND GUST).
   - BASIC WIND SPEED (OTHER STRUCTURE): 105 MPH (3 SECOND GUST) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-02) PER 2003 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2005 CONNECTICUT SUPPLEMENT AND 2009 AMMENDMENT.
   - SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7-95 MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES.

GENERAL NOTES

1. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.
2. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST THE PRE MANUFACTURED EQUIPMENT BUILDING SHOP DRAWINGS.
3. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
4. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

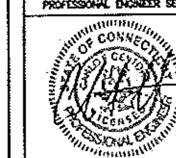
STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)
   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE---ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS---ASTM A325-N
   G. U-BOLTS---ASTM A36
   H. ANCHOR RODS---ASTM F 1554
   I. WELDING ELECTRODE---ASTM E 70XX
2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLET J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.
11. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
12. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
13. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
14. CONNECTIONS SHALL CONFORM TO ALL REQUIREMENTS OF THE "AISC SPECIFICATION FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR SHELTERS", LATEST EDITION, AND THE "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS", LATEST EDITION.
15. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
16. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
17. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
18. FABRICATE BEAMS WITH MILL CAMBER UP.
19. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
20. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
21. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
22. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

DESIGNED BY: DEB
DRAWN BY: FLO
CHK'D BY: CFC

REV.	DATE	DRAWN BY	CHK'D BY	
0	05/30/12	DMD	DEB	CONSTRUCTION - CLIENT REVIEW
1	6/19/12	DEB	CFC	CONSTRUCTION

PROFESSIONAL ENGINEER SEAL



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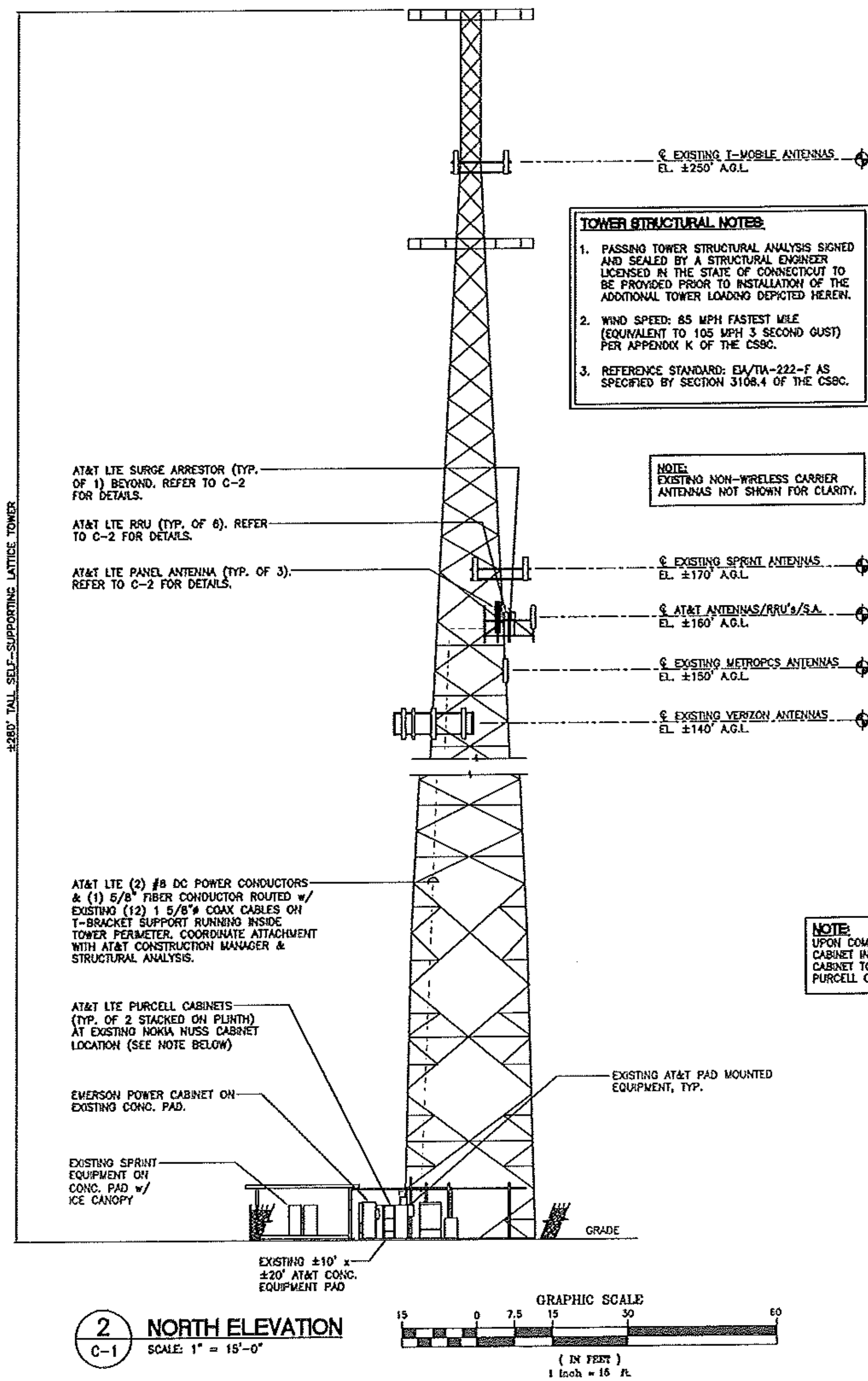
JOB NO. 11118.0056

NOTES AND SPECIFICATIONS

N-1

Sheet No. 2 of 6

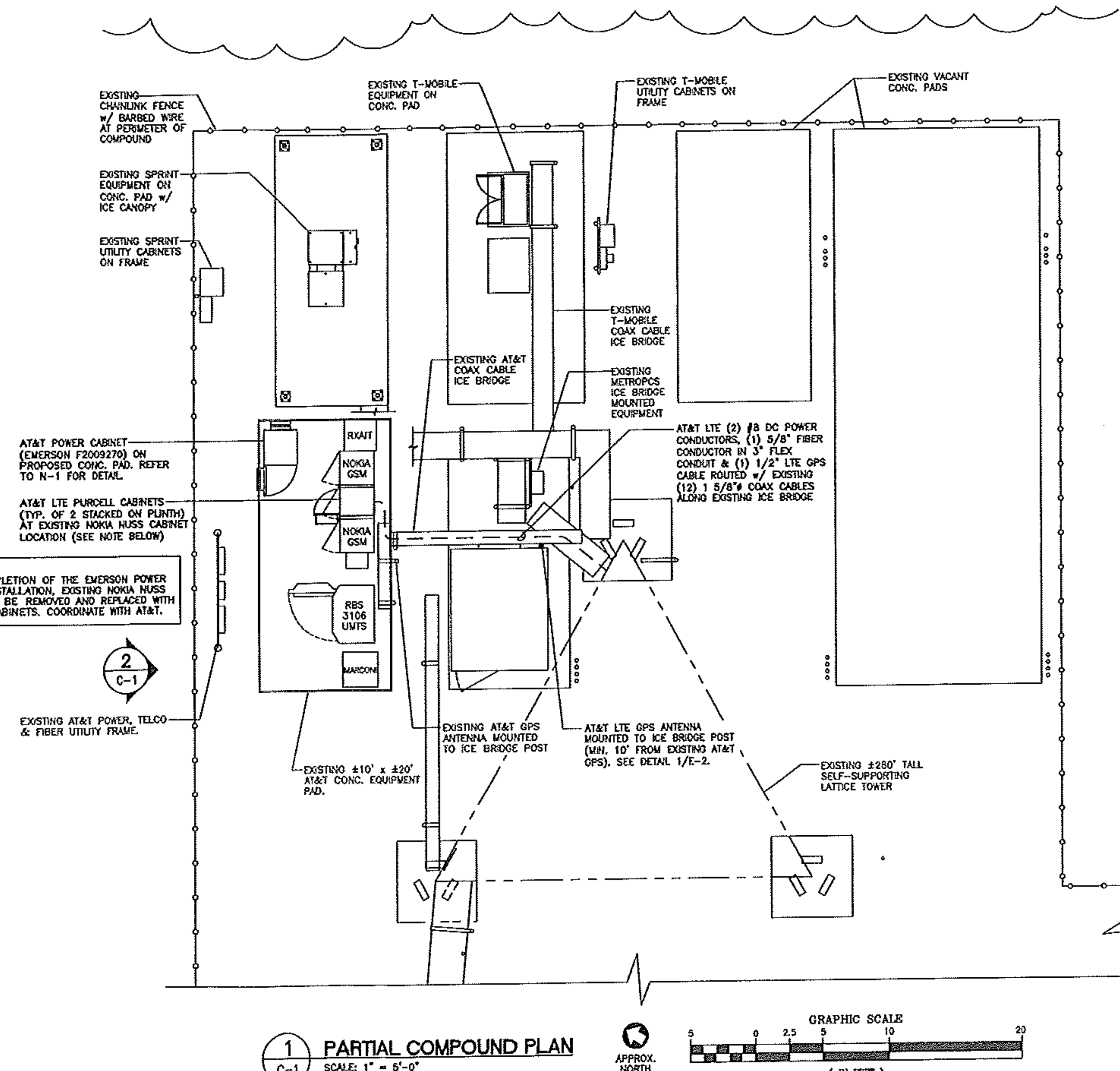


TOWER STRUCTURAL NOTES:

1. PASSING TOWER STRUCTURAL ANALYSIS SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT TO BE PROVIDED PRIOR TO INSTALLATION OF THE ADDITIONAL TOWER LOADING DEPICTED HEREIN.
2. WIND SPEED: 85 MPH FASTEST MILE (EQUIVALENT TO 105 MPH 3 SECOND GUST) PER APPENDIX K OF THE CSBC.
3. REFERENCE STANDARD: EIA/TIA-222-F AS SPECIFIED BY SECTION 3108.4 OF THE CSBC.

NOTE:
EXISTING NON-WIRELESS CARRIER ANTENNAS NOT SHOWN FOR CLARITY.

2 / C-1 **NORTH ELEVATION**
SCALE: 1" = 15'-0"



NOTE:
UPON COMPLETION OF THE EMERSON POWER CABINET INSTALLATION, EXISTING NOKIA NUSS CABINET TO BE REMOVED AND REPLACED WITH PURCELL CABINETS. COORDINATE WITH AT&T.

1 / C-1 **PARTIAL COMPOUND PLAN**
SCALE: 1" = 5'-0"

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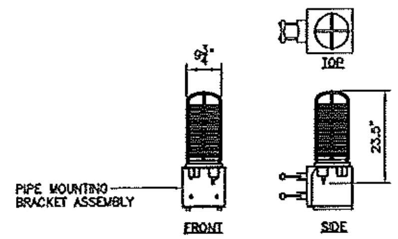
PLANS AND ELEVATION

C-1

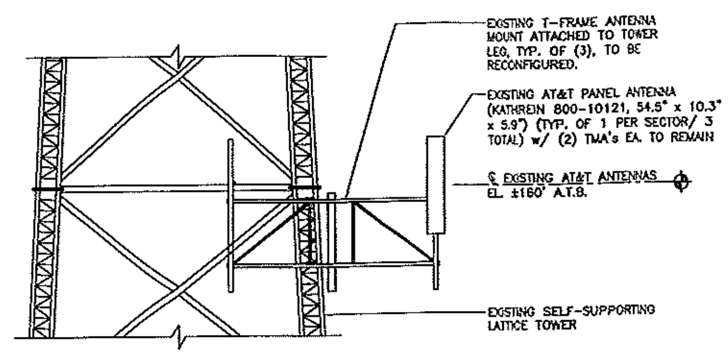
Sheet No. 3 of 6



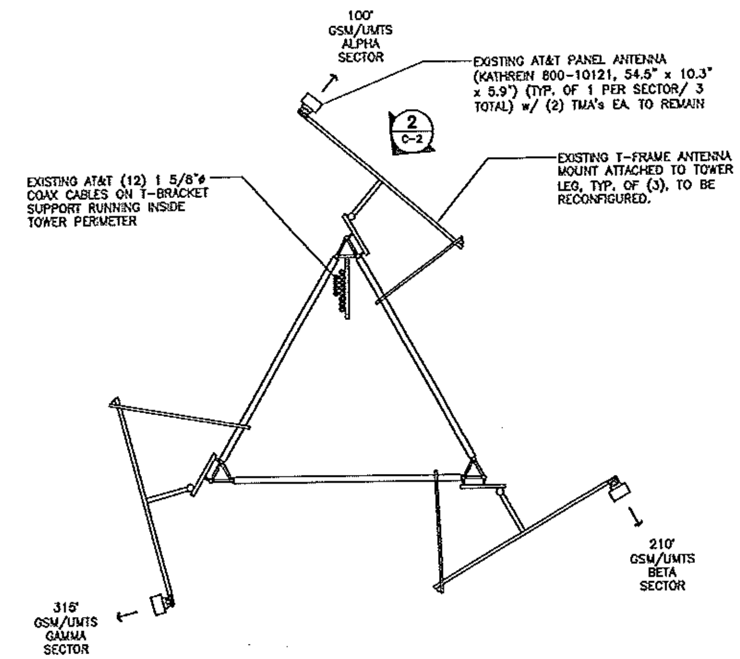
SURGE ARRESTOR				
SITE TYPE	ARRESTOR MAKE/MODEL	QTY REQUIRED	ARRESTOR LOCATION	WEIGHT
TOWER	MAKE: RAYCAP (SQUID) MODEL: DC6-48-60-18-8F	(1) PER SITE	TOWER, ADJACENT TO AT&T ANTENNAS AND RRUs.	20 LBS. (WITHOUT MOUNT)

NOTES:
1. CONTRACTOR TO COORDINATE FINAL SURGE ARRESTOR MODEL SELECTION(S) WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.
2. CONTRACTOR TO INSTALL ARRESTOR IN CONFORMANCE WITH MANUFACTURERS RECOMMENDATIONS.

5 / C-2 SURGE ARRESTOR DETAIL
NOT TO SCALE

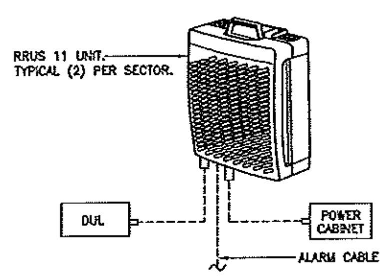


2 / C-2 EXISTING ANTENNA SECTOR ELEVATION
SCALE: 1/4" = 1'-0"



1 / C-2 EXISTING ANTENNA PLAN
SCALE: 1/4" = 1'-0"

APPROX. NORTH

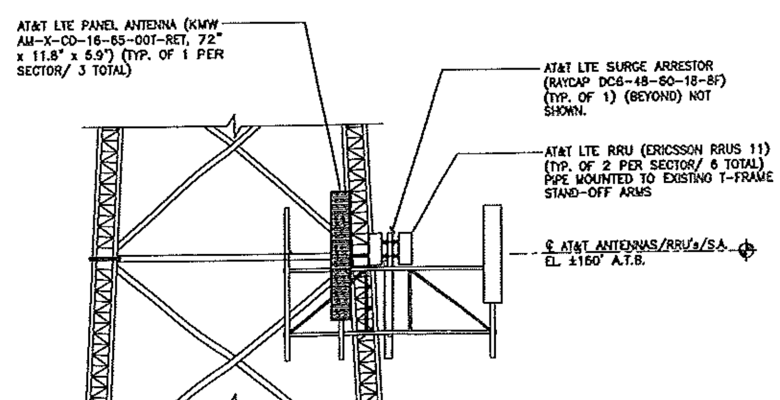


RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS 11	17.8"L x 17.3"W x 7.2"D	BAND 4: 44 LBS. BAND 12: 50 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. SIDE: 0" MIN.

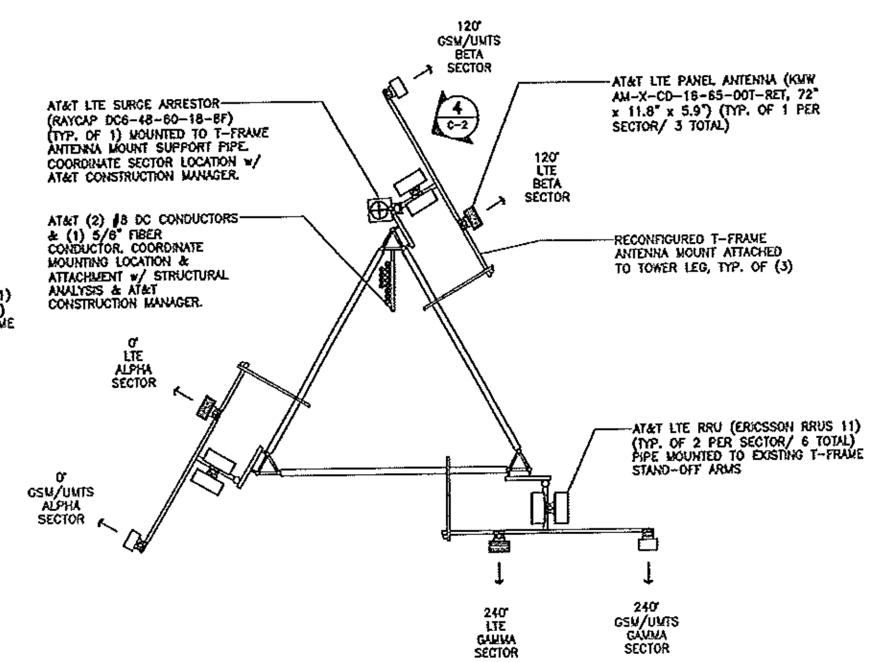
NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.

6 / C-2 RRU DETAIL
NOT TO SCALE

NOTES:
1. ROTATE EXISTING GSM/UMTS ANTENNAS & RECONFIGURE EXISTING T-ARM ANTENNA MOUNTS AS REQUIRED TO ACCOMMODATE PROPOSED LTE AZIMUTHS.
2. PROVIDE MOUNTING PIPES, CROSSOVERS & ASSOCIATED HARDWARE TO COMPLETE THE PROPOSED UPGRADE. REPLACE EXISTING COMPONENTS AS REQUIRED.
3. REFER TO STRUCTURAL ANALYSIS AND FINAL AT&T RFDS PRIOR TO INSTALLATION OF ANTENNAS AND COAX.



4 / C-2 PROPOSED ANTENNA SECTOR ELEVATION
SCALE: 1/4" = 1'-0"



3 / C-2 PROPOSED ANTENNA PLAN
SCALE: 1/4" = 1'-0"

APPROX. NORTH

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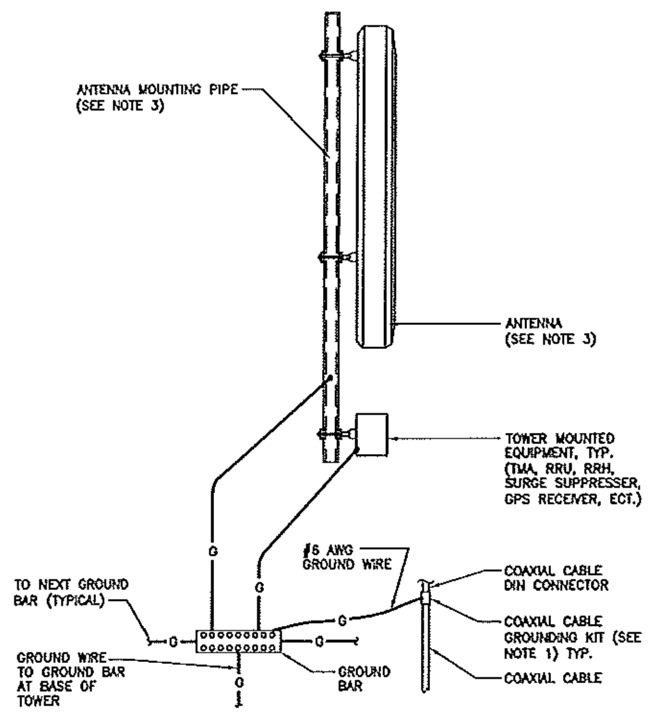
LTE EQUIPMENT DETAILS

C-2

Sheet No. 4 of 6

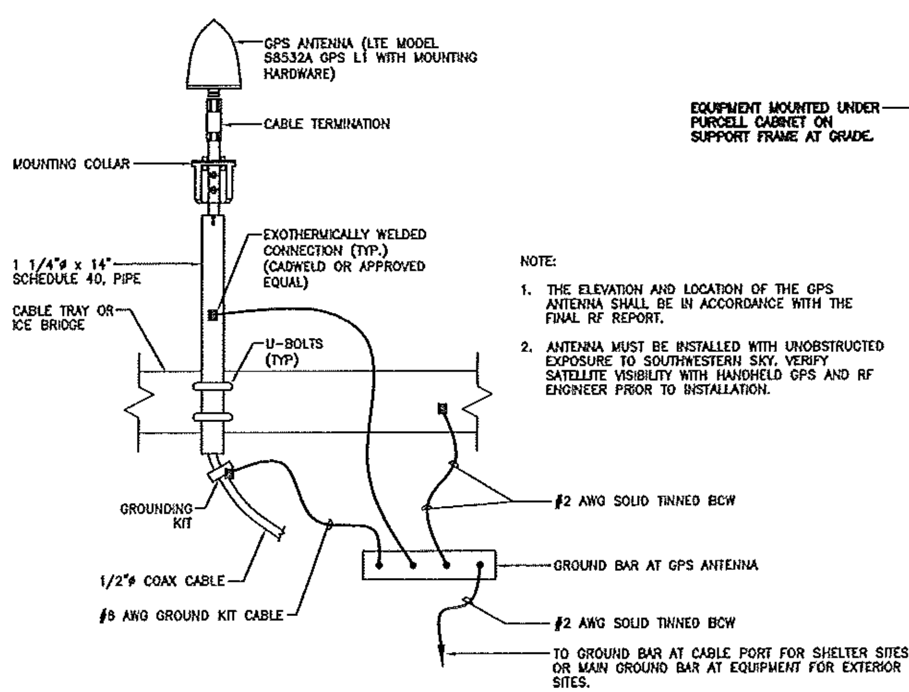


NOTES:

1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

1 / E-1 TYPICAL ANTENNA GROUNDING DETAIL

NOT TO SCALE

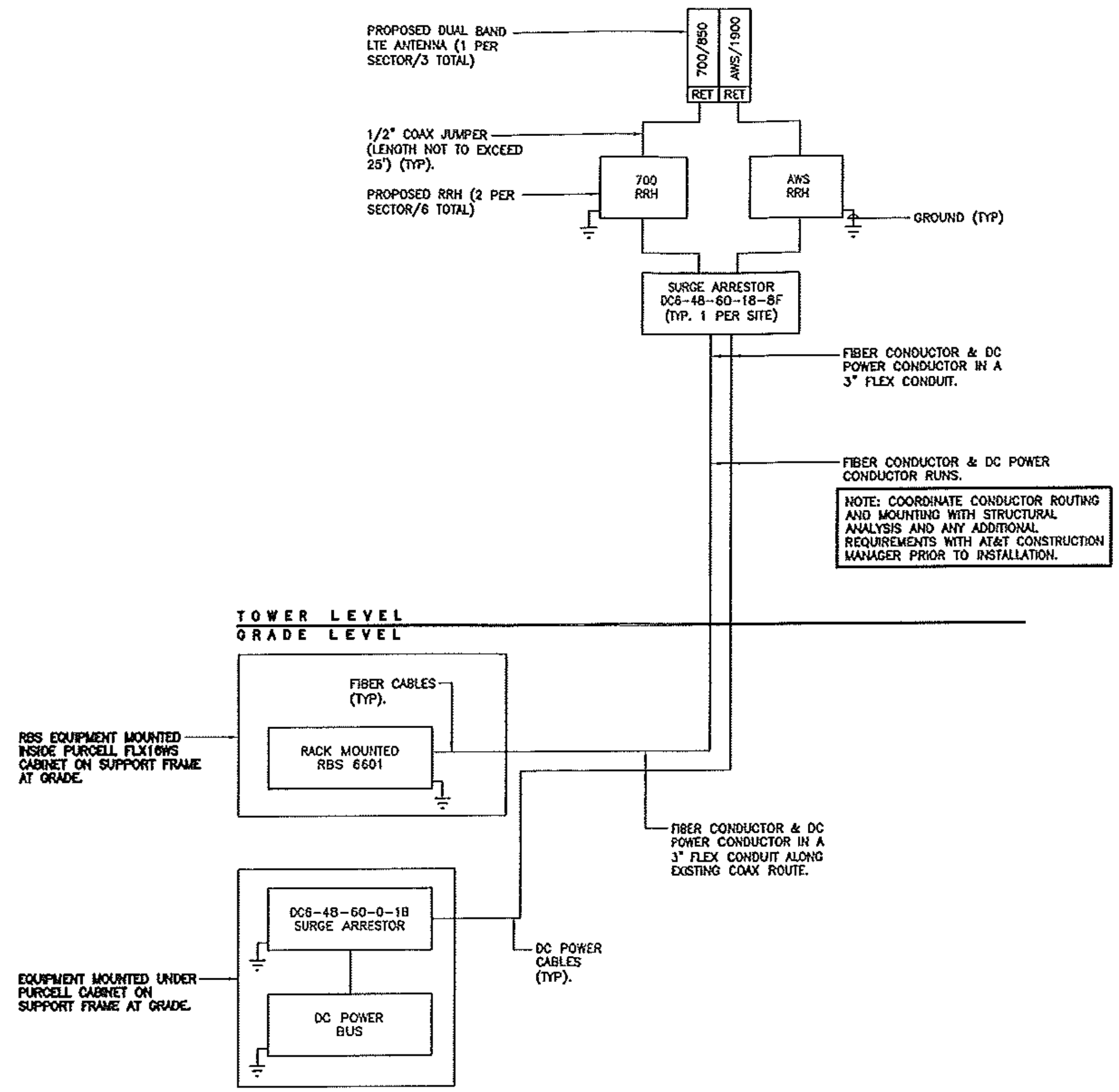


NOTE:

1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT.
2. ANTENNA MUST BE INSTALLED WITH UNOBSTRUCTED EXPOSURE TO SOUTHWESTERN SKY. VERIFY SATELLITE VISIBILITY WITH HANDHELD GPS AND RF ENGINEER PRIOR TO INSTALLATION.

3 / E-1 GPS MOUNTED TO CABLE TRAY / ICE BRIDGE

NOT TO SCALE



NOTES:

1. CONTRACTOR TO CONFIRM ALL PARTS.
2. INSTALL ALL EQUIPMENT TO MANUFACTURERS RECOMMENDATIONS.

2 / E-1 LTE SCHEMATIC DIAGRAM

NOT TO SCALE

ELECTRICAL NOTES

1. PRIOR TO START OF CONSTRUCTION CONTRACTOR SHALL COORDINATE WITH OWNER FOR ALL CONSTRUCTION STANDARDS AND SPECIFICATIONS, AND ALL MANUFACTURER DOCUMENTATION FOR ALL EQUIPMENT TO BE INSTALLED.
2. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH LOCAL BUILDING CODE, NATIONAL ELECTRIC CODE, OWNER AND MANUFACTURER'S SPECIFICATIONS.
3. CONNECT ALL NEW EQUIPMENT TO EXISTING TELCO AS REQUIRED BY MANUFACTURER.
4. MAINTAIN ALL CLEARANCES REQUIRED BY NEC AND EQUIPMENT MANUFACTURER.
5. PRIOR TO INSTALLATION CONTRACTOR SHALL MEASURE EXISTING ELECTRICAL LOAD AND VERIFY EXISTING AVAILABLE CAPACITY FOR PROPOSED INSTALLATION. IF INADEQUATE CAPACITY IS AVAILABLE, CONTRACTOR SHALL COORDINATE WITH LOCAL ELECTRIC UTILITY COMPANY TO UPGRADE EXISTING ELECTRIC SERVICE.
6. CONTRACTOR SHALL INSPECT EXISTING GROUNDING AND LIGHTNING PROTECTION SYSTEM AND ENSURE THAT IT IS IN COMPLIANCE WITH NEC, AND SITE OWNER'S SPECIFICATIONS. THE RESULTS OF THIS INSPECTION SHALL BE PRESENTED TO OWNERS REPRESENTATIVE, AND ANY DEFICIENCIES SHALL BE CORRECTED.
7. ALL TRANSMISSION TOWER SITES CONTAIN AN EXTENSIVE BURIED GROUNDING SYSTEM. ALL GROUNDING WORK MUST BE COORDINATED WITH, AND APPROVED BY, THE TOWER OWNER'S SITE REPRESENTATIVE. ALL OF THE TOWER OWNER'S SPECIFICATIONS MUST BE STRICTLY FOLLOWED.
8. PROVIDE AND INSTALL GROUND KITS FOR ALL NEW COAXIAL CABLES AND BOND TO EXISTING OWNERS GROUNDING SYSTEM PER OWNERS SPECIFICATIONS AND NEC.
9. ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT-BOLT TYPE CONNECTORS, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION:
10. MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.
11. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.
12. THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNER'S REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES AS MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR SCHEDULING OF ALL INSPECTIONS AS MAY BE REQUIRED BY THE LOCAL AUTHORITY.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE SITE AND/OR BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.
15. THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.
16. DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL, WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE, PRIOR TO SUBMITTAL OF BID.
17. ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.
18. GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.
19. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122. (MIN. #12 AWG).
20. CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 5 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16960).

TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

A. CONTRACTOR SHALL RETAIN THE SERVICES OF A LOCAL INDEPENDENT ELECTRICAL TESTING FIRM (WITH MINIMUM 5 YEARS COMMERCIAL EXPERIENCE IN THE ELECTRICAL TESTING INDUSTRY) AS SPECIFIED BY OWNER TO PERFORM:

TEST 1: RESISTANCE TO GROUND TEST ON THE CELLULAR GROUNDING SYSTEM.

THE TESTING FIRM SHALL INCLUDE THE FOLLOWING INFORMATION WITH THE REPORT:

1. TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.
2. CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.
3. GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.

B. TESTING SHALL BE PERFORMED IN THE PRESENCE AND TO THE SATISFACTION OF OWNERS CONSTRUCTION REPRESENTATIVE. TESTING DATA SHALL BE INITIALED AND DATED BY THE CONSTRUCTION AND INCLUDED WITH THE WRITTEN REPORT/ANALYSIS.

C. THE CONTRACTOR SHALL FORWARD SIX (6) COPIES OF THE INDEPENDENT ELECTRICAL TESTING FIRM REPORT/ANALYSIS TO ENGINEER A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO THE JOB TURNOVER.

D. CONTRACTOR TO PROVIDE A MINIMUM OF ONE (1) WEEK NOTICE TO OWNER AND ENGINEER FOR ALL TESTS REQUIRING WITNESSING.

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CHK'D BY:	CKD

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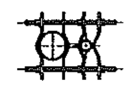
ELECTRICAL DETAILS AND NOTES

E-1

Sheet No. 5 of 6

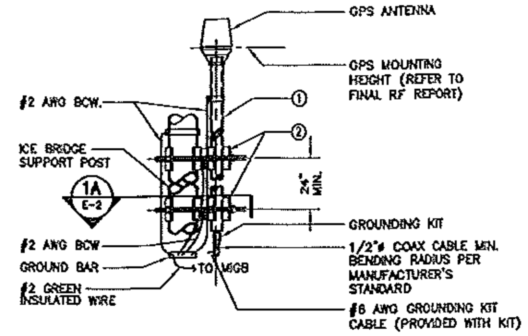
BILL OF MATERIALS		
ITEM	DESCRIPTION	QUANTITY
①	2-1/2"ø SCH. 40 x 8'-0" LG. MAX SS OR GALV. PIPE	1
②	UNIVERSAL CLAMP SET.	2



1A / E-2 **PLAN VIEW**
NOT TO SCALE

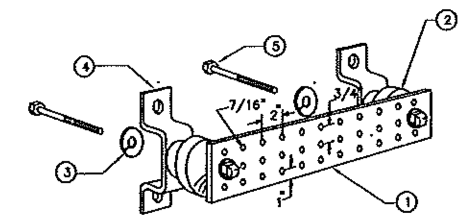
NOTES:

1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT AND COORDINATED WITH AT&T CONSTRUCTION MANAGER.
2. THE GPS ANTENNA MOUNT IS DESIGNED TO FASTEN TO A STANDARD 2-1/2" DIAMETER, SCHEDULE 40, GALVANIZED STEEL OR STAINLESS STEEL PIPE. THE PIPE MUST NOT BE THREADED AT THE ANTENNA MOUNT END. THE PIPE SHALL BE CUT TO THE REQUIRED LENGTH (MINIMUM OF 24 INCHES) USING A HAND OR ROTARY PIPE CUTTER TO ASSURE A SMOOTH AND PERPENDICULAR CUT. A HACK SAW SHALL NOT BE USED. THE CUT PIPE END SHALL BE DEBURRED AND SMOOTH IN ORDER TO SEAL AGAINST THE NEOPRENE GASKET ATTACHED TO THE ANTENNA MOUNT.
3. ATTACH TO ICE BRIDGE POST NEAREST ANTENNA CABLE PORT AT EQUIPMENT.
4. PRIOR TO INSTALLATION CONTRACTOR SHALL TEST GPS LOCATION WITH HAND HELD AND MOVE GPS ANTENNA TO OTHER ICE BRIDGE POSTS AS REQUIRED TO ACHIEVE ADEQUATE SIGNAL. FAILURE TO ACHIEVE ADEQUATE SIGNAL WITH A HAND HELD GPS SHALL BE REPORTED TO CONSTRUCTION MANAGER AND ENGINEER TO DETERMINE ALTERNATE INSTALLATION LOCATION FOR GPS ANTENNA.



GPS ANTENNA MOUNTING BRACKET

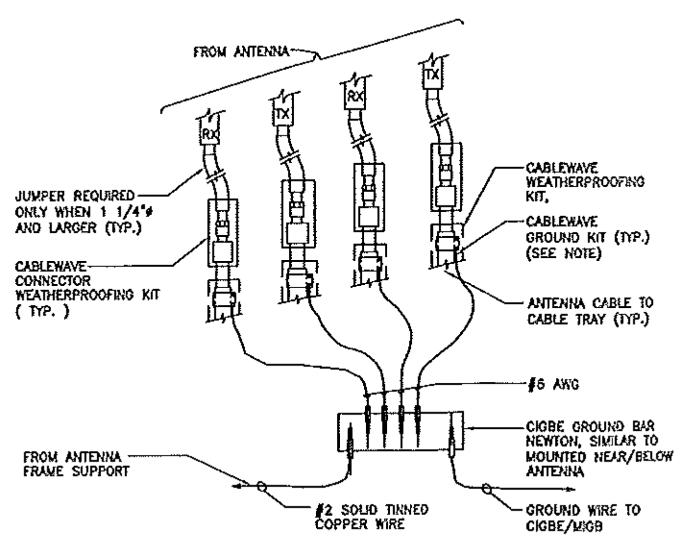
1 / E-2 **GPS GROUNDING/MOUNTING BRACKET DETAILS**
NOT TO SCALE



LEGEND

1. TINNED COPPER GROUND BAR, 1/4"x 4"x 20", NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG .
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 2. 3061-4.
3. 3. 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. 4. CAT NO. A-6056.
5. STAINLESS STEEL SECURITY SCREWS.

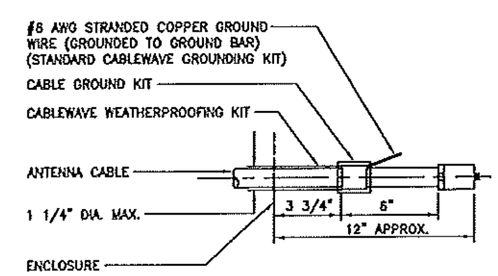
2 / E-2 **GROUND BAR DETAIL**
NOT TO SCALE



NOTE:

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

3 / E-2 **CONNECTION OF GROUND WIRES TO GROUND BAR**
NOT TO SCALE



NOTE:

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

4 / E-2 **ANTENNA CABLE GROUNDING DETAIL**
NOT TO SCALE

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CHK'D BY:	CKD

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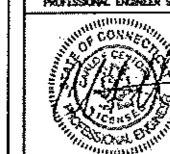

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DATE:	05/30/12
SCALE:	AS NOTED
JOB NO.	11118.C058

ELECTRICAL DETAILS

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