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

Steven L. Levine
Real Estate Consultant

HAND DELIVERED

April 30, 2014

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

Re: New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 880 Post Road East, Westport (owner, Connecticut State Police)

Dear Ms. Bachman:

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

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

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

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

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

1. The height of the overall structure will be unaffected.

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

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

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

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

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

Sincerely,

Steven L. Levine
Real Estate Consultant

cc: Gordon F. Joseloff, 1st Selectman, Town of Westport

Attachments

NEW CINGULAR WIRELESS PCS, LLC
Equipment Modification

880 Post Road East, Westport
Site Number 2147
Prior Decisions: Docket 123, Exempt Mods 8/99, 9/02, 1/03, 2/06, 7/11, 4/13

Tower Owner/Manager: Connecticut State Police

Lease Area: AT&T leases an equipment room within a shared multicarrier shelter provided by the State Police. Since all proposed equipment modifications will take place either on the tower structure or within AT&T's existing equipment room, the proposed changes will not extend either AT&T's lease area or the overall site boundaries. (Please see the attached site plan.)

Equipment Configuration: Self-Supporting Lattice Tower

Current and/or Approved:
Three Sector Frames
Nine PowerWave P65-16-XLH-RR antennas @ 134 ft c.l.
Six PowerWave TMA's @ 134 ft
Six Remote Radio Heads@ 134 ft
One surge arrestor @ 134 ft
Twelve lines 1 ¼ inch coax
One fiber and two DC power cables
Equipment Room inside common shelter

Planned Modifications:
Remove existing mounts, all existing antennas, and all associated equipment.
Remove 6 lines 1 ¼ inch coax.
Install three Commscope MTC3615 mounting frames @ 133 ft.
Re-install three PowerWave P65-16 antennas @ 133 ft c.l.
Install nine CCI HPA-65R-BUU-H6 antennas @ 133 ft c.l.
Install 18 remote radio heads and six associated A2 modules @ 133 ft.
Install three PowerWave TMA's @ 133 ft.
Install four Raycap surge arrestors @ 133 ft.
Install one fiber and seven DC power lines line to 133 ft (total of two fiber and nine DC lines).

Power Density:

Worst-case calculations for existing wireless operations at the site indicate a radio frequency electromagnetic radiation power density, measured at ground level beside the tower, of approximately 41.0 % of the standard adopted by the FCC. As depicted in the second table below, the total radio frequency electromagnetic radiation power density following proposed modifications would be approximately 32.8 % of the standard.

Existing

Company	Centerline Ht (feet)	Frequency (MHz)	Number of Channels	Power Per Channel (Watts)	Power Density (mW/cm^2)	Standard Limits (mW/cm^2)	Percent of Limit
Other Users *							24.07
AT&T UMTS *	134	880 - 894	1	500	0.0100	0.5867	1.71
AT&T UMTS *	134	1900 Band	1	500	0.0100	1.0000	1.00
AT&T GSM *	134	880 - 894	7	296	0.0415	0.5867	7.07
AT&T GSM *	134	1900 Band	6	427	0.0513	1.0000	5.13
AT&T LTE *	134	740	1	500	0.0100	0.4933	2.03
Total							41.0%

* Per CSC records

Proposed

Company	Centerline Ht (feet)	Frequency (MHz)	Number of Channels	Power Per Channel (Watts)	Power Density (mW/cm^2)	Standard Limits (mW/cm^2)	Percent of Limit
Other Users *							24.07
AT&T LTE	133	700 Band	1	500	0.0102	0.4667	2.18
AT&T LTE	133	1900 Band	1	500	0.0102	1.0000	1.02
AT&T LTE	133	2300 Band	1	500	0.0102	1.0000	1.02
AT&T UMTS	133	880 - 894	2	500	0.0203	0.5867	3.46
AT&T UMTS	133	1900 Band	1	500	0.0102	1.0000	1.02
Total							32.8%

* Per CSC records

Structural information:

The attached structural analysis demonstrates that the tower has adequate structural capacity to accommodate the proposed modifications. (URS Corporation, 4/28/14)

PROJECT INFORMATION

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY MODIFICATIONS	
SITE ADDRESS:	880 POST ROAD EAST WESTPORT, CT 06880	
LATITUDE:	41.137494 N	41° 08' 15" N
LONGITUDE:	73.334361 W	73° 20' 04" W
JURISDICTION:	NATIONAL, STATE & LOCAL CODES OR ORDINANCES	
CURRENT USE:	TELECOMMUNICATIONS FACILITY	
(P) USE:	TELECOMMUNICATIONS FACILITY	
NOC#	800-832-6662	

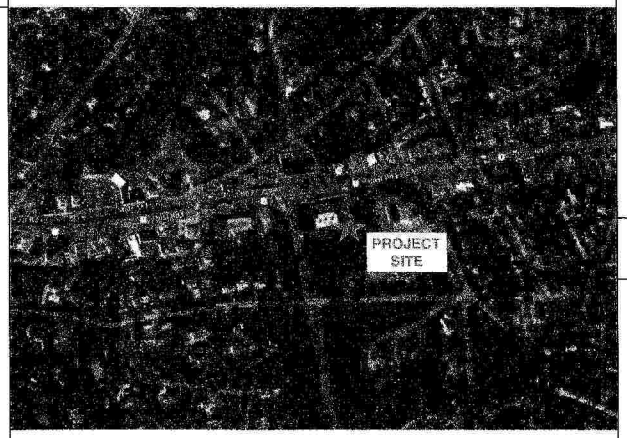
at&t

SITE NUMBER: CT2147
SITE NAME: WESTPORT SP TOWER

DRAWING INDEX

VICINITY MAP

1. Head east on Cochituate Rd toward Burr St 269 ft 2. Take the ramp to I-90 E/Masspike W/Springfield/Boston Toll road 0.6 mi 3. Keep left at the fork, follow signs for Interstate 90 W/Massachusetts Turnpike/Worchester/Springfield and merge onto I-90 W/Massachusetts Turnpike Partial toll road 38.3 mi 4. Take exit 9 to merge onto I-84 toward US-20/Hartford/New York City Partial toll road Entering Connecticut 41.7 mi 5. Keep left to continue on CT-15 S, follow signs for I-91 S/Charter Oak Bridge/N Y. City 1.1 mi 6. Continue onto CT-15 S/US-5 S 0.8 mi 7. Take exit 86 to merge onto I-91 S toward New Haven/New York City 17.1 mi 8. Take exit 17 for CT-15 S/W Cross Pkwy 0.4 mi 9. Merge onto CT-15 S 29.8 mi 10. Take exit 52 for State Route 108 S/State Route 8 S toward Bridgeport 0.6 mi 11. Follow signs for CT-8 S/Bridgeport and merge onto CT-8 S 5.2 mi 12. Keep right at the fork, follow signs for Interstate 95 S/N.Y. City and merge onto I-95 S 8.6 mi 13. Take exit 18 for Sherwood Is Connector 0.2 mi 14. Keep right at the fork, follow signs for Westport/R.R. Station/US 1 and merge onto Sherwood island Connector 1.0 mi



GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

STATE OF CONNECTICUT
MARC R. CHRETIEN
No.28307
LICENSED PROFESSIONAL ENGINEER

Marc R. Chretien

UNDERGROUND SERVICE ALERT

CALL TOLL FREE
1-888-344-7233
72 HOURS BEFORE YOU DIG

ADVANCED ENGINEERING GROUP, P.C.
Civil Engineering - Site Development Surveying - Telecommunications
500 NORTH BROADWAY
EAST PROVIDENCE, RI 02914
PH: 401-384-2403
FAX: 401-633-4324

SAI
SITE ACQUISITION, INC.
27 NORTHWESTERN DRIVE
SALEM, NH 03079

SITE NUMBER: CT2147
SITE NAME: WESTPORT SP TOWER

880 POST ROAD EAST
WESTPORT, CT 06880
FAIRFIELD COUNTY

at&t
550 COCHITUATE ROAD, SUITE 13,
FRAMINGHAM, MA 01701-4681

NO.	DATE	REVISIONS	BY	CHK	APP'D
2	3/20/14	UPDATES	MER	MRC	MRC
1	2/28/14	UPDATES	MER	MRC	MRC
0	2/26/14	UPDATES	MER	MRC	MRC
A	1/10/14	LTE 2C	MER	MRC	MRC

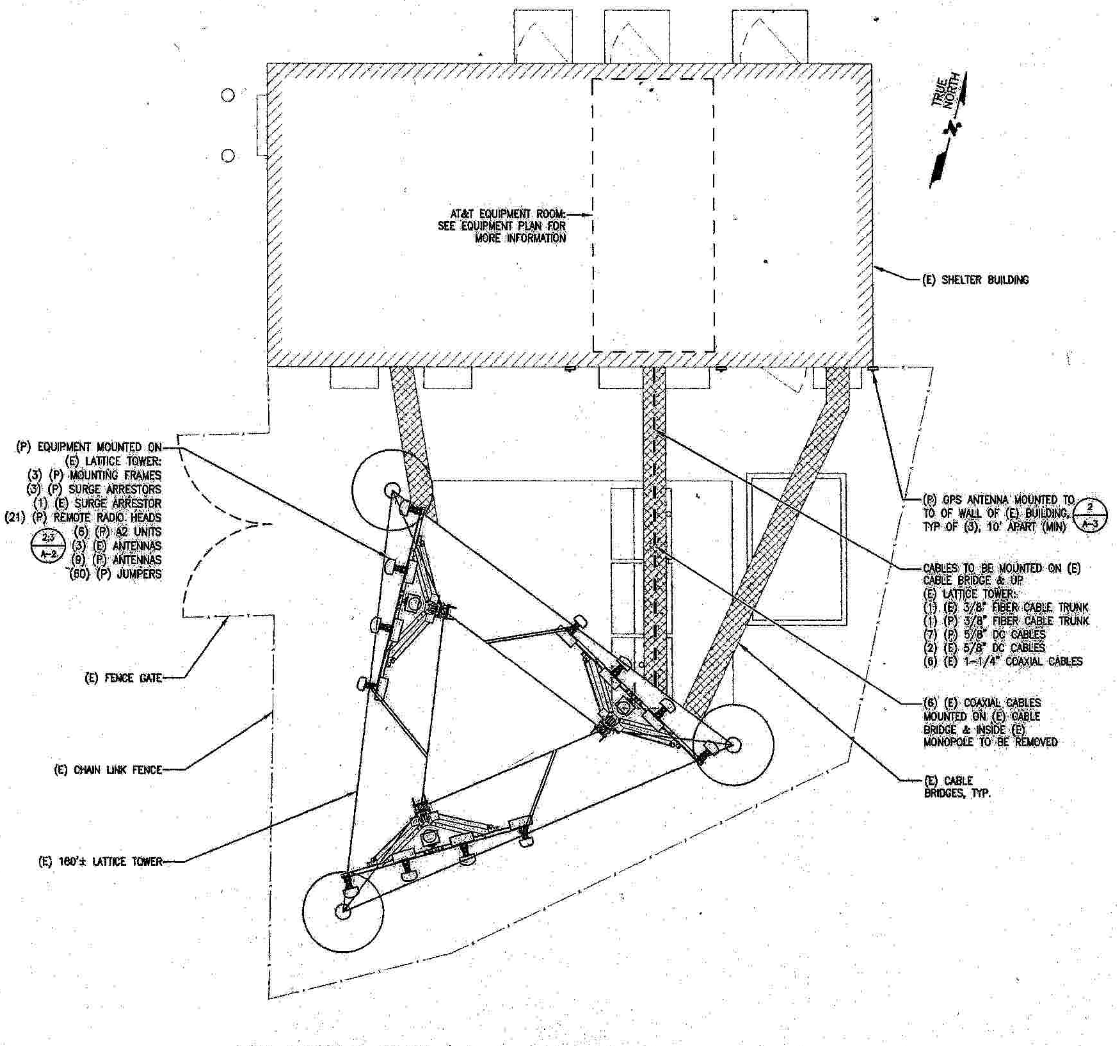
SCALE: AS SHOWN | DESIGNED BY: MRC | DRAWN BY: MER

AT&T

TITLE SHEET

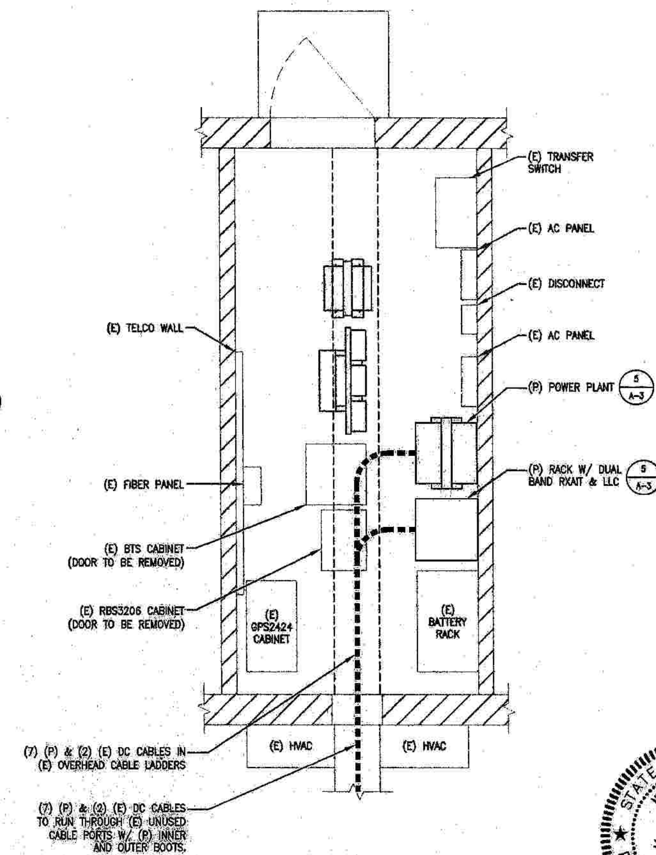
JOB NUMBER	DRAWING NUMBER	REV
2147 LTE 2C	T-1	2

HALF SIZE PRINT
THIS DRAWING IS SCALEABLE AT HALF THE NOTED SCALE



1 A-1 **COMPOUND PLAN**
SCALE: 1/4"=1'-0"

GRAPHIC SCALE 0' 2'-0" 4'-0" 8'-0" 12'-0"



2 A-1 **EQUIPMENT PLAN**
SCALE: 1/2"=1'-0"

GRAPHIC SCALE 0' 2'-0" 4'-0" 8'-0"

STATE OF CONNECTICUT MARC R. CHRETIEN No. 28307 LICENSED PROFESSIONAL ENGINEER

ADVANCED ENGINEERING GROUP, P.C.
Civil Engineering, Site Development Surveying - Telecommunications

SAI
SITE ACQUISITION, INC.
27 NORTHWESTERN DRIVE
SALEM, NH 03079

SITE NUMBER: CT2147
SITE NAME: WESTPORT SP TOWER
880 POST ROAD EAST
WESTPORT, CT 06880
FAIRFIELD COUNTY

at&t
550 COCHITUATE ROAD, SUITE 13,
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NO.	DATE	REVISIONS	BY	CHK	APP'D
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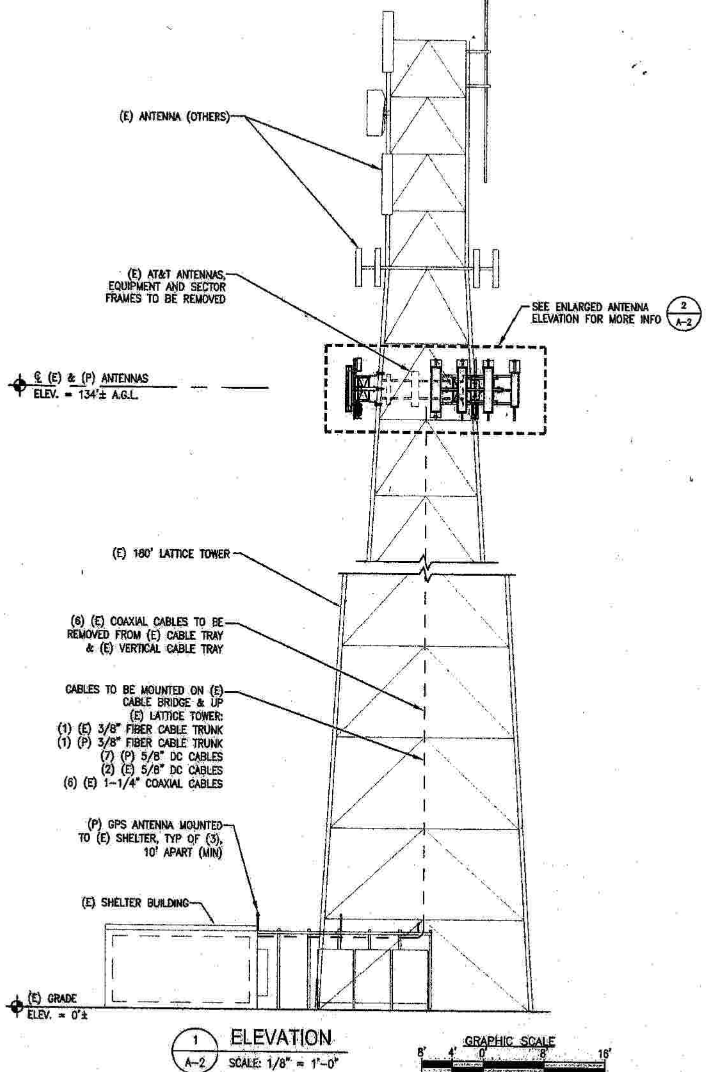
0	2/26/14	UPDATES	MER	MRC	MRC
A	1/10/14	LTE 2C	MER	MRC	MRC

SCALE: AS SHOWN | DESIGNED BY: MRC | DRAWN BY: MER

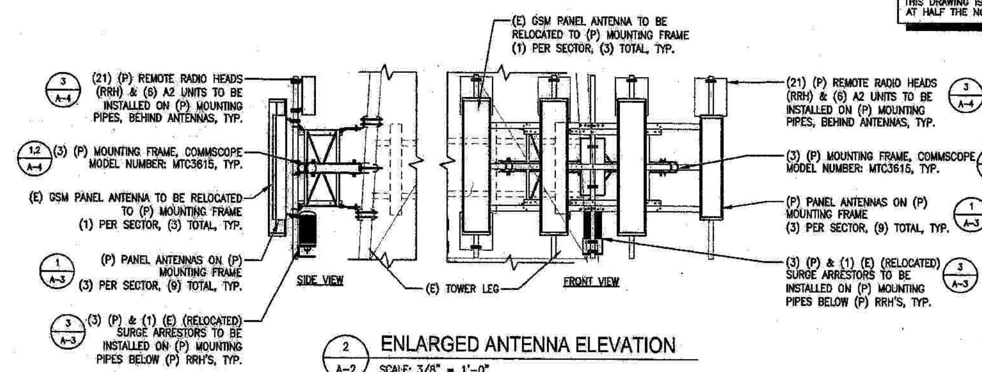
AT&T
PLAN VIEWS

JOB NUMBER	DRAWING NUMBER	REV
2147 LTE 2C	A-1	2

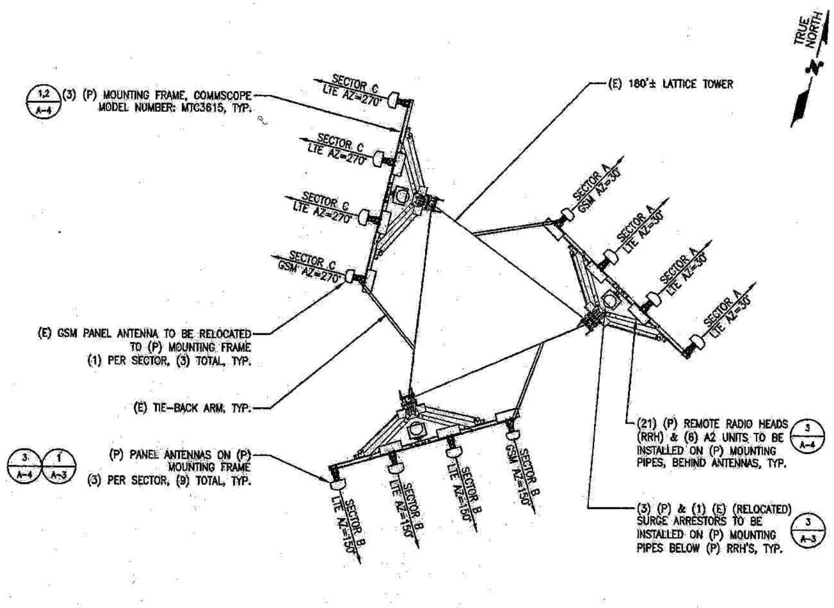
HALF SIZE PRINT
THIS DRAWING IS SCALEABLE AT HALF THE NOTED SCALE



1/A-2 ELEVATION
SCALE: 1/8" = 1'-0"



2/A-2 ENLARGED ANTENNA ELEVATION
SCALE: 3/8" = 1'-0"



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

STATE OF CONNECTICUT · MARC R. CHRETIEN · No.28307 · LICENSED PROFESSIONAL ENGINEER

ADVANCED ENGINEERING GROUP, P.C.
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A	1/10/14	LTE 2C	MER	MRC	MRC

SCALE: AS SHOWN | DESIGNED BY: MRC | DRAWN BY: MER

AT&T
ELEVATION AND ANTENNA PLANS

JOB NUMBER	DRAWING NUMBER	REV
2147 LTE 2C	A-2	2

DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF AN EXISTING 180' SELF SUPPORTING LATTICE TOWER AND ITS FOUNDATION FOR PROPOSED ANTENNA ARRANGEMENT

AT&T Site No.: CT2147
Site: Connecticut State Police Tower # 32
Address: 880 Post Road East
Westport, Connecticut

prepared for

at&t

AT&T Mobility

500 Enterprise
Drive, Suite 3A
Rocky Hill, CT 06067

prepared by

URS

URS CORPORATION
500 ENTERPRISE DRIVE, SUITE 3B
ROCKY HILL, CT 06067
TEL. 860-529-8882

36928686.00000
SAI-077

April 28, 2014

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the 180' self-supporting lattice tower located at 880 Post Road East in Westport, Connecticut. The analysis was conducted in accordance with the 2005 Connecticut State Building Code, the TIA/EIA-222-F standard and the Connecticut State Police Requirements for wind velocity of 90 mph (fastest mile) and 90 (fastest mile) concurrent with 0.5" ice. Twist (rotation) and sway (deflection) were determined in accordance with Connecticut State Police Requirements for a wind velocity of 90 mph (fastest mile) with 0.5" ice. The antenna loading considered in the analysis consists of all existing and proposed antennas, transmission lines, and ancillary items as outlined in the Introduction of this report.

The proposed AT&T antenna modifications are listed below:

Antenna and Mount	Carrier	Antenna Center Elevation
Remove: **(6) CM1007-DBPXBC-003 Diplexer Units** **(6) Ericsson RRUS11 Dual PA RRU Units** **(3) Powerwave TMA Units** **(6) Powerwave P65-16-XLH-RR Panel Antennas**	**AT&T (existing)**	**@ 133'**
Install: **(9) CCI HPA-65R-BUU-H6 Panel Antennas** **(9) Ericsson RRUS-11 Units** **(6) Ericsson RRUS-12 Units** **(3) Ericsson RRUS-E2 Units** **(3) Ericsson RRUS-32 Units** **(6) A2 Modules** **(3) Raycap DC6-48-60-18-8F Surge Suppressors** **(1) 3/8" Fiber Optic Cables** **(9) 5/8" DC Cables**	**AT&T (proposed)**	**@ 133'**

The results of the analysis indicate that the tower structure has sufficient capacity to support the proposed loading conditions. **The tower and its foundation are considered structurally adequate for the proposed antenna loading with the wind load classification specified above.**

The tower deflection (sway) is 0.4779 degrees, and the tower rotation (twist) is 0.2202 degrees with a wind velocity of 90 mph concurrent with 0.5" ice. **The tower deflection and rotation are within the Connecticut State Police specification of 0.75 degrees for deflection (sway) and (twist).**

1. EXECUTIVE SUMMARY *(continued)*

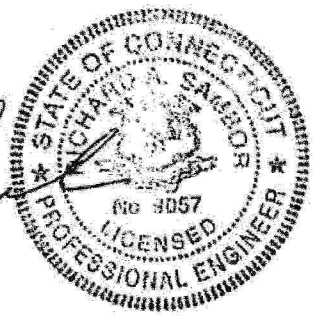
This analysis is based on:

1) The tower structure's theoretical capacity not including any assessment of the condition of the tower.
2) Original tower report prepared by Rohn Industries, Inc., engineering file 26263DL and drawing C910693 dated February 1, 1991.
3) Soil investigation and foundation capacity report prepared by Dr. Clarence Welti, P.E., P.C., dated October 10, 2002.
4) Proposed T-Mobile antenna modification provided by HPC Wireless Services via e-mail dated July 10, 2012.
5) Structural analysis performed by URS Corp., project number SAI-071 / 36922433, signed and sealed on April 2, 2013.
6) Tower Mapping and Inventory by Northeast Towers Inc., tower climb and report dated October 2, 2013.
7) Antenna inventory provided by Connecticut State Police via email dated February 8, 2014.
8) Antenna and mount configuration as specified on the following page of this report.

This report is only valid as per the assumptions and data utilized in this report for antenna inventory, mounts and associated cables. The user of this report shall field verify the assumption of the antenna and mount configuration. Notify the engineer in writing immediately if any of the information in this report is found to be other than specified.

If you should have any questions, please call.

Sincerely,
URS Corporation AES



Richard A. Sambor, P.E.
Senior Structural Engineer
RAS/mcd

2. INTRODUCTION

The subject tower is located at 880 Post Road East in Westport, Connecticut. The structure is a 180' self-supporting lattice tower manufactured by Rohn Industries Incorporated. The inventory is summarized in the table below:

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(1) Yagi Antenna	CSP-1 (existing)	Standoff	@ 180'	(1) LDF5-50A
(1) Celwave PA6-65 dish	CSP-42 (existing)	Dish Standoff	@ 177'	(1) EW-63
(2) Scala AP11-850 antenna	CSP-46,47 (existing)	Leg Mount	@ 175'	(2) LDF7-50A
(1) Sinclair SC479-HF1LDF whip antenna	CSP-56 (existing)	Standoff	@ 170'	(1) LDF7-50A
(3) Sinclair SC479-HF1LDF whip antenna (inverted) (1) TX/RX TTA	CSP-57-60 (existing)	Standoff	@ 170'	(3) LDF7-50A (1) LDF4-50A
(1) Andrew HP6-65H dish	Verizon (existing)	Dish Standoff	@ 170'	(1) EW-65
(1) Yagi Antenna	CSP-22 (existing)	Leg Mount	@ 167'	(1) LDF5-50A
(1) 8' Panel	Unknown (existing)	Mounted to Tower Face	@ 167'	(2) LDF7-50A
(2) Scala OGT9-806 inverted whips	CSP-48,49 (existing)	Standoff	@ 160'	(2) LDF7-50A
(1) Decibel DB536 whip	CSP-45 (future)	Standoff	@ 160'	(1) LDF4-50A
(1) Amphenol BXA 70080-4CF Panel Antennas (Alpha Sector) (2) Amphenol 70063-4CF Panel Antennas (Beta and Gamma Sectors) (3) Amphenol BXA171063-12CF Panel Antennas (3) AWS RRH Units (1) Raycap DB-T1-6Z-8AB-0Z Distribution Box (3) P65-15-XL-2 (3) MG D3-800T0 (6) Diplexers	Verizon (existing)	(3) 15' T-Frames	@ 160'	(12) LDF7-50A (1) 1 5/8" Fiber
(9) CCI HPA-65R-BUU-H6 Panel Antennas **(9) Ericsson RRUS-11 Units** **(6) Ericsson RRUS-12 Units** **(3) Ericsson RRUS-E2 Units** **(3) Ericsson RRUS-32 Units** **(6) A2 Modules** **(3) Raycap DC6-48-60-18-8F Surge Suppressors**	AT&T (Proposed)	**(3) Antenna Mount Frames**	@ 133'	(6) LDF6-50A (1) 3/8" Fiber **(1) 3/8" Fiber** (2) 5/8" DC Cables **(7) 5/8" DC Cables**
(3) Powerwave P65-16-XLH-RR antenna (3) Powerwave TMA Units (1) Raycap Surge Suppressor	AT&T (existing)	Relocated to Above Mount	@ 133'	See Above Cables
(9) TMAs (1) GPS (6) Ericsson Air 21 antennas	T-Mobile (existing)	Leg Mount	@ 125'	(18) LDF7-50A (1) LDF4-50A (1) Huber Suhner Hybrid cable

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(1) Telewave VHF150 Dipole Antenna	CSP-44 (existing)	Leg Mount	@ 111'	(1) LDF4-50A
(1) GPS Antenna	Unknown (existing)	Leg Mount	@ 61'	(1) LDF4-50A

2. INTRODUCTION *(continued)*

This structural analysis of the communications tower was performed by URS Corporation, AES (URS) for AT&T. The purpose of this analysis was to analyze the existing tower for its existing and proposed antenna loads. This analysis was conducted to evaluate twist (rotation), sway (deflection) and stress on the tower, and the effect of forces to the foundation of the tower resulting from existing and proposed antenna arrangements.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was done in accordance with the 2005 Connecticut State Building Code, TIA/EIA-222-F - Structural Standard for Steel Antenna Towers and Antenna Supporting Structures, and the American Institute of Steel Construction (AISC) Manual of Steel Construction - Allowable Stress Design (ASD).

The analysis was conducted using TNX Tower 6.0. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Load Condition 1 = 90 mph (fastest mile) Wind Load + Tower Dead Load
Load Condition 2 = 90 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

The TIA/EIA standard permits a one-third increase in allowable stresses for towers and monopoles less than 700 feet tall. For the purposes of this analysis, in computing the load capacity the allowable stresses of the tower members were increased by one-third.

4. FINDINGS AND EVALUATION

The combined axial and bending stresses on the tower structure were evaluated to compare with the allowable stress in accordance with AISC. The results of the analysis indicate that the calculated stresses under the proposed loading, are below the allowable stresses for the tower structure. The foundation reactions were below the allowable values in the foundation capacity report. The anchor bolts under the proposed loading were found to be within the allowable limits. The tower deflection does not exceed the Connecticut State Police specification of 0.75 degrees for deflection (sway) and rotation (twist).

Tower Base Reactions:

Description	Original	Revised Reactions (Geotech 10/10/2002)	Current	Stress (% capacity)	Pass/ Fail
Pier Compression (kips)	319.9	374	312	83.4	Pass
Pier Uplift (kips)	276.7	324	268	82.7	Pass
Overall Overturning (kip-ft)	7010.3	---	6961	---	---
Overall Shear (kips)	61.5	---	65	---	---
Shear per Leg (kips)	41.0	48	39	81.3	Pass

Tower Component Stress vs. Capacity Summary:

Component / (Section No.)	Controlling Component/ Elevation	Stress (% capacity)	Pass/ Fail	Comments:
Tower Leg (T12)	ROHN 8 EHS / 20'-30'	79.5	Pass	
Diagonal (T6)	ROHN 2.5 EH / 100'-120'	90.6	Pass	
Horizontal (T11)	ROHN 2.5 STD / 30'-40'	66.3	Pass	
Top Girt (T12)	ROHN 2.5 STD / 20'-30'	75.4	Pass	
Redund Horz 1 Bracing (T13)	ROHN 1.5 STD / 0'-20'	27.5	Pass	
Redund Diag 1 Bracing (T13)	ROHN 1.5 STD / 0'-20'	77.1	Pass	
Redund Hip 1 Bracing (T13)	ROHN 2.5 STD / 0'-20'	0.1	Pass	
Inner Bracing (T5)	L2x2x1/8 / 120'-126.667'	5.6	Pass	
Anchor Bolts	1" Dia. / Tension	53	Pass	Min area per ASCE @ 50%

Tower Twist & Sway at Top:

Description	Current	Total Allowable
Tower Twist (degrees)	0.2202	
Tower Sway (degrees)	0.4479	
Total Deflection (degrees)	0.6681	0.75

5. CONCLUSIONS

The results of the analysis indicate that the tower superstructure steel stresses are within the allowable limits. Also, the loading to the tower foundation is less than the design reactions utilized in the *Evaluation of Existing Foundation for Increased Design Loads*, prepared by Dr. Clarence Welti, P.E., P.C, signed and sealed October 10, 2002. **Therefore, the overall tower structure and its foundation are deemed structurally adequate for the proposed antenna loading for the wind load classification specified above.**

The tower deflection (sway) is 0.4779 degrees, and the tower rotation (twist) is 0.2202 degrees with a wind velocity of 90 mph concurrent with 0.5" ice. **The tower deflection and rotation are within the Connecticut State Police specification of 0.75 degrees for deflection (sway) and (twist).**

Limitations/Assumptions:

This report is based on the following:

1. Tower inventory as listed in this report.
2. Tower is properly installed and maintained.
3. All members are as specified in the original design documents and are in good condition.
4. All required members are in place.
5. All bolts are in place and are properly tightened.
6. Tower is in plumb condition.
7. All member protective coatings are in good condition.
8. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
9. Foundations were properly constructed to support original design loads as specified in the original design documents.

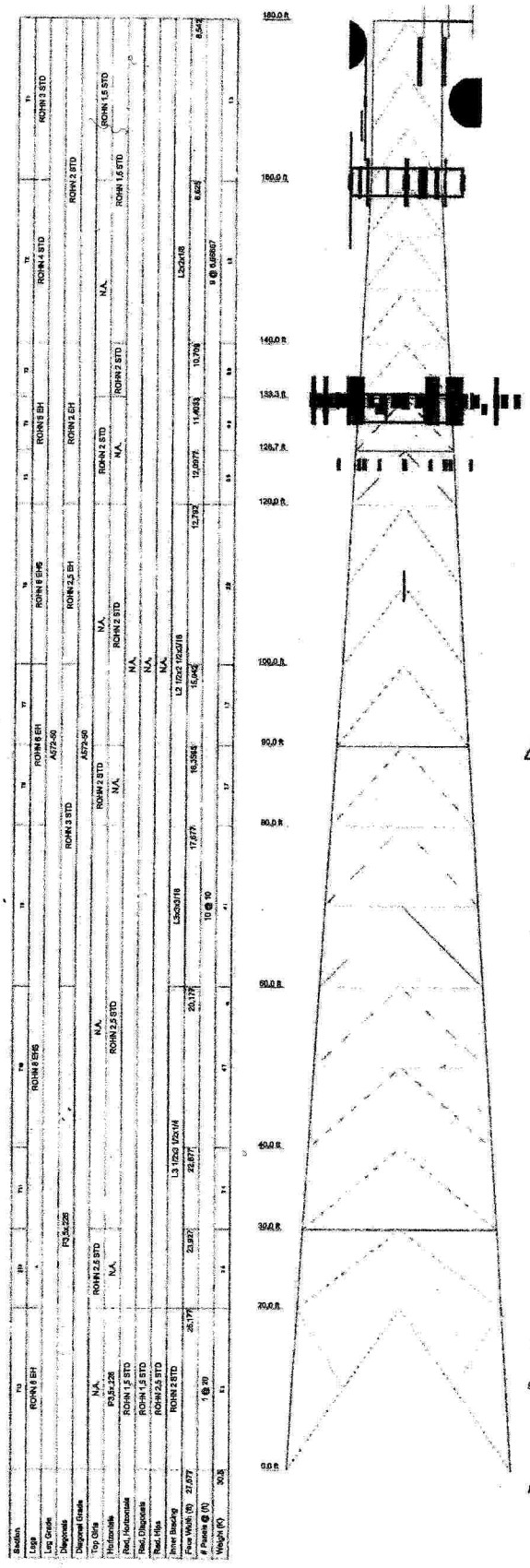
URS is not responsible for any modifications completed prior to or hereafter in which URS is not or was not directly involved. Modifications include but are not limited to:

A. Adding antennas
B. Removing/replacing antennas
C. Adding coaxial cables

URS hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact URS. URS disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

The owner shall refer to TIA/EIA-222-F for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. According to TIA/EIA-222-F section 14.1, Note 1: It is recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading condition.



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
3' Yagi (CSP-1)	180	HPA-65R-BUU-H6 (ATT)	133
Standoff (CSP)	180	HPA-65R-BUU-H6 (ATT)	133
Valmont Single Dish Standoff (1) (CSP)	177	HPA-65R-BUU-H6 (ATT)	133
PAR-65AC (CSP-42)	177	HPA-65R-BUU-H6 (ATT)	133
AP11-65D (CSP-47)	175	HPA-65R-BUU-H6 (ATT)	133
AP11-65D (CSP-46)	175	HPA-65R-BUU-H6 (ATT)	133
SC479-HF1LDF (CSP-59)	170	HPA-65R-BUU-H6 (ATT)	133
SC479-HF1LDF (CSP-58)	170	HPA-65R-BUU-H6 (ATT)	133
SC479-HF1LDF (CSP-57)	170	(3) RRUS-11 (ATT)	133
SC479-HF1LDF (CSP-56)	170	(3) RRUS-11 (ATT)	133
TMA (CSP-60)	170	(3) RRUS-11 (ATT)	133
Standoff (CSP)	170	(2) RRUS-12 (ATT)	133
Standoff (CSP)	170	(2) RRUS-12 (ATT)	133
Valmont Single Dish Standoff (1) (Verizon)	170	(2) RRUS-12 (ATT)	133
HP6-86 (Verizon)	170	RRUS-E2 (ATT)	133
VHF150 (CSP-22)	167	RRUS-E2 (ATT)	133
Standoff (CSP)	160	RRUS-E2 (ATT)	133
OGT9-806 (CSP-48)	160	RRUS-32 (ATT)	133
OGT9-806 (CSP-49)	160	RRUS-32 (ATT)	133
DS536 (CSP-45)	160	RRUS-32 (ATT)	133
Pirod 19' T-Frame Sector Mount (1) (Verizon)	160	RRUS A2 Module (ATT)	133
Pirod 19' T-Frame Sector Mount (1) (Verizon)	160	RRUS A2 Module (ATT)	133
Pirod 19' T-Frame Sector Mount (1) (Verizon)	160	RRUS A2 Module (ATT)	133
P65-15-XL-2 (Verizon)	160	RRUS A2 Module (ATT)	133
P65-15-XL-2 (Verizon)	160	RRUS A2 Module (ATT)	133
P65-15-XL-2 (Verizon)	160	RRUS A2 Module (ATT)	133
Raynet MG D3-800Tx (Verizon)	160	TT19-08BP111-001 (ATT)	133
Raynet MG D3-800Tx (Verizon)	160	TT19-08BP111-001 (ATT)	133
Raynet MG D3-800Tx (Verizon)	160	TT19-08BP111-001 (ATT)	133
(2) Diplexer (Verizon)	160	DC6-48-60-18-8F (ATT)	133
(2) Diplexer (Verizon)	160	DC6-48-60-18-8F (ATT)	133
(2) Diplexer (Verizon)	160	DC6-48-60-18-8F (ATT)	133
BXA-171063-12CF-EDIN-X (Verizon)	160	DC6-48-60-18-8F (ATT)	133
BXA-171063-12CF-EDIN-X (Verizon)	160	Pirod 19' T-Frame Sector Mount (1) (ATT)	132
BXA-171063-12CF-EDIN-X (Verizon)	160	Pirod 19' T-Frame Sector Mount (1) (ATT)	132
BXA-70080-4CF (Verizon)	160	Pirod 19' T-Frame Sector Mount (1) (ATT)	132
BXA-70063-4CF-EDIN-X (Verizon)	160	Air 21 (T-Mobile)	125
BXA-70063-4CF-EDIN-X (Verizon)	160	(3) TMA (T-Mobile)	125
RH_2040-AWS (Verizon)	160	(3) TMA (T-Mobile)	125
RH_2040-AWS (Verizon)	160	(3) TMA (T-Mobile)	125
RH_2040-AWS (Verizon)	160	Air 21 (T-Mobile)	125
Raycap DC6-48-60-18-8F DC Power Surge Protection (Verizon)	160	Air 21 (T-Mobile)	125
		Air 21 (T-Mobile)	125
Standoff (CSP)	160	GPS (GPS)	125
Standoff (CSP)	160	Air 21 (T-Mobile)	125
P65-16-XLH-RR (ATT)	133	Air 21 (T-Mobile)	125
P65-16-XLH-RR (ATT)	133	VHF150 (CSP-44)	118
P65-16-XLH-RR (ATT)	133	4' Standoff (GPS)	99
HPA-65R-BUU-H6 (ATT)	133		

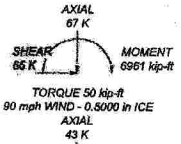
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi			

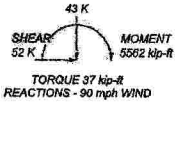
TOWER DESIGN NOTES

1. Tower designed for a 90 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 90 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. TOWER RATING: 90.6%

MAX. CORNER REACTIONS AT BASE:
DOWN: 312 K
UPLIFT: -266 K
SHEAR: 39 K



TORQUE 50 kip-ft
90 mph WIND - 0.5000 in ICE



TORQUE 37 kip-ft
REACTIONS - 90 mph WIND

URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: 860-529-8882
FAX: 860-529-3991

Job:	180' CSP Lattice Tower
Project:	Westport, Connecticut
Client: AT&T	Drawn by: MCD / App'd:
Code: TIA/EIA-222-F	Date: 03/06/14 / Scale: NTS
Path:	Dwg No. E-1

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

Steven L. Levine
Real Estate Consultant

April 30, 2014

Honorable Gordon F. Joseloff
1st Selectman, Town of Westport
Town Hall 110 Myrtle Avenue
Westport, CT 06880

Re: Telecommunications Facility – 880 Boston Post Road

Dear Mr. Joseloff:

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

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

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

Sincerely,

Steven L. Levine
Real Estate Consultant

Enclosure

DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF AN EXISTING 180' SELF SUPPORTING LATTICE TOWER AND ITS FOUNDATION FOR PROPOSED ANTENNA ARRANGEMENT

AT&T Site No.: CT2147
Site: Connecticut State Police Tower # 32
Address: 880 Post Road East
Westport, Connecticut

prepared for

at&t

AT&T Mobility

500 Enterprise
Drive, Suite 3A
Rocky Hill, CT 06067

prepared by

URS

URS CORPORATION
500 ENTERPRISE DRIVE, SUITE 3B
ROCKY HILL, CT 06067
TEL. 860-529-8882

36928686.00000
SAI-077

April 28, 2014

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the 180' self-supporting lattice tower located at 880 Post Road East in Westport, Connecticut. The analysis was conducted in accordance with the 2005 Connecticut State Building Code, the TIA/EIA-222-F standard and the Connecticut State Police Requirements for wind velocity of 90 mph (fastest mile) and 90 (fastest mile) concurrent with 0.5" ice. Twist (rotation) and sway (deflection) were determined in accordance with Connecticut State Police Requirements for a wind velocity of 90 mph (fastest mile) with 0.5" ice. The antenna loading considered in the analysis consists of all existing and proposed antennas, transmission lines, and ancillary items as outlined in the Introduction of this report.

The proposed AT&T antenna modifications are listed below:

Antenna and Mount	Carrier	Antenna Center Elevation
Remove: **(6) CM1007-DBPXBC-003 Diplexer Units** **(6) Ericsson RRUS11 Dual PA RRU Units** **(3) Powerwave TMA Units** **(6) Powerwave P65-16-XLH-RR Panel Antennas**	**AT&T (existing)**	**@ 133'**
Install: **(9) CCI HPA-65R-BUU-H6 Panel Antennas** **(9) Ericsson RRUS-11 Units** **(6) Ericsson RRUS-12 Units** **(3) Ericsson RRUS-E2 Units** **(3) Ericsson RRUS-32 Units** **(6) A2 Modules** **(3) Raycap DC6-48-60-18-8F Surge Suppressors** **(1) 3/8" Fiber Optic Cables** **(9) 5/8" DC Cables**	**AT&T (proposed)**	**@ 133'**

The results of the analysis indicate that the tower structure has sufficient capacity to support the proposed loading conditions. **The tower and its foundation are considered structurally adequate for the proposed antenna loading with the wind load classification specified above.**

The tower deflection (sway) is 0.4779 degrees, and the tower rotation (twist) is 0.2202 degrees with a wind velocity of 90 mph concurrent with 0.5" ice. **The tower deflection and rotation are within the Connecticut State Police specification of 0.75 degrees for deflection (sway) and (twist).**

1. EXECUTIVE SUMMARY *(continued)*

This analysis is based on:

1) The tower structure's theoretical capacity not including any assessment of the condition of the tower.
2) Original tower report prepared by Rohn Industries, Inc., engineering file 26263DL and drawing C910693 dated February 1, 1991.
3) Soil investigation and foundation capacity report prepared by Dr. Clarence Welti, P.E., P.C., dated October 10, 2002.
4) Proposed T-Mobile antenna modification provided by HPC Wireless Services via e-mail dated July 10, 2012.
5) Structural analysis performed by URS Corp., project number SAI-071 / 36922433, signed and sealed on April 2, 2013.
6) Tower Mapping and Inventory by Northeast Towers Inc., tower climb and report dated October 2, 2013.
7) Antenna inventory provided by Connecticut State Police via email dated February 8, 2014.
8) Antenna and mount configuration as specified on the following page of this report.

This report is only valid as per the assumptions and data utilized in this report for antenna inventory, mounts and associated cables. The user of this report shall field verify the assumption of the antenna and mount configuration. Notify the engineer in writing immediately if any of the information in this report is found to be other than specified.

If you should have any questions, please call.

Sincerely,
URS Corporation AES

Richard A. Sambor, P.E.
Senior Structural Engineer
RAS/mcd

2. INTRODUCTION

The subject tower is located at 880 Post Road East in Westport, Connecticut. The structure is a 180' self-supporting lattice tower manufactured by Rohn Industries Incorporated. The inventory is summarized in the table below:

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(1) Yagi Antenna	CSP-1 (existing)	Standoff	@ 180'	(1) LDF5-50A
(1) Celwave PA6-65 dish	CSP-42 (existing)	Dish Standoff	@ 177'	(1) EW-63
(2) Scala AP11-850 antenna	CSP-46,47 (existing)	Leg Mount	@ 175'	(2) LDF7-50A
(1) Sinclair SC479-HF1LDF whip antenna	CSP-56 (existing)	Standoff	@ 170'	(1) LDF7-50A
(3) Sinclair SC479-HF1LDF whip antenna (inverted) (1) TX/RX TTA	CSP-57-60 (existing)	Standoff	@ 170'	(3) LDF7-50A (1) LDF4-50A
(1) Andrew HP6-65H dish	Verizon (existing)	Dish Standoff	@ 170'	(1) EW-65
(1) Yagi Antenna	CSP-22 (existing)	Leg Mount	@ 167'	(1) LDF5-50A
(1) 8' Panel	Unknown (existing)	Mounted to Tower Face	@ 167'	(2) LDF7-50A
(2) Scala OGT9-806 inverted whips	CSP-48,49 (existing)	Standoff	@ 160'	(2) LDF7-50A
(1) Decibel DB536 whip	CSP-45 (future)	Standoff	@ 160'	(1) LDF4-50A
(1) Amphenol BXA 70080-4CF Panel Antennas (Alpha Sector) (2) Amphenol 70063-4CF Panel Antennas (Beta and Gamma Sectors) (3) Amphenol BXA171063-12CF Panel Antennas (3) AWS RRH Units (1) Raycap DB-T1-6Z-8AB-0Z Distribution Box (3) P65-15-XL-2 (3) MG D3-800T0 (6) Diplexers	Verizon (existing)	(3) 15' T-Frames	@ 160'	(12) LDF7-50A (1) 1 5/8" Fiber
(9) CCI HPA-65R-BUU-H6 Panel Antennas **(9) Ericsson RRUS-11 Units** **(6) Ericsson RRUS-12 Units** **(3) Ericsson RRUS-E2 Units** **(3) Ericsson RRUS-32 Units** **(6) A2 Modules** **(3) Raycap DC6-48-60-18-8F Surge Suppressors**	AT&T (Proposed)	**(3) Antenna Mount Frames**	@ 133'	(6) LDF6-50A (1) 3/8" Fiber **(1) 3/8" Fiber** (2) 5/8" DC Cables **(7) 5/8" DC Cables**
(3) Powerwave P65-16-XLH-RR antenna (3) Powerwave TMA Units (1) Raycap Surge Suppressor	AT&T (existing)	Relocated to Above Mount	@ 133'	See Above Cables
(9) TMAs (1) GPS (6) Ericsson Air 21 antennas	T-Mobile (existing)	Leg Mount	@ 125'	(18) LDF7-50A (1) LDF4-50A (1) Huber Suhner Hybrid cable

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(1) Telewave VHF150 Dipole Antenna	CSP-44 (existing)	Leg Mount	@ 111'	(1) LDF4-50A
(1) GPS Antenna	Unknown (existing)	Leg Mount	@ 61'	(1) LDF4-50A

2. INTRODUCTION *(continued)*

This structural analysis of the communications tower was performed by URS Corporation, AES (URS) for AT&T. The purpose of this analysis was to analyze the existing tower for its existing and proposed antenna loads. This analysis was conducted to evaluate twist (rotation), sway (deflection) and stress on the tower, and the effect of forces to the foundation of the tower resulting from existing and proposed antenna arrangements.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was done in accordance with the 2005 Connecticut State Building Code, TIA/EIA-222-F - Structural Standard for Steel Antenna Towers and Antenna Supporting Structures, and the American Institute of Steel Construction (AISC) Manual of Steel Construction - Allowable Stress Design (ASD).

The analysis was conducted using TNX Tower 6.0. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Load Condition 1 = 90 mph (fastest mile) Wind Load + Tower Dead Load
Load Condition 2 = 90 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

The TIA/EIA standard permits a one-third increase in allowable stresses for towers and monopoles less than 700 feet tall. For the purposes of this analysis, in computing the load capacity the allowable stresses of the tower members were increased by one-third.

4. FINDINGS AND EVALUATION

The combined axial and bending stresses on the tower structure were evaluated to compare with the allowable stress in accordance with AISC. The results of the analysis indicate that the calculated stresses under the proposed loading, are below the allowable stresses for the tower structure. The foundation reactions were below the allowable values in the foundation capacity report. The anchor bolts under the proposed loading were found to be within the allowable limits. The tower deflection does not exceed the Connecticut State Police specification of 0.75 degrees for deflection (sway) and rotation (twist).

Tower Base Reactions:

Description	Original	Revised Reactions (Geotech 10/10/2002)	Current	Stress (% capacity)	Pass/ Fail
Pier Compression (kips)	319.9	374	312	83.4	Pass
Pier Uplift (kips)	276.7	324	268	82.7	Pass
Overall Overturning (kip-ft)	7010.3	---	6961	---	---
Overall Shear (kips)	61.5	---	65	---	---
Shear per Leg (kips)	41.0	48	39	81.3	Pass

Tower Component Stress vs. Capacity Summary:

Component / (Section No.)	Controlling Component/ Elevation	Stress (% capacity)	Pass/ Fail	Comments:
Tower Leg (T12)	ROHN 8 EHS / 20'-30'	79.5	Pass	
Diagonal (T6)	ROHN 2.5 EH / 100'-120'	90.6	Pass	
Horizontal (T11)	ROHN 2.5 STD / 30'-40'	66.3	Pass	
Top Girt (T12)	ROHN 2.5 STD / 20'-30'	75.4	Pass	
Redund Horz 1 Bracing (T13)	ROHN 1.5 STD / 0'-20'	27.5	Pass	
Redund Diag 1 Bracing (T13)	ROHN 1.5 STD / 0'-20'	77.1	Pass	
Redund Hip 1 Bracing (T13)	ROHN 2.5 STD / 0'-20'	0.1	Pass	
Inner Bracing (T5)	L2x2x1/8 / 120'-126.667'	5.6	Pass	
Anchor Bolts	1" Dia. / Tension	53	Pass	Min area per ASCE @ 50%

Tower Twist & Sway at Top:

Description	Current	Total Allowable
Tower Twist (degrees)	0.2202	
Tower Sway (degrees)	0.4479	
Total Deflection (degrees)	0.6681	0.75

5. CONCLUSIONS

The results of the analysis indicate that the tower superstructure steel stresses are within the allowable limits. Also, the loading to the tower foundation is less than the design reactions utilized in the *Evaluation of Existing Foundation for Increased Design Loads*, prepared by Dr. Clarence Welti, P.E., P.C, signed and sealed October 10, 2002. **Therefore, the overall tower structure and its foundation are deemed structurally adequate for the proposed antenna loading for the wind load classification specified above.**

The tower deflection (sway) is 0.4779 degrees, and the tower rotation (twist) is 0.2202 degrees with a wind velocity of 90 mph concurrent with 0.5" ice. **The tower deflection and rotation are within the Connecticut State Police specification of 0.75 degrees for deflection (sway) and (twist).**

Limitations/Assumptions:

This report is based on the following:

1. Tower inventory as listed in this report.
2. Tower is properly installed and maintained.
3. All members are as specified in the original design documents and are in good condition.
4. All required members are in place.
5. All bolts are in place and are properly tightened.
6. Tower is in plumb condition.
7. All member protective coatings are in good condition.
8. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
9. Foundations were properly constructed to support original design loads as specified in the original design documents.

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B. Removing/replacing antennas
C. Adding coaxial cables

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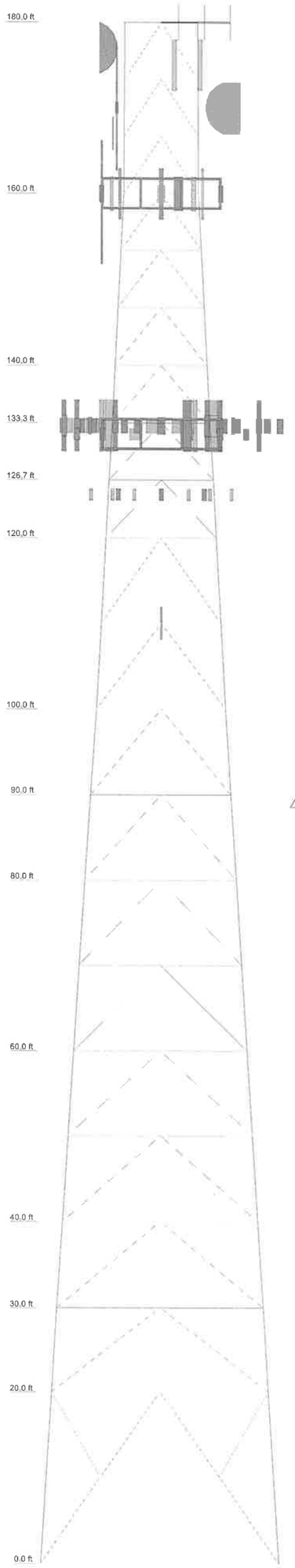
The owner shall refer to TIA/EIA-222-F for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. According to TIA/EIA-222-F section 14.1, Note 1: It is recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading condition.

6. DRAWINGS AND DATA

TNX TOWER INPUT / OUPUT SUMMARY

Section	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	ROHN 8 EH			ROHN 8 EHS			ROHN 6 EH	ROHN 6 EHS		ROHN 5 EH		ROHN 4 STD	ROHN 3 STD
Leg Grade				A572-50									
Diagonals					ROHN 3 STD			ROHN 2.5 EH		ROHN 2 EH		ROHN 2 STD	
Diagonal Grade							A572-50						
Top Girts	N.A.	ROHN 2.5 STD		N.A.		ROHN 2 STD	N.A.		ROHN 2 STD	N.A.		N.A.	ROHN 1.5 STD
Horizontals	P3.5x.226	N.A.		ROHN 2.5 STD		N.A.	ROHN 2 STD		N.A.	ROHN 2 STD		ROHN 1.5 STD	
Red. Horizontals	ROHN 1.5 STD						N.A.						
Red. Diagonals	ROHN 1.5 STD						N.A.						
Red. Hips	ROHN 2.5 STD						N.A.						
Inner Bracing	ROHN 2 STD		L3 1/2x3 1/2x1/4		L3x3x3/16		L2 1/2x2 1/2x3/16				L2x2x1/8		
Face Width (ft) 27.677	25.177	23.927	22.677	20.177	17.677	16.3595	15.042	12.792	12.0977	11.4033	10.709	8.625	8.542
# Panels @ (ft)	1 @ 20				10 @ 10						9 @ 6.66667		
Weight (K) 30.5	5.2	2.5	2.4	4.7	4.1	1.7	1.7	2.8	0.9	0.6	0.8	1.5	1.3



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SC479-HF1LDF (CSP-56)	170	HPA-65R-BUU-H6 (ATT)	133
SC479-HF1LDF (CSP-57)	170	(3) RRUS-11 (ATT)	133
SC479-HF1LDF (CSP-58)	170	(3) RRUS-11 (ATT)	133
TMA (CSP-60)	170	(3) RRUS-11 (ATT)	133
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Pirod 15' T-Frame Sector Mount (1) (Verizon)	160	RRUS A2 Module (ATT)	133
P65-15-XL-2 (Verizon)	160	RRUS A2 Module (ATT)	133
P65-15-XL-2 (Verizon)	160	RRUS A2 Module (ATT)	133
P65-15-XL-2 (Verizon)	160	RRUS A2 Module (ATT)	133
Rymsa MG D3-800Tx (Verizon)	160	TT19-08BP111-001 (ATT)	133
Rymsa MG D3-800Tx (Verizon)	160	TT19-08BP111-001 (ATT)	133
Rymsa MG D3-800Tx (Verizon)	160	TT19-08BP111-001 (ATT)	133
(2) Diplexer (Verizon)	160	DC6-48-60-18-8F (ATT)	133
(2) Diplexer (Verizon)	160	DC6-48-60-18-8F (ATT)	133
(2) Diplexer (Verizon)	160	DC6-48-60-18-8F (ATT)	133
BXA-171063-12CF-EDIN-X (Verizon)	160	DC6-48-60-18-8F (ATT)	133
BXA-171063-12CF-EDIN-X (Verizon)	160	Pirod 15' T-Frame Sector Mount (1) (ATT)	132
BXA-171063-12CF-EDIN-X (Verizon)	160	Pirod 15' T-Frame Sector Mount (1) (ATT)	132
BXA-70080-4CF (Verizon)	160	Pirod 15' T-Frame Sector Mount (1) (ATT)	132
BXA-70063-4CF-EDIN-X (Verizon)	160	Air 21 (T-Mobile)	125
BXA-70063-4CF-EDIN-X (Verizon)	160	(3) TMA (T-Mobile)	125
RH_2X40-AWS (Verizon)	160	(3) TMA (T-Mobile)	125
RH_2X40-AWS (Verizon)	160	(3) TMA (T-Mobile)	125
RH_2X40-AWS (Verizon)	160	Air 21 (T-Mobile)	125
Raycap DC6-48-60-18-8F DC Power Surge Protection (Verizon)	160	Air 21 (T-Mobile)	125
		Air 21 (T-Mobile)	125
Standoff (CSP)	160	GPS (GPS)	125
Standoff (CSP)	160	Air 21 (T-Mobile)	125
P65-16-XLH-RR (ATT)	133	Air 21 (T-Mobile)	125
P65-16-XLH-RR (ATT)	133	VHF150 (CSP-44)	110
P65-16-XLH-RR (ATT)	133	4' Standoff (GPS)	60
HPA-65R-BUU-H6 (ATT)	133		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi			

TOWER DESIGN NOTES

1. Tower designed for a 90 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 90 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. TOWER RATING: 90.6%

MAX. CORNER REACTIONS AT BASE:
DOWN: 312 K
UPLIFT: -268 K
SHEAR: 39 K

AXIAL
67 K

SHEAR
65 K

MOMENT
6961 kip-ft

TORQUE 50 kip-ft
90 mph WIND - 0.5000 in ICE

AXIAL
43 K

SHEAR
52 K

MOMENT
5562 kip-ft

TORQUE 37 kip-ft
REACTIONS - 90 mph WIND

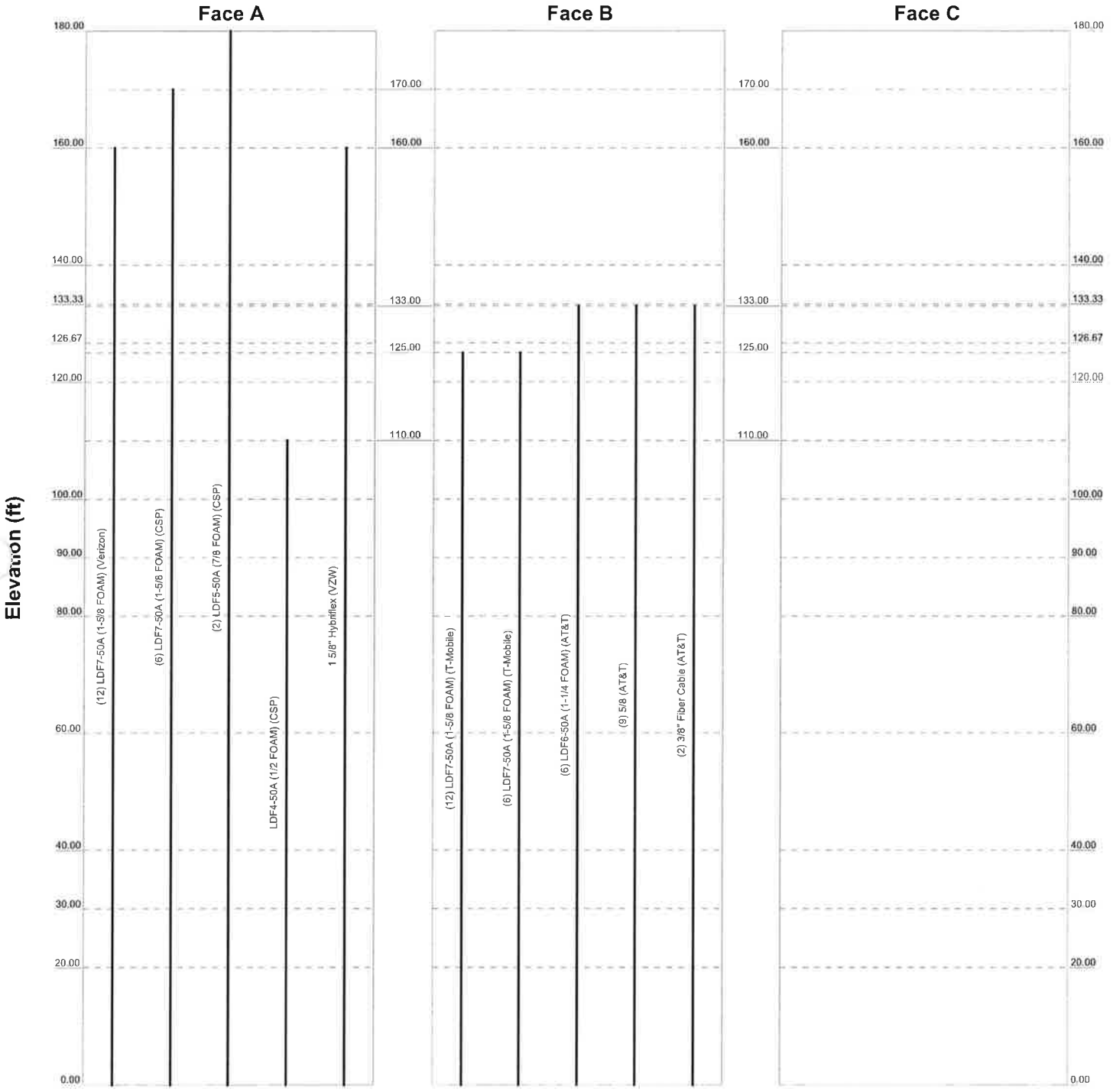
URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: 860-529-8882
FAX: 860-529-3991

Job: *180' CSP Lattice Tower*			
Project: *Westport, Connecticut*			
Client: AT&T	Drawn by: MCD	App'd:	
Code: TIA/EIA-222-F	Date: 03/06/14	Scale: NTS	
Path:		Dwg No. E-1	

TNX TOWER FEEDLINE DISTRIBUTION

Feedline Distribution Chart
0' - 180'

Round Flat App In Face App Out Face Truss Leg



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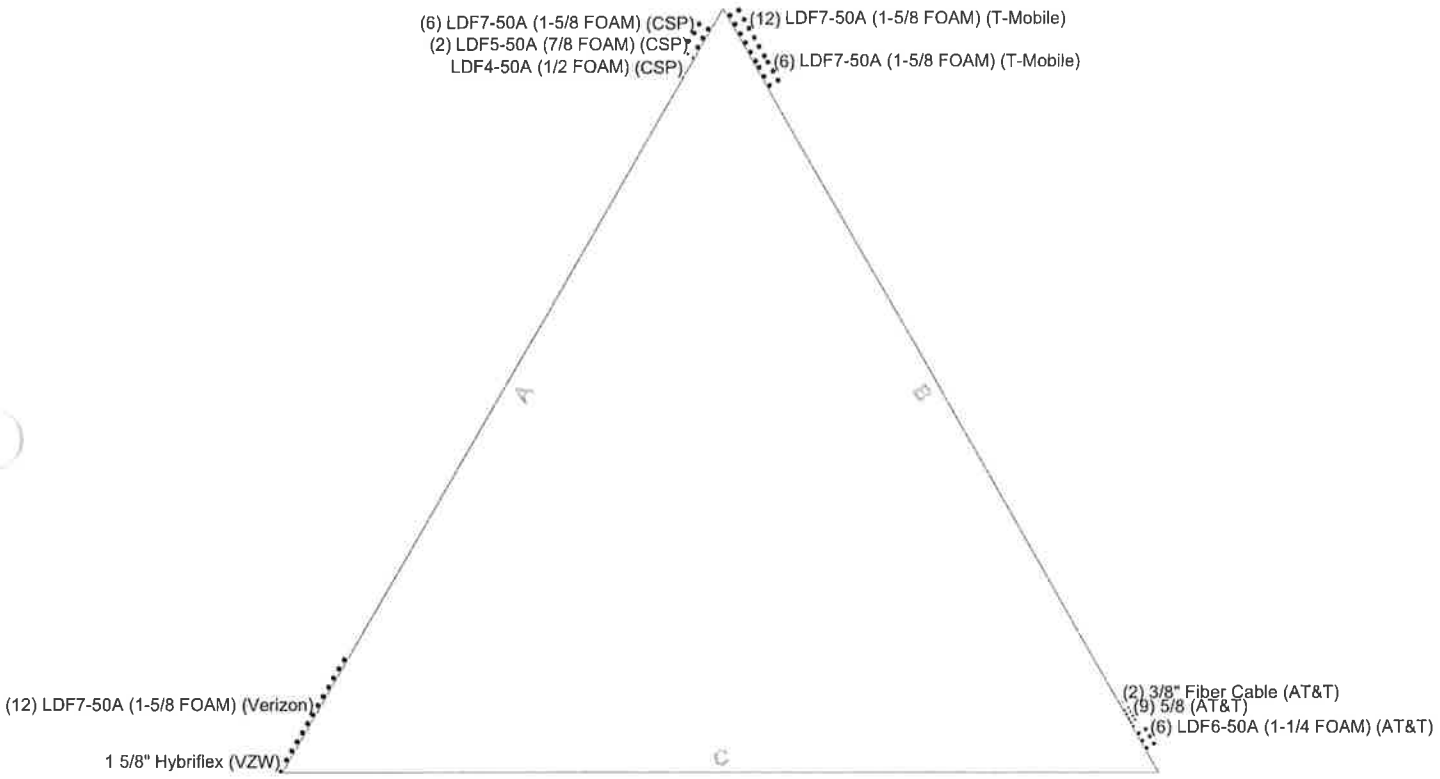
Project: ***Westport, Connecticut***		
Client: AT&T	Drawn by: MCD	App'd:
Code: TIA/EIA-222-F	Date: 03/06/14	Scale: NTS
Path:		Dwg No. E-7

TNX TOWER FEEDLINE PLAN

Feedline Plan

Round _____ Flat _____ App In Face App Out Face



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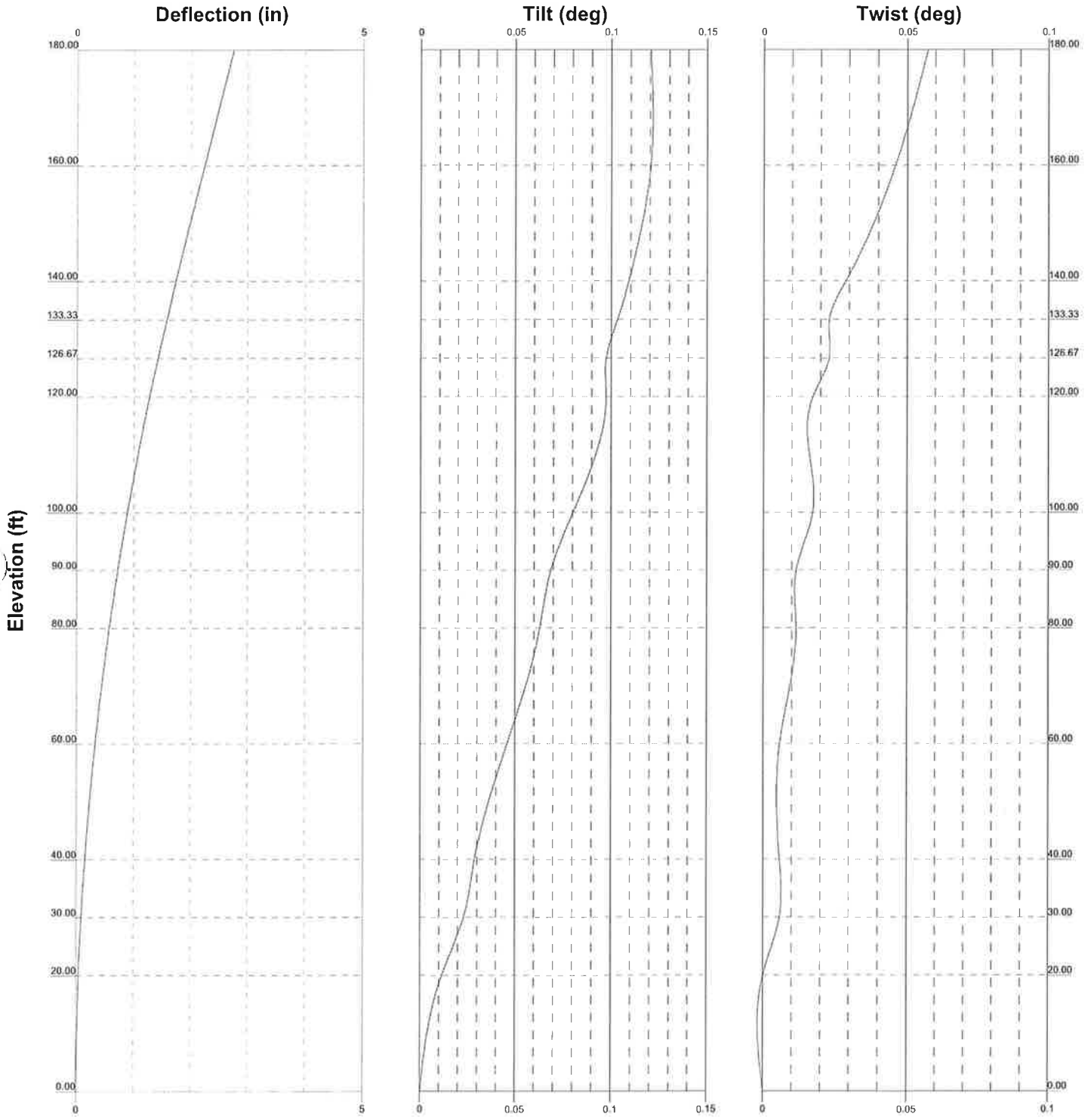
FAX: 860-529-3991

Job: ***180' CSP Lattice Tower***		
Project: ***Westport, Connecticut***		
Client: AT&T	Drawn by: MCD	App'd:
Code: TIA/EIA-222-F	Date: 03/06/14	Scale: NTS
Path:		Dwg No. E-7

TNX TOWER DEFLECTION, TILT, AND TWIST

TIA/EIA-222-F - Service - 50 mph

Maximum Values



URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: 860-529-8882
FAX: 860-529-3991

Job: ***180' CSP Lattice Tower***			
Project: ***Westport, Connecticut***			
Client: AT&T	Drawn by: MCD	App'd:	
Code: TIA/EIA-222-F	Date: 03/06/14	Scale: NTS	
Path:		Dwg No. E-5	

DETAILED OUTPUT

tnxTower	Job	Page
	180' CSP Lattice Tower	1 of 50
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	Project Westport, Connecticut	Date 14:27:22 03/06/14
	Client AT&T	Designed by MCD

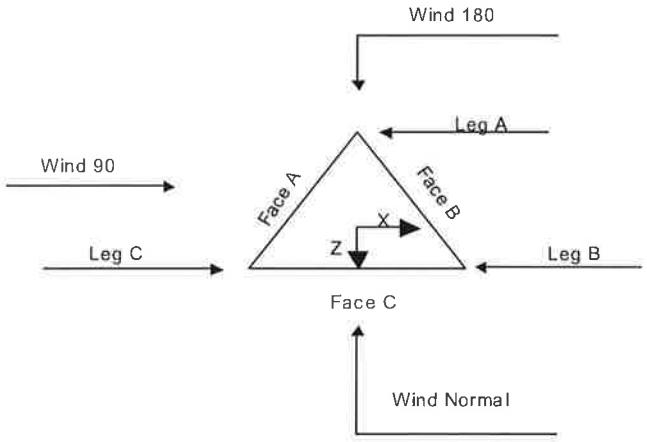
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.00 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 8.54 ft at the top and 27.68 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 90 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 90 mph is used in combination with ice.
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	√ Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	Assume Rigid Index Plate	√ Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	√ SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	√ Retension Guys To Initial Tension	√ All Leg Panels Have Same Allowable
Escalate Ice	Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
√ Include Bolts In Member Capacity	Autocalc Torque Arm Areas	**Poles**
√ Leg Bolts Are At Top Of Section	√ SR Members Have Cut Ends	√ Include Shear-Torsion Interaction
√ Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	√ Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	180.00-160.00			8.54	1	20.00
T2	160.00-140.00			8.63	1	20.00
T3	140.00-133.33			10.71	1	6.67
T4	133.33-126.67			11.40	1	6.67
T5	126.67-120.00			12.10	1	6.67
T6	120.00-100.00			12.79	1	20.00
T7	100.00-90.00			15.04	1	10.00
T8	90.00-80.00			16.36	1	10.00
T9	80.00-60.00			17.68	1	20.00
T10	60.00-40.00			20.18	1	20.00
T11	40.00-30.00			22.68	1	10.00
T12	30.00-20.00			23.93	1	10.00
T13	20.00-0.00			25.18	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	180.00-160.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T2	160.00-140.00	6.67	K Brace Down	No	Yes	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T3	140.00-133.33	6.67	K Brace Down	No	Yes	0.0000	0.0000
T4	133.33-126.67	6.67	K Brace Down	No	Yes	0.0000	0.0000
T5	126.67-120.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T6	120.00-100.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T7	100.00-90.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T8	90.00-80.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T9	80.00-60.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T10	60.00-40.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T11	40.00-30.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T12	30.00-20.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T13	20.00-0.00	20.00	K1 Down	No	Yes	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 180.00-160.00	Pipe	ROHN 3 STD	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T2 160.00-140.00	Pipe	ROHN 4 STD	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T3 140.00-133.33	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Pipe	ROHN 2 EH	A572-50 (50 ksi)
T4 133.33-126.67	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Pipe	ROHN 2 EH	A572-50 (50 ksi)
T5 126.67-120.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Pipe	ROHN 2 EH	A572-50 (50 ksi)
T6 120.00-100.00	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Pipe	ROHN 2.5 EH	A572-50 (50 ksi)
T7 100.00-90.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T8 90.00-80.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T9 80.00-60.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T10 60.00-40.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Pipe	P3.5x.226	A572-50 (50 ksi)
T11 40.00-30.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Pipe	P3.5x.226	A572-50 (50 ksi)
T12 30.00-20.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Pipe	P3.5x.226	A572-50 (50 ksi)
T13 20.00-0.00	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Pipe	P3.5x.226	A572-50 (50 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
T4 133.33-126.67	Pipe	ROHN 2 STD	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)
T5 126.67-120.00	Pipe	ROHN 2 STD	A572-50	Solid Round		A36

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T8 90.00-80.00	Pipe	ROHN 2 STD	(50 ksi) A572-50 (50 ksi)	Single Angle		(36 ksi) A36 (36 ksi)
T12 30.00-20.00	Pipe	ROHN 2.5 STD	A572-50 (50 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 180.00-160.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)
T2 160.00-140.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)
T3 140.00-133.33	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T4 133.33-126.67	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T5 126.67-120.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T6 120.00-100.00	None	Single Angle		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T7 100.00-90.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T8 90.00-80.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T9 80.00-60.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T10 60.00-40.00	None	Single Angle		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T11 40.00-30.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T12 30.00-20.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T13 20.00-0.00	None	Flat Bar		A36 (36 ksi)	Pipe	P3.5x.226	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T1 180.00-160.00	Solid Round		A36 (36 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T2 160.00-140.00	Solid Round		A36 (36 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T3 140.00-133.33	Solid Round		A36 (36 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T4 133.33-126.67	Solid Round		A36 (36 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T5 126.67-120.00	Solid Round		A36 (36 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T6 120.00-100.00	Single Angle		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T7 100.00-90.00	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T8 90.00-80.00	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T9 80.00-60.00	Solid Round		A36 (36 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T10 60.00-40.00	Single Angle		A36 (36 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T11 40.00-30.00	Single Angle		A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T12 30.00-20.00	Single Angle		A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T13 20.00-0.00	Solid Round		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
T13 20.00-0.00	A572-50 (50 ksi)	Horizontal (1)	Pipe	ROHN 1.5 STD	0.8
		Diagonal (1)	Pipe	ROHN 1.5 STD	0.8
		Hip (1)	Pipe	ROHN 2.5 STD	0.8

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 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 140.00-133.33	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 133.33-126.67	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 126.67-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T7 100.00-90.00	0.00	0.0000	A36 (36 ksi)	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
T8 90.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T9 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T10 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T11 40.00-30.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T12 30.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T13 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 180.00-160.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 160.00-140.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 140.00-133.33	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 133.33-126.67	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 126.67-120.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 120.00-100.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 100.00-90.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 90.00-80.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 80.00-60.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T10 60.00-40.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T11 40.00-30.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T12 30.00-20.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T13 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)*

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 180.00-160.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 160.00-140.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 140.00-133.33	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 133.33-126.67	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 126.67-120.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 120.00-100.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 100.00-90.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 90.00-80.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 80.00-60.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 60.00-40.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 40.00-30.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T12 30.00-20.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T13 20.00-0.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T1 180.00-160.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T2 160.00-140.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T3 140.00-133.33	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T4 133.33-126.67	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T5 126.67-120.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T6 120.00-100.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T7 100.00-90.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T8 90.00-80.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T9 80.00-60.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T10 60.00-40.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000

Tower Elevation	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T11 40.00-30.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T12 30.00-20.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T13 20.00-0.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000

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
LDF7-50A (1-5/8 FOAM) (Verizon)	A	Yes	Ar (CfAe)	160.00 - 0.00	0.0000	-0.42	12	12	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM) (T-Mobile)	B	Yes	Ar (CfAe)	125.00 - 0.00	0.0000	-0.46	12	6	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM) (T-Mobile)	B	Yes	Ar (CfAe)	125.00 - 0.00	0.0000	-0.41	6	3	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM) (CSP)	A	Yes	Ar (CfAe)	170.00 - 0.00	0.0000	0.46	6	3	1.9800	1.9800		0.82
LDF5-50A (7/8 FOAM) (CSP)	A	Yes	Ar (CfAe)	180.00 - 0.00	0.0000	0.435	2	1	1.0900	1.0900		0.33
LDF4-50A (1/2 FOAM) (CSP)	A	Yes	Ar (CfAe)	110.00 - 0.00	0.0000	0.41	1	1	0.6300	0.6300		0.15
1 5/8" Hybriflex (VZW)	A	Yes	Ar (CfAe)	160.00 - 0.00	0.0000	-0.5	1	1	1.6250	1.6250		0.21
LDF6-50A (1-1/4 FOAM) (AT&T)	B	Yes	Ar (CfAe)	133.00 - 0.00	0.0000	0.46	6	3	1.5500	1.5500		0.66
5/8 (AT&T)	B	Yes	Ar (CfAe)	133.00 - 0.00	0.0000	0.43	9	5	0.8800	0.8800		0.40
3/8" Fiber Cable (AT&T)	B	Yes	Ar (CfAe)	133.00 - 0.00	0.0000	0.41	2	1	0.4800	0.4800		0.12

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	180.00-160.00	A	6.767	0.000	0.000	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	0.000	0.000	0.00
T2	160.00-140.00	A	54.025	0.000	0.000	0.000	0.31
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T3	140.00-133.33	A	18.008	0.000	0.000	0.000	0.10
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T4	133.33-126.67	A	18.008	0.000	0.000	0.000	0.10
		B	5.030	0.000	0.000	0.000	0.05
		C	0.000	0.000	0.000	0.000	0.00
T5	126.67-120.00	A	18.008	0.000	0.000	0.000	0.10
		B	12.719	0.000	0.000	0.000	0.13
		C	0.000	0.000	0.000	0.000	0.00
T6	120.00-100.00	A	54.550	0.000	0.000	0.000	0.31
		B	45.583	0.000	0.000	0.000	0.45
		C	0.000	0.000	0.000	0.000	0.00
T7	100.00-90.00	A	27.538	0.000	0.000	0.000	0.16
		B	22.792	0.000	0.000	0.000	0.23
		C	0.000	0.000	0.000	0.000	0.00
T8	90.00-80.00	A	27.538	0.000	0.000	0.000	0.16
		B	22.792	0.000	0.000	0.000	0.23
		C	0.000	0.000	0.000	0.000	0.00
T9	80.00-60.00	A	55.075	0.000	0.000	0.000	0.32
		B	45.583	0.000	0.000	0.000	0.45
		C	0.000	0.000	0.000	0.000	0.00
T10	60.00-40.00	A	55.075	0.000	0.000	0.000	0.32
		B	45.583	0.000	0.000	0.000	0.45
		C	0.000	0.000	0.000	0.000	0.00
T11	40.00-30.00	A	27.538	0.000	0.000	0.000	0.16
		B	22.792	0.000	0.000	0.000	0.23
		C	0.000	0.000	0.000	0.000	0.00
T12	30.00-20.00	A	27.538	0.000	0.000	0.000	0.16
		B	22.792	0.000	0.000	0.000	0.23
		C	0.000	0.000	0.000	0.000	0.00
T13	20.00-0.00	A	55.075	0.000	0.000	0.000	0.32
		B	45.583	0.000	0.000	0.000	0.45
		C	0.000	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	180.00-160.00	A	0.500	10.933	0.000	0.000	0.000	0.19
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	160.00-140.00	A	0.500	82.358	0.000	0.000	0.000	0.92
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T3	140.00-133.33	A	0.500	27.453	0.000	0.000	0.000	0.31
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T4	133.33-126.67	A	0.500	27.453	0.000	0.000	0.000	0.31
		B		5.811	3.716	0.000	0.000	0.16
		C		0.000	0.000	0.000	0.000	0.00
T5	126.67-120.00	A	0.500	27.453	0.000	0.000	0.000	0.31
		B		17.292	3.911	0.000	0.000	0.38
		C		0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T6	120.00-100.00	A	0.500	83.717	0.000	0.000	0.000	0.93
		B		63.050	11.733	0.000	0.000	1.35
		C		0.000	0.000	0.000	0.000	0.00
T7	100.00-90.00	A	0.500	42.538	0.000	0.000	0.000	0.47
		B		31.525	5.867	0.000	0.000	0.67
		C		0.000	0.000	0.000	0.000	0.00
T8	90.00-80.00	A	0.500	42.538	0.000	0.000	0.000	0.47
		B		31.525	5.867	0.000	0.000	0.67
		C		0.000	0.000	0.000	0.000	0.00
T9	80.00-60.00	A	0.500	85.075	0.000	0.000	0.000	0.94
		B		63.050	11.733	0.000	0.000	1.35
		C		0.000	0.000	0.000	0.000	0.00
T10	60.00-40.00	A	0.500	85.075	0.000	0.000	0.000	0.94
		B		63.050	11.733	0.000	0.000	1.35
		C		0.000	0.000	0.000	0.000	0.00
T11	40.00-30.00	A	0.500	42.538	0.000	0.000	0.000	0.47
		B		31.525	5.867	0.000	0.000	0.67
		C		0.000	0.000	0.000	0.000	0.00
T12	30.00-20.00	A	0.500	42.538	0.000	0.000	0.000	0.47
		B		31.525	5.867	0.000	0.000	0.67
		C		0.000	0.000	0.000	0.000	0.00
T13	20.00-0.00	A	0.500	85.075	0.000	0.000	0.000	0.94
		B		63.050	11.733	0.000	0.000	1.35
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	180.00-160.00	A	0.531	1.247	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T2	160.00-140.00	A	3.959	8.782	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T3	140.00-133.33	A	1.359	2.942	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T4	133.33-126.67	A	1.332	2.884	0.000	0.000
		B	0.372	1.001	0.000	0.000
		C	0.000	0.000	0.000	0.000
T5	126.67-120.00	A	1.308	2.833	0.000	0.000
		B	0.924	2.188	0.000	0.000
		C	0.000	0.000	0.000	0.000
T6	120.00-100.00	A	3.309	6.967	0.000	0.000
		B	2.765	6.223	0.000	0.000
		C	0.000	0.000	0.000	0.000
T7	100.00-90.00	A	1.813	3.714	0.000	0.000
		B	1.500	3.265	0.000	0.000
		C	0.000	0.000	0.000	0.000
T8	90.00-80.00	A	1.757	3.604	0.000	0.000
		B	1.454	3.168	0.000	0.000
		C	0.000	0.000	0.000	0.000
T9	80.00-60.00	A	3.618	7.312	0.000	0.000
		B	2.995	6.428	0.000	0.000
		C	0.000	0.000	0.000	0.000

Section	Elevation	Face	A_R	A_R Ice	A_F	A_F Ice
	ft		ft^2	ft^2	ft^2	ft^2
T10	60.00-40.00	A	3.798	7.534	0.000	0.000
		B	3.144	6.622	0.000	0.000
		C	0.000	0.000	0.000	0.000
T11	40.00-30.00	A	1.856	3.683	0.000	0.000
		B	1.536	3.238	0.000	0.000
		C	0.000	0.000	0.000	0.000
T12	30.00-20.00	A	1.832	3.637	0.000	0.000
		B	1.516	3.197	0.000	0.000
		C	0.000	0.000	0.000	0.000
T13	20.00-0.00	A	3.848	7.994	0.000	0.000
		B	3.185	7.027	0.000	0.000
		C	0.000	0.000	0.000	0.000

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	180.00-160.00	-0.3626	-4.4014	-0.4064	-4.9134
T2	160.00-140.00	-16.0443	2.2300	-16.9324	2.1690
T3	140.00-133.33	-16.1618	2.2858	-17.5016	2.2843
T4	133.33-126.67	-9.9665	4.9260	-9.8749	5.2926
T5	126.67-120.00	-8.2763	-3.8976	-8.0642	-3.9053
T6	120.00-100.00	-8.4436	-7.1555	-8.4116	-7.6107
T7	100.00-90.00	-9.0186	-7.7590	-9.0844	-8.4801
T8	90.00-80.00	-9.6642	-8.2702	-9.7372	-9.0409
T9	80.00-60.00	-9.5396	-8.1110	-9.8776	-9.1101
T10	60.00-40.00	-10.2299	-8.6396	-10.6789	-9.7799
T11	40.00-30.00	-10.9199	-9.1846	-11.4047	-10.4017
T12	30.00-20.00	-11.3623	-9.5337	-11.8704	-10.8005
T13	20.00-0.00	-12.3715	-10.3477	-12.8315	-11.6319

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
3' Yagi (CSP-1)	A	From Leg	1.50 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	2.08 3.79	2.08 3.79	0.03 0.05
Standoff (CSP)	A	None		0.0000	180.00	No Ice 1/2" Ice	0.52 0.79	0.52 0.79	0.02 0.02
Valmont Single Dish Standoff (1) (CSP)	C	None		0.0000	177.00	No Ice 1/2" Ice	2.64 3.69	2.64 3.69	0.04 0.05
AP11-850 (CSP-46)	B	From Face	1.00 3.00 0.00	0.0000	175.00	No Ice 1/2" Ice	4.96 5.36	2.25 2.57	0.01 0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
AP11-850	B	From Face	1.00	0.0000	175.00	No Ice	4.96	2.25	0.01
(CSP-47)			-3.00			1/2" Ice	5.36	2.57	0.04
			0.00						
Valmont Single Dish Standoff	B	None		0.0000	170.00	No Ice	2.64	2.64	0.04
(1)						1/2" Ice	3.69	3.69	0.05
(Verizon)									
SC479-HF1LDF	C	From Leg	3.00	0.0000	170.00	No Ice	5.06	5.06	0.03
(CSP-59)			0.00			1/2" Ice	6.54	6.54	0.07
			-11.00						
SC479-HF1LDF	C	From Leg	1.00	0.0000	170.00	No Ice	5.06	5.06	0.03
(CSP-56)			0.00			1/2" Ice	6.54	6.54	0.07
			0.00						
SC479-HF1LDF	C	From Leg	1.00	0.0000	170.00	No Ice	5.06	5.06	0.03
(CSP-57)			0.00			1/2" Ice	6.54	6.54	0.07
			0.00						
SC479-HF1LDF	C	From Leg	1.00	0.0000	170.00	No Ice	5.06	5.06	0.03
(CSP-58)			0.00			1/2" Ice	6.54	6.54	0.07
			0.00						
TMA	C	From Leg	1.00	0.0000	170.00	No Ice	1.06	0.45	0.02
(CSP-60)			0.00			1/2" Ice	1.21	0.57	0.03
			0.00						
Standoff	B	None		0.0000	170.00	No Ice	0.52	0.52	0.02
(CSP)						1/2" Ice	0.79	0.79	0.02
Standoff	C	None		0.0000	170.00	No Ice	0.52	0.52	0.02
(CSP)						1/2" Ice	0.79	0.79	0.02
VHF150	C	From Leg	1.50	0.0000	167.00	No Ice	1.38	0.94	0.02
(CSP-22)			0.00			1/2" Ice	1.65	1.28	0.02
			0.00						
Standoff	A	None		0.0000	160.00	No Ice	0.52	0.52	0.02
(CSP)						1/2" Ice	0.79	0.79	0.02
Standoff	A	None		0.0000	160.00	No Ice	0.52	0.52	0.02
(CSP)						1/2" Ice	0.79	0.79	0.02
Standoff	C	None		0.0000	160.00	No Ice	0.52	0.52	0.02
(CSP)						1/2" Ice	0.79	0.79	0.02
OGT9-806	A	From Leg	3.00	0.0000	160.00	No Ice	2.15	2.15	0.02
(CSP-48)			3.00			1/2" Ice	3.25	3.25	0.03
			-11.00						
OGT9-806	A	From Leg	3.00	0.0000	160.00	No Ice	2.15	2.15	0.02
(CSP-49)			-3.00			1/2" Ice	3.25	3.25	0.03
			-11.00						
DB536	C	From Leg	3.00	0.0000	160.00	No Ice	2.83	2.83	0.02
(CSP-45)			0.00			1/2" Ice	3.99	3.99	0.04
			0.00						
Pirod 15' T-Frame Sector	A	None		0.0000	160.00	No Ice	15.00	15.00	0.50
Mount (1)						1/2" Ice	20.60	20.60	0.65
(Verizon)									
Pirod 15' T-Frame Sector	B	None		0.0000	160.00	No Ice	15.00	15.00	0.50
Mount (1)						1/2" Ice	20.60	20.60	0.65
(Verizon)									
Pirod 15' T-Frame Sector	C	None		0.0000	160.00	No Ice	15.00	15.00	0.50
Mount (1)						1/2" Ice	20.60	20.60	0.65
(Verizon)									
P65-15-XL-2	A	From Face	3.00	0.0000	160.00	No Ice	8.54	5.99	0.07
(Verizon)			2.00			1/2" Ice	9.13	6.89	0.13
			0.00						
P65-15-XL-2	B	From Face	3.00	0.0000	160.00	No Ice	8.54	5.99	0.07
(Verizon)			2.00			1/2" Ice	9.13	6.89	0.13

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						
P65-15-XL-2	C	From Face	3.00	0.0000	160.00	No Ice	8.54	5.99	0.07
(Verizon)			2.00			1/2" Ice	9.13	6.89	0.13
			0.00						
Rymsa MG D3-800Tx	A	From Face	3.00	0.0000	160.00	No Ice	3.57	3.43	0.03
(Verizon)			4.00			1/2" Ice	3.94	4.07	0.06
			0.00						
Rymsa MG D3-800Tx	B	From Face	3.00	0.0000	160.00	No Ice	3.57	3.43	0.03
(Verizon)			4.00			1/2" Ice	3.94	4.07	0.06
			0.00						
Rymsa MG D3-800Tx	C	From Face	3.00	0.0000	160.00	No Ice	3.57	3.43	0.03
(Verizon)			4.00			1/2" Ice	3.94	4.07	0.06
			0.00						
(2) Diplexer	A	From Leg	3.00	0.0000	160.00	No Ice	0.47	0.12	0.01
(Verizon)			0.00			1/2" Ice	0.56	0.17	0.01
			0.00						
(2) Diplexer	B	From Leg	3.00	0.0000	160.00	No Ice	0.47	0.12	0.01
(Verizon)			0.00			1/2" Ice	0.56	0.17	0.01
			0.00						
(2) Diplexer	C	From Leg	3.00	0.0000	160.00	No Ice	0.47	0.12	0.01
(Verizon)			0.00			1/2" Ice	0.56	0.17	0.01
			0.00						
Air 21	A	From Face	3.00	0.0000	125.00	No Ice	6.53	4.36	0.08
(T-Mobile)			0.00			1/2" Ice	6.98	4.77	0.12
			0.00						
Air 21	B	From Face	3.00	0.0000	125.00	No Ice	6.53	4.36	0.08
(T-Mobile)			0.00			1/2" Ice	6.98	4.77	0.12
			0.00						
Air 21	C	From Face	3.00	0.0000	125.00	No Ice	6.53	4.36	0.08
(T-Mobile)			0.00			1/2" Ice	6.98	4.77	0.12
			0.00						
(3) TMA	A	From Face	3.00	0.0000	125.00	No Ice	1.06	0.45	0.02
(T-Mobile)			0.00			1/2" Ice	1.21	0.57	0.03
			0.00						
(3) TMA	B	From Face	3.00	0.0000	125.00	No Ice	1.06	0.45	0.02
(T-Mobile)			0.00			1/2" Ice	1.21	0.57	0.03
			0.00						
(3) TMA	C	From Face	3.00	0.0000	125.00	No Ice	1.06	0.45	0.02
(T-Mobile)			0.00			1/2" Ice	1.21	0.57	0.03
			0.00						
Air 21	A	From Face	3.00	0.0000	125.00	No Ice	6.53	4.36	0.08
(T-Mobile)			0.00			1/2" Ice	6.98	4.77	0.12
			0.00						
Air 21	B	From Face	3.00	0.0000	125.00	No Ice	6.53	4.36	0.08
(T-Mobile)			0.00			1/2" Ice	6.98	4.77	0.12
			0.00						
Air 21	C	From Face	3.00	0.0000	125.00	No Ice	6.53	4.36	0.08
(T-Mobile)			0.00			1/2" Ice	6.98	4.77	0.12
			0.00						
GPS	C	From Face	1.00	0.0000	125.00	No Ice	0.00	0.00	0.00
(GPS)			0.00			1/2" Ice	0.00	0.00	0.00
			0.00						
VHF150	A	From Leg	1.50	0.0000	110.00	No Ice	1.38	0.94	0.02
(CSP-44)			0.00			1/2" Ice	1.65	1.28	0.02
			0.00						
BXA-171063-12CF-EDIN-X	A	From Face	3.00	0.0000	160.00	No Ice	4.80	3.63	0.02
(Verizon)			0.00			1/2" Ice	5.25	4.06	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
BXA-171063-12CF-EDIN-X	B	From Face	3.00	0.0000	160.00	No Ice	4.80	3.63	0.02
(Verizon)			0.00			1/2" Ice	5.25	4.06	0.05
			0.00						
BXA-171063-12CF-EDIN-X	C	From Face	3.00	0.0000	160.00	No Ice	4.80	3.63	0.02
(Verizon)			0.00			1/2" Ice	5.25	4.06	0.05
			0.00						
BXA-70080-4CF	A	From Face	3.00	0.0000	160.00	No Ice	3.69	2.79	0.02
(Verizon)			-2.00			1/2" Ice	4.06	3.10	0.05
			0.00						
BXA-70063-4CF-EDIN-X	B	From Face	3.00	0.0000	160.00	No Ice	5.16	2.52	0.01
(Verizon)			-2.00			1/2" Ice	5.55	2.82	0.04
			0.00						
BXA-70063-4CF-EDIN-X	C	From Face	3.00	0.0000	160.00	No Ice	5.16	2.52	0.01
(Verizon)			-2.00			1/2" Ice	5.55	2.82	0.04
			0.00						
RH_2X40-AWS	A	From Leg	3.00	0.0000	160.00	No Ice	2.52	1.59	0.04
(Verizon)			0.00			1/2" Ice	2.75	1.80	0.06
			0.00						
RH_2X40-AWS	B	From Leg	3.00	0.0000	160.00	No Ice	2.52	1.59	0.04
(Verizon)			0.00			1/2" Ice	2.75	1.80	0.06
			0.00						
RH_2X40-AWS	C	From Leg	3.00	0.0000	160.00	No Ice	2.52	1.59	0.04
(Verizon)			0.00			1/2" Ice	2.75	1.80	0.06
			0.00						
Raycap DC6-48-60-18-8F	C	From Face	3.00	0.0000	160.00	No Ice	1.27	1.27	0.05
DC Power Surge Protection			0.00			1/2" Ice	1.46	1.46	0.07
(Verizon)			0.00						
4' Standoff	C	None		0.0000	60.00	No Ice	3.42	3.42	0.11
(GPS)						1/2" Ice	3.67	3.67	0.15
Pirod 15' T-Frame Sector	A	None		0.0000	132.00	No Ice	15.00	15.00	0.50
Mount (1)						1/2" Ice	20.60	20.60	0.65
(AT&T)									
Pirod 15' T-Frame Sector	B	None		0.0000	132.00	No Ice	15.00	15.00	0.50
Mount (1)						1/2" Ice	20.60	20.60	0.65
(AT&T)									
Pirod 15' T-Frame Sector	C	None		0.0000	132.00	No Ice	15.00	15.00	0.50
Mount (1)						1/2" Ice	20.60	20.60	0.65
(AT&T)									
P65-16-XLH-RR	A	From Face	3.00	0.0000	133.00	No Ice	8.40	4.70	0.06
(AT&T)			-3.00			1/2" Ice	8.95	5.15	0.11
			0.00						
P65-16-XLH-RR	B	From Face	3.00	0.0000	133.00	No Ice	8.40	4.70	0.06
(AT&T)			-3.00			1/2" Ice	8.95	5.15	0.11
			0.00						
P65-16-XLH-RR	C	From Face	3.00	0.0000	133.00	No Ice	8.40	4.70	0.06
(AT&T)			-3.00			1/2" Ice	8.95	5.15	0.11
			0.00						
HPA-65R-BUU-H6	A	From Leg	3.00	0.0000	133.00	No Ice	10.36	6.45	0.06
(AT&T)			-6.00			1/2" Ice	10.93	6.91	0.12
			0.00						
HPA-65R-BUU-H6	B	From Leg	3.00	0.0000	133.00	No Ice	10.36	6.45	0.06
(AT&T)			-6.00			1/2" Ice	10.93	6.91	0.12
			0.00						
HPA-65R-BUU-H6	C	From Leg	3.00	0.0000	133.00	No Ice	10.36	6.45	0.06
(AT&T)			-6.00			1/2" Ice	10.93	6.91	0.12
			0.00						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
HPA-65R-BUU-H6	A	From Leg	3.00	0.0000	133.00	No Ice	10.36	6.45	0.06
(AT&T)			3.00			1/2" Ice	10.93	6.91	0.12
			0.00						
HPA-65R-BUU-H6	B	From Leg	3.00	0.0000	133.00	No Ice	10.36	6.45	0.06
(AT&T)			3.00			1/2" Ice	10.93	6.91	0.12
			0.00						
HPA-65R-BUU-H6	C	From Leg	3.00	0.0000	133.00	No Ice	10.36	6.45	0.06
(AT&T)			3.00			1/2" Ice	10.93	6.91	0.12
			0.00						
HPA-65R-BUU-H6	A	From Leg	3.00	0.0000	133.00	No Ice	10.36	6.45	0.06
(AT&T)			6.00			1/2" Ice	10.93	6.91	0.12
			0.00						
HPA-65R-BUU-H6	B	From Leg	3.00	0.0000	133.00	No Ice	10.36	6.45	0.06
(AT&T)			6.00			1/2" Ice	10.93	6.91	0.12
			0.00						
HPA-65R-BUU-H6	C	From Leg	3.00	0.0000	133.00	No Ice	10.36	6.45	0.06
(AT&T)			6.00			1/2" Ice	10.93	6.91	0.12
			0.00						
(3) RRUS-11	A	From Leg	3.00	0.0000	133.00	No Ice	3.26	1.38	0.05
(AT&T)			-6.00			1/2" Ice	3.50	1.56	0.07
			0.00						
(3) RRUS-11	B	From Leg	3.00	0.0000	133.00	No Ice	3.26	1.38	0.05
(AT&T)			-6.00			1/2" Ice	3.50	1.56	0.07
			0.00						
(3) RRUS-11	C	From Leg	3.00	0.0000	133.00	No Ice	3.26	1.38	0.05
(AT&T)			-6.00			1/2" Ice	3.50	1.56	0.07
			0.00						
(2) RRUS-12	A	From Leg	3.00	0.0000	133.00	No Ice	3.67	1.49	0.05
(AT&T)			-3.00			1/2" Ice	3.93	1.67	0.07
			0.00						
(2) RRUS-12	B	From Leg	3.00	0.0000	133.00	No Ice	3.67	1.49	0.05
(AT&T)			-3.00			1/2" Ice	3.93	1.67	0.07
			0.00						
(2) RRUS-12	C	From Leg	3.00	0.0000	133.00	No Ice	3.67	1.49	0.05
(AT&T)			-3.00			1/2" Ice	3.93	1.67	0.07
			0.00						
RRUS-E2	A	From Leg	3.00	0.0000	133.00	No Ice	3.67	1.49	0.06
(AT&T)			3.00			1/2" Ice	3.93	1.67	0.08
			0.00						
RRUS-E2	B	From Leg	3.00	0.0000	133.00	No Ice	3.67	1.49	0.06
(AT&T)			3.00			1/2" Ice	3.93	1.67	0.08
			0.00						
RRUS-E2	C	From Leg	3.00	0.0000	133.00	No Ice	3.67	1.49	0.06
(AT&T)			3.00			1/2" Ice	3.93	1.67	0.08
			0.00						
RRUS-32	A	From Leg	3.00	0.0000	133.00	No Ice	3.87	2.76	0.08
(AT&T)			6.00			1/2" Ice	4.15	3.02	0.10
			0.00						
RRUS-32	B	From Leg	3.00	0.0000	133.00	No Ice	3.87	2.76	0.08
(AT&T)			6.00			1/2" Ice	4.15	3.02	0.10
			0.00						
RRUS-32	C	From Leg	3.00	0.0000	133.00	No Ice	3.87	2.76	0.08
(AT&T)			6.00			1/2" Ice	4.15	3.02	0.10
			0.00						
RRUS A2 Module	A	From Leg	3.00	0.0000	133.00	No Ice	2.41	0.54	0.02
(AT&T)			3.00			1/2" Ice	2.62	0.67	0.03
			-1.00						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RRUS A2 Module (AT&T)	A	From Leg	3.00 -3.00 -1.00	0.0000	133.00	No Ice 1/2" Ice	2.41 2.62	0.54 0.67	0.02 0.03
RRUS A2 Module (AT&T)	B	From Leg	3.00 3.00 -1.00	0.0000	133.00	No Ice 1/2" Ice	2.41 2.62	0.54 0.67	0.02 0.03
RRUS A2 Module (AT&T)	B	From Leg	3.00 -3.00 -1.00	0.0000	133.00	No Ice 1/2" Ice	2.41 2.62	0.54 0.67	0.02 0.03
RRUS A2 Module (AT&T)	C	From Leg	3.00 3.00 -1.00	0.0000	133.00	No Ice 1/2" Ice	2.41 2.62	0.54 0.67	0.02 0.03
RRUS A2 Module (AT&T)	C	From Leg	3.00 -3.00 -1.00	0.0000	133.00	No Ice 1/2" Ice	2.41 2.62	0.54 0.67	0.02 0.03
TT19-08BP111-001 (AT&T)	A	From Leg	3.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice	0.64 0.76	0.52 0.62	0.02 0.02
TT19-08BP111-001 (AT&T)	B	From Leg	3.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice	0.64 0.76	0.52 0.62	0.02 0.02
TT19-08BP111-001 (AT&T)	C	From Leg	3.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice	0.64 0.76	0.52 0.62	0.02 0.02
DC6-48-60-18-8F (AT&T)	A	From Leg	3.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice	1.27 1.46	1.27 1.46	0.02 0.04
DC6-48-60-18-8F (AT&T)	B	From Leg	3.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice	1.27 1.46	1.27 1.46	0.02 0.04
DC6-48-60-18-8F (AT&T)	C	From Leg	3.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice	1.27 1.46	1.27 1.46	0.02 0.04
DC6-48-60-18-8F (AT&T)	A	None		0.0000	133.00	No Ice 1/2" Ice	1.27 1.46	1.27 1.46	0.02 0.04

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
PA6-65AC (CSP-42)	C	Paraboloid w/o Radome	From Leg	1.00 0.00 0.00	Worst		177.00	6.00	No Ice 1/2" Ice	28.27 29.05	0.09 0.24
HP6-65 (Verizon)	B	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 0.00	Worst		170.00	6.00	No Ice 1/2" Ice	28.27 29.05	0.14 0.29

Tower Pressures - No Ice

$G_H = 1.121$

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 180.00-160.00	170.00	1.597	33	177.503	A	0.000	30.934	11.667	37.71	0.000	0.000
					B	0.000	24.699		47.24	0.000	0.000
					C	0.000	24.699		47.24	0.000	0.000
T2 160.00-140.00	150.00	1.541	32	200.850	A	0.000	78.891	15.027	19.05	0.000	0.000
					B	0.000	28.825		52.13	0.000	0.000
					C	0.000	28.825		52.13	0.000	0.000
T3 140.00-133.33	136.67	1.501	31	76.803	A	0.000	28.226	6.192	21.94	0.000	0.000
					B	0.000	11.577		53.49	0.000	0.000
					C	0.000	11.577		53.49	0.000	0.000
T4 133.33-126.67	130.00	1.48	31	81.431	A	0.000	28.469	6.192	21.75	0.000	0.000
					B	0.000	16.450		37.64	0.000	0.000
					C	0.000	11.792		52.51	0.000	0.000
T5 126.67-120.00	123.33	1.457	30	86.060	A	0.000	28.728	6.192	21.56	0.000	0.000
					B	0.000	23.823		25.99	0.000	0.000
					C	0.000	12.028		51.48	0.000	0.000
T6 120.00-100.00	110.00	1.411	29	289.399	A	0.000	89.842	22.130	24.63	0.000	0.000
					B	0.000	81.419		27.18	0.000	0.000
					C	0.000	38.601		57.33	0.000	0.000
T7 100.00-90.00	95.00	1.353	28	162.540	A	0.000	46.951	11.074	23.59	0.000	0.000
					B	0.000	42.518		26.04	0.000	0.000
					C	0.000	21.227		52.17	0.000	0.000
T8 90.00-80.00	85.00	1.31	27	175.715	A	0.000	47.528	11.074	23.30	0.000	0.000
					B	0.000	43.085		25.70	0.000	0.000
					C	0.000	21.747		50.92	0.000	0.000
T9 80.00-60.00	70.00	1.24	26	392.943	A	0.000	104.470	28.825	27.59	0.000	0.000
					B	0.000	95.602		30.15	0.000	0.000
					C	0.000	53.013		54.37	0.000	0.000
T10 60.00-40.00	50.00	1.126	23	442.943	A	0.000	108.932	28.825	26.46	0.000	0.000
					B	0.000	100.095		28.80	0.000	0.000
					C	0.000	57.656		49.99	0.000	0.000
T11 40.00-30.00	35.00	1.017	21	240.222	A	0.000	55.440	14.412	26.00	0.000	0.000
					B	0.000	51.014		28.25	0.000	0.000
					C	0.000	29.759		48.43	0.000	0.000
T12 30.00-20.00	25.00	1	21	252.722	A	0.000	56.093	14.412	25.69	0.000	0.000
					B	0.000	51.663		27.90	0.000	0.000
					C	0.000	30.387		47.43	0.000	0.000
T13 20.00-0.00	10.00	1	21	542.943	A	0.000	110.803	28.825	26.01	0.000	0.000
					B	0.000	101.975		28.27	0.000	0.000
					C	0.000	59.577		48.38	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.121$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 180.00-160.00	170.00	1.597	33	0.5000	179.170	A	0.000	43.619	15.000	34.39	0.000	0.000
						B	0.000	33.933		44.20	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						C	0.000	33.933		44.20	0.000	0.000
T2 160.00-140.00	150.00	1.541	32	0.5000	202.519	A	0.000	111.999	18.366	16.40	0.000	0.000
						B	0.000	38.423		47.80	0.000	0.000
						C	0.000	38.423		47.80	0.000	0.000
T3 140.00-133.33	136.67	1.501	31	0.5000	77.359	A	0.000	39.465	7.305	18.51	0.000	0.000
						B	0.000	14.954		48.85	0.000	0.000
						C	0.000	14.954		48.85	0.000	0.000
T4 133.33-126.67	130.00	1.48	31	0.5000	81.988	A	0.000	39.829	7.305	18.34	0.000	0.000
						B	3.716	20.070		30.71	0.000	0.000
						C	0.000	15.260		47.87	0.000	0.000
T5 126.67-120.00	123.33	1.457	30	0.5000	86.617	A	0.000	40.214	7.305	18.17	0.000	0.000
						B	3.911	30.698		21.11	0.000	0.000
						C	0.000	15.595		46.85	0.000	0.000
T6 120.00-100.00	110.00	1.411	29	0.5000	291.068	A	0.000	124.793	25.470	20.41	0.000	0.000
						B	11.733	104.869		21.84	0.000	0.000
						C	0.000	48.043		53.02	0.000	0.000
T7 100.00-90.00	95.00	1.353	28	0.5000	163.375	A	0.000	65.011	12.745	19.60	0.000	0.000
						B	5.867	54.447		21.13	0.000	0.000
						C	0.000	26.187		48.67	0.000	0.000
T8 90.00-80.00	85.00	1.31	27	0.5000	176.550	A	0.000	65.826	12.745	19.36	0.000	0.000
						B	5.867	55.249		20.85	0.000	0.000
						C	0.000	26.892		47.39	0.000	0.000
T9 80.00-60.00	70.00	1.24	26	0.5000	394.613	A	0.000	141.554	32.167	22.72	0.000	0.000
						B	11.733	120.414		24.34	0.000	0.000
						C	0.000	63.792		50.42	0.000	0.000
T10 60.00-40.00	50.00	1.126	23	0.5000	444.613	A	0.000	146.688	32.167	21.93	0.000	0.000
						B	11.733	125.575		23.43	0.000	0.000
						C	0.000	69.147		46.52	0.000	0.000
T11 40.00-30.00	35.00	1.017	21	0.5000	241.056	A	0.000	74.635	16.083	21.55	0.000	0.000
						B	5.867	64.068		23.00	0.000	0.000
						C	0.000	35.781		44.95	0.000	0.000
T12 30.00-20.00	25.00	1	21	0.5000	253.556	A	0.000	75.497	16.083	21.30	0.000	0.000
						B	5.867	64.924		22.72	0.000	0.000
						C	0.000	36.596		43.95	0.000	0.000
T13 20.00-0.00	10.00	1	21	0.5000	544.613	A	0.000	149.298	32.167	21.55	0.000	0.000
						B	11.733	128.240		22.98	0.000	0.000
						C	0.000	72.216		44.54	0.000	0.000

Tower Pressure - Service

$G_H = 1.121$

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 180.00-160.00	170.00	1.597	10	177.503	A	0.000	30.934	11.667	37.71	0.000	0.000
					B	0.000	24.699		47.24	0.000	0.000
					C	0.000	24.699		47.24	0.000	0.000
T2 160.00-140.00	150.00	1.541	10	200.850	A	0.000	78.891	15.027	19.05	0.000	0.000
					B	0.000	28.825		52.13	0.000	0.000
					C	0.000	28.825		52.13	0.000	0.000
T3 140.00-133.33	136.67	1.501	10	76.803	A	0.000	28.226	6.192	21.94	0.000	0.000
					B	0.000	11.577		53.49	0.000	0.000
					C	0.000	11.577		53.49	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
T4	130.00	1.48	9	81.431	A	0.000	28.469	6.192	21.75	0.000	0.000
133.33-126.67					B	0.000	16.450		37.64	0.000	0.000
					C	0.000	11.792		52.51	0.000	0.000
T5	123.33	1.457	9	86.060	A	0.000	28.728	6.192	21.56	0.000	0.000
126.67-120.00					B	0.000	23.823		25.99	0.000	0.000
					C	0.000	12.028		51.48	0.000	0.000
T6	110.00	1.411	9	289.399	A	0.000	89.842	22.130	24.63	0.000	0.000
120.00-100.00					B	0.000	81.419		27.18	0.000	0.000
					C	0.000	38.601		57.33	0.000	0.000
T7	95.00	1.353	9	162.540	A	0.000	46.951	11.074	23.59	0.000	0.000
100.00-90.00					B	0.000	42.518		26.04	0.000	0.000
					C	0.000	21.227		52.17	0.000	0.000
T8 90.00-80.00	85.00	1.31	8	175.715	A	0.000	47.528	11.074	23.30	0.000	0.000
					B	0.000	43.085		25.70	0.000	0.000
					C	0.000	21.747		50.92	0.000	0.000
T9 80.00-60.00	70.00	1.24	8	392.943	A	0.000	104.470	28.825	27.59	0.000	0.000
					B	0.000	95.602		30.15	0.000	0.000
					C	0.000	53.013		54.37	0.000	0.000
T10	50.00	1.126	7	442.943	A	0.000	108.932	28.825	26.46	0.000	0.000
60.00-40.00					B	0.000	100.095		28.80	0.000	0.000
					C	0.000	57.656		49.99	0.000	0.000
T11	35.00	1.017	7	240.222	A	0.000	55.440	14.412	26.00	0.000	0.000
40.00-30.00					B	0.000	51.014		28.25	0.000	0.000
					C	0.000	29.759		48.43	0.000	0.000
T12	25.00	1	6	252.722	A	0.000	56.093	14.412	25.69	0.000	0.000
30.00-20.00					B	0.000	51.663		27.90	0.000	0.000
					C	0.000	30.387		47.43	0.000	0.000
T13 20.00-0.00	10.00	1	6	542.943	A	0.000	110.803	28.825	26.01	0.000	0.000
					B	0.000	101.975		28.27	0.000	0.000
					C	0.000	59.577		48.38	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	0.06	1.25	A	0.174	2.684	0.585	1	1	18.112	1.80	90.25	A
180.00-160.00			B	0.139	2.812	0.58	1	1	14.322			
			C	0.139	2.812	0.58	1	1	14.322			
T2	0.31	1.50	A	0.393	2.078	0.649	1	1	51.175	3.81	190.52	A
160.00-140.00			B	0.144	2.796	0.581	1	1	16.733			
			C	0.144	2.796	0.581	1	1	16.733			
T3	0.10	0.83	A	0.368	2.132	0.639	1	1	18.033	1.34	201.16	A
140.00-133.33			B	0.151	2.769	0.582	1	1	6.733			
			C	0.151	2.769	0.582	1	1	6.733			
T4	0.15	0.84	A	0.35	2.172	0.632	1	1	18.002	1.34	201.72	A
133.33-126.67			B	0.202	2.589	0.591	1	1	9.719			
			C	0.145	2.791	0.581	1	1	6.848			
T5	0.23	0.86	A	0.334	2.21	0.627	1	1	18.007	1.35	202.21	A
126.67-120.00			B	0.277	2.359	0.609	1	1	14.510			
			C	0.14	2.81	0.58	1	1	6.976			
T6	0.77	2.93	A	0.31	2.269	0.619	1	1	55.626	4.14	206.86	A
120.00-100.00			B	0.281	2.347	0.61	1	1	49.695			
			C	0.133	2.834	0.579	1	1	22.353			
T7	0.38	1.68	A	0.289	2.326	0.613	1	1	28.760	2.10	210.33	A
100.00-90.00			B	0.262	2.403	0.605	1	1	25.719			

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	0.131	2.844	0.579	1	1	12.284			
T8	0.38	1.72	A	0.27	2.377	0.607	1	1	28.864	2.09	209.01	A
90.00-80.00			B	0.245	2.452	0.601	1	1	25.879			
			C	0.124	2.87	0.578	1	1	12.566			
T9	0.77	4.10	A	0.266	2.391	0.606	1	1	63.314	4.36	218.07	A
80.00-60.00			B	0.243	2.458	0.6	1	1	57.379			
			C	0.135	2.828	0.579	1	1	30.710			
T10	0.77	4.70	A	0.246	2.45	0.601	1	1	65.452	4.20	209.82	A
60.00-40.00			B	0.226	2.512	0.596	1	1	59.661			
			C	0.13	2.846	0.579	1	1	33.362			
T11	0.38	2.44	A	0.231	2.496	0.597	1	1	33.107	1.95	195.35	A
40.00-30.00			B	0.212	2.555	0.593	1	1	30.252			
			C	0.124	2.87	0.578	1	1	17.195			
T12	0.38	2.50	A	0.222	2.524	0.595	1	1	33.382	1.96	195.86	A
30.00-20.00			B	0.204	2.581	0.591	1	1	30.549			
			C	0.12	2.884	0.577	1	1	17.545			
T13	0.77	5.17	A	0.204	2.582	0.591	1	1	65.511	3.93	196.61	A
20.00-0.00			B	0.188	2.637	0.588	1	1	59.960			
			C	0.11	2.925	0.576	1	1	34.325			
Sum Weight:	5.46	30.51						OTM	2907.08 kip-ft	34.38		

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 ft²	F K	w plf	Ctrl. Face
T1	0.06	1.25	A	0.174	2.684	0.585	0.825	1	18.112	1.80	90.25	A
180.00-160.00			B	0.139	2.812	0.58	0.825	1	14.322			
			C	0.139	2.812	0.58	0.825	1	14.322			
T2	0.31	1.50	A	0.393	2.078	0.649	0.825	1	51.175	3.81	190.52	A
160.00-140.00			B	0.144	2.796	0.581	0.825	1	16.733			
			C	0.144	2.796	0.581	0.825	1	16.733			
T3	0.10	0.83	A	0.368	2.132	0.639	0.825	1	18.033	1.34	201.16	A
140.00-133.33			B	0.151	2.769	0.582	0.825	1	6.733			
			C	0.151	2.769	0.582	0.825	1	6.733			
T4	0.15	0.84	A	0.35	2.172	0.632	0.825	1	18.002	1.34	201.72	A
133.33-126.67			B	0.202	2.589	0.591	0.825	1	9.719			
			C	0.145	2.791	0.581	0.825	1	6.848			
T5	0.23	0.86	A	0.334	2.21	0.627	0.825	1	18.007	1.35	202.21	A
126.67-120.00			B	0.277	2.359	0.609	0.825	1	14.510			
			C	0.14	2.81	0.58	0.825	1	6.976			
T6	0.77	2.93	A	0.31	2.269	0.619	0.825	1	55.626	4.14	206.86	A
120.00-100.00			B	0.281	2.347	0.61	0.825	1	49.695			
			C	0.133	2.834	0.579	0.825	1	22.353			
T7	0.38	1.68	A	0.289	2.326	0.613	0.825	1	28.760	2.10	210.33	A
100.00-90.00			B	0.262	2.403	0.605	0.825	1	25.719			
			C	0.131	2.844	0.579	0.825	1	12.284			
T8	0.38	1.72	A	0.27	2.377	0.607	0.825	1	28.864	2.09	209.01	A
90.00-80.00			B	0.245	2.452	0.601	0.825	1	25.879			
			C	0.124	2.87	0.578	0.825	1	12.566			
T9	0.77	4.10	A	0.266	2.391	0.606	0.825	1	63.314	4.36	218.07	A
80.00-60.00			B	0.243	2.458	0.6	0.825	1	57.379			
			C	0.135	2.828	0.579	0.825	1	30.710			
T10	0.77	4.70	A	0.246	2.45	0.601	0.825	1	65.452	4.20	209.82	A

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
60.00-40.00			B	0.226	2.512	0.596	0.825	1	59.661			
			C	0.13	2.846	0.579	0.825	1	33.362			
T11	0.38	2.44	A	0.231	2.496	0.597	0.825	1	33.107	1.95	195.35	A
40.00-30.00			B	0.212	2.555	0.593	0.825	1	30.252			
			C	0.124	2.87	0.578	0.825	1	17.195			
T12	0.38	2.50	A	0.222	2.524	0.595	0.825	1	33.382	1.96	195.86	A
30.00-20.00			B	0.204	2.581	0.591	0.825	1	30.549			
			C	0.12	2.884	0.577	0.825	1	17.545			
T13	0.77	5.17	A	0.204	2.582	0.591	0.825	1	65.511	3.93	196.61	A
20.00-0.00			B	0.188	2.637	0.588	0.825	1	59.960			
			C	0.11	2.925	0.576	0.825	1	34.325			
Sum Weight:	5.46	30.51						OTM	2907.08 kip-ft	34.38		

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 ft²	F K	w plf	Ctrl. Face
T1	0.06	1.25	A	0.174	2.684	0.585	0.8	1	18.112	1.80	90.25	A
180.00-160.00			B	0.139	2.812	0.58	0.8	1	14.322			
			C	0.139	2.812	0.58	0.8	1	14.322			
T2	0.31	1.50	A	0.393	2.078	0.649	0.8	1	51.175	3.81	190.52	A
160.00-140.00			B	0.144	2.796	0.581	0.8	1	16.733			
			C	0.144	2.796	0.581	0.8	1	16.733			
T3	0.10	0.83	A	0.368	2.132	0.639	0.8	1	18.033	1.34	201.16	A
140.00-133.33			B	0.151	2.769	0.582	0.8	1	6.733			
			C	0.151	2.769	0.582	0.8	1	6.733			
T4	0.15	0.84	A	0.35	2.172	0.632	0.8	1	18.002	1.34	201.72	A
133.33-126.67			B	0.202	2.589	0.591	0.8	1	9.719			
			C	0.145	2.791	0.581	0.8	1	6.848			
T5	0.23	0.86	A	0.334	2.21	0.627	0.8	1	18.007	1.35	202.21	A
126.67-120.00			B	0.277	2.359	0.609	0.8	1	14.510			
			C	0.14	2.81	0.58	0.8	1	6.976			
T6	0.77	2.93	A	0.31	2.269	0.619	0.8	1	55.626	4.14	206.86	A
120.00-100.00			B	0.281	2.347	0.61	0.8	1	49.695			
			C	0.133	2.834	0.579	0.8	1	22.353			
T7	0.38	1.68	A	0.289	2.326	0.613	0.8	1	28.760	2.10	210.33	A
100.00-90.00			B	0.262	2.403	0.605	0.8	1	25.719			
			C	0.131	2.844	0.579	0.8	1	12.284			
T8	0.38	1.72	A	0.27	2.377	0.607	0.8	1	28.864	2.09	209.01	A
90.00-80.00			B	0.245	2.452	0.601	0.8	1	25.879			
			C	0.124	2.87	0.578	0.8	1	12.566			
T9	0.77	4.10	A	0.266	2.391	0.606	0.8	1	63.314	4.36	218.07	A
80.00-60.00			B	0.243	2.458	0.6	0.8	1	57.379			
			C	0.135	2.828	0.579	0.8	1	30.710			
T10	0.77	4.70	A	0.246	2.45	0.601	0.8	1	65.452	4.20	209.82	A
60.00-40.00			B	0.226	2.512	0.596	0.8	1	59.661			
			C	0.13	2.846	0.579	0.8	1	33.362			
T11	0.38	2.44	A	0.231	2.496	0.597	0.8	1	33.107	1.95	195.35	A
40.00-30.00			B	0.212	2.555	0.593	0.8	1	30.252			
			C	0.124	2.87	0.578	0.8	1	17.195			
T12	0.38	2.50	A	0.222	2.524	0.595	0.8	1	33.382	1.96	195.86	A
30.00-20.00			B	0.204	2.581	0.591	0.8	1	30.549			
			C	0.12	2.884	0.577	0.8	1	17.545			

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
T13	0.77	5.17	A	0.204	2.582	0.591	0.8	1	65.511	3.93	196.61	A
20.00-0.00			B	0.188	2.637	0.588	0.8	1	59.960			
			C	0.11	2.925	0.576	0.8	1	34.325			
Sum Weight:	5.46	30.51						OTM	2907.08 kip-ft	34.38		

Tower Forces - No 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 ft²	F K	w plf	Ctrl. Face
T1	0.06	1.25	A	0.174	2.684	0.585	0.85	1	18.112	1.80	90.25	A
180.00-160.00			B	0.139	2.812	0.58	0.85	1	14.322			
			C	0.139	2.812	0.58	0.85	1	14.322			
T2	0.31	1.50	A	0.393	2.078	0.649	0.85	1	51.175	3.81	190.52	A
160.00-140.00			B	0.144	2.796	0.581	0.85	1	16.733			
			C	0.144	2.796	0.581	0.85	1	16.733			
T3	0.10	0.83	A	0.368	2.132	0.639	0.85	1	18.033	1.34	201.16	A
140.00-133.33			B	0.151	2.769	0.582	0.85	1	6.733			
			C	0.151	2.769	0.582	0.85	1	6.733			
T4	0.15	0.84	A	0.35	2.172	0.632	0.85	1	18.002	1.34	201.72	A
133.33-126.67			B	0.202	2.589	0.591	0.85	1	9.719			
			C	0.145	2.791	0.581	0.85	1	6.848			
T5	0.23	0.86	A	0.334	2.21	0.627	0.85	1	18.007	1.35	202.21	A
126.67-120.00			B	0.277	2.359	0.609	0.85	1	14.510			
			C	0.14	2.81	0.58	0.85	1	6.976			
T6	0.77	2.93	A	0.31	2.269	0.619	0.85	1	55.626	4.14	206.86	A
120.00-100.00			B	0.281	2.347	0.61	0.85	1	49.695			
			C	0.133	2.834	0.579	0.85	1	22.353			
T7	0.38	1.68	A	0.289	2.326	0.613	0.85	1	28.760	2.10	210.33	A
100.00-90.00			B	0.262	2.403	0.605	0.85	1	25.719			
			C	0.131	2.844	0.579	0.85	1	12.284			
T8	0.38	1.72	A	0.27	2.377	0.607	0.85	1	28.864	2.09	209.01	A
90.00-80.00			B	0.245	2.452	0.601	0.85	1	25.879			
			C	0.124	2.87	0.578	0.85	1	12.566			
T9	0.77	4.10	A	0.266	2.391	0.606	0.85	1	63.314	4.36	218.07	A
80.00-60.00			B	0.243	2.458	0.6	0.85	1	57.379			
			C	0.135	2.828	0.579	0.85	1	30.710			
T10	0.77	4.70	A	0.246	2.45	0.601	0.85	1	65.452	4.20	209.82	A
60.00-40.00			B	0.226	2.512	0.596	0.85	1	59.661			
			C	0.13	2.846	0.579	0.85	1	33.362			
T11	0.38	2.44	A	0.231	2.496	0.597	0.85	1	33.107	1.95	195.35	A
40.00-30.00			B	0.212	2.555	0.593	0.85	1	30.252			
			C	0.124	2.87	0.578	0.85	1	17.195			
T12	0.38	2.50	A	0.222	2.524	0.595	0.85	1	33.382	1.96	195.86	A
30.00-20.00			B	0.204	2.581	0.591	0.85	1	30.549			
			C	0.12	2.884	0.577	0.85	1	17.545			
T13	0.77	5.17	A	0.204	2.582	0.591	0.85	1	65.511	3.93	196.61	A
20.00-0.00			B	0.188	2.637	0.588	0.85	1	59.960			
			C	0.11	2.925	0.576	0.85	1	34.325			
Sum Weight:	5.46	30.51						OTM	2907.08 kip-ft	34.38		

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 ft²	F K	w plf	Ctrl. Face
T1	0.19	1.84	A	0.243	2.457	0.6	1	1	26.181	2.39	119.43	A
180.00-160.00			B	0.189	2.632	0.588	1	1	19.963			
			C	0.189	2.632	0.588	1	1	19.963			
T2	0.92	2.15	A	0.553	1.841	0.726	1	1	81.309	5.36	268.06	A
160.00-140.00			B	0.19	2.631	0.588	1	1	22.606			
			C	0.19	2.631	0.588	1	1	22.606			
T3	0.31	1.08	A	0.51	1.887	0.703	1	1	27.733	1.83	273.84	A
140.00-133.33			B	0.193	2.619	0.589	1	1	8.809			
			C	0.193	2.619	0.589	1	1	8.809			
T4	0.47	1.10	A	0.486	1.919	0.69	1	1	27.496	1.81	272.19	A
133.33-126.67			B	0.29	2.323	0.613	1	1	16.017			
			C	0.186	2.643	0.588	1	1	8.968			
T5	0.69	1.13	A	0.464	1.951	0.68	1	1	27.343	1.81	271.03	A
126.67-120.00			B	0.4	2.065	0.651	1	1	23.909			
			C	0.18	2.664	0.587	1	1	9.147			
T6	2.28	3.73	A	0.429	2.01	0.664	1	1	82.831	5.46	272.90	A
120.00-100.00			B	0.401	2.063	0.652	1	1	80.092			
			C	0.165	2.717	0.584	1	1	28.052			
T7	1.14	2.13	A	0.398	2.068	0.651	1	1	42.306	2.75	275.08	A
100.00-90.00			B	0.369	2.128	0.64	1	1	40.686			
			C	0.16	2.734	0.583	1	1	15.270			
T8	1.14	2.19	A	0.373	2.12	0.641	1	1	42.188	2.72	272.43	A
90.00-80.00			B	0.346	2.18	0.631	1	1	40.735			
			C	0.152	2.763	0.582	1	1	15.647			
T9	2.29	5.22	A	0.359	2.152	0.636	1	1	89.976	5.58	278.89	A
80.00-60.00			B	0.335	2.207	0.627	1	1	87.256			
			C	0.162	2.729	0.583	1	1	37.211			
T10	2.29	5.98	A	0.33	2.219	0.626	1	1	91.755	5.33	266.49	A
60.00-40.00			B	0.309	2.273	0.619	1	1	89.419			
			C	0.156	2.751	0.582	1	1	40.267			
T11	1.14	3.11	A	0.31	2.271	0.619	1	1	46.191	2.48	247.92	A
40.00-30.00			B	0.29	2.323	0.613	1	1	45.136			
			C	0.148	2.777	0.581	1	1	20.797			
T12	1.14	3.19	A	0.298	2.302	0.615	1	1	46.447	2.49	248.57	B
30.00-20.00			B	0.279	2.353	0.61	1	1	45.455			
			C	0.144	2.792	0.581	1	1	21.249			
T13	2.29	6.38	A	0.274	2.367	0.608	1	1	90.822	5.01	250.37	B
20.00-0.00			B	0.257	2.417	0.604	1	1	89.150			
			C	0.133	2.837	0.579	1	1	41.811			
Sum Weight:	16.30	39.23						OTM	3867.70 kip-ft	45.01		

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	0.19	1.84	A	0.243	2.457	0.6	0.825	1	26.181	2.39	119.43	A
180.00-160.00			B	0.189	2.632	0.588	0.825	1	19.963			
			C	0.189	2.632	0.588	0.825	1	19.963			

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
T2	0.92	2.15	A	0.553	1.841	0.726	0.825	1	81.309	5.36	268.06	A
160.00-140.00			B	0.19	2.631	0.588	0.825	1	22.606			
			C	0.19	2.631	0.588	0.825	1	22.606			
T3	0.31	1.08	A	0.51	1.887	0.703	0.825	1	27.733	1.83	273.84	A
140.00-133.33			B	0.193	2.619	0.589	0.825	1	8.809			
			C	0.193	2.619	0.589	0.825	1	8.809			
T4	0.47	1.10	A	0.486	1.919	0.69	0.825	1	27.496	1.81	272.19	A
133.33-126.67			B	0.29	2.323	0.613	0.825	1	15.367			
			C	0.186	2.643	0.588	0.825	1	8.968			
T5	0.69	1.13	A	0.464	1.951	0.68	0.825	1	27.343	1.81	271.03	A
126.67-120.00			B	0.4	2.065	0.651	0.825	1	23.224			
			C	0.18	2.664	0.587	0.825	1	9.147			
T6	2.28	3.73	A	0.429	2.01	0.664	0.825	1	82.831	5.46	272.90	A
120.00-100.00			B	0.401	2.063	0.652	0.825	1	78.039			
			C	0.165	2.717	0.584	0.825	1	28.052			
T7	1.14	2.13	A	0.398	2.068	0.651	0.825	1	42.306	2.75	275.08	A
100.00-90.00			B	0.369	2.128	0.64	0.825	1	39.660			
			C	0.16	2.734	0.583	0.825	1	15.270			
T8	1.14	2.19	A	0.373	2.12	0.641	0.825	1	42.188	2.72	272.43	A
90.00-80.00			B	0.346	2.18	0.631	0.825	1	39.709			
			C	0.152	2.763	0.582	0.825	1	15.647			
T9	2.29	5.22	A	0.359	2.152	0.636	0.825	1	89.976	5.58	278.89	A
80.00-60.00			B	0.335	2.207	0.627	0.825	1	85.203			
			C	0.162	2.729	0.583	0.825	1	37.211			
T10	2.29	5.98	A	0.33	2.219	0.626	0.825	1	91.755	5.33	266.49	A
60.00-40.00			B	0.309	2.273	0.619	0.825	1	87.366			
			C	0.156	2.751	0.582	0.825	1	40.267			
T11	1.14	3.11	A	0.31	2.271	0.619	0.825	1	46.191	2.48	247.92	A
40.00-30.00			B	0.29	2.323	0.613	0.825	1	44.109			
			C	0.148	2.777	0.581	0.825	1	20.797			
T12	1.14	3.19	A	0.298	2.302	0.615	0.825	1	46.447	2.49	248.51	A
30.00-20.00			B	0.279	2.353	0.61	0.825	1	44.428			
			C	0.144	2.792	0.581	0.825	1	21.249			
T13	2.29	6.38	A	0.274	2.367	0.608	0.825	1	90.822	5.00	249.83	A
20.00-0.00			B	0.257	2.417	0.604	0.825	1	87.097			
			C	0.133	2.837	0.579	0.825	1	41.811			
Sum Weight:	16.30	39.23						OTM	3867.58 kip-ft	45.00		

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	0.19	1.84	A	0.243	2.457	0.6	0.8	1	26.181	2.39	119.43	A
180.00-160.00			B	0.189	2.632	0.588	0.8	1	19.963			
			C	0.189	2.632	0.588	0.8	1	19.963			
T2	0.92	2.15	A	0.553	1.841	0.726	0.8	1	81.309	5.36	268.06	A
160.00-140.00			B	0.19	2.631	0.588	0.8	1	22.606			
			C	0.19	2.631	0.588	0.8	1	22.606			
T3	0.31	1.08	A	0.51	1.887	0.703	0.8	1	27.733	1.83	273.84	A
140.00-133.33			B	0.193	2.619	0.589	0.8	1	8.809			
			C	0.193	2.619	0.589	0.8	1	8.809			
T4	0.47	1.10	A	0.486	1.919	0.69	0.8	1	27.496	1.81	272.19	A
133.33-126.67			B	0.29	2.323	0.613	0.8	1	15.274			

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	0.186	2.643	0.588	0.8	1	8.968			
T5	0.69	1.13	A	0.464	1.951	0.68	0.8	1	27.343	1.81	271.03	A
126.67-120.00			B	0.4	2.065	0.651	0.8	1	23.126			
			C	0.18	2.664	0.587	0.8	1	9.147			
T6	2.28	3.73	A	0.429	2.01	0.664	0.8	1	82.831	5.46	272.90	A
120.00-100.00			B	0.401	2.063	0.652	0.8	1	77.745			
			C	0.165	2.717	0.584	0.8	1	28.052			
T7	1.14	2.13	A	0.398	2.068	0.651	0.8	1	42.306	2.75	275.08	A
100.00-90.00			B	0.369	2.128	0.64	0.8	1	39.513			
			C	0.16	2.734	0.583	0.8	1	15.270			
T8	1.14	2.19	A	0.373	2.12	0.641	0.8	1	42.188	2.72	272.43	A
90.00-80.00			B	0.346	2.18	0.631	0.8	1	39.562			
			C	0.152	2.763	0.582	0.8	1	15.647			
T9	2.29	5.22	A	0.359	2.152	0.636	0.8	1	89.976	5.58	278.89	A
80.00-60.00			B	0.335	2.207	0.627	0.8	1	84.909			
			C	0.162	2.729	0.583	0.8	1	37.211			
T10	2.29	5.98	A	0.33	2.219	0.626	0.8	1	91.755	5.33	266.49	A
60.00-40.00			B	0.309	2.273	0.619	0.8	1	87.072			
			C	0.156	2.751	0.582	0.8	1	40.267			
T11	1.14	3.11	A	0.31	2.271	0.619	0.8	1	46.191	2.48	247.92	A
40.00-30.00			B	0.29	2.323	0.613	0.8	1	43.963			
			C	0.148	2.777	0.581	0.8	1	20.797			
T12	1.14	3.19	A	0.298	2.302	0.615	0.8	1	46.447	2.49	248.51	A
30.00-20.00			B	0.279	2.353	0.61	0.8	1	44.281			
			C	0.144	2.792	0.581	0.8	1	21.249			
T13	2.29	6.38	A	0.274	2.367	0.608	0.8	1	90.822	5.00	249.83	A
20.00-0.00			B	0.257	2.417	0.604	0.8	1	86.803			
			C	0.133	2.837	0.579	0.8	1	41.811			
Sum Weight:	16.30	39.23						OTM	3867.58 kip-ft	45.00		

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 ft²	F K	w plf	Ctrl. Face
T1	0.19	1.84	A	0.243	2.457	0.6	0.85	1	26.181	2.39	119.43	A
180.00-160.00			B	0.189	2.632	0.588	0.85	1	19.963			
			C	0.189	2.632	0.588	0.85	1	19.963			
T2	0.92	2.15	A	0.553	1.841	0.726	0.85	1	81.309	5.36	268.06	A
160.00-140.00			B	0.19	2.631	0.588	0.85	1	22.606			
			C	0.19	2.631	0.588	0.85	1	22.606			
T3	0.31	1.08	A	0.51	1.887	0.703	0.85	1	27.733	1.83	273.84	A
140.00-133.33			B	0.193	2.619	0.589	0.85	1	8.809			
			C	0.193	2.619	0.589	0.85	1	8.809			
T4	0.47	1.10	A	0.486	1.919	0.69	0.85	1	27.496	1.81	272.19	A
133.33-126.67			B	0.29	2.323	0.613	0.85	1	15.460			
			C	0.186	2.643	0.588	0.85	1	8.968			
T5	0.69	1.13	A	0.464	1.951	0.68	0.85	1	27.343	1.81	271.03	A
126.67-120.00			B	0.4	2.065	0.651	0.85	1	23.322			
			C	0.18	2.664	0.587	0.85	1	9.147			
T6	2.28	3.73	A	0.429	2.01	0.664	0.85	1	82.831	5.46	272.90	A
120.00-100.00			B	0.401	2.063	0.652	0.85	1	78.332			
			C	0.165	2.717	0.584	0.85	1	28.052			
T7	1.14	2.13	A	0.398	2.068	0.651	0.85	1	42.306	2.75	275.08	A

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
100.00-90.00			B	0.369	2.128	0.64	0.85	1	39.806			
			C	0.16	2.734	0.583	0.85	1	15.270			
T8	1.14	2.19	A	0.373	2.12	0.641	0.85	1	42.188	2.72	272.43	A
90.00-80.00			B	0.346	2.18	0.631	0.85	1	39.855			
			C	0.152	2.763	0.582	0.85	1	15.647			
T9	2.29	5.22	A	0.359	2.152	0.636	0.85	1	89.976	5.58	278.89	A
80.00-60.00			B	0.335	2.207	0.627	0.85	1	85.496			
			C	0.162	2.729	0.583	0.85	1	37.211			
T10	2.29	5.98	A	0.33	2.219	0.626	0.85	1	91.755	5.33	266.49	A
60.00-40.00			B	0.309	2.273	0.619	0.85	1	87.659			
			C	0.156	2.751	0.582	0.85	1	40.267			
T11	1.14	3.11	A	0.31	2.271	0.619	0.85	1	46.191	2.48	247.92	A
40.00-30.00			B	0.29	2.323	0.613	0.85	1	44.256			
			C	0.148	2.777	0.581	0.85	1	20.797			
T12	1.14	3.19	A	0.298	2.302	0.615	0.85	1	46.447	2.49	248.51	A
30.00-20.00			B	0.279	2.353	0.61	0.85	1	44.575			
			C	0.144	2.792	0.581	0.85	1	21.249			
T13	2.29	6.38	A	0.274	2.367	0.608	0.85	1	90.822	5.00	249.83	A
20.00-0.00			B	0.257	2.417	0.604	0.85	1	87.390			
			C	0.133	2.837	0.579	0.85	1	41.811			
Sum Weight:	16.30	39.23						OTM	3867.58 kip-ft	45.00		

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 ft²	F K	w plf	Ctrl. Face
T1	0.06	1.25	A	0.174	2.684	0.585	1	1	18.112	0.56	27.85	A
180.00-160.00			B	0.139	2.812	0.58	1	1	14.322			
			C	0.139	2.812	0.58	1	1	14.322			
T2	0.31	1.50	A	0.393	2.078	0.649	1	1	51.175	1.18	58.80	A
160.00-140.00			B	0.144	2.796	0.581	1	1	16.733			
			C	0.144	2.796	0.581	1	1	16.733			
T3	0.10	0.83	A	0.368	2.132	0.639	1	1	18.033	0.41	62.09	A
140.00-133.33			B	0.151	2.769	0.582	1	1	6.733			
			C	0.151	2.769	0.582	1	1	6.733			
T4	0.15	0.84	A	0.35	2.172	0.632	1	1	18.002	0.42	62.26	A
133.33-126.67			B	0.202	2.589	0.591	1	1	9.719			
			C	0.145	2.791	0.581	1	1	6.848			
T5	0.23	0.86	A	0.334	2.21	0.627	1	1	18.007	0.42	62.41	A
126.67-120.00			B	0.277	2.359	0.609	1	1	14.510			
			C	0.14	2.81	0.58	1	1	6.976			
T6	0.77	2.93	A	0.31	2.269	0.619	1	1	55.626	1.28	63.85	A
120.00-100.00			B	0.281	2.347	0.61	1	1	49.695			
			C	0.133	2.834	0.579	1	1	22.353			
T7	0.38	1.68	A	0.289	2.326	0.613	1	1	28.760	0.65	64.92	A
100.00-90.00			B	0.262	2.403	0.605	1	1	25.719			
			C	0.131	2.844	0.579	1	1	12.284			
T8	0.38	1.72	A	0.27	2.377	0.607	1	1	28.864	0.65	64.51	A
90.00-80.00			B	0.245	2.452	0.601	1	1	25.879			
			C	0.124	2.87	0.578	1	1	12.566			
T9	0.77	4.10	A	0.266	2.391	0.606	1	1	63.314	1.35	67.31	A
80.00-60.00			B	0.243	2.458	0.6	1	1	57.379			
			C	0.135	2.828	0.579	1	1	30.710			

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
T10	0.77	4.70	A	0.246	2.45	0.601	1	1	65.452	1.30	64.76	A
60.00-40.00			B	0.226	2.512	0.596	1	1	59.661			
			C	0.13	2.846	0.579	1	1	33.362			
T11	0.38	2.44	A	0.231	2.496	0.597	1	1	33.107	0.60	60.29	A
40.00-30.00			B	0.212	2.555	0.593	1	1	30.252			
			C	0.124	2.87	0.578	1	1	17.195			
T12	0.38	2.50	A	0.222	2.524	0.595	1	1	33.382	0.60	60.45	A
30.00-20.00			B	0.204	2.581	0.591	1	1	30.549			
			C	0.12	2.884	0.577	1	1	17.545			
T13	0.77	5.17	A	0.204	2.582	0.591	1	1	65.511	1.21	60.68	A
20.00-0.00			B	0.188	2.637	0.588	1	1	59.960			
			C	0.11	2.925	0.576	1	1	34.325			
Sum Weight:	5.46	30.51						OTM	897.25 kip-ft	10.61		

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	0.06	1.25	A	0.174	2.684	0.585	0.825	1	18.112	0.56	27.85	A
180.00-160.00			B	0.139	2.812	0.58	0.825	1	14.322			
			C	0.139	2.812	0.58	0.825	1	14.322			
T2	0.31	1.50	A	0.393	2.078	0.649	0.825	1	51.175	1.18	58.80	A
160.00-140.00			B	0.144	2.796	0.581	0.825	1	16.733			
			C	0.144	2.796	0.581	0.825	1	16.733			
T3	0.10	0.83	A	0.368	2.132	0.639	0.825	1	18.033	0.41	62.09	A
140.00-133.33			B	0.151	2.769	0.582	0.825	1	6.733			
			C	0.151	2.769	0.582	0.825	1	6.733			
T4	0.15	0.84	A	0.35	2.172	0.632	0.825	1	18.002	0.42	62.26	A
133.33-126.67			B	0.202	2.589	0.591	0.825	1	9.719			
			C	0.145	2.791	0.581	0.825	1	6.848			
T5	0.23	0.86	A	0.334	2.21	0.627	0.825	1	18.007	0.42	62.41	A
126.67-120.00			B	0.277	2.359	0.609	0.825	1	14.510			
			C	0.14	2.81	0.58	0.825	1	6.976			
T6	0.77	2.93	A	0.31	2.269	0.619	0.825	1	55.626	1.28	63.85	A
120.00-100.00			B	0.281	2.347	0.61	0.825	1	49.695			
			C	0.133	2.834	0.579	0.825	1	22.353			
T7	0.38	1.68	A	0.289	2.326	0.613	0.825	1	28.760	0.65	64.92	A
100.00-90.00			B	0.262	2.403	0.605	0.825	1	25.719			
			C	0.131	2.844	0.579	0.825	1	12.284			
T8	0.38	1.72	A	0.27	2.377	0.607	0.825	1	28.864	0.65	64.51	A
90.00-80.00			B	0.245	2.452	0.601	0.825	1	25.879			
			C	0.124	2.87	0.578	0.825	1	12.566			
T9	0.77	4.10	A	0.266	2.391	0.606	0.825	1	63.314	1.35	67.31	A
80.00-60.00			B	0.243	2.458	0.6	0.825	1	57.379			
			C	0.135	2.828	0.579	0.825	1	30.710			
T10	0.77	4.70	A	0.246	2.45	0.601	0.825	1	65.452	1.30	64.76	A
60.00-40.00			B	0.226	2.512	0.596	0.825	1	59.661			
			C	0.13	2.846	0.579	0.825	1	33.362			
T11	0.38	2.44	A	0.231	2.496	0.597	0.825	1	33.107	0.60	60.29	A
40.00-30.00			B	0.212	2.555	0.593	0.825	1	30.252			
			C	0.124	2.87	0.578	0.825	1	17.195			
T12	0.38	2.50	A	0.222	2.524	0.595	0.825	1	33.382	0.60	60.45	A
30.00-20.00			B	0.204	2.581	0.591	0.825	1	30.549			

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	0.12	2.884	0.577	0.825	1	17.545			
T13	0.77	5.17	A	0.204	2.582	0.591	0.825	1	65.511	1.21	60.68	A
20.00-0.00			B	0.188	2.637	0.588	0.825	1	59.960			
			C	0.11	2.925	0.576	0.825	1	34.325			
Sum Weight:	5.46	30.51						OTM	897.25 kip-ft	10.61		

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	0.06	1.25	A	0.174	2.684	0.585	0.8	1	18.112	0.56	27.85	A
180.00-160.00			B	0.139	2.812	0.58	0.8	1	14.322			
			C	0.139	2.812	0.58	0.8	1	14.322			
T2	0.31	1.50	A	0.393	2.078	0.649	0.8	1	51.175	1.18	58.80	A
160.00-140.00			B	0.144	2.796	0.581	0.8	1	16.733			
			C	0.144	2.796	0.581	0.8	1	16.733			
T3	0.10	0.83	A	0.368	2.132	0.639	0.8	1	18.033	0.41	62.09	A
140.00-133.33			B	0.151	2.769	0.582	0.8	1	6.733			
			C	0.151	2.769	0.582	0.8	1	6.733			
T4	0.15	0.84	A	0.35	2.172	0.632	0.8	1	18.002	0.42	62.26	A
133.33-126.67			B	0.202	2.589	0.591	0.8	1	9.719			
			C	0.145	2.791	0.581	0.8	1	6.848			
T5	0.23	0.86	A	0.334	2.21	0.627	0.8	1	18.007	0.42	62.41	A
126.67-120.00			B	0.277	2.359	0.609	0.8	1	14.510			
			C	0.14	2.81	0.58	0.8	1	6.976			
T6	0.77	2.93	A	0.31	2.269	0.619	0.8	1	55.626	1.28	63.85	A
120.00-100.00			B	0.281	2.347	0.61	0.8	1	49.695			
			C	0.133	2.834	0.579	0.8	1	22.353			
T7	0.38	1.68	A	0.289	2.326	0.613	0.8	1	28.760	0.65	64.92	A
100.00-90.00			B	0.262	2.403	0.605	0.8	1	25.719			
			C	0.131	2.844	0.579	0.8	1	12.284			
T8	0.38	1.72	A	0.27	2.377	0.607	0.8	1	28.864	0.65	64.51	A
90.00-80.00			B	0.245	2.452	0.601	0.8	1	25.879			
			C	0.124	2.87	0.578	0.8	1	12.566			
T9	0.77	4.10	A	0.266	2.391	0.606	0.8	1	63.314	1.35	67.31	A
80.00-60.00			B	0.243	2.458	0.6	0.8	1	57.379			
			C	0.135	2.828	0.579	0.8	1	30.710			
T10	0.77	4.70	A	0.246	2.45	0.601	0.8	1	65.452	1.30	64.76	A
60.00-40.00			B	0.226	2.512	0.596	0.8	1	59.661			
			C	0.13	2.846	0.579	0.8	1	33.362			
T11	0.38	2.44	A	0.231	2.496	0.597	0.8	1	33.107	0.60	60.29	A
40.00-30.00			B	0.212	2.555	0.593	0.8	1	30.252			
			C	0.124	2.87	0.578	0.8	1	17.195			
T12	0.38	2.50	A	0.222	2.524	0.595	0.8	1	33.382	0.60	60.45	A
30.00-20.00			B	0.204	2.581	0.591	0.8	1	30.549			
			C	0.12	2.884	0.577	0.8	1	17.545			
T13	0.77	5.17	A	0.204	2.582	0.591	0.8	1	65.511	1.21	60.68	A
20.00-0.00			B	0.188	2.637	0.588	0.8	1	59.960			
			C	0.11	2.925	0.576	0.8	1	34.325			
Sum Weight:	5.46	30.51						OTM	897.25 kip-ft	10.61		

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 ft²	F K	w plf	Ctrl. Face
T1	0.06	1.25	A	0.174	2.684	0.585	0.85	1	18.112	0.56	27.85	A
180.00-160.00			B	0.139	2.812	0.58	0.85	1	14.322			
			C	0.139	2.812	0.58	0.85	1	14.322			
T2	0.31	1.50	A	0.393	2.078	0.649	0.85	1	51.175	1.18	58.80	A
160.00-140.00			B	0.144	2.796	0.581	0.85	1	16.733			
			C	0.144	2.796	0.581	0.85	1	16.733			
T3	0.10	0.83	A	0.368	2.132	0.639	0.85	1	18.033	0.41	62.09	A
140.00-133.33			B	0.151	2.769	0.582	0.85	1	6.733			
			C	0.151	2.769	0.582	0.85	1	6.733			
T4	0.15	0.84	A	0.35	2.172	0.632	0.85	1	18.002	0.42	62.26	A
133.33-126.67			B	0.202	2.589	0.591	0.85	1	9.719			
			C	0.145	2.791	0.581	0.85	1	6.848			
T5	0.23	0.86	A	0.334	2.21	0.627	0.85	1	18.007	0.42	62.41	A
126.67-120.00			B	0.277	2.359	0.609	0.85	1	14.510			
			C	0.14	2.81	0.58	0.85	1	6.976			
T6	0.77	2.93	A	0.31	2.269	0.619	0.85	1	55.626	1.28	63.85	A
120.00-100.00			B	0.281	2.347	0.61	0.85	1	49.695			
			C	0.133	2.834	0.579	0.85	1	22.353			
T7	0.38	1.68	A	0.289	2.326	0.613	0.85	1	28.760	0.65	64.92	A
100.00-90.00			B	0.262	2.403	0.605	0.85	1	25.719			
			C	0.131	2.844	0.579	0.85	1	12.284			
T8	0.38	1.72	A	0.27	2.377	0.607	0.85	1	28.864	0.65	64.51	A
90.00-80.00			B	0.245	2.452	0.601	0.85	1	25.879			
			C	0.124	2.87	0.578	0.85	1	12.566			
T9	0.77	4.10	A	0.266	2.391	0.606	0.85	1	63.314	1.35	67.31	A
80.00-60.00			B	0.243	2.458	0.6	0.85	1	57.379			
			C	0.135	2.828	0.579	0.85	1	30.710			
T10	0.77	4.70	A	0.246	2.45	0.601	0.85	1	65.452	1.30	64.76	A
60.00-40.00			B	0.226	2.512	0.596	0.85	1	59.661			
			C	0.13	2.846	0.579	0.85	1	33.362			
T11	0.38	2.44	A	0.231	2.496	0.597	0.85	1	33.107	0.60	60.29	A
40.00-30.00			B	0.212	2.555	0.593	0.85	1	30.252			
			C	0.124	2.87	0.578	0.85	1	17.195			
T12	0.38	2.50	A	0.222	2.524	0.595	0.85	1	33.382	0.60	60.45	A
30.00-20.00			B	0.204	2.581	0.591	0.85	1	30.549			
			C	0.12	2.884	0.577	0.85	1	17.545			
T13	0.77	5.17	A	0.204	2.582	0.591	0.85	1	65.511	1.21	60.68	A
20.00-0.00			B	0.188	2.637	0.588	0.85	1	59.960			
			C	0.11	2.925	0.576	0.85	1	34.325			
Sum Weight:	5.46	30.51						OTM	897.25 kip-ft	10.61		

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	14.03					
Bracing Weight	16.48					

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
Total Member Self-Weight	30.51			-16.92	3.56	
Total Weight	43.20			-16.92	3.56	
Wind 0 deg - No Ice		0.13	-51.92	-5529.88	-19.04	-36.82
Wind 30 deg - No Ice		26.11	-45.03	-4802.59	-2779.66	-35.52
Wind 45 deg - No Ice		36.86	-36.81	-3931.16	-3920.81	-31.18
Wind 60 deg - No Ice		45.10	-26.08	-2792.98	-4794.52	-24.71
Wind 90 deg - No Ice		52.00	-0.13	-39.52	-5523.74	-7.27
Wind 120 deg - No Ice		44.97	25.85	2719.99	-4771.92	12.11
Wind 135 deg - No Ice		36.67	36.62	3865.35	-3888.84	20.89
Wind 150 deg - No Ice		25.88	44.90	4746.15	-2740.51	28.25
Wind 180 deg - No Ice		-0.13	51.92	5496.05	26.17	36.82
Wind 210 deg - No Ice		-26.11	45.03	4768.75	2786.79	35.52
Wind 225 deg - No Ice		-36.86	36.81	3897.32	3927.94	31.18
Wind 240 deg - No Ice		-45.10	26.08	2759.14	4801.65	24.71
Wind 270 deg - No Ice		-52.00	0.13	5.69	5530.86	7.27
Wind 300 deg - No Ice		-44.97	-25.85	-2753.82	4779.04	-12.11
Wind 315 deg - No Ice		-36.67	-36.62	-3899.19	3895.97	-20.89
Wind 330 deg - No Ice		-25.88	-44.90	-4779.98	2747.63	-28.25
Member Ice	8.72					
Total Weight Ice	66.53			-47.57	7.13	
Wind 0 deg - Ice		0.13	-65.28	-6928.82	-15.88	-49.15
Wind 30 deg - Ice		32.79	-56.59	-6018.31	-3460.83	-49.90
Wind 45 deg - Ice		46.30	-46.25	-4929.54	-4885.39	-45.14
Wind 60 deg - Ice		56.66	-32.75	-3508.07	-5976.53	-37.30
Wind 90 deg - Ice		65.35	-0.13	-70.59	-6888.92	-14.70
Wind 120 deg - Ice		56.53	32.52	3373.12	-5953.62	11.84
Wind 135 deg - Ice		46.11	46.06	4801.85	-4852.84	24.35
Wind 150 deg - Ice		32.56	56.46	5900.15	-3420.96	35.21
Wind 180 deg - Ice		-0.13	65.27	6833.56	30.15	49.14
Wind 210 deg - Ice		-32.79	56.59	5923.17	3475.09	49.90
Wind 225 deg - Ice		-46.30	46.25	4834.40	4899.65	45.14
Wind 240 deg - Ice		-56.67	32.76	3412.99	5990.90	37.31
Wind 270 deg - Ice		-65.35	0.13	-24.56	6903.19	14.70
Wind 300 deg - Ice		-56.53	-32.52	-3468.20	5967.78	-11.84
Wind 315 deg - Ice		-46.11	-46.06	-4896.99	4867.10	-24.35
Wind 330 deg - Ice		-32.56	-56.46	-5995.30	3435.23	-35.21
Total Weight	43.20			-16.92	3.56	
Wind 0 deg - Service		0.04	-16.03	-1700.73	-6.21	-11.36
Wind 30 deg - Service		8.06	-13.90	-1476.26	-858.26	-10.96
Wind 45 deg - Service		11.38	-11.36	-1207.30	-1210.46	-9.62
Wind 60 deg - Service		13.92	-8.05	-856.01	-1480.13	-7.63
Wind 90 deg - Service		16.05	-0.04	-6.17	-1705.19	-2.25
Wind 120 deg - Service		13.88	7.98	845.53	-1473.15	3.74
Wind 135 deg - Service		11.32	11.30	1199.03	-1200.60	6.45
Wind 150 deg - Service		7.99	13.86	1470.88	-846.17	8.72
Wind 180 deg - Service		-0.04	16.03	1702.34	7.74	11.36
Wind 210 deg - Service		-8.06	13.90	1477.86	859.78	10.96
Wind 225 deg - Service		-11.38	11.36	1208.90	1211.99	9.62
Wind 240 deg - Service		-13.92	8.05	857.61	1481.65	7.63
Wind 270 deg - Service		-16.05	0.04	7.78	1706.72	2.25
Wind 300 deg - Service		-13.88	-7.98	-843.92	1474.68	-3.74
Wind 315 deg - Service		-11.32	-11.30	-1197.43	1202.12	-6.45
Wind 330 deg - Service		-7.99	-13.86	-1469.28	847.70	-8.72

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 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
19	Dead+Wind 0 deg+Ice
20	Dead+Wind 30 deg+Ice
21	Dead+Wind 45 deg+Ice
22	Dead+Wind 60 deg+Ice
23	Dead+Wind 90 deg+Ice
24	Dead+Wind 120 deg+Ice
25	Dead+Wind 135 deg+Ice
26	Dead+Wind 150 deg+Ice
27	Dead+Wind 180 deg+Ice
28	Dead+Wind 210 deg+Ice
29	Dead+Wind 225 deg+Ice
30	Dead+Wind 240 deg+Ice
31	Dead+Wind 270 deg+Ice
32	Dead+Wind 300 deg+Ice
33	Dead+Wind 315 deg+Ice
34	Dead+Wind 330 deg+Ice
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	180 - 160	Leg	Max Tension	27	4.71	-0.48	0.16
			Max. Compression	30	-6.66	0.05	-0.10
			Max. Mx	22	-0.33	-1.08	-0.21

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	34	-0.33	-0.00	-1.82
			Max. Vy	22	0.69	-1.08	-0.21
			Max. Vx	34	-0.99	-0.00	1.51
		Diagonal	Max Tension	23	5.84	0.00	0.00
			Max. Compression	23	-5.94	0.00	0.00
			Max. Mx	31	5.84	0.02	0.00
			Max. My	19	0.50	0.00	0.00
			Max. Vy	31	-0.01	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
		Horizontal	Max Tension	31	3.21	-0.01	-0.00
			Max. Compression	23	-3.16	0.00	0.00
			Max. Mx	27	0.07	-0.02	-0.01
			Max. My	22	-0.06	-0.01	-0.01
			Max. Vy	27	-0.01	-0.02	-0.01
			Max. Vx	22	0.00	-0.01	-0.01
		Top Girt	Max Tension	27	0.77	-0.01	0.00
			Max. Compression	19	-0.77	-0.01	-0.00
			Max. Mx	32	-0.05	-0.01	-0.00
			Max. My	22	-0.34	-0.01	-0.00
			Max. Vy	32	-0.01	-0.01	-0.00
			Max. Vx	27	0.00	-0.01	-0.00
		Inner Bracing	Max Tension	19	0.01	0.00	0.00
			Max. Compression	19	-0.01	0.00	0.00
			Max. Mx	18	-0.00	-0.01	0.00
			Max. My	30	0.00	0.00	-0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	30	-0.00	0.00	0.00
T2	160 - 140	Leg	Max Tension	32	29.64	-0.41	0.08
			Max. Compression	30	-36.16	0.41	-0.02
			Max. Mx	22	9.20	-0.46	0.01
			Max. My	34	-3.41	-0.01	0.61
			Max. Vy	22	-2.13	-0.05	0.10
			Max. Vx	34	2.11	0.00	0.08
		Diagonal	Max Tension	23	8.59	0.00	0.00
			Max. Compression	23	-8.70	0.00	0.00
			Max. Mx	31	8.54	0.03	0.00
			Max. My	19	1.05	0.00	0.00
			Max. Vy	31	0.01	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
		Horizontal	Max Tension	23	5.41	0.00	0.00
			Max. Compression	23	-5.39	-0.01	0.00
			Max. Mx	32	0.62	-0.02	-0.01
			Max. My	30	-0.00	-0.01	0.01
			Max. Vy	32	-0.02	-0.02	-0.01
			Max. Vx	30	-0.00	-0.01	0.01
		Inner Bracing	Max Tension	34	0.01	0.00	0.00
			Max. Compression	23	-0.01	0.00	0.00
			Max. Mx	18	-0.00	-0.01	0.00
			Max. My	30	0.00	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
T3	140 - 133.333	Leg	Max Tension	32	39.62	-0.41	0.08
			Max. Compression	30	-47.07	0.84	-0.01
			Max. Mx	22	39.35	-0.89	0.01
			Max. My	34	-3.88	-0.03	0.71
			Max. Vy	22	0.38	-0.89	0.01
			Max. Vx	34	-0.38	-0.03	0.71
		Diagonal	Max Tension	23	8.65	0.00	0.00
			Max. Compression	23	-8.80	0.00	0.00
			Max. Mx	20	8.60	0.04	0.00
			Max. My	19	1.35	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. Vy	20	-0.02	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
		Horizontal	Max Tension	23	5.66	0.00	0.00
			Max. Compression	23	-5.64	-0.02	0.00
			Max. Mx	32	0.63	-0.04	-0.01
			Max. My	22	-0.43	-0.04	-0.01
			Max. Vy	32	-0.02	-0.04	-0.01
			Max. Vx	22	0.00	-0.04	-0.01
		Inner Bracing	Max Tension	25	0.00	0.00	0.00
			Max. Compression	32	-0.01	0.00	0.00
			Max. Mx	18	-0.00	-0.01	0.00
			Max. My	30	0.00	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
T4	133.333 - 126.667	Leg	Max Tension	32	49.27	-0.89	0.03
			Max. Compression	30	-59.61	0.87	-0.00
			Max. Mx	22	47.39	-0.92	0.00
			Max. My	34	-6.12	-0.03	1.02
			Max. Vy	22	-2.93	-0.89	0.01
			Max. Vx	34	2.83	-0.03	0.71
		Diagonal	Max Tension	20	12.62	0.00	0.00
			Max. Compression	20	-12.78	0.00	0.00
			Max. Mx	20	12.62	0.05	0.00
			Max. My	19	1.37	0.00	0.00
			Max. Vy	20	-0.02	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
		Top Girt	Max Tension	27	8.70	-0.02	0.01
			Max. Compression	19	-8.76	-0.03	-0.01
			Max. Mx	32	-0.82	-0.04	-0.02
			Max. My	22	-1.79	-0.04	-0.02
			Max. Vy	32	-0.02	-0.04	-0.02
			Max. Vx	22	0.00	-0.04	-0.02
		Inner Bracing	Max Tension	19	0.15	0.00	0.00
			Max. Compression	19	-0.15	0.00	0.00
			Max. Mx	18	0.00	-0.01	0.00
			Max. My	19	0.15	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
T5	126.667 - 120	Leg	Max Tension	22	62.16	-0.92	0.00
			Max. Compression	30	-75.55	1.14	-0.05
			Max. Mx	27	61.38	-1.16	-0.09
			Max. My	34	-6.89	-0.01	1.17
			Max. Vy	27	-0.66	-0.92	-0.02
			Max. Vx	26	-0.67	-0.03	-1.01
		Diagonal	Max Tension	20	13.36	0.00	0.00
			Max. Compression	20	-13.53	0.00	0.00
			Max. Mx	20	13.36	0.05	0.00
			Max. My	19	1.32	0.00	0.00
			Max. Vy	20	-0.02	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
		Top Girt	Max Tension	20	9.30	-0.03	0.00
			Max. Compression	20	-9.28	-0.03	0.00
			Max. Mx	22	-0.69	-0.04	-0.02
			Max. My	22	-0.73	-0.04	-0.02
			Max. Vy	22	-0.02	-0.04	-0.02
			Max. Vx	22	0.00	-0.04	-0.02
		Inner Bracing	Max Tension	20	0.16	0.00	0.00
			Max. Compression	20	-0.16	0.00	0.00
			Max. Mx	18	-0.00	-0.02	0.00
			Max. My	19	0.15	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. Vy	18	-0.01	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
T6	120 - 100	Leg	Max Tension	22	98.48	-1.19	0.08
			Max. Compression	30	-115.02	1.22	-0.08
			Max. Mx	27	97.08	-1.24	-0.08
			Max. My	31	-6.76	-0.03	-1.28
			Max. Vy	27	-0.49	-1.21	-0.06
			Max. Vx	31	-0.53	-0.03	-1.28
		Diagonal	Max Tension	20	16.69	0.00	0.00
			Max. Compression	20	-16.94	0.00	0.00
			Max. Mx	20	16.29	0.12	0.00
			Max. My	19	1.65	0.00	0.00
			Max. Vy	20	0.04	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
		Horizontal	Max Tension	28	9.82	0.00	0.00
			Max. Compression	28	-9.86	-0.04	-0.00
			Max. Mx	22	1.05	-0.06	-0.02
			Max. My	22	-1.08	-0.05	-0.02
			Max. Vy	22	-0.03	-0.06	-0.02
			Max. Vx	22	0.00	-0.05	-0.02
		Inner Bracing	Max Tension	26	0.01	0.00	0.00
			Max. Compression	20	-0.01	0.00	0.00
			Max. Mx	18	-0.00	-0.03	0.00
			Max. My	19	0.00	0.00	-0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
T7	100 - 90	Leg	Max Tension	22	118.77	-1.23	0.08
			Max. Compression	30	-137.17	1.18	-0.06
			Max. Mx	27	117.41	-1.24	-0.08
			Max. My	31	-9.18	-0.04	-1.25
			Max. Vy	27	-0.48	-1.24	-0.08
			Max. Vx	31	0.50	-0.04	-1.25
		Diagonal	Max Tension	28	14.81	0.00	0.00
			Max. Compression	28	-15.10	0.00	0.00
			Max. Mx	20	14.77	0.13	0.00
			Max. My	19	1.46	0.00	0.00
			Max. Vy	20	-0.04	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
		Horizontal	Max Tension	28	9.35	0.00	0.00
			Max. Compression	28	-9.51	-0.04	-0.00
			Max. Mx	22	1.25	-0.06	-0.02
			Max. My	22	-1.29	-0.06	-0.02
			Max. Vy	22	-0.03	-0.06	-0.02
			Max. Vx	22	0.00	-0.06	-0.02
		Inner Bracing	Max Tension	26	0.00	0.00	0.00
			Max. Compression	20	-0.01	0.00	0.00
			Max. Mx	18	-0.00	-0.04	0.00
			Max. My	19	0.00	0.00	-0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
T8	90 - 80	Leg	Max Tension	22	136.18	-1.21	0.07
			Max. Compression	30	-156.55	1.39	-0.08
			Max. Mx	27	134.00	-1.44	-0.09
			Max. My	34	-10.23	-0.02	1.51
			Max. Vy	27	0.50	-1.44	-0.09
			Max. Vx	23	-0.52	-0.03	1.50
		Diagonal	Max Tension	28	14.49	0.00	0.00
			Max. Compression	28	-14.81	0.00	0.00
			Max. Mx	20	14.44	0.15	0.00
			Max. My	19	1.36	0.00	0.00
			Max. Vy	20	0.04	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	19	-0.00	0.00	0.00
		Top Girt	Max Tension	28	9.64	-0.05	-0.00
			Max. Compression	28	-9.68	-0.05	-0.00
			Max. Mx	22	-0.04	-0.07	-0.01
			Max. My	22	-0.85	-0.07	-0.02
			Max. Vy	22	-0.03	-0.07	-0.01
			Max. Vx	22	0.00	-0.07	-0.02
		Inner Bracing	Max Tension	28	0.17	0.00	0.00
			Max. Compression	28	-0.17	0.00	0.00
			Max. Mx	18	-0.01	-0.05	0.00
			Max. My	19	0.15	0.00	-0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
T9	80 - 60	Leg	Max Tension	22	168.65	-1.71	0.06
			Max. Compression	19	-193.75	1.82	0.09
			Max. Mx	27	165.80	-1.87	-0.09
			Max. My	34	-12.43	-0.02	1.89
			Max. Vy	27	0.51	-1.71	-0.04
			Max. Vx	31	0.52	-0.03	-1.69
		Diagonal	Max Tension	28	14.83	0.00	0.00
			Max. Compression	28	-15.25	0.00	0.00
			Max. Mx	20	14.74	0.18	0.00
			Max. My	19	1.28	0.00	0.00
			Max. Vy	20	-0.05	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
		Horizontal	Max Tension	28	10.64	0.00	0.00
			Max. Compression	28	-10.63	-0.09	-0.00
			Max. Mx	22	1.77	-0.13	-0.02
			Max. My	27	-1.75	-0.11	-0.02
			Max. Vy	22	-0.05	-0.13	-0.02
			Max. Vx	22	0.00	-0.12	-0.02
		Inner Bracing	Max Tension	26	0.00	0.00	0.00
			Max. Compression	28	-0.01	0.00	0.00
			Max. Mx	18	-0.01	-0.07	0.00
			Max. My	19	-0.00	0.00	-0.00
			Max. Vy	18	0.03	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
T10	60 - 40	Leg	Max Tension	22	199.28	-1.69	0.05
			Max. Compression	19	-229.86	1.47	0.05
			Max. Mx	27	181.64	-1.87	-0.09
			Max. My	34	-13.31	-0.02	1.89
			Max. Vy	27	-0.52	-1.87	-0.09
			Max. Vx	23	0.53	-0.02	1.88
		Diagonal	Max Tension	28	14.92	0.00	0.00
			Max. Compression	28	-15.51	0.00	0.00
			Max. Mx	20	14.82	0.25	0.00
			Max. My	19	1.15	0.00	0.00
			Max. Vy	20	-0.07	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
		Horizontal	Max Tension	28	11.41	0.00	0.00
			Max. Compression	28	-11.32	-0.12	-0.00
			Max. Mx	22	2.10	-0.15	-0.02
			Max. My	27	-2.08	-0.14	-0.02
			Max. Vy	22	-0.06	-0.15	-0.02
			Max. Vx	22	0.00	-0.14	-0.02
		Inner Bracing	Max Tension	1	0.00	0.00	0.00
			Max. Compression	28	-0.01	0.00	0.00
			Max. Mx	18	-0.01	-0.13	0.00
			Max. My	19	-0.00	0.00	-0.00
			Max. Vy	18	0.05	0.00	0.00
			Max. Vx	19	0.00	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
T11	40 - 30	Leg	Max Tension	22	213.88	-1.58	0.07
			Max. Compression	19	-247.31	2.41	-0.02
			Max. Mx	30	-246.35	2.41	0.00
			Max. My	31	-17.05	-0.05	-1.78
			Max. Vy	27	0.50	-2.20	0.01
			Max. Vx	31	-0.51	-0.05	-1.78
		Diagonal	Max Tension	28	14.97	0.00	0.00
			Max. Compression	28	-15.60	0.00	0.00
			Max. Mx	20	14.85	0.28	0.00
			Max. My	19	1.05	0.00	0.00
			Max. Vy	20	-0.07	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
		Horizontal	Max Tension	28	11.73	0.00	0.00
			Max. Compression	28	-11.63	-0.13	-0.00
			Max. Mx	22	2.27	-0.16	-0.02
			Max. My	27	-2.24	-0.16	-0.02
			Max. Vy	22	-0.06	-0.16	-0.02
			Max. Vx	22	0.00	-0.16	-0.02
		Inner Bracing	Max Tension	1	0.00	0.00	0.00
			Max. Compression	28	-0.01	0.00	0.00
			Max. Mx	18	-0.01	-0.14	0.00
			Max. My	19	-0.00	0.00	-0.00
			Max. Vy	18	0.05	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
T12	30 - 20	Leg	Max Tension	22	227.97	-2.21	0.02
			Max. Compression	19	-264.30	-1.67	0.27
			Max. Mx	30	-262.79	2.41	0.00
			Max. My	34	-17.55	-0.45	4.45
			Max. Vy	30	0.81	2.41	0.00
			Max. Vx	31	0.77	-0.50	-4.39
		Diagonal	Max Tension	28	14.99	0.00	0.00
			Max. Compression	28	-15.67	0.00	0.00
			Max. Mx	20	14.87	0.30	0.00
			Max. My	19	0.97	0.00	0.00
			Max. Vy	20	-0.07	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
		Top Girt	Max Tension	28	12.06	-0.14	-0.00
			Max. Compression	28	-11.84	-0.14	-0.00
			Max. Mx	22	1.00	-0.17	-0.02
			Max. My	27	1.27	-0.17	-0.02
			Max. Vy	22	-0.06	-0.17	-0.02
			Max. Vx	22	0.00	-0.17	-0.02
		Inner Bracing	Max Tension	28	0.21	0.00	0.00
			Max. Compression	28	-0.21	0.00	0.00
			Max. Mx	18	-0.01	-0.16	0.00
			Max. My	19	0.18	0.00	-0.00
			Max. Vy	18	0.05	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
T13	20 - 0	Leg	Max Tension	22	239.02	0.51	0.21
			Max. Compression	19	-280.41	0.00	-0.00
			Max. Mx	19	-279.64	7.64	-0.36
			Max. My	34	-18.85	-0.45	4.45
			Max. Vy	30	-1.32	7.59	0.27
			Max. Vx	34	1.10	-0.45	4.45
		Diagonal	Max Tension	28	23.39	-0.21	0.03
			Max. Compression	28	-24.01	0.00	0.00
			Max. Mx	21	14.03	-0.29	0.07
			Max. My	20	-22.67	0.02	-0.15
			Max. Vy	21	0.06	-0.29	0.07
			Max. Vx	20	-0.01	0.00	0.00
		Horizontal	Max Tension	28	12.71	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	28	-12.97	-0.25	-0.00
			Max. Mx	22	-2.64	-0.38	-0.04
			Max. My	30	2.08	-0.13	0.04
			Max. Vy	22	0.10	-0.38	-0.04
			Max. Vx	30	-0.00	-0.13	0.04
		Redund Horz 1 Bracing	Max Tension	19	4.87	0.00	0.00
			Max. Compression	19	-4.87	0.00	0.00
			Max. Mx	18	0.33	0.02	0.00
			Max. Vy	18	-0.01	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	19	4.45	0.00	0.00
			Max. Compression	19	-4.45	0.00	0.00
			Max. Mx	19	4.45	0.03	0.00
			Max. My	20	1.38	0.00	0.00
			Max. Vy	19	-0.01	0.00	0.00
			Max. Vx	20	-0.00	0.00	0.00
		Redund Hip 1 Bracing	Max Tension	1	0.00	0.00	0.00
			Max. Compression	22	-0.04	0.00	0.00
			Max. Mx	18	-0.01	0.04	0.00
			Max. Vy	18	-0.02	0.00	0.00
		Inner Bracing	Max Tension	1	0.00	0.00	0.00
			Max. Compression	19	-0.01	0.00	0.00
			Max. Mx	18	-0.01	0.11	0.00
			Max. My	19	-0.00	0.00	0.00
			Max. Vy	18	-0.03	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	30	310.58	33.70	-20.37
	Max. H_x	30	310.58	33.70	-20.37
	Max. H_z	21	-257.90	-28.86	19.56
	Min. Vert	22	-267.70	-30.84	18.69
	Min. H_x	22	-267.70	-30.84	18.69
	Min. H_z	29	300.78	31.77	-21.15
Leg B	Max. Vert	24	308.40	-34.06	-19.42
	Max. H_x	32	-266.55	31.25	17.72
	Max. H_z	33	-256.56	29.45	18.20
	Min. Vert	32	-266.55	31.25	17.72
	Min. H_x	24	308.40	-34.06	-19.42
	Min. H_z	25	298.40	-32.34	-19.84
Leg A	Max. Vert	19	312.00	-1.01	39.30
	Max. H_x	31	23.20	6.22	1.79
	Max. H_z	19	312.00	-1.01	39.30
	Min. Vert	27	-263.67	1.05	-35.90
	Min. H_x	23	25.13	-6.23	1.96
	Min. H_z	27	-263.67	1.05	-35.90

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	43.20	0.00	0.00	-16.92	3.56	0.00
Dead+Wind 0 deg - No Ice	43.20	0.13	-51.92	-5539.16	-19.00	-36.83
Dead+Wind 30 deg - No Ice	43.20	26.11	-45.03	-4810.68	-2784.29	-35.54
Dead+Wind 45 deg - No Ice	43.20	36.86	-36.81	-3937.79	-3927.38	-31.20
Dead+Wind 60 deg - No Ice	43.20	45.10	-26.08	-2797.69	-4802.57	-24.74
Dead+Wind 90 deg - No Ice	43.20	52.00	-0.13	-39.57	-5533.02	-7.33
Dead+Wind 120 deg - No Ice	43.20	44.97	25.85	2724.61	-4779.90	12.08
Dead+Wind 135 deg - No Ice	43.20	36.67	36.62	3871.90	-3895.32	20.88
Dead+Wind 150 deg - No Ice	43.20	25.88	44.90	4754.17	-2745.03	28.25
Dead+Wind 180 deg - No Ice	43.20	-0.13	51.92	5505.29	26.31	36.84
Dead+Wind 210 deg - No Ice	43.20	-26.11	45.03	4776.74	2791.54	35.54
Dead+Wind 225 deg - No Ice	43.20	-36.86	36.81	3903.85	3934.58	31.20
Dead+Wind 240 deg - No Ice	43.20	-45.10	26.08	2763.77	4809.74	24.74
Dead+Wind 270 deg - No Ice	43.20	-52.00	0.13	5.73	5540.16	7.32
Dead+Wind 300 deg - No Ice	43.20	-44.97	-25.85	-2758.39	4787.10	-12.08
Dead+Wind 315 deg - No Ice	43.20	-36.67	-36.62	-3905.67	3902.56	-20.88
Dead+Wind 330 deg - No Ice	43.20	-25.88	-44.90	-4787.96	2752.31	-28.25
Dead+Ice	66.53	0.00	0.00	-47.55	7.13	0.00
Dead+Wind 0 deg+Ice	66.53	0.13	-65.28	-6946.91	-15.81	-49.19
Dead+Wind 30 deg+Ice	66.53	32.79	-56.59	-6034.08	-3469.80	-49.95
Dead+Wind 45 deg+Ice	66.53	46.30	-46.25	-4942.47	-4898.13	-45.21
Dead+Wind 60 deg+Ice	66.53	56.66	-32.75	-3517.27	-5992.15	-37.42
Dead+Wind 90 deg+Ice	66.53	65.35	-0.13	-70.74	-6906.94	-14.87
Dead+Wind 120 deg+Ice	66.53	56.53	32.52	3382.04	-5969.14	11.73
Dead+Wind 135 deg+Ice	66.53	46.11	46.06	4814.51	-4865.43	24.31
Dead+Wind 150 deg+Ice	66.53	32.56	56.46	5915.68	-3429.76	35.22
Dead+Wind 180 deg+Ice	66.53	-0.13	65.27	6851.46	30.41	49.18
Dead+Wind 210 deg+Ice	66.53	-32.79	56.59	5938.64	3484.32	49.95
Dead+Wind 225 deg+Ice	66.53	-46.30	46.25	4847.02	4912.57	45.21
Dead+Wind 240 deg+Ice	66.53	-56.67	32.76	3421.90	6006.64	37.43
Dead+Wind 270 deg+Ice	66.53	-65.35	0.13	-24.57	6921.26	14.87
Dead+Wind 300 deg+Ice	66.53	-56.52	-32.52	-3477.17	5983.43	-11.74
Dead+Wind 315 deg+Ice	66.53	-46.11	-46.06	-4909.68	4879.90	-24.31
Dead+Wind 330 deg+Ice	66.53	-32.56	-56.46	-6010.88	3444.31	-35.22
Dead+Wind 0 deg - Service	43.20	0.04	-16.03	-1721.34	-3.42	-11.37
Dead+Wind 30 deg - Service	43.20	8.06	-13.90	-1496.49	-856.90	-10.97
Dead+Wind 45 deg - Service	43.20	11.38	-11.36	-1227.12	-1209.67	-9.63
Dead+Wind 60 deg - Service	43.20	13.92	-8.05	-875.21	-1479.81	-7.64
Dead+Wind 90 deg - Service	43.20	16.05	-0.04	-23.93	-1705.27	-2.26
Dead+Wind 120 deg - Service	43.20	13.88	7.98	829.21	-1472.82	3.73
Dead+Wind 135 deg - Service	43.20	11.32	11.30	1183.32	-1199.81	6.44
Dead+Wind 150 deg - Service	43.20	7.99	13.86	1455.63	-844.83	8.72
Dead+Wind 180 deg - Service	43.20	-0.04	16.03	1687.47	10.59	11.37
Dead+Wind 210 deg - Service	43.20	-8.06	13.90	1462.61	864.05	10.97
Dead+Wind 225 deg - Service	43.20	-11.38	11.36	1193.20	1216.85	9.64
Dead+Wind 240 deg - Service	43.20	-13.92	8.05	841.31	1486.96	7.64
Dead+Wind 270 deg - Service	43.20	-16.05	0.04	-9.94	1712.40	2.26
Dead+Wind 300 deg - Service	43.20	-13.88	-7.98	-863.07	1479.97	-3.73
Dead+Wind 315 deg - Service	43.20	-11.32	-11.30	-1217.20	1206.95	-6.45
Dead+Wind 330 deg - Service	43.20	-7.99	-13.86	-1489.53	851.92	-8.72

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	-43.20	0.00	0.00	43.20	0.00	0.000%
2	0.13	-43.20	-51.92	-0.13	43.20	51.92	0.000%
3	26.11	-43.20	-45.03	-26.11	43.20	45.03	0.001%
4	36.86	-43.20	-36.81	-36.86	43.20	36.81	0.000%
5	45.10	-43.20	-26.08	-45.10	43.20	26.08	0.000%
6	52.00	-43.20	-0.13	-52.00	43.20	0.13	0.001%
7	44.97	-43.20	25.85	-44.97	43.20	-25.85	0.000%
8	36.67	-43.20	36.62	-36.67	43.20	-36.62	0.000%
9	25.88	-43.20	44.90	-25.88	43.20	-44.90	0.000%
10	-0.13	-43.20	51.92	0.13	43.20	-51.92	0.000%
11	-26.11	-43.20	45.03	26.11	43.20	-45.03	0.001%
12	-36.86	-43.20	36.81	36.86	43.20	-36.81	0.001%
13	-45.10	-43.20	26.08	45.10	43.20	-26.08	0.000%
14	-52.00	-43.20	0.13	52.00	43.20	-0.13	0.001%
15	-44.97	-43.20	-25.85	44.97	43.20	25.85	0.000%
16	-36.67	-43.20	-36.62	36.67	43.20	36.62	0.000%
17	-25.88	-43.20	-44.90	25.88	43.20	44.90	0.000%
18	0.00	-66.53	0.00	0.00	66.53	0.00	0.000%
19	0.13	-66.53	-65.28	-0.13	66.53	65.28	0.001%
20	32.79	-66.53	-56.59	-32.79	66.53	56.59	0.002%
21	46.30	-66.53	-46.25	-46.30	66.53	46.25	0.001%
22	56.66	-66.53	-32.75	-56.66	66.53	32.75	0.001%
23	65.35	-66.53	-0.13	-65.35	66.53	0.13	0.001%
24	56.53	-66.53	32.52	-56.53	66.53	-32.52	0.000%
25	46.11	-66.53	46.06	-46.11	66.53	-46.06	0.001%
26	32.56	-66.53	56.46	-32.56	66.53	-56.46	0.001%
27	-0.13	-66.53	65.27	0.13	66.53	-65.27	0.001%
28	-32.79	-66.53	56.59	32.79	66.53	-56.59	0.002%
29	-46.30	-66.53	46.25	46.30	66.53	-46.25	0.002%
30	-56.67	-66.53	32.76	56.67	66.53	-32.76	0.001%
31	-65.35	-66.53	0.13	65.35	66.53	-0.13	0.001%
32	-56.53	-66.53	-32.52	56.52	66.53	32.52	0.001%
33	-46.11	-66.53	-46.06	46.11	66.53	46.06	0.001%
34	-32.56	-66.53	-56.46	32.56	66.53	56.46	0.001%
35	0.04	-43.20	-16.03	-0.04	43.20	16.03	0.000%
36	8.06	-43.20	-13.90	-8.06	43.20	13.90	0.000%
37	11.38	-43.20	-11.36	-11.38	43.20	11.36	0.000%
38	13.92	-43.20	-8.05	-13.92	43.20	8.05	0.000%
39	16.05	-43.20	-0.04	-16.05	43.20	0.04	0.000%
40	13.88	-43.20	7.98	-13.88	43.20	-7.98	0.000%
41	11.32	-43.20	11.30	-11.32	43.20	-11.30	0.000%
42	7.99	-43.20	13.86	-7.99	43.20	-13.86	0.000%
43	-0.04	-43.20	16.03	0.04	43.20	-16.03	0.000%
44	-8.06	-43.20	13.90	8.06	43.20	-13.90	0.000%
45	-11.38	-43.20	11.36	11.38	43.20	-11.36	0.000%
46	-13.92	-43.20	8.05	13.92	43.20	-8.05	0.000%
47	-16.05	-43.20	0.04	16.05	43.20	-0.04	0.001%
48	-13.88	-43.20	-7.98	13.88	43.20	7.98	0.000%
49	-11.32	-43.20	-11.30	11.32	43.20	11.30	0.000%
50	-7.99	-43.20	-13.86	7.99	43.20	13.86	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	0.00000163
3	Yes	4	0.00000001	0.00000373
4	Yes	4	0.00000001	0.00000317
5	Yes	4	0.00000001	0.00000202
6	Yes	4	0.00000001	0.00000234
7	Yes	4	0.00000001	0.00000128
8	Yes	4	0.00000001	0.00000144
9	Yes	4	0.00000001	0.00000177
10	Yes	4	0.00000001	0.00000220
11	Yes	4	0.00000001	0.00000374
12	Yes	4	0.00000001	0.00000284
13	Yes	4	0.00000001	0.00000143
14	Yes	4	0.00000001	0.00000234
15	Yes	4	0.00000001	0.00000191
16	Yes	4	0.00000001	0.00000181
17	Yes	4	0.00000001	0.00000175
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000331
20	Yes	4	0.00026183	0.00000783
21	Yes	4	0.00019011	0.00000682
22	Yes	4	0.00000001	0.00000438
23	Yes	4	0.00017273	0.00000446
24	Yes	4	0.00000001	0.00000246
25	Yes	4	0.00000001	0.00000295
26	Yes	4	0.00000001	0.00000362
27	Yes	4	0.00000001	0.00000468
28	Yes	4	0.00026742	0.00000788
29	Yes	4	0.00022549	0.00000600
30	Yes	4	0.00000001	0.00000298
31	Yes	4	0.00017181	0.00000446
32	Yes	4	0.00000001	0.00000399
33	Yes	4	0.00000001	0.00000382
34	Yes	4	0.00000001	0.00000357
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001
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	0.00000001
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	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	2.748	36	0.1206	0.0570
T2	160 - 140	2.237	36	0.1183	0.0439
T3	140 - 133.333	1.731	36	0.1067	0.0287
T4	133.333 - 126.667	1.578	36	0.1033	0.0254
T5	126.667 - 120	1.423	36	0.0996	0.0222

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T6	120 - 100	1.274	36	0.0950	0.0198
T7	100 - 90	0.886	36	0.0783	0.0145
T8	90 - 80	0.719	36	0.0704	0.0122
T9	80 - 60	0.570	36	0.0620	0.0102
T10	60 - 40	0.324	37	0.0465	0.0070
T11	40 - 30	0.148	37	0.0299	0.0045
T12	30 - 20	0.085	45	0.0214	0.0033
T13	20 - 0	0.040	43	0.0129	0.0022

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	3' Yagi	36	2.748	0.1206	0.0570	963478
177.00	PA6-65AC	36	2.672	0.1207	0.0552	963478
175.00	AP11-850	36	2.621	0.1207	0.0540	963478
170.00	HP6-65	36	2.493	0.1205	0.0509	481735
167.00	VHF150	36	2.417	0.1201	0.0489	370567
160.00	Standoff	36	2.237	0.1183	0.0439	358068
133.00	P65-16-XLH-RR	36	1.570	0.1031	0.0252	176401
132.00	Pirod 15' T-Frame Sector Mount (1)	36	1.547	0.1026	0.0247	197226
125.00	Air 21	36	1.385	0.0985	0.0215	67780
110.00	VHF150	36	1.069	0.0868	0.0169	56994
60.00	4' Standoff	37	0.324	0.0465	0.0070	67463

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	11.015	21	0.4779	0.2202
T2	160 - 140	8.980	21	0.4697	0.1749
T3	140 - 133.333	6.961	20	0.4264	0.1196
T4	133.333 - 126.667	6.346	20	0.4133	0.1080
T5	126.667 - 120	5.727	20	0.3986	0.0967
T6	120 - 100	5.129	20	0.3802	0.0863
T7	100 - 90	3.573	20	0.3141	0.0631
T8	90 - 80	2.904	20	0.2825	0.0532
T9	80 - 60	2.304	20	0.2488	0.0442
T10	60 - 40	1.312	21	0.1868	0.0305
T11	40 - 30	0.600	21	0.1205	0.0195
T12	30 - 20	0.346	28	0.0863	0.0144
T13	20 - 0	0.165	27	0.0518	0.0096

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	3' Yagi	21	11.015	0.4779	0.2202	214365
177.00	PA6-65AC	21	10.712	0.4782	0.2142	214365
175.00	AP11-850	21	10.510	0.4782	0.2101	214365
170.00	HP6-65	21	10.003	0.4776	0.1995	107183
167.00	VHF150	21	9.698	0.4764	0.1928	82448
160.00	Standoff	21	8.980	0.4697	0.1749	75781
133.00	P65-16-XLH-RR	20	6.315	0.4126	0.1074	52047
132.00	Pirod 15' T-Frame Sector Mount (1)	20	6.223	0.4106	0.1057	58680
125.00	Air 21	20	5.574	0.3943	0.0940	17377
110.00	VHF150	20	4.309	0.3477	0.0736	14439
60.00	4' Standoff	21	1.312	0.1868	0.0305	16809

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	180 - 160	ROHN 3 STD	20.00	6.67	68.8 K=1.00	21.168	2.2285	-6.66	47.17	0.141 ✔
T2	160 - 140	ROHN 4 STD	20.04	6.68	53.1 K=1.00	23.861	3.1741	-36.16	75.74	0.477 ✔
T3	140 - 133.333	ROHN 5 EH	6.68	6.68	43.6 K=1.00	25.320	6.1120	-47.07	154.75	0.304 ✔
T4	133.333 - 126.667	ROHN 5 EH	6.68	6.68	43.6 K=1.00	25.320	6.1120	-59.61	154.75	0.385 ✔
T5	126.667 - 120	ROHN 5 EH	6.68	6.68	43.6 K=1.00	25.320	6.1120	-75.55	154.75	0.488 ✔
T6	120 - 100	ROHN 6 EHS	20.04	10.02	54.0 K=1.00	23.709	6.7133	-115.02	159.16	0.723 ✔
T7	100 - 90	ROHN 6 EH	10.03	10.03	54.8 K=1.00	23.580	8.4049	-137.17	198.19	0.692 ✔
T8	90 - 80	ROHN 6 EH	10.03	10.03	54.8 K=1.00	23.580	8.4049	-156.55	198.19	0.790 ✔
T9	80 - 60	ROHN 8 EHS	20.05	10.03	41.2 K=1.00	25.662	9.7193	-193.75	249.41	0.777 ✔
T10	60 - 40	ROHN 8 EHS	20.05	10.03	41.2 K=1.00	25.662	9.7193	-229.87	249.41	0.922 ✔
T11	40 - 30	ROHN 8 EHS	10.03	10.03	41.2 K=1.00	25.662	9.7193	-247.31	249.41	0.992 ✔
T12	30 - 20	ROHN 8 EHS	10.03	10.03	41.2 K=1.00	25.662	9.7193	-264.30	249.41	1.060 ✔
T13	20 - 0	ROHN 8 EH	20.05	10.03	41.8 K=1.00	25.576	12.7627	-280.41	326.43	0.859 ✔

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	180 - 160	ROHN 2 STD	7.94	7.67	117.0 K=1.00	10.918	1.0745	-5.94	11.73	0.506 ✓
T2	160 - 140	ROHN 2 STD	8.55	8.25	125.8 K=1.00	9.431	1.0745	-8.70	10.13	0.859 ✓
T3	140 - 133.333	ROHN 2 EH	8.77	8.42	131.5 K=1.00	8.637	1.4807	-8.80	12.79	0.688 ✓
T4	133.333 - 126.667	ROHN 2 EH	9.00	8.66	135.3 K=1.00	8.163	1.4807	-12.78	12.09	1.057 ✓
T5	126.667 - 120	ROHN 2 EH	9.24	8.91	139.1 K=1.00	7.717	1.4807	-13.53	11.43	1.184 ✓
T6	120 - 100	ROHN 2.5 EH	12.52	12.06	156.6 K=1.00	6.090	2.2535	-16.57	13.72	1.207 ✓
T7	100 - 90	ROHN 3 STD	12.92	12.49	128.8 K=1.00	9.001	2.2285	-15.10	20.06	0.753 ✓
T8	90 - 80	ROHN 3 STD	13.35	12.93	133.4 K=1.00	8.392	2.2285	-14.81	18.70	0.792 ✓
T9	80 - 60	ROHN 3 STD	14.21	13.70	141.3 K=1.00	7.477	2.2285	-15.25	16.66	0.915 ✓
T10	60 - 40	P3.5x.226	15.12	14.64	131.5 K=1.00	8.641	2.6795	-15.51	23.15	0.670 ✓
T11	40 - 30	P3.5x.226	15.60	15.13	135.8 K=1.00	8.096	2.6795	-15.60	21.69	0.719 ✓
T12	30 - 20	P3.5x.226	16.08	15.62	140.2 K=1.00	7.592	2.6795	-15.67	20.34	0.770 ✓
T13	20 - 0	P3.5x.226	24.33	12.17	109.2 K=1.00	12.519	2.6795	-24.01	33.55	0.716 ✓

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	180 - 160	ROHN 1.5 STD	8.60	4.15	80.0 K=1.00	19.004	0.7995	-3.16	15.19	0.208 ✓
T2	160 - 140	ROHN 1.5 STD	10.01	4.82	92.9 K=1.00	16.309	0.7995	-5.39	13.04	0.413 ✓
T3	140 - 133.333	ROHN 2 STD	10.71	5.17	78.8 K=1.00	19.257	1.0745	-5.64	20.69	0.272 ✓
T6	120 - 100	ROHN 2 STD	13.92	6.68	101.9 K=1.00	14.269	1.0745	-9.86	15.33	0.643 ✓
T7	100 - 90	ROHN 2 STD	15.04	7.24	110.5 K=1.00	12.241	1.0745	-9.51	13.15	0.723 ✓
T9	80 - 60	ROHN 2.5 STD	18.93	9.10	115.3 K=1.00	11.230	1.7040	-10.63	19.14	0.555 ✓
T10	60 - 40	ROHN 2.5 STD	21.43	10.35	131.1 K=1.00	8.682	1.7040	-11.32	14.80	0.765 ✓
T11	40 - 30	ROHN 2.5 STD	22.68	10.98	139.1	7.722	1.7040	-11.63	13.16	0.883

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=1.00					✔
T13	20 - 0	P3.5x.226	25.18	12.23	109.8 K=1.00	12.390	2.6795	-12.97	33.20	0.391 ✔

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 $\frac{P}{P_a}$
T1	180 - 160	ROHN 1.5 STD	8.54	4.13	79.5 K=1.00	19.110	0.7995	-0.77	15.28	0.050 ✔
T4	133.333 - 126.667	ROHN 2 STD	11.40	5.47	83.4 K=1.00	18.326	1.0745	-8.76	19.69	0.445 ✔
T5	126.667 - 120	ROHN 2 STD	12.10	5.82	88.7 K=1.00	17.220	1.0745	-9.28	18.50	0.501 ✔
T8	90 - 80	ROHN 2 STD	16.36	7.90	120.5 K=1.00	10.285	1.0745	-9.68	11.05	0.876 ✔
T12	30 - 20	ROHN 2.5 STD	23.93	11.60	147.0 K=1.00	6.913	1.7040	-11.84	11.78	1.005 ✔

Redundant Horizontal (1) 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 $\frac{P}{P_a}$
T13	20 - 0	ROHN 1.5 STD	6.29	5.93	91.5 K=0.80	16.611	0.7995	-4.87	13.28	0.366 ✔

Redundant Diagonal (1) 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 $\frac{P}{P_a}$
T13	20 - 0	ROHN 1.5 STD	11.50	10.77	166.1 K=0.80	5.412	0.7995	-4.45	4.33	1.028 ✔

Redundant Hip (1) 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 $\frac{P}{P_a}$
T13	20 - 0	ROHN 2.5 STD	6.29	6.29	63.8 K=0.80	22.062	1.7040	-0.04	37.59	0.001 ✔

Inner Bracing 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	180 - 160	L2x2x1/8	4.27	4.27	128.9 K=1.00	8.985	0.4844	-0.01	4.35	0.003 ✔
T2	160 - 140	L2x2x1/8	5.01	5.01	151.1 K=1.00	6.537	0.4844	-0.01	3.17	0.002 ✔
T3	140 - 133.333	L2x2x1/8	5.35	5.35	161.6 K=1.00	5.716	0.4844	-0.01	2.77	0.003 ✔
T4	133.333 - 126.667	L2x2x1/8	5.70	5.70	172.1 K=1.00	5.041	0.4844	-0.15	2.44	0.062 ✔
T5	126.667 - 120	L2x2x1/8	6.05	6.05	182.6 K=1.00	4.479	0.4844	-0.16	2.17	0.074 ✔
T6	120 - 100	L2 1/2x2 1/2x3/16	6.96	6.96	168.7 K=1.00	5.248	0.9020	-0.01	4.73	0.002 ✔
T7	100 - 90	L2 1/2x2 1/2x3/16	7.52	7.52	182.3 K=1.00	4.492	0.9020	-0.01	4.05	0.003 ✔
T8	90 - 80	L2 1/2x2 1/2x3/16	8.18	8.18	198.3 K=1.00	3.798	0.9020	-0.17	3.43	0.049 ✔
T9	80 - 60	L3x3x3/16	9.46	9.46	190.5 K=1.00	4.113	1.0900	-0.01	4.48	0.003 ✔
T10	60 - 40	L3 1/2x3 1/2x1/4	10.71	10.71	185.2 K=1.00	4.352	1.6900	-0.01	7.35	0.002 ✔
T11	40 - 30	L3 1/2x3 1/2x1/4	11.34	11.34	196.1 K=1.00	3.885	1.6900	-0.01	6.57	0.002 ✔
T12	30 - 20	L3 1/2x3 1/2x1/4	11.96	11.96	206.9 K=1.00	3.490	1.6900	-0.21	5.90	0.035 ✔
T13	20 - 0	ROHN 2 STD	12.59	12.59	191.9 K=1.00	4.054	1.0745	-0.01	4.36	0.003 ✔

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	180 - 160	ROHN 3 STD	20.00	6.67	68.8	30.000	2.2285	4.71	66.85	0.070 ✔
T2	160 - 140	ROHN 4 STD	20.04	6.68	53.1	30.000	3.1741	29.64	95.22	0.311

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 $\frac{P}{P_a}$
T3	140 - 133.333	ROHN 5 EH	6.68	6.68	43.6	30.000	6.1120	39.62	183.36	0.216
T4	133.333 - 126.667	ROHN 5 EH	6.68	6.68	43.6	30.000	6.1120	49.27	183.36	0.269
T5	126.667 - 120	ROHN 5 EH	6.68	6.68	43.6	30.000	6.1120	62.16	183.36	0.339
T6	120 - 100	ROHN 6 EHS	20.04	10.02	54.0	30.000	6.7133	98.48	201.40	0.489
T7	100 - 90	ROHN 6 EH	10.03	10.03	54.8	30.000	8.4049	118.77	252.15	0.471
T8	90 - 80	ROHN 6 EH	10.03	10.03	54.8	30.000	8.4049	136.18	252.15	0.540
T9	80 - 60	ROHN 8 EHS	20.05	10.03	41.2	30.000	9.7193	168.65	291.58	0.578
T10	60 - 40	ROHN 8 EHS	20.05	10.03	41.2	30.000	9.7193	199.28	291.58	0.683
T11	40 - 30	ROHN 8 EHS	10.03	10.03	41.2	30.000	9.7193	213.88	291.58	0.734
T12	30 - 20	ROHN 8 EHS	10.03	10.03	41.2	30.000	9.7193	227.97	291.58	0.782
T13	20 - 0	ROHN 8 EH	20.05	10.03	41.8	30.000	12.7627	239.01	382.88	0.624

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	180 - 160	ROHN 2 STD	7.94	7.67	117.0	30.000	1.0745	5.84	32.24	0.181
T2	160 - 140	ROHN 2 STD	8.55	8.25	125.8	30.000	1.0745	8.59	32.24	0.266
T3	140 - 133.333	ROHN 2 EH	8.77	8.42	131.5	30.000	1.4807	8.65	44.42	0.195
T4	133.333 - 126.667	ROHN 2 EH	9.00	8.66	135.3	30.000	1.4807	12.62	44.42	0.284
T5	126.667 - 120	ROHN 2 EH	9.24	8.91	139.1	30.000	1.4807	13.36	44.42	0.301
T6	120 - 100	ROHN 2.5 EH	12.19	11.73	152.3	30.000	2.2535	16.69	67.61	0.247
T7	100 - 90	ROHN 3 STD	12.92	12.49	128.8	30.000	2.2285	14.81	66.85	0.221
T8	90 - 80	ROHN 3 STD	13.35	12.93	133.4	30.000	2.2285	14.49	66.85	0.217
T9	80 - 60	ROHN 3 STD	13.77	13.27	136.8	30.000	2.2285	14.83	66.85	0.222
T10	60 - 40	P3.5x.226	15.12	14.64	131.5	30.000	2.6795	14.92	80.39	0.186
T11	40 - 30	P3.5x.226	15.60	15.13	135.8	30.000	2.6795	14.97	80.39	0.186

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 $\frac{P}{P_a}$
T12	30 - 20	P3.5x.226	16.08	15.62	140.2	30.000	2.6795	14.99	80.39	0.186
T13	20 - 0	P3.5x.226	24.33	12.17	109.2	30.000	2.6795	23.39	80.39	0.291

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	180 - 160	ROHN 1.5 STD	8.60	4.15	80.0	30.000	0.7995	3.21	23.98	0.134
T2	160 - 140	ROHN 1.5 STD	10.01	4.82	92.9	30.000	0.7995	5.41	23.98	0.226
T3	140 - 133.333	ROHN 2 STD	10.71	5.17	78.8	30.000	1.0745	5.66	32.24	0.176
T6	120 - 100	ROHN 2 STD	13.92	6.68	101.9	30.000	1.0745	9.82	32.24	0.305
T7	100 - 90	ROHN 2 STD	15.04	7.24	110.5	30.000	1.0745	9.35	32.24	0.290
T9	80 - 60	ROHN 2.5 STD	18.93	9.10	115.3	30.000	1.7040	10.64	51.12	0.208
T10	60 - 40	ROHN 2.5 STD	21.43	10.35	131.1	30.000	1.7040	11.41	51.12	0.223
T11	40 - 30	ROHN 2.5 STD	22.68	10.98	139.1	30.000	1.7040	11.73	51.12	0.229
T13	20 - 0	P3.5x.226	25.18	12.23	109.8	30.000	2.6795	12.71	80.39	0.158

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	180 - 160	ROHN 1.5 STD	8.54	4.13	79.5	30.000	0.7995	0.77	23.98	0.032
T4	133.333 - 126.667	ROHN 2 STD	11.40	5.47	83.4	30.000	1.0745	8.70	32.24	0.270
T5	126.667 - 120	ROHN 2 STD	12.10	5.82	88.7	30.000	1.0745	9.30	32.24	0.288
T8	90 - 80	ROHN 2 STD	16.36	7.90	120.5	30.000	1.0745	9.64	32.24	0.299
T12	30 - 20	ROHN 2.5 STD	23.93	11.60	147.0	30.000	1.7040	12.06	51.12	0.236

Redundant Horizontal (1) 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 $\frac{P}{P_a}$
T13	20 - 0	ROHN 1.5 STD	6.29	5.93	114.4	30.000	0.7995	4.87	23.98	0.203 ✔

Redundant Diagonal (1) 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 $\frac{P}{P_a}$
T13	20 - 0	ROHN 1.5 STD	11.50	10.77	207.6	30.000	0.7995	4.45	23.98	0.185 ✔

Inner Bracing 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	180 - 160	L2x2x1/8	4.27	4.27	81.8	21.600	0.4844	0.01	10.46	0.001 ✔
T2	160 - 140	L2x2x1/8	4.31	4.31	82.6	21.600	0.4844	0.01	10.46	0.001 ✔
T3	140 - 133.333	L2x2x1/8	5.35	5.35	102.6	21.600	0.4844	0.00	10.46	0.000 ✔
T4	133.333 - 126.667	L2x2x1/8	5.70	5.70	109.3	21.600	0.4844	0.15	10.46	0.014 ✔
T5	126.667 - 120	L2x2x1/8	6.05	6.05	115.9	21.600	0.4844	0.16	10.46	0.015 ✔
T6	120 - 100	L2 1/2x2 1/2x3/16	6.40	6.40	98.7	21.600	0.9020	0.01	19.48	0.000 ✔
T7	100 - 90	L2 1/2x2 1/2x3/16	7.52	7.52	116.0	21.600	0.9020	0.00	19.48	0.000 ✔
T8	90 - 80	L2 1/2x2 1/2x3/16	8.18	8.18	126.2	21.600	0.9020	0.17	19.48	0.009 ✔
T9	80 - 60	L3x3x3/16	8.84	8.84	113.0	21.600	1.0900	0.00	23.54	0.000 ✔
T12	30 - 20	L3 1/2x3 1/2x1/4	11.96	11.96	131.7	30.000	1.6900	0.21	50.70	0.004 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	180 - 160	Leg	ROHN 3 STD	1	-6.66	62.88	10.6	Pass
		Diagonal	ROHN 2 STD	9	-5.94	15.64	38.0	Pass
		Horizontal	ROHN 1.5 STD	7	-3.16	20.25	15.6	Pass
		Top Girt	ROHN 1.5 STD	6	-0.77	20.37	3.8	Pass
		Inner Bracing	L2x2x1/8	38	-0.01	5.80	0.2	Pass
T2	160 - 140	Leg	ROHN 4 STD	40	-36.16	100.96	35.8	Pass
		Diagonal	ROHN 2 STD	45	-8.70	13.51	64.4	Pass
		Horizontal	ROHN 1.5 STD	43	-5.39	17.38	31.0	Pass
		Inner Bracing	L2x2x1/8	54	-0.01	4.22	0.2	Pass
T3	140 - 133.333	Leg	ROHN 5 EH	79	-47.07	206.29	22.8	Pass
		Diagonal	ROHN 2 EH	84	-8.80	17.05	51.6	Pass
		Horizontal	ROHN 2 STD	82	-5.64	27.58	20.4	Pass
		Inner Bracing	L2x2x1/8	91	-0.01	3.69	0.2	Pass
T4	133.333 - 126.667	Leg	ROHN 5 EH	94	-59.61	206.29	28.9	Pass
		Diagonal	ROHN 2 EH	104	-12.78	16.11	79.3	Pass
		Top Girt	ROHN 2 STD	99	-8.76	26.25	33.4	Pass
		Inner Bracing	L2x2x1/8	107	-0.15	3.26	4.7	Pass
T5	126.667 - 120	Leg	ROHN 5 EH	109	-75.55	206.29	36.6	Pass
		Diagonal	ROHN 2 EH	119	-13.53	15.23	88.9	Pass
		Top Girt	ROHN 2 STD	114	-9.28	24.67	37.6	Pass
		Inner Bracing	L2x2x1/8	122	-0.16	2.89	5.6	Pass
T6	120 - 100	Leg	ROHN 6 EHS	124	-115.02	212.17	54.2	Pass
		Diagonal	ROHN 2.5 EH	135	-16.57	18.30	90.6	Pass
		Horizontal	ROHN 2 STD	133	-9.86	20.44	48.3	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	136	-0.01	6.31	0.2	Pass
T7	100 - 90	Leg	ROHN 6 EH	151	-137.17	264.19	51.9	Pass
		Diagonal	ROHN 3 STD	162	-15.10	26.74	56.5	Pass
		Horizontal	ROHN 2 STD	160	-9.51	17.53	54.2	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	163	-0.01	5.40	0.2	Pass
T8	90 - 80	Leg	ROHN 6 EH	166	-156.55	264.19	59.3	Pass
		Diagonal	ROHN 3 STD	177	-14.81	24.93	59.4	Pass
		Top Girt	ROHN 2 STD	171	-9.68	14.73	65.7	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	180	-0.17	4.57	3.7	Pass
T9	80 - 60	Leg	ROHN 8 EHS	183	-193.75	332.47	58.3	Pass
		Diagonal	ROHN 3 STD	192	-15.25	22.21	68.6	Pass
		Horizontal	ROHN 2.5 STD	190	-10.63	25.51	41.7	Pass
		Inner Bracing	L3x3x3/16	194	-0.01	5.98	0.3	Pass
T10	60 - 40	Leg	ROHN 8 EHS	210	-229.87	332.47	69.1	Pass
		Diagonal	P3.5x.226	219	-15.51	30.86	50.3	Pass
		Horizontal	ROHN 2.5 STD	217	-11.32	19.72	57.4	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	220	-0.01	9.80	0.2	Pass
T11	40 - 30	Leg	ROHN 8 EHS	237	-247.31	332.47	74.4	Pass
		Diagonal	P3.5x.226	246	-15.60	28.92	54.0	Pass
		Horizontal	ROHN 2.5 STD	244	-11.63	17.54	66.3	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	247	-0.01	8.75	0.2	Pass
T12	30 - 20	Leg	ROHN 8 EHS	252	-264.30	332.47	79.5	Pass
		Diagonal	P3.5x.226	261	-15.67	27.12	57.8	Pass
		Top Girt	ROHN 2.5 STD	255	-11.84	15.70	75.4	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	263	-0.21	7.86	2.6	Pass
T13	20 - 0	Leg	ROHN 8 EH	267	-280.41	435.13	64.4	Pass
		Diagonal	P3.5x.226	287	-24.01	44.72	53.7	Pass
		Horizontal	P3.5x.226	283	-12.97	44.25	29.3	Pass
		Redund Horz 1 Bracing	ROHN 1.5 STD	280	-4.87	17.70	27.5	Pass
		Redund Diag 1 Bracing	ROHN 1.5 STD	286	-4.45	5.77	77.1	Pass
		Redund Hip 1 Bracing	ROHN 2.5 STD	282	-0.04	50.11	0.1	Pass
		Inner Bracing	ROHN 2 STD	292	-0.01	4.36	0.5	Pass
							Summary	

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
						Leg (T12)	79.5	Pass
						Diagonal (T6)	90.6	Pass
						Horizontal (T11)	66.3	Pass
						Top Girt (T12)	75.4	Pass
						Redund Horz 1 Bracing (T13)	27.5	Pass
						Redund Diag 1 Bracing (T13)	77.1	Pass
						Redund Hip 1 Bracing (T13)	0.1	Pass
						Inner Bracing (T5)	5.6	Pass
						RATING =	**90.6**	**Pass**

ANCHOR BOLT EVALUATION

ANCHOR BOLT ANALYSIS

Input Data

Max Pier Reactions:

Uplift:	Uplift := 268 kips	*user input*
Shear:	Shear := 39 kips	*user input*
Compression:	Compression := 312 kips	*user input*

Anchor Bolt Data:

Use ASTM A354 Gr. BC

Number of Anchor Bolts = N	N := 10	*user input*	
Bolt Ultimate Strength:	F_u := 125 ksi	*user input*	
Bolt Yield Strength:	Fy := 109 ksi	*user input*	
Bolt Modulus:	E := 29000 ksi	*user input*	
Thickness of Anchor Bolts	D := 1.0in	*user input*	
Threads per Inch:	n := 8	*user input*	
Coefficient of Friction:	μ := 0.55	*user input*	(for baseplate with grout ASCE 10-97)

Anchor Bolt Area:

Gross Area of Bolt:

$$A_g := \frac{\pi}{4} \cdot D^2 \qquad A_g = 0.785 \cdot in^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 \qquad A_n = 0.606 \cdot in^2$$

Check Tensile Forces:

Maximum Tensile Force (Gross Area):

$$AllowableTension := 1.333 \cdot \left(0.33 \cdot A_g \cdot F_u \right) \qquad AllowableTension = 43.2 \cdot kips$$

Note: 1.333 increase allowed per TIA/EIA

Maximum Tensile Force (Net Area):

$$F_{net.area} := 1.333 \cdot \left(0.60 \cdot A_n \cdot Fy \right) \qquad F_{net.area} = 52.8 \cdot kips$$

Note: 1.333 increase allowed per TIA/EIA

Applied Tension:

$$MaxTension := \frac{Uplift}{N} \qquad MaxTension = 26.8 \cdot kips$$

Check Stresses:

$$\frac{MaxTension}{F_{net.area}} = 0.51$$

$$Condition1 := if\left(\frac{MaxTension}{F_{net.area}} \le 1.00, "OK", "Overstressed" \right)$$

Condition1 = "OK"

URS

Job	180' Rohn SSMW Tower - Westport, CT	Project No.	SAI-077	Page / Sheet	of / 3 of 3
Description	Anchor Bolt Analysis	Computed by	MCD	Date	03/06/14
		Checked by		Date	

Check Anchor Bolt Area:

Based on the ASCE 10-97 Design of Latticed Steel Transmission Structures

Required Area:

$$A_{s1} := \frac{Uplift}{Fy} + \frac{Shear}{\mu \cdot 0.85 \cdot Fy} \qquad A_{s1} = 3.2 \cdot in^2$$

$$A_{s2} := \left| \frac{Shear - (0.3 \cdot Compression)}{\mu \cdot 0.85 \cdot Fy} \right| \qquad A_{s2} = 1.1 \cdot in^2$$

Provided Area:

$$A_{sprovided} := A_n \cdot N \qquad A_{sprovided} = 6.1 \cdot in^2$$

$$Condition2 := if\left(\frac{A_{s1}}{A_{sprovided}} \le 1.00, "OK", "Overstressed" \right) \qquad \frac{A_{s1}}{A_{sprovided}} = 0.53$$

Condition2 = "OK"

$$Condition3 := if\left(\frac{A_{s2}}{A_{sprovided}} \le 1.00, "OK", "Overstressed" \right) \qquad \frac{A_{s2}}{A_{sprovided}} = 0.18$$

Condition3 = "OK"

FOUNDATION ANALYSIS
(PERFORMED BY DR. CLARENCE WELTI, P.E., P.C.)

DR. CLARENCE WELTI, P.E., P.C.

GEOTECHNICAL ENGINEERING

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October 10, 2002

Mr. Mohsen Sahirad
URS Corporation
500 Enterprise Drive; Suite 3B
Rocky Hill, CT 06067

Re: Telecommunications Tower; 880 Post Road; Westport, CT ; Evaluation of Existing Foundation for Increased Design Loads

Dear Mohsen:

1.0 Herewith are boring data pertaining to the above. Two borings were drilled to a maximum depth of 12 feet. One boring was drilled 10 feet into bedrock and the second boring was drilled to the top of bedrock. The two borings are shown on the attached photo. Boring B-1 was about 11 feet from the tower leg and boring B-2 was about 15 feet from the tower leg. Considering that the rock outcrops at the third leg, the two borings define rock sufficiently to permit a reasonable interpolation of rock at the actual leg foundations. The former police station site is undergoing environmental remediation. *The borings were drilled by Clarence Welti Associates, Inc. and sampling was conducted by this firm solely to obtain indications of subsurface conditions as part of a geotechnical exploration program. No services were performed to evaluate subsurface environmental conditions.*

2.0 The purpose of this study is to assess the capability of tower legs to receive the proposed revised loadings. The load summary, including initial and revised design loadings is as follows:

Loading Type	Original Reaction	Revised Reactions
Uplift	276.7 kips	324 kips
Download	319.9 kips	374 kips
Shear	41.0 kips	48 kips

3.0 The initial boring data (1990 data from Test Craig Laboratories) indicated bedrock over the entire site. It is understood that there is information indicating that two of the legs were placed in earth instead of rock. The recent boring tends to belie this. The analyses for uplift (which is the only critical item on the above reaction schedule) have been done for both earth and rock. The reference for both analyses is FHWA-1F-025 Publication "Drilled Shafts: Construction Procedures and Design Methods".

3.0.1 The tower legs were each placed on 4.5 feet diameter shafts installed 27 feet deep into either earth or rock. The design uplift was and is based on an effective length of 21 feet.

3.1 Regarding the shaft in earth analysis there were no deep blow counts in the borings, since rock was encountered within 2 feet of grade. It is however reasonable to assume the N value (blows per 12" on split spoon) will be about 60 in the till overlying rock. Using the procedure indicated on the attached calculations the ultimate uplift capacity would be 831 kips. Design capacity would be ½ of this value or 415 kips. In reviewing the reference you cited (Foundation Engineering by Das, 4th edition) a similar ultimate load capacity can also be found if one assumes an angle of internal friction of about 40° (which would be typical for N = 60) and a δ/ϕ ratio of 1.0 (relative density of soil ≥ 85+%).

3.2 Regarding the shaft in rock the friction is defined in the attached calculations. The ultimate uplift of the shaft placed the Straits Schist rock formation would be about 10 kips/sf. With a factor of safety of 3 (using 3 kips/sf) the allowable loading would be 888 kips.

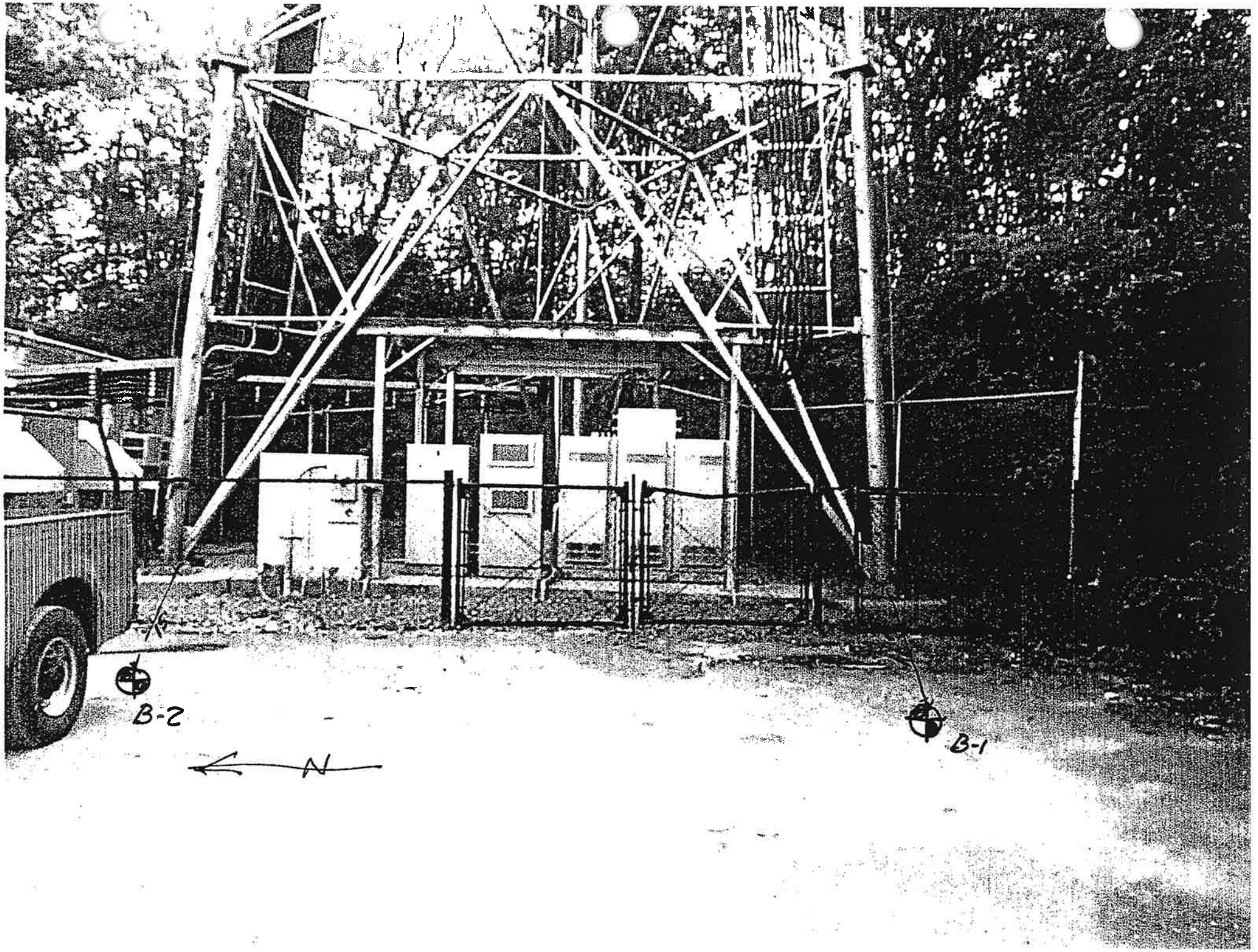
4.0 In summary it is believed that the shafts are in rock. The rock is a Schist with steep foliation and may have been drilled with only moderate effort. If the actual shaft are in earth there would have to have been a deep depression between the rock outcrop (which was cut down about 5 feet at the east leg) and the boring locations west of the two west legs, which indicated rock at 2 feet below grade similar to the original borings on the site. If there was a depression in the rock, the soil would be glacial till similar to what is being excavated to the northwest of the site at the old State Police Station. The analyses included herewith indicate that with either rock or till overburden the shafts have adequate capacity for the revised loading.

If you have any questions, please call me.

Very truly yours.

Clarence Welti, PhD, P. E.
Pres. Dr. Clarence Welti, P. E., P.C.

A:\urstoweranalysis9/04/02


B-2
B-1
N

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
URS CORPORATION

PROJECT NAME
CELL TOWER SITE
LOCATION
880 POST ROAD
WESTPORT, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	NX
SIZE I.D.	3.75"		1.5"	2.0"
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.
HOLE NO. B-1

GROUND WATER OBSERVATIONS
AT 2.0 FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 10/7/02
FINISH DATE 10/7/02

DEPTH	SAMPLE NO.	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	4-13-20-60	0.00'-1.50'		ASPHALT	.10
					BR. FINE-CRS. SAND AND FINE GRAVEL - FILL	.80
					GRAY ROCK FRAGMENTS, LITTLE SILT AND FINE SAND	1.5
					GRAY ROCK FRAGMENTS	2.0
					CORED ROCK -	
5					RUN #1 2.0' - 7.0' RECOVERED 50"	
					RUN #2 7.0' - 12.0' RECOVERED 60"	
10						
					BOTTOM OF BORING @ 12.0'	12.0
15					NOTE: BORING WAS DRILLED 11.0' WEST OF TOWER LEG	
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: BROMLEY
INSPECTOR:

SHEET 1 OF 1 | HOLE NO. B-1

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
URS CORPORATION

PROJECT NAME
CELL TOWER SITE
LOCATION
880 POST ROAD
WESTPORT, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.5"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. B-2

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 10/7/02
FINISH DATE 10/7/02

DEPTH	SAMPLE NO.	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	1-8-12-60	0.00'-1.50'		DARK BR. FINE-CRS. SAND, SOME FINE-MED. GRAVEL, TRACE SILT - FILL (1.0)	
					BR./GRAY ROCK FRAGMENTS, SILT AND FINE SAND (1.5)	
					GRAY ROCK FRAGMENTS (2.0)	
					AUGER REFUSAL @ 2.0'	
					NOTE: BORING WAS DRILLED 15'WEST OF TOWER LEG	
5						
10						
15						
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: BROMLEY
INSPECTOR:

SHEET 1 OF 1 | HOLE NO. B-2

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CLIENT URS.
PROJECT Communication Tower
SUBJECT Assessment of Capacity
BY CW DATE 10/ /02 SHEET NO.

Reference: Drilled Shafts Construction Procedures & Design Methods, PUBLICATION No FHWA-IF 99-025

Material: "Intermediate Geo-material" N > 50B/12"
(IGM)

(1) $f_{max_i} = \sigma_{vi}' \, K_{oi} \tan \phi_i'$

σ_{vi}: vertical effective stress at middle of layer i ≈ 1.8 ksf ±

K_{oi}: design value of earth pressure coefficient at rest

ϕ_i': design value of angle of internal friction of layer i

(2) $\phi_i' = \tan^{-1}\left\{\left[\frac{N_{60}\,(\text{LAYER } i)}{12.3 + 20.3\left(\frac{\sigma_{vi}}{p_a}\right)}\right]^{0.34}\right\}$

p_a = 2 ksf or 14.7 psi

N_{60} (LAYER i) = 60

$= \tan^{-1}\left\{\left[\frac{60}{12.3 + 20.3 \times 0.9}\right]^{.34}\right\} = \tan^{-1}(1.96)^{.34} = 51.5°$

(3) $K_{oi} = (1 - \sin\phi_i')\left[\frac{0.2\, p_a\, N_{60}\,(\text{layer})}{\sigma_{vi}}\right]^{\sin\phi}$

$= (1 - .78)\left[\frac{0.2 \times 2 \times 60}{1.8}\right]^{.78} = 1.65$

$f_{a} = (f_{max}\ (1)) = 3.73$ ksf × 0.75 (uplift) = 2.8 k-f

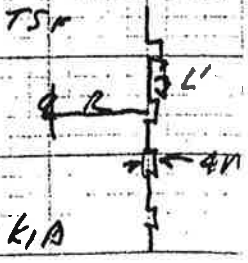
21' × 4.5 × π × 2.8 = 831 KIPS ULTIMATE UPLIFT CAPACITY

FOR SHAFT IN ROCK

q_u = 5200 psi × 333 TSF

$f_{max} = 0.8\left[\frac{\Delta R}{R}\left(\frac{L'}{L}\right)\right]^{0.45} q_u$

L = 21'
ΔR: 05' L': 0.2'



f_{max}: 5.37 TSF = 10.78 ksf

21' × π × 4.5 = 296 SF
Assume 1/3 for f_{all} ≈ 3 ksf. Q = 888 KIP