STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@po.state.ct.us
Web Site: www.state.ct.us/csc/index.htm

March 26, 2002

Christopher B. Fisher, Esq.
Cuddy & Feder & Worby LLP
90 Maple Avenue
White Plains, NY 10601-5196

RE: **EM-AT&T-152-020301** - AT&T Wireless notice of intent to modify an existing telecommunications facility located at 41 Manitock Hill Road, Waterford, Connecticut.

Dear Attorney Fisher:

At a public meeting held on March 21, 2002, the Connecticut Siting Council (Council) acknowledged your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the condition that the coax cables be installed as specified by a Professional Engineer.

The proposed modifications are to be implemented as specified here and in your notice dated February 28, 2002. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

Mortimer A. Gelston
Chairman

MAG/RKE/laf

c: Honorable Paul B. Eccard, First Selectman, Town of Waterford
Thomas V. Wagner, Planning Director, Town of Waterford
Julie M. Donaldson, Esq., Hurwitz & Sagarin LLC
Sandy M. Carter, Verizon Wireless
Ronald C. Clark, Nextel Communications
Stephen J. Humes, Esq., LeBoeuf, Lamb, Greene & MacRae

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AT&T 41 Manitock Hill Road, Waterford 3/13/02

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square
New Britain, Connecticut 06051
Phone: (860) 827-2935
Fax: (860) 827-2950

March 13, 2002

Honorable Paul B. Eccard
First Selectman
Town of Waterford
Town Hall
15 Rope Ferry Road
Waterford, CT 06385

RE: **EM-AT&T-152-020301** - AT&T Wireless notice of intent to modify an existing telecommunications facility located at 41 Manitock Hill Road, Waterford, Connecticut.

Dear ~~Mr. Eccard:~~ Paul

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

The Council will consider this item at the next meeting tentatively scheduled for March 21, 2002, at 10:00 a.m. in Hearing Room One, Ten Franklin Square, New Britain, Connecticut.

Please call me or inform the Council if you have any questions or comments regarding this proposal.

Thank you for your cooperation and consideration.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/laf

Enclosure: Notice of Intent

c: Thomas V. Wagner, Planning Director, Town of Waterford

I:\siting\em\at&t\waterford\eccard2.doc

CUDDY & FEDER & WORBY LLP

90 MAPLE AVENUE
WHITE PLAINS, NEW YORK 10601-5196

(914) 761-1300
TELECOPIER (914) 761-5372/6405
www.cfwlaw.com

500 FIFTH AVENUE
NEW YORK, NEW YORK 10110
(212) 944-2841
TELECOPIER (212) 944-2843

WESTAGE BUSINESS CENTER
300 SOUTH LAKE DRIVE
FISHKILL, NEW YORK 12524
(845) 896-2229
TELECOPIER (845) 896-3672

STAMFORD, CONNECTICUT
NORWALK, CONNECTICUT

NEIL J. ALEXANDER (also CT)
CHARLES T. BAZYDLO (also NJ)
THOMAS R. BEIRNE (also DC)
THOMAS M. BLOOMER
JOSEPH P. CARLUCCI
KENNETH J. DUBROFF
ROBERT FEDER
CHRISTOPHER B. FISHER (also CT)
ANTHONY B. GIOFFRE III (also CT)
SUSAN E.H. GORDON
KAREN G. GRANIK
JOSHUA J. GRAUER
WAYNE E. HELLER (also CT)
KENNETH F. JURIST
MICHAEL L. KATZ (also NJ)
JOSHUA E. KIMERLING (also CT)
DANIEL F. LEARY (also CT)
BARRY E. LONG

CUDDY & FEDER
1971-1995

WILLIAM S. NULL
DAWN M. PORTNEY
ELISABETH N. RADOW
NEIL T. RIMSKY
RUTH E. ROTH
JENNIFER L. VAN TUYL
CHAUNCEY L. WALKER (also CA)
ROBERT L. WOLFE
DAVID E. WORBY

Of Counsel
MICHAEL R. EDELMAN
ANDREW A. GLICKSON (also CT)
ROBERT L. OSAR (also TX)
MARYANN M. PALERMO
ROBERT C. SCHNEIDER
LOUIS R. TAFFERA

February 28, 2002

VIA FEDERAL EXPRESS
Hon. Mortimer Gelston, Chairman and Members
of the Siting Council
Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

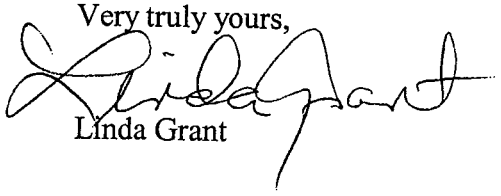
Re: AT&T Wireless Notice of Exempt Modification
850 West Main Street, Branford, Connecticut
586 Danbury Road, New Milford, Connecticut
31 Chestnut Hill Road, Colchester, Connecticut
39 Wig Hill Road, Chester, Connecticut
41 Manitock Road, Waterford, Connecticut
30 Old Country Road, Stafford, Connecticut
131 A Bishop Hill Crossing Road, Griswold, Connecticut

Hon. Mortimer Gelston, Chairman and Members of the Siting Council:

On behalf of AT&T Wireless, we respectfully enclose an original and twenty copies of its notice of exempt modification with respect to the above mentioned facilities, together with a check for $500.00 for each facility, the filing fee. We would appreciate it if these matters were

placed on the next available agenda for acknowledgment by the Council. Should the Council or staff have any questions regarding this matter, please do not hesitate to contact us.

Very truly yours,



Linda Grant

cc: Christopher B. Fisher, Esq.

EM-AT&T-152-020301

NOTICE OF INTENT TO MODIFY AN EXISTING TELECOMMUNICATIONS FACILITY AT 41 MANITOCK HILL ROAD, WATERFORD, CONNECTICUT

Pursuant to the Public Utility Environmental Standards Act, Connecticut General Statutes §§ 16-50aa ("PUESA"), and Sections 16-50j-72(b)(2) and 16-50j-73 of the Regulations of Connecticut State Agencies adopted pursuant to the PUESA, AT&T Wireless PCS, LLC, by and through its agent AT&T Wireless PCS, Inc., ("AT&T Wireless") hereby notifies the Connecticut Siting Council of its intent to modify an existing facility located at 41 Manitock Hill Road, Waterford, Connecticut (the "Manitock Hill Road Facility"), owned by Sprint Sites USA ("Sprint"). AT&T Wireless and Sprint have agreed to share the use of the Manitock Hill Road Facility, as detailed below.

The Manitock Hill Road Facility

The Manitock Hill Road Facility consists of an approximately one hundred thirty seven (137) foot lattice tower (the "Tower") and associated equipment currently being used and/or leased for future use for wireless communications by Sprint, Verizon, Nextel and VoiceStream. A chain link fence surrounds the Tower compound. The current adjacent land uses include low density residential uses and undeveloped property.

AT&T Wireless' Facility

As shown on the enclosed plans prepared by URS Corporation, including a site plan and tower elevation of the Manitock Hill Road Facility, AT&T Wireless proposes shared use of the Facility by placing antennas on the Tower and equipment cabinets needed to provide personal communications services ("PCS") within a slightly expanded fenced compound. AT&T Wireless will install panel antennas at approximately the 97 foot level of the Tower and associated equipment cabinets on a concrete pad within an expanded fenced compound. As evidenced in the structural report prepared by URS Corporation, annexed hereto as Exhibit A, AT&T has confirmed that the tower is structurally capable of supporting the addition of AT&T Wireless' antennas.

AT&T Wireless' Facility Constitutes An Exempt Modification

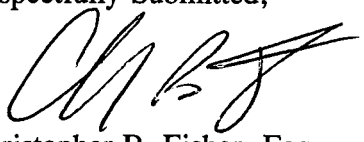
The proposed addition of AT&T Wireless' antennas and equipment to the Manitock Hill Road Facility constitutes an exempt "modification" of an existing facility as defined in Connecticut General Statutes Section 16-50i(d) and Council regulations promulgated pursuant thereto. Addition of AT&T Wireless' antennas and equipment to the Tower will not result in an increase of the Tower's height nor extend the site boundaries (i.e. leased area). Further, there will be no increase in noise levels by six (6) decibels or more at the Tower site's boundary. As set forth in an Emissions Report prepared by Tarik Ouazzani, Radio Frequency Engineer, annexed hereto as Exhibit B,

the total radio frequency electromagnetic radiation power density at the Tower site's boundary will not be increased to or above the standard adopted by the Connecticut Department of Environmental Protection as set forth in Section 22a-162 of the Connecticut General Statutes and MPE limits established by the Federal Communications Commission. For all the foregoing reasons, addition of AT&T Wireless' facility to the Tower constitutes an exempt modification which will not have a substantially adverse environmental effect.

Conclusion

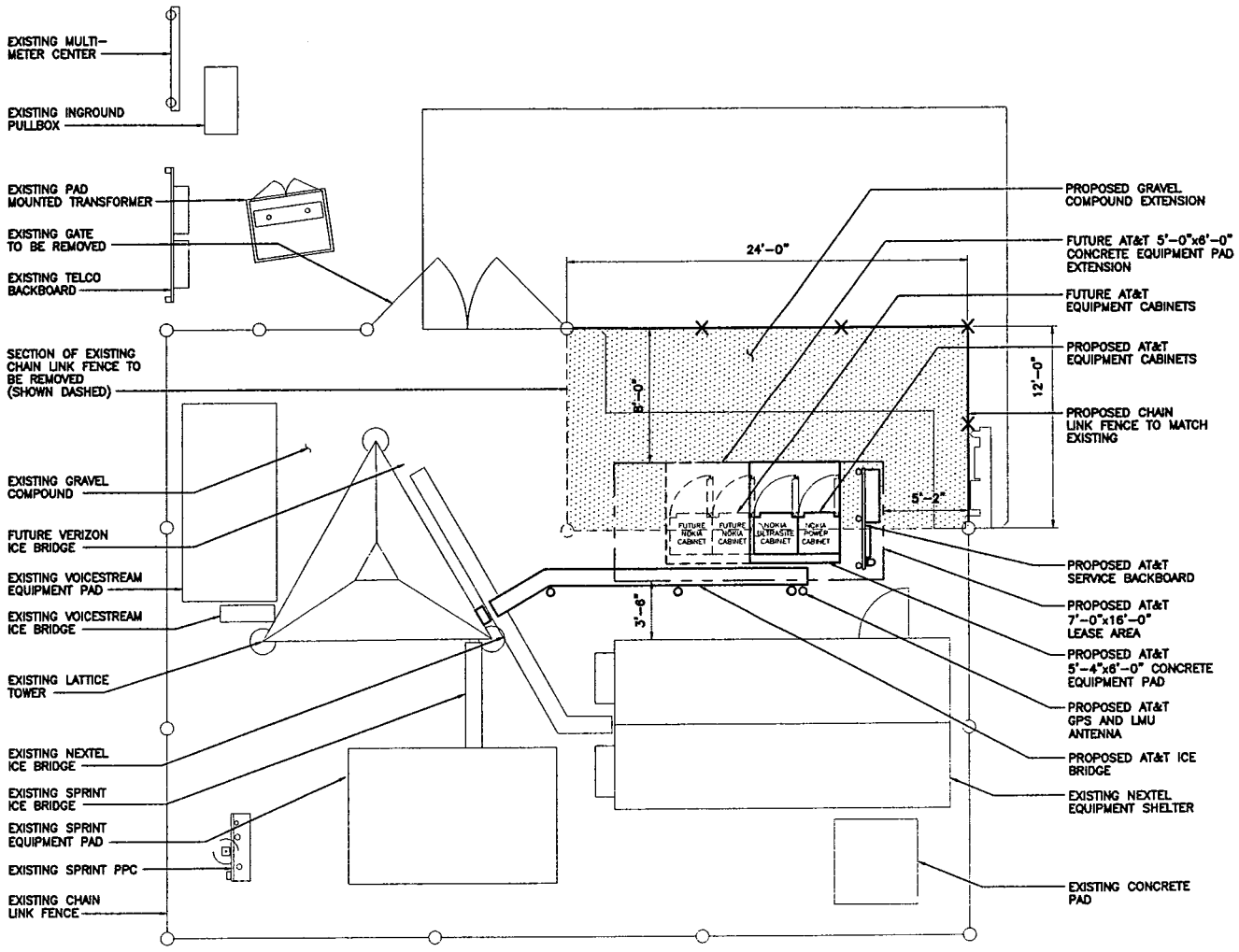
Accordingly, AT&T Wireless requests that the Connecticut Siting Council acknowledge that its proposed modification to the Manitock Hill Road Facility meets the Council's exemption criteria.

Respectfully Submitted,



Christopher B. Fisher, Esq.
On behalf of AT&T Wireless

cc: First Selectman, Town of Waterford
Harold Hewett, Bechtel



1 / SC-1 COMPOUND PLAN

SCALE: 1" = 10'-0"

0 5 10 20

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URS
URS CORPORATION-CT
795 BROOK STREET - BLDG. 5
ROCKY HILL, CT. 06067
1-(860)-529-8882
URS JOB NO.: F301924.23

AT&T
AT&T WIRELESS PCS LLC
12 OMEGA DRIVE
STAMFORD, CT 06902

DRAWING TITLE: COMPOUND PLAN

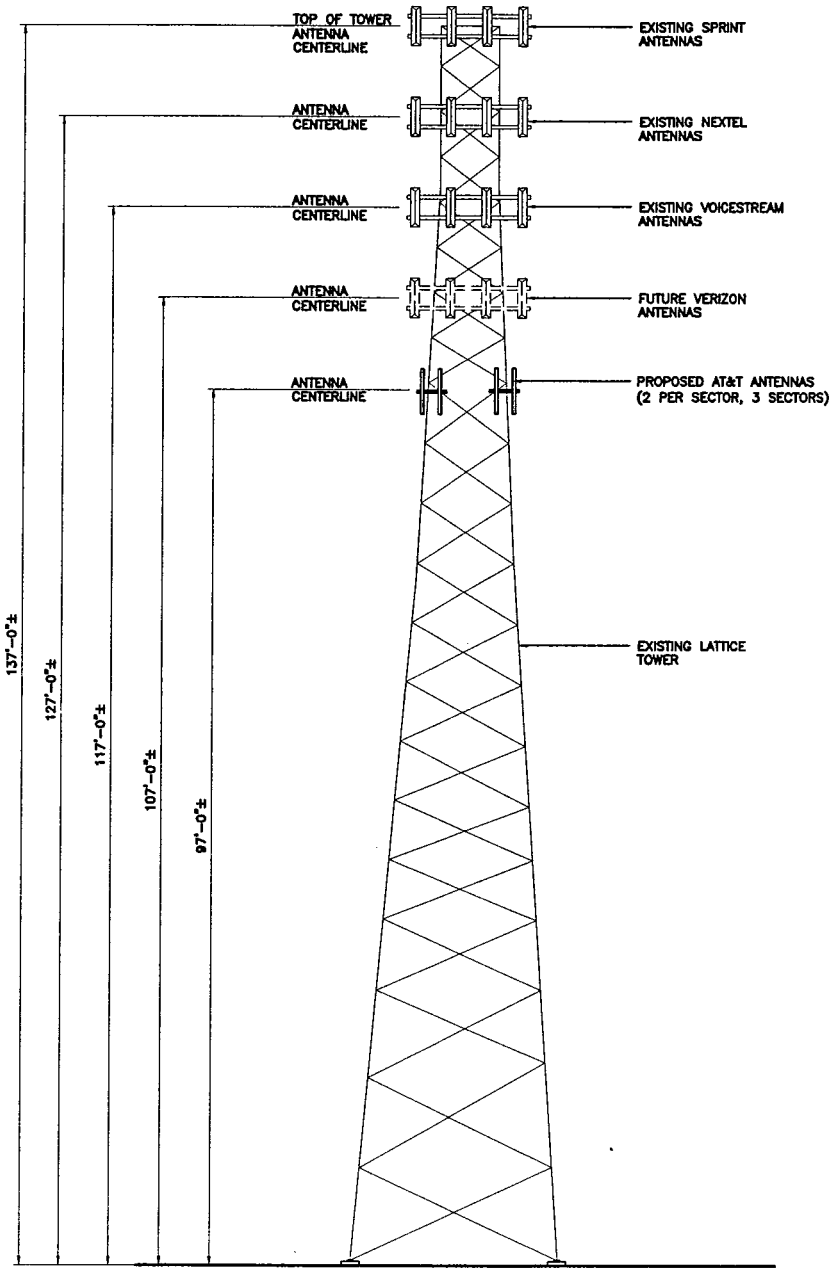
PROJECT INFORMATION:
NEW LONDON-WATERFORD AIRPORT
24445-3CO-220-SC1-1
41 MANITOCK HILL ROAD
WATERFORD, CT 06385

PROPERTY OWNER:
SPRINT SITES USA
535 CRESCENT AVE
RAMSEY, NJ 07746

SCALE:	AS NOTED	DRAWN BY:	KJB
DATE ISSUED:	02-27-02	CHECKED BY:	ICA
		APPROVED BY:	

ISSUED FOR SITING COUNCIL

JOB NO.	SITE NO.	DRAWING NUMBER	REV.
24445	CT-220	SC-1	1



1 / SC-2 TOWER ELEVATION

SCALE: 1" = 20'-0"

0 5 10 20 40

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URS

URS CORPORATION-CT
795 BROOK STREET - BLDG. 5
ROCKY HILL, CT. 06067
1-(860)-529-8882

URS JOB NO.: F301924.23

AT&T

AT&T WIRELESS PCS LLC
12 OMEGA DRIVE
STAMFORD, CT 06902

DRAWING TITLE: TOWER ELEVATION

PROJECT INFORMATION:
NEW LONDON-WATERFORD AIRPORT
24445-3CO-220-SC2-1
41 MANITOCK HILL ROAD
WATERFORD, CT 06385

PROPERTY OWNER:
SPRINT SITES USA
535 CRESCENT AVE
RAMSEY, NJ 07746

SCALE:	AS NOTED	DRAWN BY:	RB
DATE ISSUED:	02-27-02	CHECKED BY:	ICA
		APPROVED BY:	

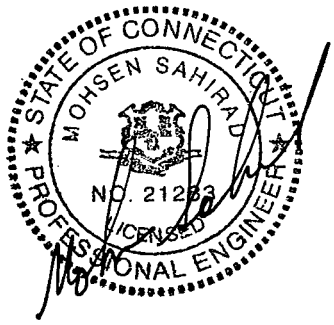
ISSUED FOR SITING COUNCIL

JOB NO.	SITE NO.	DRAWING NUMBER	REV.
24445	CT-220	SC-2	1

DETAILED STRUCTURAL ANALYSIS and EVALUATION of 137' EXISTING SELF SUPPORTING LATTICE TOWER

41 MANITOCK HILL ROAD
WATERFORD, CONNECTICUT
AT&T Site No.: CT-220

AT&T WIRELESS PCS
12 OMEGA DRIVE, 2ND FLOOR
STAMFORD, CT 06902
TEL. 203-602-7029



prepared by

URS CORPORATION
795 BROOK STREET, BUILDING
ROCKY HILL, CT 06067
TEL. 860-529-8882

F300001924.23

December 11, 2001

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the 137' lattice tower located on 41 Manitock Hill Road in Waterford, Connecticut. The analysis was conducted in accordance with the TIA/EIA-222-F standard for wind velocity of 90 mph bare and concurrent with ½" ice design wind loads (with 75% reduction). The antenna loading considered in the analysis consists of all existing and proposed antennas, transmission lines, and ancillary items as outlined in the Analysis Methodology and Loading Condition Section of this report.

The results of the analysis indicate the structure to be in compliance with the loading conditions and the materials and member sizes for the tower and foundation. The tower is considered feasible with the TIA/EIA-222-F wind load classification specified above and all the existing and proposed antenna loading.

This analysis is based on:

1) Tower and Foundation report prepared by Pirod, Inc. Engineering File A-115474 approved February 25, 1999.

2) Antenna inventory as specified in section 6 of this report.

3) Coax cable location as specified on drawing SK-1 of this report.

2. INTRODUCTION

The subject tower is located on 41 Manitock Hill Road in Waterford, Connecticut. The structure is a self supporting 137' steel triangular tapered lattice tower manufactured by Pirod Incorporated.

The tower is constructed of truss legs, diagonal angle braces, and horizontal braces. The tower sections are all bolted together. The width of the face is 4'-0" at the top and 14'-0" at the bottom. The tower geometry and structural member sizes were taken from Pirod, Inc. Project File A-115474 approved February 25, 1999.

The existing structure supports several communication antennas.

This structural analysis of the communications tower was performed by URS Corporation, AES (URS) for Nextel Communications. The purpose of this analysis was to investigate the structural integrity of the existing tower with 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

Methodology:

The tower analysis was done in accordance with TIA/EIA-222-F June 1996, Structural Standard for Steel Antenna Towers and Antenna Supporting Structure; The American Institute of Steel Construction (AISC), Manual of Steel Construction; Allowable Stress Design (ASD).

The analysis was conducted by placing one-half inch of radial ice over the entire structure and all appurtenances, then applying a simultaneous wind load at 90 mph bare and concurrent with ½" radial ice (with reduction factor).

Condition 1 = Wind Load 90 mph + Tower Dead Load

Condition 2 = Wind Load 90 mph (with ½" radial ice and 75% reduction) + Tower Dead Load

The TIA/EIA standard permits one-third increase in allowable stresses for towers and monopoles less than 700 feet tall. For purposes of this analysis, allowable stresses of tower members were increased by one-third in computing the load capacity; in addition, the appropriate "k" factors were assigned to each member.

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 analysis indicates that the tower legs, diagonals and horizontal members have sufficient capacity to carry the loads applied.

No further analysis was conducted on the foundation since the forces calculated were below the original design load.

It is imperative that the proposed coax cable configuration for the existing tower is installed as per drawing SK-1 of this report.

5. CONCLUSIONS AND RECOMMENDATIONS

The results of the analysis indicate the structure to be in compliance with the loading conditions and the materials and member sizes for the tower and foundation. The tower is considered feasible with the TIA/EIA-222-F wind load classification specified above and all the existing and proposed antenna loading.

Limitations/Assumptions:

This report is based on the following:

A. Tower is properly installed and maintained.

B. All members were as specified in the original Construction Documents and are in good condition.

C. All required members are in place.

D. All bolts are in place and are properly tightened.

E. Tower is in plumb condition.

F. All members are galvanized.

G. All tower members were properly designed, detailed, fabricated, installed, and have been properly maintained since erection.

H. Foundations were properly constructed to support original design loads as specified in the original Construction Document.

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. Installing antenna mounting
C. Replacement of existing antenna and associated cable

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.

6.) DRAWINGS AND DATA

EXISTING & PROPOSED ANTENNA DATA

URS Corporation

Job: Waterford
Description: Waterford
Connecticut Town of
wind Velocity mph V= 85 use mph → 90

Project No.
Computed by R.Niemiec Date 11-Dec-01
Checked by Date

Page sheet of of

Full antenna load

Antenna and Platform Type and Model or equivalent	Telecom CO.	Z Height above ground ft	no. antenna	Dead of each antenna with no ice Each	Projected area net Aa ft^2	Projected area net w/ ice ft^2	Length L	Width W	Is member flat y or n	CA	Wind Speed mph	Kz	Is member tubular y or r	Gh	Qz	Thrust Fx no ice lb	Thrust Fx lb with ice	Total Dead Load OF Antenna no ice	Total Dead Load OF Antenna with ice	CaAa w/o ice	CaAa w/ ice
Allgon 7184.05	Sprint	137.00	9.00	9.90	17.60	20.80	51.20	5.50	Y	1.48	90.00	1.50	N	1.14	31.14	923.00	1091.00	89.10	107.00	17.33	20.48
ALP 9212	Nextel	127.00	12.00	26.70	47.67	52.00	52.00	11.00	Y	1.40	90.00	1.47	N	1.14	30.48	2329.00	2541.00	320.40	385.00	55.61	60.67
EMS RR9017	Voicestream	117.00	6.00	18.00	18.67	21.00	56.00	8.00	Y	1.40	90.00	1.44	N	1.15	29.77	896.00	1008.00	108.00	130.00	17.42	19.60
DB844H90	Verizon	107.00	12.00	10.00	24.00	28.00	48.00	6.00	Y	1.43	90.00	1.40	N	1.16	29.02	1156.00	1348.00	120.00	144.00	28.67	33.44
Allgon 7250	AT&T	97.00	6.00	15.50	18.90	19.50	62.40	6.50	Y	1.49	90.00	1.36	N	1.16	28.22	826.00	863.00	83.00	112.00	16.75	19.33

URS Corporation

Job: Waterford
Description: Waterford
Connecticut Town of
wind Velocity mph V= 85 use mph → 90

Project No.
Computed by R.Niemiec Date 11-Dec-01
Checked by Date

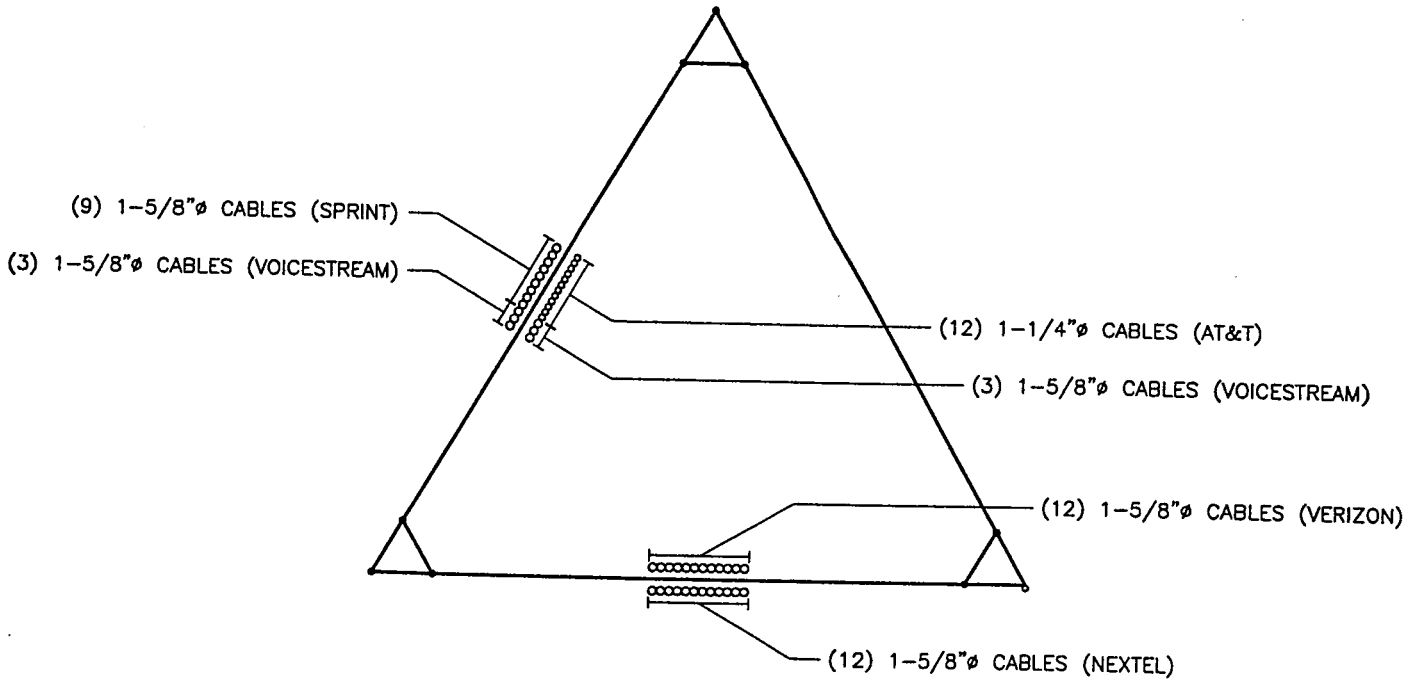
Page sheet of of

Antenna load by sector

Antenna and Platform Type and Model or equivalent	Telecom CO.	Z Height above ground ft	no. antenna	Dead of each antenna with no ice Each	Projected area net Aa ft^2	Projected area net w/ ice ft^2	Length L	Width W	Is member flat y or n	CA	Wind Speed mph	Kz	Is member tubular y or r	Gh	Qz	Thrust Fx no ice lb	Thrust Fx lb with ice	Total Dead Load OF Antenna no ice	Total Dead Load OF Antenna with ice	CaAa w/o ice	CaAa w/ ice
Allgon 7184.05	Sprint	137.00	3.00	9.90	5.87	6.93	51.20	5.50	Y	1.48	90.00	1.50	N	1.14	31.14	308.00	364.00	29.70	36.00	5.78	6.83
ALP 9212	Nextel	127.00	4.00	26.70	15.89	17.33	52.00	11.00	Y	1.40	90.00	1.47	N	1.14	30.48	777.00	847.00	106.80	129.00	18.54	20.22
EMS RR9017	Voicestream	117.00	2.00	18.00	6.22	7.00	56.00	8.00	Y	1.40	90.00	1.44	N	1.15	29.77	299.00	336.00	36.00	44.00	5.81	6.53
DB844H90	Verizon	107.00	4.00	10.00	8.00	9.33	48.00	6.00	Y	1.43	90.00	1.40	N	1.16	29.02	386.00	450.00	40.00	48.00	9.56	11.15
Allgon 7250	AT&T	97.00	2.00	15.50	5.63	6.50	62.40	6.50	Y	1.49	90.00	1.36	N	1.16	28.22	276.00	318.00	31.00	38.00	5.58	6.44

EXISTING & PROPOSED COAX CABLE CONFIGURATION

137 FT. SELF-SUPPORTING LATTICE TOWER, WATERFORD, CT.
COAX TRANSMISSION LINES MOUNTING CONFIGURATION



1 / SK-1 PROPOSED COAX CABLE CONFIGURATION
SCALE: N.T.S.

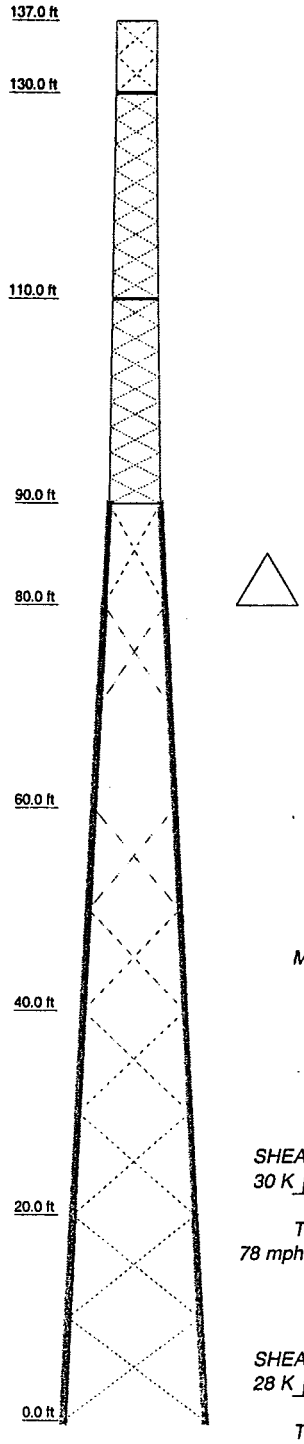
I.D. No.: CT220	URS CORPORATION AES 795 BROOK ST., BUILDING 5 ROCKY HILL, CT. 06067 1-(860)-529-8882	SITE ADDRESS: 41 MANITOCK HILL ROAD WATERFORD, CONNECTICUT	REV. / DATE: / DESCRIPTION
Designed by:			Scale: AS SHOWN / Date: 12/11/01
Drawn by: RMN			Job No. F301924.23 / File No. SK-1
Checked by:			Dwg. 1 of 1

Dwg. No. SK-1

ERI TOWER OUPUT DATA FOR EXISTING & PROPOSED ANTENNA LOADING

137 Ft. Self Supporting Tower
Waterford, CT

Section	T8	T7	T9	T5	T4	T3	T2	T1
Legs	2	1.75		1.5	1.25 (10')	SR 2 1/4	SR 2	SR 1 1/2
Diagonals	L3x3x5/16	L3x3x3/16		L2 1/2x2 1/2x3/16		SR 1	SR 7/8	SR 3/4
Top Girts			N.A.			SR 1	SR 7/8	SR 3/4
Mid Girts				N.A.				
Bottom Girts			N.A.			SR 1	SR 7/8	SR 3/4
Horizontals				N.A.				
Sec. Horiz.				N.A.				
Inner Bracing				N.A.				
Face Width (ft)	14	12	10	8	6	4.5	4	
# Panels @ Ht (ft)	1 @ 4.3	2 @ 2.7	9 @ 10	8	5	8 @ 2.48958	8 @ 2.47917	2 @ 3.45833
Weight (K)	15.7	2.7	2.7	2.1	0.8	1.8	1.2	0.3



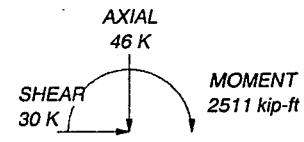
DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Allgon 7184.05	137	12' T-Frame	117
Allgon 7184.05	137	12' T-Frame	117
Allgon 7184.05	137	DB844H90	107
13' Low Profile Platform	137	DB844H90	107
ALP 9212	127	DB844H90	107
ALP 9212	127	12' T-Frame	107
ALP 9212	127	12' T-Frame	107
12' T-Frame	127	12' T-Frame	107
12' T-Frame	127	Allgon 7250	97
12' T-Frame	127	Allgon 7250	97
EMS RR9017	117	Allgon 7250	97
EMS RR9017	117	10' Lightweight T-Frame	97
EMS RR9017	117	10' Lightweight T-Frame	97
12' T-Frame	117	10' Lightweight T-Frame	97

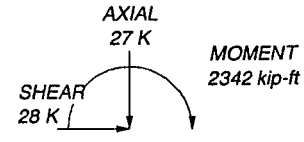
TOWER DESIGN NOTES

1. Tower designed for a 90 mph basic wind in accordance with the TIA/EIA-222
2. Tower is also designed for a 78 mph basic wind with 0.50 in ice.

MAX LEG FORCES:
DOWN: 222 K
UPLIFT: -191 K
SHEAR: 21 K



TORQUE 0 kip-ft
78 mph WIND - 0.5000 in ICE



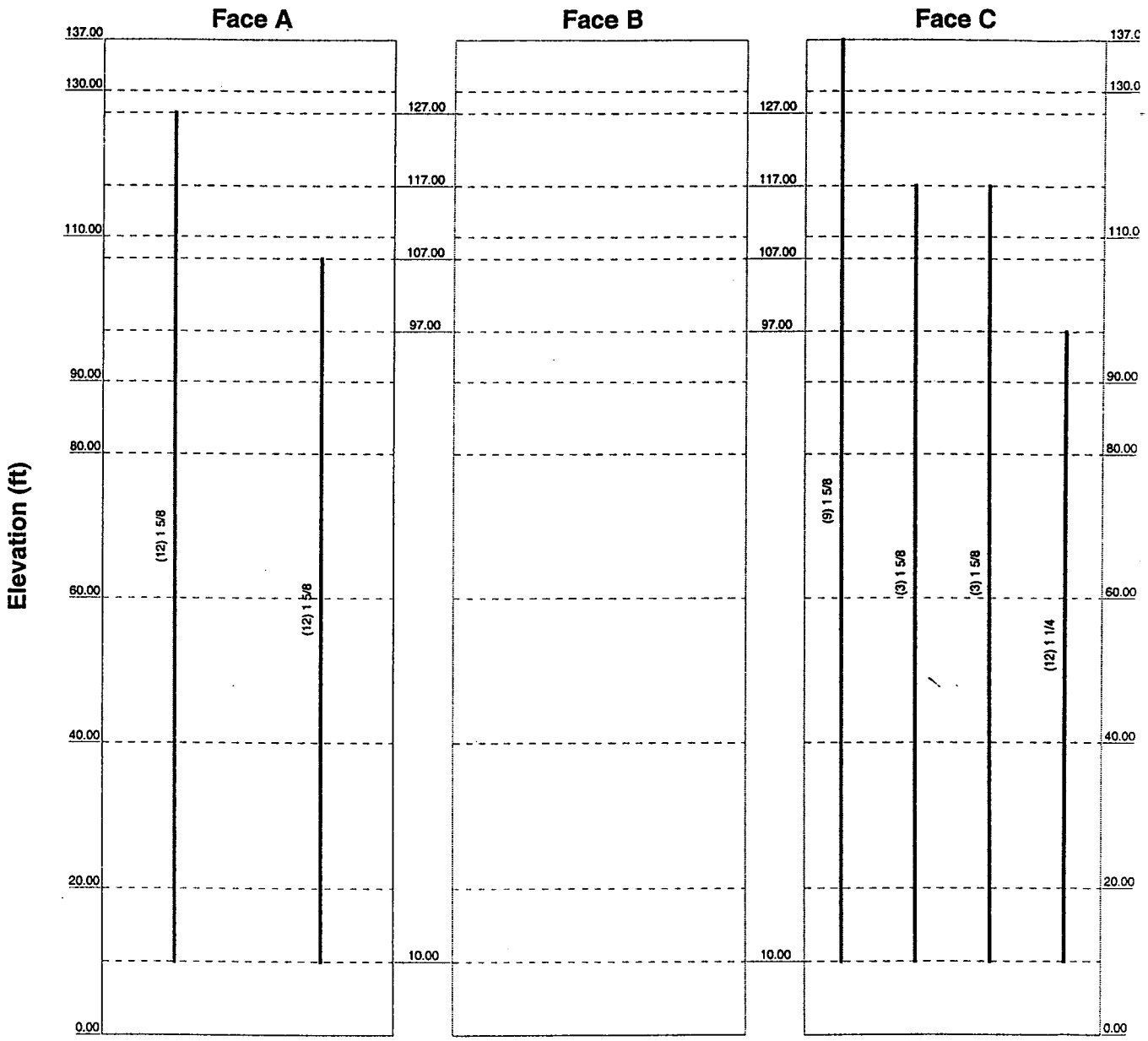
TORQUE 0 kip-ft
REACTIONS - 90 mph WIND

URS CORPORATION
795 Brook Street, Building 5
Rocky Hill, Connecticut 06067
Phone: (860) 529-8882
FAX: (860) 529-5566

Job: *F300001924.23*		
Project: *Waterford, CT*		
Client: AT&T	Drawn by: Robert M. Niemiec	App'd:
Code: TIA/EIA-222-F	Date: 12/11/01	Scale: N
Path: P:\Telecom\F12\Master\CT-220.1Master.en		Dwg No.

Feedline Distribution Chart
0' - 137'

_____ Round _____ Flat _____ App In Face _____ App Out Face _____ Truss Leg



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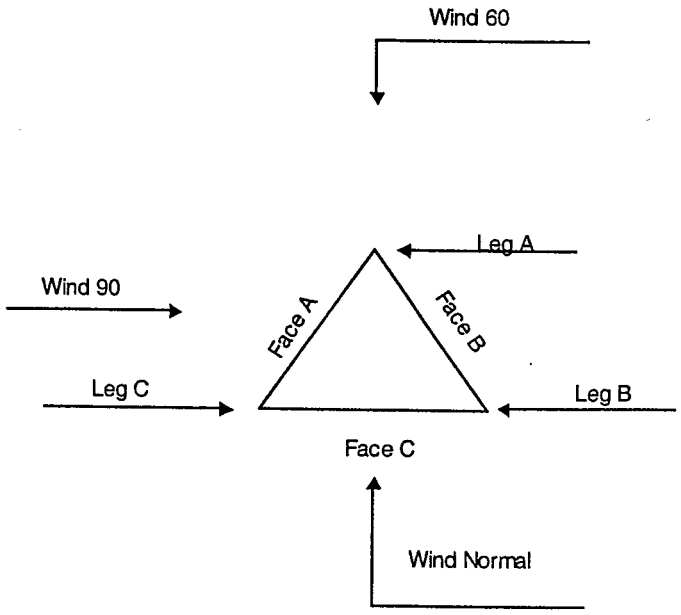
Job: ***F300001924.23***		
Project: ***Waterford, CT***		
Client: AT&T	Drawn by: Robert M. Niemiec	App'd:
Code: TIA/EIA-222-F	Date: 12/11/01	Scale: N
Path: P:\Telecom\F12\Master\CT-220.1Master.en		Dwg No. E

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 137.00 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 4.00 ft at the top and 14.00 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 90 mph .
Nominal ice thickness of 0.5000 in .
Ice density of 56 pcf .
A wind speed of 78 mph is used in combination with ice.
Moment in legs is considered .
A non-linear (P-delta) analysis was used .
Pressures are calculated at each section .
Stress ratio used in tower member design is 1.333



Triangular Tower

Tower Section Geometry

Tower Section	*Tower Elevation* ft	*Section Width* ft	*Number of Sections*	*Section Length* ft	*Diagonal Spacing* ft	*Bracing Type*	*Has K Brace End Panels*	*Has Horizontals*
T1	137-130	4.00	1	7.00	3.46	X Brace	No	Steps
T2	130-110	4.00	1	20.00	2.48	X Brace	No	Steps

Tower Section	Tower Elevation ft	Section Width ft	Number of Sections	Section Length ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals
T3	110-90	4.50	1	20.00	2.49	X Brace	No	Steps
T4	90-80	5.00	1	10.00	10.00	X Brace	No	No
T5	80-60	6.00	1	20.00	10.00	X Brace	No	No
T6	60-40	8.00	1	20.00	10.00	X Brace	No	No
T7	40-20	10.00	1	20.00	10.00	X Brace	No	No
T8	20-0	12.00	1	20.00	10.00	X Brace	No	No

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg F_y ksi	Diagonal Type	Diagonal Size	Diagonal F_y ksi
T1 137-130	Solid Round	1 1/2	50	Solid Round	3/4	50
T2 130-110	Solid Round	2	50	Solid Round	7/8	50
T3 110-90	Solid Round	2 1/4	50	Solid Round	1	50
T4 90-80	Truss Leg	1.25 (10')	50	Single Angle	L2 1/2x2 1/2x3/16	36
T5 80-60	Truss Leg	1.5	50	Single Angle	L2 1/2x2 1/2x3/16	36
T6 60-40	Truss Leg	1.75	50	Single Angle	L3x3x3/16	36
T7 40-20	Truss Leg	1.75	50	Single Angle	L3x3x3/16	36
T8 20-0	Truss Leg	2	50	Single Angle	L3x3x5/16	36

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt F_y ksi	Bottom Girt Type	Bottom Girt Size	Bottom Girt F_y ksi
T1 137-130	Solid Round	3/4	50	Solid Round	3/4	36
T2 130-110	Solid Round	7/8	50	Solid Round	7/8	36
T3 110-90	Solid Round	1	50	Solid Round	1	36
T4 90-80	Single Angle		36	Single Angle		36
T5 80-60	Single Angle		36	Single Angle		36
T6 60-40	Single Angle		36	Single Angle		36
T7 40-20	Single Angle		36	Single Angle		36
T8 20-0	Single Angle		36	Single Angle		36

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Inner Brace X Y	Truss Leg X Brace	Truss Leg Z Brace
T1 137-130	0.00	0.0000	1	1	1	1	1 1	1 1	1 1	1 1	1 1	1 1	0.5	0.85
T2 130-110	0.00	0.0000	1	1	1	1	1 1	1 1	1 1	1 1	1 1	1 1	0.5	0.85

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Legs	K Factors[1]							
							X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Inner Brace X Y	Truss Leg X Brace	Truss Leg Z Brace
ft	ft^2	in												
T3 110-90	0.00	0.0000	1	1	1	1	1	1	1	1	1	1	0.5	0.85
							1	1	1	1	1	1		
T4 90-80	0.00	0.0000	1	1	1	1	1	1	1	1	1	1	0.5	0.85
							1	1	1	1	1	1		
T5 80-60	0.00	0.0000	1	1	1	1	1	1	1	1	1	1	0.5	0.85
							1	1	1	1	1	1		
T6 60-40	0.00	0.0000	1	1	1	1	1	1	1	1	1	1	0.5	0.85
							1	1	1	1	1	1		
T7 40-20	0.00	0.0000	1	1	1	1	1	1	1	1	1	1	0.5	0.85
							1	1	1	1	1	1		
T8 20-0	0.00	0.0000	1	1	1	1	1	1	1	1	1	1	0.5	0.85
							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	Tension Area Factors						Connection Offsets							
	Legs		Inner Members				Diagonals				K-Bracing			
			Single Angle		Double Angle									
	Net Width Deduct	U	Net Width Deduct	U	Net Width Deduct	U	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	in	in	in
T1 137-130	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.000
T2 130-110	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.000
T3 110-90	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.000
T4 90-80	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.0000	0.0000	2.0000	0.0000	2.0000	0.0000	0.000
T5 80-60	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.0000	0.0000	2.0000	0.0000	2.0000	0.0000	0.000
T6 60-40	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.0000	0.0000	2.0000	0.0000	2.0000	0.0000	0.000
T7 40-20	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.0000	0.0000	2.0000	0.0000	2.0000	0.0000	0.000
T8 20-0	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.0000	0.0000	2.0000	0.0000	2.0000	0.0000	0.000

Feed Line/Linear Appurtenances Treated As Structural Components

Description	Face	Component Type	Placement	Total Number	Number Per Row	Clear Spacing	Width or Diameter	Perimeter	Weight
			ft			in	in	in	plf
1 5/8	C	Ar (CfAe)	137.00 - 10.00	9	9	1.9800	1.9800		1.04
1 5/8	A	Ar (CfAe)	127.00 - 10.00	12	12	1.9800	1.9800		1.04
1 5/8	C	Ar (CfAe)	117.00 - 10.00	3	3	1.9800	1.9800		1.04

Feed Line/Linear Appurtenances - Non-Structural

Description	Face	Component Type	Placement	Total Number	C_AA_A	Weight
			ft		ft^2/ft	plf

Description	Face	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1 5/8	C	CaAa (In Face)	117.00 - 10.00	3	No Ice	0.00	1.04
					1/2" Ice	0.00	2.55
					1" Ice	0.00	4.68
					2" Ice	0.00	10.76
					4" Ice	0.00	30.26
1 1/4	C	CaAa (In Face)	97.00 - 10.00	12	No Ice	0.00	0.66
					1/2" Ice	0.00	1.91
					1" Ice	0.00	3.78
					2" Ice	0.00	9.33
					4" Ice	0.00	27.78
1 5/8	A	CaAa (In Face)	107.00 - 10.00	12	No Ice	0.00	1.04
					1/2" Ice	0.00	2.55
					1" Ice	0.00	4.68
					2" Ice	0.00	10.76
					4" Ice	0.00	30.26

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	137-130	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	10.395	0.000	0.000	0.000	0.07
T2	130-110	A	33.660	0.000	0.000	0.000	0.21
		B	0.000	0.000	0.000	0.000	0.00
		C	33.165	0.000	0.000	0.000	0.23
T3	110-90	A	39.600	0.000	0.000	0.000	0.46
		B	0.000	0.000	0.000	0.000	0.00
		C	39.600	0.000	0.000	0.000	0.37
T4	90-80	A	19.800	0.000	0.000	0.000	0.25
		B	0.000	0.000	0.000	0.000	0.00
		C	19.800	0.000	0.000	0.000	0.24
T5	80-60	A	39.600	0.000	0.000	0.000	0.50
		B	0.000	0.000	0.000	0.000	0.00
		C	39.600	0.000	0.000	0.000	0.47
T6	60-40	A	39.600	0.000	0.000	0.000	0.50
		B	0.000	0.000	0.000	0.000	0.00
		C	39.600	0.000	0.000	0.000	0.47
T7	40-20	A	39.600	0.000	0.000	0.000	0.50
		B	0.000	0.000	0.000	0.000	0.00
		C	39.600	0.000	0.000	0.000	0.47
T8	20-0	A	19.800	0.000	0.000	0.000	0.25
		B	0.000	0.000	0.000	0.000	0.00
		C	19.800	0.000	0.000	0.000	0.24

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face	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	137-130	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		15.645	0.000	0.000	0.000	0.16
T2	130-110	A	0.500	50.660	0.000	0.000	0.000	0.52

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft	deg	ft		ft^2	ft^2	K
Allgon 7184.05	A	From Face	3.00	0.0000	137.00	No Ice	5.78	5.78	0.00
			0.00			1/2" Ice	6.83	6.83	0.00
			0.00			1" Ice	7.88	7.88	0.00
						2" Ice	9.98	9.98	0.01
						4" Ice	14.18	14.18	0.01
Allgon 7184.05	B	From Face	3.00	0.0000	137.00	No Ice	5.78	5.78	0.00
			0.00			1/2" Ice	6.83	6.83	0.00
			0.00			1" Ice	7.88	7.88	0.00
						2" Ice	9.98	9.98	0.01
						4" Ice	14.18	14.18	0.01
Allgon 7184.05	C	From Face	3.00	0.0000	137.00	No Ice	5.78	5.78	0.00
			0.00			1/2" Ice	6.83	6.83	0.00
			0.00			1" Ice	7.88	7.88	0.00
						2" Ice	9.98	9.98	0.01
						4" Ice	14.18	14.18	0.01
ALP 9212	A	From Face	3.00	0.0000	127.00	No Ice	18.54	18.54	0.11
			0.00			1/2" Ice	20.22	20.22	0.13
			0.00			1" Ice	21.90	21.90	0.15
						2" Ice	25.26	25.26	0.20
						4" Ice	31.98	31.98	0.28
ALP 9212	B	From Face	3.00	0.0000	127.00	No Ice	18.54	18.54	0.11
			0.00			1/2" Ice	20.22	20.22	0.13
			0.00			1" Ice	21.90	21.90	0.15
						2" Ice	25.26	25.26	0.20
						4" Ice	31.98	31.98	0.28
ALP 9212	C	From Face	3.00	0.0000	127.00	No Ice	18.54	18.54	0.11
			0.00			1/2" Ice	20.22	20.22	0.13
			0.00			1" Ice	21.90	21.90	0.15
						2" Ice	25.26	25.26	0.20
						4" Ice	31.98	31.98	0.28
EMS RR9017	A	From Face	3.00	0.0000	117.00	No Ice	5.81	5.81	0.00
			0.00			1/2" Ice	6.53	6.53	0.00
			0.00			1" Ice	7.25	7.25	0.01
						2" Ice	8.69	8.69	0.01
						4" Ice	11.57	11.57	0.01
EMS RR9017	B	From Face	3.00	0.0000	117.00	No Ice	5.81	5.81	0.00
			0.00			1/2" Ice	6.53	6.53	0.00
			0.00			1" Ice	7.25	7.25	0.01
						2" Ice	8.69	8.69	0.01
						4" Ice	11.57	11.57	0.01
EMS RR9017	C	From Face	3.00	0.0000	117.00	No Ice	5.81	5.81	0.00
			0.00			1/2" Ice	6.53	6.53	0.00
			0.00			1" Ice	7.25	7.25	0.01
						2" Ice	8.69	8.69	0.01
						4" Ice	11.57	11.57	0.01
DB844H90	A	From Face	3.00	0.0000	107.00	No Ice	9.56	9.56	0.00
			0.00			1/2" Ice	11.15	11.15	0.00
			0.00			1" Ice	12.74	12.74	0.01
						2" Ice	15.92	15.92	0.01
						4" Ice	22.28	22.28	0.01
DB844H90	B	From Face	3.00	0.0000	107.00	No Ice	9.56	9.56	0.00
			0.00			1/2" Ice	11.15	11.15	0.00
			0.00			1" Ice	12.74	12.74	0.01
						2" Ice	15.92	15.92	0.01
						4" Ice	22.28	22.28	0.01
DB844H90	C	From Face	3.00	0.0000	107.00	No Ice	9.56	9.56	0.00
			0.00			1/2" Ice	11.15	11.15	0.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral / Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft	deg	ft		ft^2	ft^2	K
			0.00			1" Ice	12.74	12.74	0.01
						2" Ice	15.92	15.92	0.01
						4" Ice	22.28	22.28	0.01
Allgon 7250	A	From Face	3.00	0.0000	97.00	No Ice	5.58	5.58	0.00
			0.00			1/2" Ice	6.44	6.44	0.00
			0.00			1" Ice	7.30	7.30	0.00
						2" Ice	9.02	9.02	0.01
						4" Ice	12.46	12.46	0.01
Allgon 7250	B	From Face	3.00	0.0000	97.00	No Ice	5.58	5.58	0.00
			0.00			1/2" Ice	6.44	6.44	0.00
			0.00			1" Ice	7.30	7.30	0.00
						2" Ice	9.02	9.02	0.01
						4" Ice	12.46	12.46	0.01
Allgon 7250	C	From Face	3.00	0.0000	97.00	No Ice	5.58	5.58	0.00
			0.00			1/2" Ice	6.44	6.44	0.00
			0.00			1" Ice	7.30	7.30	0.00
						2" Ice	9.02	9.02	0.01
						4" Ice	12.46	12.46	0.01
13' Low Profile Platform	C	None		0.0000	137.00	No Ice	15.70	15.70	1.30
						1/2" Ice	20.10	20.10	1.76
						1" Ice	24.50	24.50	2.23
						2" Ice	33.30	33.30	3.16
						4" Ice	50.90	50.90	5.02
12' T-Frame	A	From Leg	1.00	0.0000	127.00	No Ice	13.60	13.60	0.47
			0.00			1/2" Ice	18.40	18.40	0.60
			0.00			1" Ice	23.20	23.20	0.73
						2" Ice	32.80	32.80	1.00
						4" Ice	52.00	52.00	1.54
12' T-Frame	B	From Leg	1.00	0.0000	127.00	No Ice	13.60	13.60	0.47
			0.00			1/2" Ice	18.40	18.40	0.60
			0.00			1" Ice	23.20	23.20	0.73
						2" Ice	32.80	32.80	1.00
						4" Ice	52.00	52.00	1.54
12' T-Frame	C	From Leg	1.00	0.0000	127.00	No Ice	13.60	13.60	0.47
			0.00			1/2" Ice	18.40	18.40	0.60
			0.00			1" Ice	23.20	23.20	0.73
						2" Ice	32.80	32.80	1.00
						4" Ice	52.00	52.00	1.54
12' T-Frame	A	From Leg	1.00	0.0000	117.00	No Ice	13.60	13.60	0.47
			0.00			1/2" Ice	18.40	18.40	0.60
			0.00			1" Ice	23.20	23.20	0.73
						2" Ice	32.80	32.80	1.00
						4" Ice	52.00	52.00	1.54
12' T-Frame	B	From Leg	1.00	0.0000	117.00	No Ice	13.60	13.60	0.47
			0.00			1/2" Ice	18.40	18.40	0.60
			0.00			1" Ice	23.20	23.20	0.73
						2" Ice	32.80	32.80	1.00
						4" Ice	52.00	52.00	1.54
12' T-Frame	C	From Leg	1.00	0.0000	117.00	No Ice	13.60	13.60	0.47
			0.00			1/2" Ice	18.40	18.40	0.60
			0.00			1" Ice	23.20	23.20	0.73
						2" Ice	32.80	32.80	1.00
						4" Ice	52.00	52.00	1.54
12' T-Frame	A	From Leg	1.00	0.0000	107.00	No Ice	13.60	13.60	0.47
			0.00			1/2" Ice	18.40	18.40	0.60
			0.00			1" Ice	23.20	23.20	0.73
						2" Ice	32.80	32.80	1.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral / Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft	deg	ft		ft^2	ft^2	K
						4" Ice	52.00	52.00	1.54
12' T-Frame	B	From Leg	1.00	0.0000	107.00	No Ice	13.60	13.60	0.47
			0.00			1/2" Ice	18.40	18.40	0.60
			0.00			1" Ice	23.20	23.20	0.73
						2" Ice	32.80	32.80	1.00
						4" Ice	52.00	52.00	1.54
12' T-Frame	C	From Leg	1.00	0.0000	107.00	No Ice	13.60	13.60	0.47
			0.00			1/2" Ice	18.40	18.40	0.60
			0.00			1" Ice	23.20	23.20	0.73
						2" Ice	32.80	32.80	1.00
						4" Ice	52.00	52.00	1.54
10' Lightweight T-Frame	A	From Leg	1.00	0.0000	97.00	No Ice	8.00	8.00	0.22
			0.00			1/2" Ice	12.30	12.30	0.30
			0.00			1" Ice	16.60	16.60	0.39
						2" Ice	25.20	25.20	0.56
						4" Ice	42.40	42.40	0.90
10' Lightweight T-Frame	B	From Leg	1.00	0.0000	97.00	No Ice	8.00	8.00	0.22
			0.00			1/2" Ice	12.30	12.30	0.30
			0.00			1" Ice	16.60	16.60	0.39
						2" Ice	25.20	25.20	0.56
						4" Ice	42.40	42.40	0.90
10' Lightweight T-Frame	C	From Leg	1.00	0.0000	97.00	No Ice	8.00	8.00	0.22
			0.00			1/2" Ice	12.30	12.30	0.30
			0.00			1" Ice	16.60	16.60	0.39
						2" Ice	25.20	25.20	0.56
						4" Ice	42.40	42.40	0.90

Discrete Forces - Equivalent Torsional Loads

Section Elevation	Wind Direction	Offset From Centroid	Type	Placement	Torsion No-Ice	Torsion With Ice
ft		ft		ft	kip-ft/ft	kip-ft/ft
T1 137-130	Normal	-3.60	Conc	137	-0.74	-0.66
	Wind 60	-3.60	Conc	137	0.74	0.66
	Wind 90	-2.08	Conc	137	-0.43	-0.38
	Normal	3.60	Conc	137	0.74	0.66
	Wind 60	3.60	Conc	137	-0.74	-0.66
	Wind 90	-2.08	Conc	137	-0.43	-0.38
	Normal	0.00	Conc	137	0.00	0.00
	Wind 60	0.00	Conc	137	0.00	0.00
	Wind 90	4.15	Conc	137	0.85	0.76
T2 130-110	Normal	-3.62	Conc	127	-2.33	-1.91
	Wind 60	-3.62	Conc	127	2.33	1.91
	Wind 90	-2.09	Conc	127	-1.34	-1.10
	Normal	3.62	Conc	127	2.33	1.91
	Wind 60	3.62	Conc	127	-2.33	-1.91
	Wind 90	-2.09	Conc	127	-1.34	-1.10
	Normal	0.00	Conc	127	0.00	0.00
	Wind 60	0.00	Conc	127	0.00	0.00
	Wind 90	4.18	Conc	127	2.69	2.20
	Normal	-3.68	Conc	117	-0.73	-0.61

Section Elevation ft	Wind Direction	Offset From Centroid ft	Type	Placement ft	Torsion No-Ice kip-ft/ft	Torsion With Ice kip-ft/ft
	Wind 60	-3.68	Conc	117	0.73	0.61
	Wind 90	-2.12	Conc	117	-0.42	-0.35
	Normal	3.68	Conc	117	0.73	0.61
	Wind 60	3.68	Conc	117	-0.73	-0.61
	Wind 90	-2.12	Conc	117	-0.42	-0.35
	Normal	0.00	Conc	117	0.00	0.00
	Wind 60	0.00	Conc	117	0.00	0.00
	Wind 90	4.25	Conc	117	0.84	0.71
	Normal	0.00	Conc	127	0.00	0.00
	Wind 60	0.00	Conc	127	0.00	0.00
	Wind 90	-3.35	Conc	127	-1.58	-1.61
	Normal	2.90	Conc	127	1.37	1.39
	Wind 60	2.90	Conc	127	-1.37	-1.39
	Wind 90	1.68	Conc	127	0.79	0.80
	Normal	-2.90	Conc	127	-1.37	-1.39
	Wind 60	-2.90	Conc	127	1.37	1.39
	Wind 90	1.68	Conc	127	0.79	0.80
	Normal	0.00	Conc	117	0.00	0.00
	Wind 60	0.00	Conc	117	0.00	0.00
	Wind 90	-3.50	Conc	117	-1.61	-1.64
	Normal	3.03	Conc	117	1.40	1.42
	Wind 60	3.03	Conc	117	-1.40	-1.42
	Wind 90	1.75	Conc	117	0.81	0.82
	Normal	-3.03	Conc	117	-1.40	-1.42
	Wind 60	-3.03	Conc	117	1.40	1.42
	Wind 90	1.75	Conc	117	0.81	0.82
T3 110-90	Normal	-3.74	Conc	107	-1.18	-1.04
	Wind 60	-3.74	Conc	107	1.18	1.04
	Wind 90	-2.16	Conc	107	-0.68	-0.60
	Normal	3.74	Conc	107	1.18	1.04
	Wind 60	3.74	Conc	107	-1.18	-1.04
	Wind 90	-2.16	Conc	107	-0.68	-0.60
	Normal	0.00	Conc	107	0.00	0.00
	Wind 60	0.00	Conc	107	0.00	0.00
	Wind 90	4.32	Conc	107	1.37	1.20
	Normal	-3.80	Conc	97	-0.68	-0.59
	Wind 60	-3.80	Conc	97	0.68	0.59
	Wind 90	-2.20	Conc	97	-0.39	-0.34
	Normal	3.80	Conc	97	0.68	0.59
	Wind 60	3.80	Conc	97	-0.68	-0.59
	Wind 90	-2.20	Conc	97	-0.39	-0.34
	Normal	0.00	Conc	97	0.00	0.00
	Wind 60	0.00	Conc	97	0.00	0.00
	Wind 90	4.39	Conc	97	0.79	0.68
	Normal	0.00	Conc	107	0.00	0.00
	Wind 60	0.00	Conc	107	0.00	0.00
	Wind 90	-3.64	Conc	107	-1.64	-1.66
	Normal	3.15	Conc	107	1.42	1.44
	Wind 60	3.15	Conc	107	-1.42	-1.44
	Wind 90	1.82	Conc	107	0.82	0.83
	Normal	-3.15	Conc	107	-1.42	-1.44
	Wind 60	-3.15	Conc	107	1.42	1.44
	Wind 90	1.82	Conc	107	0.82	0.83
	Normal	0.00	Conc	97	0.00	0.00
	Wind 60	0.00	Conc	97	0.00	0.00
	Wind 90	-3.79	Conc	97	-0.97	-1.12
	Normal	3.28	Conc	97	0.84	0.97
	Wind 60	3.28	Conc	97	-0.84	-0.97

Section Elevation ft	Wind Direction	Offset From Centroid ft	Type	Placement ft	Torsion No-Ice kip-ft/ft	Torsion With Ice kip-ft/ft
	Wind 90	1.89	Conc	97	0.49	0.56
	Normal	-3.28	Conc	97	-0.84	-0.97
	Wind 60	-3.28	Conc	97	0.84	0.97
	Wind 90	1.89	Conc	97	0.49	0.56

Truss-Leg Interaction Properties

Section Designation	Area in^2	Area Ice in^2	Self Weight K	Ice Weight K	Equiv. Diameter in	Equiv. Diameter Ice in	Section Modulus S_x in^3	Section Modulus S_y in^3	Leg Area in^2
1.25 (10')	2104.4082	3171.1427	0.43	0.36	7.3070	11.0109	11.7456	13.3912	3.6816
1.5	2306.6519	3641.5135	0.56	0.44	8.0092	12.6441	16.6680	18.9600	5.3014
1.75	2435.5899	3822.0448	0.69	0.45	8.4569	13.2710	22.3705	25.3908	7.2158
1.75	2435.5899	3822.0448	0.69	0.45	8.4569	13.2710	22.3705	25.3908	7.2158
2	2607.3888	4083.7151	1.04	0.48	9.0534	14.1796	28.8276	32.6501	9.4248

Tower Pressures - No Ice

$G_H = 1.140$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1 137-130	133.50	1.491	31	28.875	A	0.000	3.515	1.750	49.79	0.000	0.000
					B	0.000	3.515		49.79		
					C	0.000	13.234		13.22		
T2 130-110	120.00	1.446	30	88.334	A	0.000	43.919	6.667	15.18	0.000	0.000
					B	0.000	12.779		52.18		
					C	0.000	43.461		15.34		
T3 110-90	100.00	1.373	28	98.750	A	0.000	51.420	7.501	14.59	0.000	0.000
					B	0.000	15.131		49.57		
					C	0.000	51.420		14.59		
T4 90-80	85.00	1.31	27	61.097	A	3.014	31.999	12.199	34.84	0.000	0.000
					B	4.724	12.199		72.09		
					C	3.014	31.999		34.84		
T5 80-60	70.00	1.24	26	153.365	A	7.215	66.342	26.742	36.36	0.000	0.000
					B	10.102	26.742		72.58		
					C	7.215	66.342		36.36		
T6 60-40	50.00	1.126	23	194.112	A	10.386	67.837	28.237	36.10	0.000	0.000
					B	13.351	28.237		67.90		
					C	10.386	67.837		36.10		
T7 40-20	30.00	1	21	234.112	A	12.071	67.837	28.237	35.34	0.000	0.000
					B	14.750	28.237		65.69		
					C	12.071	67.837		35.34		
T8 20-0	10.00	1	21	275.108	A	15.025	50.028	30.228	46.47	0.000	0.000
					B	16.275	30.228		65.00		
					C	15.025	50.028		46.47		

Tower Pressure - With Ice

$G_H = 1.140$

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 137-130	133.50	1.491	23	29.458	A	0.000	7.035	2.917	41.46	0.000	0.000
					B	0.000	7.035		41.46		
					C	0.000	20.305		14.36		
T2 130-110	120.00	1.446	23	90.000	A	0.000	65.631	10.001	15.24	0.000	0.000
					B	0.000	23.097		43.30		
					C	0.000	65.005		15.38		
T3 110-90	100.00	1.373	21	100.417	A	0.000	75.728	10.834	14.31	0.000	0.000
					B	0.000	26.096		41.52		
					C	0.000	75.728		14.31		
T4 90-80	85.00	1.31	20	64.187	A	2.723	48.182	18.382	36.11	0.000	0.000
					B	5.983	18.382		75.44		
					C	2.723	48.182		36.11		
T5 80-60	70.00	1.24	19	161.100	A	7.292	101.817	42.217	38.69	0.000	0.000
					B	12.796	42.217		76.74		
					C	7.292	101.817		38.69		
T6 60-40	50.00	1.126	18	202.146	A	10.864	103.910	44.310	38.61	0.000	0.000
					B	16.318	44.310		73.09		
					C	10.864	103.910		38.61		
T7 40-20	30.00	1	16	242.146	A	13.100	103.910	44.310	37.87	0.000	0.000
					B	18.028	44.310		71.08		
					C	13.100	103.910		37.87		
T8 20-0	10.00	1	16	283.662	A	17.593	77.144	47.344	49.97	0.000	0.000
					B	19.892	47.344		70.42		
					C	17.593	77.144		49.97		

Tower Forces - No Ice - Wind Normal (180)

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 137-130	0.07	0.26	A	0.122	2.878	0.578	1	1	2.030	0.62	88.39	C
			B	0.122	2.878	0.578	1	1	2.030			
			C	0.458	1.96	0.677	1	1	8.961			
T2 130-110	0.44	1.18	A	0.497	1.904	0.696	1	1	30.571	1.99	99.43	A
			B	0.145	2.791	0.581	1	1	7.420			
			C	0.492	1.911	0.693	1	1	30.139			
T3 110-90	0.83	1.58	A	0.521	1.875	0.708	1	1	36.420	2.21	110.72	C
			B	0.153	2.76	0.582	1	1	8.806			
			C	0.521	1.875	0.708	1	1	36.420			
T4 90-80	0.48	0.85	A	0.573	1.823	0.737	1	1	26.612	1.50	150.24	C
			B	0.277	2.359	0.609	1	1	12.154			
			C	0.573	1.823	0.737	1	1	26.612			
T5 80-60	0.97	2.14	A	0.48	1.928	0.687	1	1	52.813	2.98	149.13	C
			B	0.24	2.467	0.599	1	1	26.132			
			C	0.48	1.928	0.687	1	1	52.813			
T6 60-40	0.97	2.67	A	0.403	2.058	0.653	1	1	54.671	2.99	149.70	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			B	0.214	2.549	0.593	1	1	30.107			
			C	0.403	2.058	0.653	1	1	54.671			
T7 40-20	0.97	2.74	A	0.341	2.192	0.629	1	1	54.769	2.84	141.84	C
			B	0.184	2.652	0.587	1	1	31.330			
			C	0.341	2.192	0.629	1	1	54.769			
T8 20-0	0.48	4.30	A	0.236	2.479	0.599	1	1	44.968	2.63	131.70	C
			B	0.169	2.703	0.585	1	1	33.946			
			C	0.236	2.479	0.599	1	1	44.968			
Sum Weight:	5.22	15.71						OTM	1140.34 kip-ft	17.77		

Tower Forces - No Ice - Wind 60 (0)

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 137-130	0.07	0.26	A	0.122	2.878	0.578	0.8	1	2.030	0.62	88.39	C
			B	0.122	2.878	0.578	0.8	1	2.030			
			C	0.458	1.96	0.677	0.8	1	8.961			
T2 130-110	0.44	1.18	A	0.497	1.904	0.696	0.8	1	30.571	1.99	99.43	A
			B	0.145	2.791	0.581	0.8	1	7.420			
			C	0.492	1.911	0.693	0.8	1	30.139			
T3 110-90	0.83	1.58	A	0.521	1.875	0.708	0.8	1	36.420	2.21	110.72	C
			B	0.153	2.76	0.582	0.8	1	8.806			
			C	0.521	1.875	0.708	0.8	1	36.420			
T4 90-80	0.48	0.85	A	0.573	1.823	0.737	0.8	1	26.009	1.47	146.84	C
			B	0.277	2.359	0.609	0.8	1	11.209			
			C	0.573	1.823	0.737	0.8	1	26.009			
T5 80-60	0.97	2.14	A	0.48	1.928	0.687	0.8	1	51.370	2.90	145.06	C
			B	0.24	2.467	0.599	0.8	1	24.111			
			C	0.48	1.928	0.687	0.8	1	51.370			
T6 60-40	0.97	2.67	A	0.403	2.058	0.653	0.8	1	52.594	2.88	144.02	C
			B	0.214	2.549	0.593	0.8	1	27.437			
			C	0.403	2.058	0.653	0.8	1	52.594			
T7 40-20	0.97	2.74	A	0.341	2.192	0.629	0.8	1	52.354	2.71	135.59	C
			B	0.184	2.652	0.587	0.8	1	28.380			
			C	0.341	2.192	0.629	0.8	1	52.354			
T8 20-0	0.48	4.30	A	0.236	2.479	0.599	0.8	1	41.963	2.46	122.90	C
			B	0.169	2.703	0.585	0.8	1	30.691			
			C	0.236	2.479	0.599	0.8	1	41.963			
Sum Weight:	5.22	15.71						OTM	1120.54 kip-ft	17.24		

Tower Forces - No Ice - Wind 90

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 137-130	0.07	0.26	A	0.122	2.878	0.578	0.85	1	2.030	0.62	88.39	C
			B	0.122	2.878	0.578	0.85	1	2.030			
			C	0.458	1.96	0.677	0.85	1	8.961			
T2 130-110	0.44	1.18	A	0.497	1.904	0.696	0.85	1	30.571	1.99	99.43	A
			B	0.145	2.791	0.581	0.85	1	7.420			
			C	0.492	1.911	0.693	0.85	1	30.139			
T3 110-90	0.83	1.58	A	0.521	1.875	0.708	0.85	1	36.420	2.21	110.72	C
			B	0.153	2.76	0.582	0.85	1	8.806			
			C	0.521	1.875	0.708	0.85	1	36.420			
T4 90-80	0.48	0.85	A	0.573	1.823	0.737	0.85	1	26.160	1.48	147.69	C
			B	0.277	2.359	0.609	0.85	1	11.446			
			C	0.573	1.823	0.737	0.85	1	26.160			
T5 80-60	0.97	2.14	A	0.48	1.928	0.687	0.85	1	51.730	2.92	146.08	C
			B	0.24	2.467	0.599	0.85	1	24.617			
			C	0.48	1.928	0.687	0.85	1	51.730			
T6 60-40	0.97	2.67	A	0.403	2.058	0.653	0.85	1	53.113	2.91	145.44	C
			B	0.214	2.549	0.593	0.85	1	28.104			
			C	0.403	2.058	0.653	0.85	1	53.113			
T7 40-20	0.97	2.74	A	0.341	2.192	0.629	0.85	1	52.958	2.74	137.15	C
			B	0.184	2.652	0.587	0.85	1	29.118			
			C	0.341	2.192	0.629	0.85	1	52.958			
T8 20-0	0.48	4.30	A	0.236	2.479	0.599	0.85	1	42.714	2.50	125.10	C
			B	0.169	2.703	0.585	0.85	1	31.504			
			C	0.236	2.479	0.599	0.85	1	42.714			
Sum Weight:	5.22	15.71						OTM	1125.49 kip-ft	17.37		

Tower Forces - With Ice - Wind Normal (180)

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 137-130	0.16	0.35	A	0.239	2.471	0.599	1	1	4.215	0.77	110.71	C
			B	0.239	2.471	0.599	1	1	4.215			
			C	0.689	1.776	0.812	1	1	16.493			
T2 130-110	1.09	1.49	A	0.729	1.781	0.841	1	1	55.209	2.52	126.16	A
			B	0.257	2.418	0.604	1	1	13.941			
			C	0.722	1.779	0.836	1	1	54.348			
T3 110-90	2.06	1.94	A	0.754	1.789	0.86	1	1	65.130	2.84	141.96	C
			B	0.26	2.408	0.604	1	1	15.773			
			C	0.754	1.789	0.86	1	1	65.130			
T4 90-80	1.22	1.55	A	0.793	1.811	0.891	1	1	45.643	1.92	192.26	C
			B	0.38	2.106	0.643	1	1	17.812			
			C	0.793	1.811	0.891	1	1	45.643			
T5 80-60	2.45	3.79	A	0.677	1.776	0.804	1	1	89.147	3.48	174.22	C
			B	0.341	2.192	0.629	1	1	39.370			
			C	0.677	1.776	0.804	1	1	89.147			
T6 60-40	2.45	4.47	A	0.568	1.828	0.734	1	1	87.176	3.18	159.21	C
			B	0.3	2.296	0.616	1	1	43.608			
			C	0.568	1.828	0.734	1	1	87.176			
T7 40-20	2.45	4.58	A	0.483	1.923	0.689	1	1	84.704	2.89	144.54	C
			B	0.257	2.415	0.604	1	1	44.782			
			C	0.483	1.923	0.689	1	1	84.704			

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
T8 20-0	1.22	6.27	A	0.334	2.21	0.627	1	1	65.953	2.59	129.33	C
			B	0.237	2.477	0.599	1	1	48.234			
			C	0.334	2.21	0.627	1	1	65.953			
Sum Weight:	13.11	24.44						OTM	1369.29 kip-ft	20.21		

Tower Forces - With Ice - Wind 60 (0)

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 137-130	0.16	0.35	A	0.239	2.471	0.599	0.8	1	4.215	0.77	110.71	C
			B	0.239	2.471	0.599	0.8	1	4.215			
			C	0.689	1.776	0.812	0.8	1	16.493			
T2 130-110	1.09	1.49	A	0.729	1.781	0.841	0.8	1	55.209	2.52	126.16	A
			B	0.257	2.418	0.604	0.8	1	13.941			
			C	0.722	1.779	0.836	0.8	1	54.348			
T3 110-90	2.06	1.94	A	0.754	1.789	0.86	0.8	1	65.130	2.84	141.96	C
			B	0.26	2.408	0.604	0.8	1	15.773			
			C	0.754	1.789	0.86	0.8	1	65.130			
T4 90-80	1.22	1.55	A	0.793	1.811	0.891	0.8	1	45.098	1.90	189.96	C
			B	0.38	2.106	0.643	0.8	1	16.615			
			C	0.793	1.811	0.891	0.8	1	45.098			
T5 80-60	2.45	3.79	A	0.677	1.776	0.804	0.8	1	87.688	3.43	171.37	C
			B	0.341	2.192	0.629	0.8	1	36.811			
			C	0.677	1.776	0.804	0.8	1	87.688			
T6 60-40	2.45	4.47	A	0.568	1.828	0.734	0.8	1	85.004	3.10	155.24	C
			B	0.3	2.296	0.616	0.8	1	40.344			
			C	0.568	1.828	0.734	0.8	1	85.004			
T7 40-20	2.45	4.58	A	0.483	1.923	0.689	0.8	1	82.083	2.80	140.07	C
			B	0.257	2.415	0.604	0.8	1	41.177			
			C	0.483	1.923	0.689	0.8	1	82.083			
T8 20-0	1.22	6.27	A	0.334	2.21	0.627	0.8	1	62.434	2.45	122.43	C
			B	0.237	2.477	0.599	0.8	1	44.256			
			C	0.334	2.21	0.627	0.8	1	62.434			
Sum Weight:	13.11	24.44						OTM	1355.32 kip-ft	19.82		

Tower Forces - With Ice - Wind 90

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 137-130	0.16	0.35	A	0.239	2.471	0.599	0.85	1	4.215	0.77	110.71	C
			B	0.239	2.471	0.599	0.85	1	4.215			
			C	0.689	1.776	0.812	0.85	1	16.493			
T2 130-110	1.09	1.49	A	0.729	1.781	0.841	0.85	1	55.209	2.52	126.16	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
			B	0.257	2.418	0.604	0.85	1	13.941			
			C	0.722	1.779	0.836	0.85	1	54.348			
T3 110-90	2.06	1.94	A	0.754	1.789	0.86	0.85	1	65.130	2.84	141.96	C
			B	0.26	2.408	0.604	0.85	1	15.773			
			C	0.754	1.789	0.86	0.85	1	65.130			
T4 90-80	1.22	1.55	A	0.793	1.811	0.891	0.85	1	45.234	1.91	190.54	C
			B	0.38	2.106	0.643	0.85	1	16.915			
			C	0.793	1.811	0.891	0.85	1	45.234			
T5 80-60	2.45	3.79	A	0.677	1.776	0.804	0.85	1	88.053	3.44	172.08	C
			B	0.341	2.192	0.629	0.85	1	37.451			
			C	0.677	1.776	0.804	0.85	1	88.053			
T6 60-40	2.45	4.47	A	0.568	1.828	0.734	0.85	1	85.547	3.12	156.23	C
			B	0.3	2.296	0.616	0.85	1	41.160			
			C	0.568	1.828	0.734	0.85	1	85.547			
T7 40-20	2.45	4.58	A	0.483	1.923	0.689	0.85	1	82.738	2.82	141.18	C
			B	0.257	2.415	0.604	0.85	1	42.078			
			C	0.483	1.923	0.689	0.85	1	82.738			
T8 20-0	1.22	6.27	A	0.334	2.21	0.627	0.85	1	63.314	2.48	124.15	C
			B	0.237	2.477	0.599	0.85	1	45.250			
			C	0.334	2.21	0.627	0.85	1	63.314			
Sum Weight:	13.11	24.44						OTM	1358.81 kip-ft	19.92		

Discrete Forces - No Ice

Section Elevation ft	Add Weight K	z ft	K_z	q_z psf	G_H	$C_A A_C$ ft²	t_z in	F_C K
137	0.00	137.00	1.502	31	1.140	5.78		0.21
137	0.00	137.00	1.502	31	1.140	5.78		0.21
137	0.00	137.00	1.502	31	1.140	5.78		0.21
127	0.11	127.00	1.470	30	1.140	18.54		0.64
127	0.11	127.00	1.470	30	1.140	18.54		0.64
127	0.11	127.00	1.470	30	1.140	18.54		0.64
117	0.00	117.00	1.436	30	1.140	5.81		0.20
117	0.00	117.00	1.436	30	1.140	5.81		0.20
117	0.00	117.00	1.436	30	1.140	5.81		0.20
107	0.00	107.00	1.399	29	1.140	9.56		0.32
107	0.00	107.00	1.399	29	1.140	9.56		0.32
107	0.00	107.00	1.399	29	1.140	9.56		0.32
97	0.00	97.00	1.361	28	1.140	5.58		0.18
97	0.00	97.00	1.361	28	1.140	5.58		0.18
97	0.00	97.00	1.361	28	1.140	5.58		0.18
137	1.30	137.00	1.502	31	1.140	15.70		0.56
127	0.47	127.00	1.470	30	1.140	13.60		0.47
127	0.47	127.00	1.470	30	1.140	13.60		0.47
127	0.47	127.00	1.470	30	1.140	13.60		0.47
117	0.47	117.00	1.436	30	1.140	13.60		0.46
117	0.47	117.00	1.436	30	1.140	13.60		0.46
117	0.47	117.00	1.436	30	1.140	13.60		0.46
107	0.47	107.00	1.399	29	1.140	13.60		0.45
107	0.47	107.00	1.399	29	1.140	13.60		0.45
107	0.47	107.00	1.399	29	1.140	13.60		0.45
97	0.22	97.00	1.361	28	1.140	8.00		0.26

Section Elevation ft	Add Weight K	z ft	K_z	q_z psf	G_H	C_AA_C ft²	t_z in	F_C K
97	0.22	97.00	1.361	28	1.140	8.00		0.26
97	0.22	97.00	1.361	28	1.140	8.00		0.26
Sum Weight:	6.49					OTM	1189.98 kip-ft	10.10

Discrete Forces - With Ice

Section Elevation ft	Add Weight K	z ft	K_z	q_z psf	G_H	C_AA_C ft²	t_z in	F_C K
137	0.00	137.00	1.502	23	1.140	6.83	0.5000	0.18
137	0.00	137.00	1.502	23	1.140	6.83	0.5000	0.18
137	0.00	137.00	1.502	23	1.140	6.83	0.5000	0.18
127	0.13	127.00	1.470	23	1.140	20.22	0.5000	0.53
127	0.13	127.00	1.470	23	1.140	20.22	0.5000	0.53
127	0.13	127.00	1.470	23	1.140	20.22	0.5000	0.53
117	0.00	117.00	1.436	22	1.140	6.53	0.5000	0.17
117	0.00	117.00	1.436	22	1.140	6.53	0.5000	0.17
117	0.00	117.00	1.436	22	1.140	6.53	0.5000	0.17
107	0.00	107.00	1.399	22	1.140	11.15	0.5000	0.28
107	0.00	107.00	1.399	22	1.140	11.15	0.5000	0.28
107	0.00	107.00	1.399	22	1.140	11.15	0.5000	0.28
97	0.00	97.00	1.361	21	1.140	6.44	0.5000	0.16
97	0.00	97.00	1.361	21	1.140	6.44	0.5000	0.16
97	0.00	97.00	1.361	21	1.140	6.44	0.5000	0.16
137	1.76	137.00	1.502	23	1.140	20.10	0.5000	0.54
127	0.60	127.00	1.470	23	1.140	18.40	0.5000	0.48
127	0.60	127.00	1.470	23	1.140	18.40	0.5000	0.48
127	0.60	127.00	1.470	23	1.140	18.40	0.5000	0.48
117	0.60	117.00	1.436	22	1.140	18.40	0.5000	0.47
117	0.60	117.00	1.436	22	1.140	18.40	0.5000	0.47
117	0.60	117.00	1.436	22	1.140	18.40	0.5000	0.47
107	0.60	107.00	1.399	22	1.140	18.40	0.5000	0.46
107	0.60	107.00	1.399	22	1.140	18.40	0.5000	0.46
107	0.60	107.00	1.399	22	1.140	18.40	0.5000	0.46
97	0.30	97.00	1.361	21	1.140	12.30	0.5000	0.30
97	0.30	97.00	1.361	21	1.140	12.30	0.5000	0.30
97	0.30	97.00	1.361	21	1.140	12.30	0.5000	0.30
Sum Weight:	8.50					OTM	1122.37 kip-ft	9.57

Force Totals

Load Case	Sum of Forces K	Total Weight K	Sum of Torques kip-ft	Sum of Offset Weight Overturning Moments, M_x kip-ft	Sum of Offset Weight Overturning Moments, M_z kip-ft	Sum of Wind Overturning Moments kip-ft
Leg Weight		11.19				
Bracing Weight		4.52				
Total Member Self-Weight		15.71				
Wind Normal	27.88	27.42	0.00	0.00	0.00	2330.32
Wind 60	27.35	27.42	0.00	0.00	0.00	2310.52

Load Case	Sum of Forces K	Total Weight K	Sum of Torques kip-ft	Sum of Offset Weight Overturning Moments, M_x kip-ft	Sum of Offset Weight Overturning Moments, M_z kip-ft	Sum of Wind Overturning Moments kip-ft
Wind 90	27.48	27.42	0.00	0.00	0.00	2315.47
Member Ice		8.73				
Wind Normal - Ice	29.78	46.06	0.00	0.00	0.00	2491.66
Wind 60 - Ice	29.39	46.06	0.00	0.00	0.00	2477.69
Wind 90 - Ice	29.49	46.06	0.00	0.00	0.00	2481.18

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind Normal
3	Dead+Wind 60
4	Dead+Wind 90
5	Dead+Ice+Temp
6	Dead+Wind Normal+Ice+Temp
7	Dead+Wind 60+Ice+Temp
8	Dead+Wind 90+Ice+Temp

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	137 - 130	Leg	Max Tension	3	2.48	0.00	0.02
			Max. Compression	6	-3.75	0.00	0.06
			Max. Mx	8	1.13	-0.06	0.00
			Max. My	7	-0.06	0.00	-0.06
			Max. Vy	8	0.71	-0.05	-0.00
			Max. Vx	6	-0.78	0.00	0.06
		Diagonal	Max Tension	8	0.77	0.00	0.00
			Max. Compression	8	-0.78	0.00	0.00
		Top Girt	Max Tension	2	0.20	0.00	0.00
			Max. Compression	3	-0.21	0.00	0.00
		Bottom Girt	Max Tension	3	0.22	0.00	0.00
			Max. Compression	2	-0.22	0.00	0.00
T2	130 - 110	Leg	Max Tension	3	33.49	0.21	0.00
			Max. Compression	6	-38.78	0.13	0.00
			Max. Mx	3	5.24	0.28	0.00
			Max. My	4	-1.20	-0.00	-0.30
			Max. Vy	6	-4.14	0.13	0.00
			Max. Vx	8	-1.72	0.01	0.06
		Diagonal	Max Tension	8	3.37	0.00	0.00
			Max. Compression	8	-3.41	0.00	0.00
		Top Girt	Max Tension	3	0.10	0.00	0.00
			Max. Compression	2	-0.10	0.00	0.00
			Max. Mx	5	-0.00	0.01	0.00
			Max. Vy	5	0.01	0.00	0.00
		Bottom Girt	Max Tension	7	0.45	0.00	0.00
			Max. Compression	2	-0.42	0.00	0.00
			Max. Mx	5	0.02	0.01	0.00
			Max. Vy	5	-0.01	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T3	110 - 90	Leg	Max Tension	7	84.52	-0.00	0.00
			Max. Compression	6	-94.47	0.47	0.00
			Max. Mx	6	-41.46	0.47	0.00
			Max. My	8	-2.96	0.01	0.20
			Max. Vy	6	-4.14	0.47	0.00
			Max. Vx	8	-1.72	0.01	0.20
		Diagonal	Max Tension	8	5.15	0.00	0.00
			Max. Compression	8	-5.17	0.00	0.00
			Max. Mx	6	4.26	-0.01	0.00
			Max. Vy	6	0.01	-0.01	0.00
		Top Girt	Max Tension	3	0.09	0.00	0.00
			Max. Compression	2	-0.06	0.00	0.00
			Max. Mx	5	0.02	0.01	0.00
			Max. Vy	5	-0.01	0.00	0.00
		Bottom Girt	Max Tension	7	2.14	0.00	0.00
			Max. Compression	6	-1.90	0.00	0.00
			Max. Mx	5	0.12	0.01	0.00
			Max. Vy	5	-0.01	0.00	0.00
T4	90 - 80	Leg	Max Tension	7	91.10	-0.42	0.00
			Max. Compression	6	-100.53	6.08	0.00
			Max. Mx	7	90.75	-6.56	0.00
			Max. My	8	-5.14	-0.26	9.30
			Max. Vy	7	0.94	-6.56	0.00
			Max. Vx	8	-1.24	-0.26	9.30
		Diagonal	Max Tension	8	6.11	-0.00	-0.09
			Max. Compression	8	-6.86	0.00	0.00
			Max. Mx	6	-6.65	0.03	0.09
			Max. My	7	5.74	-0.00	-0.10
			Max. Vy	6	-0.01	0.00	0.00
			Max. Vx	7	-0.02	-0.00	-0.10
T5	80 - 60	Leg	Max Tension.	7	122.73	-5.30	0.00
			Max. Compression	6	-137.24	6.15	0.00
			Max. Mx	6	-122.67	6.59	0.00
			Max. My	8	-6.74	-0.38	9.63
			Max. Vy	6	-0.50	6.59	0.00
			Max. Vx	8	0.75	-0.38	9.63
		Diagonal	Max Tension	8	5.62	0.00	0.00
			Max. Compression	8	-5.89	0.00	0.00
			Max. Mx	7	4.32	-0.01	-0.07
			Max. My	6	5.55	0.00	-0.09
			Max. Vx	6	0.02	0.00	-0.09
T6	60 - 40	Leg	Max Tension	7	146.85	-4.91	0.00
			Max. Compression	6	-166.49	5.73	0.00
			Max. Mx	6	-152.70	5.88	0.00
			Max. My	8	-8.51	-0.10	5.38
			Max. Vy	7	0.35	-5.63	0.00
			Max. Vx	8	-0.30	0.04	5.22
		Diagonal	Max Tension	8	4.83	0.00	0.00
			Max. Compression	8	-5.16	0.00	0.00
			Max. Mx	7	4.21	-0.01	-0.09
			Max. My	6	4.16	0.00	-0.10
			Max. Vx	6	0.03	0.00	-0.09
T7	40 - 20	Leg	Max Tension	7	167.43	-4.35	0.00
			Max. Compression	6	-192.01	6.65	0.00
			Max. Mx	6	-192.01	6.65	0.00
			Max. My	8	-11.43	-0.19	5.69
			Max. Vy	6	-0.50	6.65	0.00
			Max. Vx	8	0.38	-0.21	5.42
		Diagonal	Max Tension	8	4.69	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T8	20 - 0	Leg	Max. Compression	8	-5.08	0.00	0.00
			Max. Mx	7	4.20	-0.01	-0.09
			Max. My	6	3.73	0.01	-0.09
			Max. Vx	6	0.03	0.01	-0.09
			Max Tension	7	185.17	-4.53	0.00
			Max. Compression	6	-214.97	1.12	0.00
			Max. Mx	6	-204.39	5.74	0.00
			Max. My	8	-14.05	-0.46	8.34
			Max. Vy	7	-0.58	-4.53	0.00
			Max. Vx	8	1.00	-0.46	8.01
		Diagonal	Max Tension	7	5.69	0.00	0.00
			Max. Compression	6	-6.41	0.00	0.00
			Max. Mx	6	3.43	-0.03	-0.13
			Max. My	6	3.43	0.02	-0.13
			Max. Vx	6	0.04	0.02	-0.13

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	7	118.33	9.65	-5.50
	Max. H_x	7	118.33	9.65	-5.50
	Max. H_z	8	-163.27	-13.67	7.90
	Min. Vert	8	-163.27	-13.67	7.90
	Min. H_x	8	-163.27	-13.67	7.90
	Min. H_z	7	118.33	9.65	-5.50
Leg B	Max. Vert	8	193.97	-15.86	-9.20
	Max. H_x	6	-88.21	7.49	4.32
	Max. H_z	6	-88.21	7.49	4.32
	Min. Vert	6	-88.21	7.49	4.32
	Min. H_x	8	193.97	-15.86	-9.20
	Min. H_z	8	193.97	-15.86	-9.20
Leg A	Max. Vert	6	222.47	0.00	21.13
	Max. H_x	8	15.35	0.04	1.29
	Max. H_z	6	222.47	0.00	21.13
	Min. Vert	7	-190.61	0.00	-18.38
	Min. H_x	6	222.47	0.00	21.13
	Min. H_z	7	-190.61	0.00	-18.38

Tower Mast Reaction Summary

Load Combination	Torsion kip-ft	Shear K	Vertical K	Overturning kip-ft
Dead Only	0.00	0.00	27.42	0.00
Dead+Wind Normal	0.00	27.88	27.42	2342.36
Dead+Wind 60	0.00	27.35	27.42	2322.54
Dead+Wind 90	0.02	27.48	27.42	2327.49
Dead+Ice+Temp	0.00	0.00	46.06	0.00
Dead+Wind Normal+Ice+Temp	0.00	29.78	46.06	2511.16
Dead+Wind 60+Ice+Temp	0.00	29.39	46.06	2497.19
Dead+Wind 90+Ice+Temp	0.02	29.49	46.06	2500.67

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-27.42	0.00	0.00	27.42	0.00	0.000%
2	0.00	-27.42	-27.88	0.00	27.42	27.88	0.000%
3	0.00	-27.42	27.35	0.00	27.42	-27.35	0.000%
4	27.48	-27.42	0.00	-27.48	27.42	0.00	0.000%
5	0.00	-46.06	0.00	0.00	46.06	0.00	0.000%
6	0.00	-46.06	-29.78	0.00	46.06	29.78	0.000%
7	0.00	-46.06	29.39	0.00	46.06	-29.39	0.000%
8	29.49	-46.06	0.00	-29.49	46.06	0.00	0.001%

Maximum Tower Deflections

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt deg	Twist deg
T1	137 - 130	16.504	7	1.0926	0.0001
T2	130 - 110	14.894	7	1.0880	0.0001
T3	110 - 90	10.375	7	1.0066	0.0001
T4	90 - 80	6.450	6	0.7825	0.0001
T5	80 - 60	4.874	6	0.6247	0.0002
T6	60 - 40	2.577	6	0.4081	0.0001
T7	40 - 20	1.096	6	0.2546	0.0001
T8	20 - 0	0.262	6	0.1076	0.0000

Critical Deflections and Radius of Curvature

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt deg	Twist deg	Radius of Curvature ft
137.00	Allgon 7184.05	7	16.504	1.0926	0.0001	Inf
137.00	Allgon 7184.05	7	16.504	1.0926	0.0001	Inf
137.00	Allgon 7184.05	7	16.504	1.0926	0.0001	Inf
137.00	13' Low Profile Platform	7	16.504	1.0926	0.0001	Inf
127.00	ALP 9212	7	14.203	1.0832	0.0001	Inf
127.00	ALP 9212	7	14.203	1.0832	0.0001	Inf
127.00	ALP 9212	7	14.203	1.0832	0.0001	Inf
127.00	12' T-Frame	7	14.203	1.0832	0.0001	Inf
127.00	12' T-Frame	7	14.203	1.0832	0.0001	Inf
127.00	12' T-Frame	7	14.203	1.0832	0.0001	Inf
117.00	EMS RR9017	7	11.921	1.0493	0.0001	12488
117.00	EMS RR9017	7	11.921	1.0493	0.0001	12488
117.00	EMS RR9017	7	11.921	1.0493	0.0001	12488
117.00	12' T-Frame	7	11.921	1.0493	0.0001	12488
117.00	12' T-Frame	7	11.921	1.0493	0.0001	12488
117.00	12' T-Frame	7	11.921	1.0493	0.0001	12488
107.00	DB844H90	7	9.734	0.9829	0.0001	6913
107.00	DB844H90	7	9.734	0.9829	0.0001	6913

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt deg	Twist deg	Radius of Curvature ft
107.00	DB844H90	7	9.734	0.9829	0.0001	6913
107.00	12'T-Frame	7	9.734	0.9829	0.0001	6913
107.00	12'T-Frame	7	9.734	0.9829	0.0001	6913
107.00	12'T-Frame	7	9.734	0.9829	0.0001	6913
97.00	Allgon 7250	6	7.721	0.8791	0.0001	5068
97.00	Allgon 7250	6	7.721	0.8791	0.0001	5068
97.00	Allgon 7250	6	7.721	0.8791	0.0001	5068
97.00	10' Lightweight T-Frame	6	7.721	0.8791	0.0001	5068
97.00	10' Lightweight T-Frame	6	7.721	0.8791	0.0001	5068
97.00	10' Lightweight T-Frame	6	7.721	0.8791	0.0001	5068

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	0.00000001
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000001

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	137 - 130	1 1/2	7.00	3.46	110.7	12.193	1.7672	-3.75	21.55	0.174
T2	130 - 110	2	20.00	2.48	59.5	22.802	3.1416	-38.78	71.63	0.541
T3	110 - 90	2 1/4	20.00	2.49	53.1	23.858	3.9761	-94.47	94.86	0.996
T4	90 - 80	1.25 (10')	10.02	10.02	45.4	25.051	3.6816	-100.53	92.23	1.090
T5	80 - 60	1.5	20.03	10.02	37.8	26.132	5.3014	-137.24	138.54	0.991
T6	60 - 40	1.75	20.03	10.02	32.4	26.848	7.2158	-166.50	193.73	0.859
T7	40 - 20	1.75	20.03	10.02	32.4	26.848	7.2158	-192.01	193.73	0.991
T8	20 - 0	2	20.03	10.02	28.4	27.351	9.4248	-214.58	257.78	0.832

Leg Bending Design Data (Compression):

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

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
T1	137 - 130	1 1/2	0.06	-2.023	37.500	0.054	0.00	0.000	37.500	0.000
T2	130 - 110	2	0.22	-3.288	37.500	0.088	0.00	0.000	37.500	0.000
T3	110 - 90	2 1/4	0.47	-5.061	37.500	0.135	0.00	0.000	37.500	0.000
T4	90 - 80	1.25 (10')	6.08	-6.213	37.500	0.166	0.00	0.000	37.500	0.000
T5	80 - 60	1.5	6.15	-4.428	37.500	0.118	0.00	0.000	37.500	0.000
T6	60 - 40	1.75	5.73	-3.074	37.500	0.082	0.00	0.000	37.500	0.000
T7	40 - 20	1.75	6.65	-3.569	37.500	0.095	0.00	0.000	37.500	0.000
T8	20 - 0	2	3.62	-1.508	37.500	0.040	0.00	0.000	37.500	0.000

Leg Interaction Design Data (Compression):

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	137 - 130	1 1/2	0.174	0.054	0.000	0.228 ✓	1.333	H1-3 ✓
T2	130 - 110	2	0.541	0.088	0.000	0.629 ✓	1.333	H1-3 ✓
T3	110 - 90	2 1/4	0.996	0.135	0.000	1.131 ✓	1.333	H1-3 ✓
T4	90 - 80	1.25 (10')	1.090	0.166	0.000	1.256 ✓	1.333	H1-3 ✓
T5	80 - 60	1.5	0.991	0.118	0.000	1.109 ✓	1.333	H1-3 ✓
T6	60 - 40	1.75	0.859	0.082	0.000	0.941 ✓	1.333	H1-3 ✓
T7	40 - 20	1.75	0.991	0.095	0.000	1.086 ✓	1.333	H1-3 ✓
T8	20 - 0	2	0.832	0.040	0.000	0.873 ✓	1.333	H1-3 ✓

Truss-Leg Diagonal Data:

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V K	Allow. V_a K	Stress Ratio
T4	90 - 80	0.5	1.48	121.0	10.133	0.1963	1.24	2.23	0.558 ✓
T5	80 - 60	0.5	1.47	120.0	10.279	0.1963	0.75	2.26	0.332 ✓
T6	60 - 40	0.5	1.46	119.0	10.423	0.1963	0.35	2.29	0.152 ✓
T7	40 - 20	0.5	1.46	119.0	10.423	0.1963	0.50	2.29	0.216 ✓
T8	20 - 0	0.625	1.45	94.4	13.671	0.3068	1.00	4.69	0.213 ✓

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	137 - 130	3/4	5.29	2.56	163.9	5.558	0.4418	-0.78	2.46	0.318 ✓
T2	130 - 110	7/8	5.11	2.48	135.9	8.089	0.6013	-3.41	4.86	0.701 ✓
T3	110 - 90	1	5.56	2.69	129.2	8.948	0.7854	-5.12	7.03	0.728 ✓
T4	90 - 80	L2 1/2x2 1/2x3/16	11.34	6.02	145.9	7.018	0.9020	-6.86	6.33	1.084 ✓
T5	80 - 60	L2 1/2x2 1/2x3/16	11.84	6.21	150.5	6.591	0.9020	-5.89	5.95	0.990 ✓
T6	60 - 40	L3x3x3/16	13.68	7.03	141.6	7.444	1.0900	-5.06	8.11	0.623 ✓
T7	40 - 20	L3x3x3/16	15.12	7.72	155.4	6.180	1.0900	-5.08	6.74	0.753 ✓
T8	20 - 0	L3x3x5/16	16.67	8.48	172.7	5.007	1.7800	-6.41	8.91	0.719 ✓

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	137 - 130	3/4	4.00	3.88	248.0	2.428	0.4418	-0.21	1.07	0.192 ✓
T2	130 - 110	KL/R 200 (C) - 4 7/8	4.00	3.84	210.4	3.373	0.6013	-0.10	2.03	0.050 ✓
T3	110 - 90	KL/R 200 (C) - 25 1	4.50	4.31	207.1	3.482	0.7854	-0.06	2.73	0.024 ✓

Bottom Girt Design Data (Compression):

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	137 - 130	3/4	4.00	3.88	248.0	2.428	0.4418	-0.22	1.07	0.204 ✓
T2	130 - 110	KL/R 200 (C) - 7 7/8	4.50	4.33	237.6	2.645	0.6013	-0.42	1.59	0.264 ✓
T3	110 - 90	1	5.00	4.81	231.0	2.799	0.7854	-1.90	2.20	0.864 ✓

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	137 - 130	1 1/2	7.00	3.46	110.7	30.000	1.7672	2.25	53.01	0.043
T2	130 - 110	2	20.00	2.48	59.5	30.000	3.1416	33.49	94.25	0.355
T3	110 - 90	2 1/4	20.00	2.49	53.1	30.000	3.9761	84.51	119.28	0.708
T4	90 - 80	1.25 (10')	10.02	10.02	45.4	30.000	3.6816	90.93	110.45	0.823
T5	80 - 60	1.5	20.03	10.02	37.8	30.000	5.3014	122.27	159.04	0.769
T6	60 - 40	1.75	20.03	10.02	32.4	30.000	7.2158	146.31	216.47	0.676
T7	40 - 20	1.75	20.03	10.02	32.4	30.000	7.2158	167.16	216.47	0.772
T8	20 - 0	2	20.03	10.02	28.4	30.000	9.4248	185.17	282.74	0.655

Leg Bending Design Data (Tension):

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
T1	137 - 130	1 1/2	0.05	1.875	37.500	0.050	0.00	0.000	37.500	0.000
T2	130 - 110	2	0.21	3.280	37.500	0.087	0.00	0.000	37.500	0.000
T3	110 - 90	2 1/4	0.42	4.479	37.500	0.119	0.00	0.000	37.500	0.000
T4	90 - 80	1.25 (10')	-6.56	6.704	37.500	0.179	0.00	0.000	37.500	0.000
T5	80 - 60	1.5	-6.24	4.491	37.500	0.120	0.00	0.000	37.500	0.000
T6	60 - 40	1.75	-5.63	3.018	37.500	0.080	0.00	0.000	37.500	0.000
T7	40 - 20	1.75	-6.04	3.239	37.500	0.086	0.00	0.000	37.500	0.000
T8	20 - 0	2	-4.53	1.887	37.500	0.050	0.00	0.000	37.500	0.000

Leg Interaction Design Data (Tension):

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	137 - 130	1 1/2	0.043	0.050	0.000	0.093 ✓	1.333	H2-1 ✓
T2	130 - 110	2	0.355	0.087	0.000	0.443 ✓	1.333	H2-1 ✓
T3	110 - 90	2 1/4	0.708	0.119	0.000	0.828 ✓	1.333	H2-1 ✓
T4	90 - 80	1.25 (10')	0.823	0.179	0.000	1.002 ✓	1.333	H2-1 ✓
T5	80 - 60	1.5	0.769	0.120	0.000	0.889 ✓	1.333	H2-1 ✓
T6	60 - 40	1.75	0.676	0.080	0.000	0.756 ✓	1.333	H2-1 ✓
T7	40 - 20	1.75	0.772	0.086	0.000	0.859 ✓	1.333	H2-1 ✓
T8	20 - 0	2	0.655	0.050	0.000	0.705 ✓	1.333	H2-1 ✓

Truss-Leg Diagonal Data:

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V K	Allow. V_a K	Stress Ratio
T4	90 - 80	0.5	1.48	121.0	10.133	0.1963	1.24	2.23	0.558 ✓
T5	80 - 60	0.5	1.47	120.0	10.279	0.1963	0.75	2.26	0.332 ✓
T6	60 - 40	0.5	1.46	119.0	10.423	0.1963	0.35	2.29	0.152 ✓
T7	40 - 20	0.5	1.46	119.0	10.423	0.1963	0.50	2.29	0.216 ✓
T8	20 - 0	0.625	1.45	94.4	13.671	0.3068	1.00	4.69	0.213 ✓

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	137 - 130	3/4	5.29	2.56	163.9	30.000	0.4418	0.77	13.25	0.058 ✓
T2	130 - 110	7/8	5.11	2.48	135.9	30.000	0.6013	3.37	18.04	0.187 ✓
T3	110 - 90	1	5.50	2.66	127.9	30.000	0.7854	5.15	23.56	0.218 ✓
T4	90 - 80	L2 1/2x2 1/2x3/16	11.34	6.02	92.8	21.600	0.6765	6.11	14.61	0.418 ✓
T5	80 - 60	L2 1/2x2 1/2x3/16	11.84	6.21	95.8	21.600	0.6765	5.62	14.61	0.385 ✓
T6	60 - 40	L3x3x3/16	13.02	6.73	86.0	21.600	0.8175	4.83	17.66	0.274 ✓
T7	40 - 20	L3x3x3/16	14.38	7.37	94.1	21.600	0.8175	4.69	17.66	0.266 ✓
T8	20 - 0	L3x3x5/16	16.67	8.48	110.3	21.600	1.3350	5.69	28.84	0.197 ✓

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	137 - 130	3/4	4.00	3.88	248.0	30.000	0.4418	0.20	13.25	0.015 ✓
T2	130 - 110	7/8	4.00	3.84	210.4	30.000	0.6013	0.10	18.04	0.006 ✓
T3	110 - 90	1	4.50	4.31	207.1	30.000	0.7854	0.09	23.56	0.004 ✓

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 $\frac{P}{P_a}$
		L/R > 200 (T) - 82								

Bottom Girt Design Data (Tension):

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	137 - 130	3/4	4.00	3.88	248.0	21.600	0.4418	0.22	9.54	0.023 ✓
T2	130 - 110	7/8	4.50	4.33	237.6	21.600	0.6013	0.45	12.99	0.035 ✓
T3	110 - 90	L/R > 200 (T) - 28 1	5.00	4.81	231.0	21.600	0.7854	2.14	16.96	0.126 ✓
		L/R > 200 (T) - 85								

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Controlling Element	% Capacity	Pass Fail
T1	137 - 130	Leg	1 1/2	3	17.1	Pass
		Diagonal	3/4	11	23.8	Pass
		Top Girt	3/4	4	14.4	Pass
		Bottom Girt	3/4	7	15.3	Pass
T2	130 - 110	Leg	2	24	47.2	Pass
		Diagonal	7/8	32	52.6	Pass
		Top Girt	7/8	25	3.7	Pass
		Bottom Girt	7/8	28	19.8	Pass
T3	110 - 90	Leg	2 1/4	81	84.8	Pass
		Diagonal	1	89	54.7	Pass
		Top Girt	1	82	1.8	Pass
		Bottom Girt	1	85	64.8	Pass
T4	90 - 80	Leg	1.25 (10')	138	94.2	Pass
		Diagonal	L2 1/2x2 1/2x3/16	141	81.4	Pass
T5	80 - 60	Leg	1.5	147	83.2	Pass
		Diagonal	L2 1/2x2 1/2x3/16	155	74.3	Pass
T6	60 - 40	Leg	1.75	162	70.6	Pass
		Diagonal	L3x3x3/16	164	46.7	Pass
T7	40 - 20	Leg	1.75	177	81.5	Pass
		Diagonal	L3x3x3/16	179	56.5	Pass
T8	20 - 0	Leg	2	192	65.5	Pass
		Diagonal	L3x3x5/16	196	54.0	Pass
					Summary	
				Leg	94.2	Pass
				Diagonal	81.4	Pass
				Top Girt	14.4	Pass
				Bottom Girt	64.8	Pass
				RATING =	94.2	Pass

RF Exposure Analysis for Proposed AT&T Wireless Antenna Facility

Site ID: 913-008-197

February 11, 2002

Prepared by AT&T Wireless Services, Inc.
Tarik Ouazzani RF Engineer

Table of Contents

1. Introduction

This report constitutes an RF exposure analysis for the proposed AT&T Wireless antenna facility to be located at *41 Manitock Hill Road.* This analysis uses site-specific engineering data to determine the predicted levels of radio frequency (RF) electromagnetic energy in the vicinity of the proposed facility and compares those levels with the Maximum Permissible Exposure (MPE) limits established by the Federal Communications Commission.

2. Site Data

Site Name: ***MANITOCK HILL***	
Number of simultaneously operating channels	16
Type of antenna	Allgon 7250.02
Power per channel (Watts ERP)	250 Watts
Height of antenna (feet AGL)	97 feet
Antenna Aperture Length	5.11 feet

3. RF Exposure Prediction

The following equations established by the FCC, in conjunction with the site data, were used to determine the levels of RF electromagnetic energy present in the vicinity of the proposed facility[1]:

$$PowerDensity = \frac{0.64 * N * EIRP(\theta)}{\pi * R^2} \ (mw/cm^2) \qquad \textit{Eq. 1-Far-field}$$

Where, ***N***= Number of channels, ***R***= distance in cm from the RC (Radiation Center) of antenna, and ***EIRP(θ)*** = The isotropic power expressed in milliwatts in the direction of prediction point.

$$PowerDensity = \frac{P_{in} / ch * N * 10^3}{2 * \pi * R * h * \alpha / 360} \ (mw/cm^2) \qquad \textit{Eq. 2-Near-field}$$

Where P_{in}/ch = Input power to antenna terminals in watts/ch, R = distance to center of radiation, h = aperture height in meters, α = 3 dB band-width of horizontal pattern.

[1] RF exposure is measured and predicted in terms of power density in units of milliwatts (mW), a thousandth of a watt, or microwatts (μ W), a millionth of a watt, per square centimeter (cm^2). Data comparing predictive analysis with on site measurements has demonstrated that power density can be effectively predicted at given locations in the vicinity of a wireless antenna facility.

4. FCC Guidelines for Evaluating the Environmental Effects of RF Radiation

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by a Second Memorandum Opinion and Order. These new rules represent a consensus of the federal agencies responsible for the protection of public health and the environment, including the Environmental Protection Agency (EPA), the Food and Drug Administration (FDA), the National Institute for Occupational Health and Safety (NIOSH), and the Occupational Safety and Health Administration (OSHA).

Under the laws that govern the delivery of wireless communications services in the United States, as amended by the Telecommunications Act of 1996, the FCC has exclusive jurisdiction over RF emissions from personal wireless antenna facilities, which include cellular, PCS, messaging and aviation sites. [2] Pursuant to its authority under federal law, the FCC has established rules to regulate the safety of emissions from these facilities.

5. Comparison with Standards

Exhibit A shows the levels of RF electromagnetic energy as one moves away from the antenna facility. As shown in Exhibit A, the maximum power density is 4.51 μ W/cm^2 which occurs at 110 feet from the antenna facility. The chart in exhibit A also shows that the power density is only 0.08 μ W/cm^2 at a distance of 4 feet. Table 1 below shows the Maximum Permissible Exposure (MPE) limits established by the FCC. There are different MPE limits for public/uncontrolled and occupational/controlled environments.

Table 1: Maximum Permissible Exposure limits for RF radiation

Frequency	*Public/Uncontrolled*	*Occupational/controlled*	*Maximum power density at Accessible location*
Cellular	580 μ W/cm^2	2,900 μ W/cm^2	4.51 μ W/cm^2
PCS	1000 μ W/cm^2	5,000 μ W/cm^2	

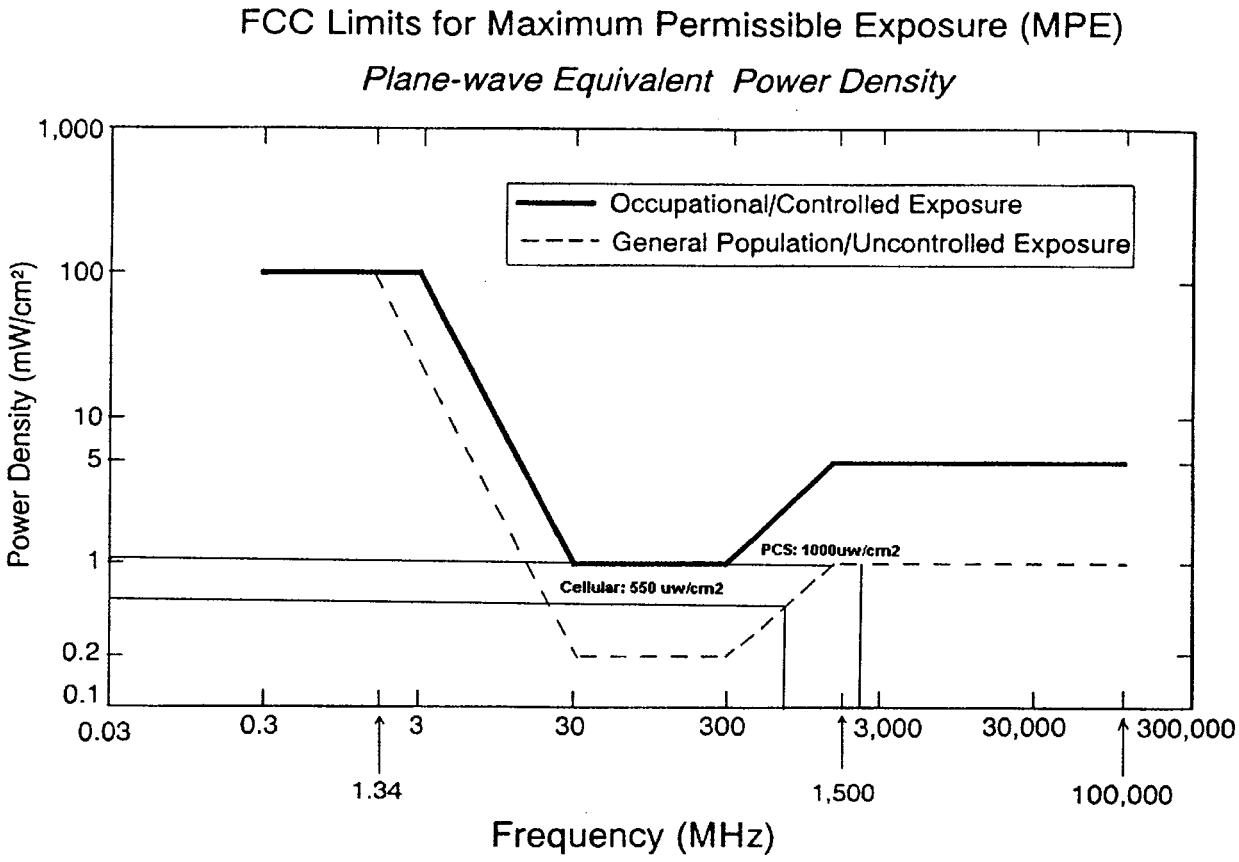
The maximum power density at the proposed facility represents only 0.45% of the public MPE limit.

6. Conclusion

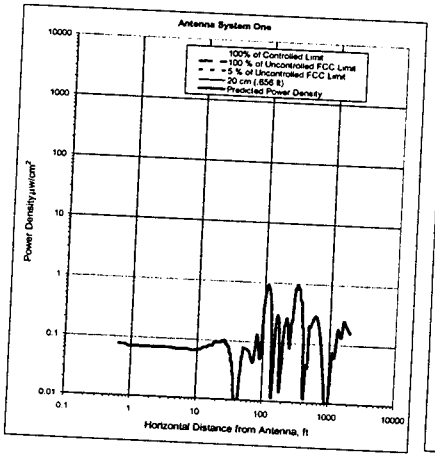
This analysis show that the maximum power density in accessible areas at this location is 4.51 μ W/cm^2, a level of RF energy that is well below the Maximum Permissible Exposure limit established by the FCC.

[2] 47 U.S. C. Section 332 (c) (7)(B)(iv) states that "[n]o State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's regulations concerning such emissions."

7. FCC Limits for Maximum Permissible Exposure



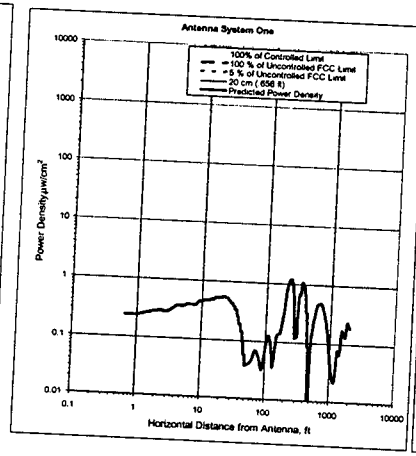
8. Exhibit A



Antenna System One

	units	Value
Frequency	MHz	1945
# of Channels	#	16
Max ERP/Ch	Watts	250
Max Pwr/Ch Into Ant.	Watts	5.597
BS Height (Center of Radiator)	feet	97
Calculation Point (above ground or roof surface)	feet	0
Antenna Model No.		Allgon 7750.07
Max Ant Gain	dBd	16.5
Down tilt	degrees	0
Miscellaneous Att.	dB	0
Height of aperture	feet	5.11
Ant HBW	degrees	65
Distance to Ant$_{location}$	feet	94.445
WOS?	Y/N?	n

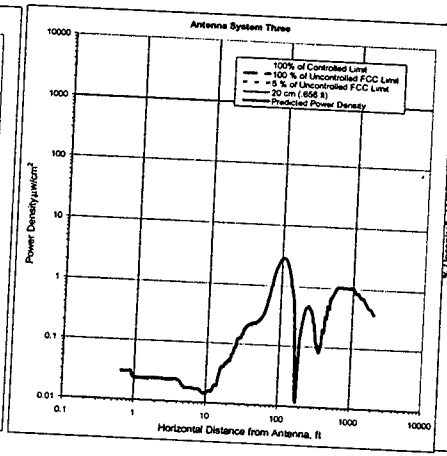
Ant System ONE Owner: AT&T
Sector: 3
Azimuth: 0/120/230



Antenna System Two

	units	Value
Frequency	MHz	1990
# of Channels	#	20
Max ERP/Ch	Watts	275
Max Pwr/Ch Into Ant.	Watts	10.948
BS Height (Center of Radiator)	feet	137
Calculation Point (above ground or roof surface)	feet	0
Antenna Model No.		Allgon 7184.15
Max Ant Gain	dBd	14
Down tilt	degrees	0
Miscellaneous Att.	dB	0
Height of aperture	feet	4
Ant HBW	degrees	90
Distance to Ant$_{location}$	feet	135
WOS?	Y/N?	n

Ant System TWO Owner: Sprint
Sector: 3
Azimuth 30/150/270



Number of Antenna Systems: 5

Meets FCC Controlled Limits for The Antennas Systems.

Meets FCC Uncontrolled Limits for The Antenna Systems.

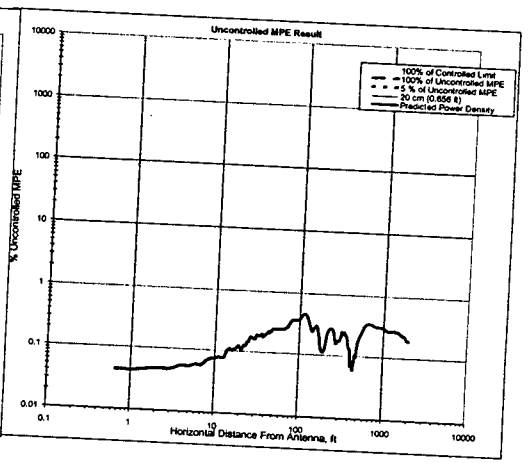
Meets 5% of FCC Uncontrolled Limits for The Antenna Systems.

No Further Maximum Permissible Exposure (MPE) Analysis Required.

	Power Density		@Horiz. Dist.
	µW/cm²	% of limit	feet
Maximum Power Density =	4.51	0.45	110.00
219.97 times lower than the MPE limit for uncontrolled environment			
Composite Power (ERP) =	25,500.00	Watts	

Site ID: 907-009-220
Site Name: Branford-Cherry Hill
Site Location: 41, Manitock Hill Road

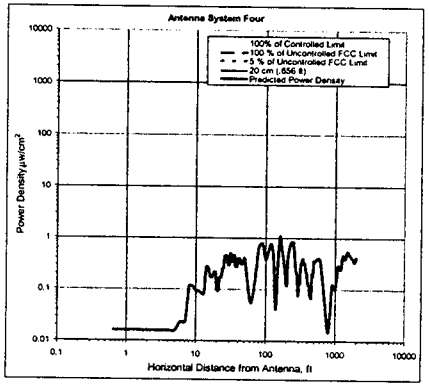
Performed By: Tarik Ouazzani
Contact Number: 201-755-2154
Date: 2/11/2002



Antenna System Three

	units	Value
Frequency	MHz	850
# of Channels	#	20
Max ERP/Ch	Watts	250
Max Pwr/Ch Into Ant.	Watts	15.774
BS Height (Center of Radiator)	feet	107
Calculation Point (above ground or roof surface)	feet	0
Antenna Model No.		DB844H90 XY
Max Ant Gain	dBd	12
Down tilt	degrees	0
Miscellaneous Att.	dB	0
Height of aperture	feet	4
Ant HBW	degrees	90
Distance to Ant$_{location}$	feet	105
WOS?	Y/N?	n

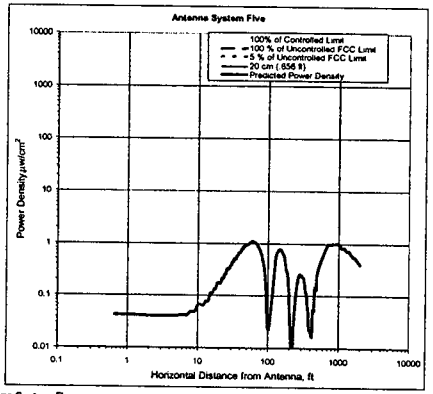
Ant System Three Owner: Verizon
Sector: 3
Azimuth 30/150/270



Antenna System Four

	units	Value
Frequency	MHz	1900
# of Channels	#	20
Max ERP/Ch	Watts	275
Max Pwr/Ch into Ant.	Watts	9.985
BS Height (Center of Radiator)	feet	117
Calculation Point (above ground or roof surface)	feet	0
Antenna Model No.		RR901702
Max Ant Gain	dBd	14.4
Down tilt	degrees	0
Miscellaneous Att.	dB	0
Height of aperture	feet	4.66
Ant HBW	degrees	90
Distance to Ant$_{bottom}$	feet	114.67
WOS?	Y/N?	n

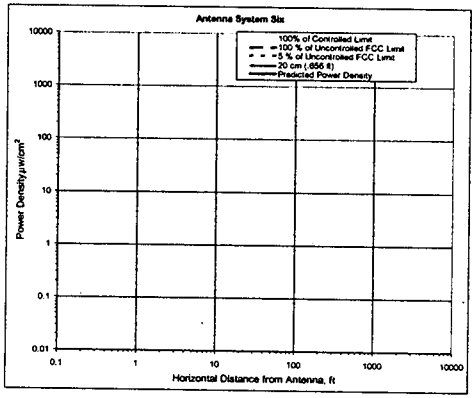
Ant System Four Owner: Voicestream
Sector: 3
Azimuth: 0/120/240



Antenna System Five

	units	Value
Frequency	MHz	850
# of Channels	#	20
Max ERP/Ch	Watts	275
Max Pwr/Ch Into Ant.	Watts	20.386
BS Height (Center of Radiator)	feet	127
Calculation Point (above ground or roof surface)	feet	0
Antenna Model No.		ALP9212
Max Ant Gain	dBd	11.3
Down tilt	degrees	0
Miscellaneous Att.	dB	0
Height of aperture	feet	4
Ant HBW	degrees	95
Distance to Ant$_{bottom}$	feet	125
WOS?	Y/N?	n

Ant System Five Owner: Nextel
Sector: 3
Azimuth: 0/120/240



Antenna System Six

	units	Value
Frequency	MHz	0
# of Channels	#	0
Max ERP/Ch	Watts	0
Max Pwr/Ch Into Ant.	Watts	#N/A
BS Height (Center of Radiator)	feet	0
Calculation Point (above ground or roof surface)	feet	0
Antenna Model No.		0
Max Ant Gain	dBd	#N/A
Down tilt	degrees	0
Miscellaneous Att.	dB	0
Height of aperture	feet	#N/A
Ant HBW	degrees	#N/A
Distance to Ant$_{bottom}$	feet	#N/A
WOS?	Y/N?	n

Ant System SIX Owner: N/A
Sector: N/A
Azimuth: N/A

9. For Further Information

Additional information about the environmental impact of RF energy from personal wireless antenna facilities can be obtained from the Federal Communications Commission:

Dr. Robert Cleveland
Federal Communications Commission
Office of Engineering and Technology
Washington, DC 20554

RF Safety Program: 202-418-2464
Internet address: rfsafety@fcc.gov
RF Safety Web Site: www.fcc.gov/oet/rfsafety

10. References

[1] The Communications Act of 1934, as amended by the Telecommunications Act of 1996, 47 U.S.C. Section 332 (c)(7)(B)(iv).

[2] *Guidelines for Evaluating the Environmental Effects of Radio frequency Radiation*, Notice of Proposed Rulemaking, ET Docket 93-62, 8 FCC Rcd 2849 (1993).

[3] *Guidelines for Evaluating the Environmental Effects of Radio frequency Radiation*, Report and Order, ET Docket 93-62, FCC 96-326, adopted August 1, 1996. 61 Federal Register 41006 (1996).

[4] *Guidelines for Evaluating the Environmental Effects of Radio frequency Radiation*, Second Memorandum Opinion and Order, ET Docket 93-62, adopted August 25, 1997.

[5] *Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields*, OET Bulletin 65, August, 1997.