



HPC Wireless Services
22 Shelter Rock Lane.
Building C
Danbury, CT, 06810
P.: 203.797.1112

April 17, 2017

VIA OVERNIGHT COURIER

Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051
Attn: Ms. Melanie Bachman, Acting Executive Director

Re: Sprint Spectrum, L.P. – Exempt Modification
2 Hinckley Hill Road, Norwich (aka Preston), Connecticut

Dear Ms. Bachman:

This letter and attachments are submitted on behalf of Sprint Spectrum, L.P. (“Sprint”). Sprint is undertaking modifications to certain existing sites in its Connecticut system in order to implement updated technology. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of the construction that 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 Mayor of the City of Norwich.

Sprint plans to modify the existing wireless communications facility owned by Cordless Data Transfer located at 2 Hinckley Hill Road, Norwich (coordinates 41°-30-53”N, 72°-03’-42”W). Attached are plan and elevation drawings depicting the planned changes and documentation of the structural sufficiency of the structure to accommodate the revised equipment configuration. Also included is a power density report reflecting the modification to Sprint’s operations at the site.

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes (“C.G.S.”) Section 16-50j(d) because the general physical characteristics of the facility will not be significantly changed. 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).

Ms. Melanie Bachman

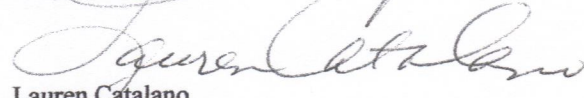
April 17, 2015

Page 2

1. Sprint will be adding (3) combiners and (3) RRHs (remote radio heads) all at the centerline height of approximately 140' from the tower base. There will be no changes to the site boundaries.
2. The proposed changes will not increase the noise level at the existing facility by six decibels or more. The incremental effect of the proposed changes will be negligible
3. The changes to the facility 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. As indicated on the attached report prepared by EBI Consulting dated March 19, 2015, Sprint's operations at the site will result in a power density level of 8.63% and the combined site operations assuming all carriers present will result in a total power density of 51.06%.

Please contact me by phone at (201) 310-9852 or by email at lcatalano@hpcwireless.com with questions concerning this matter. Thank you for your consideration.

Respectfully yours,



Lauren Catalano

HPC Wireless Services

Project Manager

lcatalano@hpcwireless.com

201.310.9852

Attachments

cc Honorable Debercy Hinchey, Mayor, Town of Norwich
Robert Congdon, Republican, First Selectman, Town of Preston
Cordless Data Transfer, LLC (CDT), Tower Owner
James Irwin and LaVerne Irwin (underlying property owners)

Sprint



CARRIER EQUIPMENT ADD

SITE NAME
MONTVILLE / NORWICH CDT

SITE NUMBER
CT23XC114

SITE ADDRESS
**2 HINKLEY HILL ROAD
PRESTON, CT 06360**

SITE TYPE
SELF SUPPORT TOWER

Sprint
6100 SPRINT PARKWAY
OVERLAND PARK, KS 66251

ALCATEL•LUCENT
323 GWYNEDD COURT
EXTON, PENNSYLVANIA 19341

SureSite
3659 GREEN RD STE. 214,
CLEVELAND, OH 44122
Office: (216) 593-0400
Fax: (216) 593-0401

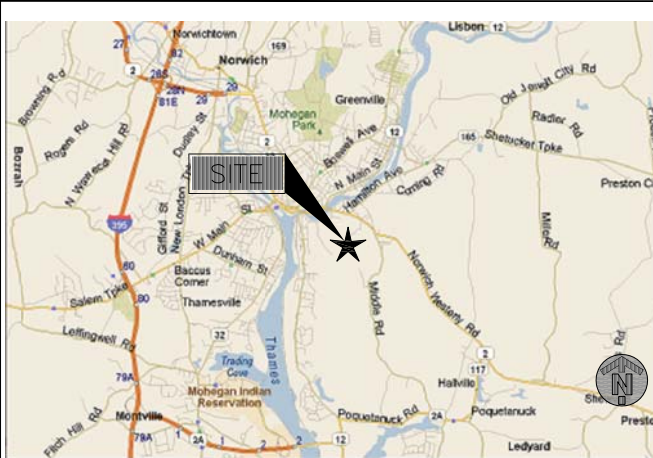
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3/13/15		REVISED FINAL	BE
3/19/15		REVISED FINAL	KR

APPLICABLE CODES

CONNECTICUT STATE CODE COMPLIANCE:
ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THIS PLANS NEEDS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES.
BUILDING CODE:
2005 CONNECTICUT STATE BUILDING CODE (2013 AMENDMENTS)
(2003 INTERNATIONAL BUILDING CODE W/AMMENDMENTS)
ELECTRICAL CODE:
2011 NATIONAL ELECTRICAL CODE (NFPA 70)
ACCESSIBILITY REQUIREMENTS:
• FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. ADA ACCESS REQUIREMENTS ARE NOT REQUIRED.
• THIS FACILITY DOES NOT REQUIRE POTABLE WATER AND WILL NOT PRODUCE ANY SEWAGE.

AREA MAP



PROJECT SUMMARY

SITE NAME: MONTVILLE / NORWICH CDT
SITE NUMBER: CT23XC114
SITE ADDRESS: 2 HINKLEY HILL ROAD
PRESTON, CT 06360
COUNTY: NEW LONDON
ZONING JURISDICTION: NORWICH COUNTY
ZONING CLASSIFICATION: R40
PARCEL ID#: 119-001-001.000-000
SOURCE: SITERRA
LATITUDE: N 41.514811' (NAD 83)
LONGITUDE: W 72.061592' (NAD 83)
PROPERTY/TOWER OWNER:
COMPANY: CORDLESS DATA TRANSFER, INC.
CONTACT: P.O BOX 363
ADDRESS: MARLBOROUGH, CT 06447
EMAIL: [REDACTED]
PH: [REDACTED]

SHEET INDEX

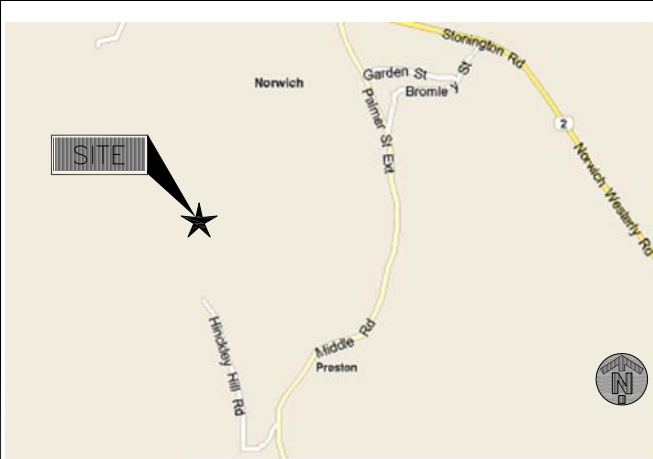
SHEET	DESCRIPTION
T-1	TITLE SHEET
A-1	ENLARGED SITE PLAN
A-2	TOWER ELEVATION AND ANTENNA LAYOUTS
A-3	SITE DETAILS
A-4	RF DATA SHEET

PROJECT DESCRIPTION

THE SCOPE OF WORK CONSISTS OF MODIFYING THE EXISTING WIRELESS INSTALLATION:
• INSTALL (3) NEW RRH (REMOTE RADIO HEADS)
• INSTALL (3) NEW COMBINER

NOTE: DRAWING SCALES ARE FOR 11"x17" SHEETS UNLESS OTHERWISE NOTED.

VICINITY MAP



PROJECT MANAGER:

COMPANY: ALCATEL LUCENT
CONTACT: DAN LAMAS
EMAIL: dan.lamas@alcatel-lucent.com
PH: (630) 979-2506

SITE ACQUISITION

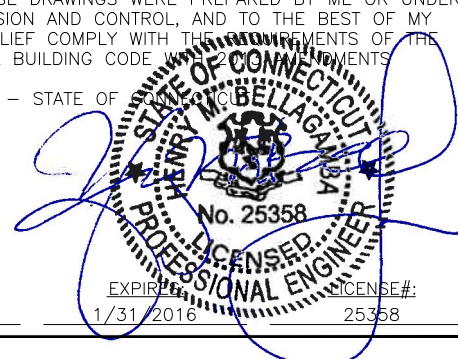
COMPANY: SURESITE
CONTACT: DAVID ROCKER
EMAIL: d.rocker@sure-site.com
PH: (216) 593-0400 x13

ENGINEERING FIRM:

COMPANY: FULLERTON ENGINEERING CONSULTANTS, INC.
CONTACT: TYLER DAILEY
EMAIL: tdailey@fullertonengineering.com
OFFICE: (847) 292-0200 x224

CERTIFICATION STATEMENT:

I CERTIFY THAT THESE DRAWINGS WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND CONTROL, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF COMPLY WITH THE REQUIREMENTS OF THE 2003 INTERNATIONAL BUILDING CODE WITH AMENDMENTS.
LICENSED ENGINEER - STATE OF CONNECTICUT
DATE SIGNED: 3/19/2015
EXPIRES: 1/31/2016
PROFESSIONAL ENGINEER LICENSE#: 25358



SITE NAME

MONTVILLE / NORWICH CDT

SITE I.D.

CT23XC114

SITE ADDRESS

**2 HINKLEY HILL ROAD
PRESTON, CT 06360**

SHEET NAME

TITLE SHEET

SHEET NUMBER

T-1

SIGNATURE BLOCK

APPROVAL	SIGNATURE	DATE
SITE ACQ. MGR		
CONSTRUCTION MGR		
A&E MGR		
PLANNING CONS.		
RF MGR		
RF ENGINEER		
PROPERTY OWNER		
SPRINT REP.		
AVV MGR.		

DRIVING DIRECTIONS

DEPART FROM BRADLEY INTERNATIONAL AIRPORT, CT.
HEAD TOWARDS TERMINAL RD. KEEP RIGHT ONTO BRADLEY FIELD CONNECTOR. TAKE RAMP RIGHT FOR I-91 SOUTH TOWARD HARTFORD. AT EXIT 30, TAKE RAMP LEFT FOR I-84 EAST TOWARD E. HARTFORD. AT EXIT 55, TAKE RAMP RIGHT FOR CT-2 EAST TOWARD NORWICH. KEEP STRAIGHT ONTO CT-2 E / CT-32 S. TURN RIGHT ONTO WASHINGTON ST. BEAR LEFT ONTO WASHINGTON ST. BEAR RIGHT ONTO CHELSEA HARBOR DR. TURN RIGHT ONTO CT-2, AND BEAR LEFT ONTO VIADUCT ST. BEAR RIGHT ONTO CT-2. BEAR RIGHT ONTO PALMER ST EXT. BEAR RIGHT ONTO HINKLEY HILL RD. AND ARRIVE AT SITE.

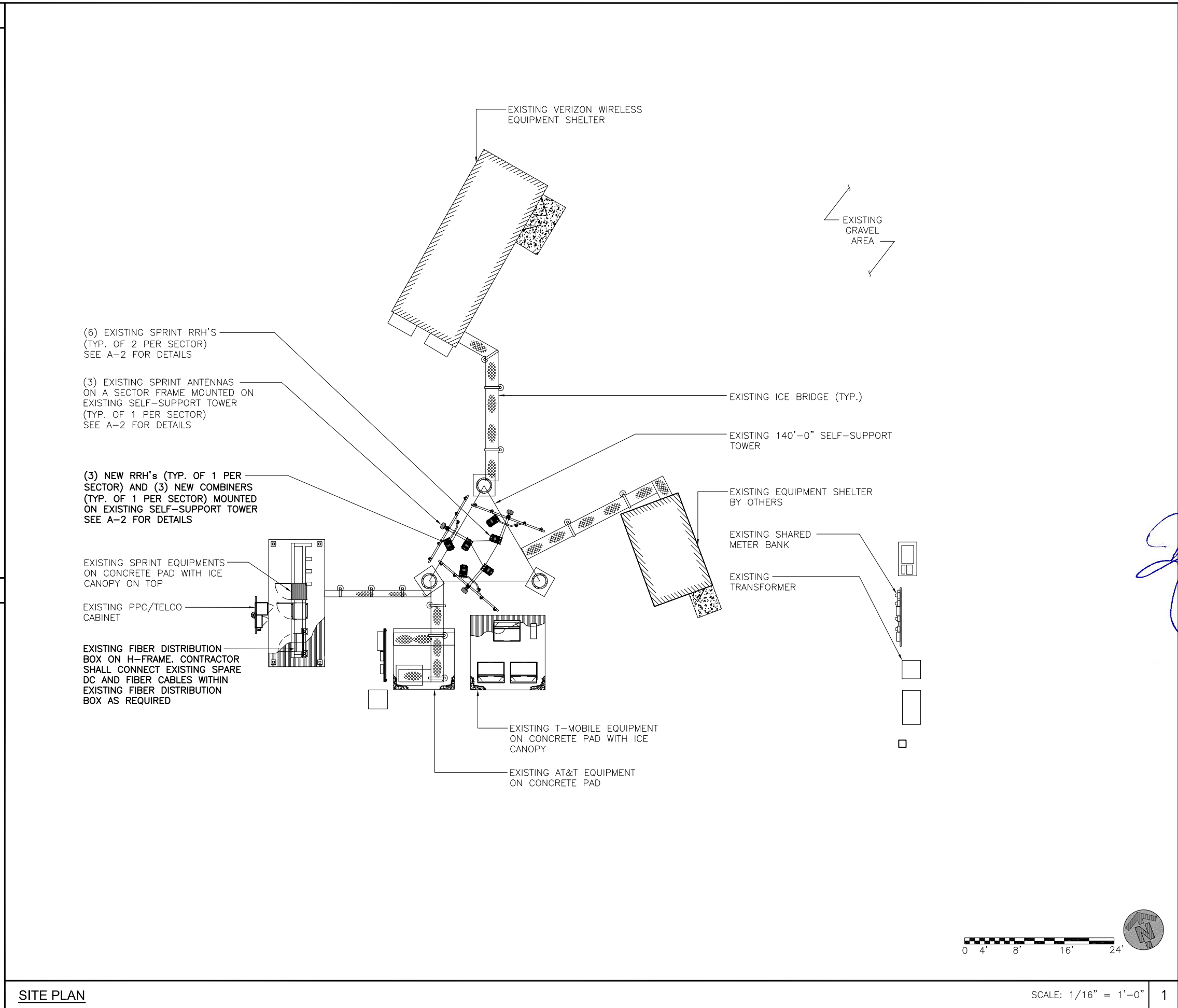
PROJECT TEAM

 6100 SPRINT PARKWAY OVERLAND PARK, KS 66251 TEL: (913) 624-6000 APPLICANT	 323 GWYNEDD COURT EXTON, PENNSYLVANIA 19341 PROJECT MANAGER	 3659 GREEN RD STE. 214, CLEVELAND, OH 44122 Office: (216) 593-0400 Fax: (216) 593-0401 SITE ACQUISITION	 9600 W. BRYN MAWR AVE., SUITE 200 ROSEMONT, ILLINOIS 60018 TEL: 847-292-0200 FAX: 847-292-0206 COA# PEC.0001444 www.FullertonEngineering.com ENGINEER
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ABBREVIATIONS	
A/C	AIR CONDITIONER
AFF	ABOVE FINISHED FLOOR
AGL	ABOVE GRADE LEVEL
AMSL	ABOVE MEAN SEA LEVEL
APPROX	APPROXIMATE
AWG	AMERICAN WIRE GAUGE
BLDG	BUILDING
BTS	BASE TRANSMISSION STATION
CAB	CABINET
COL	COLUMN
CONC	CONCRETE
CND	CONDUIT
DWG	DRAWING
FT	FOOT (FEET)
EGB	EQUIPMENT GROUND BAR
ELEC	ELECTRICAL
ELEV	ELEVATION
EMT	ELECTRICAL METALLIC TUBING
EQUIP	EQUIPMENT
(E)	EXISTING
FND	FOUNDATION
GALV	GALVANIZED
GND	GROUND
GPS	GLOBAL POSITIONING SYSTEM
IN	INCH(ES)
LB (#)	POUND(S)
MAX	MAXIMUM
MFR	MANUFACTURER
MGB	MASTER GROUND BAR
MIN	MINIMUM
(N)	NEW
NEC	NATIONAL ELECTRICAL CODE
NOM	NOMINAL
NTS	NOT TO SCALE
NV	NETWORK VISION
OE/OT	OVERHEAD ELECTRIC/TELCO
POS	POSITION
RGS	RIGID GALVANIZED STEEL
RRH	REMOTE RADIO HEAD
RRU	REMOTE RADIO UNIT
SF	SQUARE FOOT
STL	STEEL
T & B	TOP & BOTTOM
T/	TOP
TBD	TO BE DETERMINED
TYP	TYPICAL
UE/UT	UNDERGROUND ELECTRIC/TELCO
UNO	UNLESS NOTED OTHERWISE
VIF	VERIFY IN FIELD
W/	WITH
XFMR	TRANSFORMER

SYMBOLS	
⚠	REVISION
⊕	WORK POINT
⊙	UTILITY POLE
▨	BRICK
▩	COMPRESSED STONE
▧	CONCRETE
▦	EARTH
▯	GRAVEL
▭	MASONRY
▮	STEEL
---	CENTERLINE
---	PROPERTY LINE
---	LEASE LINE
---	EASEMENT LINE
---	FENCE
X-X	CHAINLINK
□	WOOD
○	WROUGHT IRON
E	ELECTRIC
OE	OVERHEAD
UE	UNDERGROUND
F	FIBER
OF	OVERHEAD
UF	UNDERGROUND
T	TELEPHONE
OT	OVERHEAD
UT	UNDERGROUND
DC	DCPOWER
L A L A	SECTION REFERENCE



Sprint
6100 SPRINT PARKWAY
OVERLAND PARK, KS 66251

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STATE OF CONNECTICUT
HENRY M. BELLAGAY
No. 25358
LICENSED PROFESSIONAL ENGINEER
SIGNED DATE: 3/19/2015

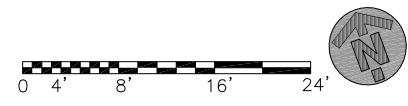
SITE NAME
MONTVILLE / NORWICH CDT

SITE I.D.
CT23XC114

SITE ADDRESS
**2 HINKLEY HILL ROAD
PRESTON, CT 06360**

SHEET NAME
**ENLARGED
SITE PLAN**

SHEET NUMBER
A-1



SCALE: 1/16" = 1'-0" 1

SITE PLAN

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STRUCTURAL NOTES/SPRINT STRUCTURAL SERVICES

COMPLIANCE NOTE:

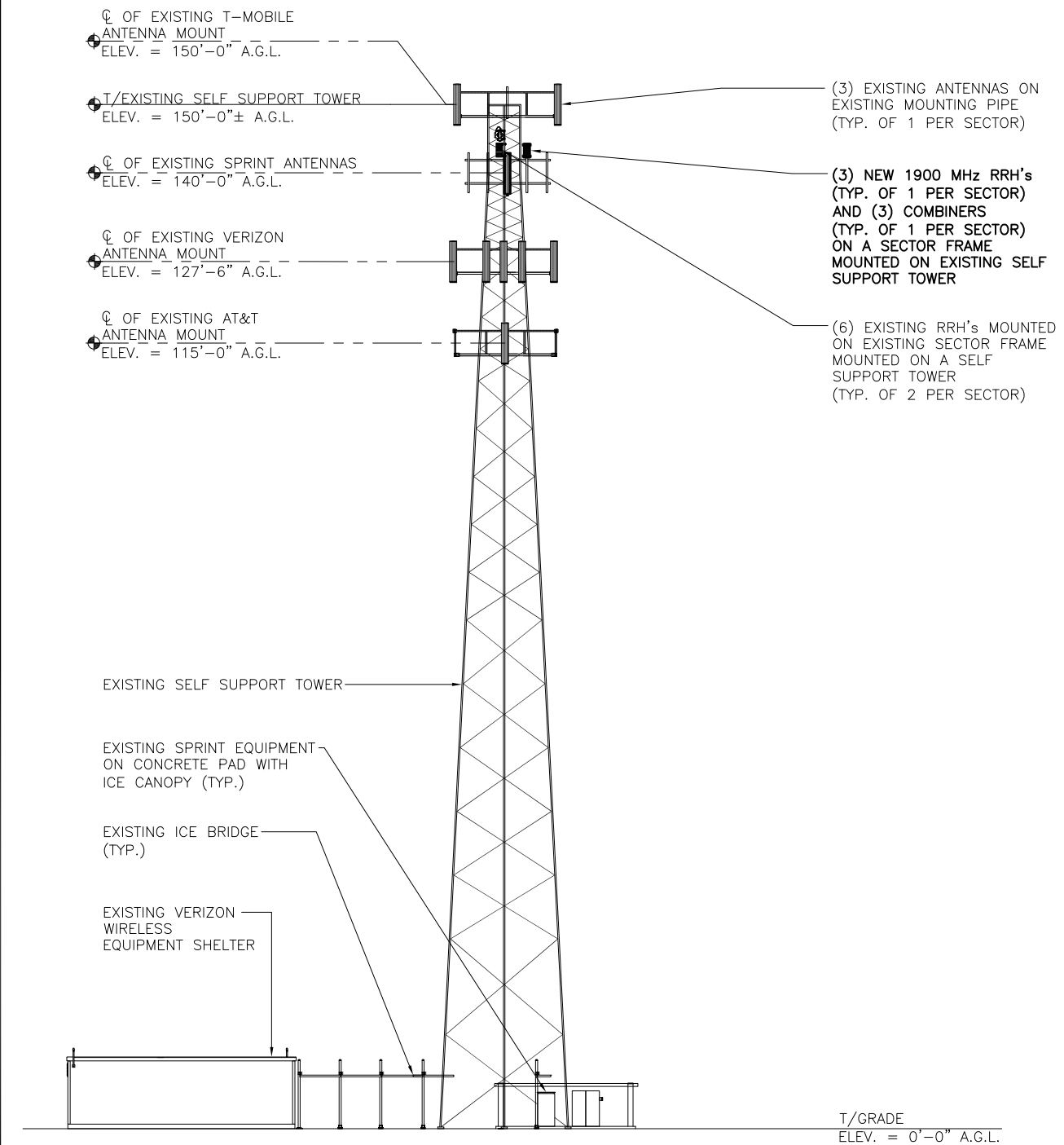
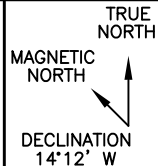
1. FULLERTON ENGINEERING CONSULTANTS, INC. CERTIFIES THAT SPRINT'S ENTIRE ANTENNA STRUCTURE, INCLUDING TOWER PLATFORMS, ARMS AND ALL OTHER ASPECTS OF THE STRUCTURE WILL SUPPORT THE SPRINT EQUIPMENT DEPLOYMENT.
2. STRUCTURAL CALCULATIONS FOR THE TOWER WERE PREPARED BY OTHERS AND THOSE CALCULATIONS CERTIFY THE CAPACITY OF THE TOWER STRUCTURE FOR THE DEPLOYMENT OF THE SPRINT EQUIPMENT. CONTRACTOR TO COORDINATE WITH PROJECT MANAGER TO OBTAIN A COPY.
3. CONTRACTOR TO REFER TO STRUCTURAL CALCULATIONS OF THE TOWER FOR ADDITIONAL LOADS. NO ERECTION OR MODIFICATION OF THE STRUCTURE SHALL BE MADE WITHOUT APPROVAL OF THE STRUCTURAL ENGINEER

ANTENNA NOTES:

1. CONTRACTOR SHALL VERIFY WITH SPRINT REPRESENTATIVE THE LATEST REVISION TO THE RF INFORMATION.
2. ALL ANTENNA AZIMUTHS ARE TO BE TAKEN FROM TRUE NORTH.

RF WARNING SIGNAGE & EMERGENCY SIGNAGE NOTE:

CONTRACTOR TO CONFIRM THAT THE SITE IS COMPLIANT WITH RF WARNING SIGNAGE & EMERGENCY SIGNAGE AS REQUIRED BY THE FEDERAL GUIDELINES CONTAINED WITHIN OET 65 BULLETIN & AS PER SPRINT GUIDELINES.

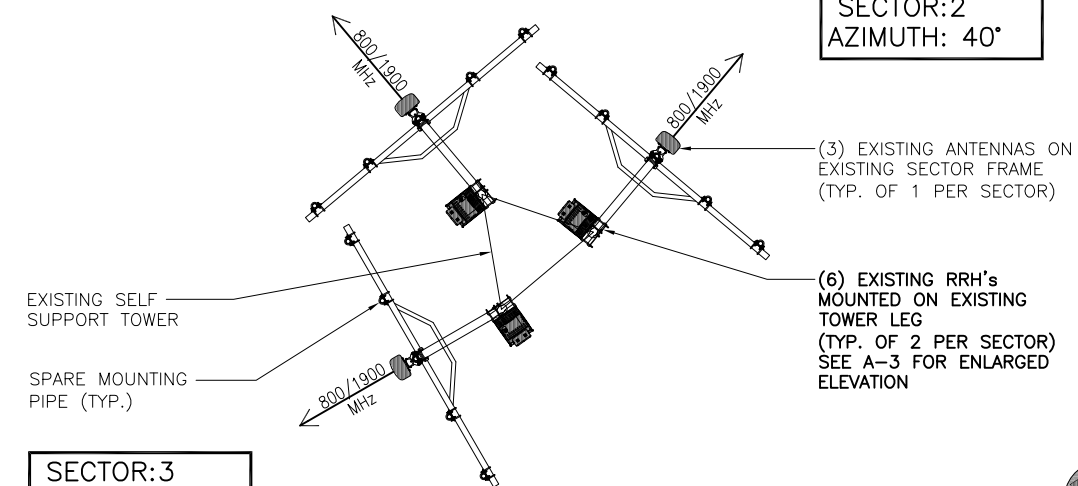


ELEVATION

SCALE: N.T.S. 1

SECTOR:1
AZIMUTH: 320°

SECTOR:2
AZIMUTH: 40°



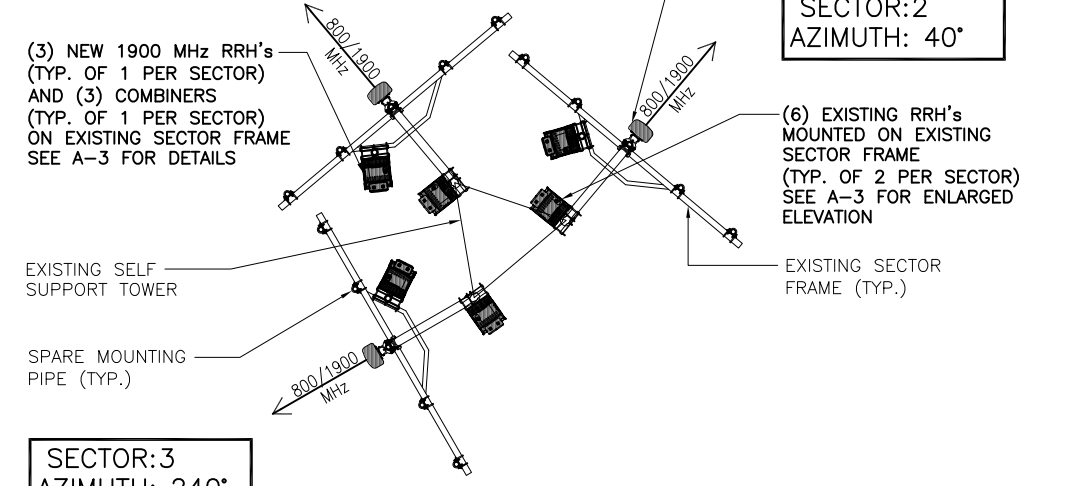
SECTOR:3
AZIMUTH: 240°

EXISTING ANTENNA & RRH LAYOUT

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

SECTOR:1
AZIMUTH: 320°

SECTOR:2
AZIMUTH: 40°



SECTOR:3
AZIMUTH: 240°

FINAL ANTENNA & RRH LAYOUT

SCALE: 1/8" = 1'-0" 3

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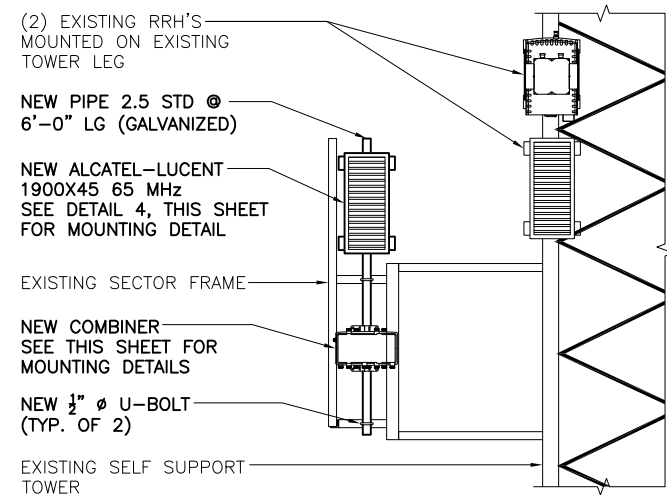
SITE I.D.
CT23XC114

SITE ADDRESS
**2 HINKLEY HILL ROAD
PRESTON, CT 06360**

SHEET NAME
**TOWER ELEVATION
AND ANTENNA
LAYOUTS**

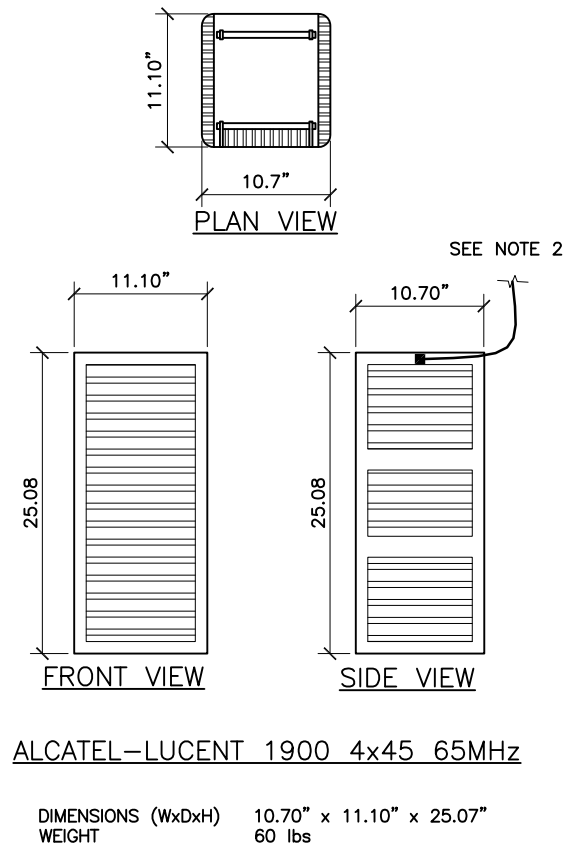
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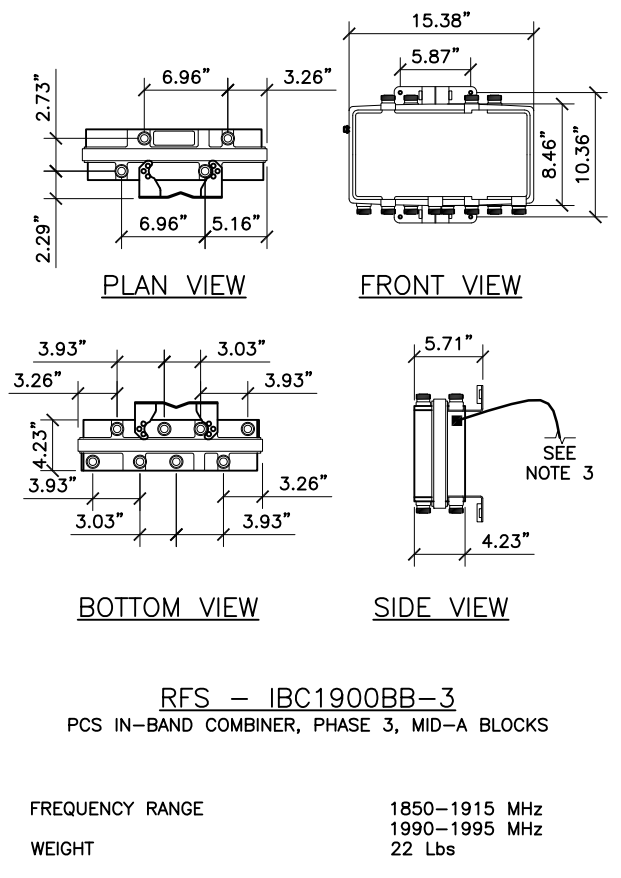
ENLARGED RRH ELEVATION

SCALE: 1/4" = 1'-0" 1



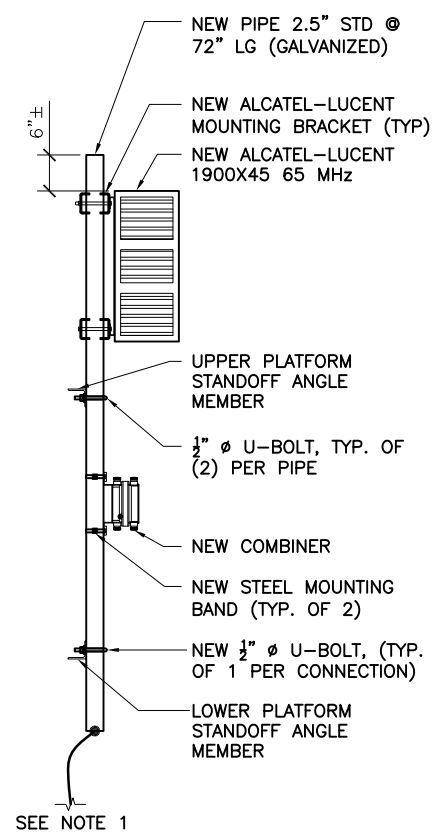
RRH SPECS

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



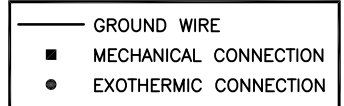
COMBINERS SPECS

SCALE: 3/4" = 1'-0" 3



RRH AND BREAK-OUT MOUNTING DETAIL

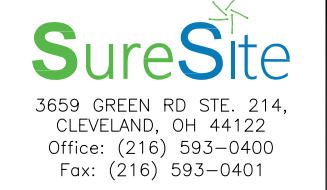
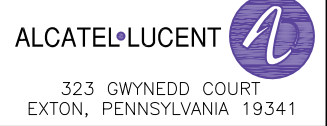
SCALE: N.T.S. 4



- NOTES:
1. NEW #2 GREEN STRANDED INSULATED COPPER GROUND WIRE FROM ANTENNA MOUNTING PIPE TO SECTOR GROUND BAR (ONE PER PIPE)
 2. NEW #2 GREEN STRANDED INSULATED COPPER GROUND WIRE FROM RRH TO SECTOR GROUND BAR
 3. NEW #2 GREEN STRANDED INSULATED COPPER GROUND WIRE FROM COMBINER TO SECTOR GROUND BAR

GROUNDING NOTES

SCALE: N.T.S. 5



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SIGNED DATE: 3/19/2015

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MONTVILLE / NORWICH CDT

SITE I.D.
CT23XC114

SITE ADDRESS
2 HINKLEY HILL ROAD
PRESTON, CT 06360

SHEET NAME
SITE DETAILS

SHEET NUMBER
A-3

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Market	Northern Connecticut		
Cascade ID	CT23XC114		
	Sector 1	Sector 2	Sector 3
1900MHz_Azimuth	320	40	240
1900MHz_No_of_Antennas	1	1	1
1900MHz_RADCenter(ft)	140	140	140
1900MHz_AntennaMake	KMW	RFS	RFS
1900MHz_AntennaModel	ET-X-TU-42-15-37-18-IR-RA	APXVSP18-C-A20	APXV9ERR18-C-A20
1900MHz_Horizontal_Beamwidth	37	65	80
1900MHz_Vertical_Beamwidth	8	5.5	5.5
1900MHz_AntennaHeight (ft)	4	6	6
1900MHz_AntennaGain(dBd)	15.9	15.9	14.9
1900MHz_E_Tilt	-2	-1	0
1900MHz_M_Tilt	0	0	-3
1900_Effective_Tilt	-2	-1	-3
1900MHz_Carrier_Forecast_12.3	7	7	7
1900MHz_RRH_Manufacturer	ALU	ALU	ALU
1900MHz_RRH_Model_12.3	RRH 1900 4X45 65MHz	RRH 1900 4X45 65MHz	RRH 1900 4X45 65MHz
1900MHz_RRH_Count_12.3	2	2	2
1900MHz_RRH_Location	Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower
1900MHz_Combiner_Model_12.3	IBC1900BB-3	IBC1900BB-3	IBC1900BB-3
1900MHz_Power_Split_Ratio (Main/Split)			
1900MHz_Splitter_Manufacturer	None Used	None Used	None Used
1900MHz_Splitter_Model	None Used	None Used	None Used
1900MHz_Number_of_Splitters			
1900MHz_Top_Jumper #1_Length (RRH or Combiner-to-Antenna for TT or Main Coax to Antenna for Ground Mount, ft)	10	10	10
1900MHz_Top_Jumper #1_Cable_Model (RRH or Combiner-to-Antenna for TT or Main Coax to Antenna for Ground Mount)	LCF12-50J	LCF12-50J	LCF12-50J
1900MHz_Top_Jumper #2_Length (RRH to Combiner for TT if applicable, ft)	N/A	N/A	N/A
1900MHz_Top_Jumper #2_Cable_Model (RRH to Combiner for TT if applicable)	N/A	N/A	N/A
1900MHz_Main_Coax_Cable_Length (ft)	N/A	N/A	N/A
1900MHz_Main_Coax_Cable_Model	N/A	N/A	N/A
1900MHz_Bottom_Jumper #1_Length (Ground based RRH to Combiner-OR-Main Coax, ft)	N/A	N/A	N/A
1900MHz_Bottom_Jumper #1_Cable_Model (Ground based RRH to Combiner-OR-Main Coax)	N/A	N/A	N/A
1900MHz_Bottom_Jumper #2_Length (Ground based-Combiner to Main Coax, ft)	N/A	N/A	N/A
1900MHz_Bottom_Jumper #2_Cable_Model (Ground based-Combiner to Main Coax)	N/A	N/A	N/A
800MHz_Azimuth	320	40	240
800MHz_No_of_Antennas	0	0	0
800MHz_RADCenter(ft)	140	140	140
800MHz_AntennaMake	KMW	RFS	RFS
800MHz_AntennaModel	ET-X-TU-42-15-37-18-IR-RA(Shared w/ 1900)	APXVSP18-C-A20 (Shared w/1900)	APXV9ERR18-C-A20 (Shared w/1900)
800MHz_Horizontal_Beamwidth	42	65	80
800MHz_Vertical_Beamwidth	18	11.5	10.5
800MHz_AntennaHeight (ft)	4	6	6
800MHz_AntennaGain (dBd)	12.9	13.4	11.9
800MHz_E_Tilt	-4	-4	0
800MHz_M_Tilt	0	0	-3
800 MHz Effective Tilt (degrees)	-4	-4	-3
800MHz_RRH_Manufacturer	ALU	ALU	ALU
800_Combiner_Model	No Combiner Required	No Combiner Required	No Combiner Required
800MHz_RRH_Model	800 MHz RRH 2x50W	800 MHz RRH 2x50W	800 MHz RRH 2x50W
800MHz_RRH_Count	1	1	1
800MHz_RRH_Location	Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower
800MHz_Power_Split_Ratio (Main/Split)			
800MHz_Splitter_Manufacturer	None Used	None Used	None Used
800MHz_Splitter_Model	None Used	None Used	None Used
800MHz_Number_of_Splitters	0	0	0
800_Top_Jumper #1_Length (RRH to Antenna for TT or Main Coax to Antenna for GM)	10	10	10
800_Top_Jumper_Cable_Model (RRH to Antenna for TT or Main Coax to Antenna for GM)	LCF12-50J	LCF12-50J	LCF12-50J
800MHz_Main_Coax_Cable_Length (ft)	0	0	0
800MHz_Main_Coax_Cable_Model	0	0	0
800_Bottom_Jumper #1_Length (Ground based RRH to Main Coax)	0	0	0
800_Bottom_Jumper #1_Cable_Model (Ground based RRH to Main Coax)	N/A	N/A	N/A
Has_Split	No	No	No
Plumbing_Scenario	0	0	0
Date_Updated	2/20/2014	2/20/2014	2/20/2014
Update_Description	Add one 65 RRH & Ph 3 ver 2 combiner	Add one 65 RRH & Ph 3 ver 2 combiner	Add one 65 RRH & Ph 3 ver 2 combiner
Site_Type	TT6 jumper with 800 with LTE	TT6 jumper with 800 with LTE	TT6 jumper with 800 with LTE
Comments			
This RFDS is Carrier Add View RFDS Generated on 2/20/2014			

1900

800

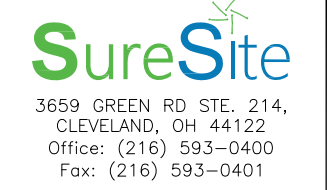
Comments



6100 SPRINT PARKWAY
OVERLAND PARK, KS 66251



323 GWYNEDD COURT
EXTON, PENNSYLVANIA 19341

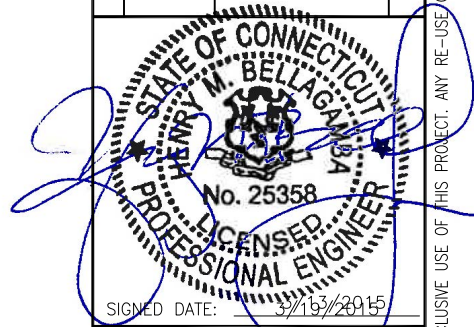


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5/20/14		90% REVIEW	MT
7/14/14		FINAL	MT
3/13/15		REVISED FINAL	BE
3/19/15		REVISED FINAL	KR



SITE NAME
MONTVILLE / NORWICH CDT

SITE I.D.
CT23XC114

SITE ADDRESS
**2 HINKLEY HILL ROAD
PRESTON, CT 06360**

SHEET NAME
RF DATA SHEETS

SHEET NUMBER
A-4

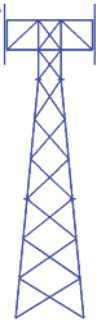
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Mark LeGault
Cordless Data Transfer, Inc.
600 Old Hartford Road
Colchester, CT 06415
March 18, 2015

Fred A. Nudd Job Number: 215-35024

Location: 2 Hinkley Hill Road, Norwich, CT 06360, New London County (Lat. & Long: 41-30-53.45, -72-03-42.08)

Subject: Structural Analysis of a 150 ft Self-Supporting Tower

Fred A. Nudd Corporation has completed a three-dimensional, finite element model structural analysis of the above noted self-supporting tower. This tower was analyzed considered appurtenance loads noted in the appurtenance loading table on the following page. The design loading criteria and strength design are per the TIA/EIA-222-F standard, which is the recommended design standard per the 2003 International Building Code (Sec. 1609 & 3108), including 2005, 2009, 2011 & 2013 Connecticut Building Code Amendments. Additional standards used in this analysis include the AISC Manual for Steel Construction, Allowable Stress Design, 9th Ed. and ACI 318-05, Building Code Requirements for Structural Concrete and Commentary. Tower and foundation dimensions have been taken from original design drawings by Fred A. Nudd Corporation (Drawing Number 99-6864-1 & 99-6864-2R, dated July 22, 1999 & November 20, 1999). Onsite subsurface conditions were taken from a geotechnical report by Coneco (Project Number C104.0CDT, dated November 15, 1999). The tower is assumed to be in good, undamaged and equivalent to as new condition and has been maintained / inspected per criteria by TIA-222.

The purpose of this analysis is to determine the structure's ability to support new Sprint equipment installed at a rad center of 140 ft above ground level (AGL). The new equipment to be installed, which included antennas, coax, mounts and associated hardware are listed on the following page in the appurtenance loading table.

Results of the analysis indicate the tower will be able to support the design loads noted in the appurtenance loading table on the following page. Specific section design loads, capacities and stress ratios are provided on the following pages. Maximum member usage was found to be 84%. Detailed calculation of the applied forces and member capacities are provided in the following pages.

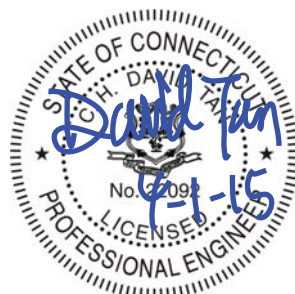
The tower base foundation was analyzed using soil properties from the aforementioned geotechnical report. Based on this analysis, the foundation is capable of supporting the existing and proposed equipment. Factor of safety in excess of two was calculated regarding foundation resistance to applied axial and lateral loads. Detailed calculation of the applied forces and member capacities are provided in the following pages.

In conclusion, the tower superstructure and substructure can support the listed existing and proposed appurtenance loading.

We trust this report satisfies your needs. Please contact us with any questions or concerns regarding this report.

Best Regards,

Fred A. Nudd Corporation



David Tan, P.E. (CT PE # 22092)

Code Design Criteria

TIA/EIA-222-F

Windspeed = 85 mph, fastest mile

Exposure = C

Radial Ice = 0.5 inch

Ice Windspeed = 74 mph, fastest mile

Appurtenance Loading – Existing and To Remain on Tower

Height (ft)	Carrier	Appurtenance	Mount	Coax (in)
150	T-Mobile	(3) RFS APX16DWV-16DWVS-E-A20 (6) RFS APXV18-209014-C (3) TMA (6) RFS ATMPP1412D-1CWA	(3) 12 ft Boom / Frame	(18) 1-5/8
140	Sprint	(1) KMW ET-X-TU-42-15-37-18-IR-RA (1) RFS APXVSPP18-C-A20 (1) RFS APXV9ERR18-C-A20 (3) Alcatel Lucent 4X45 65 RRU (3) Alcatel Lucent 2X50W RRU	(3) 12 ft Boom / Frame	(3) 1-1/4 Hybriflex
127.5	Verizon	(3) Antel BXA-70063-6CF-2 (4) RFS APL868013 (6) RFS FD9R6004/2C-3L (3) Ryma MG D5-800T2 (1) Antel BXA-171085-12CF (2) Antel BXA-171063-12CF (2) RFS APL866513 (3) Alcatel Lucent RRH2x40-AWS (1) RFS DB-T1-6Z-8AB-0Z	(3) 12 ft Boom / Frame	(12) 1-5/8 (1) 1-5/8 Fiber Cable
115	AT&T Mobility	(3) Powerwave 7770.00 (6) Powerwave LGP21401	(3) 10 ft Boom / Frame	(12) 1-1/4

- Height measurement taken as distance from top of base foundation to center of appurtenance.

Appurtenance Loading – Additional Loading Configuration For Sprint

Height (ft)	Carrier	Appurtenance	Mount	Coax (in)
140	Sprint	(3) Alcatel Lucent 1900 MHz RRR, 65 MHz (3) RFS IBC1900BB-3	(3) 12 ft Boom / Frame	--

- Height measurement taken as distance from top of base foundation to center of appurtenance.

Maximum Member Usage

Member	Percentage
Leg	73
Diagonal	84
Horizontal	2
Anchor Bolts	73
Splice/Connection Bolts	84

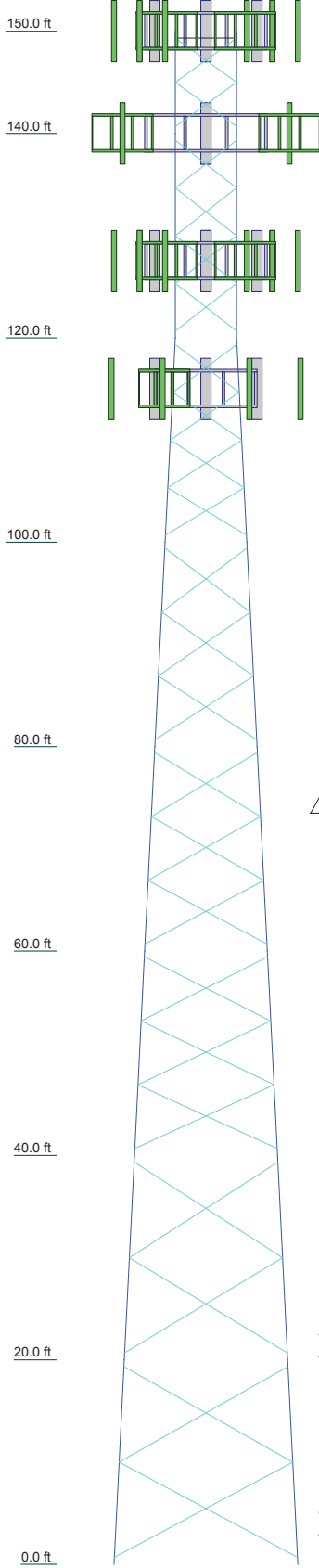
- Percentage equal to or less than 100% denote member stress levels are satisfactory for loading.
- Percentage greater than 100% indicates member strengthening is required.

Foundation Reaction Usage

Design Load	Capacity (kip)	Design Load (kip)	Percentage
Compression / Leg	288.6	234.0	81
Uplift / Leg	318.8	197.2	62
Shear / Leg	47.9	23.3	49

- Percentage equal to or less than 100% denote foundation is satisfactory for loading.
- Percentage greater than 100% indicates foundation strengthening is required.

Section	T1	T2	T3	T4	T5	T6	T7	T8
Legs	P2.5x.203		P4x.237	P5x.288	P6x.28	P8x.322	P8x.5	
Leg Grade	A		L2x2x3/16	L2 1/2x2 1/2x3/16	A500M-54	L3x3x3/16	L3 1/2x3 1/2x1/4	
Diagonals								
Diagonal Grade					A36			
Top Girts	L3x3x1/4				N.A.			
Face Width (ft)	6	8	10	12	14	16	18	
# Panels @ (ft)	2 @ 4.33333	8 @ 4.66667	9 @ 6.25	4 @ 9.33333				
Weight (lb)	421.5	791.8	1140.7	1485.0	1986.3	2680.9	3828.5	3948.6



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
RFS APX16DWV-16DWVS-E-A20 (T-Mobile)	150	Antel BXA-171063-12CF (Verizon)	127.5
RFS APX16DWV-16DWVS-E-A20 (T-Mobile)	150	Alcatel Lucent RRH2x40 AWS (Verizon)	127.5
RFS APX16DWV-16DWVS-E-A20 (T-Mobile)	150	Alcatel Lucent RRH2x40 AWS (Verizon)	127.5
(2) RFS APXV18-209014-C (T-Mobile)	150	Alcatel Lucent RRH2x40 AWS (Verizon)	127.5
(2) RFS APXV18-209014-C (T-Mobile)	150	RFS DB-T1-6Z-8B-0Z (Verizon)	127.5
Nudd TMA (T-Mobile)	150	(2) RFS APL868013 (Verizon)	127.5
Nudd TMA (T-Mobile)	150	(2) RFS APL868013 (Verizon)	127.5
Nudd TMA (T-Mobile)	150	(2) RFS APL866513 (Verizon)	127.5
(2) RFS ATMP1412D-1CWA (T-Mobile)	150	(2) RFS FD9R6004/2C-3L (Verizon)	127.5
(2) RFS ATMP1412D-1CWA (T-Mobile)	150	(2) RFS FD9R6004/2C-3L (Verizon)	127.5
Nudd 12' boom	150	Nudd 12' boom	127.5
Nudd 12' boom	150	Nudd 12' boom	127.5
Nudd 12' boom	150	Nudd 12' boom	127.5
Nudd 12' boom	150	Rymasa MG D5-800T2 (Verizon)	127.5
KMW ET-X-TU-42-15-37-18-IR-RA	140	Rymasa MG D5-800T2 (Verizon)	127.5
RFS APXVSP18-C	140	Rymasa MG D5-800T2 (Verizon)	127.5
RFS APXV9ERR18-C-A20	140	Antel BXA-70063/6CF-2 (Verizon)	127.5
Alcatel Lucent 1900 MHz	140	Antel BXA-70063/6CF-2 (Verizon)	127.5
Alcatel Lucent 800 MHz	140	Powerwave 7770.00 (ATI)	115
Alcatel Lucent 1900 MHz	140	Powerwave 7770.00 (ATI)	115
Alcatel Lucent 800 MHz	140	Powerwave 7770.00 (ATI)	115
Alcatel Lucent 1900 MHz	140	(2) Powerwave LGP21401 (ATI)	115
Alcatel Lucent 800 MHz	140	(2) Powerwave LGP21401 (ATI)	115
Nudd 12' boom	140	(2) Powerwave LGP21401 (ATI)	115
Alcatel Lucent 1900 MHz RRH	140	Nudd 10' boom	115
Alcatel Lucent 1900 MHz RRH	140	Nudd 10' boom	115
Alcatel Lucent 1900 MHz RRH	140	Nudd 10' boom	115
RFS IBC1900BB-3	140	Andrew SBNH-1D6565C (ATI)	115
RFS IBC1900BB-3	140	(2) Ericsson RRU511 (ATI)	115
RFS IBC1900BB-3	140	(2) Ericsson RRU511 (ATI)	115
Antel BXA-171085-12CF (Verizon)	127.5	(2) Ericsson RRU511 (ATI)	115
Antel BXA-171063-12CF (Verizon)	127.5	Raycap DC6-48-60-18-8F (ATI)	115
		KMW AM-X-CD-16-65-00T-RET (ATI)	115
		Powerwave P65-17-XLH-RR (ATI)	115

SYMBOL LIST

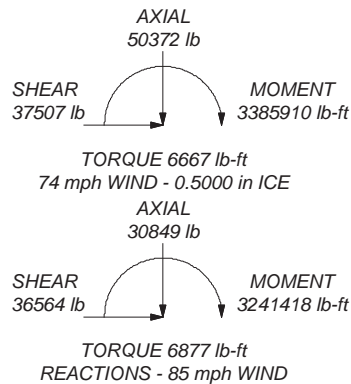
MARK	SIZE	MARK	SIZE
A	L1 1/2x1 1/2x3/16		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500M-54	54 ksi	70 ksi	A36	36 ksi	58 ksi

MAX. CORNER REACTIONS AT BASE:

DOWN: 233989 lb
 UPLIFT: -197200 lb
 SHEAR: 23265 lb

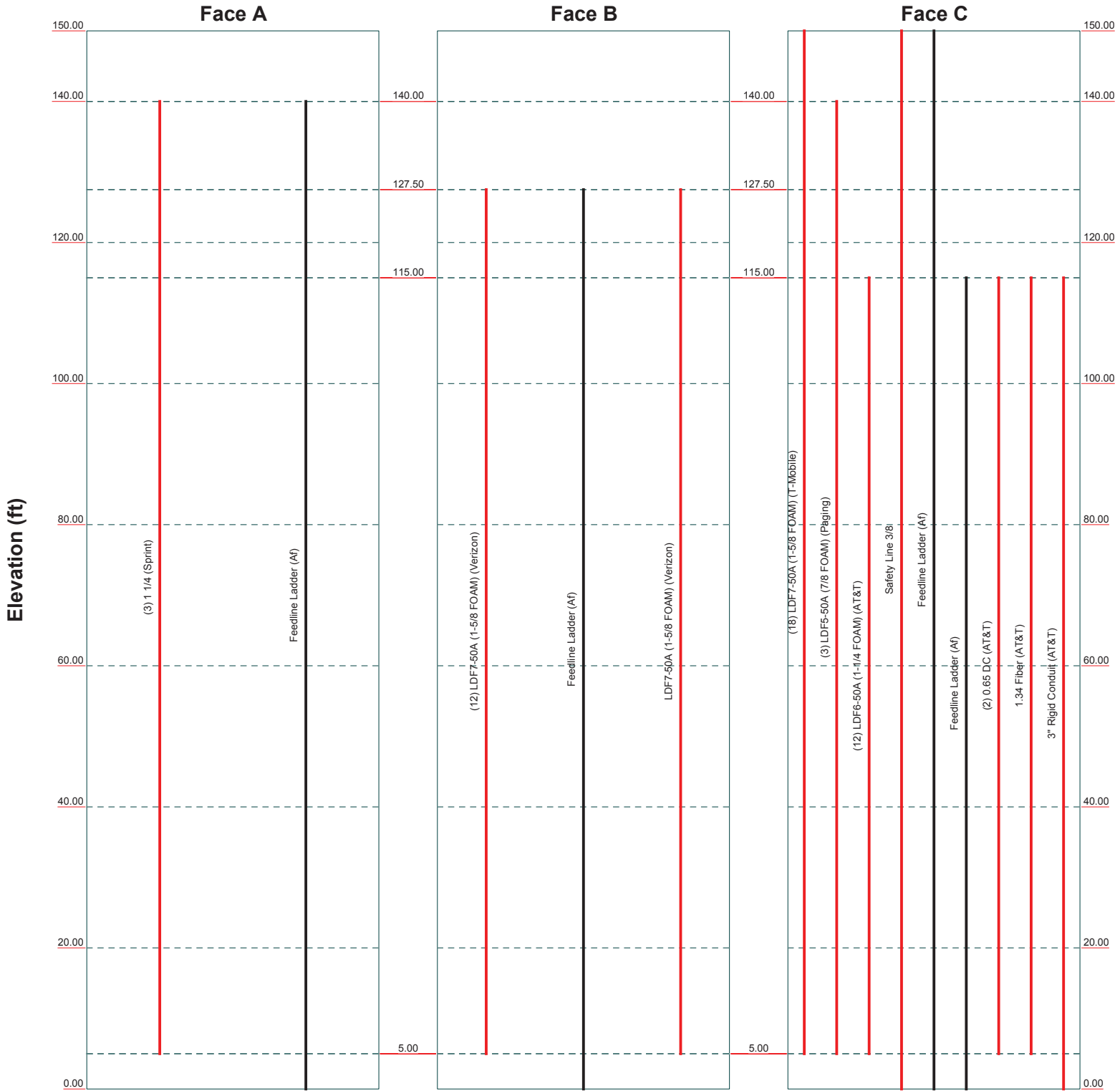


Phone: FAX:	Job: 150' SS Tower Norwich, CT. Analysis
	Project: 215-35024
	Client: CDT
	Code: TIA/EIA-222-F
	Path:
	Drawn by: FAN
	Date: 03/18/15
	App'd:
	Scale: NTS
	Dwg No. E-1

Feedline Distribution Chart

0' - 150'

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



Phone: FAX:	Job: 150' SS Tower Norwich, CT. Analysis		
	Project: 215-35024		
	Client: CDT	Drawn by: FAN	App'd:
	Code: TIA/EIA-222-F	Date: 03/18/15	Scale: NTS
	Path:		Dwg No. E-7

<i>RISATower</i> Phone: FAX:	Job 150' SS Tower Norwich, CT. Analysis	Page 1 of 28
	Project 215-35024	Date 22:32:18 03/18/15
	Client CDT	Designed by FAN

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 150.00 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 6.00 ft at the top and 18.00 ft at the base.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Basic wind speed of 85 mph.

Nominal ice thickness of 0.5000 in.

Ice density of 56 pcf.

A wind speed of 74 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

Weld together tower sections have flange connections..

Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..

Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..

Welds are fabricated with ER-70S-6 electrodes..

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

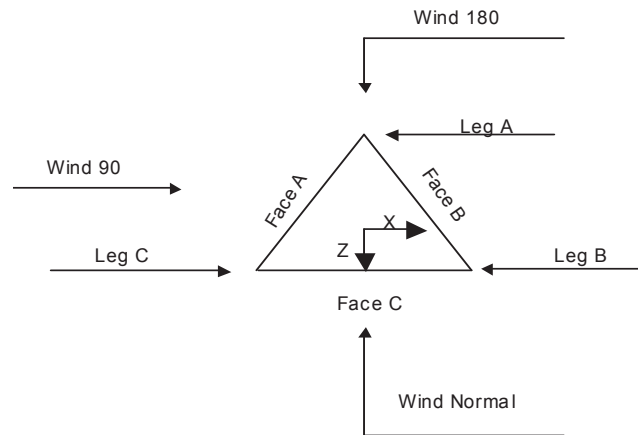
Stress ratio used in tower member design is 1.333.

Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

<ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile √ Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) Add IBC .6D+W Combination 	<ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area √ Use Clear Spans For KL/r Retention Guys To Initial Tension Bypass Mast Stability Checks √ Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. Autocalc Torque Arm Areas SR Members Have Cut Ends Sort Capacity Reports By Component Triangulate Diamond Inner Bracing 	<ul style="list-style-type: none"> Treat Feedline Bundles As Cylinder Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feedline Torque Include Angle Block Shear Check <div style="text-align: center; background-color: #e0e0e0; padding: 2px;">Poles</div> <ul style="list-style-type: none"> Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets
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<i>RISATower</i> Phone: FAX:	Job 150' SS Tower Norwich, CT. Analysis	Page 2 of 28
	Project 215-35024	Date 22:32:18 03/18/15
	Client CDT	Designed by FAN



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	<i>ft</i>			<i>ft</i>		<i>ft</i>
T1	150.00-140.00			6.00	1	10.00
T2	140.00-120.00			6.00	1	20.00
T3	120.00-100.00			6.00	1	20.00
T4	100.00-80.00			8.00	1	20.00
T5	80.00-60.00			10.00	1	20.00
T6	60.00-40.00			12.00	1	20.00
T7	40.00-20.00			14.00	1	20.00
T8	20.00-0.00			16.00	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
	<i>ft</i>	<i>ft</i>				<i>in</i>	<i>in</i>
T1	150.00-140.00	4.33	X Brace	No	No	8.0000	8.0000
T2	140.00-120.00	4.67	X Brace	No	No	8.0000	8.0000
T3	120.00-100.00	4.67	X Brace	No	No	8.0000	8.0000
T4	100.00-80.00	6.25	X Brace	No	No	7.5000	7.5000
T5	80.00-60.00	6.25	X Brace	No	No	7.5000	7.5000
T6	60.00-40.00	6.25	X Brace	No	No	7.5000	7.5000
T7	40.00-20.00	9.33	X Brace	No	No	8.0000	8.0000

<i>RISATower</i> Phone: FAX:	Job 150' SS Tower Norwich, CT. Analysis	Page 3 of 28
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	Client CDT	Designed by FAN

Tower Section	Tower Elevation <i>ft</i>	Diagonal Spacing <i>ft</i>	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset <i>in</i>	Bottom Girt Offset <i>in</i>
T8	20.00-0.00	9.33	X Brace	No	No	8.0000	8.0000

Tower Section Geometry (cont'd)

Tower Elevation <i>ft</i>	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 150.00-140.00	Pipe	P2.5x.203	A500M-54 (54 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T2 140.00-120.00	Pipe	P2.5x.203	A500M-54 (54 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T3 120.00-100.00	Pipe	P4x.237	A500M-54 (54 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T4 100.00-80.00	Pipe	P5x.258	A500M-54 (54 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 80.00-60.00	Pipe	P6x.28	A500M-54 (54 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T6 60.00-40.00	Pipe	P8x.322	A500M-54 (54 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T7 40.00-20.00	Pipe	P8x.5	A500M-54 (54 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T8 20.00-0.00	Pipe	P8x.5	A500M-54 (54 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation <i>ft</i>	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T1 150.00-140.00	Solid Round		A572-50 (50 ksi)	Solid Round	9/16	A572-50 (50 ksi)
T2 140.00-120.00	Solid Round		A572-50 (50 ksi)	Solid Round	9/16	A572-50 (50 ksi)
T3 120.00-100.00	Solid Round		A572-50 (50 ksi)	Solid Round	9/16	A572-50 (50 ksi)
T4 100.00-80.00	Solid Round		A572-50 (50 ksi)	Solid Round	9/16	A572-50 (50 ksi)
T5 80.00-60.00	Solid Round		A572-50 (50 ksi)	Solid Round	9/16	A572-50 (50 ksi)
T6 60.00-40.00	Solid Round		A572-50 (50 ksi)	Solid Round	9/16	A572-50 (50 ksi)
T7 40.00-20.00	Solid Round		A572-50 (50 ksi)	Solid Round	9/16	A572-50 (50 ksi)
T8 20.00-0.00	Solid Round		A572-50 (50 ksi)	Solid Round	9/16	A572-50 (50 ksi)

Tower Section Geometry (cont'd)

<i>RISATower</i> Phone: FAX:	Job 150' SS Tower Norwich, CT. Analysis	Page 4 of 28
	Project 215-35024	Date 22:32:18 03/18/15
	Client CDT	Designed by FAN

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
T1 150.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T7 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T8 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	Calc K Single Angles	Calc K Solid Rounds	Legs	K Factors ¹							
				X Brace Diags	K Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace	
											X Y
ft											
T1 150.00-140.00	Yes	No	1	1	1	1	1	1	1	1	1
T2 140.00-120.00	Yes	No	1	1	1	1	1	1	1	1	1
T3 120.00-100.00	Yes	No	1	1	1	1	1	1	1	1	1
T4 100.00-80.00	Yes	No	1	1	1	1	1	1	1	1	1
T5 80.00-60.00	Yes	No	1	1	1	1	1	1	1	1	1
T6 60.00-40.00	Yes	No	1	1	1	1	1	1	1	1	1
T7 40.00-20.00	Yes	No	1	1	1	1	1	1	1	1	1
T8 20.00-0.00	Yes	No	1	1	1	1	1	1	1	1	1

¹Note: 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)

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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 150.00-140.00	0.0000	1	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 140.00-120.00	0.0000	1	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 120.00-100.00	0.0000	1	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 100.00-80.00	0.0000	1	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 80.00-60.00	0.0000	1	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 60.00-40.00	0.0000	1	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 40.00-20.00	0.0000	1	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 20.00-0.00	0.0000	1	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 ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 150.00-140.00	Flange	0.7500	4	0.5000	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T2 140.00-120.00	Flange	1.0000	4	0.6250	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T3 120.00-100.00	Flange	1.0000	6	0.6250	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T4 100.00-80.00	Flange	1.0000	8	0.6250	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T5 80.00-60.00	Flange	1.2500	8	0.6250	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T6 60.00-40.00	Flange	1.2500	8	0.6250	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T7 40.00-20.00	Flange	1.2500	8	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T8 20.00-0.00	Flange	1.5000	8	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
		F1554-36		A325N		A325N		A325N		A325N		A325N		A325N	

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) (T-Mobile)	C	Yes	Ar (CfAe)	150.00 - 5.00	0.0000	-0.25	18	9	1.9800	1.9800		0.82
LDF5-50A (7/8 FOAM) (Paging)	C	Yes	Ar (CfAe)	140.00 - 5.00	0.0000	-0.35	3	3	1.0900	1.0900		0.33

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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 1/4 (Sprint)	A	Yes	Ar (CfAe)	140.00 - 5.00	0.0000	-0.25	3	3	1.5500	1.5500		0.66
LDF7-50A (1-5/8 FOAM)	B	Yes	Ar (CfAe)	127.50 - 5.00	0.0000	-0.25	12	12	1.9800	1.9800		0.82
LDF6-50A (1-1/4 FOAM)	C	Yes	Ar (CfAe)	115.00 - 5.00	0.0000	0.25	12	6	1.5500	1.5500		0.66
Safety Line 3/8	C	No	Ar (Leg)	150.00 - 0.00	0.0000	0	1	1	0.3750	0.3750		0.22
Feedline Ladder (Af)	C	Yes	Af (CfAe)	150.00 - 0.00	0.0000	-0.25	1	1	3.0000	3.0000	12.0000	8.40
Feedline Ladder (Af)	C	Yes	Af (CfAe)	115.00 - 0.00	0.0000	0.25	1	1	3.0000	3.0000	12.0000	8.40
Feedline Ladder (Af)	B	Yes	Af (CfAe)	127.50 - 0.00	0.0000	-0.25	1	1	3.0000	3.0000	12.0000	8.40
Feedline Ladder (Af)	A	Yes	Af (CfAe)	140.00 - 0.00	0.0000	-0.25	1	1	3.0000	3.0000	12.0000	8.40
0.65 DC (AT&T)	C	Yes	Ar (CfAe)	115.00 - 5.00	0.0000	0.25	2	2	0.6300	0.0000		0.15
1.34 Fiber (AT&T)	C	Yes	Ar (CfAe)	115.00 - 5.00	0.0000	0.25	1	1	0.6300	0.0000		0.15
3" Rigid Conduit (AT&T)	C	Yes	Ar (CfAe)	115.00 - 0.00	0.0000	-0.25	1	1	2.0000	3.0000		2.80
LDF7-50A (1-5/8 FOAM) (Verizon)	B	Yes	Ar (CfAe)	127.50 - 5.00	0.0000	-0.25	1	1	1.9800	1.9800		0.82

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight lb
T1	150.00-140.00	A	0.313	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	15.163	2.500	0.000	0.000	233.80
T2	140.00-120.00	A	8.375	5.000	0.000	0.000	207.60
		B	16.087	1.875	0.000	0.000	142.95
		C	35.775	5.000	0.000	0.000	487.40
T3	120.00-100.00	A	8.375	5.000	0.000	0.000	207.60
		B	42.900	5.000	0.000	0.000	381.20
		C	51.150	8.750	0.000	0.000	780.95
T4	100.00-80.00	A	8.375	5.000	0.000	0.000	207.60
		B	42.900	5.000	0.000	0.000	381.20
		C	56.275	10.000	0.000	0.000	878.80
T5	80.00-60.00	A	8.375	5.000	0.000	0.000	207.60
		B	42.900	5.000	0.000	0.000	381.20
		C	56.275	10.000	0.000	0.000	878.80
T6	60.00-40.00	A	8.375	5.000	0.000	0.000	207.60
		B	42.900	5.000	0.000	0.000	381.20
		C	56.275	10.000	0.000	0.000	878.80
T7	40.00-20.00	A	8.375	5.000	0.000	0.000	207.60
		B	42.900	5.000	0.000	0.000	381.20
		C	56.275	10.000	0.000	0.000	878.80
T8	20.00-0.00	A	6.438	5.000	0.000	0.000	197.70

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Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight lb
		B	32.175	5.000	0.000	0.000	327.90
		C	43.612	10.000	0.000	0.000	758.20

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} In Face ft ²	C _{AA} Out Face ft ²	Weight lb
T1	150.00-140.00	A	0.500	1.146	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		23.496	3.056	0.000	0.000	538.85
T2	140.00-120.00	A	0.500	15.042	6.111	0.000	0.000	336.76
		B		24.212	2.292	0.000	0.000	310.92
		C		57.442	6.111	0.000	0.000	1155.77
T3	120.00-100.00	A	0.500	15.042	6.111	0.000	0.000	336.76
		B		64.567	6.111	0.000	0.000	829.11
		C		84.067	11.482	0.000	0.000	1760.16
T4	100.00-80.00	A	0.500	15.042	6.111	0.000	0.000	336.76
		B		64.567	6.111	0.000	0.000	829.11
		C		92.942	13.272	0.000	0.000	1961.63
T5	80.00-60.00	A	0.500	15.042	6.111	0.000	0.000	336.76
		B		64.567	6.111	0.000	0.000	829.11
		C		92.942	13.272	0.000	0.000	1961.63
T6	60.00-40.00	A	0.500	15.042	6.111	0.000	0.000	336.76
		B		64.567	6.111	0.000	0.000	829.11
		C		92.942	13.272	0.000	0.000	1961.63
T7	40.00-20.00	A	0.500	15.042	6.111	0.000	0.000	336.76
		B		64.567	6.111	0.000	0.000	829.11
		C		92.942	13.272	0.000	0.000	1961.63
T8	20.00-0.00	A	0.500	11.854	6.111	0.000	0.000	308.08
		B		48.425	6.111	0.000	0.000	677.34
		C		71.946	13.010	0.000	0.000	1610.70

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	150.00-140.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	1.270	1.504	2.226
T2	140.00-120.00	A	0.000	0.820	1.077	1.640
		B	0.000	1.128	1.517	2.256
		C	0.000	2.610	3.391	5.221
T3	120.00-100.00	A	0.000	0.780	1.024	1.559
		B	0.000	2.860	3.847	5.720
		C	0.000	3.784	4.760	7.567
T4	100.00-80.00	A	0.000	0.592	0.971	1.479
		B	0.000	2.171	3.650	5.428
		C	0.000	3.201	5.002	8.003
T5	80.00-60.00	A	0.000	0.559	1.101	1.676
		B	0.000	2.050	4.135	6.149
		C	0.000	3.022	5.667	9.067
T6	60.00-40.00	A	0.000	0.539	1.061	1.616

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Section	Elevation	Face	A_R	$A_{R_{Ice}}$	A_F	$A_{F_{Ice}}$
	ft		ft ²	ft ²	ft ²	ft ²
T7	40.00-20.00	B	0.000	1.977	3.988	5.930
		C	0.000	2.915	5.465	8.744
		A	0.000	0.381	0.876	1.334
T8	20.00-0.00	B	0.000	1.399	3.292	4.896
		C	0.000	2.062	4.512	7.219
		A	0.000	0.309	0.720	1.080
		B	0.000	1.048	2.474	3.667
		C	0.000	1.593	3.527	5.576

Feed Line Center of Pressure

Section	Elevation	CP_x	CP_z	CP_x	CP_z
	ft	in	in	Ice in	Ice in
T1	150.00-140.00	5.9789	8.2828	5.2625	8.0542
T2	140.00-120.00	4.1273	3.9171	3.9794	4.1722
T3	120.00-100.00	3.6129	0.9808	3.3257	1.4685
T4	100.00-80.00	3.6916	1.8181	3.3805	2.4991
T5	80.00-60.00	3.9732	1.8712	3.7271	2.6688
T6	60.00-40.00	4.1999	1.9123	4.0244	2.8141
T7	40.00-20.00	4.9205	2.1808	4.7729	3.2735
T8	20.00-0.00	4.3414	2.5533	4.1882	3.6226

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz. Lateral Vert	Azimuth Adjustment	Placement	C_{AA} Front	C_{AA} Side	Weight	
			ft ft ft	°	ft	ft ²	ft ²	lb	
RFS	C	From Leg	4.00	0.0000	150.00	No Ice	6.46	2.15	53.90
APX16DWV-16DWVS-E-A 20 (T-Mobile)			0.00			1/2" Ice	6.82	2.55	86.90
RFS	A	From Leg	4.00	0.0000	150.00	No Ice	6.46	2.15	53.90
APX16DWV-16DWVS-E-A 20 (T-Mobile)			0.00			1/2" Ice	6.82	2.55	86.90
RFS	B	From Leg	4.00	0.0000	150.00	No Ice	6.46	2.15	53.90
APX16DWV-16DWVS-E-A 20 (T-Mobile)			0.00			1/2" Ice	6.82	2.55	86.90
(2) RFS APXV18-209014-C (T-Mobile)	C	From Leg	4.00	0.0000	150.00	No Ice	3.51	2.00	34.10
			0.00			1/2" Ice	3.84	2.37	53.70
(2) RFS APXV18-209014-C (T-Mobile)	A	From Leg	4.00	0.0000	150.00	No Ice	3.51	2.00	34.10
			0.00			1/2" Ice	3.84	2.37	53.70
(2) RFS APXV18-209014-C (T-Mobile)	B	From Leg	4.00	0.0000	150.00	No Ice	3.51	2.00	34.10
			0.00			1/2" Ice	3.84	2.37	53.70

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Lateral						Vert
			ft	ft	°	ft	ft ²	ft ²	lb	
Nudd TMA (T-Mobile)	C	From Leg	0.00							
			4.00		0.0000	150.00	No Ice	1.40	1.40	5.00
			0.00				1/2" Ice	1.64	1.64	8.00
Nudd TMA (T-Mobile)	A	From Leg	0.00							
			4.00		0.0000	150.00	No Ice	1.40	1.40	5.00
			0.00				1/2" Ice	1.64	1.64	8.00
Nudd TMA (T-Mobile)	B	From Leg	0.00							
			4.00		0.0000	150.00	No Ice	1.40	1.40	5.00
			0.00				1/2" Ice	1.64	1.64	8.00
Antel BXA-70063/6CF-2 (Verizon)	C	From Leg	0.00							
			4.00		0.0000	127.50	No Ice	7.57	2.21	17.00
			0.00				1/2" Ice	8.02	2.70	57.60
Antel BXA-70063/6CF-2 (Verizon)	A	From Leg	0.00							
			4.00		0.0000	127.50	No Ice	7.57	2.21	17.00
			0.00				1/2" Ice	8.02	2.70	57.60
Antel BXA-70063/6CF-2 (Verizon)	B	From Leg	0.00							
			4.00		0.0000	127.50	No Ice	7.57	2.21	17.00
			0.00				1/2" Ice	8.02	2.70	57.60
Powerwave 7770.00 (AT&T)	A	From Leg	0.00							
			4.00		0.0000	115.00	No Ice	5.88	2.93	35.00
			0.00				1/2" Ice	6.25	3.29	67.60
Powerwave 7770.00 (AT&T)	B	From Leg	0.00							
			4.00		0.0000	115.00	No Ice	5.88	2.93	35.00
			0.00				1/2" Ice	6.25	3.29	67.60
Powerwave 7770.00 (AT&T)	C	From Leg	0.00							
			4.00		0.0000	115.00	No Ice	5.88	2.93	35.00
			0.00				1/2" Ice	6.25	3.29	67.60
(2) Powerwave LGP21401 (AT&T)	A	From Leg	0.00							
			4.00		0.0000	115.00	No Ice	1.95	0.53	31.00
			0.00				1/2" Ice	2.11	0.63	42.00
(2) Powerwave LGP21401 (AT&T)	B	From Leg	0.00							
			4.00		0.0000	115.00	No Ice	1.95	0.53	31.00
			0.00				1/2" Ice	2.11	0.63	42.00
(2) Powerwave LGP21401 (AT&T)	C	From Leg	0.00							
			4.00		0.0000	115.00	No Ice	1.95	0.53	31.00
			0.00				1/2" Ice	2.11	0.63	42.00
(2) RFS APL868013 (Verizon)	C	From Leg	0.00							
			4.00		0.0000	127.50	No Ice	2.87	3.61	8.20
			0.00				1/2" Ice	3.17	3.92	33.60
(2) RFS APL868013 (Verizon)	A	From Leg	0.00							
			4.00		0.0000	127.50	No Ice	2.87	3.61	8.20
			0.00				1/2" Ice	3.17	3.92	33.60
(2) RFS APL866513 (Verizon)	B	From Leg	0.00							
			4.00		0.0000	127.50	No Ice	4.29	3.73	15.70
			0.00				1/2" Ice	4.62	4.05	47.00
(2) RFS FD9R6004/2C-3L (Verizon)	C	From Leg	0.00							
			4.00		0.0000	127.50	No Ice	0.31	0.08	3.10
			0.00				1/2" Ice	0.38	0.12	5.40
(2) RFS FD9R6004/2C-3L (Verizon)	A	From Leg	0.00							
			4.00		0.0000	127.50	No Ice	0.31	0.08	3.10
			0.00				1/2" Ice	0.38	0.12	5.40
(2) RFS FD9R6004/2C-3L (Verizon)	B	From Leg	0.00							
			4.00		0.0000	127.50	No Ice	0.31	0.08	3.10
			0.00				1/2" Ice	0.38	0.12	5.40
Ryma MG D5-800T2 (Verizon)	C	From Leg	0.00							
			4.00		0.0000	127.50	No Ice	3.45	2.22	19.80
			0.00				1/2" Ice	3.80	2.60	39.90

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Lateral						Vert
			ft	ft	°	ft	ft ²	ft ²	lb	
Ryma MG D5-800T2 (Verizon)	A	From Leg	0.00							
			4.00		0.0000	127.50	No Ice	3.45	2.22	19.80
			0.00				1/2" Ice	3.80	2.60	39.90
Ryma MG D5-800T2 (Verizon)	B	From Leg	0.00							
			4.00		0.0000	127.50	No Ice	3.45	2.22	19.80
			0.00				1/2" Ice	3.80	2.60	39.90
(2) RFS ATMPP1412D-1CWA (T-Mobile)	C	From Leg	0.00							
			4.00		0.0000	150.00	No Ice	1.17	0.42	12.50
			0.00				1/2" Ice	1.30	0.52	19.50
(2) RFS ATMPP1412D-1CWA (T-Mobile)	A	From Leg	0.00							
			4.00		0.0000	150.00	No Ice	1.17	0.42	12.50
			0.00				1/2" Ice	1.30	0.52	19.50
(2) RFS ATMPP1412D-1CWA (T-Mobile)	B	From Leg	0.00							
			4.00		0.0000	150.00	No Ice	1.17	0.42	12.50
			0.00				1/2" Ice	1.30	0.52	19.50
Powerwave P65-17-XLH-RR (AT&T)	A	From Leg	0.00							
			4.00		0.0000	115.00	No Ice	11.47	4.00	62.00
			0.00				1/2" Ice	12.08	4.68	124.10
KMW AM-X-CD-16-65-00T-RET (AT&T)	B	From Leg	0.00							
			4.00		0.0000	115.00	No Ice	8.26	4.64	48.50
			0.00				1/2" Ice	8.73	5.12	95.00
Andrew SBNH-1D6565C (AT&T)	C	From Leg	0.00							
			4.00		0.0000	115.00	No Ice	11.41	7.70	60.90
			0.00				1/2" Ice	12.03	8.36	126.60
(2) Ericsson RRU11 (AT&T)	A	From Leg	0.00							
			4.00		0.0000	115.00	No Ice	2.99	0.36	50.00
			0.00				1/2" Ice	3.19	0.48	63.50
(2) Ericsson RRU11 (AT&T)	B	From Leg	0.00							
			4.00		0.0000	115.00	No Ice	2.99	0.36	50.00
			0.00				1/2" Ice	3.19	0.48	63.50
(2) Ericsson RRU11 (AT&T)	C	From Leg	0.00							
			4.00		0.0000	115.00	No Ice	2.99	0.36	50.00
			0.00				1/2" Ice	3.19	0.48	63.50
Raycap DC6-48-60-18-8F (AT&T)	A	From Leg	0.00							
			4.00		0.0000	115.00	No Ice	2.57	2.57	31.80
			0.00				1/2" Ice	2.77	2.77	54.40
Antel BXA-171085-12CF (Verizon)	A	From Leg	0.00							
			4.00		0.0000	127.50	No Ice	4.79	3.62	15.00
			0.00				1/2" Ice	5.27	4.14	42.50
Antel BXA-171063-12CF (Verizon)	B	From Leg	0.00							
			4.00		0.0000	127.50	No Ice	4.79	3.62	15.00
			0.00				1/2" Ice	5.27	4.14	42.50
Antel BXA-171063-12CF (Verizon)	C	From Leg	0.00							
			4.00		0.0000	127.50	No Ice	4.79	3.62	15.00
			0.00				1/2" Ice	5.27	4.14	42.50
Alcatel Lucent RRH2x40 AWS (Verizon)	A	From Leg	0.00							
			4.00		0.0000	127.50	No Ice	2.52	1.59	44.00
			0.00				1/2" Ice	2.72	1.77	61.40
Alcatel Lucent RRH2x40 AWS (Verizon)	B	From Leg	0.00							
			4.00		0.0000	127.50	No Ice	2.52	1.59	44.00
			0.00				1/2" Ice	2.72	1.77	61.40
Alcatel Lucent RRH2x40 AWS (Verizon)	C	From Leg	0.00							
			4.00		0.0000	127.50	No Ice	2.52	1.59	44.00
			0.00				1/2" Ice	2.72	1.77	61.40
RFS DB-T1-6Z-8B-0Z (Verizon)	A	From Leg	0.00							
			4.00		0.0000	127.50	No Ice	5.60	2.33	30.00
			0.00				1/2" Ice	5.87	2.53	66.10

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA}		Weight	
			Horz	Lateral			Front	Side		
			ft	ft	°	ft	ft ²	ft ²	lb	
KMW ET-X-TU-42-15-37-18-IR-R A	A	From Leg	0.00		0.0000	140.00	No Ice	7.28	3.29	50.00
			4.00				1/2" Ice	7.61	3.59	95.80
			0.00							
RFS APXVSPP18-C	B	From Leg	0.00		0.0000	140.00	No Ice	8.02	5.28	57.00
			4.00				1/2" Ice	8.48	5.75	106.50
			0.00							
RFS APXV9ERR18-C-A20	C	From Leg	0.00		0.0000	140.00	No Ice	8.02	5.81	62.00
			4.00				1/2" Ice	8.48	6.27	114.00
			0.00							
Alcatel Lucent 1900 MHz	A	From Leg	0.00		0.0000	140.00	No Ice	2.41	2.47	60.00
			4.00				1/2" Ice	2.59	2.66	84.70
			0.00							
Alcatel Lucent 800 MHz	A	From Leg	0.00		0.0000	140.00	No Ice	1.70	1.28	60.00
			4.00				1/2" Ice	1.85	1.41	77.00
			0.00							
Alcatel Lucent 1900 MHz	B	From Leg	0.00		0.0000	140.00	No Ice	2.41	2.47	60.00
			4.00				1/2" Ice	2.59	2.66	84.70
			0.00							
Alcatel Lucent 800 MHz	B	From Leg	0.00		0.0000	140.00	No Ice	1.70	1.28	60.00
			4.00				1/2" Ice	1.85	1.41	77.00
			0.00							
Alcatel Lucent 1900 MHz	C	From Leg	0.00		0.0000	140.00	No Ice	2.41	2.47	60.00
			4.00				1/2" Ice	2.59	2.66	84.70
			0.00							
Alcatel Lucent 800 MHz	C	From Leg	0.00		0.0000	140.00	No Ice	1.70	1.28	60.00
			4.00				1/2" Ice	1.85	1.41	77.00
			0.00							
Nudd 12' boom	C	From Leg	1.00		0.0000	150.00	No Ice	17.10	9.30	254.00
			0.00				1/2" Ice	21.40	21.40	376.00
			0.00							
Nudd 12' boom	A	From Leg	1.00		0.0000	150.00	No Ice	17.10	9.30	254.00
			0.00				1/2" Ice	21.40	21.40	376.00
			0.00							
Nudd 12' boom	B	From Leg	1.00		0.0000	150.00	No Ice	17.10	9.30	254.00
			0.00				1/2" Ice	21.40	21.40	376.00
			0.00							
Nudd 12' boom	C	From Leg	1.00		0.0000	127.50	No Ice	17.10	9.30	254.00
			0.00				1/2" Ice	21.40	21.40	376.00
			0.00							
Nudd 12' boom	A	From Leg	1.00		0.0000	127.50	No Ice	17.10	9.30	254.00
			0.00				1/2" Ice	21.40	21.40	376.00
			0.00							
Nudd 12' boom	B	From Leg	1.00		0.0000	127.50	No Ice	17.10	9.30	254.00
			0.00				1/2" Ice	21.40	21.40	376.00
			0.00							
Nudd 10' boom	C	From Leg	1.00		0.0000	115.00	No Ice	15.50	9.30	255.00
			0.00				1/2" Ice	19.60	19.60	367.00
			0.00							
Nudd 10' boom	C	From Leg	1.00		0.0000	115.00	No Ice	15.50	9.30	255.00
			0.00				1/2" Ice	19.60	19.60	367.00
			0.00							
Nudd 10' boom	A	From Leg	1.00		0.0000	115.00	No Ice	15.50	9.30	255.00
			0.00				1/2" Ice	19.60	19.60	367.00
			0.00							
Nudd 12' boom	A	From Leg	1.00		0.0000	140.00	No Ice	17.10	9.30	254.00
			0.00				1/2" Ice	21.40	21.40	376.00
			0.00							

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight	
			Horz	Lateral						
			Vert							
			ft	ft	°	ft	ft ²	ft ²	lb	
			ft							
Alcatel Lucent 1900 MHz RRH	A	From Leg	0.00		0.0000	140.00	No Ice	2.58	2.54	60.00
			4.00				1/2" Ice	2.77	2.73	86.50
			0.00							
Alcatel Lucent 1900 MHz RRH	B	From Leg	4.00		0.0000	140.00	No Ice	2.91	3.80	60.00
			0.00				1/2" Ice	3.11	4.03	86.50
			0.00							
Alcatel Lucent 1900 MHz RRH	C	From Leg	4.00		0.0000	140.00	No Ice	2.91	3.80	60.00
			0.00				1/2" Ice	3.11	4.03	68.50
			0.00							
RFS IBC1900BB-3	A	From Leg	4.00		0.0000	140.00	No Ice	1.41	0.63	22.00
			0.00				1/2" Ice	1.55	0.74	31.00
			0.00							
RFS IBC1900BB-3	B	From Leg	4.00		0.0000	140.00	No Ice	1.41	0.63	22.00
			0.00				1/2" Ice	1.55	0.74	31.00
			0.00							
RFS IBC1900BB-3	C	From Leg	4.00		0.0000	140.00	No Ice	1.41	0.63	22.00
			0.00				1/2" Ice	1.55	0.74	31.00
			0.00							

Tower Pressures - No Ice

$$G_H = 1.133$$

Section Elevation	z	K _Z	q _z	A _G	F _a	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face	C _A A _A Out Face
ft	ft		psf	ft ²	c	ft ²	ft ²	ft ²		ft ²	ft ²
T1 150.00-140.00	145.00	1.526	28	62.396	A	4.993	5.104	4.792	47.46	0.000	0.000
					B	4.993	4.792	48.97	0.000	0.000	
					C	5.989	19.954	18.47	0.000	0.000	
T2 140.00-120.00	130.00	1.48	27	124.792	A	13.653	17.958	9.583	30.32	0.000	0.000
					B	10.088	25.671	26.80	0.000	0.000	
					C	11.339	45.358	16.90	0.000	0.000	
T3 120.00-100.00	110.00	1.411	26	147.509	A	14.599	23.400	15.025	39.54	0.000	0.000
					B	11.776	57.925	21.56	0.000	0.000	
					C	14.613	66.175	18.60	0.000	0.000	
T4 100.00-80.00	90.00	1.332	25	189.283	A	17.025	26.949	18.574	42.24	0.000	0.000
					B	14.347	61.474	24.50	0.000	0.000	
					C	17.995	74.849	20.01	0.000	0.000	
T5 80.00-60.00	70.00	1.24	23	231.055	A	21.929	30.495	22.120	42.19	0.000	0.000
					B	18.895	65.020	26.36	0.000	0.000	
					C	22.363	78.395	21.95	0.000	0.000	
T6 60.00-40.00	50.00	1.126	21	274.393	A	24.383	37.173	28.798	46.78	0.000	0.000
					B	21.456	71.698	30.91	0.000	0.000	
					C	24.979	85.073	26.17	0.000	0.000	
T7 40.00-20.00	30.00	1	18	314.393	A	23.751	37.173	28.798	47.27	0.000	0.000
					B	21.336	71.698	30.95	0.000	0.000	
					C	25.116	85.073	26.14	0.000	0.000	
T8 20.00-0.00	10.00	1	18	354.393	A	25.953	35.235	28.798	47.06	0.000	0.000

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Section Elevation	z	K _Z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face	C _A A _A Out Face
ft	ft		psf	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
					B	24.198	60.973		33.81	0.000	0.000
					C	28.146	72.410		28.64	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.133$

Section Elevation	z	K _Z	q _z	t _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face	C _A A _A Out Face
ft	ft		psf	in	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
T1 150.00-140.00	145.00	1.526	21	0.5000	63.229	A	4.993	10.453	6.458	41.81	0.000	0.000
						B	4.993	9.307		45.16	0.000	0.000
						C	5.822	31.533		17.29	0.000	0.000
T2 140.00-120.00	130.00	1.48	21	0.5000	126.458	A	14.201	32.003	12.917	27.96	0.000	0.000
						B	9.766	40.866		25.51	0.000	0.000
						C	10.620	72.613		15.52	0.000	0.000
T3 120.00-100.00	110.00	1.411	20	0.5000	149.178	A	15.175	37.937	18.364	34.58	0.000	0.000
						B	11.014	85.382		19.05	0.000	0.000
						C	14.538	103.959		15.50	0.000	0.000
T4 100.00-80.00	90.00	1.332	18	0.5000	190.952	A	17.629	41.562	21.913	37.02	0.000	0.000
						B	13.680	89.507		21.24	0.000	0.000
						C	18.266	116.852		16.22	0.000	0.000
T5 80.00-60.00	70.00	1.24	17	0.5000	232.724	A	22.465	45.952	25.459	37.21	0.000	0.000
						B	17.992	93.986		22.74	0.000	0.000
						C	22.236	121.388		17.73	0.000	0.000
T6 60.00-40.00	50.00	1.126	16	0.5000	276.062	A	24.939	53.454	32.137	40.99	0.000	0.000
						B	20.625	101.541		26.31	0.000	0.000
						C	24.972	128.978		20.87	0.000	0.000
T7 40.00-20.00	30.00	1	14	0.5000	316.062	A	24.404	52.405	32.137	41.84	0.000	0.000
						B	20.843	100.913		26.39	0.000	0.000
						C	25.681	128.624		20.83	0.000	0.000
T8 20.00-0.00	10.00	1	14	0.5000	356.062	A	26.704	49.875	32.137	41.97	0.000	0.000
						B	24.117	85.706		29.26	0.000	0.000
						C	29.106	108.682		23.32	0.000	0.000

Tower Pressure - Service

$G_H = 1.133$

Section Elevation	z	K _Z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face	C _A A _A Out Face
ft	ft		psf	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
T1 150.00-140.00	145.00	1.526	14	62.396	A	4.993	5.104	4.792	47.46	0.000	0.000
					B	4.993	4.792		48.97	0.000	0.000
					C	5.989	19.954		18.47	0.000	0.000
T2 140.00-120.00	130.00	1.48	14	124.792	A	13.653	17.958	9.583	30.32	0.000	0.000
					B	10.088	25.671		26.80	0.000	0.000
					C	11.339	45.358		16.90	0.000	0.000
T3 120.00-100.00	110.00	1.411	13	147.509	A	14.599	23.400	15.025	39.54	0.000	0.000
					B	11.776	57.925		21.56	0.000	0.000

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Section Elevation <i>ft</i>	<i>z</i> <i>ft</i>	<i>K_Z</i>	<i>q_z</i> <i>psf</i>	<i>A_G</i> <i>ft²</i>	<i>F_a</i> <i>c</i> <i>e</i>	<i>A_F</i> <i>ft²</i>	<i>A_R</i> <i>ft²</i>	<i>A_{leg}</i> <i>ft²</i>	<i>Leg</i> <i>%</i>	<i>C_{AA}</i> <i>In</i> <i>Face</i> <i>ft²</i>	<i>C_{AA}</i> <i>Out</i> <i>Face</i> <i>ft²</i>
T4 100.00-80.00	90.00	1.332	12	189.283	C	14.613	66.175	18.574	18.60	0.000	0.000
					A	17.025	26.949		42.24	0.000	0.000
					B	14.347	61.474		24.50	0.000	0.000
T5 80.00-60.00	70.00	1.24	11	231.055	C	17.995	74.849	22.120	20.01	0.000	0.000
					A	21.929	30.495		42.19	0.000	0.000
					B	18.895	65.020		26.36	0.000	0.000
T6 60.00-40.00	50.00	1.126	10	274.393	C	22.363	78.395	28.798	21.95	0.000	0.000
					A	24.383	37.173		46.78	0.000	0.000
					B	21.456	71.698		30.91	0.000	0.000
T7 40.00-20.00	30.00	1	9	314.393	C	24.979	85.073	28.798	26.17	0.000	0.000
					A	23.751	37.173		47.27	0.000	0.000
					B	21.336	71.698		30.95	0.000	0.000
T8 20.00-0.00	10.00	1	9	354.393	C	25.116	85.073	28.798	26.14	0.000	0.000
					A	25.953	35.235		47.06	0.000	0.000
					B	24.198	60.973		33.81	0.000	0.000
					C	28.146	72.410		28.64	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation <i>ft</i>	Add Weight <i>lb</i>	Self Weight <i>lb</i>	<i>F_a</i> <i>c</i> <i>e</i>	<i>e</i>	<i>C_F</i>	<i>R_R</i>	<i>D_F</i>	<i>D_R</i>	<i>A_E</i> <i>ft²</i>	<i>F</i> <i>lb</i>	<i>w</i> <i>plf</i>	Ctrl. Face
T1 150.00-140.00	233.80	421.53	A	0.162	2.728	0.583	1	1	7.970	1244.22	124.42	C
			B	0.157	2.747	0.583	1	1	7.784			
			C	0.416	2.034	0.658	1	1	19.122			
T2 140.00-120.00	837.95	791.76	A	0.253	2.428	0.603	1	1	24.477	2559.47	127.97	C
			B	0.287	2.332	0.612	1	1	25.796			
			C	0.454	1.966	0.675	1	1	41.969			
T3 120.00-100.00	1369.75	1140.72	A	0.258	2.415	0.604	1	1	28.729	3408.47	170.42	C
			B	0.473	1.938	0.684	1	1	51.390			
			C	0.548	1.846	0.723	1	1	62.456			
T4 100.00-80.00	1467.60	1485.02	A	0.232	2.492	0.598	1	1	33.128	3729.69	186.48	C
			B	0.401	2.063	0.652	1	1	54.418			
			C	0.491	1.913	0.693	1	1	69.843			
T5 80.00-60.00	1467.60	1986.33	A	0.227	2.509	0.596	1	1	40.112	3873.86	193.69	C
			B	0.363	2.142	0.637	1	1	60.331			
			C	0.436	1.997	0.667	1	1	74.651			
T6 60.00-40.00	1467.60	2680.91	A	0.224	2.517	0.596	1	1	46.525	3915.31	195.77	C
			B	0.339	2.196	0.629	1	1	66.539			
			C	0.401	2.062	0.652	1	1	80.449			
T7 40.00-20.00	1467.60	3829.48	A	0.194	2.617	0.589	1	1	45.652	3591.18	179.56	C
			B	0.296	2.307	0.615	1	1	65.405			
			C	0.35	2.17	0.633	1	1	78.937			
T8 20.00-0.00	1283.80	3948.61	A	0.173	2.69	0.585	1	1	46.573	3551.07	177.55	C
			B	0.24	2.467	0.599	1	1	60.749			
			C	0.284	2.34	0.611	1	1	72.393			
Sum Weight:	9595.70	16284.35						OTM	1833929.3 7 lb-ft	25873.28		

Tower Forces - No Ice - Wind 60 To Face

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Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
T1 150.00-140.00	233.80	421.53	A	0.162	2.728	0.583	0.8	1	6.972	1166.28	116.63	C
			B	0.157	2.747	0.583	0.8	1	6.786			
			C	0.416	2.034	0.658	0.8	1	17.924			
T2 140.00-120.00	837.95	791.76	A	0.253	2.428	0.603	0.8	1	21.747	2421.17	121.06	C
			B	0.287	2.332	0.612	0.8	1	23.778			
			C	0.454	1.966	0.675	0.8	1	39.701			
T3 120.00-100.00	1369.75	1140.72	A	0.258	2.415	0.604	0.8	1	25.809	3248.98	162.45	C
			B	0.473	1.938	0.684	0.8	1	49.034			
			C	0.548	1.846	0.723	0.8	1	59.533			
T4 100.00-80.00	1467.60	1485.02	A	0.232	2.492	0.598	0.8	1	29.723	3537.51	176.88	C
			B	0.401	2.063	0.652	0.8	1	51.549			
			C	0.491	1.913	0.693	0.8	1	66.244			
T5 80.00-60.00	1467.60	1986.33	A	0.227	2.509	0.596	0.8	1	35.726	3641.76	182.09	C
			B	0.363	2.142	0.637	0.8	1	56.552			
			C	0.436	1.997	0.667	0.8	1	70.179			
T6 60.00-40.00	1467.60	2680.91	A	0.224	2.517	0.596	0.8	1	41.649	3672.18	183.61	C
			B	0.339	2.196	0.629	0.8	1	62.247			
			C	0.401	2.062	0.652	0.8	1	75.454			
T7 40.00-20.00	1467.60	3829.48	A	0.194	2.617	0.589	0.8	1	40.902	3362.65	168.13	C
			B	0.296	2.307	0.615	0.8	1	61.138			
			C	0.35	2.17	0.633	0.8	1	73.914			
T8 20.00-0.00	1283.80	3948.61	A	0.173	2.69	0.585	0.8	1	41.382	3274.94	163.75	C
			B	0.24	2.467	0.599	0.8	1	55.909			
			C	0.284	2.34	0.611	0.8	1	66.764			
Sum Weight:	9595.70	16284.35						OTM	1731786.6 5 lb-ft	24325.47		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
T1 150.00-140.00	233.80	421.53	A	0.162	2.728	0.583	0.85	1	7.222	1185.77	118.58	C
			B	0.157	2.747	0.583	0.85	1	7.035			
			C	0.416	2.034	0.658	0.85	1	18.224			
T2 140.00-120.00	837.95	791.76	A	0.253	2.428	0.603	0.85	1	22.429	2455.74	122.79	C
			B	0.287	2.332	0.612	0.85	1	24.282			
			C	0.454	1.966	0.675	0.85	1	40.268			
T3 120.00-100.00	1369.75	1140.72	A	0.258	2.415	0.604	0.85	1	26.539	3288.85	164.44	C
			B	0.473	1.938	0.684	0.85	1	49.623			
			C	0.548	1.846	0.723	0.85	1	60.264			
T4 100.00-80.00	1467.60	1485.02	A	0.232	2.492	0.598	0.85	1	30.574	3585.55	179.28	C
			B	0.401	2.063	0.652	0.85	1	52.266			
			C	0.491	1.913	0.693	0.85	1	67.144			
T5 80.00-60.00	1467.60	1986.33	A	0.227	2.509	0.596	0.85	1	36.823	3699.79	184.99	C
			B	0.363	2.142	0.637	0.85	1	57.496			
			C	0.436	1.997	0.667	0.85	1	71.297			
T6 60.00-40.00	1467.60	2680.91	A	0.224	2.517	0.596	0.85	1	42.868	3732.96	186.65	C
			B	0.339	2.196	0.629	0.85	1	63.320			
			C	0.401	2.062	0.652	0.85	1	76.703			
T7 40.00-20.00	1467.60	3829.48	A	0.194	2.617	0.589	0.85	1	42.089	3419.79	170.99	C
			B	0.296	2.307	0.615	0.85	1	62.205			
			C	0.35	2.17	0.633	0.85	1	75.169			
T8 20.00-0.00	1283.80	3948.61	A	0.173	2.69	0.585	0.85	1	42.680	3343.98	167.20	C
			B	0.24	2.467	0.599	0.85	1	57.119			
			C									

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Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
Sum Weight:	9595.70	16284.35	C	0.284	2.34	0.611	0.85	1 OTM	68.171 1757322.3 3 lb-ft	24712.42		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
T1 150.00-140.00	538.85	669.78	A	0.244	2.455	0.6	1	1	11.269	1277.36	127.74	C
			B	0.226	2.511	0.596	1	1	10.541			
			C	0.591	1.81	0.748	1	1	29.409			
T2 140.00-120.00	1803.46	1268.88	A	0.365	2.137	0.638	1	1	34.622	2816.65	140.83	C
			B	0.4	2.063	0.652	1	1	36.401			
			C	0.658	1.779	0.791	1	1	68.053			
T3 120.00-100.00	2926.04	1715.74	A	0.356	2.158	0.635	1	1	39.252	4309.22	215.46	C
			B	0.646	1.783	0.783	1	1	77.863			
			C	0.794	1.812	0.892	1	1	107.247			
T4 100.00-80.00	3127.50	2166.64	A	0.31	2.27	0.619	1	1	43.355	4267.61	213.38	C
			B	0.54	1.853	0.719	1	1	78.030			
			C	0.708	1.777	0.825	1	1	114.711			
T5 80.00-60.00	3127.50	2866.41	A	0.294	2.312	0.614	1	1	50.683	4021.83	201.09	C
			B	0.481	1.926	0.688	1	1	82.661			
			C	0.617	1.794	0.764	1	1	115.006			
T6 60.00-40.00	3127.50	3721.00	A	0.284	2.34	0.611	1	1	57.606	3866.76	193.34	C
			B	0.443	1.986	0.67	1	1	88.645			
			C	0.558	1.836	0.729	1	1	118.947			
T7 40.00-20.00	3127.50	4822.68	A	0.243	2.459	0.6	1	1	55.854	3452.54	172.63	C
			B	0.385	2.094	0.646	1	1	86.001			
			C	0.488	1.916	0.692	1	1	114.632			
T8 20.00-0.00	2596.12	5006.11	A	0.215	2.546	0.594	1	1	56.309	3265.08	163.25	C
			B	0.308	2.274	0.619	1	1	77.128			
			C	0.387	2.09	0.646	1	1	99.355			
Sum Weight:	20374.47	22237.23						OTM	2020573.9 7 lb-ft	27277.05		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
T1 150.00-140.00	538.85	669.78	A	0.244	2.455	0.6	0.8	1	10.271	1226.78	122.68	C
			B	0.226	2.511	0.596	0.8	1	9.542			
			C	0.591	1.81	0.748	0.8	1	28.245			
T2 140.00-120.00	1803.46	1268.88	A	0.365	2.137	0.638	0.8	1	31.782	2728.74	136.44	C
			B	0.4	2.063	0.652	0.8	1	34.447			
			C	0.658	1.779	0.791	0.8	1	65.929			
T3 120.00-100.00	2926.04	1715.74	A	0.356	2.158	0.635	0.8	1	36.217	4192.39	209.62	C
			B	0.646	1.783	0.783	0.8	1	75.661			

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Section Elevation <i>ft</i>	Add Weight <i>lb</i>	Self Weight <i>lb</i>	<i>F a c e</i>	<i>e</i>	<i>C_F</i>	<i>R_R</i>	<i>D_F</i>	<i>D_R</i>	<i>A_E</i> <i>ft²</i>	<i>F</i> <i>lb</i>	<i>w</i> <i>plf</i>	<i>Ctrl. Face</i>
T4 100.00-80.00	3127.50	2166.64	C	0.794	1.812	0.892	0.8	1	104.339	4131.70	206.59	C
			A	0.31	2.27	0.619	0.8	1	39.830			
			B	0.54	1.853	0.719	0.8	1	75.294			
T5 80.00-60.00	3127.50	2866.41	C	0.708	1.777	0.825	0.8	1	111.058	3866.31	193.32	C
			A	0.294	2.312	0.614	0.8	1	46.190			
			B	0.481	1.926	0.688	0.8	1	79.063			
T6 60.00-40.00	3127.50	3721.00	C	0.617	1.794	0.764	0.8	1	110.559	3704.40	185.22	C
			A	0.284	2.34	0.611	0.8	1	52.618			
			B	0.443	1.986	0.67	0.8	1	84.520			
T7 40.00-20.00	3127.50	4822.68	C	0.558	1.836	0.729	0.8	1	113.952	3297.84	164.89	C
			A	0.243	2.459	0.6	0.8	1	50.973			
			B	0.385	2.094	0.646	0.8	1	81.832			
T8 20.00-0.00	2596.12	5006.11	C	0.488	1.916	0.692	0.8	1	109.496	3073.78	153.69	C
			A	0.215	2.546	0.594	0.8	1	50.968			
			B	0.308	2.274	0.619	0.8	1	72.304			
Sum Weight:	20374.47	22237.23	C	0.387	2.09	0.646	0.8	1	93.534	26221.94		
								OTM	1951169.9 2 lb-ft			

Tower Forces - With Ice - Wind 90 To Face

Section Elevation <i>ft</i>	Add Weight <i>lb</i>	Self Weight <i>lb</i>	<i>F a c e</i>	<i>e</i>	<i>C_F</i>	<i>R_R</i>	<i>D_F</i>	<i>D_R</i>	<i>A_E</i> <i>ft²</i>	<i>F</i> <i>lb</i>	<i>w</i> <i>plf</i>	<i>Ctrl. Face</i>
T1 150.00-140.00	538.85	669.78	A	0.244	2.455	0.6	0.85	1	10.520	1239.43	123.94	C
			B	0.226	2.511	0.596	0.85	1	9.792			
			C	0.591	1.81	0.748	0.85	1	28.536			
T2 140.00-120.00	1803.46	1268.88	A	0.365	2.137	0.638	0.85	1	32.492	2750.72	137.54	C
			B	0.4	2.063	0.652	0.85	1	34.936			
			C	0.658	1.779	0.791	0.85	1	66.460			
T3 120.00-100.00	2926.04	1715.74	A	0.356	2.158	0.635	0.85	1	36.976	4221.60	211.08	C
			B	0.646	1.783	0.783	0.85	1	76.211			
			C	0.794	1.812	0.892	0.85	1	105.066			
T4 100.00-80.00	3127.50	2166.64	A	0.31	2.27	0.619	0.85	1	40.711	4165.68	208.28	C
			B	0.54	1.853	0.719	0.85	1	75.978			
			C	0.708	1.777	0.825	0.85	1	111.971			
T5 80.00-60.00	3127.50	2866.41	A	0.294	2.312	0.614	0.85	1	47.313	3905.19	195.26	C
			B	0.481	1.926	0.688	0.85	1	79.963			
			C	0.617	1.794	0.764	0.85	1	111.670			
T6 60.00-40.00	3127.50	3721.00	A	0.284	2.34	0.611	0.85	1	53.865	3744.99	187.25	C
			B	0.443	1.986	0.67	0.85	1	85.551			
			C	0.558	1.836	0.729	0.85	1	115.201			
T7 40.00-20.00	3127.50	4822.68	A	0.243	2.459	0.6	0.85	1	52.193	3336.52	166.83	C
			B	0.385	2.094	0.646	0.85	1	82.874			
			C	0.488	1.916	0.692	0.85	1	110.780			
T8 20.00-0.00	2596.12	5006.11	A	0.215	2.546	0.594	0.85	1	52.303	3121.61	156.08	C
			B	0.308	2.274	0.619	0.85	1	73.510			
			C	0.387	2.09	0.646	0.85	1	94.989			
Sum Weight:	20374.47	22237.23						OTM	1968520.9 3 lb-ft	26485.72		

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Tower Forces - Service - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
T1 150.00-140.00	233.80	421.53	A	0.162	2.728	0.583	1	1	7.970	619.96	62.00	C
			B	0.157	2.747	0.583	1	1	7.784			
			C	0.416	2.034	0.658	1	1	19.122			
T2 140.00-120.00	837.95	791.76	A	0.253	2.428	0.603	1	1	24.477	1275.31	63.77	C
			B	0.287	2.332	0.612	1	1	25.796			
			C	0.454	1.966	0.675	1	1	41.969			
T3 120.00-100.00	1369.75	1140.72	A	0.258	2.415	0.604	1	1	28.729	1698.34	84.92	C
			B	0.473	1.938	0.684	1	1	51.390			
			C	0.548	1.846	0.723	1	1	62.456			
T4 100.00-80.00	1467.60	1485.02	A	0.232	2.492	0.598	1	1	33.128	1858.39	92.92	C
			B	0.401	2.063	0.652	1	1	54.418			
			C	0.491	1.913	0.693	1	1	69.843			
T5 80.00-60.00	1467.60	1986.33	A	0.227	2.509	0.596	1	1	40.112	1930.23	96.51	C
			B	0.363	2.142	0.637	1	1	60.331			
			C	0.436	1.997	0.667	1	1	74.651			
T6 60.00-40.00	1467.60	2680.91	A	0.224	2.517	0.596	1	1	46.525	1950.88	97.54	C
			B	0.339	2.196	0.629	1	1	66.539			
			C	0.401	2.062	0.652	1	1	80.449			
T7 40.00-20.00	1467.60	3829.48	A	0.194	2.617	0.589	1	1	45.652	1789.38	89.47	C
			B	0.296	2.307	0.615	1	1	65.405			
			C	0.35	2.17	0.633	1	1	78.937			
T8 20.00-0.00	1283.80	3948.61	A	0.173	2.69	0.585	1	1	46.573	1769.39	88.47	C
			B	0.24	2.467	0.599	1	1	60.749			
			C	0.284	2.34	0.611	1	1	72.393			
Sum Weight:	9595.70	16284.35						OTM	913791.80 lb-ft	12891.87		

Tower Forces - Service - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
T1 150.00-140.00	233.80	421.53	A	0.162	2.728	0.583	0.8	1	6.972	581.12	58.11	C
			B	0.157	2.747	0.583	0.8	1	6.786			
			C	0.416	2.034	0.658	0.8	1	17.924			
T2 140.00-120.00	837.95	791.76	A	0.253	2.428	0.603	0.8	1	21.747	1206.40	60.32	C
			B	0.287	2.332	0.612	0.8	1	23.778			
			C	0.454	1.966	0.675	0.8	1	39.701			
T3 120.00-100.00	1369.75	1140.72	A	0.258	2.415	0.604	0.8	1	25.809	1618.87	80.94	C
			B	0.473	1.938	0.684	0.8	1	49.034			
			C	0.548	1.846	0.723	0.8	1	59.533			
T4 100.00-80.00	1467.60	1485.02	A	0.232	2.492	0.598	0.8	1	29.723	1762.63	88.13	C
			B	0.401	2.063	0.652	0.8	1	51.549			
			C	0.491	1.913	0.693	0.8	1	66.244			
T5 80.00-60.00	1467.60	1986.33	A	0.227	2.509	0.596	0.8	1	35.726	1814.58	90.73	C
			B	0.363	2.142	0.637	0.8	1	56.552			
			C	0.436	1.997	0.667	0.8	1	70.179			
T6 60.00-40.00	1467.60	2680.91	A	0.224	2.517	0.596	0.8	1	41.649	1829.73	91.49	C
			B	0.339	2.196	0.629	0.8	1	62.247			
			C	0.401	2.062	0.652	0.8	1	75.454			
T7 40.00-20.00	1467.60	3829.48	A	0.194	2.617	0.589	0.8	1	40.902	1675.51	83.78	C
			B	0.296	2.307	0.615	0.8	1	61.138			

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Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
T8 20.00-0.00	1283.80	3948.61	C	0.35	2.17	0.633	0.8	1	73.914			
			A	0.173	2.69	0.585	0.8	1	41.382	1631.81	81.59	C
			B	0.24	2.467	0.599	0.8	1	55.909			
			C	0.284	2.34	0.611	0.8	1	66.764			
Sum Weight:	9595.70	16284.35						OTM	862897.16 lb-ft	12120.65		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
T1 150.00-140.00	233.80	421.53	A	0.162	2.728	0.583	0.85	1	7.222	590.83	59.08	C
			B	0.157	2.747	0.583	0.85	1	7.035			
			C	0.416	2.034	0.658	0.85	1	18.224			
T2 140.00-120.00	837.95	791.76	A	0.253	2.428	0.603	0.85	1	22.429	1223.62	61.18	C
			B	0.287	2.332	0.612	0.85	1	24.282			
			C	0.454	1.966	0.675	0.85	1	40.268			
T3 120.00-100.00	1369.75	1140.72	A	0.258	2.415	0.604	0.85	1	26.539	1638.74	81.94	C
			B	0.473	1.938	0.684	0.85	1	49.623			
			C	0.548	1.846	0.723	0.85	1	60.264			
T4 100.00-80.00	1467.60	1485.02	A	0.232	2.492	0.598	0.85	1	30.574	1786.57	89.33	C
			B	0.401	2.063	0.652	0.85	1	52.266			
			C	0.491	1.913	0.693	0.85	1	67.144			
T5 80.00-60.00	1467.60	1986.33	A	0.227	2.509	0.596	0.85	1	36.823	1843.49	92.17	C
			B	0.363	2.142	0.637	0.85	1	57.496			
			C	0.436	1.997	0.667	0.85	1	71.297			
T6 60.00-40.00	1467.60	2680.91	A	0.224	2.517	0.596	0.85	1	42.868	1860.02	93.00	C
			B	0.339	2.196	0.629	0.85	1	63.320			
			C	0.401	2.062	0.652	0.85	1	76.703			
T7 40.00-20.00	1467.60	3829.48	A	0.194	2.617	0.589	0.85	1	42.089	1703.98	85.20	C
			B	0.296	2.307	0.615	0.85	1	62.205			
			C	0.35	2.17	0.633	0.85	1	75.169			
T8 20.00-0.00	1283.80	3948.61	A	0.173	2.69	0.585	0.85	1	42.680	1666.20	83.31	C
			B	0.24	2.467	0.599	0.85	1	57.119			
			C	0.284	2.34	0.611	0.85	1	68.171			
Sum Weight:	9595.70	16284.35						OTM	875620.82 lb-ft	12313.45		

Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M _x lb-ft	Sum of Overturning Moments, M _z lb-ft	Sum of Torques lb-ft
Leg Weight	10129.62					
Bracing Weight	6154.73					
Total Member Self-Weight	16284.35					
Total Weight	30848.75			9290.21	-12.10	
Wind 0 deg - No Ice		119.96	-36564.61	-3232785.20	-13192.03	6115.56

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Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M _x lb-ft	Sum of Overturning Moments, M _z lb-ft	Sum of Torques lb-ft
Wind 30 deg - No Ice		17556.15	-30720.53	-2738675.79	-1561018.59	6865.23
Wind 60 deg - No Ice		29953.08	-17612.29	-1572090.30	-2668460.16	6050.07
Wind 90 deg - No Ice		34904.53	-119.96	-3889.73	-3099196.76	3851.29
Wind 120 deg - No Ice		31173.56	18178.41	1618913.76	-2743738.41	482.99
Wind 150 deg - No Ice		17348.37	30600.57	2744076.27	-1538190.27	-3013.94
Wind 180 deg - No Ice		-119.96	35016.80	3149222.91	13167.84	-5566.47
Wind 210 deg - No Ice		-17556.15	30720.53	2757256.21	1560994.39	-6865.23
Wind 240 deg - No Ice		-31293.52	18386.20	1641742.08	2756894.16	-6598.55
Wind 270 deg - No Ice		-34904.53	119.96	22470.15	3099172.56	-3851.29
Wind 300 deg - No Ice		-29833.12	-17404.51	-1549261.98	2655256.03	-483.60
Wind 330 deg - No Ice		-17348.37	-30600.57	-2725495.85	1538166.07	3013.94
Member Ice	5952.88					
Total Weight Ice	50371.50			21702.04	-6724.34	
Wind 0 deg - Ice		-31.21	-37507.55	-3347793.44	-2671.13	4796.12
Wind 30 deg - Ice		18235.68	-31781.57	-2849260.78	-1649926.83	6236.13
Wind 60 deg - Ice		31387.89	-18199.19	-1624833.49	-2841861.34	6165.27
Wind 90 deg - Ice		36525.41	31.21	25755.25	-3300149.69	4623.76
Wind 120 deg - Ice		32332.85	18780.80	1709959.96	-2906020.22	1787.92
Wind 150 deg - Ice		18289.73	31812.78	2896718.07	-1656947.20	-1612.37
Wind 180 deg - Ice		31.21	36452.44	3321793.47	-10777.56	-4443.07
Wind 210 deg - Ice		-18235.68	31781.57	2892664.86	1636478.15	-6236.13
Wind 240 deg - Ice		-32301.64	18726.75	1702939.59	2888518.32	-6584.04
Wind 270 deg - Ice		-36525.41	-31.21	17648.83	3286701.00	-4623.76
Wind 300 deg - Ice		-31419.10	-18253.24	-1631853.86	2832465.86	-1722.20
Wind 330 deg - Ice		-18289.73	-31812.78	-2853313.99	1643498.51	1612.37
Total Weight	30848.75			9290.21	-12.10	
Wind 0 deg - Service		59.77	-18219.04	-1616962.63	-4449.38	3047.20
Wind 30 deg - Service		8747.70	-15307.12	-1370762.78	-775684.76	3420.74
Wind 60 deg - Service		14924.72	-8775.67	-789488.35	-1327489.56	3014.57
Wind 90 deg - Service		17391.88	-59.77	-8101.21	-1542112.63	1918.98
Wind 120 deg - Service		15532.84	9057.76	800492.91	-1364998.44	240.66
Wind 150 deg - Service		8644.17	15247.34	1361127.52	-764310.09	-1501.76
Wind 180 deg - Service		-59.77	17447.82	1562999.89	8684.95	-2773.60
Wind 210 deg - Service		-8747.70	15307.12	1367694.68	779920.33	-3420.74
Wind 240 deg - Service		-15592.62	9161.29	811867.57	1375801.18	-3287.86
Wind 270 deg - Service		-17391.88	59.77	5033.12	1546348.21	-1918.98
Wind 300 deg - Service		-14864.94	-8672.14	-778113.69	1325157.96	-240.96
Wind 330 deg - Service		-8644.17	-15247.34	-1364195.62	768545.66	1501.76

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice

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Comb. No.	Description
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	23	232787.05	17953.48	-10095.48
	Max. H _x	10	216648.22	19206.41	-10846.44
	Max. H _z	17	-194092.05	-20112.03	11409.43
	Min. Vert	17	-194092.05	-20112.03	11409.43
	Min. H _x	17	-194092.05	-20112.03	11409.43
	Min. H _z	10	216648.22	19206.41	-10846.44
Leg B	Max. Vert	19	233989.30	-17915.12	-10257.99
	Max. H _x	25	-193795.29	20061.39	11540.00
	Max. H _z	25	-193795.29	20061.39	11540.00
	Min. Vert	25	-193795.29	20061.39	11540.00
	Min. H _x	6	215181.15	-19003.71	-10944.32
	Min. H _z	6	215181.15	-19003.71	-10944.32
Leg A	Max. Vert	15	232453.81	159.92	20671.57
	Max. H _x	11	8837.62	2520.49	634.35
	Max. H _z	2	218218.24	186.09	22215.01
	Min. Vert	21	-197199.51	-138.37	-23264.10
	Min. H _x	5	10532.85	-2519.97	782.14
	Min. H _z	21	-197199.51	-138.37	-23264.10

Tower Mast Reaction Summary

Load Combination	Vertical lb	Shear _x lb	Shear _z lb	Overturning Moment, M _x lb-ft	Overturning Moment, M _z lb-ft	Torque lb-ft

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Load Combination	Vertical	Shear _x	Shear _z	Overturning Moment, M _x	Overturning Moment, M _z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
Dead Only	30848.75	0.69	0.00	9290.33	-12.93	-7.18
Dead+Wind 0 deg - No Ice	30848.75	119.96	-36564.28	-3241390.97	-13232.13	6110.37
Dead+Wind 30 deg - No Ice	30848.75	17555.97	-30720.25	-2746000.61	-1565180.71	6876.94
Dead+Wind 60 deg - No Ice	30848.75	29952.78	-17612.12	-1576297.25	-2675579.22	6071.51
Dead+Wind 90 deg - No Ice	30848.75	34904.20	-119.95	-3896.01	-3107448.32	3877.15
Dead+Wind 120 deg - No Ice	30848.75	31173.28	18178.25	1623219.39	-2751002.02	510.69
Dead+Wind 150 deg - No Ice	30848.75	17348.22	30600.27	2751407.54	-1542285.80	-2992.60
Dead+Wind 180 deg - No Ice	30848.75	-119.96	35016.45	3157648.72	13197.75	-5560.67
Dead+Wind 210 deg - No Ice	30848.75	-17556.00	30720.23	2764626.08	1565143.16	-6876.71
Dead+Wind 240 deg - No Ice	30848.75	-31293.24	18386.03	1646111.92	2764192.28	-6621.04
Dead+Wind 270 deg - No Ice	30848.75	-34904.20	119.98	22529.98	3107429.60	-3877.87
Dead+Wind 300 deg - No Ice	30848.75	-29832.82	-17404.34	-1553417.87	2662343.72	-510.82
Dead+Wind 330 deg - No Ice	30848.75	-17348.19	-30600.28	-2732794.41	1542264.16	2993.12
Dead+Ice+Temp	50371.50	-0.00	-0.00	21704.02	-6727.60	-0.03
Dead+Wind 0 deg+Ice+Temp	50371.50	-31.21	-37506.99	-3361858.28	-2677.87	4821.96
Dead+Wind 30 deg+Ice+Temp	50371.50	18235.37	-31781.09	-2861267.35	-1656863.99	6300.95
Dead+Wind 60 deg+Ice+Temp	50371.50	31387.38	-18198.90	-1631692.86	-2853827.58	6243.71
Dead+Wind 90 deg+Ice+Temp	50371.50	36524.84	31.23	25854.72	-3314024.19	4701.49
Dead+Wind 120 deg+Ice+Temp	50371.50	32332.37	18780.52	1717123.05	-2918196.88	1845.47
Dead+Wind 150 deg+Ice+Temp	50371.50	18289.47	31812.26	2908892.49	-1663910.27	-1591.71
Dead+Wind 180 deg+Ice+Temp	50371.50	31.21	36451.83	3335774.13	-10821.49	-4464.65
Dead+Wind 210 deg+Ice+Temp	50371.50	-18235.42	31781.05	2904821.21	1643358.07	-6301.10
Dead+Wind 240 deg+Ice+Temp	50371.50	-32301.17	18726.46	1710070.41	2900628.21	-6667.42
Dead+Wind 270 deg+Ice+Temp	50371.50	-36524.84	-31.19	17707.88	3300529.21	-4701.54
Dead+Wind 300 deg+Ice+Temp	50371.50	-31418.59	-18252.97	-1638752.40	2844410.00	-1778.92
Dead+Wind 330 deg+Ice+Temp	50371.50	-18289.42	-31812.29	-2865342.39	1650419.63	1591.93
Dead+Wind 0 deg - Service	30848.75	59.77	-18218.87	-1610445.51	-6595.36	3044.82
Dead+Wind 30 deg - Service	30848.75	8747.62	-15306.97	-1363600.67	-779897.21	3423.09
Dead+Wind 60 deg - Service	30848.75	14924.57	-8775.59	-780763.40	-1333179.65	3025.20
Dead+Wind 90 deg - Service	30848.75	17391.71	-59.77	2725.01	-1548374.53	1935.95
Dead+Wind 120 deg - Service	30848.75	15532.70	9057.67	813483.70	-1370769.40	254.50
Dead+Wind 150 deg - Service	30848.75	8644.09	15247.19	1375634.58	-768489.00	-1495.19
Dead+Wind 180 deg - Service	30848.75	-59.77	17447.64	1578050.95	6573.19	-2770.73
Dead+Wind 210 deg - Service	30848.75	-8747.62	15306.96	1382219.76	779871.96	-3423.01
Dead+Wind 240 deg - Service	30848.75	-15592.47	9161.20	824888.51	1377334.09	-3299.31
Dead+Wind 270 deg - Service	30848.75	-17391.71	59.78	15892.43	1548355.98	-1936.09
Dead+Wind 300 deg - Service	30848.75	-14864.80	-8672.06	-769361.64	1326576.19	-254.46
Dead+Wind 330 deg - Service	30848.75	-8644.09	-15247.20	-1357018.49	768471.85	1495.26

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
1	-0.00	-30848.75	-0.00	-0.69	30848.75	-0.00	0.002%
2	119.96	-30848.75	-36564.61	-119.96	30848.75	36564.28	0.001%
3	17556.15	-30848.75	-30720.53	-17555.97	30848.75	30720.25	0.001%
4	29953.08	-30848.75	-17612.29	-29952.78	30848.75	17612.12	0.001%
5	34904.53	-30848.75	-119.96	-34904.20	30848.75	119.95	0.001%
6	31173.56	-30848.75	18178.41	-31173.28	30848.75	-18178.25	0.001%
7	17348.37	-30848.75	30600.57	-17348.22	30848.75	-30600.27	0.001%
8	-119.96	-30848.75	35016.80	119.96	30848.75	-35016.45	0.001%
9	-17556.15	-30848.75	30720.53	17556.00	30848.75	-30720.23	0.001%
10	-31293.52	-30848.75	18386.20	31293.24	30848.75	-18386.03	0.001%
11	-34904.53	-30848.75	119.96	34904.20	30848.75	-119.98	0.001%
12	-29833.12	-30848.75	-17404.51	29832.82	30848.75	17404.34	0.001%
13	-17348.37	-30848.75	-30600.57	17348.19	30848.75	30600.28	0.001%
14	-0.00	-50371.50	-0.00	0.00	50371.50	0.00	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
15	-31.21	-50371.50	-37507.55	31.21	50371.50	37506.99	0.001%
16	18235.68	-50371.50	-31781.57	-18235.37	50371.50	31781.09	0.001%
17	31387.89	-50371.50	-18199.19	-31387.38	50371.50	18198.90	0.001%
18	36525.41	-50371.50	31.21	-36524.84	50371.50	-31.23	0.001%
19	32332.85	-50371.50	18780.80	-32332.37	50371.50	-18780.52	0.001%
20	18289.73	-50371.50	31812.78	-18289.47	50371.50	-31812.26	0.001%
21	31.21	-50371.50	36452.43	-31.21	50371.50	-36451.83	0.001%
22	-18235.68	-50371.50	31781.57	18235.42	50371.50	-31781.05	0.001%
23	-32301.64	-50371.50	18726.75	32301.17	50371.50	-18726.46	0.001%
24	-36525.41	-50371.50	-31.21	36524.84	50371.50	31.19	0.001%
25	-31419.10	-50371.50	-18253.24	31418.59	50371.50	18252.97	0.001%
26	-18289.73	-50371.50	-31812.78	18289.42	50371.50	31812.29	0.001%
27	59.77	-30848.75	-18219.04	-59.77	30848.75	18218.87	0.000%
28	8747.70	-30848.75	-15307.12	-8747.62	30848.75	15306.97	0.000%
29	14924.72	-30848.75	-8775.67	-14924.57	30848.75	8775.59	0.000%
30	17391.88	-30848.75	-59.77	-17391.71	30848.75	59.77	0.000%
31	15532.84	-30848.75	9057.76	-15532.70	30848.75	-9057.67	0.000%
32	8644.17	-30848.75	15247.34	-8644.09	30848.75	-15247.19	0.000%
33	-59.77	-30848.75	17447.82	59.77	30848.75	-17447.64	0.000%
34	-8747.70	-30848.75	15307.12	8747.62	30848.75	-15306.96	0.000%
35	-15592.62	-30848.75	9161.29	15592.47	30848.75	-9161.20	0.000%
36	-17391.88	-30848.75	59.77	17391.71	30848.75	-59.78	0.000%
37	-14864.94	-30848.75	-8672.14	14864.80	30848.75	8672.06	0.000%
38	-8644.17	-30848.75	-15247.34	8644.09	30848.75	15247.20	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.0000001	0.00002494
2	Yes	4	0.0000001	0.00007929
3	Yes	4	0.0000001	0.00008213
4	Yes	4	0.0000001	0.00008482
5	Yes	4	0.0000001	0.00008218
6	Yes	4	0.0000001	0.00007925
7	Yes	4	0.0000001	0.00008238
8	Yes	4	0.0000001	0.00008495
9	Yes	4	0.0000001	0.00008221
10	Yes	4	0.0000001	0.00007912
11	Yes	4	0.0000001	0.00008211
12	Yes	4	0.0000001	0.00008490
13	Yes	4	0.0000001	0.00008223
14	Yes	4	0.0000001	0.00000001
15	Yes	4	0.0000001	0.00013827
16	Yes	4	0.0000001	0.00014156
17	Yes	4	0.0000001	0.00014454
18	Yes	4	0.0000001	0.00014138
19	Yes	4	0.0000001	0.00013807
20	Yes	4	0.0000001	0.00014144
21	Yes	4	0.0000001	0.00014446
22	Yes	4	0.0000001	0.00014147
23	Yes	4	0.0000001	0.00013809
24	Yes	4	0.0000001	0.00014141
25	Yes	4	0.0000001	0.00014472
26	Yes	4	0.0000001	0.00014156
27	Yes	4	0.0000001	0.00008177

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28	Yes	4	0.00000001	0.00008315
29	Yes	4	0.00000001	0.00008438
30	Yes	4	0.00000001	0.00008297
31	Yes	4	0.00000001	0.00008152
32	Yes	4	0.00000001	0.00008320
33	Yes	4	0.00000001	0.00008453
34	Yes	4	0.00000001	0.00008311
35	Yes	4	0.00000001	0.00008147
36	Yes	4	0.00000001	0.00008299
37	Yes	4	0.00000001	0.00008450
38	Yes	4	0.00000001	0.00008326

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	150 - 140	5.990	27	0.3884	0.0219
T2	140 - 120	5.131	27	0.3838	0.0189
T3	120 - 100	3.534	27	0.3182	0.0120
T4	100 - 80	2.266	27	0.2398	0.0089
T5	80 - 60	1.349	27	0.1649	0.0072
T6	60 - 40	0.734	27	0.1017	0.0052
T7	40 - 20	0.336	27	0.0585	0.0030
T8	20 - 0	0.109	27	0.0294	0.0015

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	RFS APX16DWV-16DWVS-E-A20	27	5.990	0.3884	0.0219	79756
140.00	KMW	27	5.131	0.3838	0.0189	39927
127.50	ET-X-TU-42-15-37-18-IR-RA	27	4.103	0.3484	0.0144	17171
115.00	Antel BXA-70063/6CF-2 Powerwave 7770.00	27	3.183	0.2980	0.0109	12922

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	150 - 140	12.435	19	0.8003	0.0440
T2	140 - 120	10.667	19	0.7899	0.0379
T3	120 - 100	7.383	19	0.6575	0.0241
T4	100 - 80	4.757	19	0.4998	0.0178
T5	80 - 60	2.836	19	0.3462	0.0144
T6	60 - 40	1.541	19	0.2142	0.0104
T7	40 - 20	0.703	19	0.1234	0.0060
T8	20 - 0	0.225	15	0.0620	0.0031

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Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
150.00	RFS APX16DWV-16DWVS-E-A20	19	12.435	0.8003	0.0440	37716
140.00	KMW	19	10.667	0.7899	0.0379	18936
127.50	ET-X-TU-42-15-37-18-IR-RA	19	8.553	0.7182	0.0289	8537
115.00	Antel BXA-70063/6CF-2 Powerwave 7770.00	19	6.658	0.6171	0.0218	6443

Bolt Design Data

Section No.	Elevation	Component Type	Bolt Grade	Bolt Size	Number Of Bolts	Maximum Load per Bolt	Allowable Load	Ratio Load Allowable	Allowable Ratio	Criteria	
	ft			in		lb	lb				
T1	150	Leg	A325N	0.7500	4	1401.06	19418.00	0.072	✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	1900.45	4123.34	0.461	✓	1.333	Bolt Shear
T2	140	Leg	A325N	1.0000	4	8677.36	34445.20	0.252	✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	5449.08	6117.19	0.891	✓	1.333	Member Bearing
T3	120	Leg	A325N	1.0000	6	11502.80	34508.40	0.333	✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	5497.92	6117.19	0.899	✓	1.333	Member Bearing
T4	100	Leg	A325N	1.0000	8	12485.40	34516.60	0.362	✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	5950.79	6117.19	0.973	✓	1.333	Member Bearing
T5	80	Leg	A325N	1.2500	8	15955.70	53964.50	0.296	✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	6157.59	6117.19	1.007	✓	1.333	Member Bearing
T6	60	Leg	A325N	1.2500	8	19141.20	53955.80	0.355	✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	6856.69	6117.19	1.121	✓	1.333	Member Bearing
T7	40	Leg	A325N	1.2500	8	22059.40	53939.60	0.409	✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	8080.66	9062.50	0.892	✓	1.333	Member Bearing
T8	20	Leg	F1554-36	1.5000	8	24782.90	33823.20	0.733	✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	9332.82	9062.50	1.030	✓	1.333	Member Bearing

Compression Checks

Leg Design Data (Compression)

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Section No.	Elevation ft	Size	L ft	L _a ft	Kl/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio P P _a
T1	150 - 140	P2.5x.203	10.00	0.67	8.4 K=1.00	31.707	1.7040	-7599.80	54030.80	0.141
T2	140 - 120	P2.5x.203	20.00	4.67	59.1 K=1.00	24.270	1.7040	-35055.60	41357.70	0.848
T3	120 - 100	P4x.237	20.03	4.67	37.2 K=1.00	28.107	3.1741	-74565.00	89211.40	0.836
T4	100 - 80	P5x.258	20.03	6.26	40.0 K=1.00	27.658	4.2999	-115066.00	118925.00	0.968
T5	80 - 60	P6x.28	20.03	6.26	33.5 K=1.00	28.667	5.5813	-147382.00	160002.00	0.921
T6	60 - 40	P8x.322	20.03	6.26	25.6 K=1.00	29.771	8.3993	-178035.00	250055.00	0.712
T7	40 - 20	P8x.5	20.03	9.35	39.0 K=1.00	27.821	12.7627	-200671.00	355075.00	0.565
T8	20 - 0	P8x.5	20.03	9.35	39.0 K=1.00	27.821	12.7627	-228965.00	355075.00	0.645

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _a ft	Kl/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio P P _a
T1	150 - 140	L1 1/2x1 1/2x3/16	7.40	3.42	139.8 K=1.00	7.641	0.5273	-1848.16	4029.59	0.459
T2	140 - 120	L2x2x3/16	7.60	3.51	110.3 K=1.03	11.637	0.7150	-5444.89	8320.76	0.654
T3	120 - 100	L2x2x3/16	9.00	4.28	130.5 K=1.00	8.771	0.7150	-5453.01	6271.25	0.870
T4	100 - 80	L2 1/2x2 1/2x3/16	11.48	5.51	133.7 K=1.00	8.359	0.9020	-5894.15	7540.03	0.782
T5	80 - 60	L3x3x3/16	13.20	6.33	127.4 K=1.00	9.196	1.0900	-6188.66	10023.70	0.617
T6	60 - 40	L3x3x3/16	14.99	7.14	143.7 K=1.00	7.232	1.0900	-6498.05	7883.35	0.824
T7	40 - 20	L3 1/2x3 1/2x1/4	17.27	8.35	144.4 K=1.00	7.165	1.6900	-7850.70	12109.70	0.648
T8	20 - 0	L3 1/2x3 1/2x1/4	18.99	9.21	159.2 K=1.00	5.890	1.6900	-8767.37	9954.30	0.881

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _a ft	Kl/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio P P _a
T1	150 - 140	L3x3x1/4	6.00	5.76	118.4 K=1.01	10.513	1.4400	-423.58	15138.80	0.028

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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 lb	Allow. P _a lb	Ratio P P _a
T1	150 - 140	P2.5x.203	10.00	0.67	8.4	32.400	1.7040	5604.25	55211.20	0.102
T2	140 - 120	P2.5x.203	20.00	0.67	8.4	32.400	1.7040	34709.40	55211.20	0.629
T3	120 - 100	P4x.237	20.03	0.67	5.3	32.400	3.1741	69017.00	102839.00	0.671
T4	100 - 80	P5x.258	20.03	0.63	4.0	32.400	4.2999	99883.50	139316.00	0.717
T5	80 - 60	P6x.28	20.03	0.63	3.3	32.400	5.5813	127645.00	180836.00	0.706
T6	60 - 40	P8x.322	20.03	0.63	2.6	32.400	8.3993	153130.00	272136.00	0.563
T7	40 - 20	P8x.5	20.03	0.67	2.8	32.400	12.7627	176476.00	413512.00	0.427
T8	20 - 0	P8x.5	20.03	0.67	2.8	32.400	12.7627	198263.00	413512.00	0.479



Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio P P _a
T1	150 - 140	L1 1/2x1 1/2x3/16	7.40	3.42	93.4	29.000	0.3076	1900.45	8920.90	0.213
T2	140 - 120	L2x2x3/16	7.60	3.51	71.0	29.000	0.4308	5449.08	12492.70	0.436
T3	120 - 100	L2x2x3/16	9.00	4.28	86.0	29.000	0.4308	5497.92	12492.70	0.440
T4	100 - 80	L2 1/2x2 1/2x3/16	10.45	5.01	79.3	29.000	0.5710	5950.79	16559.90	0.359
T5	80 - 60	L3x3x3/16	12.11	5.79	75.7	29.000	0.7120	6157.59	20648.90	0.298
T6	60 - 40	L3x3x3/16	14.99	7.14	92.9	29.000	0.7120	6856.69	20648.90	0.332
T7	40 - 20	L3 1/2x3 1/2x1/4	18.07	8.74	97.8	29.000	1.1034	8080.66	31999.70	0.253
T8	20 - 0	L3 1/2x3 1/2x1/4	19.81	9.61	107.4	29.000	1.1034	9332.82	31999.70	0.292



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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 lb	Allow. P _a lb	Ratio $\frac{P}{P_a}$
T1	150 - 140	L3x3x1/4	6.00	5.76	74.3	21.600	1.4400	397.35	31104.00	0.013

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P _{allow} lb	% Capacity	Pass Fail	
T1	150 - 140	Leg	P2.5x.203	2	-7599.80	72023.05	10.6	Pass	
		Diagonal	L1 1/2x1 1/2x3/16	7	-1848.16	5371.44	34.4	Pass	
							34.6 (b)		
T2	140 - 120	Top Girt	L3x3x1/4	4	-423.58	20180.02	2.1	Pass	
		Leg	P2.5x.203	20	-35055.60	55129.81	63.6	Pass	
T3	120 - 100	Diagonal	L2x2x3/16	24	-5444.89	11091.57	49.1	Pass	
									66.8 (b)
T4	100 - 80	Leg	P4x.237	47	-74565.00	118918.79	62.7	Pass	
		Diagonal	L2x2x3/16	53	-5453.01	8359.58	65.2	Pass	
							67.4 (b)		
T5	80 - 60	Leg	P5x.258	74	-115066.00	158527.02	72.6	Pass	
		Diagonal	L2 1/2x2 1/2x3/16	76	-5894.15	10050.86	58.6	Pass	
							73.0 (b)		
T6	60 - 40	Leg	P6x.28	95	-147382.00	213282.66	69.1	Pass	
		Diagonal	L3x3x3/16	97	-6188.66	13361.59	46.3	Pass	
							75.5 (b)		
T7	40 - 20	Leg	P8x.322	116	-178035.00	333323.30	53.4	Pass	
		Diagonal	L3x3x3/16	118	-6498.05	10508.51	61.8	Pass	
							84.1 (b)		
T8	20 - 0	Leg	P8x.5	137	-200671.00	473314.96	42.4	Pass	
		Diagonal	L3 1/2x3 1/2x1/4	145	-7850.70	16142.23	48.6	Pass	
							66.9 (b)		
		Leg	P8x.5	152	-228965.00	473314.96	48.4	Pass	
							55.0 (b)		
							66.1	Pass	
							77.3 (b)		
							Summary		
							Leg (T4)	72.6	Pass
							Diagonal (T6)	84.1	Pass
							Top Girt (T1)	2.1	Pass
							Bolt Checks	84.1	Pass
							RATING =	84.1	Pass

Site Name:	Norwich, CT
Client:	CDT
Project Number:	215-35024
Date:	3/18/2015

Design Base Loads (Unfactored)

Moment (Overturning) (M_u):	0.0 k-ft
Shear/Leg (V_u):	23.3 k
Compression/Leg (P_u):	234.0 k
Uplift/Leg (T_u):	197.2 k
Tower Type (GT / SST / MP):	SST
Diameter of Caisson (d):	3.5 ft
Length of Caisson (l):	4.3 ft
Caisson Height Above Ground (h):	0.5 ft
Depth Below Ground Surface to Water Table (w):	100.0 ft
Unit Weight of Concrete:	150.0 pcf
Unit Weight of Soil:	135.0 pcf
Unit Weight of Water:	62.4 pcf
Ultimate Compressive Bearing Pressure:	60000 psf
Capacity Increase (Due to Transient Loads):	1.00
Pullout Angle:	30.0 degrees
Rod Diameter:	1.00 in
Rod Ultimate Strength:	150 ksi
Rod Net Area:	0.85 in ²
Number of Rods:	5
Diameter of Cored Hole:	3.00 in
Ultimate Grout / Rock Interface Bond Strength:	250 psi
Rod Embedment Length:	78 in
Rod Exposure Above Lock Off Nut in Foundation:	60 in
Rod Embedment Circle:	26 in
Free Stress Length:	150 in
Lock Off Load:	89 k
Volume of Concrete:	41.7 ft ³
Weight of Concrete (Buoyancy Effect Considered):	6.3 k
Compressive Bearing Resistance:	577.3 k
Pullout Weight:	711.9 k
Rod Bond Strength:	918.9 k
Williams Rod Strength:	637.5 k
Maximum Lock Off Load:	95.6 k > Design Lock Off Load, OK
Nominal Uplift Capacity per Leg (Factor of Safety \geq 2.0):	318.8 k
Nominal Compressive Capacity per Leg (Factor of Safety \geq 2.0):	288.6 k
T_u :	197.2 k
P_u :	234.7 k
$T_u/T_{Allowable}$:	0.62 Result: OK
$P_u/P_{Allowable}$:	0.81 Result: OK

Lateral Capacity

Depth (ft)		Ultimate Lateral Bearing Pressure (psf)	Increment (psf/ft)	γ_{Soil} (pcf)	Cohesion (psf)	ϕ (degree)
Top	Bottom					
0.0	0.5	0.0	100.0	100	0	0
0.5	1.0	47.9	100.0	100	0	0
1.0	1.5	100.0	100.0	100	0	0
1.5	2.5	41636.6	567.5	135	10000	38
2.5	3.0	42204.1	567.5	135	10000	38
3.0	3.5	42274.6	567.5	135	10000	38
3.5	3.9	42327.6	567.5	135	10000	38
3.9	3.8	42389.4	567.5	135	10000	38

Total Lateral Resistance:	461.1 k
Inflection Point (Below Ground Surface):	3.8 ft
Design Overturning Moment At Inflection Point (M_{uip}):	100.8 k-ft
Nominal Moment Capacity per Leg (Factor of Safety ≥ 2.0):	206.9 k-ft
$M_{\text{uip}}/M_{\text{Allowable}}$:	0.49 Result: OK

Caisson Strength Capacity

Concrete Compressive Strength (f'_c):	3000 psi
Vertical Steel Rebar Size #:	6
# of Vertical Steel Rebars:	23
Vertical Steel Rebar Yield Strength (F_y):	60 ksi
Horizontal Tie / Stirrup Size #:	4
Horizontal Tie / Stirrup Spacing:	12.0 in
Horizontal Tie / Stirrup Steel Yield Strength (F_y):	40 ksi
Load Factor:	1.30
Design Moment (M_u):	131.1 k-ft
Nominal Moment Capacity ($\phi_B M_n$):	692.9 k-ft
$M_u/\phi_B M_n$:	0.19 Result: OK
Design Shear (V_u):	30.2 k
Nominal Shear Capacity ($\phi_V V_n$):	158.6 k
$V_u/\phi_V V_n$:	0.19 Result: OK
Design Tension (T_u):	256.4 k
Nominal Tension Capacity ($\phi_T T_n$):	546.5 k
$T_u/\phi_T T_n$:	0.47 Result: OK
Design Compression (P_u):	304.2 k
Nominal Compression Capacity ($\phi_P P_n$):	2145.5 k
$P_u/\phi_P P_n$:	0.14 Result: OK

RADIO FREQUENCY FCC REGULATORY COMPLIANCE
MAXIMUM PERMISSIBLE EXPOSURE (MPE) ASSESSMENT

Sprint Existing Facility

Site ID: CT23XC114

Montville / Norwich CDT

2 Hinkley Hill Road
Preston, CT 06360

March 19, 2015

EBI Project Number: 6212005671

March 19, 2015

Sprint
Attn: RF Engineering Manager
1 International Boulevard, Suite 800
Mahwah, NJ 07495

Re: Radio Frequency Maximum Permissible Exposure (MPE) Assessment for Site:
CT23XC114 - Montville / Norwich CDT

Site Total: 51.06% - MPE% in full compliance

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at **2 Hinkley Hill Road, Preston, CT**, for the purpose of determining whether the radio frequency (RF) exposure levels from the proposed Sprint equipment upgrades on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limit for the cellular band (850 MHz Band) is approximately $567 \mu\text{W}/\text{cm}^2$, and the general population exposure limit for the 1900 MHz (PCS) band is $1000 \mu\text{W}/\text{cm}^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed upgrades to the existing Sprint Wireless antenna facility located at **2 Hinkley Hill Road, Preston, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all emissions were calculated using the following assumptions:

- 1) 7 channels in the 1900 MHz Band were considered for each sector of the proposed installation.
- 2) 2 channels in the 800 MHz Band was considered for each sector of the proposed installation.
- 3) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 4) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

- 5) The antennas used in this modeling are the **KMW ET-X-TU-42-15-37-18-IR-RA**, **RFS APXVSPP18-C-A20**, The and the **RFS APXV9ERR18-C-A20**. This is based on feedback from the carrier with regards to anticipated antenna selection. The KMW - ET-X-TU-42-15-37-18-IR-RA has a 15.9 dBd gain value at its main lobe at 1900 MHz and 12.9 dBd at its main lobe for 850 MHz. The RFS APXVSPP18-C-A20 has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. The **RFS APXV9ERR18-C-A20** has a 14.9 dBd gain value at its main lobe at 1900 MHz and 11.9 dBd at its main lobe for 850 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 6) The antenna mounting height centerline for the proposed antennas is **140 feet** above ground level (AGL).
- 7) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculation were done with respect to uncontrolled / general public threshold limits

Site ID	CT23XC114 - Montville / Norwich CDT
Site Address	2 Hinkley Hill Road, Preston, CT, 06360
Site Type	Self Support Tower

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
1a	RFS	ET-X-TU-42-15-37-18-IR-RA	RRH	1900 MHz	CDMA / LTE	45	7	315	5.9	140	134	1/2 "	0.5	0	1092.22	2.19%
1a	RFS	ET-X-TU-42-15-37-18-IR-RA	RRH	850 MHz	CDMA / LTE	50	2	100	2.9	140	134	1/2 "	0.5	0	173.78	0.61%
Sector total Power Density Value:																2.80%

Sector 2

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
2a	RFS	APXVSP18-C-A20	RRH	1900 MHz	CDMA / LTE	45	7	315	5.9	140	134	1/2 "	0.5	0	1092.22	2.19%
2a	RFS	APXVSP18-C-A20	RRH	850 MHz	CDMA / LTE	50	2	100	3.4	140	134	1/2 "	0.5	0	194.98	0.69%
Sector total Power Density Value:																2.88%

Sector 3

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
3a	RFS	APXV9ERR18-C-A20	RRH	1900 MHz	CDMA / LTE	45	7	315	4.9	140	134	1/2 "	0.5	0	867.58	1.74%
3a	RFS	APXV9ERR18-C-A20	RRH	850 MHz	CDMA / LTE	50	2	100	1.9	140	134	1/2 "	0.5	0	138.04	0.49%
Sector total Power Density Value:																2.22%

Site Composite MPE %	
Carrier	MPE %
Sprint	8.63%
Metro PCS	4.34%
T-Mobile	3.78%
Verizon Wireless	29.26%
Verizon Paging	1.59%
TSR Paging	1.80%
Aquis Paging	1.66%
Total Site MPE %	51.06%

Summary

All calculations performed for this analysis yielded results that were well within the allowable limits for general public Maximum Permissible Exposure (MPE) to radio frequency energy.

The anticipated Maximum Composite contributions from the Sprint facility are **8.63% (2.80% from sector 1, 2.88% from sector 2 and 2.22% from sector 3)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **51.06%** of the allowable FCC established general public limit sampled at 6 feet above ground level. This total composite site value is based upon MPE values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.



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